DRAFT POND SITING REPORT

Florida Department of Transportation

District Five

SR 535 PD&E Study

Limits of Project: FROM US 192 TO NORTH OF WORLD CENTER DRIVE (SR 536)

Orange and Osceola Counties, Florida

Financial Management Number: 437174-2

ETDM Number: 14325

Date: May 2024

The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being, or have been, carried out by the Florida Department of Transportation (FDOT) pursuant to 23 U.S.C. § 327 and a Memorandum of Understanding dated May 26, 2022 and executed by the Federal Highway Administration and FDOT.

_____
Authorized Signature

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Print/Type Name

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Title

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Address

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Address

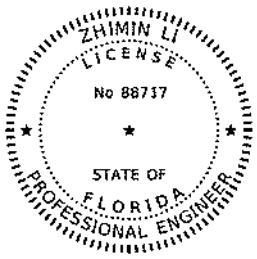
Seal

PROFESSIONAL ENGINEERING CERTIFICATE

I hereby certify that I am a registered professional engineer in the State of Florida practicing with BCC Engineering LLC, a corporation, authorized to operate as an engineering business by the State of Florida, and that I have reviewed or approved the evaluation, findings, opinions, conclusions, or technical advice hereby reported for:

Project:	SR 535 PD&E from US 192 to North of World Center Drive
FM Number:	437174-2
Location:	Osceola and Orange County, Florida
Client:	FDOT District Five

This PD&E Pond Siting Report includes a summary of data collection efforts and engineering analysis for this SR 535 project. I acknowledge that the procedures and references used to develop the results contained in this report are standard to the professional practice of transportation engineering and planning as applied through professional judgment and experience.



Name: Zhimin Li, P.E.
P.E. Number 88717
Date May 20, 2024

This item has been electronically signed and sealed by Zhimin Li, P.E. on _____ using a digital signature. Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

Executive Summary

SR 535 is a four-lane divided minor arterial facility located within unincorporated Osceola and Orange Counties in Central Florida. SR 535 is known as Vineland Road in Osceola County and Kissimmee-Vineland Road in Orange County. The project limits extend approximately 2.35 miles from the US 192 intersection in Osceola County to just north of the SR 536 intersection in Orange County. The purpose of the project is to accommodate future projected traffic demand and improve safety. The need for the project is based on addressing future transportation demand and safety concerns.

The project is within the jurisdiction of MetroPlan Orlando. The MetroPlan Orlando 2045 Cost Feasible Plan (CFP) includes widening of SR 535 from US 192 in Osceola County to SR 536 in Orange County in years 2031 to 2035 (construction). The SR 535 improvements are funded for design in the Florida Department of Transportation (FDOT) 2024-2029 Five-Year Work Program and MetroPlan Orlando 2023-2028 Transportation Improvement Program (TIP). This project was screened in the Efficient Transportation Decision Making (ETDM) system as ETDM #14325.

'No-Build' and Construction ('Build') Alternatives were evaluated during the study. The build alternative consists of widening SR 535 from four to six lanes. The study evaluated a range of typical section and intersection alternatives including inside widening and outside widening of the existing roadway. The build alternative analysis included the evaluation of open and closed stormwater drainage conveyance systems together with the evaluation of pond site locations. The study also evaluated Transportation System Management and Operations (TSMO) and multimodal improvements.

The Preferred Alternative consists of inside widening from four to six lanes with a shared use path along both sides and intersection improvements. The Preferred Alternative has a design speed of 45-miles per hour (mph) and consists of full reconstruction with the additional lanes constructed towards the median. The typical section consists of three (3) 11-foot travel lanes in each direction separated by a 32-foot to 47-foot median with a 14-foot shared use path on the west side and a 12-foot shared use path on the east side of the roadway. The Preferred Alternative will be constructed within the existing right-of-way width of 200-feet to 224-feet. Swales with ditch bottom inlets in conjunction with flume inlets at the curb line will be provided for drainage conveyance.

The Preferred Alternative will also implement intersection improvements including the following innovative intersection concepts.

- Polynesian Isle Boulevard Partial Median U-Turn (PMUT): Implementation of the PMUT involves the removal of northbound and southbound direct left turn movements from SR 535 to Polynesian Isle Boulevard and the addition of signalized U-turns at the existing median openings located just north and south of the intersection along SR 535 to accommodate vehicles wishing to travel east or west on Polynesian Isle Boulevard.
- International Drive Partial Displaced Left Turn (PDLT). Implementation of the PDLT involves the removal of direct eastbound and westbound left turns from Internation Drive at SR 535 with the displaced left turns installed on both legs International Drive. The

northbound and southbound left turn movements for SR 535 continue to take place at the main intersection.

- SR 536 (World Center Drive) Partial Displaced Left Turn (PDLT). Implementation of the PDLT involves the removal and replacement of direct northbound and southbound left turns from SR 535 at SR 536 with the displaced left turns installed on both legs of SR 535. The eastbound and westbound left turn movements for the SR 536/World Center Drive continue to take place at the main intersection.

This Pond Siting Report (PSR) has been prepared to identify stormwater management requirements and evaluate potential sites for stormwater management facilities to meet applicable water quality treatment and attenuation requirements. This analysis is preliminary and is used as an engineering tool to identify potential pond sites utilizing an "alternatives" methodology. The pond site locations are screened using preliminary information based upon many assumptions and judgments. The calculations presented in this report are preliminary and help in estimating the preliminary size of the stormwater ponds for each basin. The pond sizes, the limits of the basins associated with each pond alternative shown on the figures, tables, and included in the documentation are subject to change throughout the preliminary engineering and project design phases. The vertical datum for this analysis is the North American Vertical Datum of 1988 (NAVD 88), and datum conversions for data used in the analysis is referenced in this report.

Where feasible, stormwater management facilities have been recommended within existing FDOT or County right-of-way. Where the siting of a stormwater management facility will require additional right-of-way, a pond site evaluation matrix has been prepared to document and compare alternative sites with respect to numerous factors influencing site selection including: right-of-way requirements, easement requirements, costs for a given pond site, floodplain impacts, contamination and hazardous materials, potential utility impacts, threatened endangered & significant species, cultural resources, wetland impacts, construction and maintenance considerations, and impacts to other relevant features.

There are 4 basins in the existing and proposed condition (Basins 1-4), and all basins drain to permitted stormwater systems in the existing condition. Basins 1-3 collect runoff from state roads, including SR 530 (US 192), SR 535 and SR 536, while Basin 4 collects runoff from International Drive, an Orange County roadway. The preferred alternative for each basin is provided in **Table ES-1** and anticipated right of way needs (excluding public right-of-way used for the alternatives) associated with the preferred alternatives are provided in **Table ES-2**. Existing stormwater ponds within Basins 1 and 4 have sufficient capacity to provide the required water quality treatment and attenuation in the ponds currently serving these basins, so no additional right-of-way is required based on the calculations contained herein.

Table ES-1: Preferred Pond Alternatives

Basin	Preferred Alternative	Ponds	Type	Remarks
1	1A	Exist. Pond 1-1	Wet	Exist. pond sufficient. Reduced drainage area (30.94 ac to 29.16 ac) from exist. to proposed conditions. Increased freeboard in exist. pond.
2	2A	Exist. Pond 2-1 and Pond 2-2	Wet	Interconnected ponds to provide required water quality treatment and attenuation. Utilize Exist. Pond 2-1 outfall to Shingle Creek.
3	3A	Exist. Pond 3-1 and Pond 3-2	Wet	Interconnected ponds to provide required water quality treatment and attenuation. Utilize Exist. Pond 3-1 and Pond 3-2 outfalls to Shingle Creek.
4	4A	Exist. Pond 4-1	Wet	Exist. pond sufficient. Reduced drainage area (8.70 ac to 7.63 ac) from exist. to proposed conditions. Increased freeboard in exist. pond.

Table ES-2: Right-of-Way Needs for Preferred Alternatives

Basin	Preferred Alternative	Ponds	Estimated R/W Req'd.	Remarks
1	1A	Exist. Pond 1-1	0.0	Pond within exist. R/W
2	2A	Exist. Pond 2-1 and Pond 2-2	4.3	Exist. Pond 2-1 within exist. R/W. Estimated R/W needs for Pond 2-2 provided (excluding public R/W used for pond).
3	3A	Exist. Pond 3-1 and Pond 3-2	3.5	Exist. Pond 3-1 within exist. R/W. Estimated R/W needs for Pond 3-2 provided (excluding public R/W used for pond).
4	4A	Exist. Pond 4-1	0.0	Pond within exist. R/W

A summary of the preferred alternatives is provided below:

- Basin 1: Alternative 1A is the preferred alternative for Basin 1. Alternative 1A consists of an existing wet detention pond (identified as Exist. Pond 1-1) within FDOT right-of-way to provide the required water quality treatment and attenuation volumes.

- Basin 2: Alternative 2A is the preferred alternative for Basin 2. Alternative 2A consists of 2 ponds, one existing wet detention pond within existing FDOT right-of-way (identified as Exist. Pond 2-1) interconnected with a second wet detention pond (identified as Pond 2-

2) to provide the required water quality treatment and attenuation volumes. Since there is insufficient area within the existing FDOT right-of-way to provide a stormwater management alternative to meet water quality treatment and attenuation requirements, Pond Alternative 2A will require acquisition of right-of-way.

- Basin 3: Alternative 3A is the preferred alternative for Basin 3. Alternative 3A consists of 2 ponds, one existing wet detention pond within existing FDOT right-of-way (identified as Exist. Pond 3-1) interconnected with a second wet detention pond (identified as Pond 3-2) to provide the required water quality treatment and attenuation volumes. Since there is insufficient area within the existing FDOT right-of-way to provide a stormwater management alternative to meet water quality treatment and attenuation requirements, Pond Alternative 3A will require acquisition of right-of-way.

- Basin 4: Alternative 4A is the preferred alternative for Basin 4. Alternative 4A consists of an existing wet detention pond (identified as Exist. Pond 4-1) within existing right-of-way and easement to provide the required water quality treatment and attenuation volumes.

Project improvements will impact the 100-year floodplain as a result of longitudinal and transverse impacts. Five floodplain compensation (FPC) sites have been developed as part of this analysis. All FPC sites analyzed will provide the requisite storage to offset floodplain impacts. As part of this analysis a comparison matrix was developed to determine which location would be the preferred alternative. Based on this analysis, FPC Site 1 is the recommended alternative. Please reference the Location Hydraulics Report for additional information on floodplain impacts and compensation for the preferred alternative improvements.

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1.0 Introduction

In November 2017, the Florida Department of Transportation (FDOT) District Five (D-5) completed a Corridor Planning Study (CPS) to evaluate State Road 535 (SR 535) from US 192 in Osceola County to I-4 in Orange County. The purpose of the CPS was to identify specific problem areas along the corridor and evaluate multimodal alternatives that will be carried forward into future phases of project development in order to optimize the operations of the existing facility. Improvements identified as a result of the CPS included widening from four to six lanes, TSM&O and multimodal improvements, and intersection improvements (including innovative intersection designs).

FDOT D-5 is conducting a Project Development and Environment (PD&E) Study to evaluate the recommendations from the CPS including the widening of SR 535 from four to six lanes from US 192 in Osceola County to just north of World Center Drive (SR 536) in Orange County, approximately 2.35 miles. The Preliminary Engineering Report (PER) documents the project's purpose and need, the alternatives developed, the process of selecting the preferred alternative, and presents the preliminary design analysis for the preferred alternative.

This Pond Siting Report (PSR) was prepared as a component of the PD&E Study in accordance with the Florida Department of Transportation (FDOT) PD&E Manual (July 1, 2023). This report will preliminarily analyze the appropriate location and size of stormwater ponds to account for the increase of stormwater runoff due to the proposed roadway improvements.

The purpose of this pond siting report is to:

- Size ponds to provide the required water quality treatment and runoff attenuation
- Evaluate alternatives for stormwater management ponds
- Identify stormwater pond alternative locations
- Analyze impacts to adjacent properties
- Analyze impacts to wetlands and other environmental resources
- Identify opportunities for joint use locations
- Identify right-of-way needs
- Recommend preferred pond sites

Evaluation of floodplain impacts and alternative floodplain compensation (FPC) site analysis is provided in the Location Hydraulics Report (LHR) under separate cover.

The horizontal datum for the project is Florida State Plane (NAD 1983), East Zone. The vertical datum for the project is the North American Vertical Datum of 1988 (NAVD 88), and the elevation difference between NAVD 88 and NGVD 29 is -0.90 feet (i.e., the NAVD 88 elevation is 0.90 feet lower than the corresponding NGVD 29 elevation).

1.1 Project Description

SR 535 is a four-lane divided minor arterial facility located within unincorporated Osceola and Orange Counties in Central Florida. SR 535 is known as Vineland Road in Osceola

County and Kissimmee-Vineland Road in Orange County. The project limits extend approximately 2.35 miles from the US 192 intersection in Osceola County to just north of the SR 536 intersection in Orange County, as shown in **Figure 1-1**.

Figure 1-1: Project Location

1.2 Purpose & Need

The purpose of the project is to accommodate future projected traffic demand and improve safety. The need for the project is based on addressing future transportation demand and safety concerns.

1.2.1 Transportation Demand

In the existing condition, the section of SR 535 from US 192 to Kyngs Heath Road operates at a Level of Service (LOS) D with an Annual Average Daily Traffic (AADT) of 28,300; the section from Kyngs Heath Road to Poinciana Boulevard operates at LOS D with an AADT of 26,900; the section from Poinciana Boulevard to Polynesian Isle Boulevard operates at LOS D with an AADT of 46,800; the section from Polynesian Isle Boulevard to World Center Drive operates at LOS D with an AADT of 44,300.

In the future year (2045) No-Build condition, the section of SR 535 from US 192 and Kyngs Heath Road is projected to operate at LOS F with an AADT of 42,000; the section from Kyngs Heath Road to Poinciana Boulevard is projected to operate at LOS E with an AADT of 40,000; the section from Poinciana Boulevard to Polynesian Isle Boulevard is projected to operate at LOS F with an AADT of 69,000; the section from Polynesian Isle Boulevard to World Center Drive is projected to operate at LOS F with an AADT of 66,000.

1.2.2 Safety

A total of 981 crashes were reported on SR 535 from US 192 to Lake Bryan Beach Boulevard in the five-year period from 2014 through 2018. Of those reported crashes, 463 (47%) resulted in injury and four (4) resulted in a fatality. The most frequent crash type was rear end with 605 (62%) total crashes, indicating congestion. Sideswipe crashes were the second highest with 106 (11%), followed by left-turn with 93 (9%) total crashes. Of the 981 crashes, 602 (61%) crashes occurred during daylight conditions. The crash rates along this segment of SR 535 exceed the FDOT statewide **averages for similar facilities.**

1.3 Project Status

The project is within the jurisdiction of MetroPlan Orlando. The MetroPlan Orlando 2045 Cost Feasible Plan (CFP) includes widening of SR 535 from US 192 in Osceola County to SR 536 in Orange County in years 2031 to 2035 (construction). The SR 535 improvements are funded for design in the Florida Department of Transportation (FDOT) 2024-2029 Five-Year Work Program and MetroPlan Orlando 2023-2028 Transportation Improvement Program (TIP). This project was screened in the Efficient Transportation Decision Making (ETDM) system as ETDM #14325.

1.4 Commitments

This section will be included as part of the Final Preliminary Engineering Report (PER).

1.5 Alternatives Analysis Summary

The following alternatives were evaluated during the study:

- 'No-Build' Alternative
- Construction ('Build') Alternative
  The build alternative consists of widening SR 535 from four to six lanes. The study evaluated a range of typical section and intersection alternatives including inside widening and outside widening of the existing roadway. The build alternative analysis included the evaluation of open and closed stormwater drainage conveyance systems together with the evaluation of pond site locations. The study

also evaluated Transportation System Management and Operations (TSMO) and multimodal improvements.

1.6 Description of Preferred Alternative

The Preferred Alternative consists of inside widening from four to six lanes with a shared use path along both sides and intersection improvements. The preferred alternative is shown on **Figure 1-2**.

The Preferred Alternative has a design speed of 45-miles per hour (mph) and consists of full reconstruction with the additional lanes constructed towards the median. The typical section consists of three (3) 11-foot travel lanes in each direction separated by a 32-foot to 47-foot median with a 14-foot shared use path on the west side and a 12-foot shared use path on the east side of the roadway. The Preferred Alternative will be constructed within the existing right-of-way width of 200-feet to 224-feet. Swales with ditch bottom inlets in conjunction with flume inlets at the curb line will be provided for drainage conveyance. Stormwater attenuation and floodplain compensation will be provided.

Figure 1-2: Preferred Typical Section

1.6.1 Intersection Improvements

The Preferred Alternative will also implement intersection improvements including the following innovative intersection concepts.

- Polynesian Isle Boulevard Partial Median U-Turn (PMUT): Implementation of the PMUT involves the removal of northbound and southbound direct left turn movements from SR 535 to Polynesian Isle Boulevard and the addition of signalized U-turns at the existing median openings located just north and south of the intersection along SR 535 to accommodate vehicles wishing to travel east or west on Polynesian Isle Boulevard.

- International Drive Partial Displaced Left Turn (PDLT). Implementation of the PDLT involves the removal of direct eastbound and westbound left turns from Internation Drive at SR 535 with the displaced left turns installed on both legs International Drive. The northbound and southbound left turn movements for SR 535 continue to take place at the main intersection.
- SR 536 (World Center Drive) Partial Displaced Left Turn (PDLT). Implementation of the PDLT involves the removal and replacement of direct northbound and southbound left turns from SR 535 at SR 536 with the displaced left turns installed on both legs of SR 535. The eastbound and westbound left turn movements for the SR 536/World Center Drive continue to take place at the main intersection.

1.6.2 Right-of-Way and Construction Cost

SR 535 has an existing right-of-way (R/W) of 224 feet which is ample R/W to accommodate the Preferred Alternative. Some R/W impacts will be required to accommodate intersection improvements at the International Drive and World Center Drive (SR 536) intersections and for offsite ponds. See **Table 1-1** for the cost estimate.

Table 1-1: Cost Estimate

	Cost
Construction	$76.5M
R/W	$38.1M
Utility Relocation	$7M
Sub Total	$121.6M
Design (15%)	$11.5M
CEI (10%)	$7.7M
Total Estimated Project Cost	$140.8M

2.0 Data Collection

In order to locate the existing stormwater facilities, determine existing drainage patterns within the limits of the corridor, potential site availability, and design criteria and requirements, the following sources were used:

- FDOT Drainage Manual, 2024
- FDOT Drainage Design Guide, 2024
- SFWMD Environmental Resource Permit Applicant's Handbook, Volumes I (2020) and II (2016)
- Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps, Panel Nos. 12095C0605F,12097C0055G, 12095C0585F
- Osceola and Orange County Property Appraiser Websites
- SFWMD Environmental Resource Permit (ERP) Research
- USDA Natural Resources Conservation Service (NRCS) Web Soil Survey
- NOAA LiDAR Data
- FDOT Aerial Maps
- USGS Topographic Map Quadrangles
- FDOT Straight Line Diagrams
- Geotechnical Investigations

3.0 Design Criteria

The design of the stormwater management facilities for the project is governed by the rules set forth by the South Florida Water Management District (SFWMD), FDOT, Orange and Osceola Counties. Water quality treatment and attenuation requirements will comply with the guidelines as defined in Chapter 62-330.010 of the Florida Administration Code (F.A.C.), the SFWMD Environmental Resource Permit Applicant's Handbooks, and the FDOT Drainage Manual as well as the pre-application meeting held with SFWMD on 11/16/22. SFWMD pre-application meeting minutes can be found in **Appendix I**.

3.1 Water Quality Treatment Criteria

SR 535 within the project limits is located within the Shingle Creek basin (WBID 3169A) and Lake Okeechobee Basin Management Action Plan (BMAP) and does not directly discharge to an Outstanding Water (OFW). It should be noted that north of SR 417, SR 535 is located on the divide between WBID 3169A and WBID 3169B (Reedy Creek Basin), and the historical discharge from SR 535 is to WBID 3169A based on a review of permit documentation. Retention, detention, or both retention and detention in the overall system, including swales, lakes, canals, greenways, etc., shall be provided for one of the three following criteria or equivalent combinations thereof: (SFWMD Applicant's Handbook, Vol. II, Sec. 4.2.1)

- Wet detention volume shall be provided for the first inch of runoff from the developed project, or the total runoff of 2.5 inches times the impervious area, whichever is greater.
- Dry detention volume shall be provided equal to 75 percent of the above amounts computed for wet detention.
- Retention volume shall be provided equal to 50 percent of the above amounts computed for wet detention.
- Impervious areas subject to non-vehicular traffic (e.g., sidewalk and shared use paths) do not require water quality treatment and can be separated out from the calculation of impervious area. For the purposes of the pond siting analysis in the PD&E, the shared use paths have been included in the calculation of impervious area to provide a conservative estimate of water quality volume required. It is recommended that the impervious area acreage be refined during the final design phase of the project to provide a more accurate estimate of required water quality treatment volume.
- Based on the pre-application meeting with SFWMD, an additional 50% of water quality treatment volume should be provided wherever feasible due to the fact that the project is located within the Lake Okeechobee BMAP. If not feasible, SFWMD will require a description of the site constraints or reasons that the additional treatment volume cannot be provided.
- Net improvement for nutrient loading requirements: the project lies within the Shingle Creek Basin, which is impaired for nutrients (macrophytes). SFWMD

stated that nutrient loading calculations are not required for discharges to Shingle Creek due to this type of nutrient impairment, but that net improvement for total phosphorus (TP) is required because the project lies within the Lake Okeechobee BMAP. SFWMD pre-application meeting minutes can be found in **Appendix I**.

3.2 Water Quantity (Attenuation) Criteria

3.2.1 SFWMD Criteria

For open basins, the post-development peak rate of discharge must not exceed the pre- developed peak rate of discharge for the 25-year/72-hour event. For closed basins, the post-development peak discharge volume must not exceed the pre-development peak discharge rate and volume during the 100-year, 72-hour storm. (SFWMD Applicant's Handbook, Vol. II, Sec. 3.2 and 3.3).

3.2.2 FDOT Criteria

The design of stormwater management systems for Department projects will comply with the water quality, rate, and quantity requirements of Section 334.044(15), Florida Statues (F.S.), Chapter 14-86, Florida Administrative Code (F.A.C.), Rules of the Department of Transportation, only in basins closed during storms up to and including the 100-year storm event, or areas subject to historical flooding.

3.2.3 Osceola County and Orange County Criteria

Based on a review of permit documentation, one existing pond evaluated in this report utilizes the Osceola County 10-year/72-hour and 100-year/72-hour event. Several existing ponds evaluated in this report utilize the Orange County 25-year/24-hour event. Please see the pond calculations for the design storm utilized to determine required attenuation volumes.

3.3 Anticipated Permits

A summary of the anticipated permits required is provided below:

- An Individual Environmental Resource Permit (ERP) will be required from the SFWMD. SFWMD indicated that a new ERP would be issued for the proposed project improvements that references the previous permits in the pre-application meeting.
- A Water Use Permit for dewatering may be required from the SFWMD.
- A NPDES permit will be required from the Florida Department of Environmental Protection (FDEP), as the project will result in 1 acre or more of disturbed area.
- A 404 permit may be required from the FDEP. This will be determined during the design phase of this project.

4.0 Environmental Look Around

Discussion of potential regional stormwater alternatives was discussed as part of the Community Advisory Group (CAG) meetings held with representatives from Osceola and Orange Counties. The following regional alternatives were evaluated as part of the Environmental Look Around (ELA) process:

- Expansion of the existing stormwater pond in the SR 535/Osceola Parkway interchange infield area: Osceola County representatives stated that the infield area was being reserved to accommodate future improvements to Osceola Parkway, so this alternative was dropped from further consideration.

- Discharge to the existing rapid infiltration basins (RIBs) owned and operated by Orange County Utilities: Orange County representatives stated that there is no additional capacity in the RIBs located east of SR 535 and south of SR 536 due to ongoing development in the area, so this alternative was dropped from further consideration.

The following potential joint-use stormwater opportunities were also evaluated as noted below:

- Potential joint-use stormwater facility or floodplain compensation site at the future extension of International Drive east of SR 535: While this option may be a viable option to consider during final design, the International Drive extension and associated improvements has not developed far enough at the current time to identify potential joint-use opportunities. There are proposed stormwater pond and floodplain compensation site alternatives located adjacent to the future International Drive extension, so opportunities may exist during final design for a joint-use facility.

- Potential joint-use stormwater facility within the Storey Lake development: the Storey Lake development has an existing stormwater management system located east of SR 535 and south of Osceola Parkway. This alternative was included in this analysis as a stormwater alternative for Basin 2.

5.0 Existing Conditions

5.1 Topography

The topography along the project corridor generally slopes from north to south, with elevations ranging from 101 feet NAVD at the SR 535/SR 536 intersection to 87 feet NAVD at the SR 535/SR 530 intersection. Based on a review of existing plans, the longitudinal grade of SR 535 ranges from approximately 0.28% - 0.30% between US 192 and Kyngs Heath Rd (State Project No. (SPN) 92090-3543), from approximately 0.10% - 0.26% (from SPN 92506-3602) and approximately 0.03% in the vicinity of the SR 535/SR 536 intersection (SPN 75560-3610). Excerpts from these plans are provided in **Appendix J**.

5.2 Soils and Geotechnical Investigations

Based on the USDA Natural Resources Conservation Service (NRCS) Web Soil Survey, soils in the area are predominantly fine sands with a groundwater depth of approximately 1 foot below the ground surface. The soils encountered along the project limits are mostly hydrologic soil group (HSG) A/D and B/D soils. For dual classification soils, the first letter represents the drained condition and the second letter represents the undrained condition. A summary of the soil types found in the vicinity of the project are provided in **Appendix H**.

The hydrologic soil groups are defined as follows:

- Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.
- Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained, or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.
- Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.
- Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Please see **Appendix H** for NRCS Soil Survey information as well as preliminary geotechnical investigation at potential pond and floodplain compensation site locations.

5.3 Contamination Screening

A total of 19 sites of potential contamination risk were identified along the project corridor in the Draft Contamination Screening Evaluation (CSER) Report for this PD&E Study. The 19 sites included 2 high-risk sites, 8 medium-risk sites and 9 low-risk sites. Please see the excerpt from the Draft CSER in **Appendix F** for further information.

5.4 Environmental Characteristics

5.4.1 Land Use Data

The project corridor is a mixture of residential, commercial, upland and wetland forest and wetlands. The widening of SR 535 does not alter the existing or future land uses in the area. Please see the Land Use Maps in **Appendix A**.

5.4.2 Cultural Features

Cultural features preserve and enhance the cultural nature of a community and include parks, schools, churches and other religious institutions. Also included are historic sites, archaeologically significant sites and resources, and potential historic districts. Based on a review of the project corridor, there are no sites within the Area of Probable Effect (APE) eligible for the National Register of Historic Places (NRHP) and no archeological sites within the APE. Please see the excerpt from the Cultural Resources Assessment Survey (CRAS) in **Appendix E** for further information.

5.4.3 Natural and Biological Features

The proposed project has potential to involve several State and/or Federally listed protected wildlife species. The project corridor was evaluated for the presence of potentially occurring species. These species and their anticipated involvement are identified in the Natural Resources Evaluation Report (NRE). The preferred alternative has “no effect”, “no effect anticipated”, “not likely to affect”, or “no adverse effect anticipated” on listed or protected species.

The potential presence of wetlands and other surface waters (OSW) were identified on the west side of SR 535 in Orange County through a desktop review of the FDOT Environmental Screening Tool (EST). In addition, Orange County and SFWMD conservation easements have also been identified in this area.

Please see the excerpt from the NRE in **Appendix G** for further information.

5.5 Cross Drains

Five cross drains have been identified under SR 535 and SR 536 within the project limits. A summary of the cross drain locations is provided in **Table 5-1**.

Table 5-1: Cross Drain Summary

Cross Drain	Road	Station	Location (Milepost)	Basin	Cross Drain Size and Type
CD-1	SR 535	1521+30	0.600	2	2-30” RCP
CD-2	SR 535	1544+00	1.037	2	2-24” RCP
CD-3	SR 535	1570+00	0.382	2 (offsite)	1-24” RCP
CD-4	SR 536	1599+00 LT	1.694	3	1-3’x8’ CBC
CD-5	SR 536	1609+50 LT	1.920	3	1-36” RCP

5.6 Existing Drainage Conditions

SR 535 is a 4-lane roadway through the project limits, comprised of a divided urban section from US 192 to Kyngs Heath Rd, and a divided rural section from Kyngs Heath Rd to north of SR 536. Four basins have been identified in the existing condition based on existing drainage divides and drainage features. All basins are classified as open basins which discharge to Shingle Creek.

The SR 535 corridor within Osceola County is highly developed, while the land use along SR535 within Orange County is currently less developed. Undeveloped areas west of SR 535 in Orange County consist primarily of wetlands, as well as Orange County and SFWMD conservation easements. There is a Florida Gas Transmission (FGT) line located on the east side of SR 535 between the Osceola Parkway interchange and the SR 535/SR 536 intersection.

All roadways within the project limits (SR 535, SR 536 and International Drive) as well as adjacent developments have permitted stormwater treatment systems. A list of the relevant Environmental Resource Permits within the project corridor is provided in **Table 5-2** and relevant permit excerpts have been included in **Appendix J**. Based on a review of the existing plans, offsite runoff is generally separated from the on-site runoff with the exception of SR 530 (US 192) in Basin 1.

Table 5-2: Relevant Environmental Resource Permits

Application No.	Permit No.	Date Issued	Description
X000008640	85-00118-S	10/10/85	SR 535 Widening from US 192 to Orange County line
901113-1	48-00592-S	11/3/90	SR 535 from South of SR 536 to I-4
930909-1	49-00653-S	4/14/94	Osceola Parkway
971113-1	49-00883-P	3/12/98	SR 530 (US 192) from Bonnet Creek to SR 535
970147-8	48-00866-S	11/12/98	Greene Property Phase II (International Drive)
150611-22	49-00908-P	8/3/15	Orchid Bay/Storey Lake
160208-15	49-00908-P	3/11/16	Orchid Bay (Storey Lake)
160428-7	49-00908-P	6/7/16	Storey Lake Blvd Phases 2 & 3

5.7 Existing Drainage Basins

A summary of the existing project basins and limits are provided in **Table 5-3**.

Table 5-3: Summary of Existing Project Basins

Basin	Road	From	To	Outfall	Basin Area* (ac)
1	SR 535	1490+00	1499+31	Exist. Pond 1-1	27.60
2	SR 535	1499+31	1595+75	Exist. Pond 2-1	56.13
3	SR 535	1595+75	1642+20	Exist. Pond 3-1 & Exist. Pond 3-2	27.17
4	International Dr	West of SR 535	End Construction	Exist. Pond 4-1 & Exist. Pond 4-2	7.96

* Basin areas exclude section of basins which cover existing ponds

5.7.1 Basin 1

Basin 1 is located on SR 535 between SR 530 (US 192) and Kyngs Heath Rd, as well as a portion of SR 530 to the east and west of the SR 535 intersection. The existing roadway and stormwater system within Basin 1 was constructed as part of SPN 92090-3543. Runoff from the roadway along SR 535 is drained by closed storm drain systems which convey runoff to an existing wet detention pond (identified as Pond WRA-4 in SPN 92090-3543) located on the south side of SR 530 and west of SR 535. The wet detention pond receives runoff from on-site area along SR 530 and SR 535, as well as offsite areas, and discharges east to Lake Cecile and to Shingle Creek.

The pond is permitted by SFWMD as part of Permit No. 49-00883-P. Based on a review of the permit documents, the SFWMD 25yr-72hr design high water (DHW) elevation within the existing pond is above the inside berm elevation. See **Appendix J** for existing plans and calculations for the existing stormwater system.

5.7.2 Basin 2

Basin 2 is located on SR 535 between Kyngs Heath Rd and SR 536. The existing roadway and stormwater system within Basin 2 was constructed as part of SPN 75560-3609 and 75560-3610. Runoff from the roadway along SR 535 is drained by roadside ditches, side drains and cross drains to convey runoff to an existing wet detention pond (identified as Pond E in Osceola Parkway plans by Osceola County [Job No. 93503]). The existing wet detention pond is located on the east side of SR 535 within the Osceola Parkway interchange infield area, and is bounded by Osceola Parkway on the south side and a FGT line on the north side. The wet detention pond receives runoff from on-site area along SR 535, and discharges east along Osceola Parkway to unnamed wetlands associated with Shingle Creek.

The pond was originally constructed as a linear ditch as part of SPN 75560-3609 and later modified by Osceola County to a wet detention pond as part of the Osceola Parkway construction. The current pond is permitted by SFWMD as part of Permit No. 49-00653-S. See **Appendix J** for existing plans and calculations for the existing stormwater system.

5.7.3 Basin 3

Basin 3 is located on SR 535 between SR 536 and the northern project limits, and includes the SR 535/SR 536 intersection and a portion of SR 536. The existing roadway and stormwater system within Basin 3 was constructed as part of SPN 75560-3610. Runoff from the roadway along SR 535 and SR 536 is drained by roadside ditches, side drains and cross drains to convey runoff to existing ponds located on both sides of SR 536 west of SR 535. The existing stormwater system consists of a wet detention pond in the northwest quadrant of the SR 535/SR 536 intersection interconnected with a dry detention pond in the southwest quadrant of the SR 535/SR 536 intersection (neither pond had specific pond names in SPN 75560-3610). The

wet detention pond receives runoff from on-site area along SR 535 and SR 536, and the dry detention pond receives runoff from SR 536. There are multiple outfalls from both the wet and dry detention ponds, but the primary discharge to towards SR 535 and to Shingle Creek.

The ponds are permitted by SFWMD as part of Permit No. 48-00592-S. See **Appendix J** for existing plans and calculations for the existing stormwater system.

5.7.4 Basin 4

Basin 4 is located on International Drive west of SR 535. This section of International Drive and the associated stormwater system within Basin 4 was constructed as part of developer improvements for the Greene property. Runoff from the roadway along International Drive is drained by closed storm drain systems which convey runoff to an existing wet detention pond (identified as Pond 5 in the permit plans for Application No. 990604-8) located on the south side of International Drive and west of SR 535, and a dry detention pond (identified as Pond 6 in the permit plans for Application No. 990604-8) in the northwest quadrant of the SR 535/International Drive intersection. The ponds receives runoff from on-site area along International Drive, and discharge to unnamed wetlands that drain to Shingle Creek.

Based on a review of the permit documents, the Orange County 25yr-24hr design high water (DHW) elevation within the existing pond is above the inside berm elevation. The pond is permitted by SFWMD as part of Permit No. 48-00866-S. See **Appendix J** for existing plans and calculations for the existing stormwater system.

6.0 Proposed Conditions

In general, basin limits and discharge points in the proposed condition will remain the same as the existing condition except where noted in the proposed basin descriptions. Existing stormwater ponds have been evaluated, and proposed stormwater ponds have been sized to provide the required water quality treatment, attenuation and nutrient load reduction set forth by the SFWMD and FDOT.

6.1 Proposed Drainage Typical Section

The preferred typical section for SR 535 is a 6-lane divided urban roadway with shared use paths on both sides of the roadway. A combination of closed storm drain system and shallow roadside ditches located between the proposed curb and gutter and shared use paths are proposed on both sides of the roadway as shown in **Figure 6-1**.

Figure 6-1: Preferred Typical Section

The primary purpose of the shallow ditches is not conveyance, as the proposed ditch footprints do not have adequate capacity to convey runoff to the proposed stormwater ponds and outfalls. The width available for the shallow ditches is generally limited by right-of-way and utility constraints. Flume inlets or curb openings will convey runoff from the roadway to the shallow ditches, and a storm drain system composed of DBIs and pipe will convey runoff to the outfall.

The shallow ditches will assist in meeting stormwater criteria, and also may assist with the phasing of the drainage system construction as noted below.

- Net improvement for nutrient loading for total phosphorus is required due to the project's location within the Lake Okeechobee BMAP. Given that the conversion from a rural typical section in the existing condition to an urban typical section in the proposed condition, there is a significant increase in the directly connected imperious area (DCIA). This increase in DCIA also results in higher nutrient loads in the proposed condition. Utilizing a proposed drainage system with flume inlets and

shallow roadside ditches where feasible will convert the proposed roadway impervious area to non-DCIA, thereby significantly reducing the nutrient load in the proposed condition prior to stormwater treatment.

- The preferred widening for SR 535 is to widen to the inside (towards the median). Construction of storm drain systems outside of the existing roadway footprint may facilitate the Maintenance of Traffic (MOT) plan developed during the design phase.

6.2 Proposed Pond Sizing Methodology

The pond sizing analysis assumes that all ponds will be designed using wet detention pond design criteria due to the soil conditions and groundwater table elevations along the SR 535 corridor. The report focuses on the preliminary estimate of required pond volumes necessary for each roadway drainage basin. As all project basins currently drain to permitted stormwater facilities, the existing ponds have been evaluated to determine whether the pond size is sufficient to provide the required water quality treatment and attenuation, or if additional pond volume is required (either through expansion of the existing stormwater pond or by adding a potential stormwater pond to the basin). All existing stormwater ponds serving the project basins are utilized in the proposed condition.

The following parameters were considered in the sizing and location of the potential pond sites:

- Hydrologic and hydraulic factors such as existing ground elevations, soil types, estimated seasonal high groundwater table (SHGWT), stormwater conveyance feasibility, allowable hydraulic grade line (HGL);
- Potential impacts to environmental resources, including wetlands, conservation easements, threatened or endangered species;
- Floodplain impacts;
- Major utility conflict potential;
- Parcel descriptions and land usage;
- Impacts to cultural resources; and
- Impacts to contamination sites

6.3 Proposed Drainage Basins and Stormwater Pond Alternatives

A summary of the project basins and limits are provided in **Table 6-1**.

Table 6-1: Summary of Proposed Project Basins

Basin	Road	From	To	Outfall	Basin Area* (ac)
1	SR 535	1490+00	1496+07	Exist. Pond 1-1	25.82
2	SR 535	1496+07	1595+75	Exist. Pond 2-1 and prop. pond	58.98
3	SR 535	1595+75	1642+20	Exist. Pond 3-1 & prop. pond	27.17
4	International Dr	West of SR 535	End Construction	Exist. Pond 4-1	6.00

* Basin areas exclude section of basins which cover pond sites which vary depending on the alternative.

6.3.1 Basin 1

Basin 1 is located on SR 535 from SR 530 (US 192) to south of Kyngs Heath Rd, as well as a portion of SR 530 to the east and west of the SR 535 intersection. The proposed Basin 1 drainage area has been reduced from the existing condition by shifting the SR 535/Kyngs Heath Rd intersection into Basin 2 as shown in the Basin Maps. One pond alternative (Exist. Pond 1-1) is provided for Basin 1 as the alternative is located within existing FDOT Right-of-way.

Alternative 1A (Exist. Pond 1-1)

Exist. Pond 1-1 is the existing wet detention pond located on the south side of SR 530 and west of SR 535 constructed as part of SPN 92090-3543 and permitted by SFWMD under Permit No. 49-00883-P. As noted in **Section 5.7.1** of this report, the SFWMD 25yr-72hr design high water (DHW) elevation within Exist. Pond 1-1 is above the inside berm elevation in the existing condition. As only minor roadway improvements are proposed within Basin 1, a reduction in basin area will result in lowering the DHW elevation below the inside edge of berm while meeting water quality treatment and attenuation requirements. Note that site constraints do not allow an additional 50% water quality treatment for Basin 1. See **Appendix B** for Pond Alternative Exhibits and **Appendix C** for pond sizing calculations.

6.3.2 Basin 2

Basin 2 is located on SR 535 from south of the Kyngs Heath Rd to south of the SR 535/SR 536 intersection. The proposed Basin 2 drainage area has been increased from the existing condition by shifting the SR 535/Kyngs Heath Rd intersection into Basin 2 and adding area from International Drive from existing Basin 4. Three pond alternatives are provided for Basin 2. Each alternative combines the existing wet detention pond (Exist. Pond 2-1) with a proposed offsite pond to provide the water quality treatment and attenuation requirements.

Alternative 2A (Exist. Pond 2-1 & Pond 2-2)

Alternative 2A is composed of 2 interconnected wet detention ponds, Exist. Pond 2-1 and Pond 2-2. Exist. Pond 2-1 is the existing wet detention pond originally constructed as a linear ditch as part of SPN 75560-3609 and later modified by Osceola County to a wet detention pond as part of the Osceola Parkway construction. The pond is located within the Osceola Parkway interchange infield area and cannot be expanded due to site constraints (Osceola Parkway is located south of the pond and a FGT line is located north of the pond). Pond 2-2 is a proposed offsite wet detention pond that will impact one parcel owned by Shingle Creek Community Development District (CDD) (the owner has been identified from the Osceola County Property Appraiser website). The pond and interconnection with Exist. Pond 2-1 will also impact the Osceola Parkway right-of-way owned by Osceola County. The pond site is an existing borrow pit constructed as part of the Storey Lake development on the south side of Osceola Parkway east of SR 535 under SFWMD Application No. 150611-24/Permit No. 49-00908-P. The borrow pit is hydraulically connected to the Storey Lake stormwater system, but does not provide any water quality treatment or attenuation for the development. Please see excerpts from SFWMD Application No. 150611-24/Permit No. 49-00908-P in **Appendix J**.

Pond 2-2 will be interconnected with Exist. Pond 2-1 via a pipe under Osceola Parkway. The pond system will discharge east along Osceola Parkway via the existing pond outfall system for Exist. Pond 2-1, and outfall east of Storey Lake Blvd to unnamed wetlands associated with Shingle Creek. With the interconnected ponds located to the north and south of the Osceola Parkway bridge, Alternative 2A should facilitate construction of the proposed SR 535 storm drain system by eliminating the need to construct the proposed storm drain system trunk line under the bridge in order to convey runoff to a pond.

See **Appendix B** for Pond Alternative Exhibits and **Appendix C** for pond sizing calculations.

Alternative 2B (Exist. Pond 2-1 & Pond 2-3)

Alternative 2B is composed of 2 interconnected wet detention ponds, Exist. Pond 2-1 and Pond 2-3. Exist. Pond 2-1 is described in Alternative 2A. Pond 2-3 is a proposed offsite wet detention pond that will impact 3 parcels – a developed commercial site owned by 7-Eleven Inc., a developed commercial site owned by Osceola Enterprises of Kissimmee,

and an undeveloped commercial site owned by GH Land Trust (owners have been identified from the Osceola County Property Appraiser website). The pond and interconnection with Exist. Pond 2-1 will also impact Old Vineland Rd north of Kyngs Heath Rd (which is currently a dead-end street that only serves the properties impacted by Pond 2-3) and Osceola Parkway Right-of-way owned by Osceola County.

Pond 2-3 will be interconnected with Exist. Pond 2-1 via pipes along the east side of SR 535 and under Osceola Parkway. The pond system will discharge east along Osceola Parkway via the existing pond outfall system for Exist. Pond 2-1, and outfall east of Storey Lake Blvd to unnamed wetlands associated with Shingle Creek. With the interconnected ponds located to the north and south of the Osceola Parkway bridge, Alternative 2B should facilitate construction of the proposed SR 535 storm drain system by eliminating the need to construct the proposed storm drain system trunk line under the bridge in order to convey runoff to a pond.

See **Appendix B** for Pond Alternative Exhibits and **Appendix C** for pond sizing calculations.

Alternative 2C (Exist. Pond 2-1 & Pond 2-4)

Alternative 2C is composed of 7 wet detention ponds, Exist. Pond 2-1 and Pond 2-4. Exist. Pond 2-1 is described in Alternative 2A. Pond 2-4 refers to the existing permitted stormwater management system for the Storey Creek development, which is comprised of 6 interconnected ponds with an outfall to wetlands associated with Shingle Creek on the east side of the development. These 6 interconnected ponds are owned by the Shingle Creek CDD and Osceola County (owners have been identified from the Osceola County Property Appraiser website). This alternative would serve as a joint-use facility.

Runoff from SR 535 is not currently conveyed to Pond 2-4, so any required water quality treatment and attenuation volume will have to be added to the current permitted pond volumes. Analysis of the Pond 2-4 system is based on information from SFWMD Application No. 150611-24/Permit No. 49-00908-P. The hydraulic analysis documentation available on the SFWMD ePermitting website for the Storey Lake development is incomplete, but does provide enough data to provide reasonable assurance that Alternative 2C is a viable option.

A summary of the analysis for Alternative 2C is provided below:

- It is anticipated that the existing pond outfalls will remain. Exist. Pond 2-1 will continue to discharge east along Osceola Parkway via the existing pond outfall system and outfall east of Storey Lake Blvd. to unnamed wetlands associated with Shingle Creek. The Pond 2-4 system will continue to discharge via multiple control structures to unnamed wetlands associated with Shingle Creek south of the Exist. Pond 2-1 outfall.
- It is assumed that a portion of the required water quality treatment and attenuation volume in Basin 2 can be provided in Exist. Pond 2-1, with the remaining volume provided within the Pond 2-4 system.

- Based on a preliminary volumetric analysis using the 2 large ponds within the Pond 2-4 system, there is sufficient excess treatment volume in the Pond 2-4 system (32.91 ac-ft from SFWMD Application #150611-22) to accommodate the total water quality treatment volume for the Basin 2 improvements. If it is not feasible to utilize the excess permitted treatment volume provided in the Pond 2-4 system, then the top of treatment volume stage would increase by approximately 0.15 feet.
- Similarly, the increase in attenuation volume requirements in the Pond 2-4 system due to the SR 535 improvements in Basin 2 would increase the DHW stage by approximately 0.06 feet.
- The total stage increase in the Pond 2-4 system if receiving runoff from Basin 2 is approximately 0.21 feet.
- These minor increases in pond stage could be handled through modification of the existing control structures for Exist. Pond 2-1 and the Pond-2-4 system.
- Runoff from SR 535 could be routed to the Pond 2-4 system though the existing borrow pit in the southeast quadrant of the SR 535/Osceola Parkway interchange (e.g., the location of Pond 2-2).
- In order to utilize the Pond 2-4 system as a joint-use facility, FDOT would require easement over the interconnected pond system. Based on information from the Osceola County Property Appraiser website, the total area of the 6 interconnected ponds in the Storey Lake development is approximately 99.2 ac.

Please see **Appendix J** for excerpts from SFWMD Application Nos. 150611-22, 160208-15 and 160248-7/Permit No. 49-00908-P. See **Appendix B** for Pond Alternative Exhibits and **Appendix C** for pond sizing calculations.

6.3.3 Basin 3

Basin 3 is located on SR 535 from south of the SR 535/SR 536 intersection to north of the SR 535/SR 536 intersection, as well as SR 536 to the west of the SR 535/SR 536 intersection. Three pond alternatives are provided for Basin 3. Each alternative combines the existing wet detention pond (Exist. Pond 3-1) in the northwest quadrant of the SR 535/SR 536 intersection with a proposed offsite pond to provide the water quality treatment and attenuation requirements. The existing dry detention pond (Exist. Pond 3-2) in the southwest quadrant of the SR 535/SR 536 intersection is impacted by the proposed roadway improvements and cannot be used in the proposed condition.

Alternative 3A (Exist. Pond 3-1 & Pond 3-2)

Alternative 3A is composed of 2 interconnected wet detention ponds, Exist. Pond 3-1 and Pond 3-2. Exist. Pond 3-1 is the existing wet detention pond in the northwest quadrant of the SR 535/SR 536 intersection constructed as a linear ditch as part of SPN 75560-3610. Pond 3-2 is a proposed offsite wet detention pond in the southwest quadrant of the SR 535/SR 536 intersection (adjacent to Exist. Pond 3-2). Pond 3-2 will impact one parcel owned by WGW Partners LLC (the owner's name has been identified from the Orange

County Property Appraiser website). The Pond 3-2 site is undeveloped and is located adjacent to an existing SFWMD and Orange County conservation easement.

Pond 3-2 will be interconnected with Exist. Pond 3-1 via a pipe under SR 536. It is anticipated that multiple outfalls may be used for Exist. Pond 3-1 and Pond 3-2 (similar to the existing condition) to reduce the storage volume required. The number of outfalls and attenuation requirements for each outfall will be determined in final design, but the primary discharge will be towards SR 535 and to Shingle Creek.

See **Appendix B** for Pond Alternative Exhibits and **Appendix C** for pond sizing calculations.

Alternative 3B (Exist. Pond 3-1 & Pond 3-3)

Alternative 3B is composed of 2 interconnected wet detention ponds, Exist. Pond 3-1 and Pond 3-3. Exist. Pond 3-1 is described in Alternative 3A. Pond 3-3 is a proposed offsite wet detention pond located in the southeast quadrant of the SR 535/SR 536 intersection that will impact 3 parcels – a developed commercial site owned by Red Rosen LLC, a developed commercial site owned by J&G Investment Group VC 1 LLC, and an undeveloped commercial site owned by Orange County Properties Limited LLC (owners have been identified from the Osceola County Property Appraiser website).

Due to the location of Pond 3-3 relative to Basin 3 and Exist. Pond 3-1, it is anticipated that the ponds will be interconnected in series with Exist. Pond 3-1 draining to Pond 3-3. It is anticipated that multiple outfalls may be used for Exist. Pond 3-1 and Pond 3-3 (similar to the existing condition) to reduce the storage volume required. The number of outfalls and attenuation requirements for each outfall will be determined in final design, but the primary discharge will be towards SR 535 and to Shingle Creek.

See **Appendix B** for Pond Alternative Exhibits and **Appendix C** for pond sizing calculations.

Alternative 3C (Exist. Pond 3-1 & Pond 3-4)

Alternative 3C is composed of 2 interconnected wet detention ponds, Exist. Pond 3-1 and Pond 3-4. Exist. Pond 3-1 is described in Alternative 3A. Pond 3-4 is a proposed offsite wet detention pond located east of SR 535 and south of SR 536, and adjacent to the Internation Drive extension. Pond 3-4 will impact one parcel owned by Gissy Holdings I-Drive Property LLC (the owner's name has been identified from the Orange County Property Appraiser website).

Due to the location of Pond 3-4 relative to Basin 3 and Exist. Pond 3-1, it is anticipated that the ponds will be interconnected in series with Exist. Pond 3-1 draining to Pond 3-4. It is anticipated that multiple outfalls may be used for Exist. Pond 3-1 and Pond 3-4 (similar to the existing condition) to reduce the storage volume required. The number of outfalls and attenuation requirements for each outfall will be determined in final design, but the primary discharge will be towards SR 535 and to Shingle Creek.

See **Appendix B** for Pond Alternative Exhibits and **Appendix C** for pond sizing calculations.

6.3.4 Basin 4

Basin 4 is located on International Drive west of SR 535. The proposed Basin 4 drainage area has been reduced from the existing condition by shifting a portion of the existing basin on International Drive to Basin 2. One pond alternative (Exist. Pond 4-1) is provided for Basin 4 as no improvements to the permitted stormwater system are proposed. The existing dry detention pond (Exist. Pond 4-2) in the northwest quadrant of the SR 535/International Drive intersection is impacted by the proposed roadway improvements and cannot be used in the proposed condition.

Alternative 4A (Exist. Pond 4-1)

Exist. Pond 4-1 is the existing wet detention pond located on the south side of International Drive and west of SR 535 constructed as part of the Greene Property Phase II improvements and permitted by SFWMD under Permit No. 48-00866-S. As noted in **Section 5.7.4** of this report, the Orange County 25yr-24hr design high water (DHW) elevation within Exist. Pond 4-1 is above the inside berm elevation in the existing condition. There is a slight increase in the impervious area within Basin 4, but a reduction in total basin area. The reduction in basin area will result in lowering the DHW elevation below the inside edge of berm while meeting water quality treatment and attenuation requirements. Note that site constraints do not allow an additional 50% water quality treatment for Basin 4. See **Appendix B** for Pond Alternative Exhibits and **Appendix C** for pond sizing calculations.

6.4 Preferred Pond Sites

The preferred alternative for each basin is provided in **Table 6-2** and anticipated right-of-way needs (excluding public right-of-way used for the alternatives) associated with the preferred alternatives are provided in **Table 6-3**. Existing stormwater ponds within Basins 1 and 4 have sufficient capacity to provide the required water quality treatment and attenuation in the ponds currently serving these basins, so no additional right-of-way is required based on the calculations contained herein.

Pond evaluation matrices for each basin are provided in **Appendix D**. A summary of the pond site recommendations is provided below:

- Exist. Pond 1-1 is sufficient for Basin 1

- Alternative 2A (Exist. Pond 2-1 and Pond 2-2) is the preferred alternative for Basin 2. Alternative 2A has the lowest estimated total cost, and is in the most hydraulically favorable location.

- Alternative 3A (Exist. Pond 3-1 and Pond 3-2) is the preferred alternative for Basin 3. The evaluation of the preferred alternative for Basin 3 also includes an evaluation of the floodplain compensation (FPC) site needs within Basin 3 (see the Location Hydraulics Report under separate cover for additional details).

  Therefore, the estimated total cost of the stormwater alternatives in conjunction with FPC site alternatives (assuming only 1 site per parcel is selected) was performed. Alternative 3A involves the expansion of an existing pond, and maintains the existing drainage patterns with less impact to the SR 535/SR 536 intersection. Alternative 3C requires more significant impact to the existing drainage systems at the SR 535/SR 536 intersection which may result in additional impacts to utilities and maintenance of traffic operations for the travelling public.

- Exist. Pond 4-1 is sufficient for Basin 4

Table 6-2: Preferred Pond Sites

Basin	Preferred Alternative	Ponds	Type	Remarks
1	1A	Exist. Pond 1-1	Wet	Exist. pond sufficient. Reduced drainage area (27.60 ac to 25.82 ac) from exist. to proposed conditions. Increased freeboard in exist. pond.
2	2A	Exist. Pond 2-1 and Pond 2-2	Wet	Interconnected ponds to provide required water quality treatment and attenuation. Utilize Exist. Pond 2-1 outfall to Shingle Creek.
3	3A	Exist. Pond 3-1 and Pond 3-2	Wet	Interconnected ponds to provide required water quality treatment and attenuation. Utilize Exist. Pond 3-1 and Pond 3-2 outfalls to Shingle Creek.
4	4A	Exist. Pond 4-1	Wet	Exist. pond sufficient. Reduced drainage area (7.96 ac to 6.00 ac) from exist. to proposed conditions and Exist Pond 4-2 removed. Increased freeboard in exist. pond.

Table 6-3: Right-of-Way Needs for Preferred Alternatives

Basin	Preferred Alternative	Ponds	Estimated R/W Req'd.	Remarks
1	1A	Exist. Pond 1-1	0.0	Pond within exist. R/W
2	2A	Exist. Pond 2-1 and Pond 2-2	4.3	Exist. Pond 2-1 within exist. R/W. Estimated R/W needs for Pond 2-2 provided (excluding public R/W used for pond).
3	3A	Exist. Pond 3-1 and Pond 3-2	3.5	Exist. Pond 3-1 within exist. R/W. Estimated R/W needs for Pond 3-2 provided (excluding public R/W used for pond).
4	4A	Exist. Pond 4-1	0.0	Pond within exist. R/W

6.5 Nutrient Loading Analysis

The project lies within the Shingle Creek basin, which is impaired for nutrients (macrophytes). It should be noted that north of SR 417, SR 535 is located on the divide between WBID 3169A and WBID 3169B (Reedy Creek Basin) and that WBID 3169B is not impaired for nutrients. SFWMD stated that nutrient loading calculations are not required for discharges to Shingle Creek due to this type of nutrient impairment, but that net improvement for total phosphorus (TP) is required because the project lies within the Lake Okeechobee BMAP. Impervious areas subject to non-vehicular traffic (e.g., sidewalk and shared use paths) do not require water quality treatment and can be separated out from the calculation of impervious area. For the purposes of the pond siting analysis in the PD&E, the shared use paths have been

included in the calculation of impervious area to provide a conservative estimate of water quality volume required. It is recommended that the impervious area acreage be refined during the design phase of the project to provide a more accurate estimate of water quality treatment volume requirements.

Based on the SFWMD pre-application meeting, dry detention facilities (existing or proposed) do not receive any credit for providing nutrient load reduction. As all basins discharge to Shingle Creek, net improvement for TP is analyzed on a project-wide basis. Nutrient load calculations using BMPTrains can be found in **Appendix C**. A summary of the net improvement calculations for the preferred pond sites is included in **Table 6-4**.

Table 6-4: Nutrient Loading Summary

Basin	Existing TP Loading (kg/yr)	Proposed TP Loading (kg/yr)	Difference in TP Loading (kg/yr)
1	3.41	3.13	-0.28
2	2.45	2.49	0.04
3	1.91	1.57	-0.34
4	1.58	1.02	-0.56
Total	9.35	8.21	-1.14

7.0 Floodplains and Floodways

The Federal Emergency Management Agency (FEMA) has developed Flood Insurance Rate Maps (FIRMs) for the study area. The relevant FIRM panel numbers are 12095C0605F for Orange County, Florida dated September 25, 2009, and 12097C0055G for Osceola County, Florida dated June 18, 2013. Based on the information contained within the FIRMs, there is a 100-year floodplain located directly south of SR 535 between Station 1550+00 and Station 1600+00. The floodplain through this area is bisected by International Drive and SR 417 creating three distinct sections. All three locations have been identified as Zone A on the FIRMs. There are no floodways located within the limits of the project. The floodplain limits in the vicinity of project improvements have been identified in the Pond Alternatives Exhibits provided in **Appendix B**. The FEMA FIRMs have also been provided in **Appendix A**.

Since all three locations of floodplain have been identified as Zone A, no base flood elevations (BFE) were provided on the FIRMs. In order to extrapolate a value for the BFEs to utilize in the floodplain impact calculations, the floodplain shapes were superimposed on contours generated from LiDAR data. The BFEs associated with each impact location have been identified in **Table 7-1** along with the floodplain impacts within each section.

Table 7-1: Base Flood Elevations and Floodplain Impacts

Floodplain Reference*	Station Range	Base Flood Elevation	Floodplain Impacts (ac-ft)
1	1582+00 to 1600+00	95	4.82
2	1569+00 to 1582+00	91	1.78
3	1550+00 to 1569+00	89.5	2.29
Total			**8.89**

*reference numbers as noted on the calculations and exhibits

Project improvements will result in longitudinal and transverse impacts to the 100-year floodplain. Longitudinal impacts are anticipated from encroaching into the floodplain areas due to the proposed roadway improvements, as well as from a stormwater pond berm. SR 535 does not bisect the floodplain but is instead on the upstream fringe of the mapped floodplain. Transverse impacts are anticipated from the extension or replacement of the existing cross drains. During the design phase, opportunities to reduce these impacts by optimizing the grading for ditches and proposed side slopes will be investigated. In addition to the impacts that result from the road widening, the Pond 3-2 maintenance berm will also encroach into the 100-year floodplain.

Since the three impact locations are within close proximity of each other, it was determined that the impacts from the three locations could be combined for developing compensation options. Equivalent storage was checked to ensure impacts at the lower elevations could be

accommodated at each floodplain compensation site. Five floodplain compensation (FPC) sites have been developed and are included as part of the analysis. Since land adjacent to the floodplain in the vicinity of the project is limited, four of the five FPC sites will be hydraulically connected to the floodplain utilizing storm drain piping. Pond liners have been assumed at FPC sites 1, 2, and 3 in order to provide compensation at equivalent elevations for those impacts at the lower end of the spectrum. Once more detailed information is obtained during the design phase it is anticipated that additional storage can be provided within the right-of-way at these lower elevations and the need for liners will be either be reduced or eliminated. The location of the five FPC sites are shown on the Pond Alternative Exhibits in **Appendix B** and the compensation provided at each location is summarized in **Table 7-2** below. Detailed calculations for each floodplain compensation site are provided in the **Location Hydraulics Report** under separate cover.

Table 7-2: Floodplain Compensation Alternatives

FPC Site	Station	Side	Floodplain Compensation Provided (ac-ft)
1	1586+00	Rt	14.45
2	1581+00	Rt	19.74
3	1575+00	Rt	19.74
4	1572+00	Lt	10.08
5	1566+00	Rt	12.75

All FPC site alternatives analyzed will provide the required storage to offset floodplain impacts. Based on this analysis, FPC Site 1 is the preferred alternative. The evaluation matrix which outlines all of the variables included in the analysis is provided in the **Location Hydraulics Report**.

8.0 Results

The analysis presented in this report identified potential stormwater pond sites based on recent aerials and other preliminary data. Once the potential pond sites were narrowed down to three alternatives, a more detailed analysis was conducted utilizing the following parameters: right-of-way requirements, easement requirements, costs for a given pond site, floodplain impacts, contamination and hazardous materials, potential utility impacts, threatened endangered & significant species, cultural resources, wetland impacts, construction and maintenance considerations, and impacts to other relevant features as noted in the pond site evaluation matrix provided in **Appendix D**. In conjunction with this analysis, a Contamination Screening Evaluation Report, Natural Resource Evaluation, and a Cultural Resource Assessment Survey were prepared and are provided under separate cover with this submittal. The preferred alternative for each basin is provided in **Table 8-1** and anticipated right of way needs (excluding public right-of-way used for the alternatives) associated with the preferred alternatives are provided in **Table 8-2**.

Table 8-1: Preferred Pond Alternatives

Basin	Preferred Alternative	Ponds	Type	Remarks
1	1A	Exist. Pond 1-1	Wet	Exist. pond sufficient. Reduced drainage area (27.60 ac to 25.82 ac) from exist. to proposed conditions. Increased freeboard in exist. pond.
2	2A	Exist. Pond 2-1 and Pond 2-2	Wet	Interconnected ponds to provide required water quality treatment and attenuation. Utilize Exist. Pond 2-1 outfall to Shingle Creek.
3	3A	Exist. Pond 3-1 and Pond 3-2	Wet	Interconnected ponds to provide required water quality treatment and attenuation. Utilize Exist. Pond 3-1 and Pond 3-2 outfalls to Shingle Creek.
4	4A	Exist. Pond 4-1	Wet	Exist. pond sufficient. Reduced drainage area (7.96 ac to 6.00 ac) from exist. to proposed conditions and Exist Pond 4-2 removed. Increased freeboard in exist. pond.

Table 8-2: Right-of-Way Needs for Preferred Alternatives

Basin	Preferred Alternative	Ponds	Estimated R/W Req'd.	Remarks
1	1A	Exist. Pond 1-1	0.0	Pond within exist. R/W
2	2A	Exist. Pond 2-1 and Pond 2-2	4.3	Exist. Pond 2-1 within exist. R/W. Estimated R/W needs for Pond 2-2 provided (excluding public R/W used for pond).
3	3A	Exist. Pond 3-1 and Pond 3-2	3.5	Exist. Pond 3-1 within exist. R/W. Estimated R/W needs for Pond 3-2 provided (excluding public R/W used for pond).
4	4A	Exist. Pond 4-1	0.0	Pond within exist. R/W

An analysis of floodplain impacts and FPC alternatives has been performed, and the evaluation matrix which outlines all of the variables included in the analysis is provided in the **Location Hydraulics Report**. Project improvements will impact the 100-year floodplain as a result of longitudinal impacts and transverse impacts. Impacts to the floodplain were conservatively estimated based on the existing profile and the potential impacts of the road widening within the project limits. During the design phase, opportunities to reduce these impacts by optimizing the grading for ditches and proposed side slopes should be investigated. The preferred FPC alternative and anticipated right of way needs associated with the preferred alternative are provided in **Table 8-3**.

Table 8-3: Preferred FPC Site

Name	Floodplain Impacts (ac-ft)	Floodplain Compensation Volume Prov'd. (ac-ft)	Estimated Pond R/W Req'd. (Including Access) (ac)
FPC 1	8.89	14.5	4.3

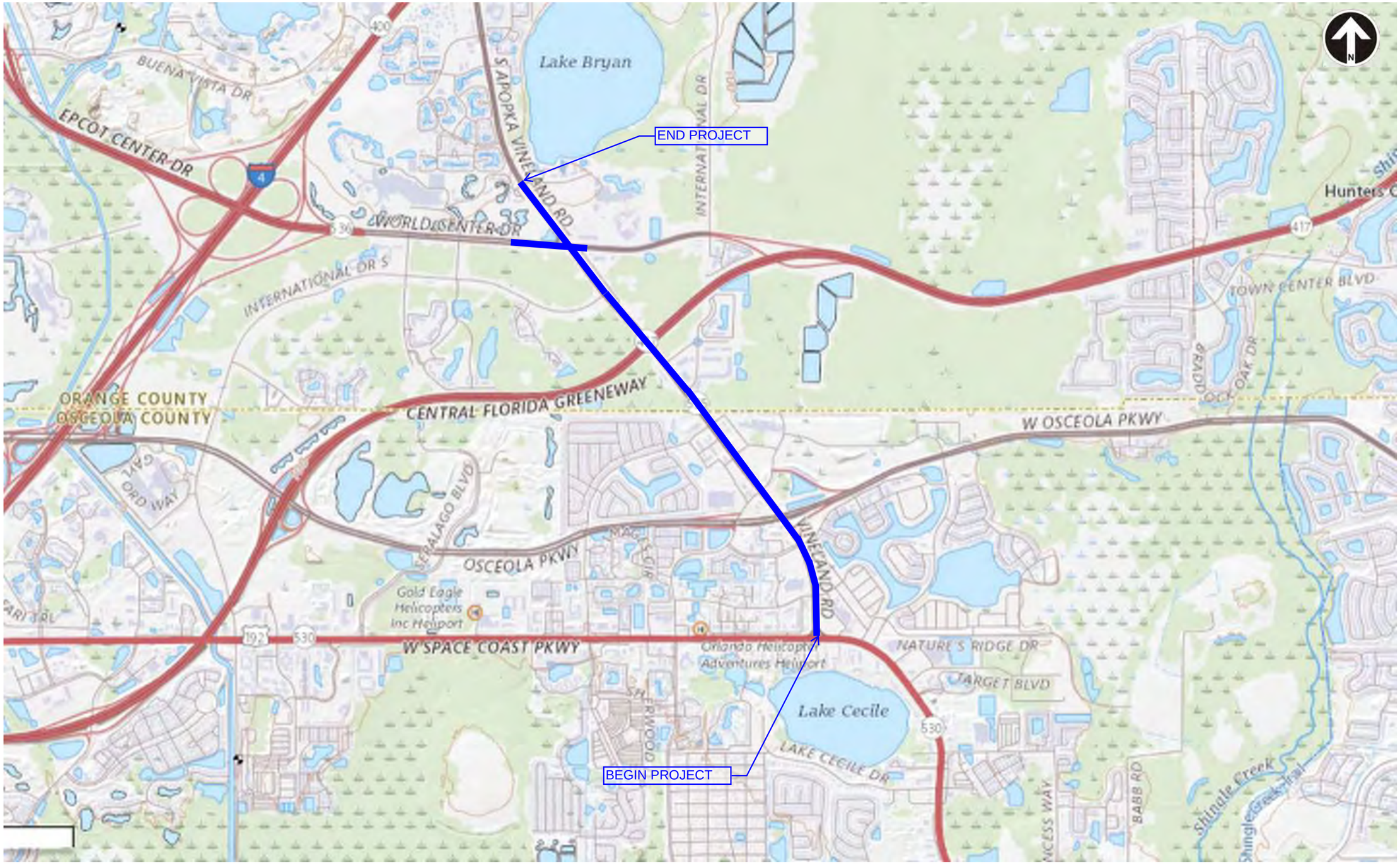
9.0 Conclusions

Potential ponds have been sized and located along the project limits for this PD&E study. The analysis estimates right-of-way needs using a volumetric analysis, which accounts for water quality treatment and water quantity for runoff attenuation. Please note that the estimated right-of-way areas for the ponds were based on pond sizes determined from preliminary data, calculations, reasonable engineering judgment, and assumptions. It should be noted that the information contained herein is preliminary and will need to be refined once this project enters the design phase. Pond sizes and configurations may change during final design as more detailed information on SHWT, wetland normal pool elevation, final roadway profile design, aesthetic requirements, etc. become available.

Appendix A

Exhibits

SR 535 PD&E
USGS Quad Map within Vicinity of Project Limits



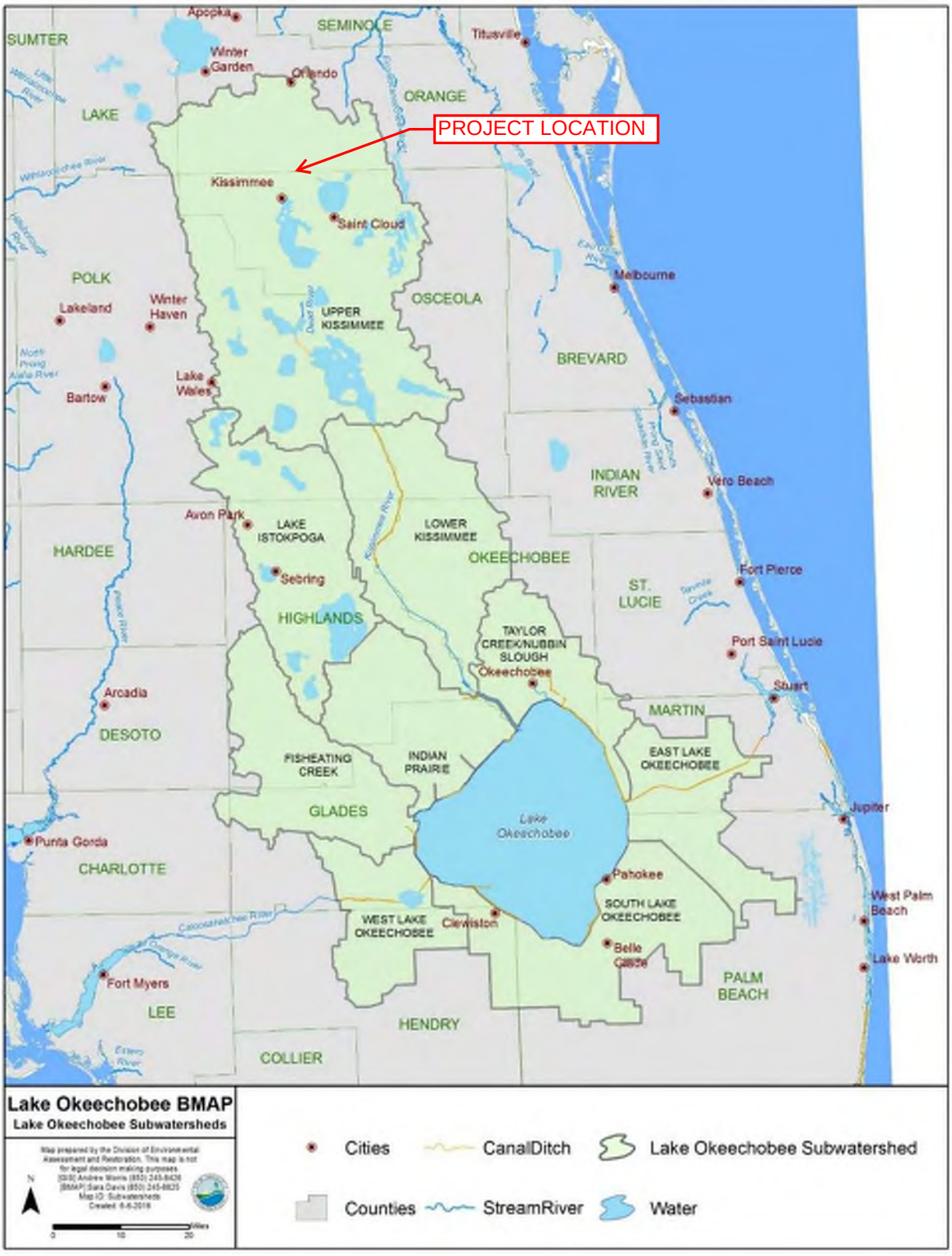
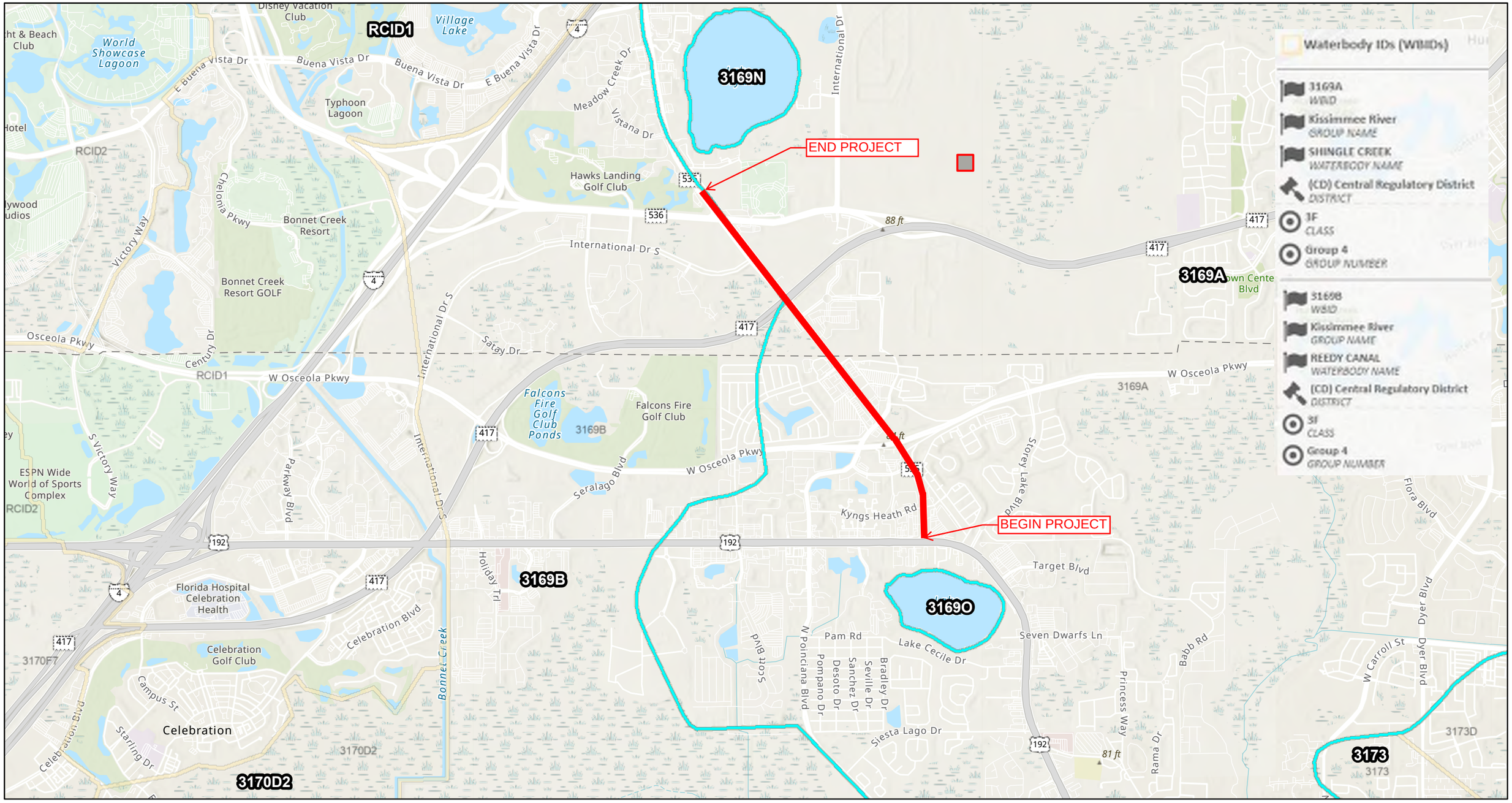


Figure ES-1. Lake Okeechobee Sub-watersheds

SR 535 PD&E - WBID Map



February 22, 2024

Waterbody IDs (WBIDs)

Group 4

1:36,112

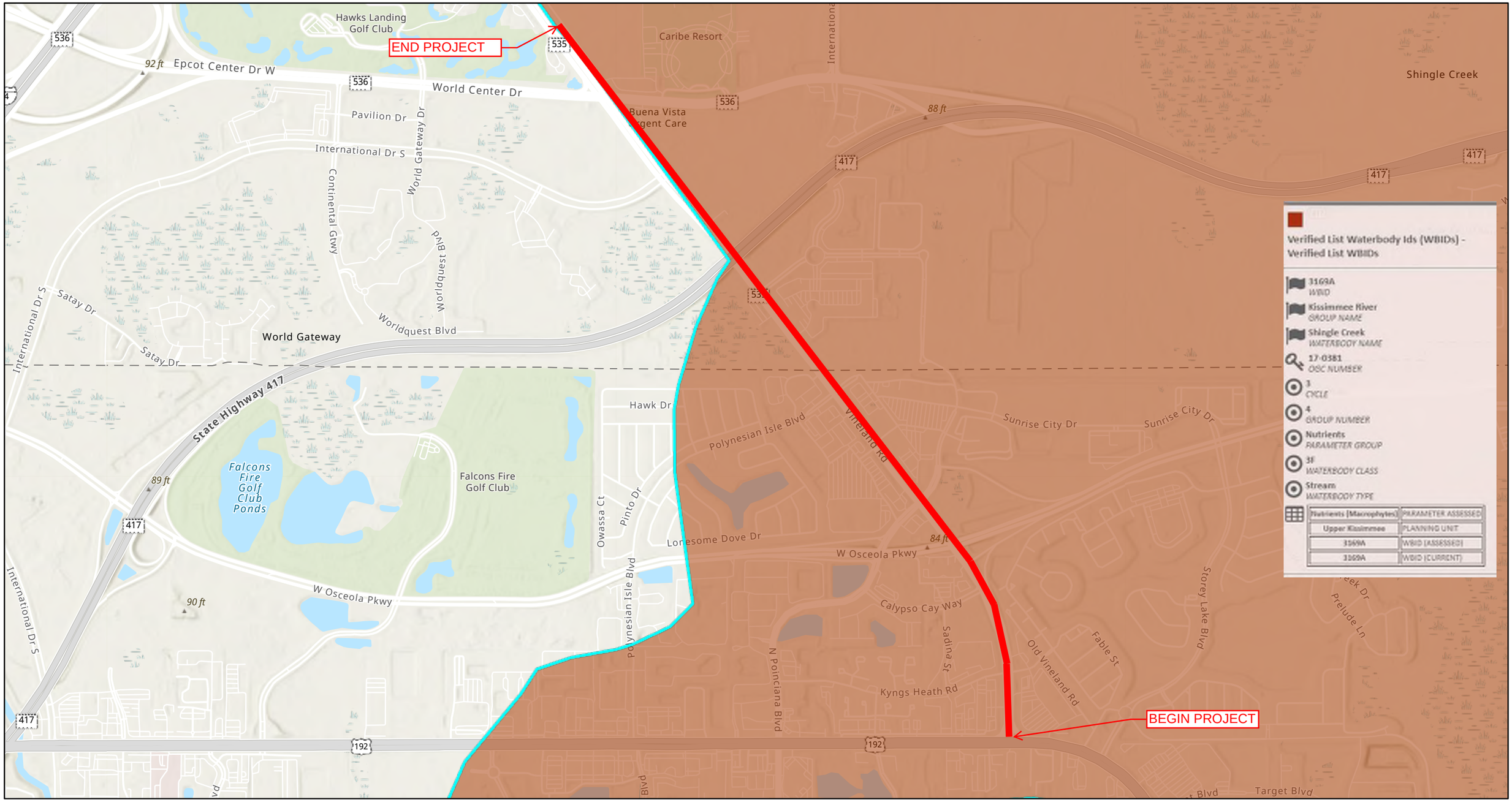
0 0.4 0.8 1.6 mi

0 0.5 1 2 km

Esri, NASA, NGA, USGS, FEMA, FDEP, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, USFWS, FDEP,DEAR

Map created by Map Direct, powered by ESRI.

SR 535 PD&E - Verified List WBIDs and TMDLs Map



February 22, 2024

Verified List WBIDs

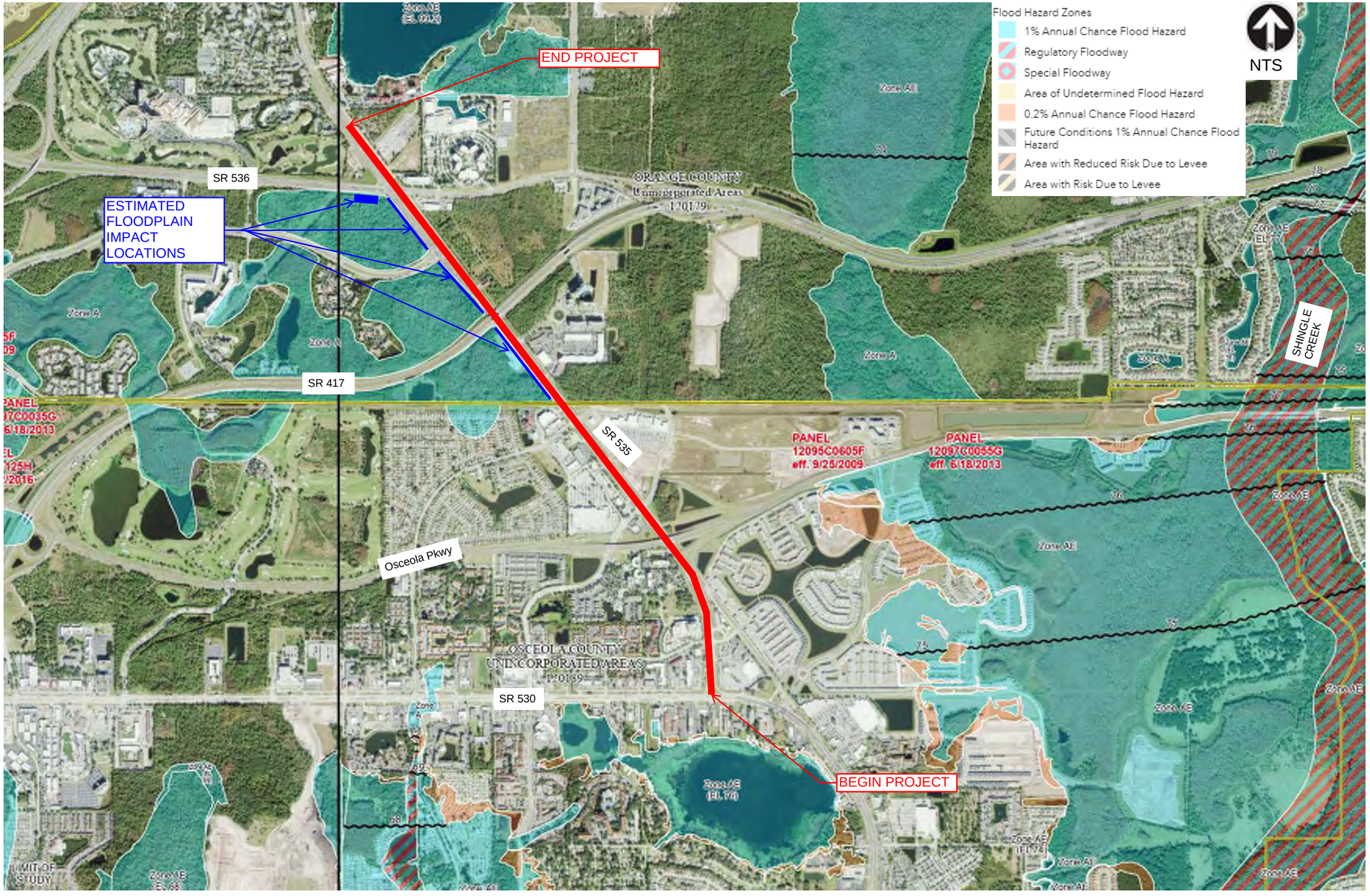
1:18,056

0 0.2 0.4 0.8 mi

0 0.3 0.6 1.2 km

FDEP, DEAR, Esri, NASA, NGA, USGS, FEMA, Esri Community Maps Contributors, FDEP, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, USFWS

SR 535 PD&E
FEMA Floodplains within Vicinity of Project Limits



NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations (BFEs) shown on this map apply only landward of 0.0 North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Transverse Mercator State Plane Florida East FIPS 0901. The **horizontal datum** was NAD83 HARN, GRS1980 spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood **elevations** on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, NNGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242** or visit its website at http://www.ngs.noaa.gov.

Base map information shown on this FIRM was provided in digital format by the Osceola County Planning Office. Orthophotography was collected in late 2007 early 2008.

This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

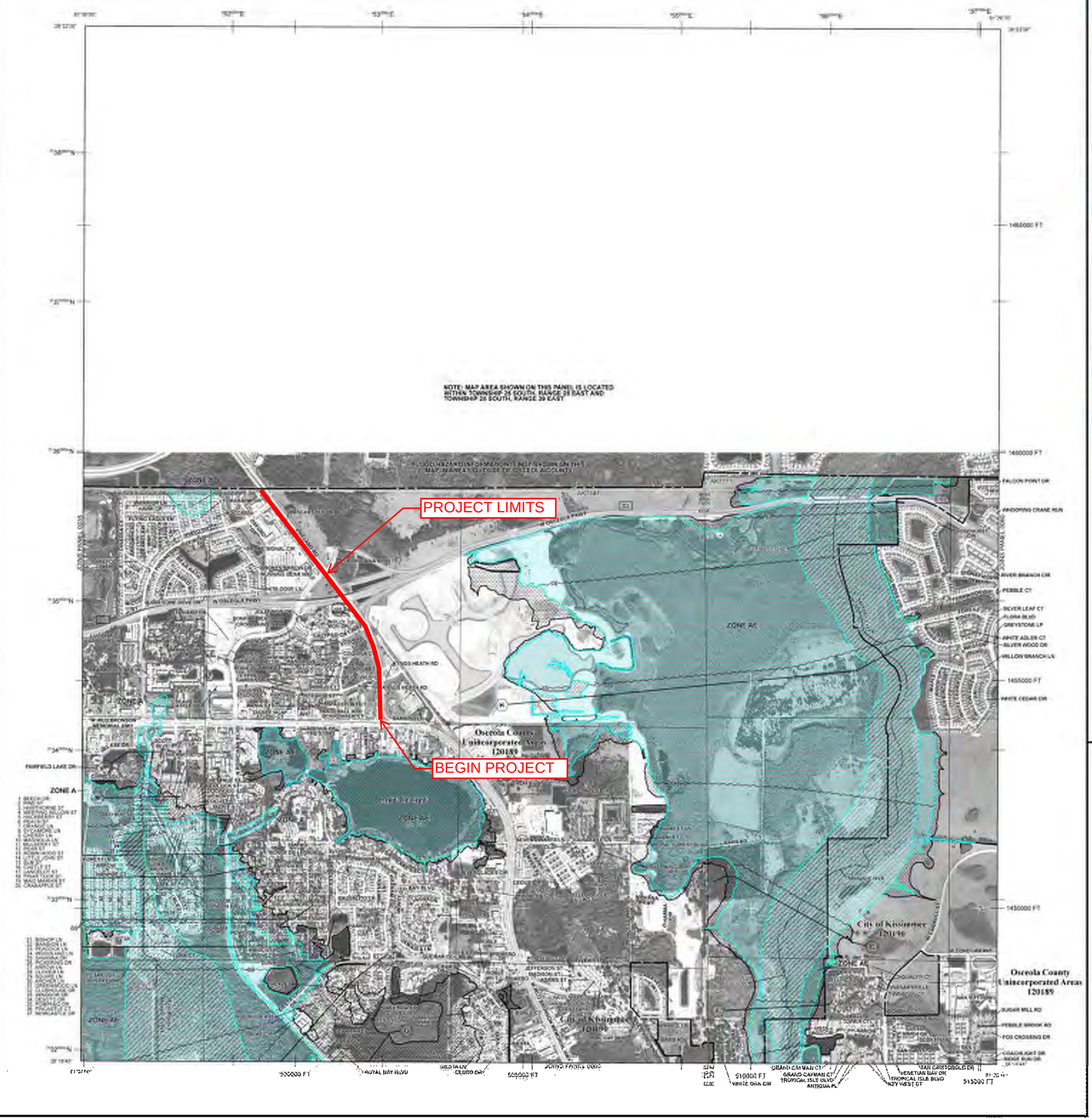
Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels, community map repository addresses, and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

For information and questions about this map, available products associated with this FIRM including historic versions of this FIRM, how to order products or the National Flood Insurance Program in general, please call the **FEMA Mapping Information eXchange** at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Map Service website at http://www.msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website. Users may determine the current map date for each FIRM panel by visiting the FEMA Map Service Center website or by calling the FEMA Map Information eXchange.

The "**profile base lines**" depicted on this map represent the hydraulic modeling baselines that match the flood profiles in the FIS report. As a result of improved topographic data, the "profile base line", in some cases, may deviate significantly from the channel centerline or appear outside the SFHA.

NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN TOWNSHIP 26 SOUTH, RANGE 28 EAST AND TOWNSHIP 25 SOUTH, RANGE 29 EAST



LEGEND

SPECIAL FLOOD HAZARD AREAS (SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD)

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance 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 sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE AR Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.

ZONE A99 Area to be protected from 1% annual chance flood event by a Federal flood protection system under construction; no Base Flood Elevations determined.

ZONE V Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% annual chance floodplain boundary

0.2% annual chance floodplain boundary

Floodway boundary

Zone D boundary

CBRS and OPA boundary

Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities.

513 Base Flood Elevation line and value; elevation in feet*

(EL 987) Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

A — A Cross section line

23 — 23 Transect line

97°07'30", 32°22'30" Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), western hemisphere

4°75'mE 1000-meter Universal Transverse Mercator grid ticks, zone 17

5000000 FT 5000-foot grid values: Florida State Plane coordinate system, East Zone (FIPSZONE = 0901), Transverse Mercator projection

DX5510 Bench mark (see explanation in Notes to Users section of this FIRM panel)

M1.5 River Mile

MAP REPOSITORIES
Refer to Map Repositories List on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
MAY 7, 2007

EFFECTIVE DATES OF REVISION(S) TO THIS PANEL
JUNE 6, 2001 - To correct datum reference note.

JUNE 18, 2013 - To update corporate limits, change Base Flood Elevations, add Base Flood Elevations, change Special Flood Hazard Areas, change zone designations, update roads and road names, incorporate previously issued Letters of Map Revision, and reflect updated topographic information.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 1000'

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0055G

FIRM

FLOOD INSURANCE RATE MAP

OSCEOLA COUNTY, FLORIDA AND INCORPORATED AREAS

PANEL 55 OF 900

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
KISSIMMEE, CITY OF	120186	0055	G
OSCEOLA COUNTY	120189	0055	G

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
12097C0055G

MAP REVISED
JUNE 18, 2013

Federal Emergency Management Agency

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0 North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was State Plane Florida East FIPS Zone 0901. The **horizontal datum** was NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

Spatial Reference System Division
National Geodetic Survey, NOAA
Silver Spring Metro Center
1315 East-West Highway
Silver Spring, Maryland 20910
(301) 713-3191

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242** or visit its website at http://www.ngs.noaa.gov/.

Base map information shown on this FIRM was provided in digital format by Orange County, Florida.

This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

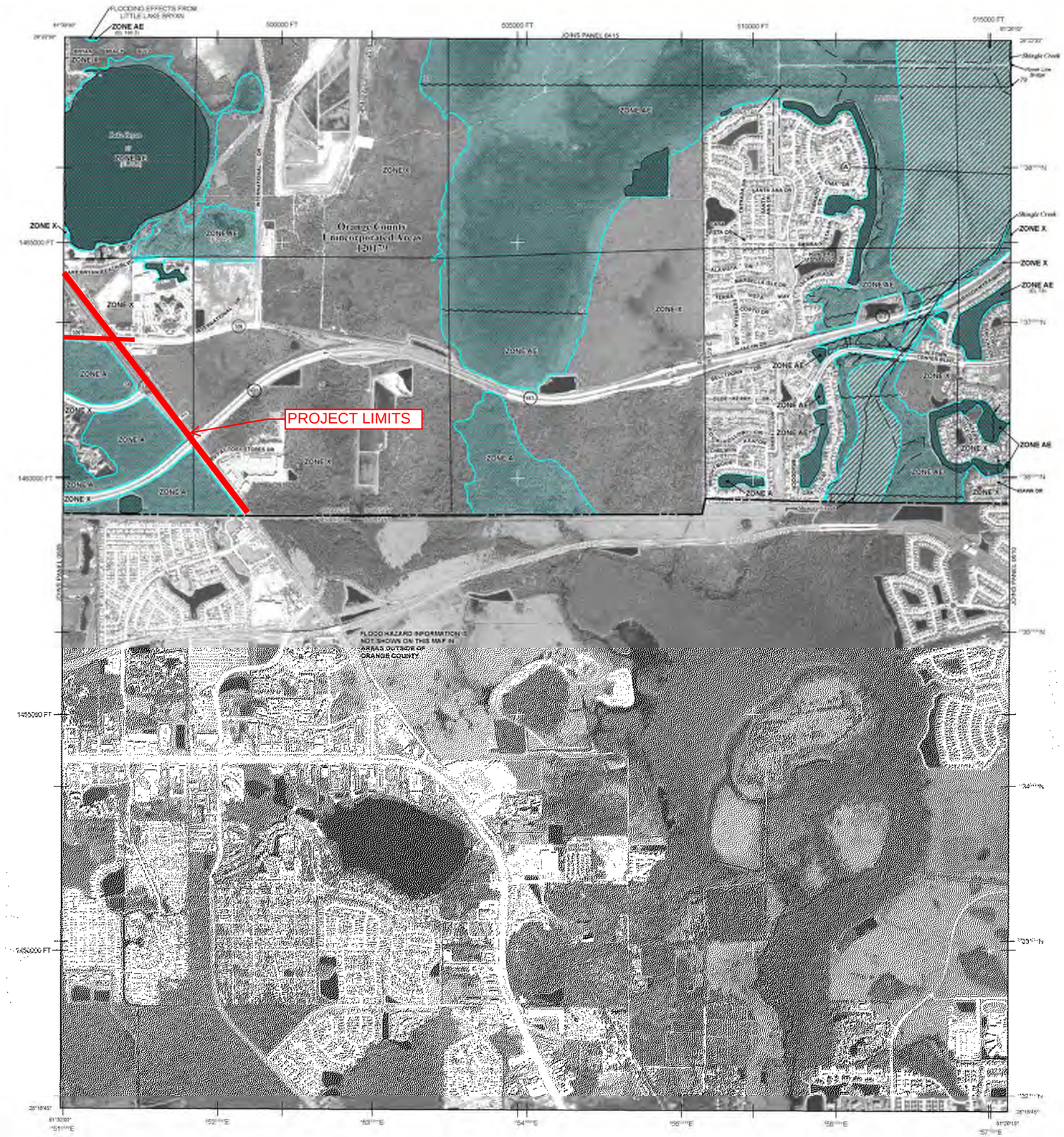
Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at http://www.msc.fema.gov/.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip/.

NGVD29 to NAVD88 Vertical Datum Conversion Table (feet)

Watershed Name	Minimum Conversion	Maximum Conversion	Average Conversion	Maximum Offset
Big Econlockhatchee River	-1.10	-1.15	-1.09	0.08
Boggy Creek	-0.94	-1.51	-0.96	0.09
Cypress Creek	-0.87	-0.91	-0.85	0.03
Howie Branch	-0.96	-1.05	-0.93	0.07
Lake Apopka	-0.87	-0.92	-0.91	0.08
Lake Hart	-0.97	-1.07	-1.02	0.05
Little Econlockhatchee River	-0.92	-1.07	-1.01	0.08
Little Wekiva River	-0.91	-1.02	-0.95	0.07
Rowdy Creek	-0.86	-0.92	-0.88	0.02
Shingle Creek	-0.88	-0.95	-0.91	0.04
St. Johns River	-1.06	-1.33	-1.10	0.14
Wekiva River	-0.88	-1.51	-0.94	0.07



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD EVENT

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance 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 sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- ZONE AR — Area of special flood hazard formerly protected from the 1% annual chance flood event by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
- ZONE A99 — Area to be protected from 1% annual chance flood event by a Federal flood protection system under construction; no Base Flood Elevations determined.
- ZONE V — Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
- ZONE VE — Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

- ZONE X — Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

- ZONE X — Areas determined to be outside the 0.2% annual chance floodplain.
- ZONE D — Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

- Cross section line
- Transect line

97°07'30", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western hemisphere

1000-meter Universal Transverse Mercator grid ticks, zone 17

5000-foot grid values: Florida State Plane coordinate system, East Zone (FIPSZONE = 0901), Transverse Mercator projection

Bench mark (see explanation in Notes to Users section of this FIRM panel)

River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
DECEMBER 8, 2000

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
SEPTEMBER 25, 2009 - to update corporate limits, to change Base Flood Elevations, to add Base Flood Elevations, to add Special Flood Hazard Areas, to change Special Flood Hazard Areas, to delete Special Flood Hazard Areas, to update map format, to add roads and road names, to incorporate previously issued Letters of Map Revision, to reflect updated topographic information, and to incorporate previously issued Letters of Map Amendment.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 1000'

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0605F

FIRM

FLOOD INSURANCE RATE MAP

ORANGE COUNTY, FLORIDA

AND INCORPORATED AREAS

PANEL 605 OF 750

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ORANGE COUNTY	120179	0605	F

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
12095C0605F

MAP REVISED
SEPTEMBER 25, 2009

Federal Emergency Management Agency

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0 North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was State Plane Florida East FIPS Zone 0901. The **horizontal datum** was NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

Spatial Reference System Division
National Geodetic Survey, NOAA
Silver Spring Metro Center
1315 East-West Highway
Silver Spring, Maryland 20910
(301) 713-3191

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242** or visit its website at http://www.ngs.noaa.gov/.

Base map information shown on this FIRM was provided in digital format by Orange County, Florida.

This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

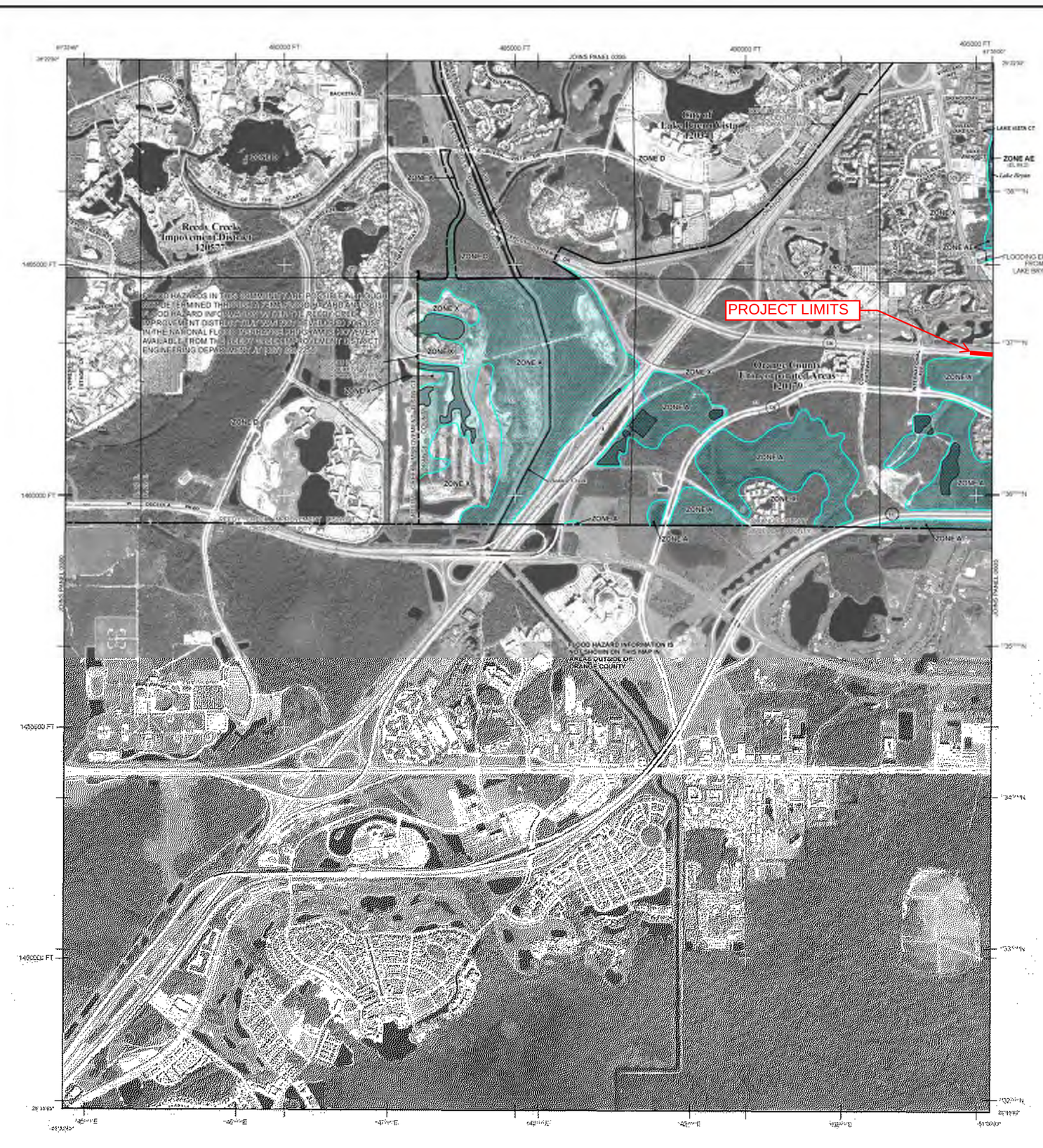
Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels, community map repository addresses, and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at http://www.msc.fema.gov/.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip/.

NGVD29 to NAVD88 Vertical Datum Conversion Table (feet)

Watershed Name	Minimum Conversion	Maximum Conversion	Average Conversion	Maximum Offset
Big Econlockhatchee River	-1.10	-1.15	-1.06	0.05
Boggy Creek	-2.23	-1.91	-2.06	0.09
Cypress Creek	-2.27	-2.01	-2.20	0.03
Howie Branch	-2.05	-2.00	-2.05	0.07
Lake Apopka	-2.07	-2.01	-2.01	0.06
Lake Hart	-2.02	-1.97	-1.52	0.05
Little Econlockhatchee River	-2.02	-1.97	-1.91	0.09
Little Wekiva River	-1.97	-1.92	-1.53	0.07
Reedy Creek	-2.05	-2.00	-2.02	0.02
Shingle Creek	-2.22	-2.05	-2.01	0.04
St. Johns River	-1.05	-1.22	-1.10	0.14
Wekiva River	-2.02	-1.51	-1.94	0.07



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD EVENT

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance 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 sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- **ZONE AR** — Area of special flood hazard formerly protected from the 1% annual chance flood event by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
- **ZONE A99** — Area to be protected from 1% annual chance flood event by a Federal flood protection system under construction; no Base Flood Elevations determined.
- **ZONE V** — Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
- **ZONE VE** — Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

- **ZONE X** — Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

- **ZONE X** — Areas determined to be outside the 0.2% annual chance floodplain.
- **ZONE D** — Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

- Cross section line
- Transect line
- 87°07'30", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
- 1000-meter Universal Transverse Mercator grid ticks, zone 17
- 5000-foot grid values: Florida State Plane coordinate system, East Zone (FIPSZONE = 0901), Transverse Mercator projection
- DX5510 — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
DECEMBER 6, 2000

EFFECTIVE DATES OF REVISION(S) TO THIS PANEL
SEPTEMBER 25, 2009 - to update corporate limits, to change Base Flood Elevations, to add Base Flood Elevations, to add Special Flood Hazard Areas, to change Special Flood Hazard Areas, to delete Special Flood Hazard Areas, to update map format, to add roads and road names, to incorporate previously issued Letters of Map Revision, to reflect updated topographic information, and to incorporate previously issued Letters of Map Amendment

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 1000'

PANEL 0585F

NFIP NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

ORANGE COUNTY, FLORIDA

AND INCORPORATED AREAS

PANEL 585 OF 750

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINING:

COMMUNITY	NUMBER	PANEL	SUFFIX
LAKE BUENA VISTA, CITY OF	120041	0585	F
ORANGE COUNTY	120179	0585	F
REEDY CREEK IMPROVEMENT DISTRICT	120267	0585	F

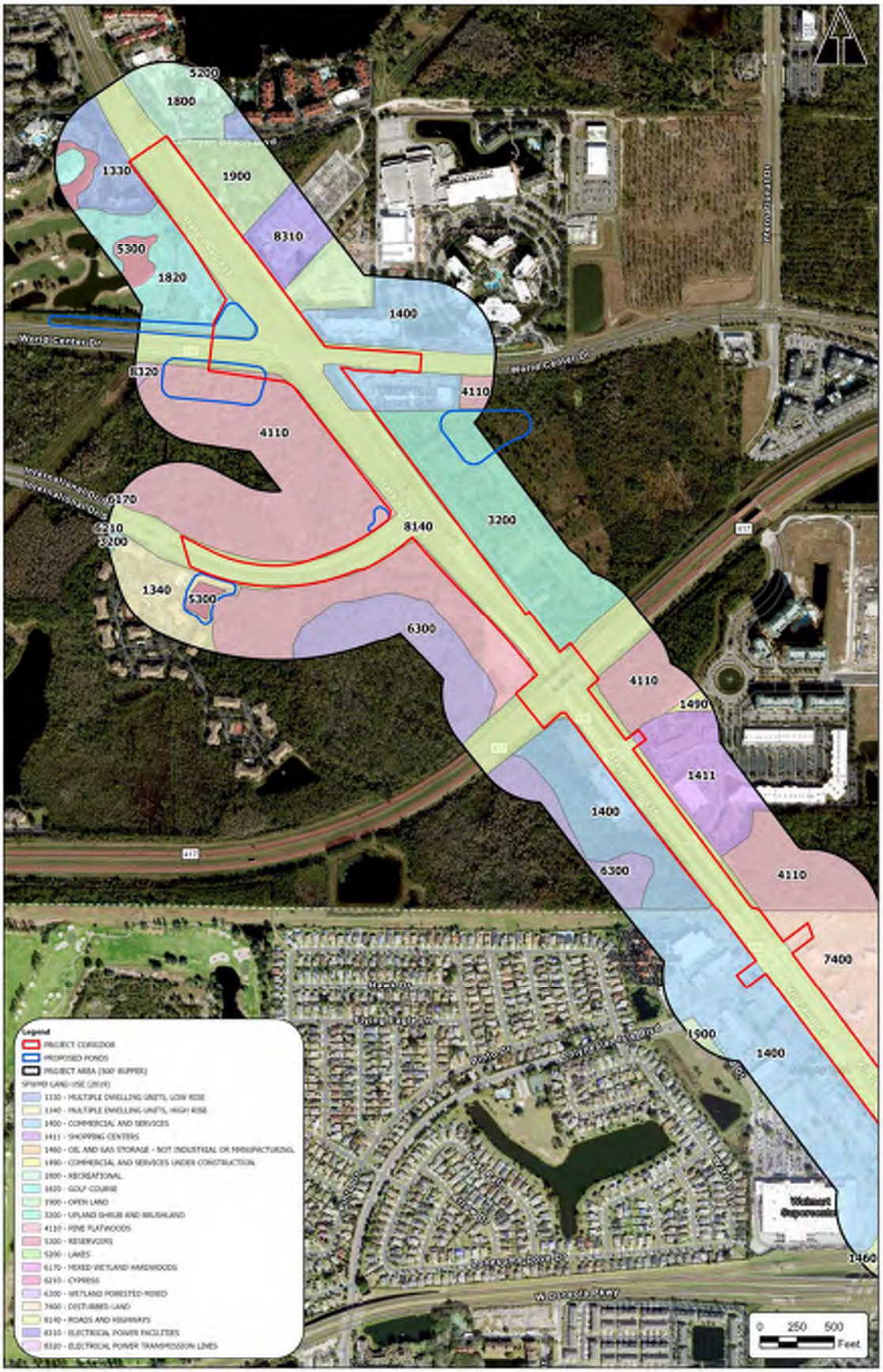
Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
12095C0585F

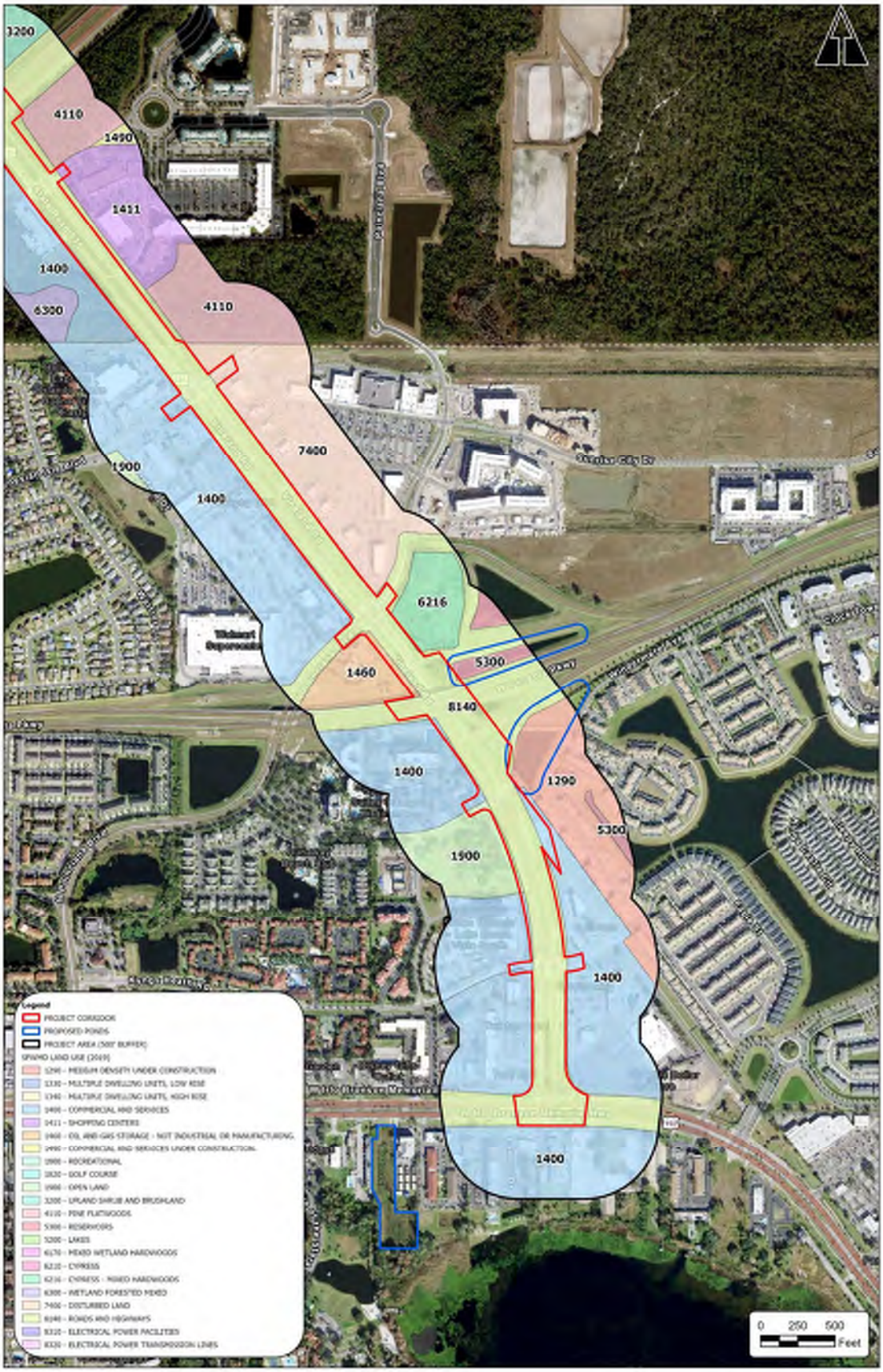
MAP REVISED
SEPTEMBER 25, 2009

Federal Emergency Management Agency

Land Use in Orange County Project Area



Land Use in Osceola County Project Area



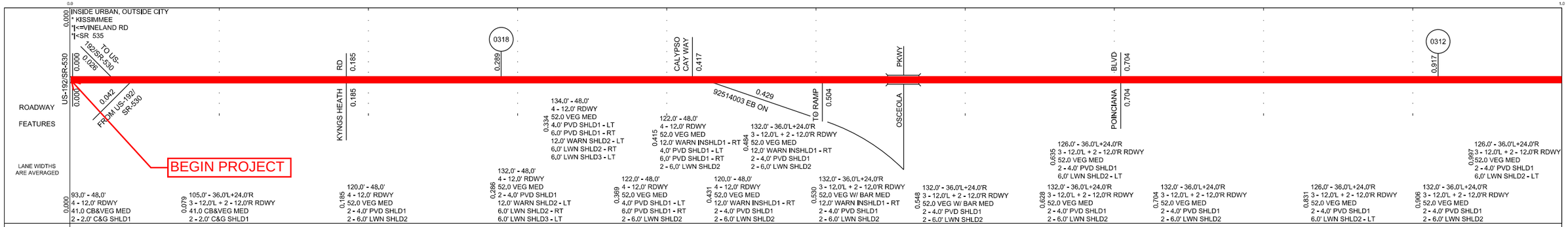
	5 YR INV	SLD REV	BMP	EMP	INV	SLD REV
DATE	12/14/2020	01/22/2021				
BY	HNTB	HNTB				

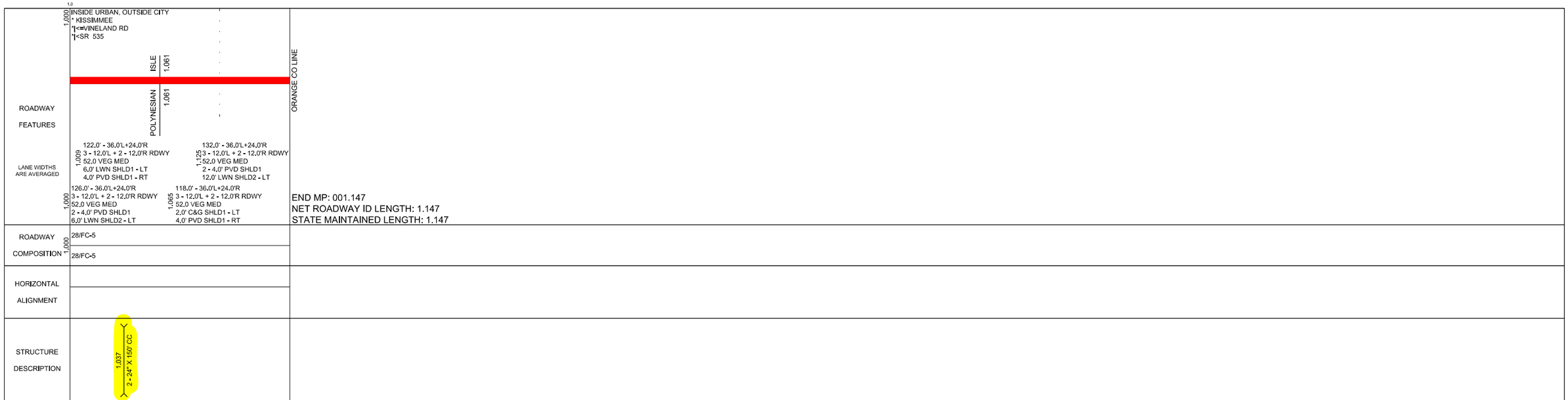
FLORIDA DEPARTMENT OF TRANSPORTATION

STRAIGHT LINE DIAGRAM OF ROAD INVENTORY

SECTION STATUS	INT. or US ROUTE NO.	STATE ROAD NO.	COUNTY	DISTRICT	ROADWAY ID	SHEET NO:
02		SR 535	OSCEOLA	05	92040000	1 OF 1

A-11





	5 YR INV	SLD REV
DATE	03/20/2020	04/28/2020
BY	HNTB	HNTB

BMP	EMP	INV	SLD REV
0.000	2.314	03/20/2020 HNTB	02/18/2021 S. Shams

FLORIDA DEPARTMENT OF TRANSPORTATION

STRAIGHT LINE DIAGRAM OF ROAD INVENTORY

SECTION STATUS	INT. or US ROUTE NO.	STATE ROAD NO.	COUNTY	DISTRICT	ROADWAY ID	SHEET NO:
02		SR 535	ORANGE	05	75001	1 OF 2

A-12

ROADWAY FEATURES

INSIDE URBAN, OUTSIDE CITY
* KISSIMMEE
*|<=KISSIMMEE VINELND RD
*|<SR 535

OSCEOLA CO LINE 0.000

LBV FACTORY STORE DR 0.247

CONNECTOR 0.351 / SOUTHERN 0.359

CONNECTOR 0.368 / SOUTHERN 0.376

OLD 535 0.575

INTERNATIONAL DR S 0.642

SR-536/WORLD CTR DR 0.895

TO WORLD CENTER DR 0.943

TO WORLD CENTER DR CR-536/WORLD CTR DR 0.858 / 0.895

FROM WORLD CENTER DR 0.908

LANE WIDTHS ARE AVERAGED

0.000 147.0' - 48.0' | 4 - 12.0' RDWY | 65.0 VEG MED | 2 - 5.0' PVD SHLD1 | 2 - 12.0' LWN SHLD2

0.442 147.0' - 48.0' | 4 - 12.0' RDWY | 65.0 VEG MED | 5.0' WARN INSHLD1 - LT | 2 - 5.0' PVD SHLD1 | 2 - 12.0' LWN SHLD2

0.461 147.0' - 48.0' | 4 - 12.0' RDWY | 65.0 VEG MED | 11.0' WARN INSHLD1 - LT | 2 - 5.0' PVD SHLD1 | 2 - 12.0' LWN SHLD2

0.505 147.0' - 48.0' | 4 - 12.0' RDWY | 65.0 VEG MED | 5.0' WARN INSHLD1 - LT | 2 - 5.0' PVD SHLD1 | 2 - 12.0' LWN SHLD2

0.523 147.0' - 48.0' | 4 - 12.0' RDWY | 65.0 VEG MED | 2 - 5.0' PVD SHLD1 | 2 - 12.0' LWN SHLD2

0.528 147.0' - 48.0' | 4 - 12.0' RDWY | 65.0 VEG MED | 4.0' PVD INSHLD1 - RT | 2 - 5.0' PVD SHLD1 | 2 - 12.0' LWN SHLD2

0.614 147.0' - 48.0' | 4 - 12.0' RDWY | 65.0 VEG MED | 2 - 5.0' PVD SHLD1 | 2 - 12.0' LWN SHLD2

0.642 171.0' - 72.0' | 6 - 12.0' RDWY | 65.0 VEG MED | 2 - 5.0' PVD SHLD1 | 2 - 12.0' LWN SHLD2

0.658 148.0' - 72.0' | 6 - 12.0' RDWY | 42.0 VEG MED | 5.0' WARN INSHLD1 - RT | 2 - 5.0' PVD SHLD1 | 2 - 12.0' LWN SHLD2

0.675 148.0' - 72.0' | 6 - 12.0' RDWY | 42.0 VEG MED | 2 - 5.0' PVD SHLD1 | 2 - 12.0' LWN SHLD2

ROADWAY COMPOSITION

0.000 28/FC-5 / 28/FC-5

0.664 28/FC-5 / 28/FC-5

0.785 28/FC-5 / 28/FC-5

HORIZONTAL ALIGNMENT

CURVE DATA NOT FIELD VERIFIED

PI=0.030 Δ=1°47'27.00" PI=0.060 Δ=1°41'13.00"

B=N36°54'48"W B=N38°42'15"W B=N37°01'02"W

PI=0.261 Δ=0°07'26.00"

B=N36°53'36"W

Δ=7°05'56.00" D=1°00' PC=0.373 PI=0.429 PT=0.495

B=N43°59'42"W

PC=0.549 PI=0.616 PT=0.683 Δ=7°05'56.00" D=1°00'

B=N36°53'46"W

STRUCTURE DESCRIPTION

0.004 1 - 15' X 72' CC

0.099 1 - 15' X 80' CC

#0475 42.2' UP

#0474 42.2' UP

0.382 1 - 24' X 168' CC

0.568 1 - 15' X 102' CC

0.610 1 - 15' X 80' CC

0.741 1 - 15' X 78' CC

DISTRICT USE

SIS

FUN CLASS

0.000 URBAN MINOR ART

SPEED LIMIT

0.000 50MPH

ROADWAY FEATURES

1.000 INSIDE URBAN, OUTSIDE CITY
* KISSIMMEE
*|<=KISSIMMEE VINELND RD
*|<SR 535

END PROJECT

VISTANA DR 1.434

0630 1.730

VISTANA CTR DR 1.768

MEADOW CREEK DR 1.903

LK BRYAN BEACH BLVD 1.235

BLUE HERON BEACH DR 1.768

LAKE VINING DR 1.903

LANE WIDTHS ARE AVERAGED

1.000 148.0' - 72.0' | 6 - 12.0' RDWY | 42.0 VEG MED | 2 - 5.0' PVD SHLD1 | 2 - 12.0' LWN SHLD2

1.062 148.0' - 72.0' | 6 - 12.0' RDWY | 42.0 VEG MED | 15.0' WARN INSHLD1 - LT | 2 - 5.0' PVD SHLD1 | 2 - 12.0' LWN SHLD2

1.082 148.0' - 72.0' | 6 - 12.0' RDWY | 42.0 VEG MED | 2 - 5.0' PVD SHLD1 | 2 - 12.0' LWN SHLD2

1.357 134.0' - 76.0' | 6 - 12.7' RDWY | 24.0 CB&VEG MED | 2 - 5.0' PVD SHLD1 | 2 - 12.0' LWN SHLD2

1.371 104.0' - 76.0' | 6 - 12.7' RDWY | 24.0 CB&VEG MED | 2 - 2.0' C&G SHLD1

1.600 102.0' - 76.0' | 6 - 12.7' RDWY | 22.0 TFSP MED | 2 - 2.0' C&G SHLD1

1.774 104.0' - 76.0' | 6 - 12.7' RDWY | 24.0 CB&VEG MED | 2 - 2.0' C&G SHLD1

1.860 103.0' - 76.0' | 6 - 12.7' RDWY | 23.0 TFSP MED | 2 - 2.0' C&G SHLD1

1.903 101.0' - 76.0' | 6 - 12.7' RDWY | 21.0 CB&VEG MED | 2 - 2.0' C&G SHLD1

ROADWAY COMPOSITION

1.000 28/FC-5 / 28/FC-5

1.373 28/FC-6 / 28/FC-6

HORIZONTAL ALIGNMENT

CURVE DATA NOT FIELD VERIFIED

PC=1.191 PI=1.364 PT=1.531 Δ=26°56'09.00" D=1°30'

B=N09°57'37"W

PC=1.914 PI=1.969 PT=2.024 Δ=14°42'01.00" D=1°30'

STRUCTURE DESCRIPTION

DISTRICT USE

SIS

FUN CLASS

1.000 URBAN MINOR ART

SPEED LIMIT

1.000 50MPH

1.185 45MPH

Version: 1.4.2.27 02/18/2021

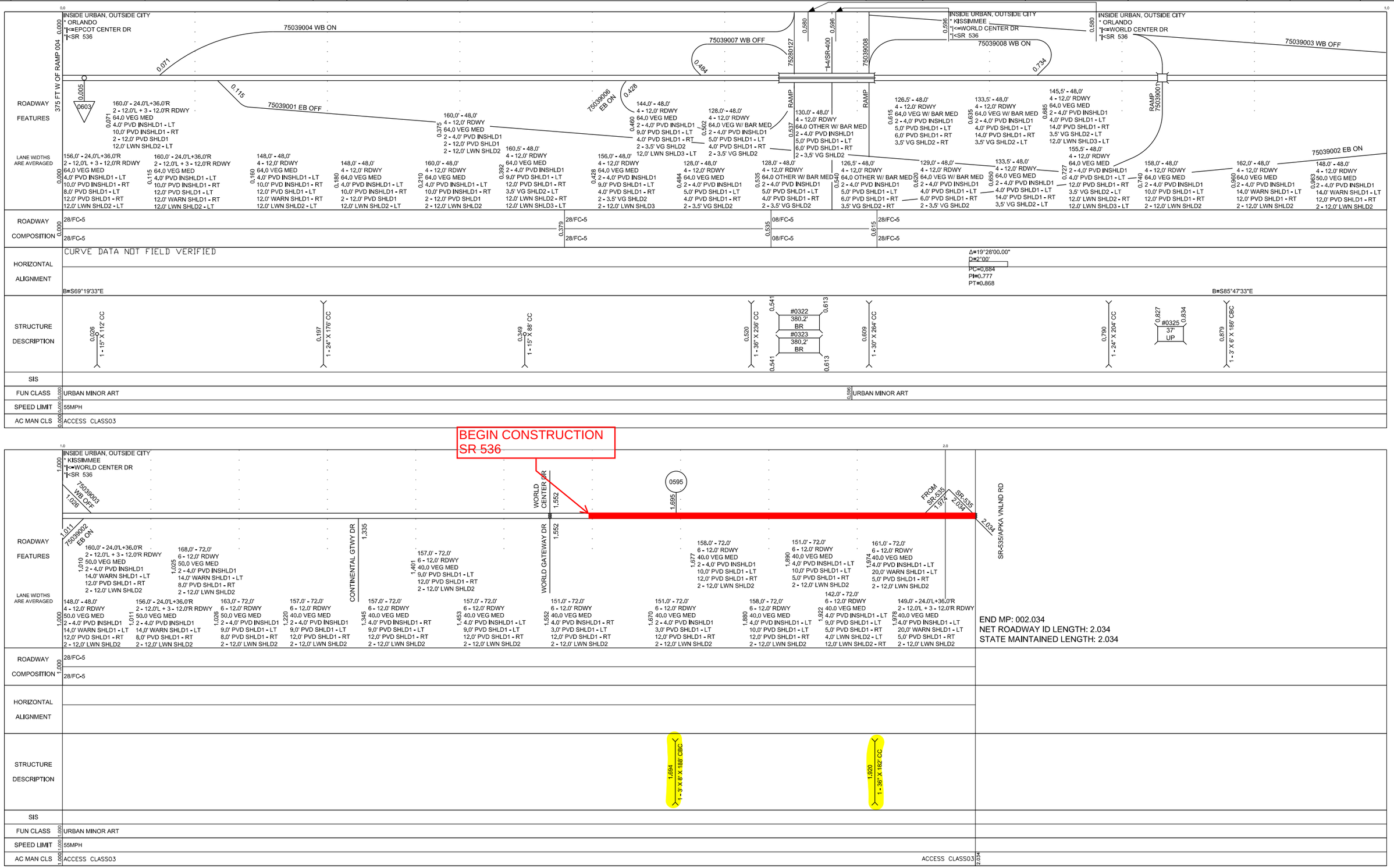
	5 YR INV	SLD REV	BMP	EMP	INV	SLD REV
DATE	12/02/2021	12/09/2021				
BY	HNTB	HNTB				

FLORIDA DEPARTMENT OF TRANSPORTATION

STRAIGHT LINE DIAGRAM OF ROAD INVENTORY

SECTION STATUS	INT. or US ROUTE NO.	STATE ROAD NO.	COUNTY	DISTRICT	ROADWAY ID	SHEET NO:
02		SR 536	ORANGE	05	75039000	1 OF 1

A-13



Version: 1.4.2.27 12/09/2021

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

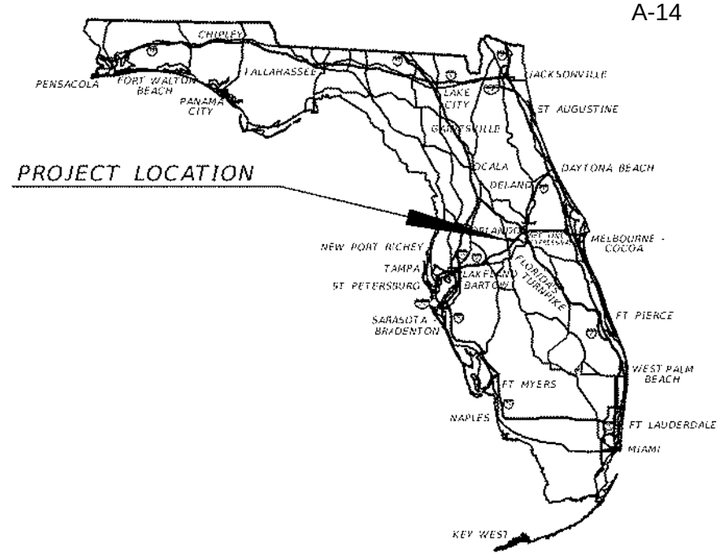
TYPICAL SECTION PACKAGE

FINANCIAL PROJECT ID 437174-2-22-01
(FEDERAL FUNDS)

OSCEOLA COUNTY (92040) & ORANGE COUNTY (75035)

STATE ROAD NO. 535

ADD LANES AND RECONSTRUCT FROM US 192 TO
NORTH OF WORLD CENTER DRIVE (SR 536)



FDOT DISTRICT DESIGN ENGINEER	FDOT DISTRICT TRAFFIC OPERATIONS ENGINEER
CONCURRING WITH: TYPICAL SECTION ELEMENTS DESIGN & POSTED SPEEDS	CONCURRING WITH: DESIGN & POSTED SPEEDS
FDOT DISTRICT INTERMODAL SYSTEMS DEVELOPMENT MANAGER	FDOT DISTRICT STRUCTURES DESIGN ENGINEER
CONCURRING WITH: CONTEXT CLASSIFICATION TARGET SPEED	CONCURRING WITH: TYPICAL SECTION ELEMENTS
FHWA TRANSPORTATION ENGINEER	NOT USED
CONCURRING WITH: TYPICAL SECTION ELEMENTS TARGET SPEED	CONCURRING WITH:
NOT USED	NOT USED
CONCURRING WITH:	CONCURRING WITH:

PROJECT LOCATION URL:	http://tinyurl.com/SR535
PROJECT LIMITS:	OSCEOLA COUNTY
	MP 0.000 TO 1.147
	ORANGE COUNTY
	MP 0.000 TO 1.325
EXCEPTIONS:	NONE
BRIDGE LIMITS:	NONE
RAILROAD CROSSING:	NONE

APPROVED BY:

PAUL STEVEN CARBALLO LICENSE No 87891 STATE OF FLORIDA PROFESSIONAL ENGINEER

THIS ITEM HAS BEEN DIGITALLY SIGNED AND SEALED BY

PAUL STEVEN CARBALLO, P.E.

ON THE DATE ADJACENT TO THE SEAL

PRINTED COPIES OF THIS DOCUMENT ARE NOT CONSIDERED SIGNED AND SEALED AND THE SIGNATURE MUST BE VERIFIED ON ANY ELECTRONIC COPIES.

METRIC ENGINEERING, INC.
13940 SW 136TH ST
MIAMI, FLORIDA, 33186
PAUL STEVEN CARBALLO, P.E. NO. 87891

THE ABOVE NAMED PROFESSIONAL ENGINEER SHALL BE RESPONSIBLE FOR THE FOLLOWING SHEETS IN ACCORDANCE WITH RULE 61G15-23.004, F.A.C.

INDEX OF SHEETS

SHEET NO. 01

PROJECT CONTROLS

CONTEXT CLASSIFICATION

( ) C1 : NATURAL
( ) C2 : RURAL
( ) C2T : RURAL TOWN
( ) C3R : SUBURBAN RES.
( ) N/A : L.A. FACILITY
(X) C3C : SUBURBAN COMM.
( ) C4 : URBAN GENERAL
( ) C5 : URBAN CENTER
( ) C6 : URBAN CORE

FUNCTIONAL CLASSIFICATION

( ) INTERSTATE
( ) FREEWAY/EXPWY.
( ) PRINCIPAL ARTERIAL
(X) MINOR ARTERIAL
( ) MAJOR COLLECTOR
( ) MINOR COLLECTOR
( ) LOCAL

HIGHWAY SYSTEM

( ) NATIONAL HIGHWAY SYSTEM
( ) STRATEGIC INTERMODAL SYSTEM
(X) STATE HIGHWAY SYSTEM
( ) OFF-STATE HIGHWAY SYSTEM

ACCESS CLASSIFICATION

( ) 1 - FREEWAY
( ) 2 - RESTRICTIVE w/Service Roads
(X) 3 - RESTRICTIVE w/660 ft. Connection Spacing
( ) 4 - NON-RESTRICTIVE w/2640 ft. Signal Spacing
( ) 5 - RESTRICTIVE w/440 ft. Connection Spacing
( ) 6 - NON-RESTRICTIVE w/1320 ft. Signal Spacing
( ) 7 - BOTH MEDIAN TYPES

CRITERIA

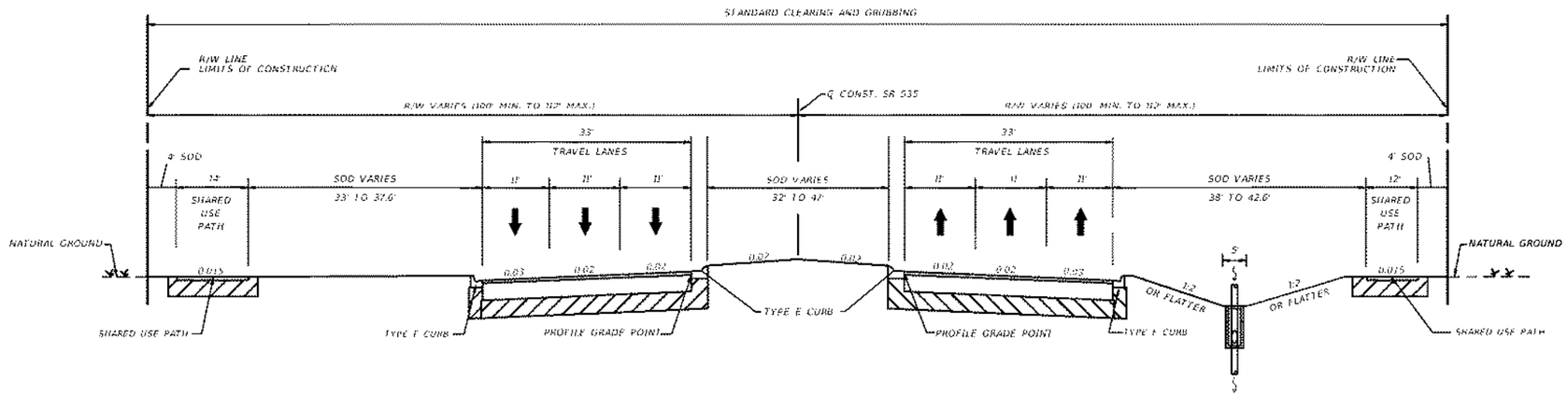
(X) NEW CONSTRUCTION / RECONSTRUCTION
( ) RESURFACING (LA FACILITIES)
( ) RRR (ARTERIALS & COLLECTORS)

POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:

DESIGN VARIATIONS

N/A

TYPICAL SECTION - A



SR 535

STA. 1489+00.00 to STA. 1518+39.58

STA. 1519+68.44 to STA. 1568+24.47

STA. 1569+61.08 to STA. 1588+07.14

NOT TO SCALE

TRAFFIC DATA

EXISTING CONDITIONS =2020 AADT = 56,000
ESTIMATED OPENING YEAR =2025 AADT = 59,500
ESTIMATED DESIGN YEAR =2045 AADT = 73,500
K = 7.5% D = 52.2% T = 9.4% (72 HOUR)
DESIGN HOURS T = 12.0%
DESIGN SPEED = 45 MPH
POSTED SPEED = 45 MPH
TARGET SPEED = 45 MPH

FINANCIAL PROJECT ID	SHEET NO.
437174-2-22-01	02

NOTICE: THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE SIGNED AND SEALED UNDER RULE 61G15-23.004, F.A.C.

PROJECT CONTROLS

CONTEXT CLASSIFICATION

( )	C1 : NATURAL	(X)	C3C : SUBURBAN COMM.
( )	C2 : RURAL	( )	C4 : URBAN GENERAL
( )	C2T : RURAL TOWN	( )	C5 : URBAN CENTER
( )	C3R : SUBURBAN RES.	( )	C6 : URBAN CORE
( )	N/A : L.A. FACILITY		

FUNCTIONAL CLASSIFICATION

( )	INTERSTATE	( )	MAJOR COLLECTOR
( )	FREEWAY/EXPWY.	( )	MINOR COLLECTOR
( )	PRINCIPAL ARTERIAL	( )	LOCAL
(X)	MINOR ARTERIAL		

HIGHWAY SYSTEM

( ) NATIONAL HIGHWAY SYSTEM
( ) STRATEGIC INTERMODAL SYSTEM
(X) STATE HIGHWAY SYSTEM
( ) OFF-STATE HIGHWAY SYSTEM

ACCESS CLASSIFICATION

( ) 1 - FREEWAY
( ) 2 - RESTRICTIVE w/Service Roads
(X) 3 - RESTRICTIVE w/660 ft. Connection Spacing
( ) 4 - NON-RESTRICTIVE w/2640 ft. Signal Spacing
( ) 5 - RESTRICTIVE w/440 ft. Connection Spacing
( ) 6 - NON-RESTRICTIVE w/1320 ft. Signal Spacing
( ) 7 - BOTH MEDIAN TYPES

CRITERIA

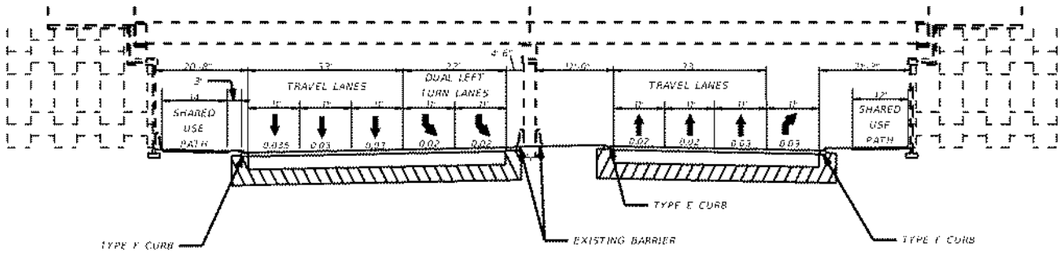
(X) NEW CONSTRUCTION / RECONSTRUCTION
( ) RESURFACING (LA FACILITIES)
( ) RRR (ARTERIALS & COLLECTORS)

POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:

DESIGN VARIATIONS

N/A

TYPICAL SECTION - B



OSCEOLA PARKWAY OVER SR 535

STA. 1518+39.58 to STA. 1519+68.44

NOT TO SCALE

TRAFFIC DATA

EXISTING CONDITIONS =2020 AADT = 56,000
ESTIMATED OPENING YEAR =2025 AADT = 59,500
ESTIMATED DESIGN YEAR =2045 AADT = 73,500
K = 7.5% D = 52.2% T = 9.4% (72 HOUR)
DESIGN HOURS T = 12.0%
DESIGN SPEED = 45 MPH
POSTED SPEED = 45 MPH
TARGET SPEED = 45 MPH

FINANCIAL PROJECT ID	SHEET NO.
437174-2-22-01	03

PROJECT CONTROLS

CONTEXT CLASSIFICATION

( )	C1 : NATURAL	(X)	C3C : SUBURBAN COMM.
( )	C2 : RURAL	( )	C4 : URBAN GENERAL
( )	C2T : RURAL TOWN	( )	C5 : URBAN CENTER
( )	C3R : SUBURBAN RES.	( )	C6 : URBAN CORE
( )	N/A : L.A. FACILITY		

FUNCTIONAL CLASSIFICATION

( )	INTERSTATE	( )	MAJOR COLLECTOR
( )	FREEWAY/EXPWY.	( )	MINOR COLLECTOR
( )	PRINCIPAL ARTERIAL	( )	LOCAL
(X)	MINOR ARTERIAL		

HIGHWAY SYSTEM

( ) NATIONAL HIGHWAY SYSTEM
( ) STRATEGIC INTERMODAL SYSTEM
(X) STATE HIGHWAY SYSTEM
( ) OFF-STATE HIGHWAY SYSTEM

ACCESS CLASSIFICATION

( ) 1 - FREEWAY
( ) 2 - RESTRICTIVE w/Service Roads
(X) 3 - RESTRICTIVE w/660 ft. Connection Spacing
( ) 4 - NON-RESTRICTIVE w/2640 ft. Signal Spacing
( ) 5 - RESTRICTIVE w/440 ft. Connection Spacing
( ) 6 - NON-RESTRICTIVE w/1320 ft. Signal Spacing
( ) 7 - BOTH MEDIAN TYPES

CRITERIA

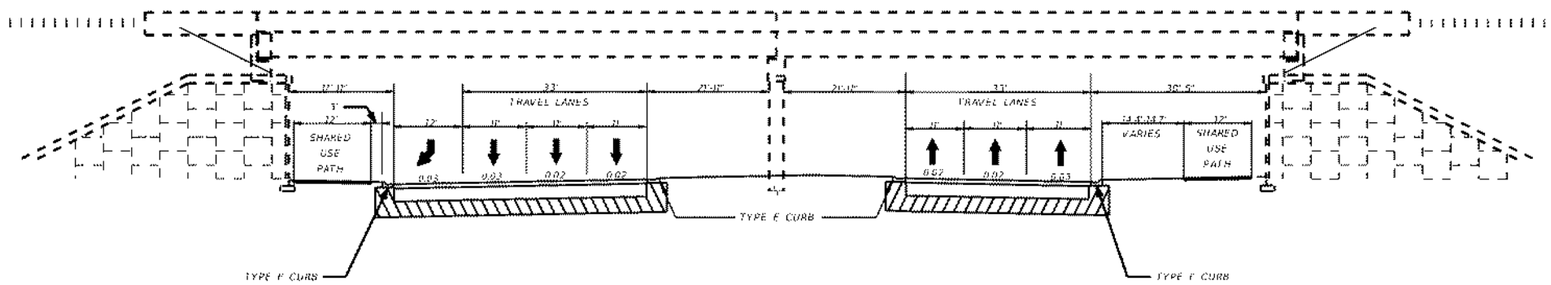
(X) NEW CONSTRUCTION / RECONSTRUCTION
( ) RESURFACING (LA FACILITIES)
( ) RRR (ARTERIALS & COLLECTORS)

POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:

DESIGN VARIATIONS

N/A

TYPICAL SECTION - C



SR 417 OVER SR 535

STA. 1568+24.47 to STA. 1569+61.08

NOT TO SCALE

TRAFFIC DATA

EXISTING CONDITIONS =2020 AADT = 56,000
ESTIMATED OPENING YEAR =2025 AADT = 59,500
ESTIMATED DESIGN YEAR =2045 AADT = 73,500
K = 7.5% D = 52.2% T = 9.4% (72 HOUR)
DESIGN HOURS T = 12.0%
DESIGN SPEED = 45 MPH
POSTED SPEED = 45 MPH
TARGET SPEED = 45 MPH

FINANCIAL PROJECT ID	SHEET NO.
437174-2-22-01	04

PROJECT CONTROLS

CONTEXT CLASSIFICATION

( )	C1 : NATURAL	(X)	C3C : SUBURBAN COMM.
( )	C2 : RURAL	( )	C4 : URBAN GENERAL
( )	C2T : RURAL TOWN	( )	C5 : URBAN CENTER
( )	C3R : SUBURBAN RES.	( )	C6 : URBAN CORE
( )	N/A : L.A. FACILITY		

FUNCTIONAL CLASSIFICATION

( )	INTERSTATE	( )	MAJOR COLLECTOR
( )	FREEWAY/EXPWY.	( )	MINOR COLLECTOR
( )	PRINCIPAL ARTERIAL	( )	LOCAL
(X)	MINOR ARTERIAL		

HIGHWAY SYSTEM

( ) NATIONAL HIGHWAY SYSTEM
( ) STRATEGIC INTERMODAL SYSTEM
(X) STATE HIGHWAY SYSTEM
( ) OFF-STATE HIGHWAY SYSTEM

ACCESS CLASSIFICATION

( ) 1 - FREEWAY
( ) 2 - RESTRICTIVE w/Service Roads
(X) 3 - RESTRICTIVE w/660 ft. Connection Spacing
( ) 4 - NON-RESTRICTIVE w/2640 ft. Signal Spacing
( ) 5 - RESTRICTIVE w/440 ft. Connection Spacing
( ) 6 - NON-RESTRICTIVE w/1320 ft. Signal Spacing
( ) 7 - BOTH MEDIAN TYPES

CRITERIA

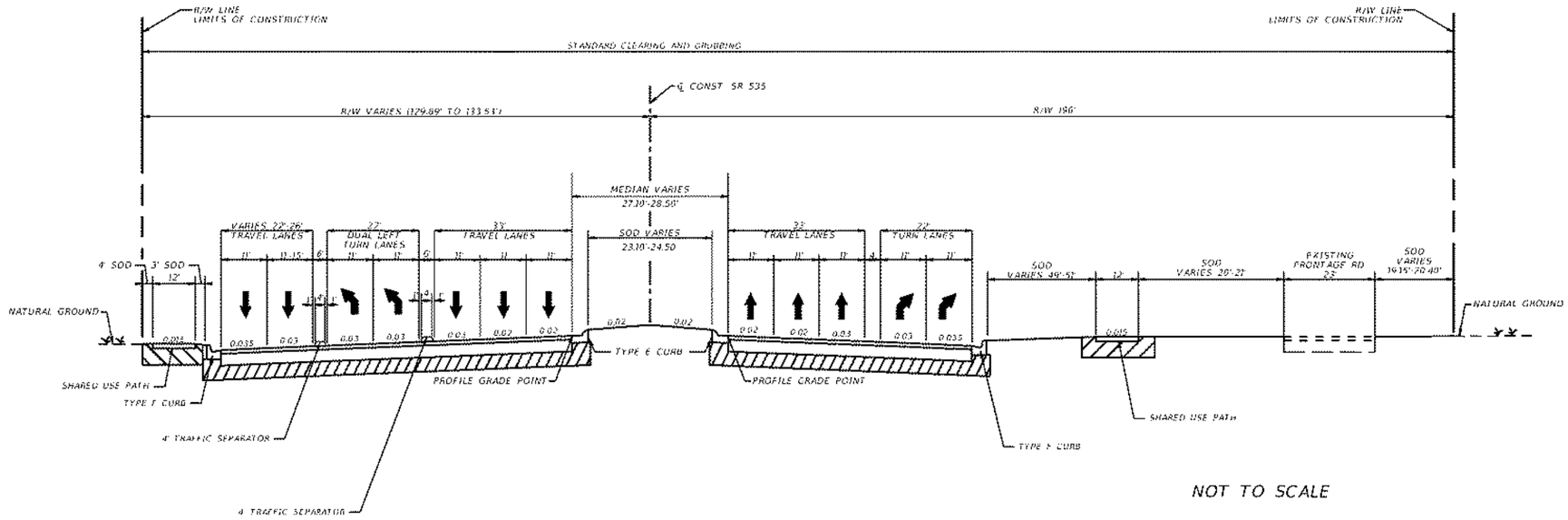
(X) NEW CONSTRUCTION / RECONSTRUCTION
( ) RESURFACING (LA FACILITIES)
( ) RRR (ARTERIALS & COLLECTORS)

POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:

DESIGN VARIATIONS

N/A

TYPICAL SECTION - D



NOT TO SCALE

DISPLACED LEFT INTERSECTION ALONG SR 535
AT THE WORLD CENTER DRIVE (SR 536) INTERSECTION

STA. 1592+47.83 to STA. 1594+45.82

TRAFFIC DATA

EXISTING CONDITIONS =2020 AADT = 56,000
ESTIMATED OPENING YEAR =2025 AADT = 59,500
ESTIMATED DESIGN YEAR =2045 AADT = 73,500
K = 7.5% D = 52.2% T = 9.4% (72 HOUR)
DESIGN HOURS T = 12.0%
DESIGN SPEED = 45 MPH
POSTED SPEED = 45 MPH
TARGET SPEED = 45 MPH

FINANCIAL PROJECT ID	SHEET NO.
437174-2-22-01	05

Appendix B

Pond Alternative Exhibits

EXIST. CONDITION

PROPOSED CONDITION

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

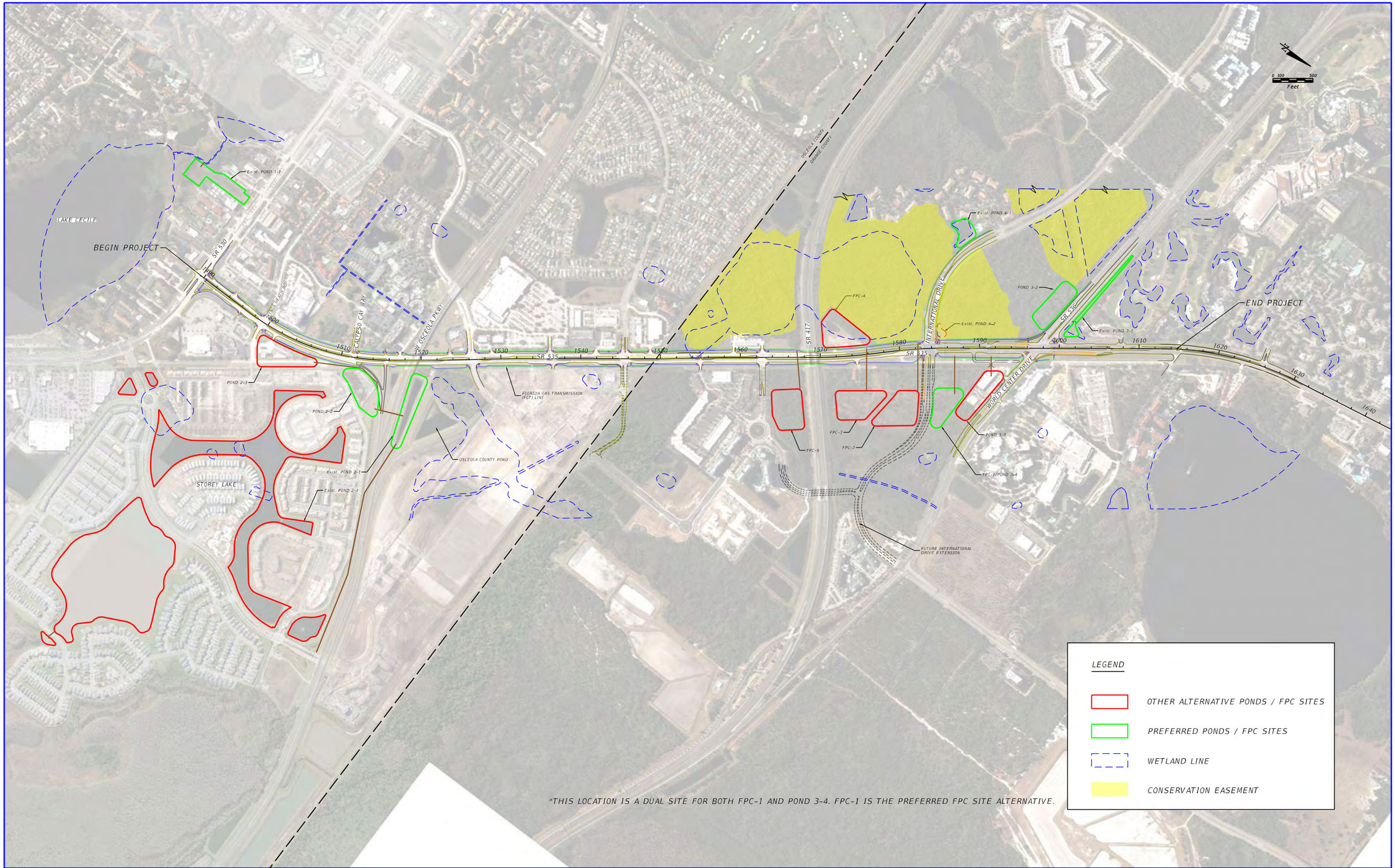
ZHIMIN LI, P.E.
P.E. LICENSE NUMBER 88717
BCC ENGINEERING, LLC.
160 N. WESTMONTE DRIVE, SUITE 2000
ALTAMONTE SPRINGS, FLORIDA 32714

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 535	ORANGE OSCEOLA	43717422201

POND ALTERNATIVES DRAINAGE MAP

SHEET NO.



REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

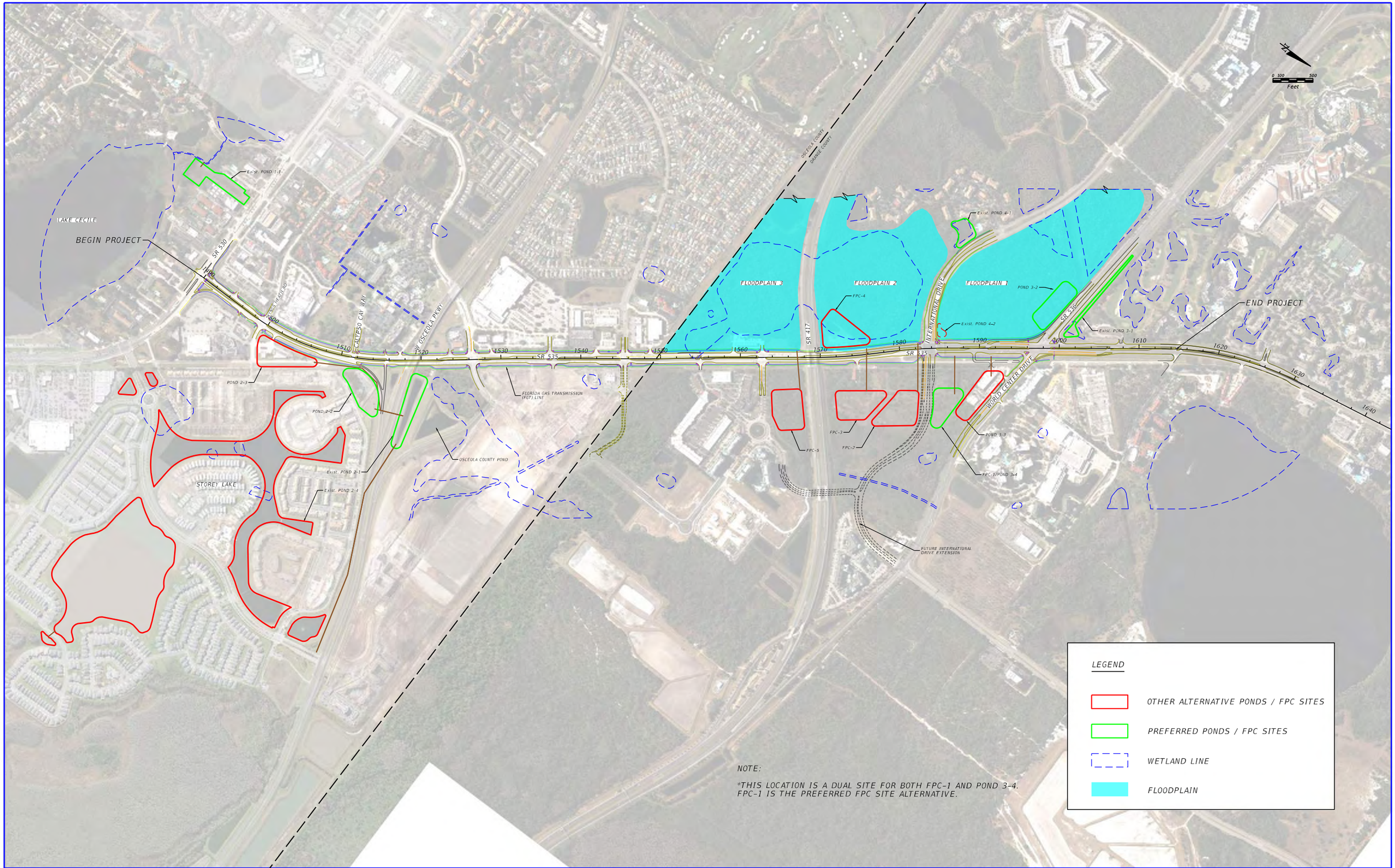
ZHIMIN LI, P.E.
P.E. LICENSE NUMBER 88717
BCC ENGINEERING, LLC.
160 N. WESTMONTE DRIVE, SUITE 2000
ALTAMONTE SPRINGS, FLORIDA 32714

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 535	ORANGE OSCEOLA	43717422201

POND ALTERNATIVES ENVIRONMENTAL EXHIBIT

SHEET NO.



NOTE:

*THIS LOCATION IS A DUAL SITE FOR BOTH FPC-1 AND POND 3-4. FPC-1 IS THE PREFERRED FPC SITE ALTERNATIVE.

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

ZHIMIN LI, P.E.
P.E. LICENSE NUMBER 88717
BCC ENGINEERING, LLC.
160 N. WESTMONTE DRIVE, SUITE 2000
ALTAMONTE SPRINGS, FLORIDA 32714

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 535	ORANGE OSCEOLA	43717422201

POND ALTERNATIVES FLOODPLAIN EXHIBIT

SHEET NO.

Appendix C

Pond Sizing Calculations,

Nutrient Loading Calculations and

Precipitation Data

Pond Sizing Calculations

BCC ENGINEERING, INC.					
PROJECT:	SR 535 PD&E				DATE
FPID:	437174-2	BASIN 1 - Exist. Pond 1-1	BY:	SH	7/24/2022
BASIN:	**1**		CHECKED:	ZL	8/24/2023
ALTERNATIVE:	**1A (EXIST. POND 1-1)**		REVISED:	ZL	11/14/2023

ALTERNATIVE 1A

PRE-DEVELOPMENT (EXISTING) CONDITION

CURVE NUMBER

LAND USE DESCRIPTION	HYDROLOGIC SOIL GROUP	CN	AREA (AC)				C*A
			PERVIOUS	IMPERVIOUS	WATER SURFACE	TOTAL	
ROADWAY BASIN							
Impervious area	D	98		13.60		13.60	1332.80
Open Space (fair) - grass 50-75%	D	84	14.00			14.00	1176.00
Subtotal (basin area):			14.00	13.60	0.00	27.60	2508.80
POND BASIN							
Water surface	D	100			1.50	1.50	150.00
Open Space (fair) - grass 50-75%	D	84	1.84			1.84	154.56
Subtotal (pond area):			1.84	0.00	1.50	3.34	304.56
TOTAL:			**15.84**	**13.60**	**1.50**	**30.94**	**2813.36**

NOTE: TOTAL AREA FROM PERMIT NO. 49-00883-P/APPLICATION #971113-1

Composite CN = 91

ESTIMATE OF RUNOFF VOLUME

PROCEDURE TO DETERMINE RUNOFF VOLUMES IS BASED ON THE SCS EQUATION AS FOLLOWS:

1) DETERMINE SOIL STORAGE [S] → S = (1000/CN) - 10 (inches)
2) DETERMINE RAINFALL [P] → (inches)
3) DETERMINE RUNOFF [R] → $R = (P - 0.2 * S)^2/(P + 0.8 * S)$ (inches)
4) DETERMINE RUNOFF VOLUME [V(R)] → V(R) = (R/12) * AREA (acre-feet)

AGENCY/DESCRIPTION	FREQUENCY	P (IN)	S (IN)	R (IN)	V(R) (AC-FT)	
FDOT 5YR-24HR	5YR-24HR	5.40	1.00	4.36	11.25	NOAA ATLAS 14
FDOT 10YR-24HR	10YR-24HR	6.37	1.00	5.31	13.70	NOAA ATLAS 14
SFWMD 25YR-72HR	25YR-72HR	9.70	1.00	8.60	22.17	SFWMD
FDOT 100YR-24HR	100YR-24HR	10.80	1.00	9.69	24.98	NOAA ATLAS 14

POST-DEVELOPMENT (PROPOSED) CONDITION

CURVE NUMBER

LAND USE DESCRIPTION	HYDROLOGIC SOIL GROUP	CN	AREA (AC)				C*A
			PERVIOUS	IMPERVIOUS	WATER SURFACE	TOTAL	
ROADWAY BASIN							
Impervious area	D	98		12.60		12.60	1234.80
Open Space (fair) - grass 50-75%	D	84	13.22			13.22	1110.48
Subtotal (basin area):			13.22	12.60	0.00	25.82	2345.28
POND BASIN							
Water surface	D	100			1.50	1.50	150.0
Open Space (fair) - grass 50-75%	D	84	1.84			1.84	154.6
Subtotal (pond area):			1.84	0.00	1.50	3.34	304.6
TOTAL:			**15.06**	**12.60**	**1.50**	**29.16**	**2,649.84**

Composite CN = 91

BCC ENGINEERING, INC.					
PROJECT:	SR 535 PD&E				DATE
FPID:	437174-2	BASIN 1 - Exist. Pond 1-1	BY:	SH	7/24/2022
BASIN:	**1**		CHECKED:	ZL	8/24/2023
ALTERNATIVE:	**1A (EXIST. POND 1-1)**		REVISED:	ZL	11/14/2023

ESTIMATE OF RUNOFF VOLUME

PROCEDURE TO DETERMINE RUNOFF VOLUMES IS BASED ON THE SCS EQUATION AS FOLLOWS:

1) DETERMINE SOIL STORAGE [S] → S = (1000/CN) - 10 (inches)
2) DETERMINE RAINFALL [P] → (inches)
3) DETERMINE RUNOFF [R] → $R = (P - 0.2 * S)^2/(P + 0.8 * S)$ (inches)
4) DETERMINE RUNOFF VOLUME [V(R)] → V(R) = (R/12) * AREA (acre-feet)

AGENCY/DESCRIPTION	FREQUENCY	P (IN)	S (IN)	R (IN)	V(R) (AC-FT)
FDOT 5YR-24HR	5YR-24HR	5.40	1.00	4.36	10.59
FDOT 10YR-24HR	10YR-24HR	6.37	1.00	5.31	12.89
SFWMD 25YR-72HR	25YR-72HR	9.70	1.00	8.59	20.88
FDOT 100YR-24HR	100YR-24HR	10.80	1.00	9.68	23.53

WATER QUANTITY (ATTENUATION) VOLUMES REQUIRED

		V(R) (AC-FT)		
AGENCY/DESCRIPTION	FREQUENCY	PRE-DEV (EXISTING)	POST-DEV (PROPOSED)	DIFFERENCE
FDOT 5YR-24HR	5YR-24HR	11.25	10.59	-0.66
FDOT 10YR-24HR	10YR-24HR	13.70	12.89	-0.80
SFWMD 25YR-72HR	**25YR-72HR**	**22.17**	**20.88**	**-1.29**
FDOT 100YR-24HR	100YR-24HR	24.98	23.53	**-1.45**

CONTROLLING WATER QUANTITY (ATTENUATION) VOLUME = **-1.29** **AC-FT**

WATER QUALITY (TREATMENT) VOLUME REQUIRED

1. WATER MANAGEMENT DISTRICT PRESUMPTIVE REQUIREMENTS:
JURISDICTION: SFWMD

SFWMD CRITERIA (SECTION 4.2.1, SFWMD APPLICANT'S HANDBOOK):
PROVIDE THE GREATER OF:
2.5" OVER THE IMPERVIOUS AREA; OR
1" OVER THE DRAINAGE AREA

AREAS:
TOTAL BASIN AREA (EXCLUDING WATER SURFACE AREAS) = 27.66 AC
PROPOSED IMPERVIOUS AREA = 12.60 AC

1" OVER TOTAL AREA = 2.31 AC-FT
2.5" OVER IMPERVIOUS AREA = 2.63 AC-FT

IMPERVIOUS AREA:
EXISTING IMPERVIOUS AREA = 13.60 AC
PROPOSED IMPERVIOUS AREA = 12.60 AC
NEW IMPERVIOUS AREA = -1.00 AC

1" OVER THE TOTAL BASIN AREA (EXCLUDING WATER SURFACE AREAS) = 2.31 AC-FT
2.5" OVER IMPERVIOUS AREA = 2.63 AC-FT

EXIST. TREATMENT CURRENTLY PROVIDED = 2.07 AC-FT

TREATMENT VOLUME PROVIDED (FROM APPLICATION #971113-1)
(EQUIVALENT TO 1.82" OVER IMPERVIOUS AREA)

USE TREATMENT VOLUME = **2.07** AC-FT (EXIST. TREATMENT PROVIDED)

NOTE: USE EXIST. TREATMENT PROVIDED BECAUSE THERE IS A REDUCTION IN IMPERVIOUS AREA FROM EXIST. TO PROPOSED CONDITIONS

2. FACILITY TYPE:
FACILITY TYPE: WET DETENTION

TYPE:	
WET DETENTION	100% REQUIRED
DRY DETENTION	75% REQUIRED
DRY DRETENTION	50% REQUIRED

WATER QUALITY VOLUME REQUIRED = 2.07 AC-FT

3. OFW AND IMPAIRED WATER/TMDL REQUIREMENTS:
ADDITIONAL 50% TREATMENT VOLUME? NO
IMPAIRED OR ADOPTED TMDL FOR NUTRIENTS? NO

NOTE: 50% ADDITIONAL TREATMENT VOLUME NOT INCLUDED FOR OKEECHOBEE BMAP IN BASIN 1 DUE TO SITE CONSTRAINTS

ADDITIONAL TREATMENT VOLUME FOR DIRECT DISCHARGE TO OFW = 0.00 AC-FT (ADDITIONAL 50% TREATMENT VOLUME)

TOTAL WATER QUALITY (TREATMENT) VOLUME = **2.07** **AC-FT**

BCC ENGINEERING, INC.					
PROJECT:	SR 535 PD&E				DATE
FPID:	437174-2	BASIN 1 - Exist. Pond 1-1	BY:	SH	7/24/2022
BASIN:	**1**		CHECKED:	ZL	8/24/2023
ALTERNATIVE:	**1A (EXIST. POND 1-1)**		REVISED:	ZL	11/14/2023

EXIST. POND STAGE-AREA TABLE

NOTE: POND STAGE-AREA DATA FROM APPLICATION #971113-1 (NGVD 29). VERTICAL DATUM HAS BEEN UPDATED TO NAVD 88 IN TABLE BELOW

DATUM CONVERSION: EL. NAVD 88 = EL. NGVD 29-0.90 FT

EXIST. POND 1-1

EL (FT)	DESCRIPTION	AREA (AC)	AVG. AREA (AC)	DEPTH (FT)	INC. VOLUME (AC-FT)	∑ VOLUME (AC-FT)	REMARKS
74.10	CONTROL EL.	1.25				0.00	FROM PERMIT #971113-1
			1.38	1.5	2.07		
75.60	TOP OF TREATMENT VOLUME	1.50				2.07	INTERPOLATED AREA
			1.72	2.61	4.48		
78.21	1' BELOW INSIDE BERM	1.93				6.55	INTERPOLATED AREA
			2.02	1.00	2.02		
79.21	INSIDE EDGE OF BERM	2.10				8.57	FROM PERMIT #971113-1
			2.11	0.07	0.15		
79.28	EXIST. 25YR-72HR DHW	2.11				8.72	INTERPOLATED AREA
			2.46	0.92	2.26		
80.20	OUTSIDE EDGE OF BERM	2.80				10.83	FROM PERMIT #971113-1

EXIST. CONTROL EL =	74.10	FT	
EXIST. TREATMENT VOLUME REQUIRED =	2.07	AC-FT	
DHW EL. (25YR-72HR) =	79.28	FT	
EXIST. ATTENUATION VOLUME PROVIDED (ABOVE WEIR) =	6.65	AC-FT	
EXIST. FREEBOARD PROVIDED FROM INSIDE EDGE OF BERM =	**-0.07**	**FT**	NOTE: 25YR-72HR DHW EXCEEDS INSIDE BERM EL. IN EXIST. CONDITIONS

PRELIMINARY POND SIZING ESTIMATE

NOTE: POND STAGE-AREA DATA FROM APPLICATION #971113-1 (NGVD 29). VERTICAL DATUM HAS BEEN UPDATED TO NAVD 88 IN TABLE BELOW

DATUM CONVERSION: EL. NAVD 88 = EL. NGVD 29-0.90 FT

EXIST. POND 1-1

EL (FT)	DESCRIPTION	AREA (AC)	AVG. AREA (AC)	DEPTH (FT)	INC. VOLUME (AC-FT)	∑ VOLUME (AC-FT)	REMARKS
74.10	CONTROL EL.	1.25				0.00	FROM PERMIT #971113-1
			1.38	1.5	2.07		
75.60	TOP OF TREATMENT VOLUME	1.50				2.07	INTERPOLATED AREA
			1.72	2.61	4.48		
78.21	1' BELOW INSIDE BERM	1.93				6.55	INTERPOLATED AREA
			2.02	1.00	2.02		
79.21	INSIDE EDGE OF BERM	2.10				8.57	FROM PERMIT #971113-1
			2.11	0.07	0.15		
79.28	EXIST. 25YR-72HR DHW	2.11				8.72	INTERPOLATED AREA
			2.46	-80.18	-196.91		
-0.90	OUTSIDE EDGE OF BERM	2.80				-188.34	FROM PERMIT #971113-1

INSIDE BERM EL. =	79.21	FT	
MIN. REQUIRED TREATMENT VOLUME EL. =	75.60	FT	
DHW EL. (TREATMENT+25YR-72HR ATTENUATION VOLUME) =	**78.64**	FT	
EXIST. FREEBOARD PROVIDED FROM INSIDE EDGE OF BERM =	**0.57**	**FT**	NOTE: FREEBOARD < 1 FT, BUT HAS BEEN INCREASED OVER THE EXIST. CONDITION.

PRELIMINARY STORM DRAIN TAILWATER ESTIMATE

DESIGN STORM FOR STORM DRAIN SYSTEM =	10YR-24HR	
WEIR EL. =	**75.60**	FT (ASSUMES BLOCKED ORIFICE OR V-NOTCH WEIR)
DESIGN STORM EL. (ESTIMATED TAILWATER EL. FOR STORM DRAIN SYSTEM) =	**78.40**	FT (10YR-72HR PEAK STAGE FROM APPLICATION #971113-1, CONVERTED TO NAVD 88 DATUM)

HYDRAULIC GRADE LINE CALCULATIONS

LOW EDGE OF PAVEMENT (LEOP) IN BASIN (FOR HGL CHECK):

BASELINE	SR530		
LOW EDGE OF PAVEMENT EL. (FT)	**81.11**	FT	MIN. ROAD EL. FROM PERMIT #971113-1, CONVERTED TO NAVD 88 DATUM

ALLOWABLE HEAD LOSS = LOWEST GUTTER EL. - TAILWATER EL. =	2.71	FT	
PIPE LENGTH FROM LOW EDGE OF PAVEMENT TO POND =	450	FT	ESTIMATED BASED ON PERMIT PLANS
ASSUMED HGL SLOPE =	0.1	%	
HGL AT LEOP =	**78.85**	OK, LOWER THAN LEOP	

BCC ENGINEERING, INC.					
PROJECT:	SR 535 PD&E				DATE
FPID:	437174-2	Basin 2 - Exist. Pond 2-1 & Pond 2-2	BY:	SH	7/27/2022
BASIN:	**2**		CHECKED:	ZL	9/7/2023
ALTERNATIVE:	**2A (EXIST. POND 2-1 & POND 2-2)**		REVISED:	ZL	11/21/2023

ALTERNATIVE 2A

PRE-DEVELOPMENT (EXISTING) CONDITION

CURVE NUMBER

LAND USE DESCRIPTION	HYDROLOGIC SOIL GROUP	CN	AREA (AC)				C*A
			PERVIOUS	IMPERVIOUS	WATER SURFACE	TOTAL	
ROADWAY BASIN							
Impervious area	A	98		3.19		3.19	312.62
Open Space (good) - grass >75%	A	39	3.03			3.03	118.17
Impervious area	D	98		18.23		18.23	1786.54
Open Space (good) - grass >75%	D	80	31.68			31.68	2534.40
Subtotal (basin area):			34.71	21.42	0.00	56.13	4751.73
POND BASIN (Exist. Pond 2-1 & Pond 2-2)							
Water surface	D	100			1.59	1.59	159.00
Open Space (good) - grass >75%	D	80	2.14			2.14	171.20
Water surface	D	100			1.59	1.59	159.00
Open Space (good) - grass >75%	D	80	2.15			2.15	172.00
		0				0.00	0.00
Subtotal (pond area):			4.29	0.00	3.18	7.47	661.20
TOTAL:			**39.00**	**21.42**	**3.18**	**63.60**	**5412.93**

Composite CN = **85**

ESTIMATE OF RUNOFF VOLUME

PROCEDURE TO DETERMINE RUNOFF VOLUMES IS BASED ON THE SCS EQUATION AS FOLLOWS:

1) DETERMINE SOIL STORAGE [S] → S = (1000/CN) - 10 (inches)
2) DETERMINE RAINFALL [P] → (inches)
3) DETERMINE RUNOFF [R] → $R = (P - 0.2 * S)^2/(P + 0.8 * S)$ (inches)
4) DETERMINE RUNOFF VOLUME [V(R)] → V(R) = (R/12) * AREA (acre-feet)

AGENCY/DESCRIPTION	FREQUENCY	P (IN)	S (IN)	R (IN)	V(R) (AC-FT)	
FDOT 5YR-24HR	5YR-24HR	5.40	1.75	3.75	19.88	NOAA ATLAS 14
FDOT 10YR-24HR	10YR-24HR	6.37	1.75	4.66	24.72	NOAA ATLAS 14
SFWMD 25YR-72HR	25YR-72HR	9.70	1.75	7.88	41.74	SFWMD
FDOT 100YR-24HR	100YR-24HR	10.80	1.75	8.95	47.44	NOAA ATLAS 14

POST-DEVELOPMENT (PROPOSED) CONDITION

CURVE NUMBER

LAND USE DESCRIPTION	HYDROLOGIC SOIL GROUP	CN	AREA (AC)				C*A
			PERVIOUS	IMPERVIOUS	WATER SURFACE	TOTAL	
ROADWAY BASIN							
Impervious area	A	98		3.53		3.53	345.94
Open Space (good) - grass >75%	A	39	2.69			2.69	104.91
Impervious area	D	98		27.60		27.60	2704.80
Open Space (good) - grass >75%	D	80	25.16			25.16	2012.80
Subtotal (basin area):			27.85	31.13	0.00	58.98	5168.45
POND BASIN (Exist. Pond 2-1 & Pond 2-2)							
Water surface	D	100			2.28	2.28	228.0
Open Space (good) - grass >75%	D	80	1.45			1.45	116.0
Water surface	D	100			1.59	1.59	159.00
Open Space (good) - grass >75%	D	80	2.15			2.15	172.00
Subtotal (pond area):			3.60	0.00	3.87	7.47	675.0
TOTAL:			**31.45**	**31.13**	**3.87**	**66.45**	**5,843.45**

Composite CN = **88**

BCC ENGINEERING, INC.					
PROJECT:	SR 535 PD&E				DATE
FPID:	437174-2	Basin 2 - Exist. Pond 2-1 & Pond 2-2	BY:	SH	7/27/2022
BASIN:	**2**		CHECKED:	ZL	9/7/2023
ALTERNATIVE:	**2A (EXIST. POND 2-1 & POND 2-2)**		REVISED:	ZL	11/21/2023

ESTIMATE OF RUNOFF VOLUME

PROCEDURE TO DETERMINE RUNOFF VOLUMES IS BASED ON THE SCS EQUATION AS FOLLOWS:

1) DETERMINE SOIL STORAGE [S] → S = (1000/CN) - 10 (inches)
2) DETERMINE RAINFALL [P] → (inches)
3) DETERMINE RUNOFF [R] → $R = (P - 0.2 * S)^2/(P + 0.8 * S)$ (inches)
4) DETERMINE RUNOFF VOLUME [V(R)] → V(R) = (R/12) * AREA (acre-feet)

AGENCY/DESCRIPTION	FREQUENCY	P (IN)	S (IN)	R (IN)	V(R) (AC-FT)
FDOT 5YR-24HR	5YR-24HR	5.40	1.37	4.04	22.39
FDOT 10YR-24HR	10YR-24HR	6.37	1.37	4.98	27.55
SFWMD 25YR-72HR	25YR-72HR	9.70	1.37	8.23	45.56
FDOT 100YR-24HR	100YR-24HR	10.80	1.37	9.31	51.57

WATER QUANTITY (ATTENUATION) VOLUMES REQUIRED

		V(R) (AC-FT)		
AGENCY/DESCRIPTION	FREQUENCY	PRE-DEV (EXISTING)	POST-DEV (PROPOSED)	DIFFERENCE
FDOT 5YR-24HR	5YR-24HR	19.88	22.39	2.51
FDOT 10YR-24HR	10YR-24HR	24.72	27.55	2.83
SFWMD 25YR-72HR	**25YR-72HR**	**41.74**	**45.56**	**3.82**
FDOT 100YR-24HR	100YR-24HR	47.44	51.57	**4.12**

ADDITIONAL WATER QUANTITY (ATTENUATION) VOLUME = **3.82** **AC-FT**

TOTAL WATER QUANTITY (ATTENUATION) VOLUME = **8.28** **AC-FT (EXIST. VOLUME + ADDITIONAL VOLUME). SEE BELOW FOR EXISTING ATTENUATION VOLUME PROVIDED.**

WATER QUALITY (TREATMENT) VOLUME REQUIRED

1. WATER MANAGEMENT DISTRICT PRESUMPTIVE REQUIREMENTS:

JURISDICTION: SFWMD

SFWMD CRITERIA (SECTION 4.2.1, SFWMD APPLICANT'S HANDBOOK):
PROVIDE THE GREATER OF:
2.5" OVER THE IMPERVIOUS AREA; OR
1" OVER THE DRAINAGE AREA

AREAS:

TOTAL BASIN AREA (EXCLUDING WATER SURFACE AREAS) =	62.58	AC
PROPOSED IMPERVIOUS AREA =	31.13	AC

IMPERVIOUS AREA:

EXISTING IMPERVIOUS AREA =	21.42	AC
PROPOSED IMPERVIOUS AREA =	31.13	AC
NEW IMPERVIOUS AREA =	9.71	AC

1" OVER THE TOTAL BASIN AREA (EXCLUDING WATER SURFACE AREAS) =	5.22	AC-FT
2.5" OVER IMPERVIOUS AREA =	6.49	AC-FT

USE TREATMENT VOLUME = **6.49** AC-FT

2. FACILITY TYPE:

FACILITY TYPE: WET DETENTION

TYPE:	
WET DETENTION	100% REQUIRED
DRY DETENTION	75% REQUIRED
DRY DRETENTION	50% REQUIRED

WATER QUALITY VOLUME REQUIRED = 6.49 AC-FT

3. OFW AND IMPAIRED WATER/TMDL REQUIREMENTS:

ADDITIONAL 50% TREATMENT VOLUME? YES PROJECT IS WITHIN LAKE OKEECHOBEE BMAP, SEE SFWMD PRE-APPLICATION MEETING MINUTES
IMPAIRED OR ADOPTED TMDL FOR NUTRIENTS? YES

ADDITIONAL TREATMENT VOLUME FOR LAKE OKEECHOBEE BMAP = 3.24 AC-FT (ADDITIONAL 50% TREATMENT VOLUME)

TOTAL WATER QUALITY (TREATMENT) VOLUME = **9.73** **AC-FT**

BCC ENGINEERING, INC.					
PROJECT:	SR 535 PD&E				DATE
FPID:	437174-2	Basin 2 - Exist. Pond 2-1 & Pond 2-2	BY:	SH	7/27/2022
BASIN:	**2**		CHECKED:	ZL	9/7/2023
ALTERNATIVE:	**2A (EXIST. POND 2-1 & POND 2-2)**		REVISED:	ZL	11/21/2023

EXIST. POND STAGE-AREA TABLE

NOTE: POND STAGE-AREA DATA FROM APPLICATION # 930909-1 (IN NGVD 29). VERTICAL DATUM HAS BEEN UPDATED TO NAVD 88 IN TABLE BELOW. DATUM CONVERSION: EL. NAVD 88 = EL. NGVD 29-0.90 FT

EXIST. POND 2-1

EL (FT)	DESCRIPTION	AREA (AC)	AVG. AREA (AC)	DEPTH (FT)	INC. VOLUME (AC-FT)	∑ VOLUME (AC-FT)	REMARKS
74.40	CONTROL EL.	**1.54**				0.00	
			1.89	4.7	8.89		
79.10	TOP OF TREATMENT VOLUME	2.24				8.89	MATCHES STAGE-VOL TABLE FROM APP #930909-1
			2.47	3.00	7.40		
82.10	1' BELOW BERM EL.	2.69				16.29	
			2.77	1.00	2.77		
83.10	INSIDE EDGE OF BERM	**2.84**				19.05	MATCHES STAGE-VOL TABLE FROM APP #930909-1

EXIST. CONTROL EL = 74.40 FT
EXIST. TREATMENT VOLUME REQUIRED = 8.89 AC-FT
DHW (25YR-72HR) = 80.91 FT 25YR-72 HR DHW FROM ICPR OUTPUT (APPLICATION #93090-1)

EXISTING ATTENUATION VOLUME PROVIDED IN EXIST. POND 2-1 = 4.46 AC-FT (DETERMINED THROUGH INTGERPOLATION OF EXIST. POND STAGE-AREA TABLE)

PRELIMINARY POND SIZING ESTIMATE

EXIST. POND 2-1

EL (FT)	DESCRIPTION	AREA (AC)	AVG. AREA (AC)	DEPTH (FT)	INC. VOLUME (AC-FT)	∑ VOLUME (AC-FT)	REMARKS
74.40	CONTROL EL.	**1.54**				0.00	
			1.89	4.7	8.89		
79.10	TOP OF TREATMENT VOLUME	2.24				8.89	
			2.39	2.00	4.78		
81.10		2.54				13.67	
			2.69	2.00	5.38		
83.10	INSIDE EDGE OF BERM	**2.84**				19.05	

POND 2-2 NOTE: POND CONTROL EL. BASED ON CONTROL EL. FROM SFWMD APPLICATION NO. 150611-22.

EL (FT)	DESCRIPTION	AREA (AC)	AVG. AREA (AC)	DEPTH (FT)	INC. VOLUME (AC-FT)	∑ VOLUME (AC-FT)	REMARKS
78.70	CONTROL EL.	**2.28**				0.00	
			2.31	0.40	0.92		
79.10	TOP OF TREATMENT VOLUME	2.33				0.92	
			2.46	2.00	4.92		
81.10	MAX. POND STAGE EL.	2.59				5.84	
			2.66	1.00	2.66		
82.10	INSIDE EDGE OF BERM	**2.72**				8.50	
			3.08	1.00	3.08		
83.10	OUTSIDE EDGE OF BERM	3.43				11.58	
85.10	TIE-DOWN TO EXIST. GROUND	3.73					

APPLY 15% CONTINGENCY TO REQUIRED POND AREA = 4.3 AC **TOTAL PARCEL AREA =** 99.2+ OK

EXIST. POND 2-1 & POND 2-2 (COMBINED)

EL (FT)	DESCRIPTION	AREA (AC)	AVG. AREA (AC)	DEPTH (FT)	INC. VOLUME (AC-FT)	∑ VOLUME (AC-FT)	REMARKS
74.40	CONTROL EL.	**1.54**				0.00	
			3.06	3.40	10.40		
79.10	TOP OF TREATMENT VOLUME	4.57				9.81	
			4.85	2.00	9.71		
81.10	MAX. POND STAGE EL.	5.13				19.52	
			5.27	1.00	5.27		
82.10	INSIDE EDGE OF BERM	**5.41**				24.80	
83.10	OUTSIDE EDGE OF BERM	6.27					

MIN. REQUIRED TREATMENT VOLUME = **9.73** AC-FT
MIN. REQUIRED TREATMENT VOLUME EL. = **79.08** FT
TREATMENT VOLUME PROVIDED = **9.81** AC-FT
DHW EL. (TREATMENT+25YR-72HR ATTENUATION VOLUME) = **80.81** FT
MAX ALLOWABLE POND STAGE EL. = **81.10** FT

PRELIMINARY STORM DRAIN TAILWATER ESTIMATE

DESIGN STORM FOR STORM DRAIN SYSTEM = 10YR-24HR
WEIR EL. = **79.10** FT (ASSUMES BLOCKED ORIFICE OR V-NOTCH WEIR)
DESIGN STORM ATTENUATION VOLUME = 7.30 AC-FT (ASSUMED AS EXIST. 25YR-72HR ATTENUATION VOLUME + ADDITIONAL 10YR-24HR ATTENUATION VOLUME)
DESIGN STORM EL. (ESTIMATED TAILWATER EL. FOR STORM DRAIN SYSTEM) = **80.60** FT

HYDRAULIC GRADE LINE CALCULATIONS

LOW EDGE OF PAVEMENT (LEOP) IN BASIN (FOR HGL CHECK):

BASELINE	SR 535
LOW EDGE OF PAVEMENT EL. (FT)	**83.00** FT

ALLOWABLE HEAD LOSS = LOWEST GUTTER EL. - TAILWATER EL. = 2.40 FT
PIPE LENGTH FROM LOW EDGE OF PAVEMENT TO POND = 600 FT
ASSUMED HGL SLOPE = 0.2 %
HGL AT LEOP = **81.80** OK, LOWER THAN LEOP

BCC ENGINEERING, INC.					
PROJECT:	SR 535 PD&E				DATE
FPID:	437174-2	Basin 2 - Exist. Pond 2-1 & Pond 2-3	BY:	SH	8/18/2022
BASIN:	**2**		CHECKED:	ZL	9/12/2023
ALTERNATIVE:	**2B (EXIST. POND 2-1 & POND 2-3)**		REVISED:	ZL	12/5/2023

ALTERNATIVE 2B

PRE-DEVELOPMENT (EXISTING) CONDITION

CURVE NUMBER

LAND USE DESCRIPTION	HYDROLOGIC SOIL GROUP	CN	AREA (AC)				C*A
			PERVIOUS	IMPERVIOUS	WATER SURFACE	TOTAL	
ROADWAY BASIN							
Impervious area	A	98		3.19		3.19	312.62
Open Space (good) - grass >75%	A	39	3.03			3.03	118.17
Impervious area	D	98		18.23		18.23	1786.54
Open Space (good) - grass >75%	D	80	31.68			31.68	2534.40
Subtotal (basin area):			34.71	21.42	0.00	56.13	4751.73
POND BASIN (Exist. Pond 2-1 & Pond 2-3)							
Urban district - commercial/business (85% imp.)	D	95		2.51		2.51	238.45
Open Space (good) - grass >75%	D	80	1.68			1.68	134.40
Water surface	D	100			1.59	1.59	159.00
Open Space (good) - grass >75%	D	80	2.15			2.15	172.00
		0				0.00	0.00
Subtotal (pond area):			3.83	2.51	1.59	7.93	703.85
TOTAL:			**38.54**	**23.93**	**1.59**	**64.06**	**5455.58**

Composite CN = **85**

ESTIMATE OF RUNOFF VOLUME

PROCEDURE TO DETERMINE RUNOFF VOLUMES IS BASED ON THE SCS EQUATION AS FOLLOWS:

1) DETERMINE SOIL STORAGE [S] → S = (1000/CN) - 10 (inches)
2) DETERMINE RAINFALL [P] → (inches)
3) DETERMINE RUNOFF [R] → $R = (P - 0.2 * S)^2/(P + 0.8 * S)$ (inches)
4) DETERMINE RUNOFF VOLUME [V(R)] → V(R) = (R/12) * AREA (acre-feet)

AGENCY/DESCRIPTION	FREQUENCY	P (IN)	S (IN)	R (IN)	V(R) (AC-FT)	
FDOT 5YR-24HR	5YR-24HR	5.40	1.74	3.76	20.05	NOAA ATLAS 14
FDOT 10YR-24HR	10YR-24HR	6.37	1.74	4.67	24.93	NOAA ATLAS 14
SFWMD 25YR-72HR	25YR-72HR	9.70	1.74	7.88	42.08	SFWMD
FDOT 100YR-24HR	100YR-24HR	10.80	1.74	8.96	47.82	NOAA ATLAS 14

POST-DEVELOPMENT (PROPOSED) CONDITION

CURVE NUMBER

LAND USE DESCRIPTION	HYDROLOGIC SOIL GROUP	CN	AREA (AC)				C*A
			PERVIOUS	IMPERVIOUS	WATER SURFACE	TOTAL	
ROADWAY BASIN							
Impervious area	A	98		3.53		3.53	345.94
Open Space (good) - grass >75%	A	39	2.69			2.69	104.91
Impervious area	D	98		27.60		27.60	2704.80
Open Space (good) - grass >75%	D	80	25.16			25.16	2012.80
Subtotal (basin area):			27.85	31.13	0.00	58.98	5168.45
POND BASIN (Exist. Pond 2-1 & Pond 2-3)							
Water surface	D	100			2.51	2.51	251.00
Open Space (good) - grass >75%	D	80	1.68			1.68	134.40
Water surface	D	100			1.59	1.59	159.00
Open Space (good) - grass >75%	D	80	2.15			2.15	172.00
Subtotal (pond area):			3.83	0.00	4.10	7.93	716.40
TOTAL:			**31.68**	**31.13**	**4.10**	**66.91**	**5884.85**

Composite CN = **88**

BCC ENGINEERING, INC.					
PROJECT:	SR 535 PD&E				DATE
FPID:	437174-2	Basin 2 - Exist. Pond 2-1 & Pond 2-3	BY:	SH	8/18/2022
BASIN:	**2**		CHECKED:	ZL	9/12/2023
ALTERNATIVE:	**2B (EXIST. POND 2-1 & POND 2-3)**		REVISED:	ZL	12/5/2023

ESTIMATE OF RUNOFF VOLUME

PROCEDURE TO DETERMINE RUNOFF VOLUMES IS BASED ON THE SCS EQUATION AS FOLLOWS:

1) DETERMINE SOIL STORAGE [S] → S = (1000/CN) - 10 (inches)
2) DETERMINE RAINFALL [P] → (inches)
3) DETERMINE RUNOFF [R] → $R = (P - 0.2 * S)^2/(P + 0.8 * S)$ (inches)
4) DETERMINE RUNOFF VOLUME [V(R)] → V(R) = (R/12) * AREA (acre-feet)

AGENCY/DESCRIPTION	FREQUENCY	P (IN)	S (IN)	R (IN)	V(R) (AC-FT)
FDOT 5YR-24HR	5YR-24HR	5.40	1.37	4.05	22.55
FDOT 10YR-24HR	10YR-24HR	6.37	1.37	4.98	27.75
SFWMD 25YR-72HR	25YR-72HR	9.70	1.37	8.23	45.89
FDOT 100YR-24HR	100YR-24HR	10.80	1.37	9.31	51.93

WATER QUANTITY (ATTENUATION) VOLUMES REQUIRED

		V(R) (AC-FT)		
AGENCY/DESCRIPTION	FREQUENCY	PRE-DEV (EXISTING)	POST-DEV (PROPOSED)	DIFFERENCE
FDOT 5YR-24HR	5YR-24HR	20.05	22.55	2.50
FDOT 10YR-24HR	10YR-24HR	24.93	27.75	2.82
SFWMD 25YR-72HR	**25YR-72HR**	**42.08**	**45.89**	**3.81**
FDOT 100YR-24HR	100YR-24HR	47.82	51.93	**4.11**

ADDITIONAL WATER QUANTITY (ATTENUATION) VOLUME = **3.81** **AC-FT**

TOTAL WATER QUANTITY (ATTENUATION) VOLUME = **8.27** **AC-FT (EXIST. VOLUME + ADDITIONAL VOLUME). SEE BELOW FOR EXISTING ATTENUATION VOLUME PROVIDED.**

WATER QUALITY (TREATMENT) VOLUME REQUIRED

1. WATER MANAGEMENT DISTRICT PRESUMPTIVE REQUIREMENTS:

JURISDICTION: SFWMD

SFWMD CRITERIA (SECTION 4.2.1, SFWMD APPLICANT'S HANDBOOK):
PROVIDE THE GREATER OF:
2.5" OVER THE IMPERVIOUS AREA; OR
1" OVER THE DRAINAGE AREA

AREAS:

TOTAL BASIN AREA (EXCLUDING WATER SURFACE AREAS) =	62.81	AC
PROPOSED IMPERVIOUS AREA =	31.13	AC

IMPERVIOUS AREA:

EXISTING IMPERVIOUS AREA =	23.93	AC
PROPOSED IMPERVIOUS AREA =	31.13	AC
NEW IMPERVIOUS AREA =	7.20	AC

1" OVER THE TOTAL BASIN AREA (EXCLUDING WATER SURFACE AREAS) =	5.23	AC-FT
2.5" OVER IMPERVIOUS AREA =	6.49	AC-FT

USE TREATMENT VOLUME = **6.49** AC-FT

2. FACILITY TYPE:

FACILITY TYPE: WET DETENTION

TYPE:	
WET DETENTION	100% REQUIRED
DRY DETENTION	75% REQUIRED
DRY RETENTION	50% REQUIRED

WATER QUALITY VOLUME REQUIRED = 6.49 AC-FT

3. OFW AND IMPAIRED WATER/TMDL REQUIREMENTS:

ADDITIONAL 50% TREATMENT VOLUME? YES PROJECT IS WITHIN LAKE OKEECHOBEE BMAP, SEE SFWMD PRE-APPLICATION MEETING MINUTES
IMPAIRED OR ADOPTED TMDL FOR NUTRIENTS? YES

ADDITIONAL TREATMENT VOLUME FOR LAKE OKEECHOBEE BMAP = 3.24 AC-FT (ADDITIONAL 50% TREATMENT VOLUME)

TOTAL WATER QUALITY (TREATMENT) VOLUME = **9.73** **AC-FT**

BCC ENGINEERING, INC.					
PROJECT:	SR 535 PD&E				DATE
FPID:	437174-2	Basin 2 - Exist. Pond 2-1 & Pond 2-3	BY:	SH	8/18/2022
BASIN:	2		CHECKED:	ZL	9/12/2023
ALTERNATIVE:	2B (EXIST. POND 2-1 & POND 2-3)		REVISED:	ZL	12/5/2023

EXIST. POND STAGE-AREA TABLE

NOTE: POND STAGE-AREA DATA FROM APPLICATION # 930909-1 (IN NGVD 29). VERTICAL DATUM HAS BEEN UPDATED TO NAVD 88 IN TABLE BELOW. DATUM CONVERSION: EL. NAVD 88 = EL. NGVD 29-0.90 FT

EXIST. POND 2-1

EL (FT)	DESCRIPTION	AREA (AC)	AVG. AREA (AC)	DEPTH (FT)	INC. VOLUME (AC-FT)	∑ VOLUME (AC-FT)	REMARKS
74.40	CONTROL EL.	**1.54**				0.00	
			1.89	4.7	8.89		
79.10	TOP OF TREATMENT VOLUME	2.24				8.89	MATCHES STAGE-VOL TABLE FROM APP #930909-1
			2.47	3.00	7.40		
82.10	1' BELOW BERM EL.	2.69				16.29	
			2.77	1.00	2.77		
83.10	INSIDE EDGE OF BERM	**2.84**				19.05	MATCHES STAGE-VOL TABLE FROM APP #930909-1

EXIST. CONTROL EL = 74.40 FT
EXIST. TREATMENT VOLUME REQUIRED = 8.89 AC-FT
DHW (25YR-72HR) = 80.91 FT 25YR-72 HR DHW FROM ICPR OUTPUT (APPLICATION #93090-1)

EXISTING ATTENUATION VOLUME PROVIDED IN EXIST. POND 2-1 = 4.46 AC-FT (DETERMINED THROUGH INTGERPOLATION OF EXIST. POND STAGE-AREA TABLE)

PRELIMINARY POND SIZING ESTIMATE

EXIST. POND 2-1

EL (FT)	DESCRIPTION	AREA (AC)	AVG. AREA (AC)	DEPTH (FT)	INC. VOLUME (AC-FT)	∑ VOLUME (AC-FT)	REMARKS
74.40	CONTROL EL.	**1.54**				0.00	
			1.89	4.7	8.89		
79.10	TOP OF TREATMENT VOLUME	2.24				8.89	
			2.39	2.00	4.78		
81.10		2.54				13.67	
			2.69	2.00	5.38		
83.10	INSIDE EDGE OF BERM	**2.84**				19.05	

POND 2-3 NOTE: POND CONTROL EL. BASED ON AVG. SHGWT EL. FROM PRELIMINARY GEOTECH BORINGS FOR POND 2-3

EL (FT)	DESCRIPTION	AREA (AC)	AVG. AREA (AC)	DEPTH (FT)	INC. VOLUME (AC-FT)	∑ VOLUME (AC-FT)	REMARKS
78.30	CONTROL EL.	**2.51**				0.00	
			2.57	0.80	2.06		
79.10	TOP OF TREATMENT VOLUME	2.64				2.06	
			2.80	2.00	5.60		
81.10	MAX. POND STAGE EL.	2.96				7.66	
			3.04	1.00	3.04		
82.10	INSIDE EDGE OF BERM	3.12				10.70	
			3.55	1.00	3.55		
83.10	OUTSIDE EDGE OF BERM	3.97				14.24	
83.80	TIE-DOWN TO EXIST. GROUND	4.19					

APPLY 15% CONTINGENCY TO REQUIRED POND AREA = 4.8 AC **TOTAL PARCEL AREA =** 5.0+ OK (TOTAL OF 3 PARCELS AND FDOT R/W)

EXIST. POND 2-1 & POND 2-3 (COMBINED)

EL (FT)	DESCRIPTION	AREA (AC)	AVG. AREA (AC)	DEPTH (FT)	INC. VOLUME (AC-FT)	∑ VOLUME (AC-FT)	REMARKS
74.40	CONTROL EL.	**1.54**				0.00	
			3.21	3.40	10.92		
79.10	TOP OF TREATMENT VOLUME	4.88				10.95	
			5.19	2.00	10.38		
81.10	MAX. POND STAGE EL.	5.50				21.33	
			5.66	1.00	5.66		
82.10	INSIDE EDGE OF BERM	**5.81**				27.00	
83.10	OUTSIDE EDGE OF BERM	6.81					

MIN. REQUIRED TREATMENT VOLUME = **8.27** AC-FT
MIN. REQUIRED TREATMENT VOLUME EL. = **78.87** FT
TREATMENT VOLUME PROVIDED = **10.95** AC-FT
DHW EL. (TREATMENT+25YR-72HR ATTENUATION VOLUME) = 80.69 FT
MAX ALLOWABLE POND STAGE EL. = **81.10** FT

PRELIMINARY STORM DRAIN TAILWATER ESTIMATE

DESIGN STORM FOR STORM DRAIN SYSTEM = 10YR-24HR
WEIR EL. = **79.10** FT (ASSUMES BLOCKED ORIFICE OR V-NOTCH WEIR)
DESIGN STORM ATTENUATION VOLUME = 7.29 AC-FT (ASSUMED AS EXIST. 25YR-72HR ATTENUATION VOLUME + ADDITIONAL 10YR-24HR ATTENUATION VOLUME)
DESIGN STORM EL. (ESTIMATED TAILWATER EL. FOR STORM DRAIN SYSTEM) = **80.50** FT

HYDRAULIC GRADE LINE CALCULATIONS

LOW EDGE OF PAVEMENT (LEOP) IN BASIN (FOR HGL CHECK):

BASELINE	SR 535
LOW EDGE OF PAVEMENT EL. (FT)	**83.00** FT

ALLOWABLE HEAD LOSS = LOWEST GUTTER EL. - TAILWATER EL. = 2.50 FT
PIPE LENGTH FROM LOW EDGE OF PAVEMENT TO POND = 600 FT
ASSUMED HGL SLOPE = 0.2 %
HGL AT LEOP = **81.70** OK, LOWER THAN LEOP

BCC ENGINEERING, INC.					
PROJECT:	SR 535 PD&E				DATE
FPID:	437174-2	Basin 2 - Exist. Pond 2-1 & Pond 2-4	BY:	SH	9/9/2022
BASIN:	**2**		CHECKED:	ZL	9/14/2023
ALTERNATIVE:	**2C (EXIST. POND 2-1 & POND 2-4)**		REVISED:	ZL	12/12/2023

ALTERNATIVE 2C

PRE-DEVELOPMENT (EXISTING) CONDITION

CURVE NUMBER

LAND USE DESCRIPTION	HYDROLOGIC SOIL GROUP	CN	AREA (AC)				C*A
			PERVIOUS	IMPERVIOUS	WATER SURFACE	TOTAL	
ROADWAY BASIN							
Impervious area	A	98		3.19		3.19	312.62
Open Space (good) - grass >75%	A	39	3.03			3.03	118.17
Impervious area	D	98		18.23		18.23	1786.54
Open Space (good) - grass >75%	D	80	31.68			31.68	2534.40
		Subtotal (basin area):	34.71	21.42	0.00	56.13	4751.73
STOREY LAKE BASIN							
BASIN POND 1		90	11.62	14.30	1.50	27.42	2467.80
BASIN POND I-300M		89	23.07	25.01	0.00	48.08	4296.58
I-300A		94	26.73	50.77	33.35	110.85	10419.90
I-300B		92	71.18	89.51	29.43	190.12	17491.04
I-300C		91	6.00	6.96	2.30	15.26	1388.66
H-100		83	0.88	0.00	0.00	0.88	73.04
J-100		80	2.00	0.00	0.00	2.00	160.00
		Subtotal (basin area):	141.48	186.55	66.58	394.61	36297.02
POND BASIN (EXIST. POND 2-1)							
Water surface	D	100			1.59	1.59	159.00
Open Space (good) - grass >75%	D	80	2.15			2.15	172.00
		Subtotal (pond area):	2.15	0.00	1.59	3.74	331.00
		TOTAL:	**178.34**	**207.97**	**68.17**	**454.48**	**41379.75**

NOTE: STOREY LAKE BASIN DATA TAKEN FROM APPLICATION #150611-22

Composite CN = 91

ESTIMATE OF RUNOFF VOLUME

PROCEDURE TO DETERMINE RUNOFF VOLUMES IS BASED ON THE SCS EQUATION AS FOLLOWS:

1) DETERMINE SOIL STORAGE [S] → S = (1000/CN) - 10 (inches)
2) DETERMINE RAINFALL [P] → (inches)
3) DETERMINE RUNOFF [R] → $R = (P - 0.2 * S)^2/(P + 0.8 * S)$ (inches)
4) DETERMINE RUNOFF VOLUME [V(R)] → V(R) = (R/12) * AREA (acre-feet)

AGENCY/DESCRIPTION	FREQUENCY	P (IN)	S (IN)	R (IN)	V(R) (AC-FT)	
FDOT 5YR-24HR	5YR-24HR	5.40	0.98	4.38	165.75	NOAA ATLAS 14
FDOT 10YR-24HR	10YR-24HR	6.37	0.98	5.33	201.69	NOAA ATLAS 14
SFWMD 25YR-72HR	25YR-72HR	9.70	0.98	8.61	326.18	SFWMD
FDOT 100YR-24HR	100YR-24HR	10.80	0.98	9.70	367.51	NOAA ATLAS 14

POST-DEVELOPMENT (PROPOSED) CONDITION

CURVE NUMBER

LAND USE DESCRIPTION	HYDROLOGIC SOIL GROUP	CN	AREA (AC)				C*A
			PERVIOUS	IMPERVIOUS	WATER SURFACE	TOTAL	
ROADWAY BASIN							
Impervious area	A	98		3.53		3.53	345.94
Open Space (good) - grass >75%	A	39	2.69			2.69	104.91
Impervious area	D	98		27.60		27.60	2704.80
Open Space (good) - grass >75%	D	80	25.16			25.16	2012.80
		Subtotal (basin area):	27.85	31.13	0.00	58.98	5168.45
STOREY LAKE BASIN							
BASIN POND 1		90	11.62	14.30	1.50	27.42	2467.80
BASIN POND I-300M		89	23.07	25.01	0.00	48.08	4296.58
I-300A		94	26.73	50.77	33.35	110.85	10419.90
I-300B		92	71.18	89.51	29.43	190.12	17491.04
I-300C		91	6.00	6.96	2.30	15.26	1388.66
H-100		83	0.88	0.00	0.00	0.88	73.04
J-100		80	2.00	0.00	0.00	2.00	160.00
		Subtotal (basin area):	141.48	186.55	66.58	394.61	36297.02
POND BASIN (EXIST. POND 2-1)							
Water surface	D	100			1.59	1.59	159.00
Open Space (good) - grass >75%	D	80	2.15			2.15	172.00
		Subtotal (pond area):	2.15	0.00	1.59	3.74	331.00
		TOTAL:	**171.48**	**217.68**	**68.17**	**457.33**	**41,796.47**

Composite CN = 91

BCC ENGINEERING, INC.					
PROJECT:	SR 535 PD&E				DATE
FPID:	437174-2	Basin 2 - Pond 2-1 & Pond 2-4	BY:	SH	9/9/2022
BASIN:	**2**		CHECKED:	ZL	9/14/2023
ALTERNATIVE:	**2C (EXIST. POND 2-1 & POND 2-4)**		REVISED:	ZL	12/12/2023

ESTIMATE OF RUNOFF VOLUME

PROCEDURE TO DETERMINE RUNOFF VOLUMES IS BASED ON THE SCS EQUATION AS FOLLOWS:

1) DETERMINE SOIL STORAGE [S] → S = (1000/CN) - 10 (inches)
2) DETERMINE RAINFALL [P] → (inches)
3) DETERMINE RUNOFF [R] → $R = (P - 0.2 * S)^2/(P + 0.8 * S)$ (inches)
4) DETERMINE RUNOFF VOLUME [V(R)] → V(R) = (R/12) * AREA (acre-feet)

AGENCY/DESCRIPTION	FREQUENCY	P (IN)	S (IN)	R (IN)	V(R) (AC-FT)
FDOT 5YR-24HR	5YR-24HR	5.40	0.94	4.41	168.22
FDOT 10YR-24HR	10YR-24HR	6.37	0.94	5.36	204.44
SFWMD 25YR-72HR	25YR-72HR	9.70	0.94	8.65	329.84
FDOT 100YR-24HR	100YR-24HR	10.80	0.94	9.75	371.45

WATER QUANTITY (ATTENUATION) VOLUMES REQUIRED

		V(R) (AC-FT)		
AGENCY/DESCRIPTION	FREQUENCY	PRE-DEV (EXISTING)	POST-DEV (PROPOSED)	DIFFERENCE
FDOT 5YR-24HR	5YR-24HR	165.75	168.22	2.47
FDOT 10YR-24HR	10YR-24HR	201.69	204.44	2.75
SFWMD 25YR-72HR	**25YR-72HR**	**326.18**	**329.84**	**3.66**
FDOT 100YR-24HR	100YR-24HR	367.51	371.45	**3.94**

CONTROLLING WATER QUANTITY (ATTENUATION) VOLUME = **3.66** **AC-FT**

WATER QUALITY (TREATMENT) VOLUME REQUIRED

1. WATER MANAGEMENT DISTRICT PRESUMPTIVE REQUIREMENTS:
JURISDICTION: SFWMD

SFWMD CRITERIA (SECTION 4.2.1, SFWMD APPLICANT'S HANDBOOK):
PROVIDE THE GREATER OF:
2.5" OVER THE IMPERVIOUS AREA; OR
1" OVER THE DRAINAGE AREA

NOTE: DESIGN FOR THIS ALTERNATIVE ASSUMES ONLY BASIN AREA NEEDED TO MEET TREATMENT/ ATTENUATION REQUIREMENTS FOR THE INCREASE IN IMPERVIOUS AREA WILL BE DIVERTED TO POND 2-4. EXIST. POND 2-1 WILL PROVIDE TREATMENT AND ATTENUATION EQUIVALENT TO THE EXISTING CONDITION.

AREAS:
TOTAL BASIN AREA (EXCLUDING WATER SURFACE AREAS) = 389.16 AC
PROPOSED IMPERVIOUS AREA = 217.68 AC

IMPERVIOUS AREA:
EXISTING IMPERVIOUS AREA (SR 535 ROADWAY BASIN ONLY) = 21.42 AC
PROPOSED IMPERVIOUS AREA (SR 535 ROADWAY BASIN ONLY) = 31.13 AC
NEW IMPERVIOUS AREA = 9.71 AC

2.5" OVER IMPERVIOUS AREA = 6.49 AC-FT

USE ADDITIONAL TREATMENT VOLUME = **6.49** AC-FT

2. FACILITY TYPE:
FACILITY TYPE: WET DETENTION

TYPE:		
WET DETENTION	100%	REQUIRED
DRY DETENTION	75%	REQUIRED
DRY DRETENTION	50%	REQUIRED

WATER QUALITY VOLUME REQUIRED = 6.49 AC-FT

3. OFW AND IMPAIRED WATER/TMDL REQUIREMENTS:
ADDITIONAL 50% TREATMENT VOLUME? YES PROJECT IS WITHIN LAKE OKEECHOBEE BMAP, SEE SFWMD PRE-APPLICATION MEETING MINUTES
IMPAIRED OR ADOPTED TMDL FOR NUTRIENTS? YES

ADDITIONAL TREATMENT VOLUME FOR LAKE OKEECHOBEE BMAP = 3.24 AC-FT (ADDITIONAL 50% TREATMENT VOLUME)

TOTAL WATER QUALITY (TREATMENT) VOLUME = **9.73** **AC-FT**

BCC ENGINEERING, INC.					
PROJECT:	SR 535 PD&E				DATE
FPID:	437174-2	Basin 2 - Pond 2-1 & Pond 2-4	BY:	SH	9/9/2022
BASIN:	**2**		CHECKED:	ZL	9/14/2023
ALTERNATIVE:	**2C (EXIST. POND 2-1 & POND 2-4)**		REVISED:	ZL	12/12/2023

EXIST. POND AREA TABLE

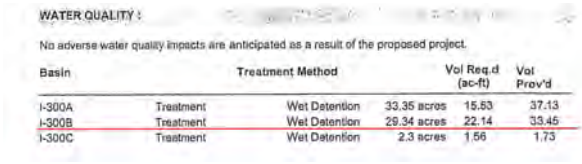
POND 2-4 (SEE APPLICATION #150611-22 FOR POND DATA FOR BASIN I-300B. PERMIT USES NGVD 29 VERTICAL DATUM.)

CONTROL EL. = 73.0 FT (NGVD 29)
DHW (100YR-72HR) = 78.8 FT (NGVD 29)

POND/BASIN	EL (FT)	DESCRIPTION	AREA (AC)	REMARKS
I-300A	**72.10**	CONTROL EL.	29.43	
I-300B	**72.10**	CONTROL EL.	33.35	
TOTAL			**62.78**	

ADDITIONAL TREATMENT VOLUME REQUIRED = **9.73** AC-FT
INCREASE IN POND 2-4 DEPTH FROM ADD. TREATMENT VOLUME = **0.15** FT
ADDITIONAL ATTENUATION VOLUME REQUIRED = **3.66** AC-FT
INCREASE IN POND 2-4 DEPTH FROM ADD. TREATMENT VOLUME = **0.06** FT
TOTAL INCREASE IN POND 2-4 STAGES FROM SR 535 RUNOFF = 0.21 FT

BASED ON POND I-300B CALCULATIONS IN APPLICATION #150611-22, THERE IS ADDITIONAL TREATMENT VOLUME AVAILABLE IN PONDS I-300A AND I-300B SEE BELOW):



WATER QUALITY :

No adverse water quality impacts are anticipated as a result of the proposed project.

Basin		Treatment Method		Vol Req.d (ac-ft)	Vol Prov'd
I-300A	Treatment	Wet Detention	33.35 acres	15.53	37.13
I-300B	Treatment	Wet Detention	29.34 acres	22.14	33.45
I-300C	Treatment	Wet Detention	2.3 acres	1.56	1.73

ADDITIONAL TREATMENT VOLUME AVAILABLE:

POND I-300A = 21.60 AC-FT
POND I-300B = 11.31 AC-FT
TOTAL EXCESS TREATMENT VOLUME IN PONDS I-300A & I-300B = 32.91 AC-FT

TOTAL TREATMENT VOLUME REQUIRED FOR SR 535 RUNOFF = 9.73 AC-FT < 32.91 AC-FT, OK

BASED ON THIS INFORMATION, THERE IS SUFFICIENT EXCESS TREATMENT VOLUME AVAILABLE AS OF THE DATE OF THE PERMIT APPLICATION TO ACCOMMODATE THE ADDITIONAL RUNOFF FROM SR 535.

HYDRAULIC GRADE LINE CALCULATIONS

ADDITIONAL PIPE LENGTH FROM EXST R/W TO POND 2-4 = 500 FT
ASSUMED HGL SLOPE = 0.2 %
INCREASE IN HGL = 1.00 FT

EXST 100-YR PEAK STAGE POND 2-4 = 78.79 FT (NGVD29)
EXST POND 2-1 DHW = 80.00 FT (NGVD29)
ALLOWABLE INCREASE IN HGL= 1.21 FT
INCREASE IN LESS THAN ALLOWABLE? YES

BCC ENGINEERING, INC.					
PROJECT:	SR 535 PD&E				DATE
FPID:	437174-2	BASIN 3 - Exist. Pond 3-1 & Pond 3-2	BY:	SH	9/22/2022
BASIN:	**3**		CHECKED:	ZL	9/18/2023
ALTERNATIVE:	**3A (EXIST. POND 3-1 & POND 3-2)**		REVISED:	ZL	1/5/2024

ALTERNATIVE 3A

PRE-DEVELOPMENT (EXISTING) CONDITION

CURVE NUMBER

LAND USE DESCRIPTION	HYDROLOGIC SOIL GROUP	CN	AREA (AC)				C*A
			PERVIOUS	IMPERVIOUS	WATER SURFACE	TOTAL	
ROADWAY BASIN							
Impervious area	A	98		9.35		9.35	916.30
Open Space (good) - grass >75%	A	39	4.73			4.73	184.47
Impervious area	D	98		6.82		6.82	668.36
Open Space (good) - grass >75%	D	80	6.27			6.27	501.60
		Subtotal (basin area):	11.00	16.17	0.00	27.17	2270.73
POND BASIN							
Water surface (Exist. Pond 3-1)	D	100			0.80	0.80	80.00
Open Space (good) - grass >75% (Exist. Pond 3-1)	D	80	0.48			0.48	38.64
Woods (good) (Pond 3-2)	D	77	3.51			3.51	270.27
		0				0.00	0.00
		0				0.00	0.00
		Subtotal (pond area):	3.99	0.00	0.80	4.79	388.91
		TOTAL	**14.99**	**16.17**	**0.80**	**31.96**	**2659.64**

Composite CN = 83

ESTIMATE OF RUNOFF VOLUME

PROCEDURE TO DETERMINE RUNOFF VOLUMES IS BASED ON THE SCS EQUATION AS FOLLOWS:

1) DETERMINE SOIL STORAGE [S] → S = (1000/CN) - 10 (inches)
2) DETERMINE RAINFALL [P] → (inches)
3) DETERMINE RUNOFF [R] → $R = (P - 0.2 * S)^2/(P + 0.8 * S)$ (inches)
4) DETERMINE RUNOFF VOLUME [V(R)] → V(R) = (R/12) * AREA (acre-feet)

AGENCY/DESCRIPTION	FREQUENCY	P (IN)	S (IN)	R (IN)	V(R) (AC-FT)
FDOT 5YR-24HR	5YR-24HR	5.40	2.02	3.56	9.48
FDOT 10YR-24HR	10YR-24HR	6.37	2.02	4.46	11.88
SFWMD 25YR-72HR	25YR-72HR	9.70	2.02	7.64	20.35
ORANGE COUNTY 25YR-24HR	25YR-24HR	7.50	2.02	5.53	14.72

POST-DEVELOPMENT (PROPOSED) CONDITION

CURVE NUMBER

LAND USE DESCRIPTION	HYDROLOGIC SOIL GROUP	CN	AREA (AC)				C*A
			PERVIOUS	IMPERVIOUS	WATER SURFACE	TOTAL	
ROADWAY BASIN							
Impervious area	A	98		8.75		8.75	857.50
Open Space (good) - grass >75%	A	39	4.61			4.61	179.79
Impervious area	D	98		9.13		9.13	894.74
Open Space (good) - grass >75%	D	80	4.68			4.68	374.40
		Subtotal (basin area):	9.29	17.88	0.00	27.17	2306.43
POND BASIN							
Water surface (Exist. Pond 3-1)	D	100			0.80	0.80	80.00
Open Space (good) - grass >75% (Exist. Pond 3-1)	D	80	0.48			0.48	38.64
Water surface (Pond 3-2)	D	100			1.34	1.34	134.00
Pasture/grassland/range (good) - ground cover >75% (Pond 3-2)	D	80	2.17			2.17	173.60
		0				0.00	0.00
		Subtotal (pond area):	2.65	0.00	2.14	4.79	426.24
		TOTAL	**11.94**	**17.88**	**2.14**	**31.96**	**2732.67**

Composite CN = 85

BCC ENGINEERING, INC.					
PROJECT:	SR 535 PD&E				DATE
FPID:	437174-2	BASIN 3 - Exist. Pond 3-1 & Pond 3-2	BY:	SH	9/22/2022
BASIN:	**3**		CHECKED:	ZL	9/18/2023
ALTERNATIVE:	**3A (EXIST. POND 3-1 & POND 3-2)**		REVISED:	ZL	1/5/2024

ESTIMATE OF RUNOFF VOLUME

PROCEDURE TO DETERMINE RUNOFF VOLUMES IS BASED ON THE SCS EQUATION AS FOLLOWS:

1) DETERMINE SOIL STORAGE [S] → S = (1000/CN) - 10 (inches)
2) DETERMINE RAINFALL [P] → (inches)
3) DETERMINE RUNOFF [R] → $R = (P - 0.2 * S)^2/(P + 0.8 * S)$ (inches)
4) DETERMINE RUNOFF VOLUME [V(R)] → V(R) = (R/12) * AREA (acre-feet)

AGENCY/DESCRIPTION	FREQUENCY	P (IN)	S (IN)	R (IN)	V(R) (AC-FT)
FDOT 5YR-24HR	5YR-24HR	5.40	1.70	3.79	10.10
FDOT 10YR-24HR	10YR-24HR	6.37	1.70	4.71	12.54
SFWMD 25YR-72HR	25YR-72HR	9.70	1.70	7.92	21.11
ORANGE COUNTY 25YR-24HR	25YR-24HR	7.50	1.70	5.79	15.42

WATER QUANTITY (ATTENUATION) VOLUMES REQUIRED

		V(R) (AC-FT)		
AGENCY/DESCRIPTION	FREQUENCY	PRE-DEV (EXISTING)	POST-DEV (PROPOSED)	DIFFERENCE
FDOT 5YR-24HR	5YR-24HR	9.48	10.10	0.62
FDOT 10YR-24HR	10YR-24HR	11.88	12.54	0.66
SFWMD 25YR-72HR	**25YR-72HR**	**20.35**	**21.11**	**0.76**
ORANGE COUNTY 25YR-24HR	25YR-24HR	14.72	15.42	**0.70**

CONTROLLING WATER QUANTITY (ATTENUATION) VOLUME = **0.76** **AC-FT**

WATER QUALITY (TREATMENT) VOLUME REQUIRED

1. WATER MANAGEMENT DISTRICT PRESUMPTIVE REQUIREMENTS

JURISDICTION: SFWMD

SFWMD CRITERIA (SECTION 4.2.1, SFWMD APPLICANT'S HANDBOOK)
PROVIDE THE GREATER OF:
2.5" OVER THE IMPERVIOUS AREA; OR
1" OVER THE DRAINAGE AREA

AREAS:
TOTAL BASIN AREA (EXCLUDING WATER SURFACE AREAS) = 29.82 AC
PROPOSED IMPERVIOUS AREA = 17.88 AC

IMPERVIOUS AREA:
EXISTING IMPERVIOUS AREA = 16.17 AC
PROPOSED IMPERVIOUS AREA = 17.88 AC
NEW IMPERVIOUS AREA = 1.71 AC

Treatment Criteria:
1" OVER THE TOTAL BASIN AREA (EXCLUDING WATER SURFACE AREAS) = 2.49 AC-FT
2.5" OVER IMPERVIOUS AREA = 3.73 AC-FT

USE TREATMENT VOLUME = 3.73 AC-FT (2.5" OVER IMPERVIOUS AREA)

2. FACILITY TYPE:

FACILITY TYPE: WET DETENTION

TYPE:	
WET DETENTION	100% REQUIRED
DRY DETENTION	75% REQUIRED
DRY DRETENTION	50% REQUIRED

WATER QUALITY VOLUME REQUIRED = 3.73 AC-FT

3. OFW AND IMPAIRED WATER/TMDL REQUIREMENTS:

ADDITIONAL 50% TREATMENT VOLUME? YES PROJECT IS WITHIN LAKE OKEECHOBEE BMAP, SEE SFWMD PRE-APPLICATION MEETING MINUTES
IMPAIRED OR ADOPTED TMDL FOR NUTRIENTS? YES

ADDITIONAL TREATMENT VOLUME FOR LAKE OKEECHOBEE BMAP = 1.86 AC-FT (ADDITIONAL 50% TREATMENT VOLUME)

TOTAL WATER QUALITY (TREATMENT) VOLUME = **5.59** **AC-FT**

BCC ENGINEERING, INC.					
PROJECT:	SR 535 PD&E				DATE
FPID:	437174-2	BASIN 3 - Exist. Pond 3-1 & Pond 3-2	BY:	SH	9/22/2022
BASIN:	**3**		CHECKED:	ZL	9/18/2023
ALTERNATIVE:	**3A (EXIST. POND 3-1 & POND 3-2)**		REVISED:	ZL	1/5/2024

EXIST. POND STAGE-AREA TABLE

NOTE: POND STAGE-AREA DATA FROM APPLICATION # 901113-1/SPN 75560-3610 (IN NGVD 29). VERTICAL DATUM HAS BEEN UPDATED TO NAVD 88 IN TABLE BELOW DATUM CONVERSION: EL. NAVD 88 = EL. NGVD 29-0.90 FT

EXIST. POND 3-1

EL (FT)	DESCRIPTION	AREA (AC)	AVG. AREA (AC)	DEPTH (FT)	INC. VOLUME (AC-FT)	∑ VOLUME (AC-FT)	REMARKS
90.81	CONTROL EL.	0.80				0.00	
			0.88	2.29	2.01		
93.10	TOP OF TREATMENT VOLUME	0.95				2.01	
			1.08	3.90	4.23		
97.00	MAX. POND STAGE EL.	1.22				6.24	
			1.25	1.00	1.25		
98.00	INSIDE EDGE OF BERM	1.28				7.49	
98.00	OUTSIDE EDGE OF BERM	1.47					

EXIST. POND 3-2

EL (FT)	DESCRIPTION	AREA (AC)	AVG. AREA (AC)	DEPTH (FT)	INC. VOLUME (AC-FT)	∑ VOLUME (AC-FT)	REMARKS
93.10	BOTTOM EL.	0.95				1.09	
			1.47	3.90	5.74		
97.00	MAX. POND STAGE EL.	1.99				6.83	
			2.13	1.00	2.13		
98.00	INSIDE EDGE OF BERM	2.26				8.95	
98.00	OUTSIDE EDGE OF BERM	2.61					

EXIST. POND 3-1 & EXIST. POND 3-2 (COMBINED)

EL (FT)	DESCRIPTION	AREA (AC)	AVG. AREA (AC)	DEPTH (FT)	INC. VOLUME (AC-FT)	∑ VOLUME (AC-FT)	REMARKS
90.81	CONTROL EL.	0.80				0.00	
			1.35	2.29	3.10		
93.10	TOP OF TREATMENT VOLUME	1.90				3.10	
			2.56	3.90	9.97		
97.00	MAX. POND STAGE EL.	3.21				13.06	
			3.38	1.00	3.38		
98.00	INSIDE EDGE OF BERM	3.54				16.44	
98.00	OUTSIDE EDGE OF BERM	4.08					

EXIST. CONTROL EL =	90.81	FT	
EXIST. TREATMENT VOLUME REQD =	1.89	AC-FT	
DHW (10YR-24HR) =	96.26	FT	(USE HIGHER OF EXIST. POND 3-1 AND 3-2 FOR CONSERVATIVE ESTIMATE OF EXIST. STORAGE PROVIDED
DHW (25YR-24HR) =	96.93	FT	(USE HIGHER OF EXIST. POND 3-1 AND 3-2 FOR CONSERVATIVE ESTIMATE OF EXIST. STORAGE PROVIDED
ATTENUATION VOLUMES PROVIDED IN EXIST. PONDS:			
ATTENUATION VOLUME PROVIDED IN EXIST. PONDS (10YR-24HR) =	**8.08**	**AC-FT**	(DETERMINED THROUGH INTERPOLATION OF EXIST. POND STAGE-AREA TABLES
ATTENUATION VOLUME PROVIDED IN EXIST. PONDS (25YR-24HR) =	**9.79**	**AC-FT**	(DETERMINED THROUGH INTERPOLATION OF EXIST. POND STAGE-AREA TABLES

PRELIMINARY POND SIZING ESTIMATE

NOTE: POND STAGE-AREA DATA FROM APPLICATION # 901113-1/SPN 75560-3610 (IN NGVD 29). VERTICAL DATUM HAS BEEN UPDATED TO NAVD 88 IN TABLE BELOW DATUM CONVERSION: EL. NAVD 88 = EL. NGVD 29-0.90 FT

EXIST. POND 3-1

EL (FT)	DESCRIPTION	AREA (AC)	AVG. AREA (AC)	DEPTH (FT)	INC. VOLUME (AC-FT)	∑ VOLUME (AC-FT)	REMARKS
90.81	CONTROL EL.	0.80				0.00	
			0.88	2.44	2.15		
93.25	TOP OF TREATMENT VOLUME	0.96				2.15	
			1.09	3.75	4.09		
97.00	MAX. POND STAGE EL.	1.22				6.24	
			1.25	1.00	1.25		
98.00	INSIDE EDGE OF BERM	1.28				7.49	
98.00	OUTSIDE EDGE OF BERM	1.47					

POND 3-2 NOTE: POND CONTROL EL. BASED ON 1' BELOW AVG. SHGWT EL. FROM PRELIMINARY GEOTECH BORINGS FOR POND 3-2

EL (FT)	DESCRIPTION	AREA (AC)	AVG. AREA (AC)	DEPTH (FT)	INC. VOLUME (AC-FT)	∑ VOLUME (AC-FT)	REMARKS
90.81	CONTROL EL.	1.34				0.00	
			1.47	2.44	3.58		
93.25	TOP OF TREATMENT VOLUME	1.59				3.58	
			1.78	3.75	6.69		
97.00	MAX. POND STAGE EL.	1.98				10.27	
			2.03	1.00	2.03		
98.00	INSIDE EDGE OF BERM	2.08				12.29	
99.00	OUTSIDE EDGE OF BERM	2.77					
94.00	TIE-DOWN TO EXIST. GROUND	3.51					AVG. EXIST. GROUND EL. 94.0

APPLY 15% CONTINGENCY TO REQUIRED POND AREA =	**4.0**	**AC**	**TOTAL PARCEL AREA =**	61.7 OK

BCC ENGINEERING, INC.					
PROJECT:	3A (EXIST. POND 3-1 & POND 3-2)				DATE
FPID:	43717422201	BASIN 3 - Exist. Pond 3-1 & Pond 3-2	BY:	SH	9/22/2022
BASIN:	**3**		CHECKED:	ZL	9/18/2023
ALTERNATIVE:	**3A (EXIST. POND 3-1 & POND 3-2)**		REVISED:	ZL	1/5/2024

Pond 3-1 & 3-2 (COMBINED)

EL (FT)	DESCRIPTION	AREA (AC)	AVG. AREA (AC)	DEPTH (FT)	INC. VOLUME (AC-FT)	∑ VOLUME (AC-FT)	REMARKS
90.81	CONTROL EL.	2.14				0.00	
			2.35	2.44	5.73		
93.25	TOP OF TREATMENT VOLUME	2.56				5.73	
			2.87	3.75	10.78		
97.00	MAX. POND STAGE EL.	3.19				16.51	
			3.28	1.00	3.28		
98.00	INSIDE EDGE OF BERM	3.36				19.78	
99.00	OUTSIDE EDGE OF BERM	4.24					

MIN. REQUIRED TREATMENT VOLUME =	**5.59**	AC-FT
MIN. REQUIRED TREATMENT VOLUME EL. =	**93.20**	FT
TREATMENT VOLUME PROVIDED =	**5.73**	AC-FT
DHW EL. (TREATMENT+25YR-72HR ATTENUATION VOLUME) =	**96.92**	FT
MAX ALLOWABLE POND STAGE EL. =	**97.00**	FT

NOTE: ADJUST EXIST. POND 3-1 WEIR EL. TO PROVIDE REQ'D. TREATMENT VOLUME

PRELIMINARY STORM DRAIN TAILWATER ESTIMATE

DESIGN STORM FOR STORM DRAIN SYSTEM =	10YR-24HR	
WEIR EL. =	**93.25**	FT
DESIGN STORM ATTENUATION VOLUME =	8.74	AC-FT (CHOOSE 5YR-24HR OR 10YR-24HR)
DESIGN STORM EL. (ESTIMATED TAILWATER EL. FOR STORM DRAIN SYSTEM) =	**96.29**	FT

HYDRAULIC GRADE LINE CALCULATIONS

LOW EDGE OF PAVEMENT (LEOP) IN BASIN (FOR HGL CHECK):

BASELINE	SR 535	
LOW EDGE OF PAVEMENT EL. (FT)	**100.00**	FT
ALLOWABLE HEAD LOSS = LOWEST GUTTER EL. - TAILWATER EL. =	3.71	FT
PIPE LENGTH FROM LOW EDGE OF PAVEMENT TO POND =	300	FT
ASSUMED HGL SLOPE =	0.15	%
HGL AT LEOP =	**96.74**	OK, LOWER THAN LEOP

BCC ENGINEERING, INC.					
PROJECT:	SR 535 PD&E				DATE
FPID:	437174-2	BASIN 3 - Exist. Pond 3-1 & Pond 3-3	BY:	SH	9/27/2022
BASIN:	**3**		CHECKED:	ZL	9/20/2023
ALTERNATIVE:	**3B (EXIST. POND 3-1 & POND 3-3)**		REVISED:	ZL	1/8/2024

ALTERNATIVE 3B

PRE-DEVELOPMENT (EXISTING) CONDITION

CURVE NUMBER

LAND USE DESCRIPTION	HYDROLOGIC SOIL GROUP	CN	AREA (AC)				C*A
			PERVIOUS	IMPERVIOUS	WATER SURFACE	TOTAL	
ROADWAY BASIN							
Impervious area	A	98		9.35		9.35	916.30
Open Space (good) - grass >75%	A	39	4.73			4.73	184.47
Impervious area	D	98		6.82		6.82	668.36
Open Space (good) - grass >75%	D	80	6.27			6.27	501.60
		Subtotal (basin area):	11.00	16.17	0.00	27.17	2270.73
POND BASIN							
Water surface	D	100			0.80	0.80	80.00
Open Space (good) - grass >75%	D	80	0.48			0.48	38.40
Woods (good)	D	77	3.58			3.58	275.66
		0				0.00	0.00
		0				0.00	0.00
		Subtotal (pond area):	4.06	0.00	0.80	4.86	394.06
		TOTAL	**15.06**	**16.17**	**0.80**	**32.03**	**2664.79**

Composite CN = 83

ESTIMATE OF RUNOFF VOLUME

PROCEDURE TO DETERMINE RUNOFF VOLUMES IS BASED ON THE SCS EQUATION AS FOLLOWS:

1) DETERMINE SOIL STORAGE [S] → S = (1000/CN) - 10 (inches)
2) DETERMINE RAINFALL [P] → (inches)
3) DETERMINE RUNOFF [R] → $R = (P - 0.2 * S)^2/(P + 0.8 * S)$ (inches)
4) DETERMINE RUNOFF VOLUME [V(R)] → V(R) = (R/12) * AREA (acre-feet)

AGENCY/DESCRIPTION	FREQUENCY	P (IN)	S (IN)	R (IN)	V(R) (AC-FT)
FDOT 5YR-24HR	5YR-24HR	5.40	2.02	3.56	9.50
FDOT 10YR-24HR	10YR-24HR	6.37	2.02	4.46	11.90
SFWMD 25YR-72HR	25YR-72HR	9.70	2.02	7.64	20.38
ORANGE COUNTY 25YR-24HR	25YR-24HR	7.50	2.02	5.52	14.74

POST-DEVELOPMENT (PROPOSED) CONDITION

CURVE NUMBER

LAND USE DESCRIPTION	HYDROLOGIC SOIL GROUP	CN	AREA (AC)				C*A
			PERVIOUS	IMPERVIOUS	WATER SURFACE	TOTAL	
ROADWAY BASIN							
Impervious area	A	98		8.75		8.75	857.50
Open Space (good) - grass >75%	A	39	4.61			4.61	179.79
Impervious area	D	98		9.13		9.13	894.74
Open Space (good) - grass >75%	D	80	4.68			4.68	374.40
		Subtotal (basin area):	9.29	17.88	0.00	27.17	2306.43
POND BASIN							
Water surface	D	100			0.80	0.80	80.00
Open Space (good) - grass >75%	D	80	0.48			0.48	38.40
Water surface	D	100			1.07	1.07	107.00
Pasture/grassland/range (good) - ground cover >75%	D	80	2.51			2.51	200.80
		0				0.00	0.00
		Subtotal (pond area):	2.99	0.00	1.87	4.86	426.20
		TOTAL	**12.28**	**17.88**	**1.87**	**32.03**	**2732.63**

Composite CN = 85

BCC ENGINEERING, INC.					
PROJECT:	SR 535 PD&E				DATE
FPID:	437174-2	BASIN 3 - Exist. Pond 3-1 & Pond 3-3	BY:	SH	9/27/2022
BASIN:	**3**		CHECKED:	ZL	9/20/2023
ALTERNATIVE:	**3B (EXIST. POND 3-1 & POND 3-3)**		REVISED:	ZL	1/8/2024

ESTIMATE OF RUNOFF VOLUME

PROCEDURE TO DETERMINE RUNOFF VOLUMES IS BASED ON THE SCS EQUATION AS FOLLOWS:

1) DETERMINE SOIL STORAGE [S] → S = (1000/CN) - 10 (inches)
2) DETERMINE RAINFALL [P] → (inches)
3) DETERMINE RUNOFF [R] → $R = (P - 0.2 * S)^2/(P + 0.8 * S)$ (inches)
4) DETERMINE RUNOFF VOLUME [V(R)] → V(R) = (R/12) * AREA (acre-feet)

AGENCY/DESCRIPTION	FREQUENCY	P (IN)	S (IN)	R (IN)	V(R) (AC-FT)
FDOT 5YR-24HR	5YR-24HR	5.40	1.72	3.77	10.07
FDOT 10YR-24HR	10YR-24HR	6.37	1.72	4.69	12.51
SFWMD 25YR-72HR	25YR-72HR	9.70	1.72	7.90	21.09
ORANGE COUNTY 25YR-24HR	25YR-24HR	7.50	1.72	5.77	15.40

WATER QUANTITY (ATTENUATION) VOLUMES REQUIRED

		V(R) (AC-FT)		
AGENCY/DESCRIPTION	FREQUENCY	PRE-DEV (EXISTING)	POST-DEV (PROPOSED)	DIFFERENCE
FDOT 5YR-24HR	5YR-24HR	9.50	10.07	0.57
FDOT 10YR-24HR	10YR-24HR	11.90	12.51	0.61
SFWMD 25YR-72HR	**25YR-72HR**	**20.38**	**21.09**	**0.71**
ORANGE COUNTY 25YR-24HR	25YR-24HR	14.74	15.40	**0.65**

CONTROLLING WATER QUANTITY (ATTENUATION) VOLUME = **0.71** **AC-FT**

WATER QUALITY (TREATMENT) VOLUME REQUIRED

1. WATER MANAGEMENT DISTRICT PRESUMPTIVE REQUIREMENTS
JURISDICTION: SFWMD

SFWMD CRITERIA (SECTION 4.2.1, SFWMD APPLICANT'S HANDBOOK)
PROVIDE THE GREATER OF:
2.5" OVER THE IMPERVIOUS AREA; OR
1" OVER THE DRAINAGE AREA

AREAS:
TOTAL BASIN AREA (EXCLUDING WATER SURFACE AREAS) = 30.16 AC
PROPOSED IMPERVIOUS AREA = 17.88 AC

IMPERVIOUS AREA:
EXISTING IMPERVIOUS AREA = 16.17 AC
PROPOSED IMPERVIOUS AREA = 17.88 AC
NEW IMPERVIOUS AREA = 1.71 AC

Treatment Criteria:
1" OVER THE TOTAL BASIN AREA (EXCLUDING WATER SURFACE AREAS) = 2.51 AC-FT
2.5" OVER IMPERVIOUS AREA = 3.73 AC-FT

USE TREATMENT VOLUME = 3.73 AC-FT (2.5" OVER IMPERVIOUS AREA)

2. FACILITY TYPE:
FACILITY TYPE: WET DETENTION

TYPE:	
WET DETENTION	100% REQUIRED
DRY DETENTION	75% REQUIRED
DRY DRETENTION	50% REQUIRED

WATER QUALITY VOLUME REQUIRED = 3.73 AC-FT

3. OFW AND IMPAIRED WATER/TMDL REQUIREMENTS:
ADDITIONAL 50% TREATMENT VOLUME? YES PROJECT IS WITHIN LAKE OKEECHOBEE BMAP, SEE SFWMD PRE-APPLICATION MEETING MINUTES
IMPAIRED OR ADOPTED TMDL FOR NUTRIENTS? YES

ADDITIONAL TREATMENT VOLUME FOR LAKE OKEECHOBEE BMAP = 1.86 AC-FT (ADDITIONAL 50% TREATMENT VOLUME)

TOTAL WATER QUALITY (TREATMENT) VOLUME = **5.59** **AC-FT**

BCC ENGINEERING, INC.					
PROJECT:	SR 535 PD&E				DATE
FPID:	437174-2	BASIN 3 - Exist. Pond 3-1 & Pond 3-3	BY:	SH	9/27/2022
BASIN:	**3**		CHECKED:	ZL	9/20/2023
ALTERNATIVE:	**3B (EXIST. POND 3-1 & POND 3-3)**		REVISED:	ZL	1/8/2024

EXIST. POND STAGE-AREA TABLE

NOTE: POND STAGE-AREA DATA FROM APPLICATION # 901113-1/SPN 75560-3610 (IN NGVD 29). VERTICAL DATUM HAS BEEN UPDATED TO NAVD 88 IN TABLE BELOW DATUM CONVERSION: EL. NAVD 88 = EL. NGVD 29-0.90 FT

EXIST. POND 3-1

EL (FT)	DESCRIPTION	AREA (AC)	AVG. AREA (AC)	DEPTH (FT)	INC. VOLUME (AC-FT)	∑ VOLUME (AC-FT)	REMARKS
90.81	CONTROL EL.	0.80				0.00	
			0.88	2.29	2.01		
93.10	TOP OF TREATMENT VOLUME	0.95				2.01	
			1.08	3.90	4.23		
97.00	MAX. POND STAGE EL.	1.22				6.24	
			1.25	1.00	1.25		
98.00	INSIDE EDGE OF BERM	1.28				7.49	
98.00	OUTSIDE EDGE OF BERM	1.47					

EXIST. POND 3-2

EL (FT)	DESCRIPTION	AREA (AC)	AVG. AREA (AC)	DEPTH (FT)	INC. VOLUME (AC-FT)	∑ VOLUME (AC-FT)	REMARKS
93.10	BOTTOM EL.	0.95				1.09	
			1.47	3.90	5.74		
97.00	MAX. POND STAGE EL.	1.99				6.83	
			2.13	1.00	2.13		
98.00	INSIDE EDGE OF BERM	2.26				8.95	
98.00	OUTSIDE EDGE OF BERM	2.61					

EXIST. POND 3-1 & EXIST. POND 3-2 (COMBINED)

EL (FT)	DESCRIPTION	AREA (AC)	AVG. AREA (AC)	DEPTH (FT)	INC. VOLUME (AC-FT)	∑ VOLUME (AC-FT)	REMARKS
90.81	CONTROL EL.	0.80				0.00	
			1.35	2.29	3.10		
93.10	TOP OF TREATMENT VOLUME	1.90				3.10	
			2.56	3.90	9.97		
97.00	MAX. POND STAGE EL.	3.21				13.06	
			3.38	1.00	3.38		
98.00	INSIDE EDGE OF BERM	3.54				16.44	
98.00	OUTSIDE EDGE OF BERM	4.08					

EXIST. CONTROL EL =	90.81	FT	
EXIST. TREATMENT VOLUME REQD =	1.89	AC-FT	
DHW (10YR-24HR) =	96.26	FT	(USE HIGHER OF EXIST. POND 3-1 AND 3-2 FOR CONSERVATIVE ESTIMATE OF EXIST. STORAGE PROVIDED
DHW (25YR-24HR) =	96.93	FT	(USE HIGHER OF EXIST. POND 3-1 AND 3-2 FOR CONSERVATIVE ESTIMATE OF EXIST. STORAGE PROVIDED
ATTENUATION VOLUMES PROVIDED IN EXIST. PONDS:			
ATTENUATION VOLUME PROVIDED IN EXIST. PONDS (10YR-24HR) =	**8.08**	**AC-FT**	(DETERMINED THROUGH INTERPOLATION OF EXIST. POND STAGE-AREA TABLES
ATTENUATION VOLUME PROVIDED IN EXIST. PONDS (25YR-24HR) =	**9.79**	**AC-FT**	(DETERMINED THROUGH INTERPOLATION OF EXIST. POND STAGE-AREA TABLES

PRELIMINARY POND SIZING ESTIMATE

NOTE: POND STAGE-AREA DATA FROM APPLICATION # 901113-1/SPN 75560-3610 (IN NGVD 29). VERTICAL DATUM HAS BEEN UPDATED TO NAVD 88 IN TABLE BELOW DATUM CONVERSION: EL. NAVD 88 = EL. NGVD 29-0.90 FT

EXIST. POND 3-1

EL (FT)	DESCRIPTION	AREA (AC)	AVG. AREA (AC)	DEPTH (FT)	INC. VOLUME (AC-FT)	∑ VOLUME (AC-FT)	REMARKS
90.81	CONTROL EL.	0.80				0.00	
			0.88	2.49	2.20		
93.30	TOP OF TREATMENT VOLUME	0.97				2.20	
			1.09	3.70	4.04		
97.00	MAX. POND STAGE EL.	1.22				6.24	
			1.25	1.00	1.25		
98.00	INSIDE EDGE OF BERM	1.28				7.49	
98.00	OUTSIDE EDGE OF BERM	1.47					

POND 3-3 NOTE: POND CONTROL EL. BASED ON SHGWT EL. FROM PRELIMINARY GEOTECH BORINGS FOR POND 3-3

EL (FT)	DESCRIPTION	AREA (AC)	AVG. AREA (AC)	DEPTH (FT)	INC. VOLUME (AC-FT)	∑ VOLUME (AC-FT)	REMARKS
90.81	CONTROL EL.	1.32				0.00	
			1.44	2.49	3.60		
93.30	TOP OF TREATMENT VOLUME	1.57				3.60	
			1.75	3.70	6.49		
97.00	MAX. POND STAGE EL.	1.94				10.09	
			1.99	1.00	1.99		
98.00	INSIDE EDGE OF BERM	2.04				12.08	
99.00	OUTSIDE EDGE OF BERM	2.78					
102.00	TIE-DOWN TO EXIST. GROUND	3.58					AVG. EXIST. GROUND EL. 94.0

APPLY 15% CONTINGENCY TO REQUIRED POND AREA =	**4.1**	**AC**	**TOTAL PARCEL AREA =**	5.3 OK (TOTAL OF 3 PARCELS)

BCC ENGINEERING, INC.					
PROJECT:	SR 535 PD & E				DATE
FPID:	43717422201	BASIN 3 - Exist. Pond 3-1 & Pond 3-3	BY:	SH	9/27/2022
BASIN:	**3**		CHECKED:	ZL	9/20/2023
ALTERNATIVE:	**3B (EXIST. POND 3-1 & POND 3-3)**		REVISED:	ZL	1/8/2024

Pond 3-1 & 3-4 (COMBINED)

EL (FT)	DESCRIPTION	AREA (AC)	AVG. AREA (AC)	DEPTH (FT)	INC. VOLUME (AC-FT)	∑ VOLUME (AC-FT)	REMARKS
90.81	CONTROL EL.	2.12				0.00	
			2.33	2.49	5.80		
93.30	TOP OF TREATMENT VOLUME	2.54				5.80	
			2.85	3.70	10.53		
97.00	MAX. POND STAGE EL.	3.16				16.33	
			3.24	1.00	3.24		
98.00	INSIDE EDGE OF BERM	3.32				19.57	
99.00	OUTSIDE EDGE OF BERM	4.25					

MIN. REQUIRED TREATMENT VOLUME =	**5.59**	AC-FT
MIN. REQUIRED TREATMENT VOLUME EL. =	**93.23**	FT
TREATMENT VOLUME PROVIDED =	**5.80**	AC-FT
DHW EL. (TREATMENT+25YR-72HR ATTENUATION VOLUME) =	**96.99**	FT
MAX ALLOWABLE POND STAGE EL. =	**97.00**	FT

NOTE: ADJUST EXIST. POND 3-1 WEIR EL. TO PROVIDE REQ'D. TREATMENT VOLUME

PRELIMINARY STORM DRAIN TAILWATER ESTIMATE

DESIGN STORM FOR STORM DRAIN SYSTEM =	10YR-24HR	
WEIR EL. =	**93.30**	FT
DESIGN STORM ATTENUATION VOLUME =	8.69	AC-FT (CHOOSE 5YR-24HR OR 10YR-24HR)
DESIGN STORM EL. (ESTIMATED TAILWATER EL. FOR STORM DRAIN SYSTEM) =	**96.35**	FT

HYDRAULIC GRADE LINE CALCULATIONS

LOW EDGE OF PAVEMENT (LEOP) IN BASIN (FOR HGL CHECK):

BASELINE	SR 535	
LOW EDGE OF PAVEMENT EL. (FT)	**100.00**	FT

ALLOWABLE HEAD LOSS = LOWEST GUTTER EL. - TAILWATER EL. =	3.65	FT
PIPE LENGTH FROM LOW EDGE OF PAVEMENT TO POND =	300	FT
ASSUMED HGL SLOPE =	0.15	%
HGL AT LEOP =	**96.80**	OK, LOWER THAN LEOP

BCC ENGINEERING, INC.					
PROJECT:	SR 535 PD&E				DATE
FPID:	437174-2	BASIN 3 - Exist. Pond 3-1 & Pond 3-4	BY:	ZL	10/11/2023
BASIN:	**3**		CHECKED:	JAG	11/8/2023
ALTERNATIVE:	**3C (EXIST. POND 3-1 & POND 3-4)**		REVISED:	ZL	1/8/2024

ALTERNATIVE 3C

PRE-DEVELOPMENT (EXISTING) CONDITION

CURVE NUMBER

LAND USE DESCRIPTION	HYDROLOGIC SOIL GROUP	CN	AREA (AC)				C*A
			PERVIOUS	IMPERVIOUS	WATER SURFACE	TOTAL	
ROADWAY BASIN							
Impervious area	A	98		9.35		9.35	916.30
Open Space (good) - grass >75%	A	39	4.73			4.73	184.47
Impervious area	D	98		6.82		6.82	668.36
Open Space (good) - grass >75%	D	80	6.27			6.27	501.60
		Subtotal (basin area):	11.00	16.17	0.00	27.17	2270.73
POND BASIN							
Water surface	D	100			0.80	0.80	80.00
Open Space (good) - grass >75%	D	80	0.48			0.48	38.40
Woods (good)	D	77	3.04			3.04	234.08
		0				0.00	0.00
		0				0.00	0.00
		Subtotal (pond area):	3.52	0.00	0.80	4.32	352.48
		TOTAL	**14.52**	**16.17**	**0.80**	**31.49**	**2623.21**

Composite CN = 83

ESTIMATE OF RUNOFF VOLUME

PROCEDURE TO DETERMINE RUNOFF VOLUMES IS BASED ON THE SCS EQUATION AS FOLLOWS:

1) DETERMINE SOIL STORAGE [S] → S = (1000/CN) - 10 (inches)
2) DETERMINE RAINFALL [P] → (inches)
3) DETERMINE RUNOFF [R] → $R = (P - 0.2 * S)^2/(P + 0.8 * S)$ (inches)
4) DETERMINE RUNOFF VOLUME [V(R)] → V(R) = (R/12) * AREA (acre-feet)

AGENCY/DESCRIPTION	FREQUENCY	P (IN)	S (IN)	R (IN)	V(R) (AC-FT)
FDOT 5YR-24HR	5YR-24HR	5.40	2.00	3.57	9.36
FDOT 10YR-24HR	10YR-24HR	6.37	2.00	4.47	11.73
SFWMD 25YR-72HR	25YR-72HR	9.70	2.00	7.65	20.08
ORANGE COUNTY 25YR-24HR	25YR-24HR	7.50	2.00	5.54	14.53

POST-DEVELOPMENT (PROPOSED) CONDITION

CURVE NUMBER

LAND USE DESCRIPTION	HYDROLOGIC SOIL GROUP	CN	AREA (AC)				C*A
			PERVIOUS	IMPERVIOUS	WATER SURFACE	TOTAL	
ROADWAY BASIN							
Impervious area	A	98		8.75		8.75	857.50
Open Space (good) - grass >75%	A	39	4.61			4.61	179.79
Impervious area	D	98		9.13		9.13	894.74
Open Space (good) - grass >75%	D	80	4.68			4.68	374.40
		Subtotal (basin area):	9.29	17.88	0.00	27.17	2306.43
POND BASIN							
Water surface	D	100			0.80	0.80	80.00
Open Space (good) - grass >75%	D	80	0.48			0.48	38.40
Water surface	D	100			0.83	0.83	83.00
Open Space (good) - grass >75%	D	80	2.21			2.21	176.80
		0				0.00	0.00
		Subtotal (pond area):	2.69	0.00	1.63	4.32	378.20
		TOTAL	**11.98**	**17.88**	**1.63**	**31.49**	**2684.63**

Composite CN = 85

BCC ENGINEERING, INC.					
PROJECT:	SR 535 PD&E				DATE
FPID:	437174-2	BASIN 3 - Exist. Pond 3-1 & Pond 3-4	BY:	ZL	10/11/2023
BASIN:	**3**		CHECKED:	JAG	11/8/2023
ALTERNATIVE:	**3C (EXIST. POND 3-1 & POND 3-4)**		REVISED:	ZL	1/8/2024

ESTIMATE OF RUNOFF VOLUME

PROCEDURE TO DETERMINE RUNOFF VOLUMES IS BASED ON THE SCS EQUATION AS FOLLOWS:

1) DETERMINE SOIL STORAGE [S] → S = (1000/CN) - 10 (inches)
2) DETERMINE RAINFALL [P] → (inches)
3) DETERMINE RUNOFF [R] → $R = (P - 0.2 * S)^2/(P + 0.8 * S)$ (inches)
4) DETERMINE RUNOFF VOLUME [V(R)] → V(R) = (R/12) * AREA (acre-feet)

AGENCY/DESCRIPTION	FREQUENCY	P (IN)	S (IN)	R (IN)	V(R) (AC-FT)
FDOT 5YR-24HR	5YR-24HR	5.40	1.73	3.77	9.88
FDOT 10YR-24HR	10YR-24HR	6.37	1.73	4.68	12.28
SFWMD 25YR-72HR	25YR-72HR	9.70	1.73	7.89	20.72
ORANGE COUNTY 25YR-24HR	25YR-24HR	7.50	1.73	5.76	15.12

WATER QUANTITY (ATTENUATION) VOLUMES REQUIRED

		V(R) (AC-FT)		
AGENCY/DESCRIPTION	FREQUENCY	PRE-DEV (EXISTING)	POST-DEV (PROPOSED)	DIFFERENCE
FDOT 5YR-24HR	5YR-24HR	9.36	9.88	0.52
FDOT 10YR-24HR	10YR-24HR	11.73	12.28	0.56
SFWMD 25YR-72HR	**25YR-72HR**	**20.08**	**20.72**	**0.64**
ORANGE COUNTY 25YR-24HR	25YR-24HR	14.53	15.12	**0.59**

CONTROLLING WATER QUANTITY (ATTENUATION) VOLUME = **0.64** **AC-FT**

WATER QUALITY (TREATMENT) VOLUME REQUIRED

1. WATER MANAGEMENT DISTRICT PRESUMPTIVE REQUIREMENTS:
JURISDICTION: SFWMD

SFWMD CRITERIA (SECTION 4.2.1, SFWMD APPLICANT'S HANDBOOK):
PROVIDE THE GREATER OF:
2.5" OVER THE IMPERVIOUS AREA; OR
1" OVER THE DRAINAGE AREA

AREAS:
TOTAL BASIN AREA (EXCLUDING WATER SURFACE AREAS) = 29.86 AC
PROPOSED IMPERVIOUS AREA = 17.88 AC

IMPERVIOUS AREA:
EXISTING IMPERVIOUS AREA = 16.17 AC
PROPOSED IMPERVIOUS AREA = 17.88 AC
NEW IMPERVIOUS AREA = 1.71 AC

Treatment Criteria:
1" OVER THE TOTAL BASIN AREA (EXCLUDING WATER SURFACE AREAS) = 2.49 AC-FT
2.5" OVER IMPERVIOUS AREA = 3.73 AC-FT

USE TREATMENT VOLUME = 3.73 AC-FT (2.5" OVER IMPERVIOUS AREA)

2. FACILITY TYPE:
FACILITY TYPE: WET DETENTION

TYPE:	
WET DETENTION	100% REQUIRED
DRY DETENTION	75% REQUIRED
DRY DRETENTION	50% REQUIRED

WATER QUALITY VOLUME REQUIRED = 3.73 AC-FT

3. OFW AND IMPAIRED WATER/TMDL REQUIREMENTS:
ADDITIONAL 50% TREATMENT VOLUME? YES PROJECT IS WITHIN LAKE OKEECHOBEE BMAP, SEE SFWMD PRE-APPLICATION MEETING MINUTES
IMPAIRED OR ADOPTED TMDL FOR NUTRIENTS? YES

ADDITIONAL TREATMENT VOLUME FOR LAKE OKEECHOBEE BMAP = 1.86 AC-FT (ADDITIONAL 50% TREATMENT VOLUME)

TOTAL WATER QUALITY (TREATMENT) VOLUME = **5.59** **AC-FT**

BCC ENGINEERING, INC.					
PROJECT:	SR 535 PD&E				DATE
FPID:	437174-2	BASIN 3 - Exist. Pond 3-1 & Pond 3-4	BY:	ZL	10/11/2023
BASIN:	**3**		CHECKED:	JAG	11/8/2023
ALTERNATIVE:	**3C (EXIST. POND 3-1 & POND 3-4)**		REVISED:	ZL	1/8/2024

EXIST. POND STAGE-AREA TABLE

NOTE: POND STAGE-AREA DATA FROM APPLICATION # 901113-1/SPN 75560-3610 (IN NGVD 29). VERTICAL DATUM HAS BEEN UPDATED TO NAVD 88 IN TABLE BELOW. DATUM CONVERSION: EL. NAVD 88 = EL. NGVD 29-0.90 FT

EXIST. POND 3-1

EL (FT)	DESCRIPTION	AREA (AC)	AVG. AREA (AC)	DEPTH (FT)	INC. VOLUME (AC-FT)	∑ VOLUME (AC-FT)	REMARKS
90.81	CONTROL EL.	0.80				0.00	
			0.88	2.29	2.01		
93.10	TOP OF TREATMENT VOLUME	0.95				2.01	
			1.08	3.90	4.23		
97.00	MAX. POND STAGE EL.	1.22				6.24	
			1.25	1.00	1.25		
98.00	INSIDE EDGE OF BERM	1.28				7.49	
98.00	OUTSIDE EDGE OF BERM	1.47					

EXIST. POND 3-2

EL (FT)	DESCRIPTION	AREA (AC)	AVG. AREA (AC)	DEPTH (FT)	INC. VOLUME (AC-FT)	∑ VOLUME (AC-FT)	REMARKS
93.10	BOTTOM EL.	0.95				1.09	
			1.47	3.90	5.74		
97.00	MAX. POND STAGE EL.	1.99				6.83	
			2.13	1.00	2.13		
98.00	INSIDE EDGE OF BERM	2.26				8.95	
98.00	OUTSIDE EDGE OF BERM	2.61					

EXIST. POND 3-1 & EXIST. POND 3-2 (COMBINED)

EL (FT)	DESCRIPTION	AREA (AC)	AVG. AREA (AC)	DEPTH (FT)	INC. VOLUME (AC-FT)	∑ VOLUME (AC-FT)	REMARKS
90.81	CONTROL EL.	0.80				0.00	
			1.35	2.29	3.10		
93.10	TOP OF TREATMENT VOLUME	1.90				3.10	
			2.56	3.90	9.97		
97.00	MAX. POND STAGE EL.	3.21				13.06	
			3.38	1.00	3.38		
98.00	INSIDE EDGE OF BERM	3.54				16.44	
98.00	OUTSIDE EDGE OF BERM	4.08					

EXIST. CONTROL EL =	90.81	FT	
EXIST. TREATMENT VOLUME REQD =	1.89	AC-FT	
DHW (10YR-24HR) =	96.26	FT	(USE HIGHER OF EXIST. POND 3-1 AND 3-2 FOR CONSERVATIVE ESTIMATE OF EXIST. STORAGE PROVIDED)
DHW (25YR-24HR) =	96.93	FT	(USE HIGHER OF EXIST. POND 3-1 AND 3-2 FOR CONSERVATIVE ESTIMATE OF EXIST. STORAGE PROVIDED)
ATTENUATION VOLUMES PROVIDED IN EXIST. PONDS:			
ATTENUATION VOLUME PROVIDED IN EXIST. PONDS (10YR-24HR) =	**8.08**	**AC-FT**	(DETERMINED THROUGH INTERPOLATION OF EXIST. POND STAGE-AREA TABLES)
ATTENUATION VOLUME PROVIDED IN EXIST. PONDS (25YR-24HR) =	**9.79**	**AC-FT**	(DETERMINED THROUGH INTERPOLATION OF EXIST. POND STAGE-AREA TABLES)

PRELIMINARY POND SIZING ESTIMATE

NOTE: POND STAGE-AREA DATA FROM APPLICATION # 901113-1/SPN 75560-3610 (IN NGVD 29). VERTICAL DATUM HAS BEEN UPDATED TO NAVD 88 IN TABLE BELOW. DATUM CONVERSION: EL. NAVD 88 = EL. NGVD 29-0.90 FT

EXIST. POND 3-1

EL (FT)	DESCRIPTION	AREA (AC)	AVG. AREA (AC)	DEPTH (FT)	INC. VOLUME (AC-FT)	∑ VOLUME (AC-FT)	REMARKS
90.81	CONTROL EL.	0.80				0.00	
			0.88	2.49	2.20		
93.30	TOP OF TREATMENT VOLUME	0.97				2.20	
			1.09	3.70	4.04		
97.00	MAX. POND STAGE EL.	1.22				6.24	
			1.25	1.00	1.25		
98.00	INSIDE EDGE OF BERM	1.28				7.49	
98.00	OUTSIDE EDGE OF BERM	1.47					

POND 3-4 NOTE: POND CONTROL EL. BASED ON SHGWT EL. FROM PRELIMINARY GEOTECH BORINGS FOR POND 3-3 (ADJACENT TO POND 3-4)

EL (FT)	DESCRIPTION	AREA (AC)	AVG. AREA (AC)	DEPTH (FT)	INC. VOLUME (AC-FT)	∑ VOLUME (AC-FT)	REMARKS
90.81	CONTROL EL.	0.83				0.00	
			0.96	2.49	2.38		
93.30	TOP OF TREATMENT VOLUME	1.08				2.38	
			1.27	3.70	4.70		
97.00	MAX. POND STAGE EL.	1.46				7.08	
			1.51	1.00	1.51		
98.00	INSIDE EDGE OF BERM	1.56				8.59	
99.00	OUTSIDE EDGE OF BERM	2.13					
102.00	TIE-DOWN TO EXIST. GROUND	3.04					AVG. EXIST. GROUND EL. 94.0

APPLY 15% CONTINGENCY TO REQUIRED POND AREA = **3.5** **AC** **TOTAL PARCEL AREA =** 57.8 OK

BCC ENGINEERING, INC.					
PROJECT:	SR 535 PD & E				DATE
FPID:	43717422201	BASIN 3 - Exist. Pond 3-1 & Pond 3-4	BY:	ZL	10/11/2023
BASIN:	**3**		CHECKED:	JAG	11/8/2023
ALTERNATIVE:	**3C (EXIST. POND 3-1 & POND 3-4)**		REVISED:	ZL	1/8/2024

Pond 3-1 & 3-4 (COMBINED)

EL (FT)	DESCRIPTION	AREA (AC)	AVG. AREA (AC)	DEPTH (FT)	INC. VOLUME (AC-FT)	∑ VOLUME (AC-FT)	REMARKS
90.81	CONTROL EL.	1.63				0.00	
			1.84	2.49	4.58		
93.30	TOP OF TREATMENT VOLUME	2.05				4.58	
			2.36	3.70	8.74		
97.00	MAX. POND STAGE EL.	2.67				13.32	
			2.76	1.00	2.76		
98.00	INSIDE EDGE OF BERM	2.84				16.08	
99.00	OUTSIDE EDGE OF BERM	3.60					

MIN. REQUIRED TREATMENT VOLUME =	**5.59**	AC-FT
MIN. REQUIRED TREATMENT VOLUME EL. =	**93.73**	FT
TREATMENT VOLUME PROVIDED =	**4.58**	AC-FT
DHW EL. (TREATMENT+25YR-72HR ATTENUATION VOLUME) =	**97.72**	FT
MAX ALLOWABLE POND STAGE EL. =	**97.00**	FT

NOTE: ADJUST EXIST. POND 3-1 WEIR EL. TO PROVIDE REQ'D. TREATMENT VOLUME

PRELIMINARY STORM DRAIN TAILWATER ESTIMATE

DESIGN STORM FOR STORM DRAIN SYSTEM =	10YR-24HR	
WEIR EL. =	**93.30**	FT
DESIGN STORM ATTENUATION VOLUME =	8.63	AC-FT (CHOOSE 5YR-24HR OR 10YR-24HR)
DESIGN STORM EL. (ESTIMATED TAILWATER EL. FOR STORM DRAIN SYSTEM) =	**96.95**	FT

HYDRAULIC GRADE LINE CALCULATIONS

LOW EDGE OF PAVEMENT (LEOP) IN BASIN (FOR HGL CHECK):

BASELINE	SR 535	
LOW EDGE OF PAVEMENT EL. (FT)	**100.00**	FT

ALLOWABLE HEAD LOSS = LOWEST GUTTER EL. - TAILWATER EL. =	3.05	FT
PIPE LENGTH FROM LOW EDGE OF PAVEMENT TO POND =	300	FT
ASSUMED HGL SLOPE =	0.15	%
HGL AT LEOP =	**97.40**	OK, LOWER THAN LEOP

BCC ENGINEERING, INC.					
PROJECT:	SR 535 PD&E				DATE
FPID:	437174-2	BASIN 4 - Exist. Pond 4-1	BY:	SH	10/13/2022
BASIN:	**4**		CHECKED:	ZL	9/27/2023
ALTERNATIVE:	**4A (EXIST. POND 4-1)**		REVISED:	ZL	1/11/2024

ALTERNATIVE 4A

PRE-DEVELOPMENT (EXISTING) CONDITION

NOTE: EXIST. HYDROLOGY FROM SFWMD APPLICATION #970147-8/PERMIT NO. 48-00866-S (POST CONDITION)

CURVE NUMBER

LAND USE DESCRIPTION	HYDROLOGIC SOIL GROUP	CN	AREA (AC)				C*A
			PERVIOUS	IMPERVIOUS	WATER SURFACE	TOTAL	
ROADWAY BASIN							
Impervious area (Exist. Pond 4-1)	D	98		4.94		4.94	484.12
Open Space (good) - grass >75% (Exist. Pond 4-1)	D	80	2.13			2.13	170.40
Impervious area (Exist. Pond 4-2)	D	98		0.83		0.83	81.34
Open Space (good) - grass >75% (Exist. Pond 4-2)	D	80	0.06			0.06	4.80
Subtotal (basin area):			2.19	5.77	0.00	7.96	740.66
POND BASIN							
Water surface (Exist. Pond 4-1)	D	98			1.63	1.63	159.7
Water surface (Exist. Pond 4-2)	D	98			0.30	0.30	29.4
Subtotal (pond area):			0.00	0.00	1.93	1.93	189.14
TOTAL:			**2.19**	**5.77**	**1.93**	**9.89**	**929.80**

Composite CN = 94

ESTIMATE OF RUNOFF VOLUME

PROCEDURE TO DETERMINE RUNOFF VOLUMES IS BASED ON THE SCS EQUATION AS FOLLOWS:

1) DETERMINE SOIL STORAGE [S] → S = (1000/CN) - 10 (inches)
2) DETERMINE RAINFALL [P] → (inches)
3) DETERMINE RUNOFF [R] → $R = (P - 0.2 * S)^2/(P + 0.8 * S)$ (inches)
4) DETERMINE RUNOFF VOLUME [V(R)] → V(R) = (R/12) * AREA (acre-feet)

AGENCY/DESCRIPTION	FREQUENCY	P (IN)	S (IN)	R (IN)	V(R) (AC-FT)
FDOT 5YR-24HR	5YR-24HR	5.40	0.64	4.70	3.88
FDOT 10YR-24HR	10YR-24HR	6.37	0.64	5.66	4.67
SFWMD 25YR-72HR	25YR-72HR	9.70	0.64	8.98	7.40
ORANGE COUNTY 25YR-24HR	25YR-24HR	7.50	0.64	6.79	5.59

POST-DEVELOPMENT (PROPOSED) CONDITION

CURVE NUMBER

LAND USE DESCRIPTION	HYDROLOGIC SOIL GROUP	CN	AREA (AC)				C*A
			PERVIOUS	IMPERVIOUS	WATER SURFACE	TOTAL	
ROADWAY BASIN							
Impervious area	D	98		0.14		0.14	13.72
Open Space (good) - grass >75%	D	80	5.86			5.86	468.80
Subtotal (basin area):			5.86	0.14	0.00	6.00	482.52
POND BASIN							
Water surface (Exist. Pond 4-1)	D	98			1.63	1.63	159.7
						0.00	0.0
Subtotal (pond area):			0.00	0.00	1.63	1.63	159.74
TOTAL:			**5.86**	**0.14**	**1.63**	**7.63**	**642.26**

Note: Exist Pond 4-2 is not utilized in puposed condition.

Composite CN = 84

BCC ENGINEERING, INC.					
PROJECT:	SR 535 PD&E				DATE
FPID:	437174-2	BASIN 4 - Exist. Pond 4-1	BY:	SH	10/13/2022
BASIN:	**4**		CHECKED:	ZL	9/27/2023
ALTERNATIVE:	**4A (EXIST. POND 4-1)**		REVISED:	ZL	1/11/2024

ESTIMATE OF RUNOFF VOLUME

PROCEDURE TO DETERMINE RUNOFF VOLUMES IS BASED ON THE SCS EQUATION AS FOLLOWS:

1) DETERMINE SOIL STORAGE [S] → S = (1000/CN) - 10 (inches)
2) DETERMINE RAINFALL [P] → (inches)
3) DETERMINE RUNOFF [R] → $R = (P - 0.2 * S)^2/(P + 0.8 * S)$ (inches)
4) DETERMINE RUNOFF VOLUME [V(R)] → V(R) = (R/12) * AREA (acre-feet)

AGENCY/DESCRIPTION	FREQUENCY	P (IN)	S (IN)	R (IN)	V(R) (AC-FT)
FDOT 5YR-24HR	5YR-24HR	5.40	1.88	3.66	2.32
FDOT 10YR-24HR	10YR-24HR	6.37	1.88	4.56	2.90
SFWMD 25YR-72HR	25YR-72HR	9.70	1.88	7.76	4.93
ORANGE COUNTY 25YR-24HR	25YR-24HR	7.50	1.88	5.64	3.58

WATER QUANTITY (ATTENUATION) VOLUMES REQUIRED

		V(R) (AC-FT)		
AGENCY/DESCRIPTION	FREQUENCY	PRE-DEV (EXISTING)	POST-DEV (PROPOSED)	DIFFERENCE
FDOT 5YR-24HR	5YR-24HR	3.88	2.32	-1.55
FDOT 10YR-24HR	10YR-24HR	4.67	2.90	-1.77
SFWMD 25YR-72HR	**25YR-72HR**	**7.40**	**4.93**	**-2.46**
ORANGE COUNTY 25YR-24HR	25YR-24HR	5.59	3.58	**-2.01**

CONTROLLING WATER QUANTITY (ATTENUATION) VOLUME = **-1.77** **AC-FT**

WATER QUALITY (TREATMENT) VOLUME REQUIRED

1. WATER MANAGEMENT DISTRICT PRESUMPTIVE REQUIREMENTS:

JURISDICTION: SFWMD

SFWMD CRITERIA (SECTION 4.2.1, SFWMD APPLICANT'S HANDBOOK):
PROVIDE THE GREATER OF:
2.5" OVER THE IMPERVIOUS AREA; OR
1" OVER THE DRAINAGE AREA

AREAS:
TOTAL BASIN AREA (EXCLUDING WATER SURFACE AREAS) = 6.00 AC
PROPOSED IMPERVIOUS AREA = 0.14 AC

IMPERVIOUS AREA:
EXISTING IMPERVIOUS AREA = 5.77 AC
PROPOSED IMPERVIOUS AREA = 0.14 AC
NEW IMPERVIOUS AREA = -5.63 AC

1" OVER THE TOTAL BASIN AREA (EXCLUDING WATER SURFACE AREAS) = 0.50 AC-FT
2.5" OVER IMPERVIOUS AREA = 0.03 AC-FT

USE TREATMENT VOLUME = 0.50 AC-FT (2.5" OVER IMPERVIOUS AREA)

EXIST. TREATMENT CURRENTLY PROVIDED = 1.80 AC-FT TREATMENT VOLUME PROVIDED (FROM APPLICATION #971113-1)

2. FACILITY TYPE:

FACILITY TYPE: WET DETENTION

TYPE:	
WET DETENTION	100% REQUIRED
DRY DETENTION	75% REQUIRED
DRY DRETENTION	50% REQUIRED

WATER QUALITY VOLUME REQUIRED = 0.50 AC-FT

3. OFW AND IMPAIRED WATER/TMDL REQUIREMENTS:

ADDITIONAL 50% TREATMENT VOLUME? NO
IMPAIRED OR ADOPTED TMDL FOR NUTRIENTS? YES

ADDITIONAL TREATMENT VOLUME FOR DIRECT DISCHARGE TO OFW = 0.00 AC-FT (ADDITIONAL 50% TREATMENT VOLUME)

TOTAL WATER QUALITY (TREATMENT) VOLUME = **0.50** **AC-FT**

EXIST. TREATMENT VOLUME REQUIRED = 1.80 AC-FT (FROM SFWMD APPLICATION #940615/PERMIT NO. 48-00866-S)
THEREFORE, NO ADDITIONAL WATER QUALITY TREATMENT VOLUME REQUIRED

BCC ENGINEERING, INC.					
PROJECT:	SR 535 PD&E				DATE
FPID:	437174-2	BASIN 4 - Exist. Pond 4-1	BY:	SH	10/13/2022
BASIN:	**4**		CHECKED:	ZL	9/27/2023
ALTERNATIVE:	**4A (EXIST. POND 4-1)**		REVISED:	ZL	1/11/2024

EXIST. POND STAGE-AREA TABLE

NOTE: POND STAGE-AREA DATA FROM APPLICATION #970147-8 (IN NGVD 29). VERTICAL DATUM HAS BEEN UPDATED TO NAVD 88 IN TABLE BELOW. DATUM CONVERSION: EL. NAVD 88 = EL. NGVD 29-0.90 FT

EXIST. POND 4-1

EL (FT)	DESCRIPTION	AREA (AC)	AVG. AREA (AC)	DEPTH (FT)	INC. VOLUME (AC-FT)	∑ VOLUME (AC-FT)	REMARKS
90.10	CONTROL EL.	0.80				0.00	
			0.91	2	1.81		
92.10	TOP OF TREATMENT VOLUME	1.01				1.81	
			1.04	0.50	0.52		
92.60	INSIDE EDGE OF BERM	1.07				2.33	
			1.08	0.11	0.12		
92.71	EXIST. DHW EL.	1.08				2.45	
			1.36	0.89	1.21		
93.60	OUTSIDE EDGE OF BERM	1.63				3.65	

EXIST. CONTROL EL =	90.10	FT	
EXIST. TREATMENT VOLUME REQD =	1.03	AC-FT	REQUIRED TREATMENT VOLUME FROM APPLICATION #970147-8
EXIST DHW (25YR-24HR) =	92.71	FT	DHW FROM APPLICATION #970147-8
EXIST. ATTENUATION VOLUME PROVIDED (ABOVE WEIR) =	0.64	AC-FT	
EXIST. FREEBOARD PROVIDED FROM INSIDE EDGE OF BERM =	**-0.11**	**FT**	NOTE: 25YR-24HR DHW EXCEEDS INSIDE BERM EL. IN EXIST. CONDITIONS

PRELIMINARY POND SIZING ESTIMATE

NOTE: POND STAGE-AREA DATA FROM APPLICATION #970147-8 (IN NGVD 29). VERTICAL DATUM HAS BEEN UPDATED TO NAVD 88 IN TABLE BELOW. DATUM CONVERSION: EL. NAVD 88 = EL. NGVD 29-0.90 FT

EXIST. POND 4-1

EL (FT)	DESCRIPTION	AREA (AC)	AVG. AREA (AC)	DEPTH (FT)	INC. VOLUME (AC-FT)	∑ VOLUME (AC-FT)	REMARKS
90.10	CONTROL EL.	0.80				0.00	
			0.91	2	1.81		
92.10	TOP OF TREATMENT VOLUME	1.01				1.81	
			1.04	0.50	0.52		
92.60	INSIDE EDGE OF BERM	1.07				2.33	
			1.08	0.11	0.12		
92.71	EXIST. DHW EL.	1.08				2.45	
			1.36	0.89	1.21		
93.60	OUTSIDE EDGE OF BERM	1.63				3.65	

INSIDE BERM EL. =	92.71	FT	
MIN. REQUIRED TREATMENT VOLUME EL. =	90.10	FT	
DHW EL. (TREATMENT+25YR-24HR ATTENUATION VOLUME) =	**91.01**	FT	
EXIST. FREEBOARD PROVIDED FROM INSIDE EDGE OF BERM =	**1.70**	**FT**	NOTE: FREEBOARD < 1 FT, BUT HAS BEEN INCREASED OVER THE EXIST. CONDITION.

PRELIMINARY STORM DRAIN TAILWATER ESTIMATE

DESIGN STORM FOR STORM DRAIN SYSTEM =	25YR-24HR	
WEIR EL. =	**92.10**	FT (ASSUMES BLOCKED ORIFICE OR V-NOTCH WEIR)
DESIGN STORM EL. (ESTIMATED TAILWATER EL. FOR STORM DRAIN SYSTEM) =	**91.01**	FT (25YR-24HR USED TO PROVIDE CONSERVATIVE ESTIMATE)

HYDRAULIC GRADE LINE CALCULATIONS

LOW EDGE OF PAVEMENT (LEOP) IN BASIN (FOR HGL CHECK):

BASELINE	INTERNATIONAL DR	
LOW EDGE OF PAVEMENT EL. (FT)	**94.3**	FT (FROM APPLICATION #970147-8)

ALLOWABLE HEAD LOSS = LOWEST GUTTER EL. - TAILWATER EL. =	3.29	FT	
PIPE LENGTH FROM LOW EDGE OF PAVEMENT TO POND =	100	FT	
ASSUMED HGL SLOPE =	0.1	%	
HGL AT LEOP =	**91.11**		OK, LOWER THAN LEOP

Nutrient Loading Calculations

BCC ENGINEERING, INC.				
PROJECT:	SR 535 PD&E			DATE
FPID:	437174-2	BY:	ZL	12/29/2023
		CHECKED:	JAG	1/10/2024
		REVISED:	ZL	4/9/2024

NUTRIENT LOADING SUMMARY - TOTAL PHORPHORUS (TP)

BASIN	POND ALTERNATIVE	TOTAL PHOSPHORUS (TP) LOADING (KG/YR)		
		EXIST. CONDITION	PROPOSED CONDITION	DIFFERENCE
1	1A	3.41	3.13	-0.28
2	2A	2.45	2.49	0.04
3	3A	1.91	1.57	-0.34
4	4A	1.58	1.02	-0.56
TOTALS		**9.35**	**8.21**	**-1.14**

BASIN 1 - EXIST. POND 1-1

- HYDROLOGY CALCULATIONS

- PERMANENT POOL VOLUME CALCULATIONS

- BMPTrains REPORT
  - PRE-CONDITION
  - POST CONDITION

SR 535 PD&E
NUTRIENT LOAD ANALYSIS - HYDROLOGY CALCULATIONS

DATE: 9/28/2022
REV: 4/9/24
BY: ZL
REV: JAG

EXISTING CONDITION

BASIN: 1
POND: Exist. Pond 1-1

	Land Cover	Soil Hydrologic Group	CN	Pervious Area (Ac)	Directly Connected	Non-Directly Connected	Total Area (Ac)	Non-DCIA Total Area	Non-DCIA CA
	Roadway Basin								
	Impervious area	D	98		11.50	2.10	13.60	2.10	205.80
	Open Space (good) - grass >75%	D	80	14.00			14.00	14.00	1120.00
	SUBTOTAL			**14.00**	**11.50**	**2.10**	**27.60**	**16.10**	**1,325.80**
	Pond Basin								
	Open Space (good) - grass >75%	D	80	1.84			1.84	1.84	147
Pond1-1	Water Surface	N/A	100	1.50			1.50	1.50	150
	SUBTOTAL			**3.34**	**0.00**	**0.00**	**3.34**	**3.34**	**297.20**
	TOTAL			**17.34**	**11.50**	**2.10**	**30.94**	**19.44**	**1,623.00**

Roadway Basin
% DCIA = **37.2%**
Non-DCIA CN = **83**

Total impervious area is taken from permit # 901113-1. DCIA is take from inspection of existing data.

1. Proposed Conditions

BASIN: 1
POND: Pond 1-1

	Land Cover	Soil Hydrologic Group	CN	Pervious Area (Ac)	Directly Connected	Non-Directly Connected	Total Area (Ac)	Non-DCIA Total Area	Non-DCIA CA
	Roadway Basin								
	Impervious area	D	98		10.55	2.05	12.60	2.05	200.90
	Open Space (good) - grass >75%	D	80	13.23			13.23	13.23	1058.10
	SUBTOTAL			**13.23**	**10.55**	**2.05**	**25.83**	**15.28**	**1,259.00**
	Pond Basin								
	Open Space (good) - grass >75%	D	80	1.84			1.84	1.84	147.20
Pond1-1	Water Surface	N/A	100	1.50			1.50	1.50	150
	SUBTOTAL			**3.34**	**0.00**	**0.00**	**3.34**	**3.34**	**297.20**
	TOTAL			**16.57**	**10.55**	**2.05**	**29.17**	**18.62**	**1,556.20**

Roadway Basin
% DCIA = **36.2%**
Non-DCIA CN = **84**

SR 535 PD & E
TMDL ANALYSIS - PERMANENT POOL VOLUME CALCULATIONS

DATE: 9/28/2022
REV: 10/15/22
BY: ZL
REV: JAG

Existing condition

POND: Pond 1-1

Description	Elevation	Area	Volume
Control El.	74.10 ft	1.25 ac	**6.73 ac-ft**
Pond Bottom Elevation	66.23 ft	0.46 ac	
Total Perm. Pool Volume:			**6.73 ac-ft**

Proposed condition

POND: Pond 1-1

Description	Elevation	Area	Volume
Control El.	74.10 ft	1.25 ac	**6.73 ac-ft**
Pond Bottom Elevation	66.23 ft	0.46 ac	
Total Perm. Pool Volume:			**6.73 ac-ft**

Complete Report (not including cost) Ver 4.3.5

Project: SR 535 Basin 1 - pre
Date: 4/9/2024 10:20:28 AM

Note: Since there is an existing pond within this basin, the existing conditions was input in the post interface so the pond could be included in the analysis. The post condition was run separately and then compared to this analysis for the existing conditions.

Site and Catchment Information

Analysis: BMP Analysis

Catchment Name	Basin 1
Rainfall Zone	Florida Zone 2
Annual Mean Rainfall	50.00

Pre-Condition Landuse Information

Landuse	Highway: TN=1.520 TP=0.200
Area (acres)	0.00
Rational Coefficient (0-1)	0.00
Non DCIA Curve Number	29.90
DCIA Percent (0-100)	0.00
Nitrogen EMC (mg/l)	1.520
Phosphorus EMC (mg/l)	0.200
Runoff Volume (ac-ft/yr)	0.000
Groundwater N (kg/yr)	0.000
Groundwater P (kg/yr)	0.000
Nitrogen Loading (kg/yr)	0.000
Phosphorus Loading (kg/yr)	0.000

Post-Condition Landuse Information

Landuse	Highway: TN=1.520 TP=0.200
Area (acres)	30.94
Rational Coefficient (0-1)	0.39
Non DCIA Curve Number	83.00
DCIA Percent (0-100)	37.20
Wet Pond Area (ac)	3.34
Nitrogen EMC (mg/l)	1.520
Phosphorus EMC (mg/l)	0.200
Runoff Volume (ac-ft/yr)	44.743

Groundwater N (kg/yr)	0.000
Groundwater P (kg/yr)	0.000
Nitrogen Loading (kg/yr)	83.856
Phosphorus Loading (kg/yr)	11.034

Catchment Number: 1 Name: Basin 1

Project: SR 535 Basin 1 - pre
Date: 4/9/2024

Wet Detention Design

Permanent Pool Volume (ac-ft)	6.730
Permanent Pool Volume (ac-ft) for 31 days residence	3.800
Annual Residence Time (days)	55
Littoral Zone Efficiency Credit	
Wetland Efficiency Credit	

Watershed Characteristics

Catchment Area (acres)	30.94
Contributing Area (acres)	27.600
Non-DCIA Curve Number	83.00
DCIA Percent	37.20
Rainfall Zone	Florida Zone 2
Rainfall (in)	50.00

Surface Water Discharge

Required TN Treatment Efficiency (%)	
Provided TN Treatment Efficiency (%)	41
Required TP Treatment Efficiency (%)	
Provided TP Treatment Efficiency (%)	69

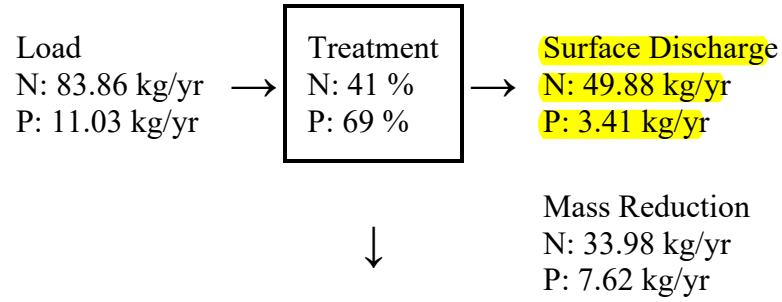
Media Mix Information

Type of Media Mix	Not Specified
Media N Reduction (%)	
Media P Reduction (%)	

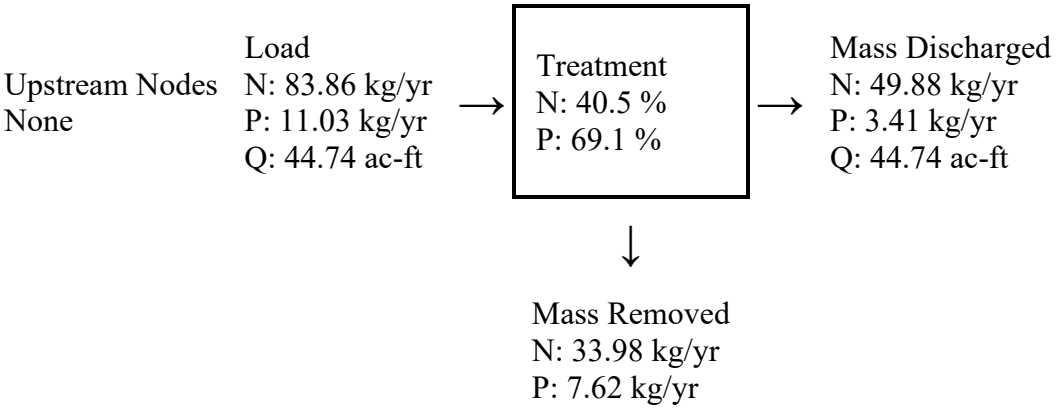
Groundwater Discharge (Stand-Alone)

Treatment Rate (MG/yr)	0.000
TN Mass Load (kg/yr)	0.000
TN Concentration (mg/L)	0.000
TP Mass Load (kg/yr)	0.000
TP Concentration (mg/L)	0.000

Load Diagram for Wet Detention (stand-alone)



Load Diagram for Wet Detention (As Used In Routing)



Summary Treatment Report Version: 4.3.5

Project: SR 535 Basin 1 - pre

Date:4/9/2024

Analysis Type: BMP Analysis

Routing Summary
Catchment 1 Routed to Outlet

BMP Types:

Catchment 1 - (Basin 1)

Wet Detention

Based on % removal values to the nearest percent

Summary Report

Nitrogen

Surface Water Discharge

Total N post load	83.86 kg/yr	
Percent N load reduction	41 %	
Provided N discharge load	49.88 kg/yr	109.98 lb/yr
Provided N load removed	33.98 kg/yr	74.92 lb/yr

Phosphorus

Surface Water Discharge

Total P post load	11.034 kg/yr	
Percent P load reduction	69 %	
Provided P discharge load	3.413 kg/yr	7.52 lb/yr
Provided P load removed	7.621 kg/yr	16.804 lb/yr

Complete Report (not including cost) Ver 4.3.5

Project: SR 535 Basin 1 - post
Date: 4/9/2024 10:56:01 AM

Site and Catchment Information

Analysis: BMP Analysis

Catchment Name	Basin 1
Rainfall Zone	Florida Zone 2
Annual Mean Rainfall	50.00

Pre-Condition Landuse Information

Landuse	Highway: TN=1.520 TP=0.200
Area (acres)	0.00
Rational Coefficient (0-1)	0.00
Non DCIA Curve Number	29.90
DCIA Percent (0-100)	0.00
Nitrogen EMC (mg/l)	1.520
Phosphorus EMC (mg/l)	0.200
Runoff Volume (ac-ft/yr)	0.000
Groundwater N (kg/yr)	0.000
Groundwater P (kg/yr)	0.000
Nitrogen Loading (kg/yr)	0.000
Phosphorus Loading (kg/yr)	0.000

Post-Condition Landuse Information

Landuse	Highway: TN=1.520 TP=0.200
Area (acres)	29.17
Rational Coefficient (0-1)	0.39
Non DCIA Curve Number	84.00
DCIA Percent (0-100)	36.20
Wet Pond Area (ac)	3.34
Nitrogen EMC (mg/l)	1.520
Phosphorus EMC (mg/l)	0.200
Runoff Volume (ac-ft/yr)	41.825

Groundwater N (kg/yr)	0.000
Groundwater P (kg/yr)	0.000
Nitrogen Loading (kg/yr)	78.386
Phosphorus Loading (kg/yr)	10.314

Catchment Number: 1 Name: Basin 1

Project: SR 535 Basin 1 - post
Date: 4/9/2024

Wet Detention Design

Permanent Pool Volume (ac-ft)	6.730
Permanent Pool Volume (ac-ft) for 31 days residence	3.552
Annual Residence Time (days)	59
Littoral Zone Efficiency Credit	
Wetland Efficiency Credit	

Watershed Characteristics

Catchment Area (acres)	29.17
Contributing Area (acres)	25.830
Non-DCIA Curve Number	84.00
DCIA Percent	36.20
Rainfall Zone	Florida Zone 2
Rainfall (in)	50.00

Surface Water Discharge

Required TN Treatment Efficiency (%)	
Provided TN Treatment Efficiency (%)	41
Required TP Treatment Efficiency (%)	
Provided TP Treatment Efficiency (%)	70

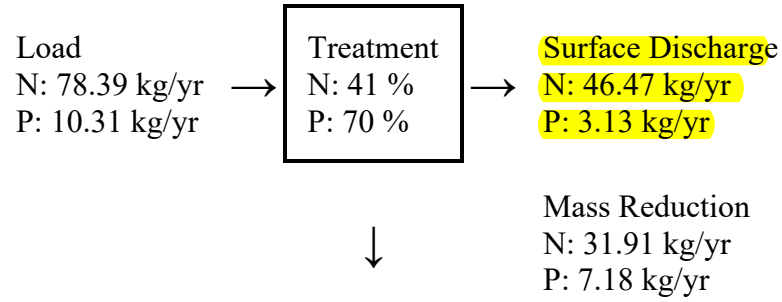
Media Mix Information

Type of Media Mix	Not Specified
Media N Reduction (%)	
Media P Reduction (%)	

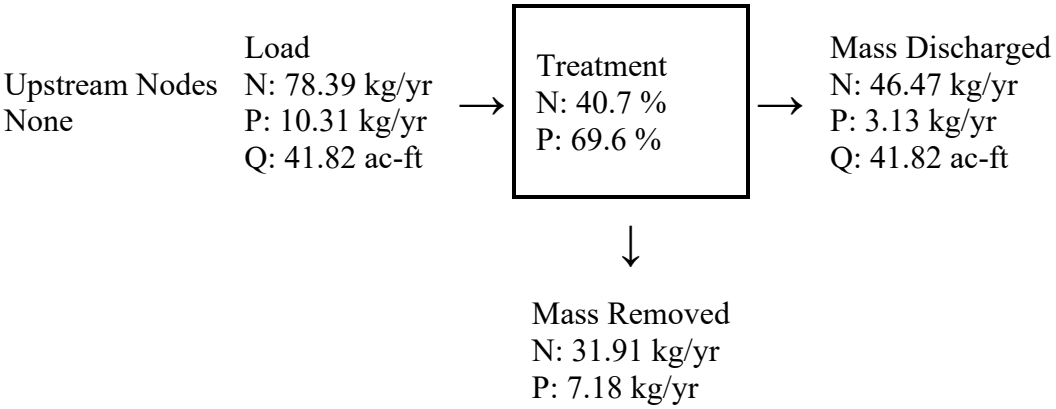
Groundwater Discharge (Stand-Alone)

Treatment Rate (MG/yr)	0.000
TN Mass Load (kg/yr)	0.000
TN Concentration (mg/L)	0.000
TP Mass Load (kg/yr)	0.000
TP Concentration (mg/L)	0.000

Load Diagram for Wet Detention (stand-alone)



Load Diagram for Wet Detention (As Used In Routing)



Summary Treatment Report Version: 4.3.5

Project: SR 535 Basin 1 - post

Date:4/9/2024

Analysis Type: BMP Analysis

Routing Summary
Catchment 1 Routed to Outlet

BMP Types:

Catchment 1 - (Basin 1)

Wet Detention

Based on % removal values to the nearest percent

Summary Report

Nitrogen

Surface Water Discharge

Total N post load	78.39 kg/yr	
Percent N load reduction	41 %	
Provided N discharge load	46.47 kg/yr	102.47 lb/yr
Provided N load removed	31.91 kg/yr	70.37 lb/yr

Phosphorus

Surface Water Discharge

Total P post load	10.314 kg/yr	
Percent P load reduction	70 %	
Provided P discharge load	3.134 kg/yr	6.91 lb/yr
Provided P load removed	7.18 kg/yr	15.832 lb/yr

BASIN 2 - EXIST.POND 2-1 & POND 2-2

- HYDROLOGY CALCULATIONS

- PERMANENT POOL VOLUME CALCULATIONS

- BMPTrains REPORT
  - PRE-CONDITION
  - POST CONDITION

SR 535 PD & E
TMDL ANALYSIS - HYDROLOGY CALCULATIONS

DATE: 9/28/2022
REV: 10/15/22
BY: ZL
REV: JAG

1. Exist. Conditions

BASIN: 2
POND: Pond 2-1

	Land Cover	Soil Hydrologic Group	CN	Pervious Area (Ac)	Directly Connected	Non-Directly Connected	Total Area	Non-DCIA Total Area	Non-DCIA CA	
	Roadway Basin									
	Impervious area	A	98			3.19	3.19	3.19	312.62	(roadway)
	Open Space (good) - grass >75%	A	39	3.03			3.03	3.03	118.17	
	Impervious area	D	98			18.23	18.23	18.23	1786.54	(roadway)
	Open Space (good) - grass >75%	D	80	31.68			31.68	31.68	2534.40	
	SUBTOTAL			**34.71**	**0.00**	**21.42**	**56.13**	**56.13**	**4,751.73**	
	Pond Basin									
	Open Space (good) - grass >75%	D	80	2.15			2.15	2.15	172	
Pond 2-1	Water Surface	N/A	100	1.59			1.59	1.59	159	
	Open Space (good) - grass >75%	D	80	1.99			1.99	1.99	159.20	
Pond 2-2	Water Surface	N/A	100	2.28			2.28	2.28	228	
	SUBTOTAL			**8.01**	**0.00**	**0.00**	**8.01**	**8.01**	**718.20**	
	TOTAL			**42.72**	**0.00**	**21.42**	**64.14**	**64.14**	**5,469.93**	

Roadway Basin
% DCIA = **0.0%**
Non-DCIA CN = **85**

1. Proposed Conditions

BASIN: 2
POND: Pond 2-1 + Pond 2-2

	Land Cover	Soil Hydrologic Group	CN	Pervious Area (Ac)	Directly Connected	Non-Directly Connected	Total Area	Non-DCIA Total Area	Non-DCIA CA	
	Roadway Basin									
	Impervious area	A	98		0.53	3.00	3.53	3.00	294.00	(roadway)
	Open Space (good) - grass >75%	A	39	2.69			2.69	2.69	104.91	
	Impervious area	D	98		5.75	21.85	27.60	21.85	2141.30	(roadway)
	Open Space (good) - grass >75%	D	80	25.16			25.16	25.16	2012.80	
	SUBTOTAL			**27.85**	**6.28**	**24.85**	**58.98**	**52.70**	**4,553.01**	
	Pond Basin									
	Open Space (good) - grass >75%	D	80	1.99			1.99	1.99	159.20	
Pond 2-2	Water Surface	N/A	100	2.28			2.28	2.28	228	
	Open Space (good) - grass >75%	D	80	2.15			2.15	2.15	172	
Pond 2-1	Water Surface	N/A	100	1.59			1.59	1.59	159	
	SUBTOTAL			**8.01**	**0.00**	**0.00**	**8.01**	**8.01**	**718.20**	
	TOTAL			**35.86**	**6.28**	**24.85**	**66.99**	**60.71**	**5,271.21**	

Roadway Basin
% DCIA = **9.4%**
Non-DCIA CN = **87**

SR 535 PD & E
TMDL ANALYSIS - PERMANENT POOL VOLUME CALCULATIONS

DATE: 9/28/2022
REV: 10/15/22
BY: ZL
REV: JAG

Existing condition

POND: Pond 2-1

Description	Elevation	Area	Volume
Control El.	74.40 ft	1.59 ac	**9.59 ac-ft**
Pond Bottom Elevation	65.00 ft	0.45 ac	
Total Perm. Pool Volume:			**9.59 ac-ft**

Proposed condition

POND: Pond 2-1 + Pond 2-2

Pond 2-1

Description	Elevation	Area	Volume
Control El.	74.40 ft	1.59 ac	**9.59 ac-ft**
Pond Bottom Elevation	65.00 ft	0.45 ac	

Pond 2-2

Description	Elevation	Area	Volume
Control El.	78.70 ft	2.28 ac	**42.49 ac-ft**
Pond Bottom Elevation	49.60 ft	0.64 ac	
Total Perm. Pool Volume:			**52.07 ac-ft**

Complete Report (not including cost) Ver 4.3.5

Project: BMP Trains Basin 2 pre
Date: 2/26/2024 2:20:38 PM

Note: Since there is an existing pond within this basin, the existing conditions was input in the post interface so the pond could be included in the analysis. The post condition was run separately and then compared to this analysis for the existing conditions.

Site and Catchment Information

Analysis: BMP Analysis

Catchment Name	Basin 2
Rainfall Zone	Florida Zone 2
Annual Mean Rainfall	50.00

Pre-Condition Landuse Information

Landuse	Highway: TN=1.520 TP=0.200
Area (acres)	0.00
Rational Coefficient (0-1)	0.00
Non DCIA Curve Number	29.90
DCIA Percent (0-100)	0.00
Nitrogen EMC (mg/l)	1.520
Phosphorus EMC (mg/l)	0.200
Runoff Volume (ac-ft/yr)	0.000
Groundwater N (kg/yr)	0.000
Groundwater P (kg/yr)	0.000
Nitrogen Loading (kg/yr)	0.000
Phosphorus Loading (kg/yr)	0.000

Post-Condition Landuse Information

Landuse	Highway: TN=1.520 TP=0.200
Area (acres)	64.14
Rational Coefficient (0-1)	0.16
Non DCIA Curve Number	85.00
DCIA Percent (0-100)	0.00
Wet Pond Area (ac)	8.01
Nitrogen EMC (mg/l)	1.520
Phosphorus EMC (mg/l)	0.200
Runoff Volume (ac-ft/yr)	37.420

Groundwater N (kg/yr)	0.000
Groundwater P (kg/yr)	0.000
Nitrogen Loading (kg/yr)	70.131
Phosphorus Loading (kg/yr)	9.228

Catchment Number: 1 Name: Basin 2

Project: BMP Trains Basin 2 pre
Date: 2/26/2024

Wet Detention Design

Permanent Pool Volume (ac-ft)	9.590
Permanent Pool Volume (ac-ft) for 31 days residence	3.178
Annual Residence Time (days)	94
Littoral Zone Efficiency Credit	
Wetland Efficiency Credit	

Watershed Characteristics

Catchment Area (acres)	64.14
Contributing Area (acres)	56.130
Non-DCIA Curve Number	85.00
DCIA Percent	0.00
Rainfall Zone	Florida Zone 2
Rainfall (in)	50.00

Surface Water Discharge

Required TN Treatment Efficiency (%)	
Provided TN Treatment Efficiency (%)	42
Required TP Treatment Efficiency (%)	
Provided TP Treatment Efficiency (%)	73

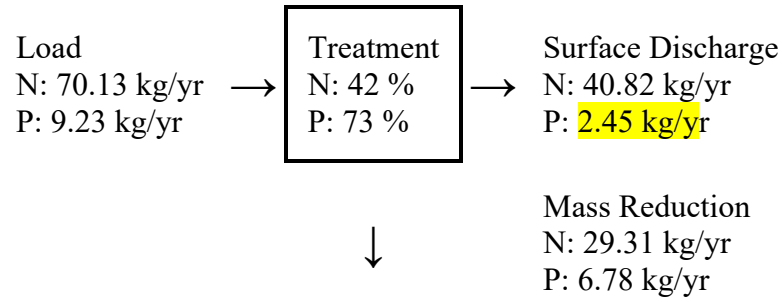
Media Mix Information

Type of Media Mix	Not Specified
Media N Reduction (%)	
Media P Reduction (%)	

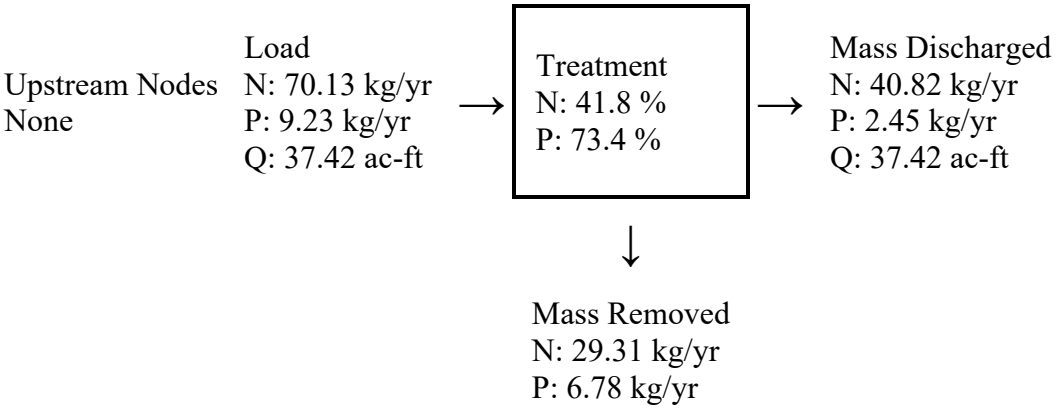
Groundwater Discharge (Stand-Alone)

Treatment Rate (MG/yr)	0.000
TN Mass Load (kg/yr)	0.000
TN Concentration (mg/L)	0.000
TP Mass Load (kg/yr)	0.000
TP Concentration (mg/L)	0.000

Load Diagram for Wet Detention (stand-alone)



Load Diagram for Wet Detention (As Used In Routing)



Summary Treatment Report Version: 4.3.5

Date:2/26/2024

Project: BMP Trains Basin 2 pre

Routing Summary
Catchment 1 Routed to Outlet

Analysis Type: BMP Analysis
BMP Types:
Catchment 1 - (Basin 2)
Wet Detention
Based on % removal values to
the nearest percent

Summary Report

Nitrogen

Surface Water Discharge

Total N post load	70.13 kg/yr	
Percent N load reduction	42 %	
Provided N discharge load	40.82 kg/yr	90.01 lb/yr
Provided N load removed	29.31 kg/yr	64.63 lb/yr

Phosphorus

Surface Water Discharge

Total P post load	9.228 kg/yr	
Percent P load reduction	73 %	
Provided P discharge load	2.451 kg/yr	5.41 lb/yr
Provided P load removed	6.777 kg/yr	14.942 lb/yr

Complete Report (not including cost) Ver 4.3.5

Project: SR 535 Basin 2 Post
Date: 4/9/2024 11:22:00 AM

Site and Catchment Information

Analysis: Net Improvement

Catchment Name	Basin 2
Rainfall Zone	Florida Zone 2
Annual Mean Rainfall	50.00

Pre-Condition Landuse Information

Landuse	Highway: TN=1.520 TP=0.200
Area (acres)	0.00
Rational Coefficient (0-1)	0.00
Non DCIA Curve Number	29.90
DCIA Percent (0-100)	0.00
Nitrogen EMC (mg/l)	1.520
Phosphorus EMC (mg/l)	0.200
Runoff Volume (ac-ft/yr)	0.000
Groundwater N (kg/yr)	0.000
Groundwater P (kg/yr)	0.000
Nitrogen Loading (kg/yr)	0.000
Phosphorus Loading (kg/yr)	0.000

Post-Condition Landuse Information

Landuse	Highway: TN=1.520 TP=0.200
Area (acres)	66.99
Rational Coefficient (0-1)	0.25
Non DCIA Curve Number	87.00
DCIA Percent (0-100)	9.40
Wet Pond Area (ac)	8.01
Nitrogen EMC (mg/l)	1.520
Phosphorus EMC (mg/l)	0.200
Runoff Volume (ac-ft/yr)	61.642

Groundwater N (kg/yr)	0.000
Groundwater P (kg/yr)	0.000
Nitrogen Loading (kg/yr)	115.527
Phosphorus Loading (kg/yr)	15.201

Catchment Number: 1 Name: Basin 2

Project: SR 535 Basin 2 Post
Date: 4/9/2024

Wet Detention Design

Permanent Pool Volume (ac-ft)	52.070
Permanent Pool Volume (ac-ft) for 31 days residence	5.235
Annual Residence Time (days)	308
Littoral Zone Efficiency Credit	
Wetland Efficiency Credit	

Watershed Characteristics

Catchment Area (acres)	66.99
Contributing Area (acres)	58.980
Non-DCIA Curve Number	87.00
DCIA Percent	9.40
Rainfall Zone	Florida Zone 2
Rainfall (in)	50.00

Surface Water Discharge

Required TN Treatment Efficiency (%)	100
Provided TN Treatment Efficiency (%)	43
Required TP Treatment Efficiency (%)	100
Provided TP Treatment Efficiency (%)	84

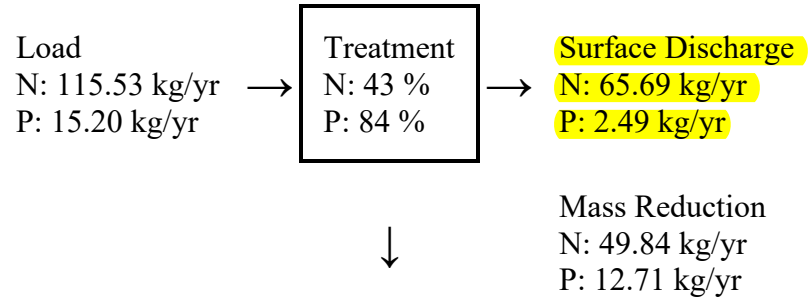
Media Mix Information

Type of Media Mix	Not Specified
Media N Reduction (%)	
Media P Reduction (%)	

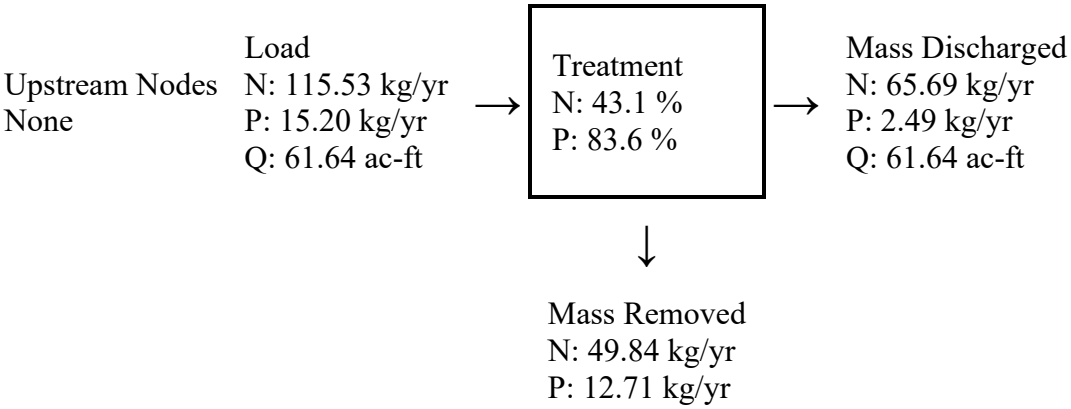
Groundwater Discharge (Stand-Alone)

Treatment Rate (MG/yr)	0.000
TN Mass Load (kg/yr)	0.000
TN Concentration (mg/L)	0.000
TP Mass Load (kg/yr)	0.000
TP Concentration (mg/L)	0.000

Load Diagram for Wet Detention (stand-alone)



Load Diagram for Wet Detention (As Used In Routing)



Summary Treatment Report Version: 4.3.5

Project: SR 535 Basin 2 Post

Date:4/9/2024

Analysis Type: Net

Routing Summary
Catchment 1 Routed to Outlet

Improvement
BMP Types:
Catchment 1 - (Basin 2)
Wet Detention
Based on % removal values to
the nearest percent
Total nitrogen target removal met? **No**
Total phosphorus target removal met? **No**

Summary Report

Nitrogen

Surface Water Discharge

Total N pre load	kg/yr	
Total N post load	115.53 kg/yr	
Target N load reduction	100 %	
Target N discharge load	kg/yr	
Percent N load reduction	43 %	
Provided N discharge load	65.69 kg/yr	144.85 lb/yr
Provided N load removed	49.84 kg/yr	109.89 lb/yr

Phosphorus

Surface Water Discharge

Total P pre load	kg/yr	
Total P post load	15.201 kg/yr	
Target P load reduction	100 %	
Target P discharge load	kg/yr	
Percent P load reduction	84 %	
Provided P discharge load	2.486 kg/yr	5.48 lb/yr
Provided P load removed	12.715 kg/yr	28.036 lb/yr

BASIN 3 - EXIST. POND 3-1 & POND 3-2

- HYDROLOGY CALCULATIONS

- PERMANENT POOL VOLUME CALCULATIONS

- BMPTrains REPORT
  - PRE-CONDITION
  - POST CONDITION

SR 535 PD & E
TMDL ANALYSIS - HYDROLOGY CALCULATIONS

DATE: 9/28/2022
REV: 10/15/22
BY: ZL
REV: JAG

1. Exist. Conditions

BASIN: 3
POND: Pond 3-1 & Pond 3-2

	Land Cover	Soil Hydrologic Group	CN	Pervious Area (Ac)	Directly Connected	Non-Directly Connected	Total Area	Non-DCIA Total Area	Non-DCIA CA	
	Roadway Basin									
	Impervious area	A	98		5.07	4.28	9.35	4.28	419.44	(roadway)
	Impervious area	D	98			6.82	6.82	6.82	668.36	(roadway)
	Open Space (good) - grass >75%	A	39	4.73			4.73	4.73	184.47	
	Open Space (good) - grass >75%	D	80	6.27			6.27	6.27	501.60	
	SUBTOTAL			**11.00**	**5.07**	**11.10**	**27.17**	**22.10**	**1,773.87**	
	Pond Basin									
	Open Space (good) - grass >75%	D	80	1.00			1.00	1.00	80	
Pond3-1	Water Surface	N/A	100	0.47			0.47	0.47	47	
Pond3-2	Woods - (good)	D	77	3.51			3.51	3.51	270	
	SUBTOTAL			**4.98**	**0.00**	**0.00**	**4.98**	**4.98**	**397.27**	
	TOTAL			**15.98**	**5.07**	**11.10**	**32.15**	**27.08**	**2,171.14**	

Roadway Basin
% DCIA = **15.8%**
Non-DCIA CN = **80**

Based on drainage map from permit # 901113-1, 60% impervious area is DCIA

1. Proposed Conditions

BASIN: 3
POND: Pond 3-1 & Pond 3-2

	Land Cover	Soil Hydrologic Group	CN	Pervious Area (Ac)	Directly Connected	Non-Directly Connected	Total Area	Non-DCIA Total Area	Non-DCIA CA	
	Roadway Basin									
	Impervious area	A	98		5.11	3.64	8.75	3.64	356.72	(roadway)
	Impervious area	D	98			9.13	9.13	9.13	894.74	(roadway)
	Open Space (good) - grass >75%	A	39	4.61			4.61	4.61	179.79	
	Open Space (good) - grass >75%	D	80	4.68			4.68	4.68	374.40	
	SUBTOTAL			**9.29**	**5.11**	**12.77**	**27.17**	**22.06**	**1,805.65**	
	Pond Basin									
	Open Space (good) - grass >75%	D	80	0.47			0.47	0.47	37.60	
Pond3-1	Water Surface	N/A	100	1.00			1.00	1.00	100	
	Open Space (good) - grass >75%	D	80	2.17			2.17	2.17	174	
Pond3-2	Water Surface	N/A	100	1.34			1.34	1.34	134	
	SUBTOTAL			**4.98**	**0.00**	**0.00**	**4.98**	**4.98**	**445.20**	
	TOTAL			**14.27**	**5.11**	**12.77**	**32.15**	**27.04**	**2,250.85**	

Roadway Basin
% DCIA = **15.9%**
Non-DCIA CN = **83**

SR 535 PD & E
TMDL ANALYSIS - PERMANENT POOL VOLUME CALCULATIONS

DATE: 9/28/2022
REV: 10/15/22
BY: ZL
REV: JAG

Existing condition

POND: Exist Wet Pond (Pond 3-1)

Description	Elevation	Area	Volume
Control El.	90.81 ft	0.80 ac	**3.81 ac-ft**
Pond Bottom Elevation	85.10 ft	0.54 ac	
Total Perm. Pool Volume:			**3.81 ac-ft**

Proposed condition

POND: Exist Wet Pond (Pond 3-1) + Expanded Detention (Pond 3-2)

Pond 3-1

Description	Elevation	Area	Volume
Control El.	90.81 ft	0.80 ac	**3.81 ac-ft**
Pond Bottom Elevation	85.10 ft	0.54 ac	

Pond 3-2

Description	Elevation	Area	Volume
Control El.	92.00 ft	1.34 ac	**7.31 ac-ft**
Pond Bottom Elevation	85.10 ft	0.78 ac	
Total Perm. Pool Volume:			**11.13 ac-ft**

Complete Report (not including cost) Ver 4.3.5

Project: SR 535 Basin 3 - pre
Date: 2/26/2024 6:08:20 PM

Note: Since there is an existing pond within this basin, the existing conditions was input in the post interface so the pond could be included in the analysis. The post condition was run separately and then compared to this analysis for the existing conditions.

Site and Catchment Information

Analysis: BMP Analysis

Catchment Name	Basin 3
Rainfall Zone	Florida Zone 2
Annual Mean Rainfall	50.00

Pre-Condition Landuse Information

Landuse	Highway: TN=1.520 TP=0.200
Area (acres)	0.00
Rational Coefficient (0-1)	0.00
Non DCIA Curve Number	29.90
DCIA Percent (0-100)	0.00
Nitrogen EMC (mg/l)	1.520
Phosphorus EMC (mg/l)	0.200
Runoff Volume (ac-ft/yr)	0.000
Groundwater N (kg/yr)	0.000
Groundwater P (kg/yr)	0.000
Nitrogen Loading (kg/yr)	0.000
Phosphorus Loading (kg/yr)	0.000

Post-Condition Landuse Information

Landuse	Highway: TN=1.520 TP=0.200
Area (acres)	32.15
Rational Coefficient (0-1)	0.22
Non DCIA Curve Number	80.00
DCIA Percent (0-100)	15.80
Wet Pond Area (ac)	4.98
Nitrogen EMC (mg/l)	1.520
Phosphorus EMC (mg/l)	0.200
Runoff Volume (ac-ft/yr)	25.087

Groundwater N (kg/yr)	0.000
Groundwater P (kg/yr)	0.000
Nitrogen Loading (kg/yr)	47.017
Phosphorus Loading (kg/yr)	6.186

Catchment Number: 1 Name: Basin 3

Project: SR 535 Basin 3 - pre
Date: 2/26/2024

Wet Detention Design

Permanent Pool Volume (ac-ft)	3.810
Permanent Pool Volume (ac-ft) for 31 days residence	2.131
Annual Residence Time (days)	55
Littoral Zone Efficiency Credit	
Wetland Efficiency Credit	

Watershed Characteristics

Catchment Area (acres)	32.15
Contributing Area (acres)	27.170
Non-DCIA Curve Number	80.00
DCIA Percent	15.80
Rainfall Zone	Florida Zone 2
Rainfall (in)	50.00

Surface Water Discharge

Required TN Treatment Efficiency (%)	
Provided TN Treatment Efficiency (%)	41
Required TP Treatment Efficiency (%)	
Provided TP Treatment Efficiency (%)	69

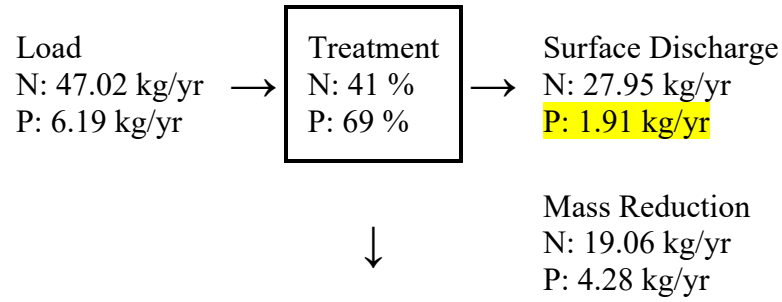
Media Mix Information

Type of Media Mix	Not Specified
Media N Reduction (%)	
Media P Reduction (%)	

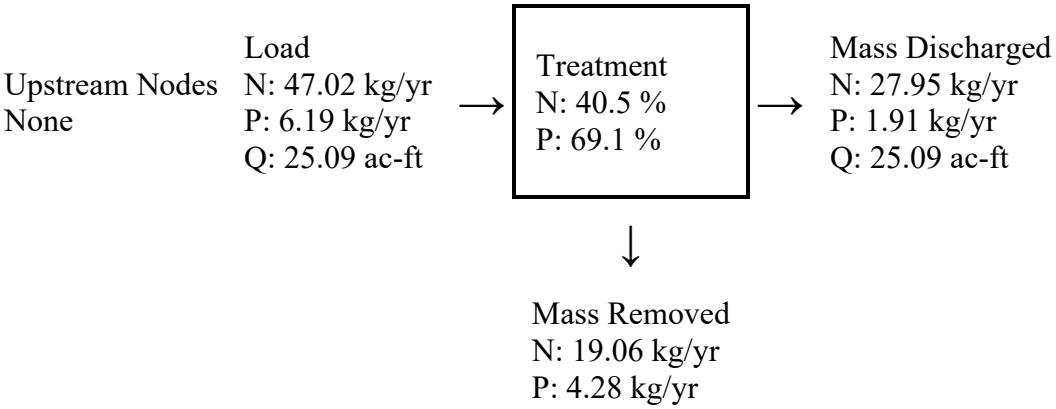
Groundwater Discharge (Stand-Alone)

Treatment Rate (MG/yr)	0.000
TN Mass Load (kg/yr)	0.000
TN Concentration (mg/L)	0.000
TP Mass Load (kg/yr)	0.000
TP Concentration (mg/L)	0.000

Load Diagram for Wet Detention (stand-alone)



Load Diagram for Wet Detention (As Used In Routing)



Summary Treatment Report Version: 4.3.5

Project: SR 535 Basin 3 - pre

Date:2/26/2024

Analysis Type: BMP Analysis

Routing Summary
Catchment 1 Routed to Outlet

BMP Types:

Catchment 1 - (Basin 3)

Wet Detention

Based on % removal values to the nearest percent

Summary Report

Nitrogen

Surface Water Discharge

Total N post load	47.02 kg/yr	
Percent N load reduction	41 %	
Provided N discharge load	27.95 kg/yr	61.64 lb/yr
Provided N load removed	19.06 kg/yr	42.04 lb/yr

Phosphorus

Surface Water Discharge

Total P post load	6.186 kg/yr	
Percent P load reduction	69 %	
Provided P discharge load	1.909 kg/yr	4.21 lb/yr
Provided P load removed	4.278 kg/yr	9.433 lb/yr

Complete Report (not including cost) Ver 4.3.5

Project: SR 535 Basin 3 - post
Date: 4/9/2024 11:43:10 AM

Site and Catchment Information

Analysis: BMP Analysis

Catchment Name	Basin 3
Rainfall Zone	Florida Zone 2
Annual Mean Rainfall	50.00

Pre-Condition Landuse Information

Landuse	Highway: TN=1.520 TP=0.200
Area (acres)	0.00
Rational Coefficient (0-1)	0.00
Non DCIA Curve Number	29.90
DCIA Percent (0-100)	0.00
Nitrogen EMC (mg/l)	1.520
Phosphorus EMC (mg/l)	0.200
Runoff Volume (ac-ft/yr)	0.000
Groundwater N (kg/yr)	0.000
Groundwater P (kg/yr)	0.000
Nitrogen Loading (kg/yr)	0.000
Phosphorus Loading (kg/yr)	0.000

Post-Condition Landuse Information

Landuse	Highway: TN=1.520 TP=0.200
Area (acres)	32.15
Rational Coefficient (0-1)	0.25
Non DCIA Curve Number	83.00
DCIA Percent (0-100)	15.90
Wet Pond Area (ac)	4.98
Nitrogen EMC (mg/l)	1.520
Phosphorus EMC (mg/l)	0.200
Runoff Volume (ac-ft/yr)	27.927

Groundwater N (kg/yr)	0.000
Groundwater P (kg/yr)	0.000
Nitrogen Loading (kg/yr)	52.339
Phosphorus Loading (kg/yr)	6.887

Catchment Number: 1 Name: Basin 3

Project: SR 535 Basin 3 - post
Date: 4/9/2024

Wet Detention Design

Permanent Pool Volume (ac-ft)	11.130
Permanent Pool Volume (ac-ft) for 31 days residence	2.372
Annual Residence Time (days)	145
Littoral Zone Efficiency Credit	
Wetland Efficiency Credit	

Watershed Characteristics

Catchment Area (acres)	32.15
Contributing Area (acres)	27.170
Non-DCIA Curve Number	83.00
DCIA Percent	15.90
Rainfall Zone	Florida Zone 2
Rainfall (in)	50.00

Surface Water Discharge

Required TN Treatment Efficiency (%)	
Provided TN Treatment Efficiency (%)	42
Required TP Treatment Efficiency (%)	
Provided TP Treatment Efficiency (%)	77

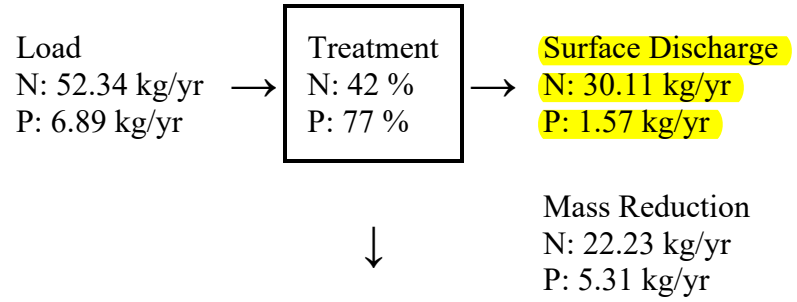
Media Mix Information

Type of Media Mix	Not Specified
Media N Reduction (%)	
Media P Reduction (%)	

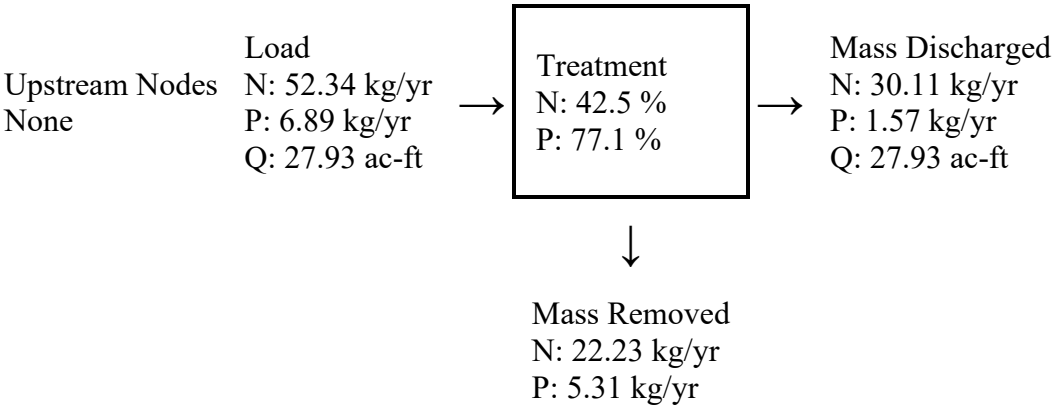
Groundwater Discharge (Stand-Alone)

Treatment Rate (MG/yr)	0.000
TN Mass Load (kg/yr)	0.000
TN Concentration (mg/L)	0.000
TP Mass Load (kg/yr)	0.000
TP Concentration (mg/L)	0.000

Load Diagram for Wet Detention (stand-alone)



Load Diagram for Wet Detention (As Used In Routing)



Summary Treatment Report Version: 4.3.5

Project: SR 535 Basin 3 - post

Date:4/9/2024

Analysis Type: BMP Analysis

Routing Summary
Catchment 1 Routed to Outlet

BMP Types:

Catchment 1 - (Basin 3)

Wet Detention

Based on % removal values to the nearest percent

Summary Report

Nitrogen

Surface Water Discharge

Total N post load	52.34 kg/yr	
Percent N load reduction	42 %	
Provided N discharge load	30.11 kg/yr	66.39 lb/yr
Provided N load removed	22.23 kg/yr	49.02 lb/yr

Phosphorus

Surface Water Discharge

Total P post load	6.887 kg/yr	
Percent P load reduction	77 %	
Provided P discharge load	1.574 kg/yr	3.47 lb/yr
Provided P load removed	5.313 kg/yr	11.715 lb/yr

BASIN 4 - EXIST. POND 4-1

- HYDROLOGY CALCULATIONS

- PERMANENT POOL VOLUME CALCULATIONS

- BMPTrains REPORT
  - PRE-CONDITION
  - POST CONDITION

SR 535 PD & E
TMDL ANALYSIS - HYDROLOGY CALCULATIONS

DATE: 9/28/2022
REV: 10/15/22
BY: ZL
REV: JAG

1. Exist. Conditions

BASIN: 4
POND: Pond 4-1

	Land Cover	Soil Hydrologic Group	CN	Pervious Area (Ac)	Directly Connected	Non-Directly Connected	Total Area	Non-DCIA Total Area	Non-DCIA CA	
	Roadway Basin									
	Impervious area	D	98		4.94		4.94	0.00	0	(roadway)
	Open Space (good) - grass >75%	D	80	2.13			2.13	2.13	170	
	SUBTOTAL			**2.13**	**4.94**	**0.00**	**7.07**	**2.13**	**170.40**	
	Pond Basin									
Pond4-1	Water Surface	N/A	100	1.63			1.63	1.63	163	
	SUBTOTAL			**1.63**	**0.00**	**0.00**	**1.63**	**1.63**	**163.00**	
	TOTAL			**3.76**	**4.94**	**0.00**	**8.70**	**3.76**	**333.40**	

Roadway Basin
% DCIA = **56.8%**
Non-DCIA CN = **89**

1. Exist. Conditions

BASIN: 4
POND: Pond 4-2

Note: Exist. Pond 4-2 is a dry detention pond, no reduction in nutrient loads

	Land Cover	Soil Hydrologic Group	CN	Pervious Area (Ac)	Directly Connected	Non-Directly Connected	Total Area	Non-DCIA Total Area	Non-DCIA CA	
	Roadway Basin									
	Impervious area	D	98		0.83		0.83	0.00	0	(roadway)
	Open Space (good) - grass >75%	D	80	0.06			0.06	0.06	5	
	SUBTOTAL			**0.06**	**0.83**	**0.00**	**0.89**	**0.06**	**4.80**	
	Pond Basin									
Pond4-2	Open Space (good) - grass >75%	D	80	0.30			0.30	0.30	24	
	SUBTOTAL			**0.30**	**0.00**	**0.00**	**0.30**	**0.30**	**24.00**	
	TOTAL			**0.36**	**0.83**	**0.00**	**1.19**	**0.36**	**28.80**	

Roadway Basin
% DCIA = **69.7%**
Non-DCIA CN = **80**

1. Proposed Conditions

BASIN: 4
POND: Pond 4-1

	Land Cover	Soil Hydrologic Group	CN	Pervious Area (Ac)	Directly Connected	Non-Directly Connected	Total Area	Non-DCIA Total Area	Non-DCIA CA	
	Roadway Basin									
	Impervious area	D	98		5.08		5.08	0.00	0	(roadway)
	Open Space (good) - grass >75%	D	80	0.92			0.92	0.92	74	
	SUBTOTAL			**0.92**	**5.08**	**0.00**	**6.00**	**0.92**	**73.60**	
	Pond Basin									
Pond4-1	Water Surface	N/A	100	1.63			1.63	1.63	163	
	SUBTOTAL			**1.63**	**0.00**	**0.00**	**1.63**	**1.63**	**163.00**	
	TOTAL			**2.55**	**5.08**	**0.00**	**7.63**	**2.55**	**236.60**	

Roadway Basin
% DCIA = **66.6%**
Non-DCIA CN = **93**

SR 535 PD & E
TMDL ANALYSIS - PERMANENT POOL VOLUME CALCULATIONS

DATE: 9/28/2022
REV: 10/15/22
BY: ZL
REV: JAG

Existing condition

POND: Pond 4-1

Description	Elevation	Area	Volume
Control El.	90.10 ft	0.80 ac	**4.82 ac-ft**
Pond Bottom Elevation	82.10 ft	0.41 ac	
Total Perm. Pool Volume:			**4.82 ac-ft**

Proposed condition

POND: Pond 4-1

Pond 4-1

Description	Elevation	Area	Volume
Control El.	90.10 ft	0.80 ac	**4.82 ac-ft**
Pond Bottom Elevation	82.10 ft	0.41 ac	

Complete Report (not including cost) Ver 4.3.5

Project: SR 535 Basin 4 - pre
Date: 2/26/2024 1:51:43 PM

Note: Since there is an existing pond within this basin, the existing conditions was input in the post interface so the pond could be included in the analysis. The post condition was run separately and then compared to this analysis for the existing conditions.

Site and Catchment Information

Analysis: BMP Analysis

Catchment Name	Basin 4 Pond 4-1	Basin 4 Pond 4-2
Rainfall Zone	Florida Zone 2	Florida Zone 2
Annual Mean Rainfall	50.00	50.00

Pre-Condition Landuse Information

Landuse	Highway: TN=1.520 TP=0.200	Highway: TN=1.520 TP=0.200
Area (acres)	0.00	0.00
Rational Coefficient (0-1)	0.00	0.00
Non DCIA Curve Number	29.90	29.90
DCIA Percent (0-100)	0.00	0.00
Nitrogen EMC (mg/l)	1.520	1.520
Phosphorus EMC (mg/l)	0.200	0.200
Runoff Volume (ac-ft/yr)	0.000	0.000
Groundwater N (kg/yr)	0.000	0.000
Groundwater P (kg/yr)	0.000	0.000
Nitrogen Loading (kg/yr)	0.000	0.000
Phosphorus Loading (kg/yr)	0.000	0.000

Post-Condition Landuse Information

Landuse	Highway: TN=1.520 TP=0.200	Highway: TN=1.520 TP=0.200
Area (acres)	8.70	1.19
Rational Coefficient (0-1)	0.56	0.60
Non DCIA Curve Number	89.00	80.00
DCIA Percent (0-100)	56.80	69.70
Wet Pond Area (ac)	1.63	0.30
Nitrogen EMC (mg/l)	1.520	1.520
Phosphorus EMC (mg/l)	0.200	0.200
Runoff Volume (ac-ft/yr)	16.409	2.217

Groundwater N (kg/yr)	0.000	0.000
Groundwater P (kg/yr)	0.000	0.000
Nitrogen Loading (kg/yr)	30.754	4.155
Phosphorus Loading (kg/yr)	4.047	0.547

Catchment Number: 1 Name: Basin 4 Pond 4-1

Project: SR 535 Basin 4 - pre
Date: 2/26/2024

Wet Detention Design

Permanent Pool Volume (ac-ft)	4.820
Permanent Pool Volume (ac-ft) for 31 days residence	1.394
Annual Residence Time (days)	107
Littoral Zone Efficiency Credit	
Wetland Efficiency Credit	

Watershed Characteristics

Catchment Area (acres)	8.70
Contributing Area (acres)	7.070
Non-DCIA Curve Number	89.00
DCIA Percent	56.80
Rainfall Zone	Florida Zone 2
Rainfall (in)	50.00

Surface Water Discharge

Required TN Treatment Efficiency (%)	
Provided TN Treatment Efficiency (%)	42
Required TP Treatment Efficiency (%)	
Provided TP Treatment Efficiency (%)	75

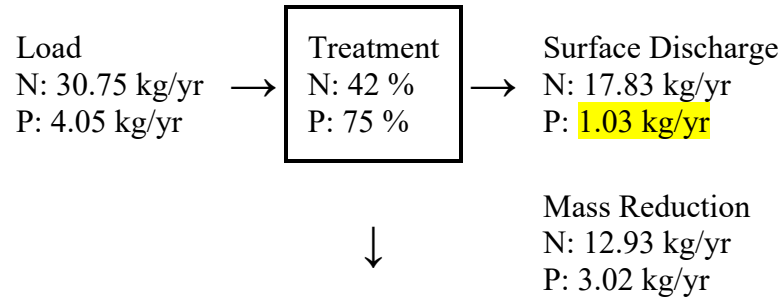
Media Mix Information

Type of Media Mix	Not Specified
Media N Reduction (%)	
Media P Reduction (%)	

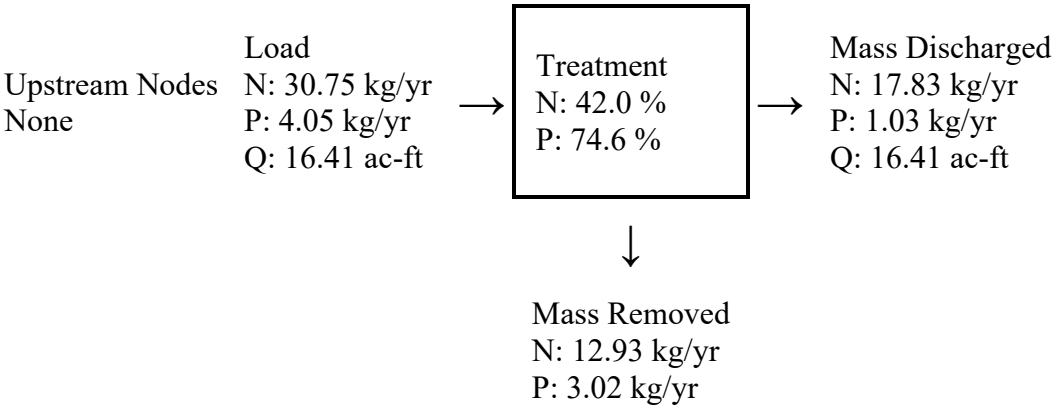
Groundwater Discharge (Stand-Alone)

Treatment Rate (MG/yr)	0.000
TN Mass Load (kg/yr)	0.000
TN Concentration (mg/L)	0.000
TP Mass Load (kg/yr)	0.000
TP Concentration (mg/L)	0.000

Load Diagram for Wet Detention (stand-alone)



Load Diagram for Wet Detention (As Used In Routing)



Catchment Number: 2 Name: Basin 4 Pond 4-2

Project: SR 535 Basin 4 - pre
Date: 2/26/2024

None Design

Watershed Characteristics

Catchment Area (acres)	1.19
Contributing Area (acres)	0.890
Non-DCIA Curve Number	80.00
DCIA Percent	69.70
Rainfall Zone	Florida Zone 2
Rainfall (in)	50.00

Surface Water Discharge

Required TN Treatment Efficiency (%)	
Provided TN Treatment Efficiency (%)	
Required TP Treatment Efficiency (%)	
Provided TP Treatment Efficiency (%)	

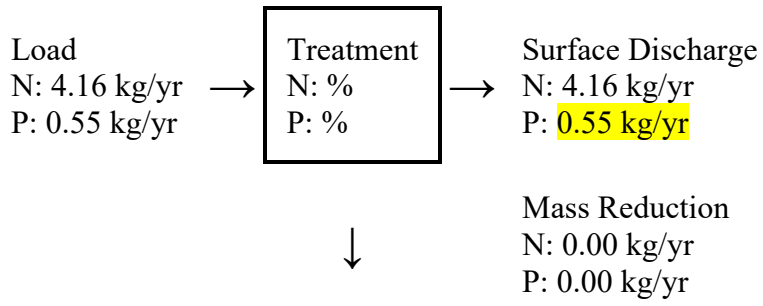
Media Mix Information

Type of Media Mix	Not Specified
Media N Reduction (%)	0.000
Media P Reduction (%)	0.000

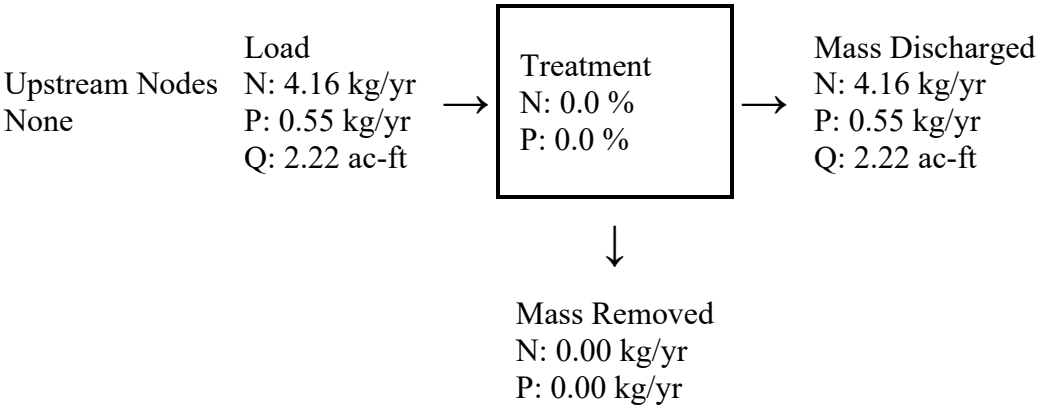
Groundwater Discharge (Stand-Alone)

Treatment Rate (MG/yr)	0.000
TN Mass Load (kg/yr)	0.000
TN Concentration (mg/L)	0.000
TP Mass Load (kg/yr)	0.000
TP Concentration (mg/L)	0.000

Load Diagram for None (stand-alone)



Load Diagram for None (As Used In Routing)



Summary Treatment Report Version: 4.3.5

Project: SR 535 Basin 4 - pre

Analysis Type: BMP Analysis
BMP Types:
Catchment 1 - (Basin 4 Pond 4-1) Wet Detention
Catchment 2 - (Basin 4 Pond 4-2) None
Based on % removal values to the nearest percent

Date:2/26/2024

Routing Summary
Catchment 1 Routed to Outlet
Catchment 2 Routed to Outlet

Summary Report

Nitrogen

Surface Water Discharge		
Total N post load	34.91 kg/yr	
Percent N load reduction	37 %	
Provided N discharge load	21.98 kg/yr	48.47 lb/yr
Provided N load removed	12.93 kg/yr	28.5 lb/yr

Phosphorus

Surface Water Discharge

Total P post load	4.593 kg/yr	
Percent P load reduction	66 %	
Provided P discharge load	1.576 kg/yr	3.47 lb/yr
Provided P load removed	3.018 kg/yr	6.654 lb/yr

Complete Report (not including cost) Ver 4.3.5

Project: SR 535 Basin 4 - post
Date: 4/9/2024 11:54:41 AM

Site and Catchment Information

Analysis: BMP Analysis

Catchment Name	Basin 4
Rainfall Zone	Florida Zone 2
Annual Mean Rainfall	50.00

Pre-Condition Landuse Information

Landuse	Highway: TN=1.520 TP=0.200
Area (acres)	0.00
Rational Coefficient (0-1)	0.00
Non DCIA Curve Number	29.90
DCIA Percent (0-100)	0.00
Nitrogen EMC (mg/l)	1.520
Phosphorus EMC (mg/l)	0.200
Runoff Volume (ac-ft/yr)	0.000
Groundwater N (kg/yr)	0.000
Groundwater P (kg/yr)	0.000
Nitrogen Loading (kg/yr)	0.000
Phosphorus Loading (kg/yr)	0.000

Post-Condition Landuse Information

Landuse	Highway: TN=1.520 TP=0.200
Area (acres)	7.63
Rational Coefficient (0-1)	0.65
Non DCIA Curve Number	93.00
DCIA Percent (0-100)	66.60
Wet Pond Area (ac)	1.63
Nitrogen EMC (mg/l)	1.520
Phosphorus EMC (mg/l)	0.200
Runoff Volume (ac-ft/yr)	16.305

Groundwater N (kg/yr)	0.000
Groundwater P (kg/yr)	0.000
Nitrogen Loading (kg/yr)	30.559
Phosphorus Loading (kg/yr)	4.021

Catchment Number: 1 Name: Basin 4

Project: SR 535 Basin 4 - post
Date: 4/9/2024

Wet Detention Design

Permanent Pool Volume (ac-ft)	4.820
Permanent Pool Volume (ac-ft) for 31 days residence	1.385
Annual Residence Time (days)	108
Littoral Zone Efficiency Credit	
Wetland Efficiency Credit	

Watershed Characteristics

Catchment Area (acres)	7.63
Contributing Area (acres)	6.000
Non-DCIA Curve Number	93.00
DCIA Percent	66.60
Rainfall Zone	Florida Zone 2
Rainfall (in)	50.00

Surface Water Discharge

Required TN Treatment Efficiency (%)	
Provided TN Treatment Efficiency (%)	42
Required TP Treatment Efficiency (%)	
Provided TP Treatment Efficiency (%)	75

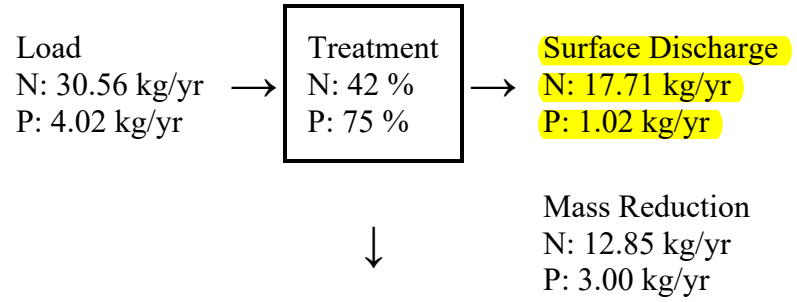
Media Mix Information

Type of Media Mix	Not Specified
Media N Reduction (%)	
Media P Reduction (%)	

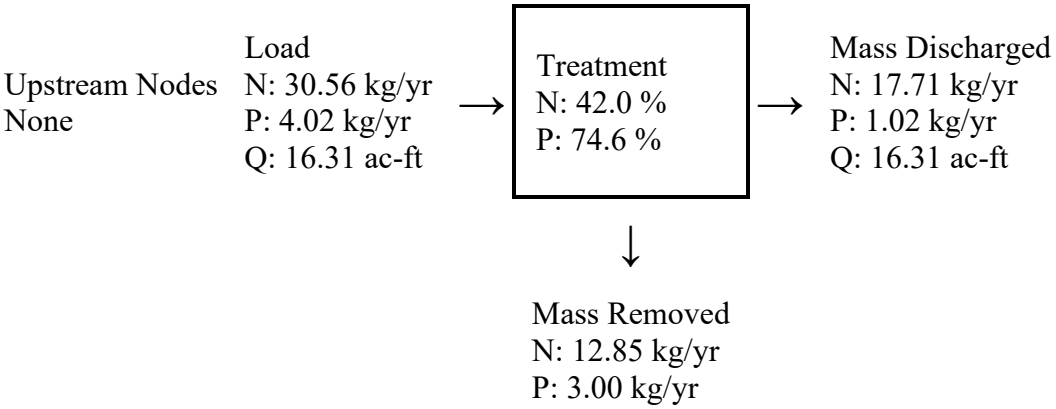
Groundwater Discharge (Stand-Alone)

Treatment Rate (MG/yr)	0.000
TN Mass Load (kg/yr)	0.000
TN Concentration (mg/L)	0.000
TP Mass Load (kg/yr)	0.000
TP Concentration (mg/L)	0.000

Load Diagram for Wet Detention (stand-alone)



Load Diagram for Wet Detention (As Used In Routing)



Summary Treatment Report Version: 4.3.5

Project: SR 535 Basin 4 - post

Date:4/9/2024

Analysis Type: BMP Analysis

Routing Summary
Catchment 1 Routed to Outlet

BMP Types:

Catchment 1 - (Basin 4)

Wet Detention

Based on % removal values to the nearest percent

Summary Report

Nitrogen

Surface Water Discharge

Total N post load	30.56 kg/yr	
Percent N load reduction	42 %	
Provided N discharge load	17.71 kg/yr	39.05 lb/yr
Provided N load removed	12.85 kg/yr	28.33 lb/yr

Phosphorus

Surface Water Discharge

Total P post load	4.021 kg/yr	
Percent P load reduction	75 %	
Provided P discharge load	1.02 kg/yr	2.25 lb/yr
Provided P load removed	3.001 kg/yr	6.616 lb/yr

Precipitation Data

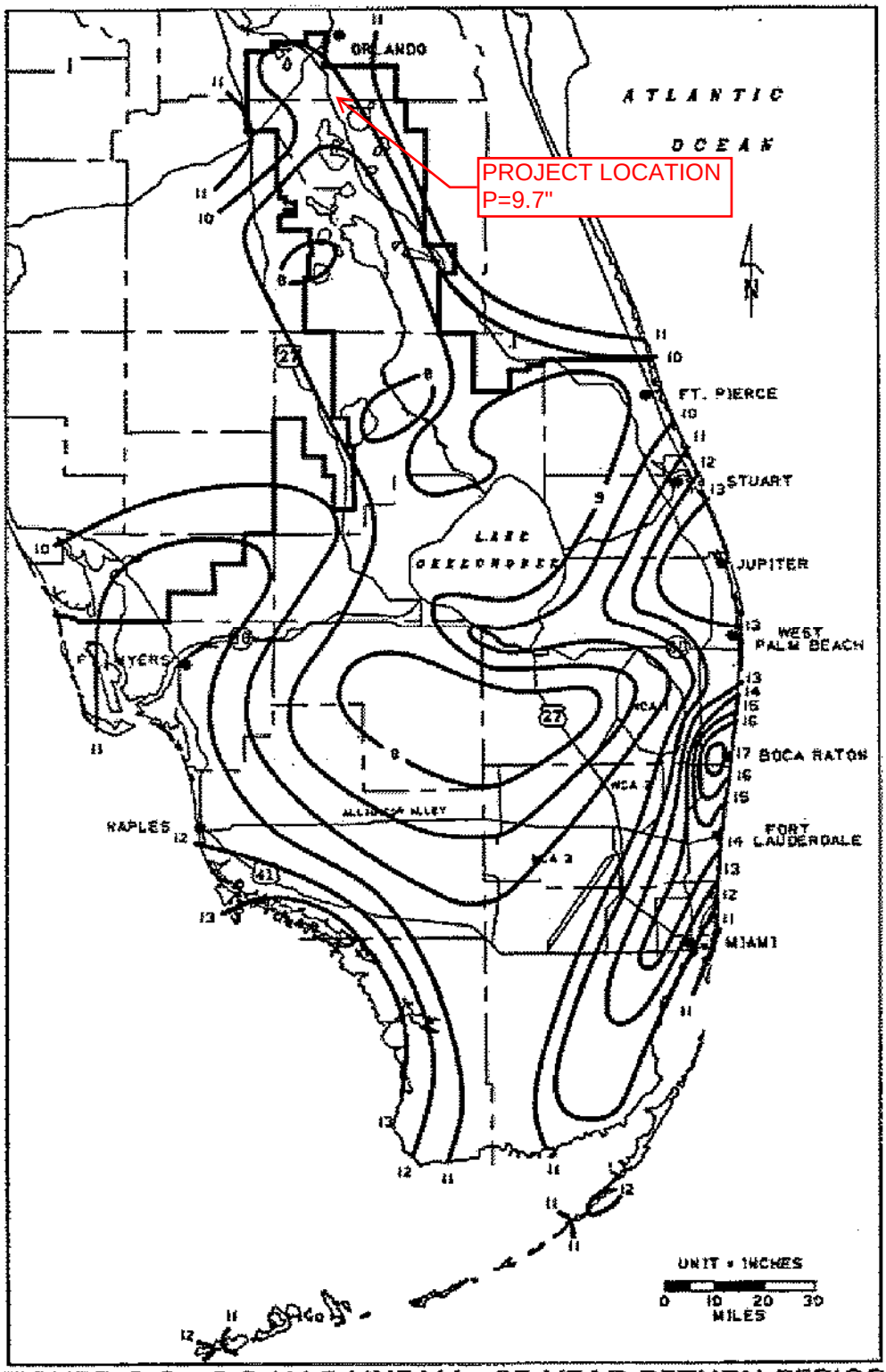


FIGURE C-8. 3-DAY RAINFALL: 25-YEAR RETURN PERIOD

NOAA Atlas 14, Volume 9, Version 2
Location name: Kissimmee, Florida, USA*
Latitude: 28.338°, Longitude: -81.4804°
Elevation: 84.45 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Deborah Martin, Sandra Pavlovic, Ishani Roy, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Michael Yekta, Geoffery Bonnin

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.477 (0.397-0.571)	0.545 (0.453-0.653)	0.651 (0.539-0.784)	0.734 (0.605-0.890)	0.842 (0.663-1.06)	0.919 (0.707-1.18)	0.991 (0.734-1.32)	1.06 (0.749-1.47)	1.14 (0.774-1.65)	1.20 (0.792-1.79)
10-min	0.698 (0.582-0.836)	0.798 (0.664-0.957)	0.953 (0.790-1.15)	1.08 (0.885-1.30)	1.23 (0.971-1.54)	1.35 (1.03-1.73)	1.45 (1.08-1.93)	1.55 (1.10-2.15)	1.67 (1.13-2.42)	1.76 (1.16-2.62)
15-min	0.851 (0.709-1.02)	0.973 (0.809-1.17)	1.16 (0.963-1.40)	1.31 (1.08-1.59)	1.50 (1.18-1.88)	1.64 (1.26-2.11)	1.77 (1.31-2.36)	1.89 (1.34-2.62)	2.04 (1.38-2.95)	2.14 (1.42-3.19)
30-min	1.39 (1.16-1.67)	1.58 (1.32-1.90)	1.88 (1.56-2.26)	2.11 (1.74-2.56)	2.41 (1.90-3.02)	2.63 (2.02-3.38)	2.83 (2.10-3.77)	3.03 (2.14-4.19)	3.26 (2.21-4.71)	3.42 (2.26-5.10)
60-min	1.85 (1.54-2.21)	2.11 (1.76-2.53)	2.52 (2.09-3.03)	2.84 (2.34-3.44)	3.25 (2.56-4.07)	3.55 (2.73-4.55)	3.82 (2.83-5.09)	4.08 (2.89-5.66)	4.39 (2.98-6.34)	4.61 (3.05-6.86)
2-hr	2.31 (1.94-2.74)	2.64 (2.21-3.15)	3.16 (2.64-3.78)	3.57 (2.96-4.30)	4.09 (3.24-5.09)	4.46 (3.46-5.69)	4.81 (3.59-6.36)	5.14 (3.66-7.07)	5.53 (3.77-7.93)	5.79 (3.85-8.58)
3-hr	2.52 (2.12-2.98)	2.89 (2.43-3.43)	3.48 (2.92-4.14)	3.95 (3.29-4.73)	4.56 (3.63-5.66)	5.00 (3.90-6.37)	5.43 (4.07-7.16)	5.84 (4.17-8.02)	6.34 (4.34-9.07)	6.70 (4.47-9.87)
6-hr	2.90 (2.46-3.42)	3.33 (2.82-3.92)	4.03 (3.41-4.77)	4.63 (3.88-5.51)	5.46 (4.41-6.81)	6.11 (4.81-7.79)	6.77 (5.13-8.95)	7.45 (5.39-10.3)	8.37 (5.79-12.0)	9.07 (6.10-13.3)
12-hr	3.37 (2.88-3.93)	3.82 (3.26-4.47)	4.65 (3.95-5.46)	5.41 (4.57-6.40)	6.57 (5.40-8.26)	7.55 (6.02-9.67)	8.60 (6.60-11.4)	9.75 (7.13-13.5)	11.4 (7.97-16.3)	12.7 (8.61-18.5)
24-hr	3.86 (3.32-4.48)	4.39 (3.77-5.10)	5.40 (4.62-6.30)	6.37 (5.42-7.49)	7.92 (6.59-10.00)	9.28 (7.48-11.9)	10.8 (8.34-14.3)	12.4 (9.18-17.2)	14.9 (10.5-21.3)	16.9 (11.5-24.4)
2-day	4.39 (3.81-5.06)	5.04 (4.36-5.82)	6.28 (5.42-7.28)	7.48 (6.41-8.72)	9.38 (7.86-11.8)	11.0 (8.96-14.1)	12.9 (10.0-17.0)	14.9 (11.1-20.4)	17.9 (12.7-25.4)	20.3 (13.9-29.2)
3-day	4.80 (4.18-5.51)	5.48 (4.76-6.30)	6.77 (5.87-7.82)	8.03 (6.91-9.33)	10.0 (8.44-12.5)	11.8 (9.59-14.9)	13.7 (10.7-18.0)	15.8 (11.8-21.6)	18.9 (13.5-26.8)	21.5 (14.8-30.8)
4-day	5.18 (4.53-5.93)	5.86 (5.11-6.71)	7.15 (6.21-8.23)	8.41 (7.26-9.74)	10.4 (8.79-13.0)	12.2 (9.95-15.4)	14.1 (11.1-18.5)	16.3 (12.2-22.2)	19.4 (13.9-27.5)	22.1 (15.2-31.5)
7-day	6.23 (5.48-7.09)	6.87 (6.03-7.83)	8.12 (7.10-9.29)	9.34 (8.12-10.8)	11.3 (9.61-14.0)	13.0 (10.7-16.4)	15.0 (11.8-19.5)	17.1 (12.9-23.2)	20.3 (14.6-28.5)	22.9 (15.9-32.5)
10-day	7.16 (6.32-8.12)	7.82 (6.89-8.89)	9.09 (7.98-10.4)	10.3 (9.00-11.9)	12.3 (10.5-15.0)	14.0 (11.5-17.5)	15.9 (12.6-20.5)	18.0 (13.6-24.2)	21.1 (15.2-29.4)	23.6 (16.4-33.4)
20-day	9.80 (8.71-11.0)	10.7 (9.53-12.1)	12.3 (10.9-14.0)	13.8 (12.1-15.7)	15.9 (13.5-19.0)	17.6 (14.6-21.6)	19.4 (15.4-24.7)	21.3 (16.2-28.2)	24.0 (17.4-33.1)	26.2 (18.4-36.8)
30-day	12.1 (10.8-13.6)	13.3 (11.9-15.0)	15.4 (13.6-17.3)	17.0 (15.0-19.3)	19.4 (16.4-22.9)	21.1 (17.5-25.6)	22.9 (18.3-28.8)	24.8 (18.8-32.4)	27.2 (19.7-37.1)	29.1 (20.4-40.7)
45-day	15.2 (13.7-17.0)	16.8 (15.1-18.8)	19.4 (17.3-21.8)	21.4 (19.0-24.2)	24.1 (20.4-28.2)	26.0 (21.5-31.2)	27.8 (22.2-34.7)	29.6 (22.5-38.4)	31.8 (23.1-43.1)	33.4 (23.6-46.5)
60-day	18.0 (16.2-20.1)	20.0 (17.9-22.2)	22.9 (20.5-25.7)	25.3 (22.5-28.5)	28.2 (24.0-32.9)	30.3 (25.2-36.2)	32.3 (25.8-39.9)	34.1 (25.9-44.0)	36.2 (26.3-48.7)	37.6 (26.6-52.2)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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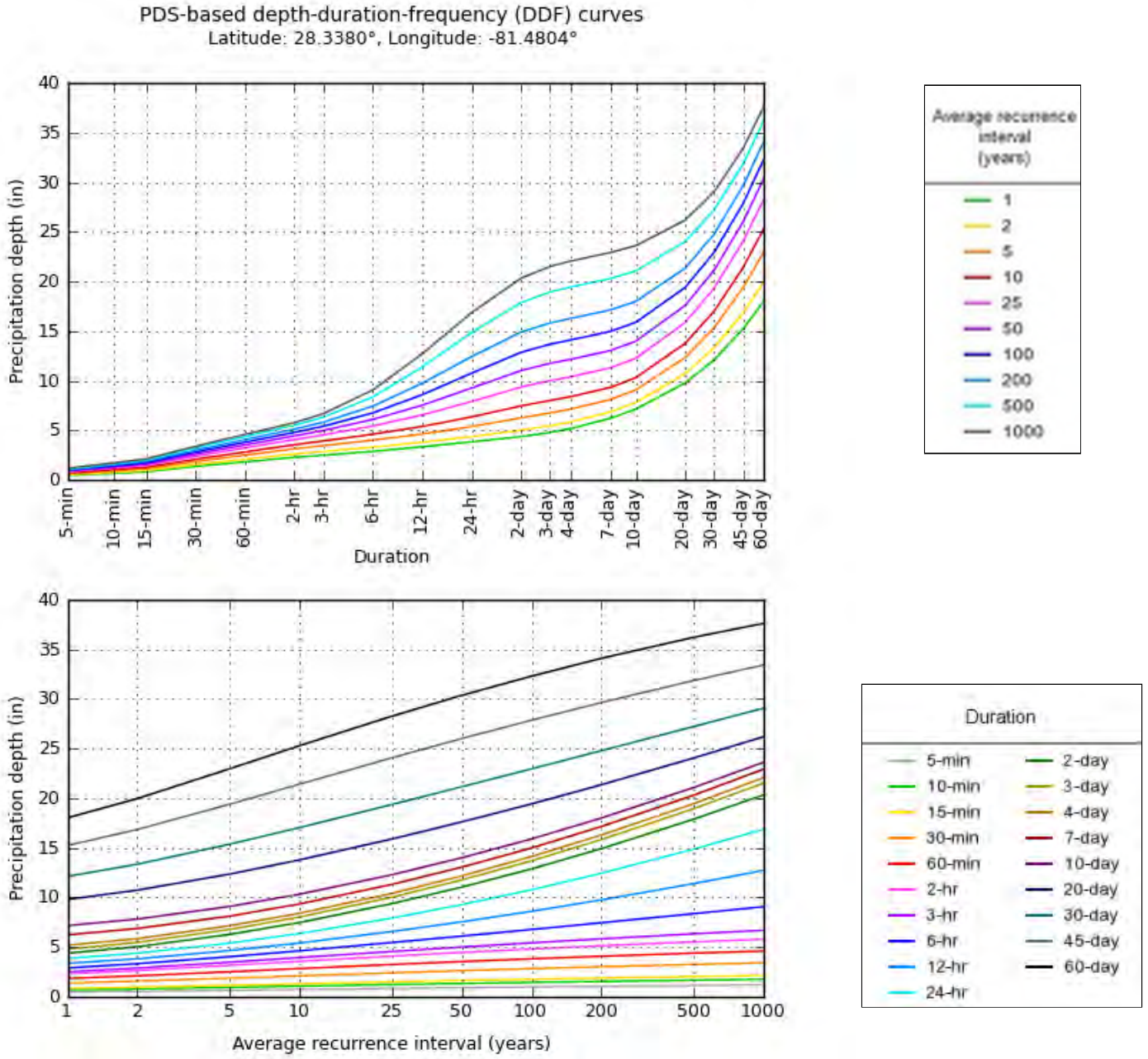
PF graphical



NOAA Atlas 14, Volume 9, Version 2

Created (GMT): Wed Jul 13 20:20:25 2022

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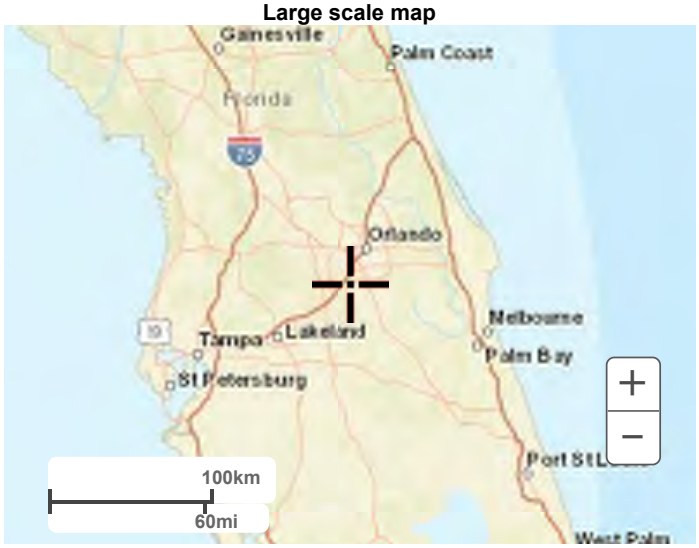
Maps & aerials

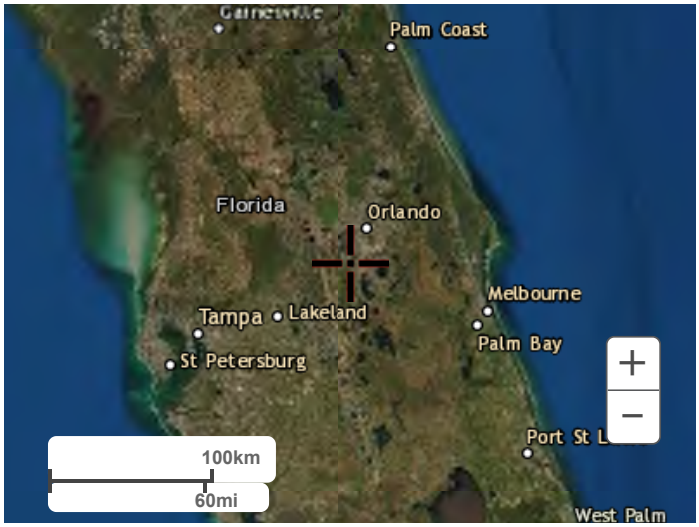
Small scale terrain

Large scale terrain

Large scale map



Large scale aerial



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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

Appendix D

Pond Site Evaluation Matrix

BCC ENGINEERING, INC.			
PROJECT: SR 535 PD&E			DATE
FPID: 437174-2	BY:	JAG	2/13/2024
	CHECKED:	JAF	2/23/2024
	REVISED:	JAG	5/6/2024

POND EVALUATION MATRIX - BASIN 2

ALTERNATIVE NO.	2A (Exist. Pond 2-1 & Pond 2-2)	2B (Exist. Pond 2-1 & Pond 2-3)	2C (Exist. Pond 2-1 & Pond 2-4)
ALTERNATIVE DESCRIPTION	INTERCONNECTED PONDS - EXISTING FDOT POND AND PROPOSED OFFSITE POND. PONDS LOCATED IN EXISTING RIGHT-OF-WAY AND PRIVATELY-OWNED BORROW PIT. PARCEL IMPACTS ALSO INCLUDE OSCEOLA PARKWAY R/W.	INTERCONNECTED PONDS - EXISTING FDOT POND AND PROPOSED OFFSITE POND. PONDS LOCATED IN EXISTING RIGHT-OF-WAY AND DEVELOPED COMMERCIAL PARCELS.	7-POND SYSTEM - EXISTING FDOT POND AND JOINT-USE INTERCONNECTED 6-POND STORMWATER SYSTEM SERVING PRIVATE DEVELOPMENT.
NO. PARCELS IMPACTED	2	3	1 (MULTIPLE TRACTS)
ESTIMATED POND R/W REQUIRED	4.3 AC	4.8 AC	99.2 AC
WHOLE TAKE/PARTIAL TAKE/JOINT-USE POND	PARTIAL (2 PARCELS)	WHOLE (3 PARCELS)	JOINT-USE POND SYSTEM
LAND USE	EXISTING BORROW PIT, HIGHWAY (OSCEOLA COUNTY) (POND 2-2)	COMMERICAL (POND 2-3)	EXISTING STORMWATER PONDS (POND 2-4 SYSTEM)
EST. COST	$9,319,700	$18,243,800	$126,478,000
DRAINAGE CONSIDERATIONS	INTERCONNECTED PONDS. POND 2-2 IS IN CLOSE PROXIMITY TO EXIST. POND 2-1, SINGLE OUTFALL FOR PONDS. MOST HYDRAULICALLY FAVORABLE, PONDS ARE CLOSE TO ROADWAY LOW POINT.	INTERCONNECTED PONDS, LARGER DISTANCE BETWEEN PONDS THAN ALT 2A. POND 2-3 IS IN PROXIMITY TO EXIST. POND 2-1, SINGLE OUTFALL FOR PONDS. PONDS ARE NEAR ROADWAY LOW POINT.	SEPARATE PONDS, 2 OUTFALLS. PONDS ARE CLOSE TO ROADWAY LOW POINT.
FEMA FLOOD ZONE	NO IMPACTS	NO IMPACTS	NO IMPACTS
CONTAMINATION-HAZARDOUS MATERIALS	NO APPARENT INVOLVEMENT	MEDIUM	NO APPARENT INVOLVEMENT
UTILITIES	NO SIGNIFICANT ISSUE IDENTIFIED	NO SIGNIFICANT ISSUE IDENTIFIED	NO SIGNIFICANT ISSUE IDENTIFIED
THREATENED & ENDANGERED SPECIES	NO SIGNIFICANT ISSUE IDENTIFIED	NO SIGNIFICANT ISSUE IDENTIFIED	NO SIGNIFICANT ISSUE IDENTIFIED
WETLANDS OR PROTECTED UPLANDS	NO IMPACTS	NO IMPACTS	NO IMPACTS
CULTURAL RESOURCES INVOLVEMENT	LOW	LOW	LOW
CONSTRUCTION	ADDITIONAL PIPING REQUIRED TO INTERCONNECT POND 2-2 TO EXIST. POND 2-1 OUTFALL = 300'	ADDITIONAL PIPING REQUIRED TO INTERCONNECT POND 2-3 TO EXIST. POND 2-1 OUTFALL = 1500'	ADDITIONAL PIPING REQUIRED TO REACH EXIST. POND 2-1 = 500' ADDITIONAL PIPING REQUIRED TO REACH POND 2-4 SYSTEM = 500'
MAINTENANCE	WET DETENTION PONDS	WET DETENTION PONDS	WET DETENTION PONDS. SR 535 RUNOFF TO JOINT-USE FACILITY, POTENTIAL MAINTENANCE NEEDS OVER POND 2-4 SYSTEM (6 PONDS, 99+ AC)
AESTHETICS	IRREGULAR POND SHAPE (POND 2-2)	IRREGULAR POND SHAPE (POND 2-3)	IRREGULAR POND SHAPE (POND 2-4 SYSTEM)
OTHER			JOINT-USE STORMWATER SYSTEM COMPRISED OF INTERCONNECTED 6-POND SYSTEM (TOTAL POND TRACTS = 99.2 AC)
PREFERRED ALTERNATIVE	PREFERRED		
COMMENTS	ALTERNATIVE 2A HAS THE LOWEST EST. COST AND IS IN THE MOST HYDRAULICALLY FAVORABLE LOCATION		

BCC ENGINEERING, INC.			
PROJECT:	SR 535 FROM US 192 TO NORTH OF WORLD CENTER DRIVE		DATE
FPID:	437174-2	BY: JAG	2/13/2024
		CHECKED: JAF	2/23/2024
		REVISED: JAG	5/6/2024

POND SITE EVALUATION MATRIX - BASIN 3

ALTERNATIVE NO.	3A (Exist. Pond 3-1 & Pond 3-2)	3B (Exist. Pond 3-1 & Pond 3-3)	3C (Exist. Pond 3-1 & Pond 3-4)
ALTERNATIVE DESCRIPTION	INTERCONNECTED PONDS - EXISTING FDOT POND AND PROPOSED OFFSITE POND. PONDS LOCATED IN EXISTING RIGHT-OF-WAY AND UNDEVELOPED PARCEL.	INTERCONNECTED PONDS - EXISTING FDOT POND AND PROPOSED OFFSITE POND. PONDS LOCATED IN EXISTING RIGHT-OF-WAY, UNDEVELOPED AND DEVELOPED PARCELS.	INTERCONNECTED PONDS - EXISTING FDOT POND AND PROPOSED OFFSITE POND. PONDS LOCATED IN EXISTING RIGHT-OF-WAY AND UNDEVELOPED PARCEL.
NO. PARCELS IMPACTED	1	3	2
ESTIMATED POND R/W REQUIRED	3.5 AC	4.1 AC	4.1 AC
WHOLE TAKE/PARTIAL TAKE/JOINT-USE POND	PARTIAL	WHOLE (2 PARCELS), PARTIAL (1 PARCEL)	PARTIAL (2 PARCELS)
LAND USE	UNDEVELOPED	COMMERCIAL (2 PARCELS) / UNDEVELOPED (1 PARCEL)	UNDEVELOPED (2 PARCELS)
EST. COST	$15,974,000	$35,020,300	$7,811,600
DRAINAGE CONSIDERATIONS	INTERCONNECTED PONDS. POND 3-2 IS IN CLOSE PROXIMITY TO EXIST. POND 3-1. MOST HYDRAULICALLY FAVORABLE, PONDS ARE CLOSE TO ROADWAY LOW POINT.	INTERCONNECTED PONDS. POND 3-3 IS FARTHER AWAY TO EXIST. POND 3-1 THAN POND 3-2, LONGER INTERCONNECTION REQUIRED. POND 3-3 FARTHER AWAY TO ROADWAY LOW POINT THAN POND 3-2.	INTERCONNECTED PONDS. POND 3-4 IS FARTHEST AWAY FROM EXIST. POND 3-1, LONGEST INTERCONNECTION REQUIRED. POND 3-4 FARTHEST AWAY FROM ROADWAY LOW POINT. WILL REQUIRE AN EASEMENT TO CONVEY RUNOFF TO POND 3-4 AND TO THE OUTFALL.
FEMA FLOOD ZONE	ZONE A - 1.3 AC OF IMPACTS FROM POND BERM	NO IMPACTS	NO IMPACTS
CONTAMINATION-HAZARDOUS MATERIALS	NO APPARENT INVOLVEMENT	HIGH	NO APPARENT INVOLVEMENT
UTILITIES	NO SIGNIFICANT ISSUE IDENTIFIED	POND INFLOW AND OUTFLOW WILL CROSS FGT LINE	POND INFLOW AND OUTFLOW WILL CROSS FGT LINE; POND 3-4 INTERCONNECTION WITH EXIST. POND 3-1 WILL REQUIRE PIPING ACROSS SR 535/SR 536 INTERSECTION, POTENTIAL FOR ADDITIONAL UTILITY IMPACTS
THREATENED & ENDANGERED SPECIES	POTENTIAL SAND SKINK HABITAT	POTENTIAL SAND SKINK HABITAT POTENTIAL CARACARA HABITAT	POTENTIAL SAND SKINK HABITAT POTENTIAL CARACARA HABITAT
WETLANDS OR PROTECTED UPLANDS	NO IMPACTS	NO IMPACTS	NO IMPACTS
CULTURAL RESOURCES INVOLVEMENT	LOW	LOW	LOW
CONSTRUCTION	ADDITIONAL PIPING REQUIRED TO POND OUTFALL = 100'	ADDITIONAL PIPING REQUIRED TO REACH POND =300' ADDITIONAL PIPING REQUIRED TO POND OUTFALL = 200'	ADDITIONAL PIPING REQUIRED TO REACH POND =600' ADDITIONAL PIPING REQUIRED TO POND OUTFALL = 300'
MAINTENANCE	WET DETENTION PONDS	WET DETENTION PONDS	WET DETENTION POND EASEMENT REQUIRED FOR ACCESS
AESTHETICS	IRREGULAR POND SHAPE	RECTANGULAR POND SHAPE	IRREGULAR POND SHAPE
OTHER			EASEMENT REQUIRED FOR CONVEYANCE AND ACCESS
PREFERRED ALTERNATIVE	SEE BASIN 3 & FPC SITE EVALUATION MATRIX. POND ALTERNATIVES 3A & 3C CARRIED FORWARD BASED ON LOWEST EST. TOTAL COSTS.		
COMMENTS	ALTERNBATIVE 3C ASSUMED TO BE INTERECONNECTED POND SYSTEM , AS UTILIZING SEPARATE PONDS WOULD REQUIRE SUBSTANTIAL DRAINAGE MODIFICATIONS AT THE SR 535.SR 536 INTERSECTION TO SPLIT DRAINAGE AREAS AND MAINTAIN EXISTING OUTFALL LOCATIONS.		

BCC ENGINEERING, INC.

PROJECT: SR 535 FROM US 192 TO NORTH OF WORLD CENTER DRIVE

FPID: 437174-2

		DATE
BY:	JAG	2/13/2024
CHECKED:	JAF	2/23/2024
REVISED:	JAG	5/6/2024

FPC EVALUATION MATRIX

ALTERNATIVE NO.	FPC 1	FPC 2	FPC 3	FPC 4	FPC 5
ALTERNATIVE DESCRIPTION	UNDEVELOPED PARCEL	UNDEVELOPED PARCEL	UNDEVELOPED PARCEL	DEVELOPED PARCEL	UNDEVELOPED PARCEL
NO. PARCELS IMPACTED	2	1	1	1	1
PARCEL SIZE	4.1 AC	5.6 AC	5.6 AC	4.8 AC	5.0 AC
WHOLE TAKE/PARTIAL TAKE/JOINT-USE POND	PARTIAL (2 PARCELS)	PARTIAL	PARTIAL	WHOLE	PARTIAL
LAND USE	UNDEVELOPED	UNDEVELOPED	UNDEVELOPED	COMMERCIAL	UNDEVELOPED
EST. COST	$9,037,100	$11,600,700	$11,265,100	$18,794,200	$15,525,900
DRAINAGE CONSIDERATIONS	• WILL REQUIRE AN EASEMENT TO CONVEY RUNOFF TO SITE AND IMPACT LOCATIONS	• WILL REQUIRE AN EASEMENT TO CONVEY RUNOFF TO SITE AND IMPACT LOCATIONS	• WILL REQUIRE AN EASEMENT TO CONVEY RUNOFF TO SITE AND IMPACT LOCATIONS	• WILL REQUIRE PIPING TO CONVEY RUNOFF TO 2 OF THE 3 IMPACT LOCATIONS	• WILL REQUIRE AN EASEMENT TO CONVEY RUNOFF TO SITE AND IMPACT LOCATIONS
FEMA FLOOD ZONE	NO IMPACTS	NO IMPACTS	NO IMPACTS	NO IMPACTS (SITE RECENTLY DEVELOPED)	NO IMPACTS
CONTAMINATION-HAZARDOUS MATERIALS	NO APPARENT INVOLVEMENT	NO APPARENT INVOLVEMENT	NO APPARENT INVOLVEMENT	NO APPARENT INVOLVEMENT	NO APPARENT INVOLVEMENT
UTILITIES	CONVEYANCE WILL CROSS FGT	CONVEYANCE WILL CROSS FGT	CONVEYANCE WILL CROSS FGT	NO SIGNIFCANT ISSUE IDENTIFIED	CONVEYANCE WILL CROSS FGT
THREATENED & ENDANGERED SPECIES	• POTENTIAL SAND SKINK HABITAT • POTENTIAL CARACARA HABITAT	• POTENTIAL SAND SKINK HABITAT • POTENTIAL CARACARA HABITAT	• POTENTIAL SAND SKINK HABITAT • POTENTIAL CARACARA HABITAT	• POTENTIAL SAND SKINK HABITAT	• POTENTIAL SAND SKINK HABITAT • POTENTIAL CARACARA HABITAT
WETLANDS OR PROTECTED UPLANDS	NO IMPACTS	NO IMPACTS	NO IMPACTS	NO IMPACTS	NO IMPACTS
CULTURAL RESOURCES INVOLVEMENT	LOW	TBD	TBD	TBD	TBD
CONSTRUCTION	• ADDITIONAL PIPING REQUIRED TO REACH FPC SITE & IMPACT LOCATIONS=3000'	• ADDITIONAL PIPING REQUIRED TO REACH FPC SITE & IMPACT LOCATIONS=2500'	• ADDITIONAL PIPING REQUIRED TO REACH FPC SITE & IMPACT LOCATIONS=2500'	• ADDITIONAL PIPING REQUIRED TO REACH FPC SITE & IMPACT LOCATIONS=900'	• ADDITIONAL PIPING REQUIRED TO REACH FPC SITE & IMPACT LOCATIONS=2400'
MAINTENANCE	NO SIGNIFICANT MAINTENANCE	NO SIGNIFICANT MAINTENANCE	NO SIGNIFICANT MAINTENANCE	NO SIGNIFICANT MAINTENANCE	NO SIGNIFICANT MAINTENANCE
AESTHETICS	N/A	N/A	N/A	N/A	N/A
OTHER	EASEMENT REQUIRED FOR CONVEYANCE AND ACCESS	EASEMENT REQUIRED FOR CONVEYANCE AND ACCESS	EASEMENT REQUIRED FOR CONVEYANCE AND ACCESS		EASEMENT REQUIRED FOR CONVEYANCE AND ACCESS
COMMENTS	FPC 1 , FPC 2 & FPC 3 SITES LOCATED ON SAME PARCEL	FPC 1 , FPC 2 & FPC 3 SITES LOCATED ON SAME PARCEL	FPC 1 , FPC 2 & FPC 3 SITES LOCATED ON SAME PARCEL		
PREFFERED ALTERNATIVE	SEE BASIN 3 & FPC SITE EVALUATION MATRIX. ANALYSIS ASSUMES ONLY 1 POND OR FPC SITE PER PARCEL FOR PREFERRED ALTERNATIVE, SO FPC SITES 1 & 5 CARRIED FORWARD BASED ON LOWEST EST. COSTS (FPC 1 HAS LOWEST EST. COST OF FPC SITES 1-3)				

BCC ENGINEERING, INC.				
PROJECT:	SR 535 FROM US 192 TO NORTH OF WORLD CENTER DRIVE			DATE
FPID:	437174-2	BY:	JAG	5/6/2024
		CHECKED:	JAF	5/16/2024
		REVISED:		

POND SITE EVALUATION MATRIX - BASIN 3 & FPC SITE

ALTERNATIVE	POND ALT 3A & FPC 1	POND ALT. 3C & FPC 5	
ALTERNATIVE DESCRIPTION	EXIST. POND 3-1, POND 3-2 & FPC 1	EXIST. POND 3-1, POND 3-4 & FPC 5	
DRAINAGE CONSIDERATIONS	INTERCONNECTED PONDS. POND 3-2 IS IN CLOSE PROXIMITY TO EXIST. POND 3-1. MOST HYDRAULICALLY FAVORABLE, PONDS ARE CLOSE TO ROADWAY LOW POINT.	INTERCONNECTED PONDS. POND 3-4 IS FARTHEST AWAY FROM EXIST. POND 3-1, LONGEST INTERCONNECTION REQUIRED. POND 3-4 FARTHEST AWAY FROM ROADWAY LOW POINT. WILL REQUIRE AN EASEMENT TO CONVEY RUNOFF TO POND 3-4 AND TO THE OUTFALL.	
FLOODPLAIN CONSIDERATIONS	EASEMENT REQUIRED FOR CONVEYANCE AND ACCESS	EASEMENT REQUIRED FOR CONVEYANCE AND ACCESS	
EST. POND COST	$15,974,000	$7,811,600	
EST. FPC COST	$9,037,100	$15,525,900	
EST. TOTAL COST	$25,011,100	$23,337,500	
PREFERRED ALTERNATIVE	PREFERRED		
COMMENTS	POND ALT 3A & FPC 1 HAVE LESS IMPACTS TO SR 535/SR 536 INTERSECTION WHEN COMPARED TO POND ALTE 3C & FPC 5. DRAINAGE MODIFICATIONS REQUIRED FOR POND ALT 3C WILL HAVE INCREASED IMPACTS TO EXIST. DRAINAGE SYSTEM, UTILITIES AND MAINTENANCE OF TRAFFIC OPERATIONS. THEREFORE, POND ALT 3A & FPC 1 IS CHOSEN AS THE PREFERRED ALTERNATIVE.		

Appendix E

Cultural Resource Assessment Survey

(CRAS) Excerpt

CULTURAL RESOURCE ASSESSMENT SURVEY FOR THE SR 535 IMPROVEMENTS FROM US 192 TO NORTH OF WORLD CENTER DRIVE, ORANGE AND OSCEOLA COUNTIES, FLORIDA

FINANCIAL MANAGEMENT NO. 437174-2-22-01
SEARCH PROJECT NO. T20065

PREPARED FOR

METRIC ENGINEERING, INC.
AND
FLORIDA DEPARTMENT OF TRANSPORTATION, DISTRICT 5
DELAND, FLORIDA

BY

SEARCH
February 2024

EXECUTIVE SUMMARY

This report presents the findings of a cultural resource assessment survey (CRAS) conducted in support of improvements to State Road 535 (Vineland Road) from US 192 to north of World Center Drive in Orange and Osceola Counties, Florida. The Florida Department of Transportation, District 5, is proposing improvements to SR 535 from West Irlo Bronson Memorial Highway (US 192) to north of World Center Drive. The project includes proposed six-lane widening, intersection improvements, lighting and signage updates, and the construction of retention ponds along the roadway. The roadway widening will occur within the existing right-of-way; no additional right-of-way is proposed. This project is federally funded.

To encompass the potential improvements, the defined archaeological area of potential effects includes the existing right-of-way where improvements are proposed. The architectural history APE included the existing right-of-way and was extended to the back or side property lines of parcels adjacent to the right-of-way or no more than 100 meters (328 feet) from the right-of-way line. Where ponds are proposed, the APE was defined to include the proposed pond footprints in addition to a 30.5-meter (100-foot) buffer of each pond. The archaeological survey was conducted within the construction footprint (i.e., the proposed pond footprints and existing right-of-way). In this document, the "APE" refers to the combined archaeological APE and architectural history APE.

The archaeological survey included the excavation of eight shovel tests and nine "no-dig" points; due to heavy modern development and buried utilities within the archaeological APE, most of the corridor was limited to pedestrian survey and surface inspection. No artifacts were recovered, and no archaeological sites or occurrences were identified within the APE. SEARCH recommends no further archaeological survey in support of the SR 535 project.

The architectural history survey resulted in the identification and evaluation of one newly recorded historic building at 8350 Lake Bryan Beach Boulevard (8OR11944). Resource 8OR11944 is recommended ineligible for the National Register of Historic Places (NRHP). The survey also recorded a new segment of the Florida Midland Railroad, a previously recorded resource in Orange and Osceola counties. It is recorded in Orange County as Resource 8OR10235 and in Osceola County as Resource 8OS02541. The State Historic Preservation Officer (SHPO) previously evaluated recorded segments of 8OR10235 and 8OS02541 outside the current APE as ineligible for the NRHP. Based on the results of the current architectural history survey and SHPO linear resource guidelines, the segment of 8OR10235/8OS0254 within the APE lacks significance and is recommended ineligible for listing in the NRHP.

No historic properties were identified within the APE. No further work is required.

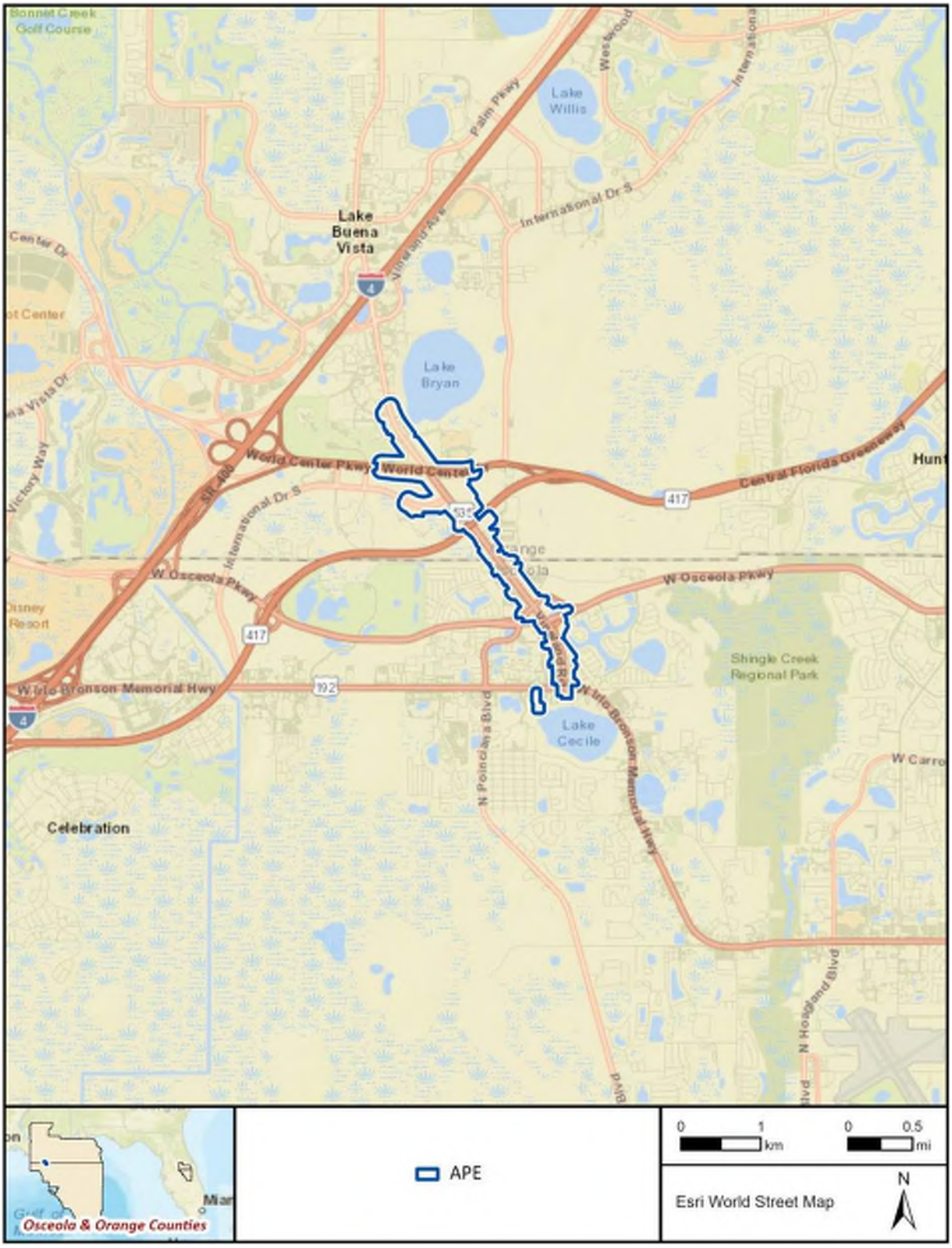


Figure 1. SR 535 project location, Orange and Osceola Counties, Florida.

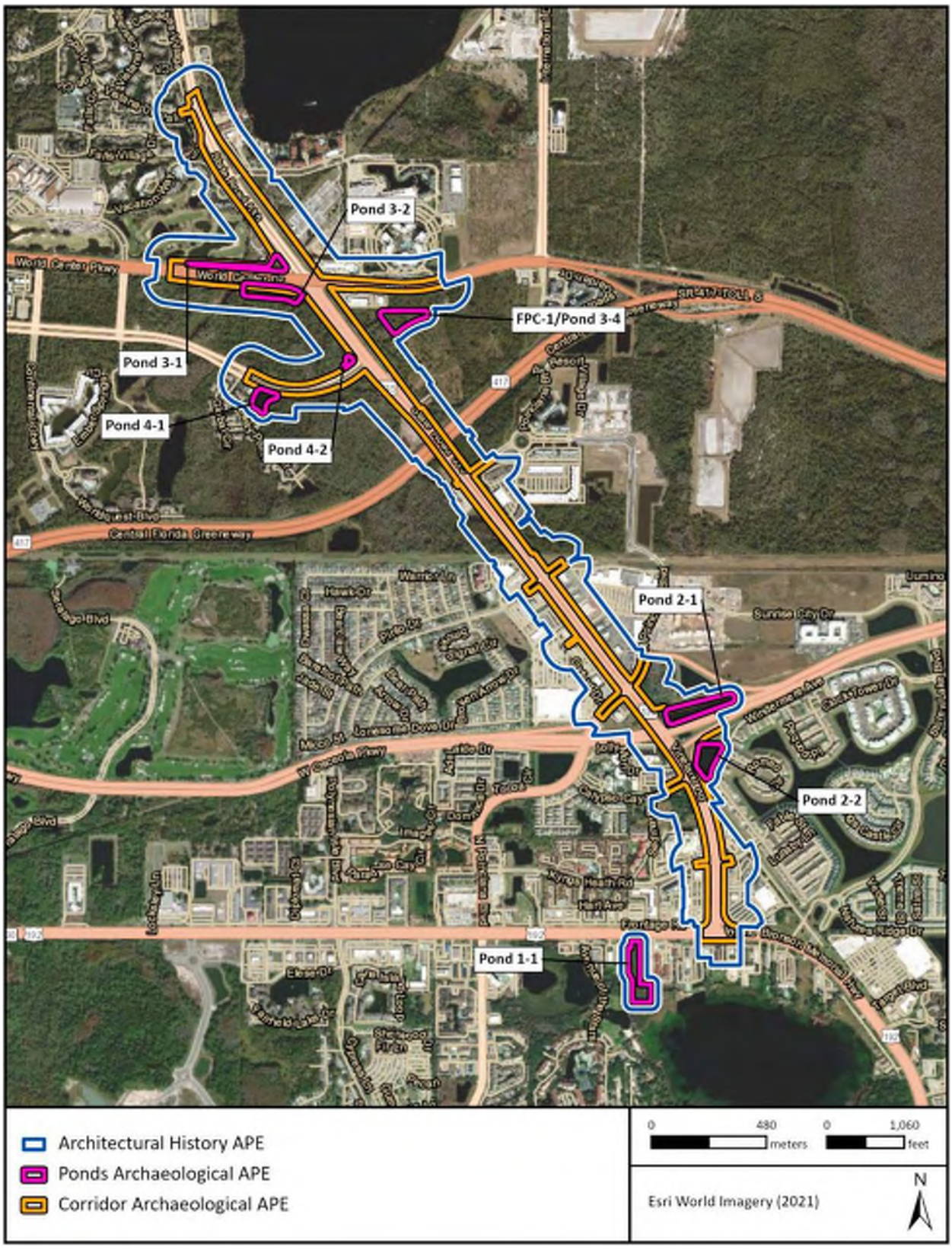
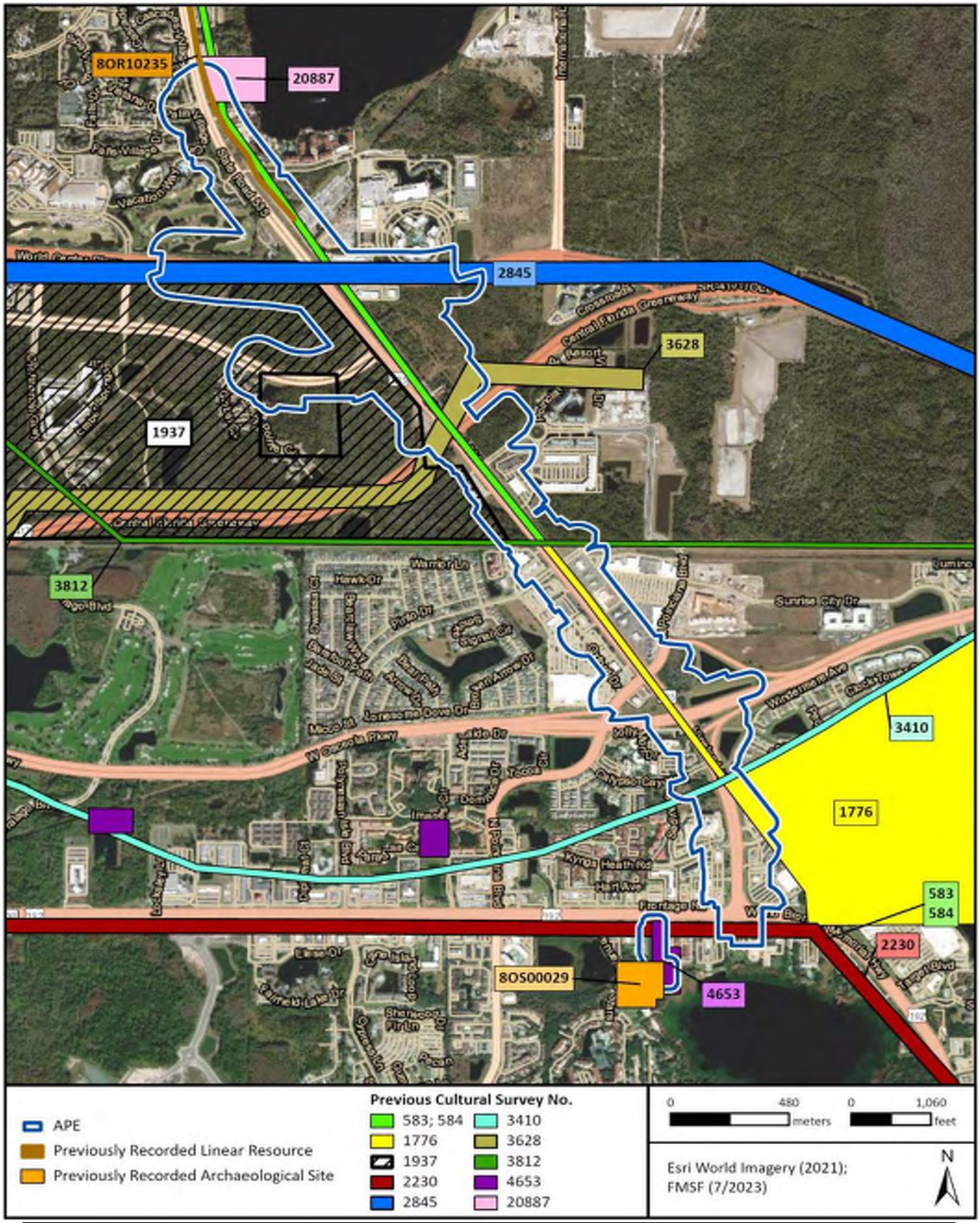


Figure 2. Location of the APE in Orange and Osceola Counties.


8OR10235
20887
2845
3628
1937
3812
3410
1776
583
584
2230
8OS00029
4653
Previous Cultural Survey No.
583; 584
1776
1937
2230
2845
3410
3628
3812
4653
20887
APE
Previously Recorded Linear Resource
Previously Recorded Archaeological Site
0
480
meters
0
1,060
feet
Esri World Imagery (2021);
FMSF (7/2023)
N

[redacted]

HISTORIC MAP AND AERIAL PHOTOGRAPH REVIEW

SEARCH examined historic maps and aerial photographs to identify past land use in the vicinity of the APE. The earliest detailed maps consulted were General Land Office (GLO) survey maps. Government land surveyors created GLO maps during the nineteenth century as part of the surveying, platting, and sale of public lands. In Florida, these maps characteristically show landscape features such as vegetation, bodies of water, roads, and Spanish land grants. The level of detail in GLO maps varies; some also depict structures, Native American villages, railroads, and agricultural fields. GLO maps of Florida Townships 24 and 25 South, Range 28 East, show no development within the APE (**Figure 5**) (GLO 1849a, 1849b).

No development is illustrated until 1890, when a northwest–southeast railroad is depicted intersected the APE on a map (Asher and Adams 1871; Johnson 1860; Leslie-Judge Company 1880; Norton 1890a, 1890b). On a map from 1900, two stops are labeled on the railroad in the vicinity of the APE (Rand McNally and Company 1900a, 1900b). In 1910, Atlantic Coast Line Railroad owned the tracks within the APE (C. S. Hammond and Company 1910a, 1910b). On a 1917 road map, no stops are labeled in or near the APE (Florida State Road Department [FSRD] 1917). General highway maps of Orange and Osceola Counties show roads on the present-day alignments of SR 535 and US 192 within the APE. The railroad remained within the APE east of SR 535 (FSRD 1935a, 1935b).

Aerial photographs taken in 1944 show several unimproved trails intersecting the APE, but they do not correspond to any present-day roads (**Figure 6**) (US Department of Agriculture [USDA] 1944).

By 1953, SR 535, US 192, and three unimproved roads existed within the APE. The railroad remained within the APE east of SR 535. One building was within the APE northwest of the intersection of SR 535 and US 192, south of an orchard (**Figure 7**) (US Geological Survey [USGS] 1953a, 1953b).

In 1965, at least 11 buildings were within the APE. A large orchard was within the APE west of SR 535 (**Figure 8**) (USDA 1965).

The railroad tracks were no longer within the APE in 1970. Eleven buildings and a substation were within the APE. Nine roads were within the APE, including SR 535 and US 192 (**Figure 9**) (USGS 1970a, 1970b).

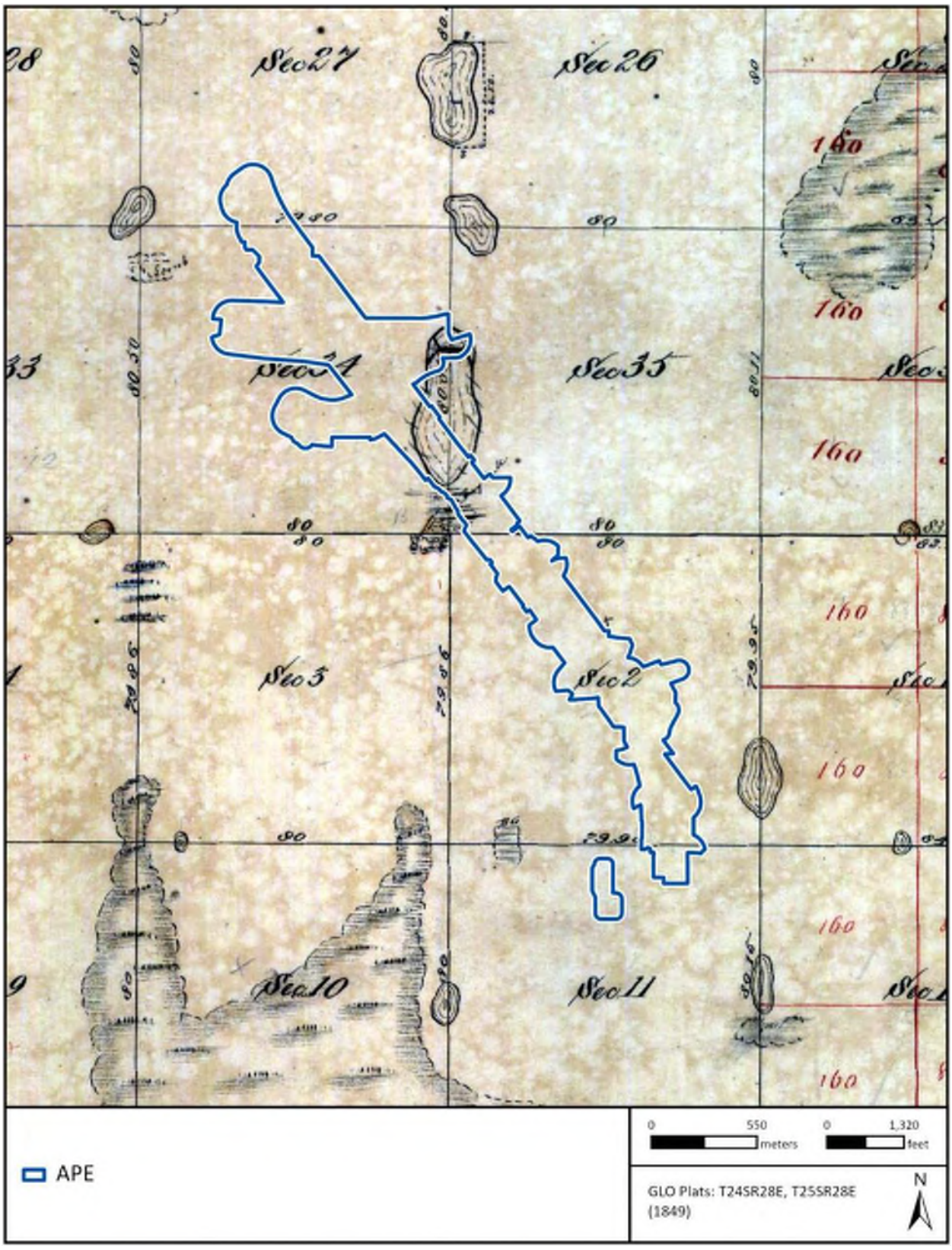


Figure 5. GLO survey map of Township 24 South, Range 28 East (GLO 1849).

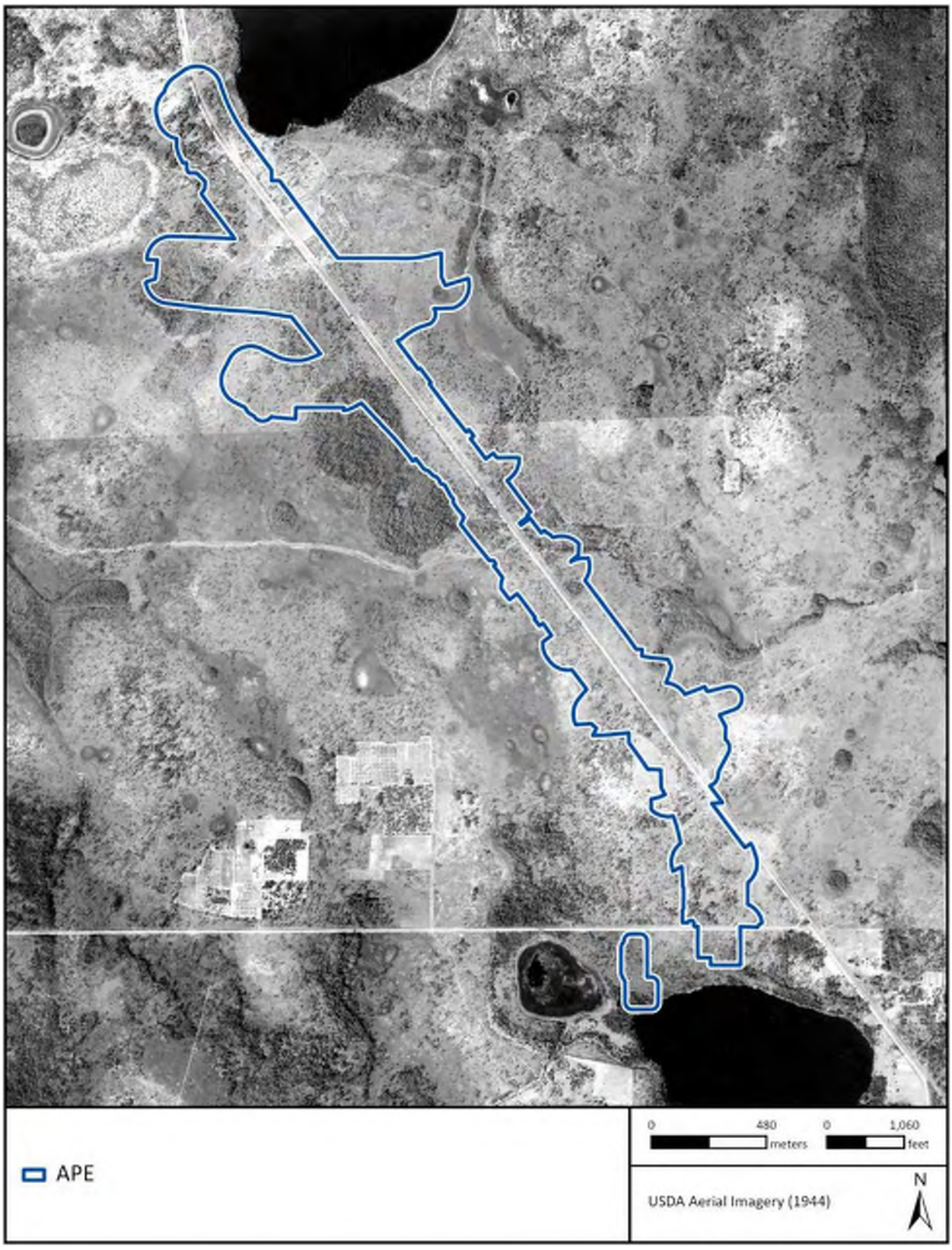


Figure 6. USDA aerial photograph of Orange and Osceola Counties, Florida (USDA 1944).

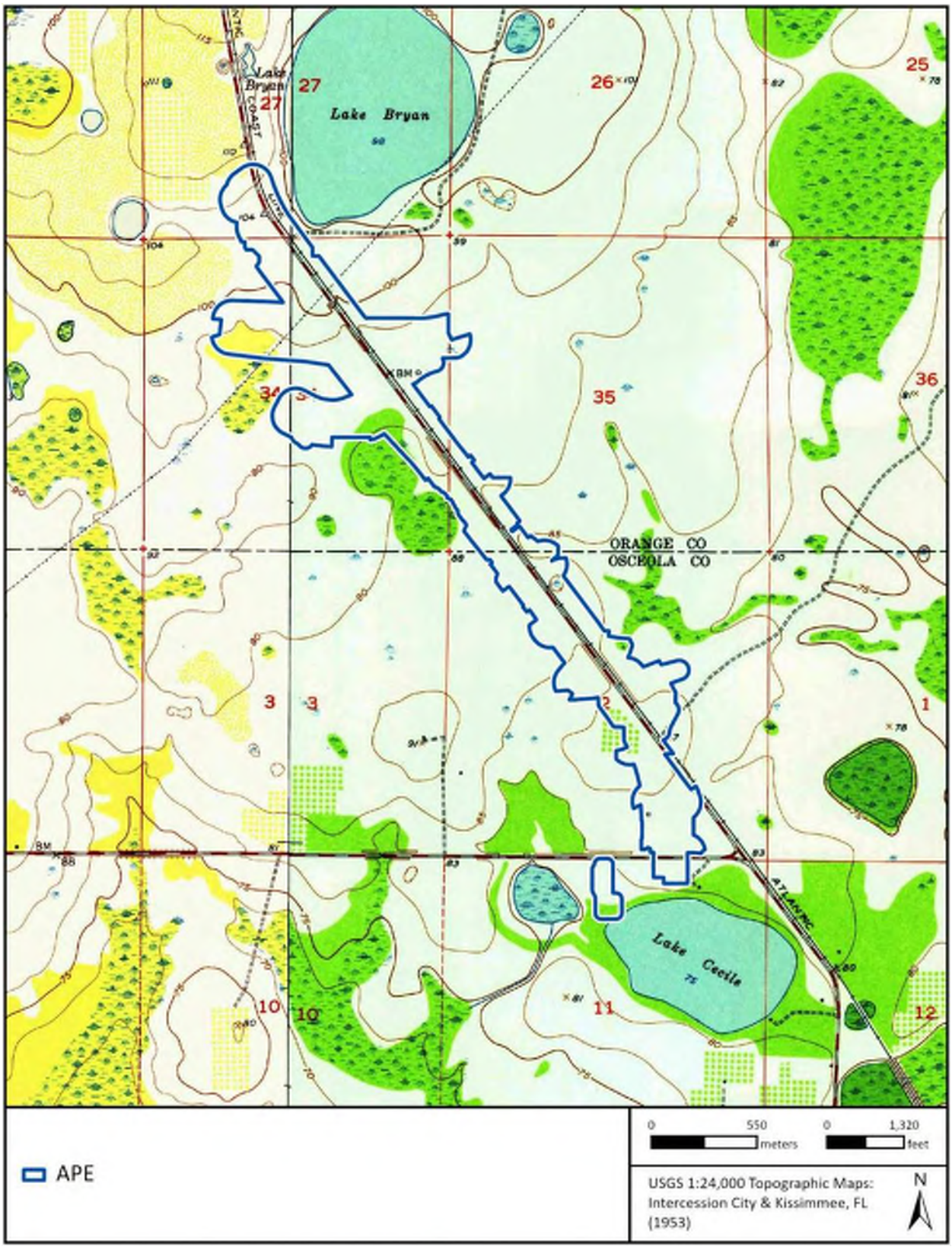


Figure 7. Intercession City and Kissimmee, Florida, USGS topographic map (USGS 1953).

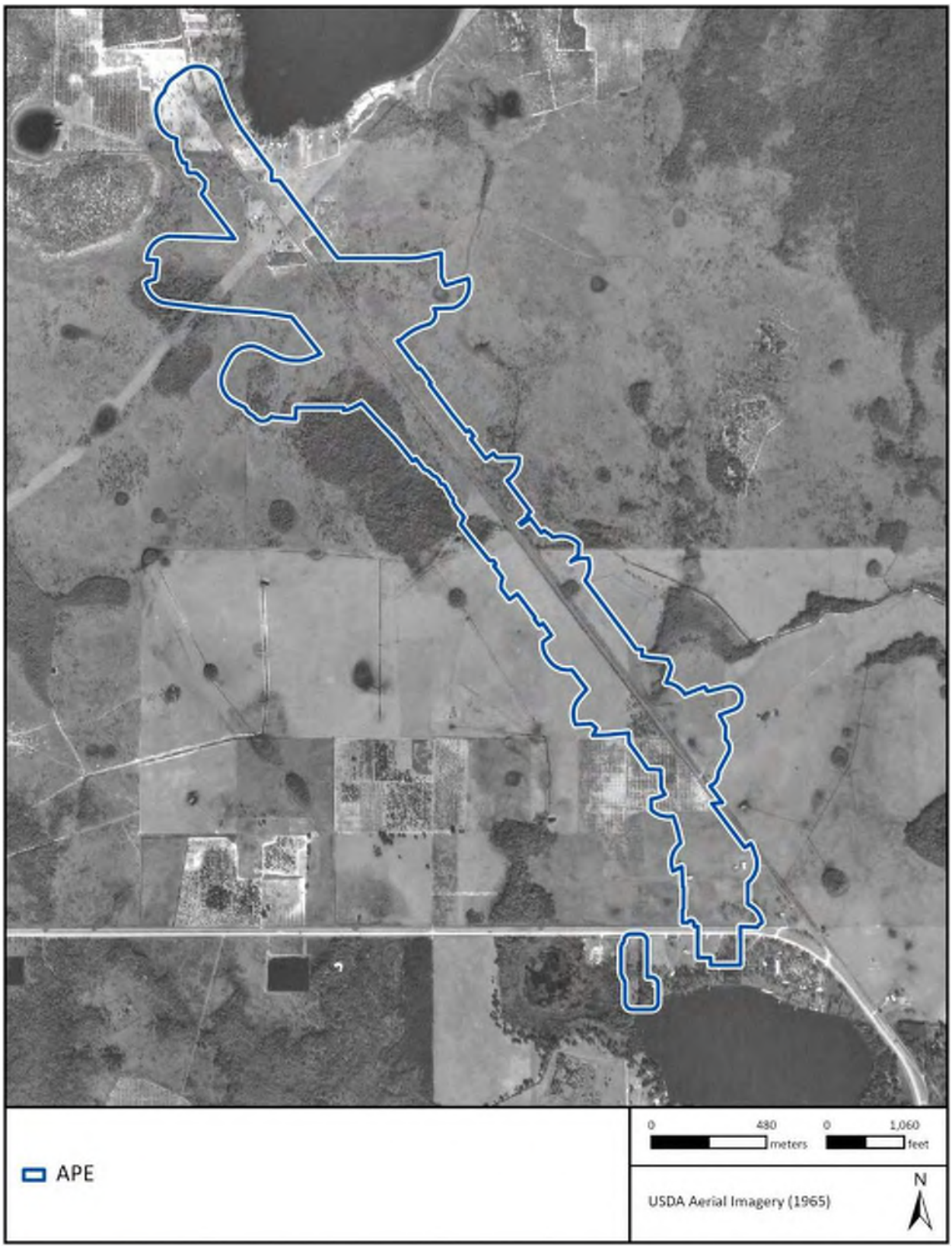


Figure 8. USDA aerial photograph of Orange and Osceola Counties, Florida (USDA 1965).

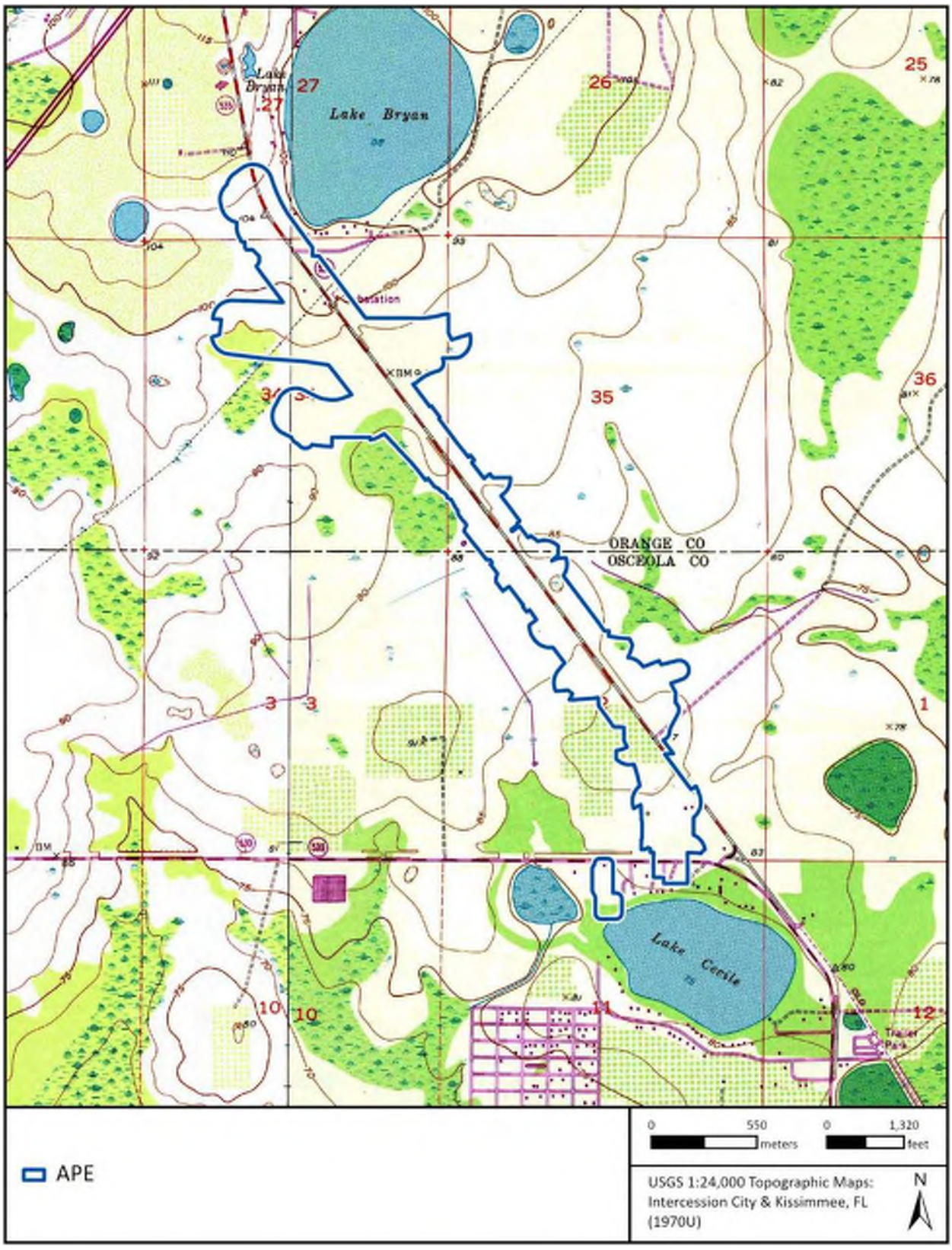


Figure 9. Intercession City & Kissimmee, Florida, USGS topographic map (USGS 1970).

Figure 10. Results of the archaeological survey, part 1.

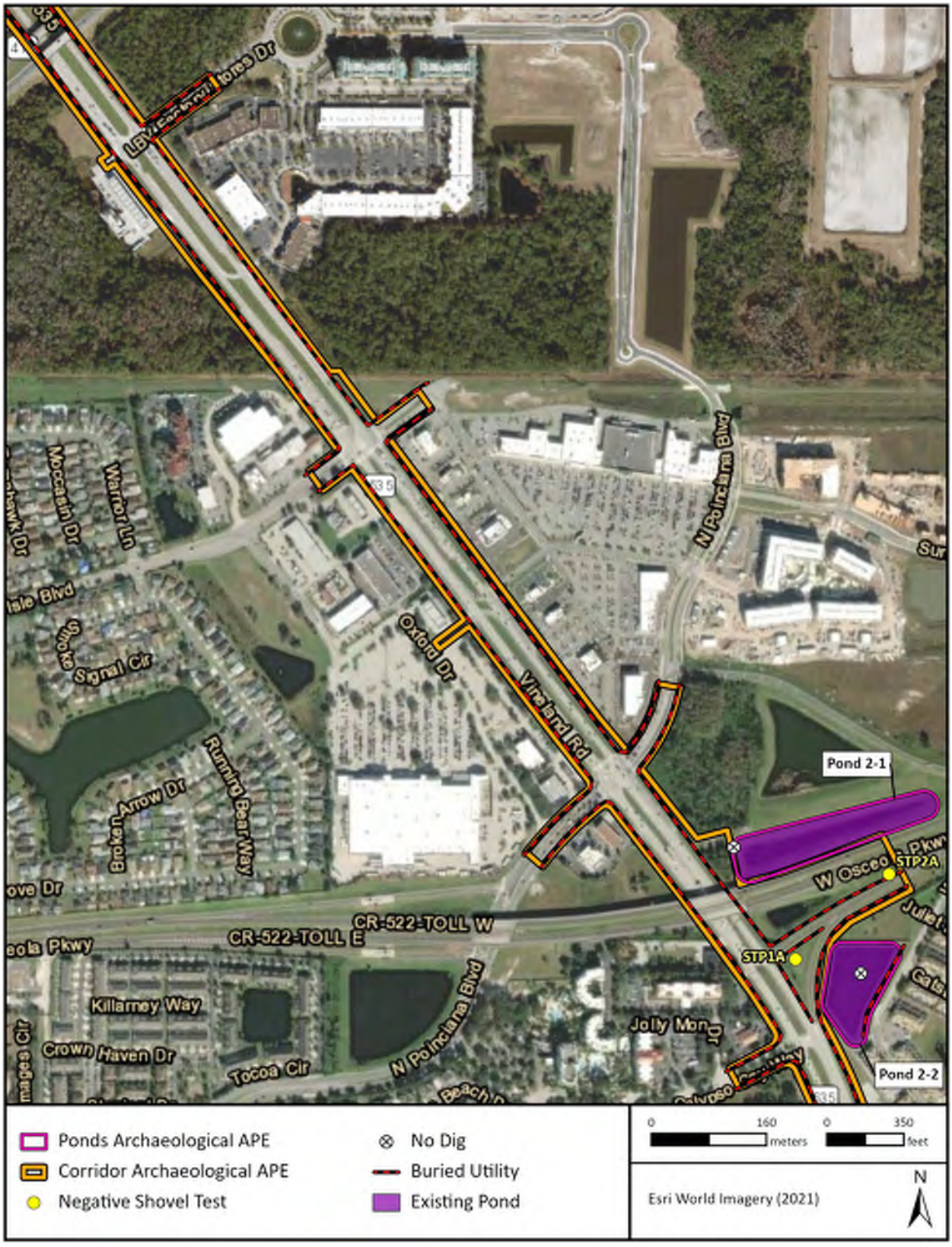


Figure 11. Results of the archaeological survey, part 2.

Figure 12. Results of the archaeological survey, part 3.

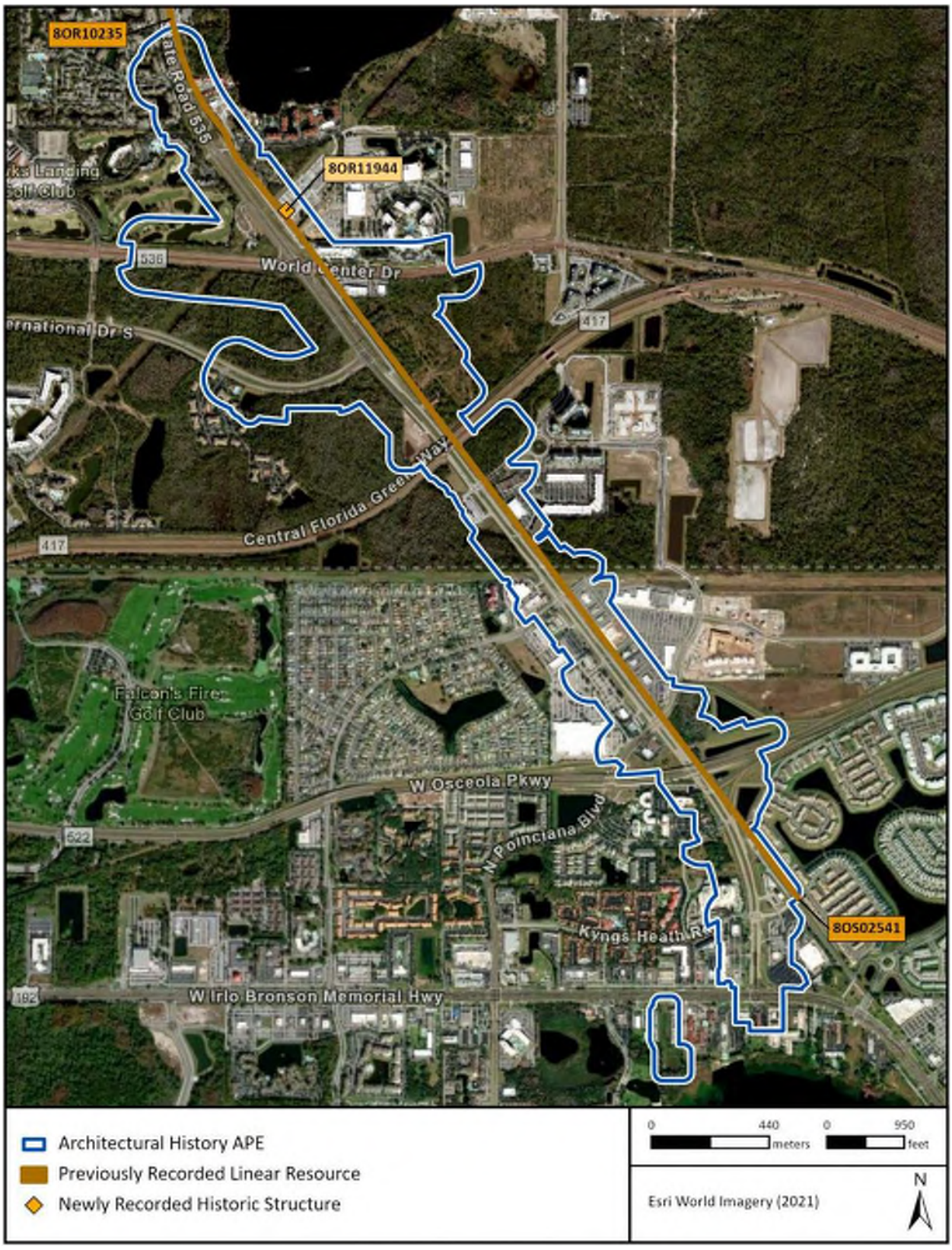


Figure 19. Historic resources in the APE.

NRHP EVALUATIONS

Linear Resources

Florida Midland Railroad (8OR10235/8OS02541)

The Florida Midland Railroad (8OR10235/8OS02541) is a previously recorded railroad corridor in Orange and Osceola Counties with all rails, ties, and ballast removed (**Figure 20**). Segments in both counties have been recommended ineligible by the SHPO (Dye and Roberts 2016; Matusik et al. 2019). Within the APE, 8OR10235 is within Sections 34 and 35 of Township 24 South, Range 28 East, as shown on the 2021 *Kissimmee, Fla.* USGS quadrangle map and within Section 27 of Township 24 South, Range 28 East, as shown on the 2021 *Intercession City, Fla.* USGS quadrangle map. Resource 8OS02541 is within Section 2 of Township 25 South, Range 28 East, as shown on the 2021 *Kissimmee, Fla.* USGS quadrangle map. The empty corridor in the APE travels northwest–southeast for 3.8 km (2.4 mi) parallel to SR 535.

Figure 20. Representative view of resource 8OR10235/8OS02541 in the APE, facing south.

The Florida Midland Railroad was formed in 1883 with the intent to construct a railroad line from Lake Jesup to Kissimmee. Legal conflicts with the South Florida Railroad resulted in the divergence of the line to a new route from Longwood to Apopka, Ocoee, Lake Butler, and finally Kissimmee. The failing line went into receivership in 1891, shortly after its completion, and foreclosed in 1896. It was then purchased by the Plant Investment Company and became part of the Plant System (Pettingill 1952:85). Upon Plant's death in 1899, the Plant System was purchased by the Atlantic Coast Line Railway in 1902 (Johnston and Mattick 2001). In 1967, the Atlantic Coast Line Railway and Seaboard Air Line merged to form the Seaboard Coast Line (Wrinn 2012). The segment of the railroad within the APE was abandoned by 1972, as evidenced by USGS topographic maps (Historic Aerials 2019).

Assessment

Resource 8OR10235/8OS02541 was evaluated based on the SHPO Historic Linear Resource Guide for newly recorded segments of a previously recorded ineligible historic linear resources (Florida SHPO 2022:3,4). All previously recorded segments of 8OR10235/8OS02541 were evaluated as ineligible. SEARCH found that the newly recorded segments within the APE are the same as those previously recorded and therefore do not change the significance of the resource. Per SHPO

guidance, there is no need for an assessment or effects evaluation, and 8OR10235/8OS02541 remains ineligible for the NRHP.

Buildings

8350 Lake Bryan Beach Boulevard (8OR11944)

Resource 8OR11944 is a newly recorded ca. 1972 Industrial Vernacular building at 8350 Lake Bryan Beach Boulevard (**Figure 21**). The resource is in Section 34 of Township 24 South, Range 28 East, as shown on the 2021 *Kissimmee, Fla.* USGS quadrangle map. The one-story concrete-block building has a rectangular plan and rests on a poured concrete slab foundation. The building's entrance is a metal door on the southeast façade. The building has a flat roof and no windows. The building is attached via a hyphen to a similar concrete-block building built in 2019. Buildings erected for commercial and industrial use characterize the Industrial Vernacular style. Steel and wood framing members were used in construction. Wood, brick, and steel exterior fabrics sheath the buildings, with steel having become more prevalent during the twentieth century. There are usually no predominant stylistic details, as the buildings "responded to the functional needs of the operations they housed and seldom were influenced by design innovations or stylistic movements" (Ochsner 2014:353). Industrial Vernacular buildings are typically found in Florida's citrus, phosphate, railroad, and, as in this case, energy industries.

Figure 21. Resource 8OR11944, facing north.

Assessment

Resource 8OR11944 is a twentieth-century Industrial Vernacular building. SEARCH recommends the resource is not significant under Criterion A because it is not indicative of a particular era and is not associated with any significant period, event, or theme. SEARCH recommends the resource is not significant under Criterion B because it lacks association with any person(s) significant in history. SEARCH recommends the resource is not significant under Criterion C due to its lack of architectural distinction. SEARCH recommends the resource is not significant under Criterion D because it lacks the potential to yield further information of historical importance. Therefore, SEARCH recommends 8OR11944 lacks the minimum criteria for NRHP inclusion, either individually or as a contributing resource to a historic district.

CONCLUSION AND RECOMMENDATIONS

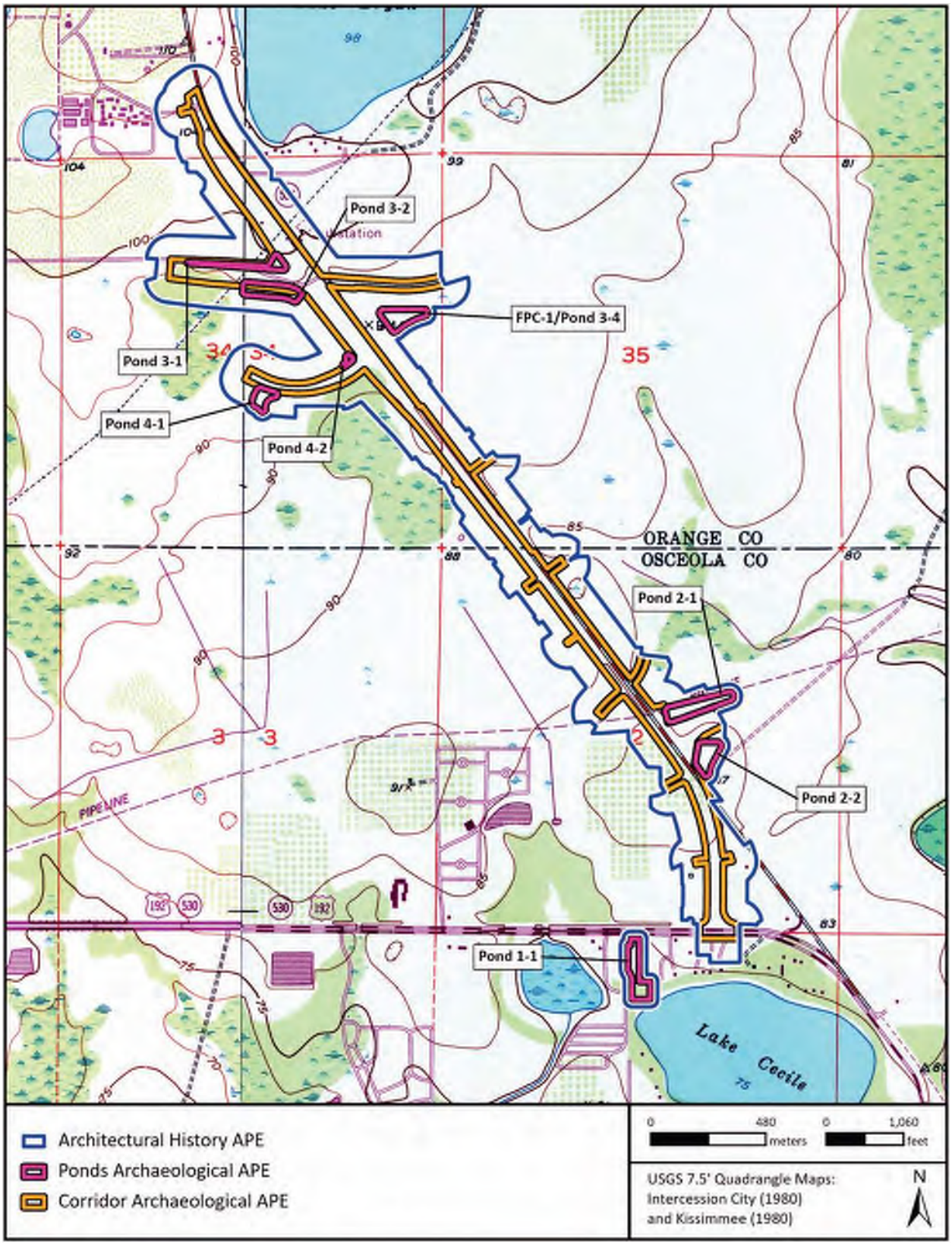
This report presents the findings of a Phase 1 CRAS conducted in support of improvements to SR 535 (Vineland Road) in Orange and Osceola Counties, Florida. FDOT, District 5, is proposing improvements such as six-lane widening, intersection improvements, lighting and signage updates, and the construction of ponds adjacent to the roadway. The total project area comprises 5.2 km (3.3 mi) of existing road corridor and eight proposed pond locations totaling approximately 16.6 ha (41 ac).

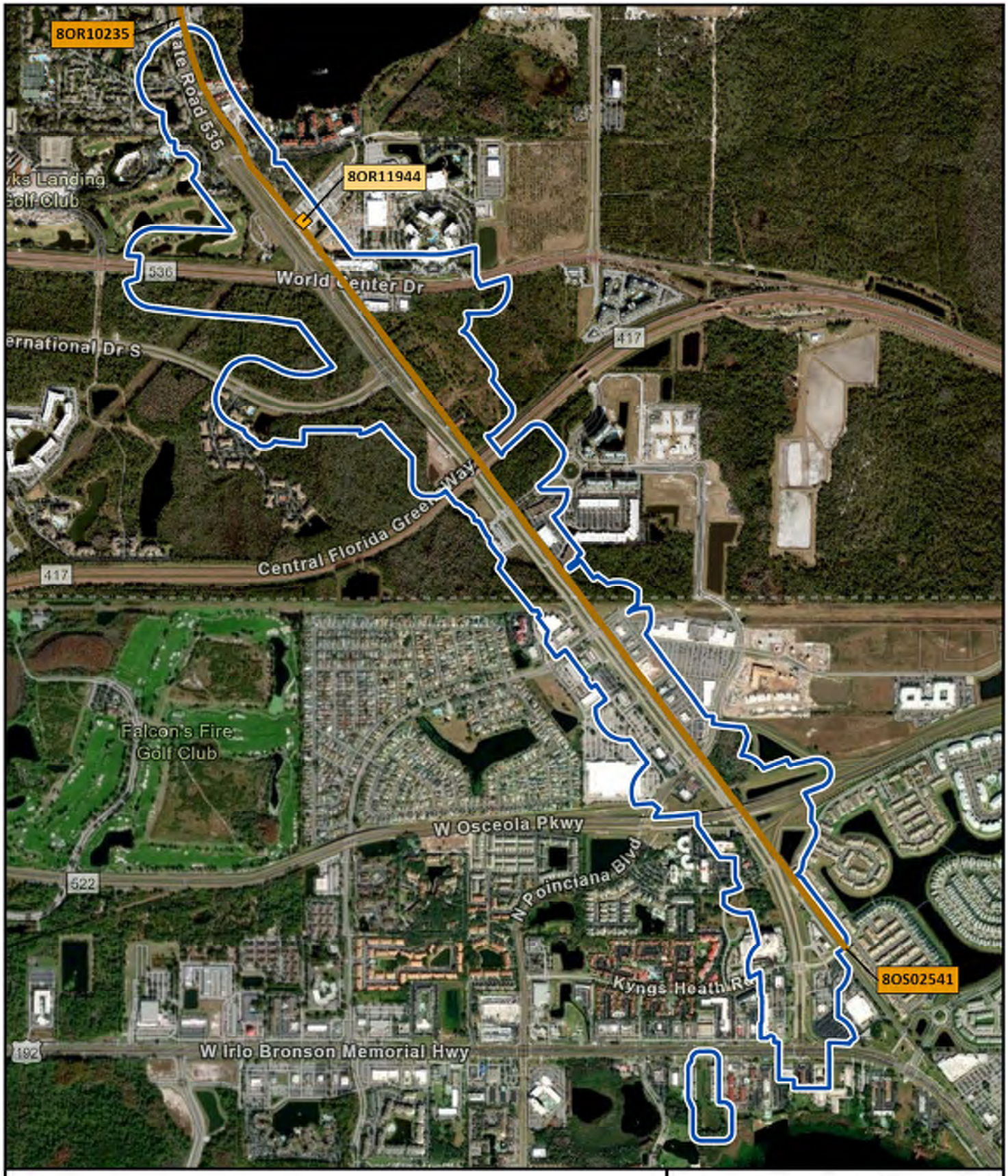
To encompass the proposed improvements, the archaeological APE was defined to include the existing SR 535 right-of-way and US 192 to north of World Center Drive. The architectural history APE for the corridor includes the limits of the archaeological APE and a buffer to the back or side property lines of parcels adjacent to the right-of-way or no more than 100 m (328 ft) from the right-of-way line. The architectural history APE for the pond footprints includes the limits of the archaeological APE and a buffer of 30.5 m (100 ft) from the footprint boundary.

The archaeological survey included pedestrian survey and the excavation of 17 shovel tests. There are several areas throughout the corridor and pond footprints where subsurface testing was not possible due to buried utilities, modern disturbances, and wetland conditions. SEARCH recovered no artifacts and identified no sites or occurrences within the archaeological APE. No evidence of the previously recorded site 8OS0029 was identified within the APE. SEARCH recommends no further archaeological survey in support of the proposed SR 535 Improvements project.

The architectural history survey resulted in the identification and evaluation of one newly recorded historic building at 8350 Lake Bryan Beach Boulevard (8OR11944), a newly recorded segment of a previously recorded linear resource that extends into two counties (8OR10235 and 8OS02541). SEARCH recommends resource 8OR11944 is ineligible for the NRHP. Based on the results of the current architectural history survey and SHPO linear resource guidelines, the segment of 8OR10235/8OS0254 within the APE lacks significance and is recommended ineligible for listing in the NRHP.

No historic properties were identified within the APE. No further work is required.


Pond 3-2
FPC-1/Pond 3-4
Pond 3-1
Pond 4-1
Pond 4-2
ORANGE CO
OSCEOLA CO
Pond 2-1
Pond 2-2
Pond 1-1
Lake Cecile
PIPE LINE
Architectural History APE
Ponds Archaeological APE
Corridor Archaeological APE
0 480 meters
0 1,060 feet
USGS 7.5' Quadrangle Maps:
Intercession City (1980)
and Kissimmee (1980)
N


8OR10235
8OR11944
8OS02541
Central Florida Greeneway
World Center Dr
W Osceola Pkwy
W Irlo Bronson Memorial Hwy
N Poinciana Blvd
Falcon's Fire Golf Club
536
417
522
192
Architectural History APE
Previously Recorded Linear Resource
Newly Recorded Historic Structure
0 440 meters
0 950 feet
Esri World Imagery (2021)
N

Appendix F

Contamination Screening Evaluation Report (CSER) Excerpt

Florida Department of Transportation

Draft Contamination Screening Evaluation Report

SR 535 PD&E Study

From US 192 to North of World Center Drive (SR 536)

Osceola and Orange Counties, Florida

Financial Project ID Number: 437174-2-22-01

ETDM Number: 14325

Federal Aid Number: N/A

February 2024

The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being, or have been, carried out by FDOT pursuant to 23 U.S.C. 327 and a Memorandum of Understanding dated 05/26/2022 and executed by FHWA and FDOT.

7.0 POTENTIAL PROJECT IMPACTS

7.1 Potentially Contaminated Sites

A total of 19 sites of potential contamination risk were identified, including 2 High Risk, 8 Medium Risk, and 9 Low Risk sites (**Table 7-1**). Information on each site is summarized in **Table 7-2** and locations are shown in **Figures 7-1** and **7-2**. Individual site descriptions including field observations and a summary of available documentation are provided in the text below. **Appendix A** contains site documentation related to each Medium and High risk site. Photographs of each Medium and High Risk site are provided in **Appendix B**.

Table 7-1: Risk Rating Summary

Risk Rating	Number of Sites	Number of Sites proposed for ROW aquisition
Low	9	0
Medium	8	0
High	2	1

Table 7-2: Site Information

Site No.	Facility Name	Address	Facility ID (FDEP/RCRA)	Source/Databases	Site Descriptions	Concerns	Approximate Distance from Project	Risk Rating
1	7-Eleven Food Store #27584	2975 Vineland Rd	8944621, Discharge ID: 9311	STCM; PCTS	Active Gas Station	Petroleum Products	Adjacent	Medium
2	Shell-Southbridge #285	3148 Vineland Rd	9063981, Discharge ID: 59807	STCM; PCTS	Active Gas Station	Petroleum Products	Adjacent	Medium
3	RMA	3490 Polynesian Isle Blvd	8945275, Discharge ID: 59075	STCM; PCTS	Former Gas Station	Petroleum Products	Adjacent	Medium
4	Central FL Pipeline-Release	Hwy 535 & Polynesian Isle Blvd	9800541, Discharge ID: 50141	STCM; PCTS	Pipeline discharge site	Petroleum Products	Adjacent	Low
5	7-Eleven Food Store #29775	8250 World Center Dr	9201333, Discharge ID: 57943	PCTS, FDEP Cleanup	Active Gas Station	Petroleum Products	Adjacent	High
6	Progress Energy SARAP Lake Bryan Substation	8350 Lake Bryan Beach Blvd	122410, ERIC ID: ERIC_12781	ERIC Waste Cleanup	Florida Power Corporation Substation	Petroleum Products	Adjacent	Low
7	Daneta LLC	13725 SR 535	9808007, Discharge ID: 60792	STCM; PCTS	Former Gas Station	Petroleum Products	Adjacent	High
8	Speedway #6434	3270 Vineland Rd	9803008	STCM; PCTS	Active Gas Station	Petroleum Products	Within proposed ROW	Medium
9	Publix Super Market #351	2915 Vineland Rd	9810287	STCM	Former non-retail fuel user	Petroleum Products	500 ft > east of project	Low
10	Embassy Suites Orlando-LK Buena Vista South	4955 Kyngs Heath Rd	9813192	STCM	Non-retail fuel user	Petroleum Products	Adjacent	Low
11	W Kissimmee Central Office	3080 Vineland Rd	8627084	STCM	Non-retail fuel user	Petroleum Products	Adjacent	Low
12	Wawa Food Market #5116	3140 Vineland Rd	9813385	STCM	Active Gas Station	Petroleum Products	Adjacent	Medium
13	Murphy USA #7190	3256 Vineland Rd	9807115	STCM	Active Gas Station	Petroleum Products	Adjacent	Medium
14	Publix Super Market #1607	3221 Vineland Rd	9815653	STCM	Non-retail fuel user	Petroleum Products	500 ft > east of project	Low
15	Racetrac #2305	15570 Apopka Vineland Rd	9813548	STCM	Active Gas Station	Petroleum Products	Adjacent	Medium

16	Orange Co Utility – PS SW #3597	14344 Hwy 535	9401271	STCM	Pump Station	Petroleum Products	Adjacent	Low
17	Wal-Mart Supercenter #5420	3250 Vineland Rd	9807198	STCM	Small AST	Flammable Material	500 ft > west of project	Low
18	Rebel #861	7900 World Center Dr	9808444	STCM	Active Gas Station	Petroleum Products	500 ft > east of project	Medium
19	Hawkeye Heli-Tours LLC	5071 W Irlo Bronson Hwy	9814492	STCM	Non-retail fuel user	Petroleum Products	500 ft > west of project	Low

Figure 7.1 Contaminated Sites in Orange County Project Area

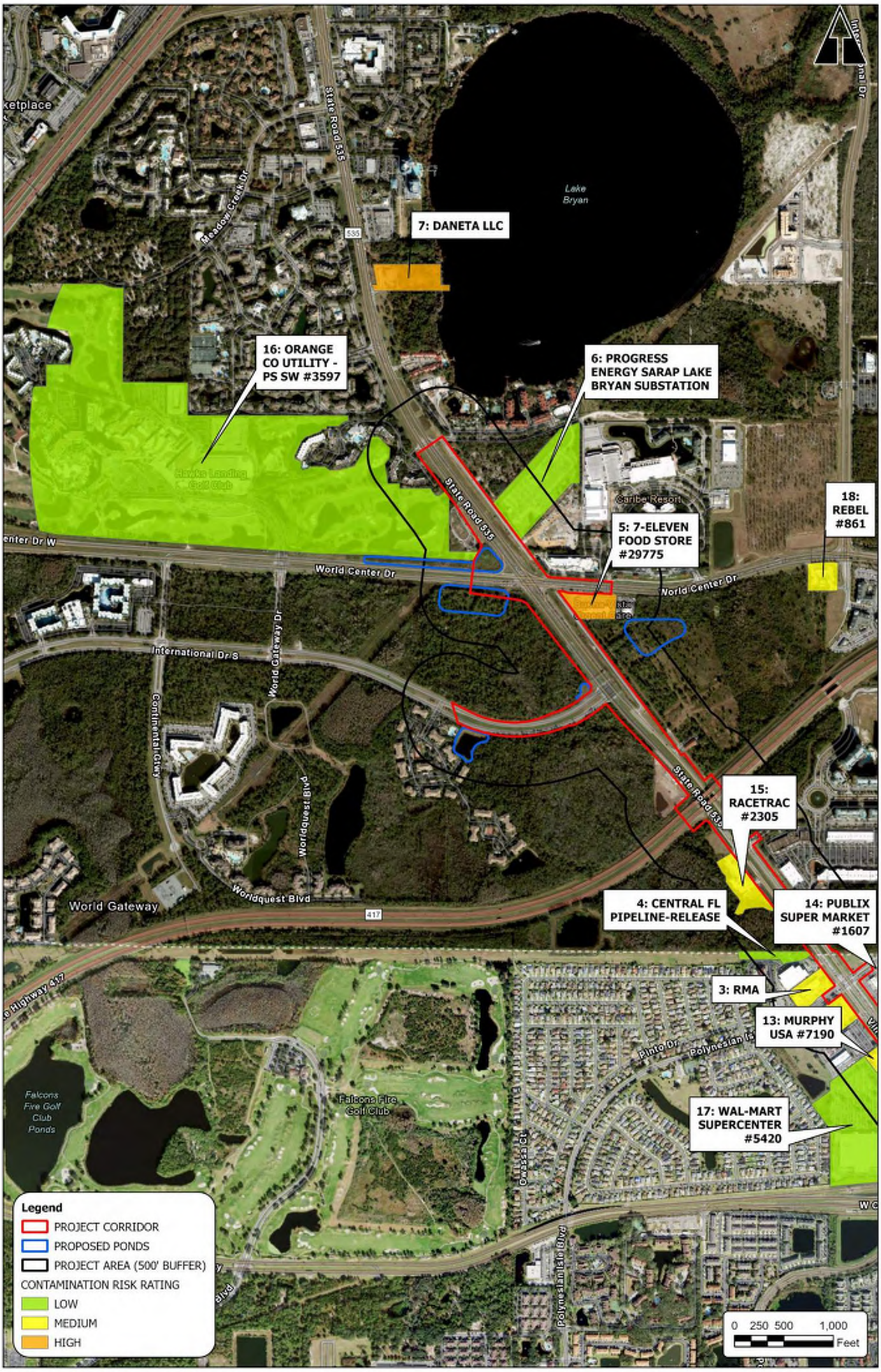


Figure 7.2 Contaminated Sites in Osceola County Project Area

7.2 Individual Site Summaries

Site 1: 7-Eleven Food Store #27584
Address: 2975 Vineland Rd, Lake Mary, FL 32746
Facility ID: 8944621, Discharge ID: 9311
Database: Petroleum Contamination Monitoring (PCTS) Discharges
Summary: This site is an active 7-Eleven food store and gas station on the east side of SR 535, approximately 4,100 feet south of the Osceola County line. According to an FDEP tank registration form, four 10,000-gallon underground storage tanks (USTs) for unleaded gasoline were installed in January of 1988. A Discharge Reporting Form was filed in June of 1991 describing an accidental discharge of an unknown quantity of unleaded gasoline. In February of 2006, the original four USTs were removed and replaced with two more 10,000-gallon USTs. The most recent FDEP inspection report from January of 2021 stated this site is in compliance. Since this site is an active gas station with a history of discharge, it is assigned a risk rating of Medium.

Site 2: Shell-Southbridge #285
Address: 3148 Vineland Rd, Kissimmee, FL 34746
Facility ID: 9063981, Discharge ID: 59807
Database: Petroleum Contamination Monitoring (PCTS) Discharges
Summary: This site is an active gas station adjacent to the project area, west of SR 535 and immediately north of N Poinciana Blvd. According to an FDEP tank registration form, three 10,000-gallon USTs storing unleaded gasoline were installed in November of 1990. A Tank Closure Assessment Report from June 28, 2010 noted the discovery of petroleum product groundwater contamination. As a result, a Natural Attenuation Monitoring Program (NAM) was created and implemented in October of 2011. In March of 2015, a Site Rehabilitation Completion Order confirmed rehabilitation was complete and a No Further Action Proposal (NFAP) was submitted. The UST with history of discharge was closed in place in September of 2019. The most recent FDEP inspection report from April of 2022 stated this site is in compliance. Since this site is an active gas station with a history of discharge, it is assigned a risk rating of Medium.

Site 3: RMA
Address: 3490 Polynesian Isle Blvd, Kissimmee, FL 34746
Facility ID: 8945275, Discharge ID: 59075
Database: Petroleum Contamination Monitoring (PCTS) Discharges
Summary: This site was formerly a convenience store and gas station and is located adjacent to the project area approximately 440 feet south of the Osceola County line and just west of SR 535. According to an FDEP tank registration form, three 10,000-gallon USTs storing unleaded gasoline were installed in October of 1989. An FDEP inspection report from May of 2009 noted a damaged spill bucket which could cause a potential discharge or release. As a result, another inspection was conducted to begin closure for these three 10,000-gallon USTs in December of 2010. A Remedial Action Plan (RAP) was developed and implemented in September of 2012 as a result of the previous discharge. The FDEP reviewed the Post Active Remediation Monitoring Annual Report – No Further Action Proposal dated April 8, 2016 and concluded that site cleanup

objectives have been met. Because this site was a former gas station with a history of discharge, it is assigned a risk rating of Medium.

Site 4: Central FL Pipeline-Release
Address: Hwy 535 & Polynesian Isle Blvd, Kissimmee, FL 32831
Facility ID: 9800541, Discharge ID: 50141
Database: Petroleum Contamination Monitoring (PCTS) Discharges
Summary: This site is a discharge site from the Central Florida Pipeline approximately 100 yards north of Polynesian Isle Blvd. An accidental discharge from a valve gasket in February of 1998 released approximately 400 gallons of unleaded gasoline into the soil. As a result, a Source Removal/Limited Site Assessment was initiated in February of 1998 and finalized in September of 1998. An IRA was completed in March of 1998 and approximately 338 tons of excessively contaminated soils were removed and 41,856 gallons of free product mixed with groundwater was collected. This discharge was granted No Further Action Status October 12, 1998. Because this site has one discharge that was remediated and granted No Further Action Status, it is assigned a risk rating of Low.

Site 5: 7-Eleven Food Store #29775
Address: C, Orlando, FL 32821
Facility ID: 9201333, Discharge ID: 57943
Database: Petroleum Contamination Monitoring (PCTS) Discharges
Summary: This site is an active gas station located immediately south of World Center Drive, just east of the intersection with SR 535. This facility contains three 10,000-gallon USTs that were installed in 1992. In June of 2007, an accidental discharge of an unknown amount of gasoline was reported. A Site Assessment Report from August of 2008 confirmed groundwater contamination exists on the property, but it did not extend beyond the property boundary, the extent of groundwater contamination did not exceed 1/4 acre, and the groundwater contamination was not migrating. Consequently, a Natural Attenuation Monitoring (NAM) Plan was submitted in October of 2008. FDEP issued a Declaration of Restrictive Covenant in October of 2020 for groundwater use restriction. Because of this discharge, restrictive covenant, and site history as a gas station, this site is assigned a risk rating of High.

Site 6: Progress Energy SARAP Lake Bryan Substation
Address: 8350 Lake Bryan Beach Blvd, Buena Vista, FL 32821
Facility ID: 122410, ERIC ID: ERIC_12781
Database: ERIC Waste Cleanup
Summary: This site is a Florida Power Corporation (FPC) substation located north of World Center Drive and just east of SR 535. A Preliminary Contamination Assessment Report (PCAR) was submitted in August of 2002 after FDEP conducted site inspections at several FPC substations and contamination concerns were documented. Nine soil samples were collected from five locations at the site. The laboratory results indicated various contaminants were detected in the soil, but none of the detected concentrations exceed Residential or Industrial Cleanup Target Levels. An FDEP letter from January of 2013 issued this site a No Further Action and Site Rehabilitation Completion Order. Because the contaminants did not exceed Residential or

Appendix G

Natural Resources Evaluation (NRE) Excerpt

SR 535 PD&E Study

Natural Resources Evaluation Report

From US 192 to North of World Center Drive (SR 536)

Orange and Osceola Counties, Florida

Contract CA770

FM Number: 437174-2

FDOT

District Five

Author

Metric Engineering, Inc.

CA #2294

Date of Publication

February 2023

The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being, or have been, carried out by the Florida Department of Transportation (FDOT) pursuant to 23 U.S.C. §327 and a Memorandum of Understanding dated December 14, 2016, and executed by the Federal Highway Administration and FDOT.

EXECUTIVE SUMMARY

This Project Development and Environment Study evaluates the potential roadway improvements along a 2.2 mile segment of State Road 535 (SR 535), a four-lane divided minor arterial facility located within unincorporated Osceola and Orange Counties in central Florida. SR 535 is known as Vineland Road in Osceola County and Kissimmee-Vineland Road in Orange County. The proposed improvements are needed to address serious existing and projected capacity and safety deficiencies prevalent within the study corridor. This document presents the existing natural resources in the project area and the potential impacts from the Preferred Alternative on protected species and wetlands.

This project was evaluated for impacts to protected plant and animal species and their habitats in accordance with the FDOT's *PD&E Manual, Part 2, Protected Species and Habitat,* which incorporates the requirements of the National Environmental Policy Act (NEPA) and related federal and state laws. Federal and state listed species with potential to occur in the project corridor were identified through research and coordination with US Fish and Wildlife Service, and the Florida Fish and Wildlife Conservation Commission. There is no Critical Habitat present within the project area. Field investigations of the project area were also conducted on multiple days and in different seasons to evaluate the potential presence of protected species and habitats. No adverse impacts are anticipated to any listed species from the Preferred Alternative, and protected species that may occur in the project area are shown in **Table ES-1** along with effect determinations.

This project was evaluated for impacts to wetlands and other surface waters in accordance with FDOT's *PD&E Manual, Part 2, Wetlands and Other Surface Waters,* which incorporates the requirements of the National Environmental Policy Act (NEPA) and related federal and state laws. There would be no direct impacts to wetlands or other surface waters under the Preferred Alternative.

Under operating agreement with the Florida Department of Environmental Protection, the SFWMD maintains state jurisdiction for Environmental Resource Permit reviews under 62-330 FAC for roadway and transportation projects. SFWMD will coordinate any required Sovereign Submerged Lands easement or lease from the Florida Department of Environmental Protection Bureau of State Lands as part of the ERP permitting process, if necessary.

There are no Federally jurisdictional wetlands that will be impacted under the Preferred Alternative. Therefore, no Section 404 permit is anticipated.

Table ES-1 Species Effect Determinations Under Preferred Alternative

Common Name	Scientific Name	Federal Status	State Status	Occurrence Potential in Project Area	Effect Determination
Fauna Species					
Audubon's crested caracara	Polyborus plancus audubonii	FT	-	Low	No Effect
Blue-tail mole skink	Eumeces egregius lividus	FT	-	Moderate	No Effect
Eastern black rail	Laterallus jamaicensis ssp. jamaicensis	FT	-	Low	No Effect
Eastern indigo snake	Drymarchon corais couperi	FT	-	Low	NLAA
Everglade snail kite	Rostrhamus sociabilis plumbeus	FE	-	Low	No Effect
Florida burrowing owl	Athene cunicularia	-	ST	Low	NAEA
Florida grasshopper sparrow	Ammodramus savannarum floridanus	FE	-	Low	No Effect
Florida pine snake	Pituophis melanoleucus mugitus	-	ST	Low	NAEA
Florida sandhill crane	Grus canadensis pratensis	-	ST	Low	NAEA
Florida sand skink	Neoseps reynoldsi	FT	-	Moderate	NLAA
Florida scrub-jay	Aphelocoma coerulescens	FT	-	Low	No Effect
Gopher tortoise	Gopherus polyphemus	-	ST	Low	NAEA
Little blue heron	Egretta caerulea	-	ST	Low	NAEA
Red-cockaded woodpecker	Picoides borealis	FE	-	Low	No Effect
Roseate spoonbill	Platalea ajaja	-	ST	Low	No Effect Antcipated
Southeastern American kestrel	Falco sparverius paulus	-	ST	Low	NAEA
Tricolored heron	Egretta tricolor	-	ST	Low	No Effect Anticipated
Wood stork	Mycteria americana	FE	-	Low	No Effect
Flora Species					
Beautiful pawpaw	Deeringothamnus pulchellus	FE	-	Low	No Effect
Britton's beargrass	Nolina brittoniana	FE	-	Low	No Effect
Florida greeneyes	Berlandiera subacaulis	FT	-	Low	No Effect
Gray's beaksedge	Rhynchospora grayi	FT	-	Low	No Effect
Lewton's polygala	Polygala lewtonii	FE	-	Low	No Effect

Notes: FE = Federally Endangered, FT = Federally Threatened, ST = State Threatened, NLAA = Not Likely to Adversely Affect, MANLAA = May Affect, Not Likely to Adversely Affect, NAEA = No Adverse Effect Anticipated

1.4 Project Area Description

The project is located in both Osceola and Orange Counties, northeast of the community of Celebration, Florida. The term "project corridor" is used in this document to represent a smaller area that encompasses the existing S.R. 535 right-of-way and the footprint of the Build Alternative. The term "project area" represents a larger expanse that encompasses the project corridor as well as all land within 500 feet of the centerline of S.R. 535. The project corridor is 2.2 miles in length.

Within the Osceola County portion of the project area, the predominant land use is commercial and services including hotels and vacation rentals, retail strip malls and supermarkets, restaurants, and gas stations. Select areas within this southern half of the project remain undeveloped, including cleared land east of SR 535 immediately south of the county line and vegetated parcels south of N Poinciana Blvd east of SR 535 and south of Calypso Cay Way west of SR 535.

The Orange County portion of the project is predominantly upland vegetated land uses, including pine flatwoods and mixed hardwood forests, and some forested wetland land uses. Commercial services, including shopping centers located just north of the county line east of SR 535, and a strip mall including a gas station and pharmacy at the southeast corner of the SR 535 and SR 536 intersection. The northern extent of the project area includes residential neighborhoods on both the east and west sides of SR 535 as well as a golf course located northwest of the SR 535 and SR 536 intersection.

Throughout the project area, there are stormwater swales located on either side of the SR 535. The southernmost 1/3 of the project contains mostly sodded swales which are within the maintained ROW. From south of the county line moving towards the northern limits of the project, the swales have canopy coverage and appear to be frequently inundated facilitating wildlife usage. At the county line and east of SR 535, there is a canal that runs perpendicular to SR 535 within the Osceola County portion of the project and parallel to SR 535 within Orange County. This canal appears to be connected to the west side of SR 535 via culverts.

1.5 Land Use

Land use cover descriptions provided for both uplands and wetlands are classified utilizing the *Florida Land Use Cover and Forms Classifications System* (FLUCCS) designations. Previous and existing land uses in the project area were initially determined utilizing US Geological Survey (USGS) maps, historical images, aerial photographs, and land use mapping from the South Florida Water Management District (SFWMD) (2017-2019). Land use categories in the project area reported by SFWMD were verified in the field. Field reviews generally confirmed the SFWMD land use mapping with very minor adjustments. Land use categories in the project area as mapped by SFWMD are shown in **Figures 1-10** and **1-11** and each land use category in the project area is described below.

Figure 1-10 Land Use in Orange County Project Area

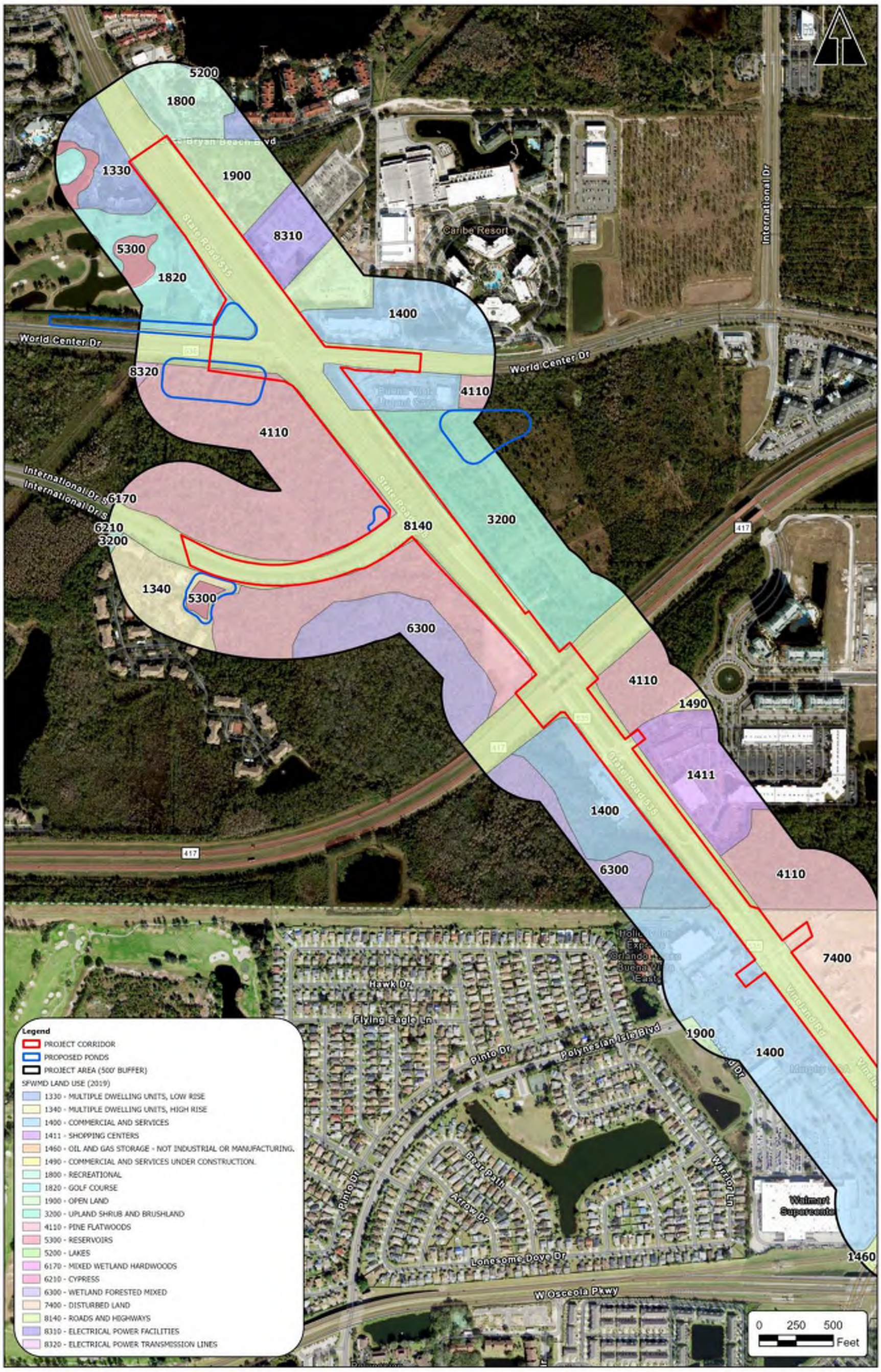
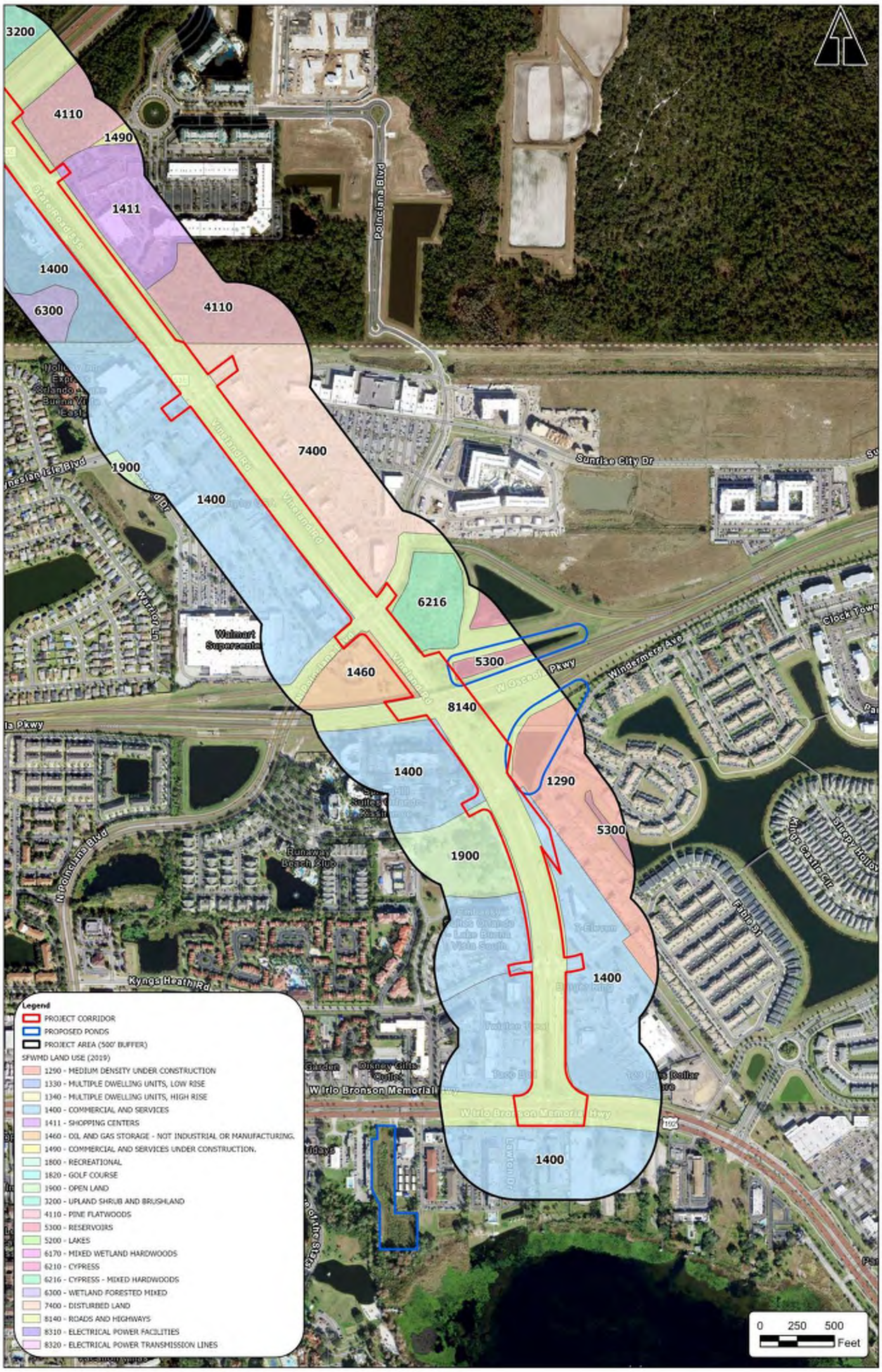


Figure 1-11 Land Use in Osceola County Project Area



Residential, Medium Density Under Construction (FLUCCS – 1290)

This category refers to a residential areas in the process of construction with a dwelling density of 2 to 5 per acre once completed. If more than 2/3 of the construction if completed, then the area should be coded by the 1200 FLUCCS for medium density residential. This land use type occurs immediately southeast of the on-ramp to eastbound Osceola Parkway from northbound SR 535.

Residential High Density, Multiple Dwelling Units (FLUCCS – 1330)

This category refers to a density of six or more dwelling units per acre. This land use category includes two-story town homes, duplexes, and other low-rise residential structures. Low-rise residential areas are newer developments which are commonly located on the urban fringe. This class is found in one location in the project area at the northwestern limits of the study area northwest of the SR 535 and World Center Drive intersection.

Commercial and Services (FLUCCS – 1400)

This is an active land use category that includes a broad range of uses and operations providing diverse products and services which often occur in complex mixtures. Subclasses include retail and wholesale, professional, cultural and entertainment, and tourist services, as well as others. The 1400 class includes shopping centers, commercial strip developments, warehouses, junk yards, campgrounds, and amusement parks. These areas are usually located along main transportation routes or at the intersections of secondary transportation corridors. This land use category accounts for a large portion of the study area and is found in several locations. This includes the southern portion of the project located south of SR 417 to south of US 192, aside from one area of 1900 Open Land and one area of 1290 Residential, Under Construction. This category is also located west of SR 535 from north of Osceola Parkway to SR 417 and east of SR 535 north and south of the World Center Drive intersection near the project's northern terminus.

Shopping Centers (FLUCCS – 1411)

This is land use category includes varying sizes and shapes of buildings which share common parking facilities for customers. These include both connected and unconnected buildings commercial and retail facilities. This land use is found in one location of the project corridor at the outlet stores located south of LBV Factory Stores Drive north of the Osceola-Orange County Line and south of SR 417.

Oil and Gas Storage (FLUCCS – 1460)

This land use category includes storage facilities for petroleum, oil, and lubricant product retail and wholesale sales. This category can be identified by tanks, spill enclosures, internal roads/railroads, spurs, embankments, piers, and maintenance facilities. This land use is found in one location in the project area, west of SR 535 from north of W Osceola Parkway to south of Poinciana Blvd.

Recreational (FLUCCS – 1800)

This land use category is used for outdoor activities such as community sports, open-air performances, and fairgrounds. This includes well organized grounds with parking facilities, which are typically not paved. This land use is found in one location at the northeast limits of the study area in association with the adjacent resort complexes on Lake Bryan around Lake Bryan Beach Blvd.

Golf Course (FLUCCS – 1820)

Golf courses are easily recognizable by their distinctive well-maintained grass areas, fairways, and ponds. Golf courses are typically constructed in low-lying areas such as pine flatwoods and may be adjacent to, or displace wetlands. These wetlands would not be broken out of the 1820 Golf Course land use classification unless they meet the two acre minimum mapping unit criteria. This land use is associated with the Hawk's Landing Golf Club located northwest of the World Center Drive and SR 535 intersection.

Open Land (FLUCCS – 1900)

This land use category includes open, undeveloped land within urban areas which are typically interpreted as transitional or uncertain land uses. This land use does not include forests or wetlands, unless they occur as small areas which do not meet the mapping unit criteria within the 1900 land use. This open land category is found in one location within the study area, south of the Calypso Cay Way to the west of SR 535.

Upland Shrub and Brushland (FLUCCS – 3200)

This category is for upland non-agricultural, non-forested lands which exhibit no evidence of cattle grazing. This class includes areas where tree species are regenerating naturally after clear cutting or fire but are less than 20 feet tall. This includes native hardwood and coniferous species but does not apply to plantations. This land use type occurs in one location in the study area to the east of SR 535 from SR 417 to the commercial land uses immediately south of World Center Drive.

Pine Flatwoods (FLUCCS – 4110)

This class is for naturally generated pine flatwoods. The canopy closure must be 25 percent or more and the trees must average over 20 feet tall. The pine flatwoods class is dominated by slash pine, longleaf pine, or both. Common understory species include saw palmetto, wax myrtle, gallberry, and a wide variety of herbs and brush. Pine flatwoods are the most prevalent community in natural areas. Most pine flatwoods occur on broad, low, flat areas with seasonal high-water tables but not on hydric soils. They transition into mesic flatwood and hardwood communities on higher ground and into hydric flatwoods, cypress, and other wetlands on the lower edges. Pine flatwoods are found in four places in the project area. One area is located to the east of SR 535 from the county line to south of the factory outlets at LBV Factory Stores Dr

and another area is located north of the LBV Factory Stores Dr to south of SR 417. The other two areas are located to the west of SR 535 from SR 417 to World Center Drive and are separated by International Drive S.

Reservoirs (FLUCCS – 5300)

This class is for artificial impoundments of water, or water bodies that have been significantly modified from the natural state. They are used for irrigation, flood control, municipal and rural water supplies, stormwater treatment, recreation, and hydro-electric power generation. Reservoirs are found in multiple places throughout the project area. Reservoirs land use is found in one location in the study area, to the east of SR 535 immediately north of Osceola Parkway.

Cypress – Mixed Hardwoods (FLUCCS – 6216)

This class is used for forested wetland communities dominated by a mix of pond or bald cypress and hardwood swamps. This land use type is found in one location in the study area, immediately south of Poinciana Blvd to the east of SR 535.

Disturbed Land (FLUCCS – 7400)

This land use class is used for areas where soil or substrate has been altered or removed by human activity, whether or not the cause is known. The Level 1 Barren Land category, including this 7400 Disturbed Land sublevel, is only applied to upland areas. This land use type is found in one location in the study area, to the east of SR 535 from north of Poinciana Blvd to south of the county line.

Roads and Highways (FLUCCS – 8140)

This class includes those highways exceeding 100 feet in width, with 4 or more lanes and median strips. The intent of this data layer is to include only the major transportation corridors. This land use type is mapped for SR 535, US 192, Osceola Parkway, Poinciana Boulevard, SR 417, International Drive South, and World Center Drive.

Electrical Power Facilities (FLUCCS – 8310)

Electrical power facility land uses include fossil fuel and nuclear plants. Associated facilities include transformer yards, cooling ponds or towers, and fuel storage. One electrical power facility is found within the project area approximately 500 feet north of the World Center Drive and SR 535 intersection, to the east of SR 535.

1.6 Elevation, Hydrology, and Drainage

The study area is located on relatively flat land with a ground elevation ranging between approximately 81 and 101 feet. There is a rise in elevation from south to north along the project corridor, with the highest elevations found at the northern end of the project. The National Resources Conservation Service (NRCS) reports the depth to water table in the project area is

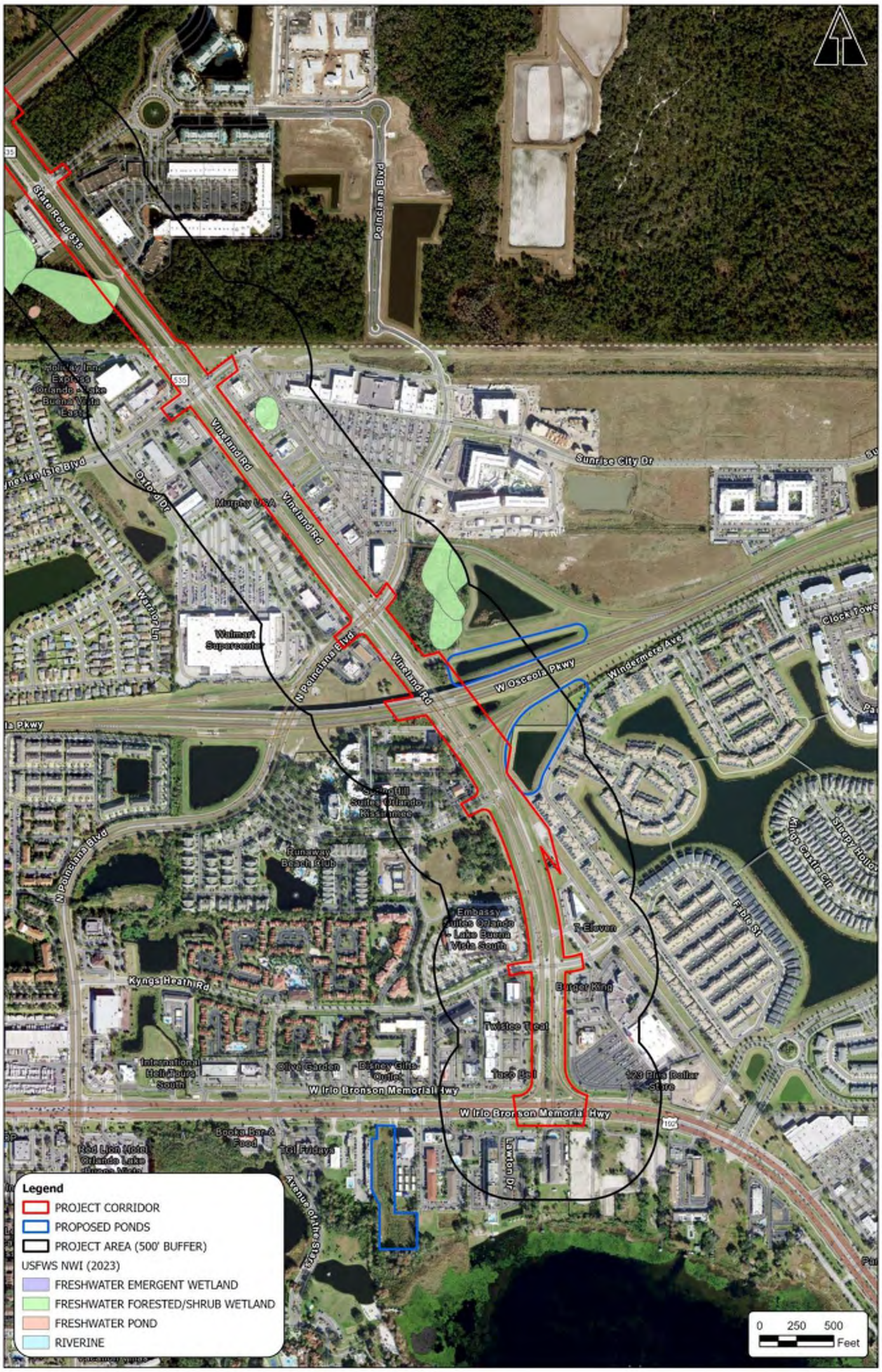
between 0 and 42 inches. **Figure 1-12** shows an elevation map created with data collected by NOAA and the U.S. Department of Commerce in 2007 using Light Detection and Ranging (LIDAR) in North American Datum 1983 (NAD 83).

Major hydrologic features and wetlands mapped by the USFWS National Wetlands Inventory (NWI) in the project area are shown in **Figure 1-13** and **1-14**. A freshwater pond within a golf course is located north of S.R. 536 and west of S.R. 535 that intersects a small portion of the project area. There are also two patches of freshwater forested/shrub wetland that intersect the project area; one patch is located south of International Drive and stretches down south of S.R. 417 to the border of Orange and Osceola County. There is also a patch of wetlands mapped north of West Osceola Parkway and east of S.R. 535, but this area has already been developed and is no longer wetland.

The project sits atop the Biscayne Aquifer, a Sole Source Aquifer as identified by the U.S. Environmental Protection Agency (USEPA). This project is located within the SFWMD's Reedy Creek and Shingle Creek Basins. According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (updated September 25, 2009), a portion of the project area in the northwest is located within the 500-year floodplain (Zone A). The remaining project area is categorized as Zone X, which is an area of minimal flood hazard.

Figure 1-13 Surface Hydrology in Orange County Project Area

Figure 1-14 Surface Hydrology in Osceola County Project Area



2.0 Protected Species and Habitat

This project was evaluated for impacts to protected plant and animal species and their habitats in accordance with FDOT's *PD&E Manual, Part 2, Protected Species and Habitat,* which incorporates the requirements of the National Environmental Policy Act (NEPA) and related federal and state laws. The Endangered Species Act of 1973, as amended, and the Florida Endangered and Threatened Species Act, Section 379.2291, Florida Statues, grant the USFWS and FWC, respectively, authority to regulate certain wildlife species. Federal agencies are required to consult with USFWS and/or NMFS to ensure federal actions are not likely to jeopardize the continued existence of federally endangered or threatened species or result in the destruction or adverse modification of designated critical habitat. The Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act apply additional protections to many bird species. In Florida, all bat species are protected by FWC.

2.1 Prior Coordination and Methodology

Preliminary data collection utilized literature reviews, the ETDM system, database reviews, and agency coordination to identify federal and state listed species, wetlands, and EFH with potential to occur in or near the project corridor. Soil maps, land use maps, and aerial imagery were also used. Specific information sources and databases utilized for assessment of potential impacts include the following:

- ETDM Summary Report for S.R. 535 (Project # 14325)
- US Fish and Wildlife Service (USFWS) Environmental Conservation Online System
- Florida Fish and Wildlife Conservation Service (FWC) databases
- FWC Integrated Wildlife Habitat Ranking System
- USFWS National Wetland Inventory (NWI) maps
- FWC Water Bird Colony Location Data (http://atoll.floridamarine.org/waterBirds/)
- FWC Bald Eagle Nest Data
- USFWS wood stork (*Mycteria americana*) nesting colonies map tool
- USFWS Species Recovery Plans
- SFWMD land use GIS layers
- FNAI Land Use GIS Layers
- U.S. Department of Agriculture NRCS Web Soil Survey

The protected species addressed in this document are listed in **Tables 2-1** and **2-2**. Federal and state listed species with potential to occur in the project area were identified through research and coordination with USFWS and FWC, particularly through the ETDM process and using data from the FDOT Environmental Screening Tool and the USFWS IPaC tool. Known habitat associations of species with potential to occur in the vicinity of the project were compared to habitats present in the project area to further evaluate potential species involvement.

The probability of occurrence of a species in the project area is broadly categorized according to the following definitions. A probability of occurrence of No indicates that potential habitat within the range of the species does not occur in the project area. A Low probability of occurrence indicates that while the project area is in the species range (or within a USFWS Consultation Area for that species), potential habitat is so minimal or low quality that it is unlikely the species would be present. A Moderate probability of occurrence indicates that the project area contains suitable habitat within the species range and within reasonable proximity to source populations.

Table 2.1 Listed Wildlife Species Potentially Occurring in Project Area

Common Name	Scientific Name	Federal Status	State Status	Occurrence Potential in Project Area	Effect Determination
Audubon's crested caracara	Polyborus plancus audubonii	FT	-	No	No Effect
Blue-tail mole skink	Eumeces egregius lividus	FT	-	No	No Effect
Eastern black rail	Laterallus jamaicensis ssp. jamaicensis	FT	-	NO	No Effect
Eastern indigo snake	Drymarchon corais couperi	FT	-	Low	NLAA
Everglade snail kite	Rostrhamus sociabilis plumbeus	FE	-	No	No Effect
Florida burrowing owl	Athene cunicularia	-	ST	Low	NAEA
Florida grasshopper sparrow	Ammodramus savannarum floridanus	FE	-	Low	No Effect
Florida pine snake	Pituophis melanoleucus mugitus	-	ST	Low	NAEA
Florida sandhill crane	Grus canadensis pratensis	-	ST	Low	NAEA
Florida sand skink	Neoseps reynoldsi	FT	-	Moderate	NLAA
Florida scrub-jay	Aphelocoma coerulescens	FT	-	Low	No Effect
Gopher tortoise	Gopherus polyphemus	-	ST	Low	NAEA
Little blue heron	Egretta caerulea	-	ST	Low	NAEA
Red-cockaded woodpecker	Picoides borealis	FE	-	Low	No Effect
Roseate spoonbill	Platalea ajaja	-	ST	Low	No Effect Anticipated
Southeastern American kestrel	Falco sparverius paulus	-	ST	Low	NAEA
Tricolored heron	Egretta tricolor	-	ST	Low	No Effect Anticipated
Wood stork	Mycteria americana	FE	-	Low	No Effect

Notes: FE = Federally Endangered, FT = Federally Threatened, ST = State Threatened, NLAA = Not Likely to Adversely Affect, MANLAA = May Affect, Not Likely to Adversely Affect, NAEA = No Adverse Effect Anticipated

Table 2-2 Listed Plant Species Potentially Occurring in Project Area

Common Name	Scientific Name	Federal Status	State Status	Occurrence Potential in Project Area	Effect Determination
Beautiful pawpaw	Deeringothamnus pulchellus	FE	-	Low	No Effect
Britton's beargrass	Nolina brittoniana	FE	-	Low	No Effect
Florida greeneyes	Berlandiera subacaulis	FT	-	Low	No Effect
Gray's beaksedge	Rhynchospora grayi	FT	-	Low	No Effect
Lewton's polygala	Polygala lewtonii	FE	-	Low	No Effect
Papery Whitlow-wort	Paronychia chartacea	FT	-	No	No Effect
Scrub plum	Prunus geniculata	FT	-	Low	No Effect

A High probability of occurrence indicates the project area is near known populations or sightings and contains high quality potential habitat.

Multiple field investigations were conducted to evaluate wildlife presence and habitat potential, to identify wetlands and other surface waters, and to document existing conditions in the project area. Preliminary field investigations occurred on January 16, 2020, and again on June 29, 2020. In depth field surveys were conducted on September 21, 2022, and November 4, 2022. During field surveys, maps showing land use by FLUCCS code and USFWS NWI wetlands maps were verified with existing conditions. Biologists recorded visual observations of protected plant and animal species and their potential habitats, as well as other indicators of presence such as vocalizations, tracks, scat, staining, and burrows. They also noted natural vegetative communities in multiple locations and recorded dominant plant species in each stratum in wetlands.

The project is within the USFWS consultation areas for Audubon's crested caracara (*Polyborus plancus audubonii*), Florida grasshopper sparrow (*Ammodramus savannarum floridanus*), Florida

sand skink (*Neoseps reynoldsi*), red-cockaded woodpecker (*Leuconotopicus borealis*), Florida scrub-jay (*Aphelocoma coerulescens*), Everglade snail kite (*Rostrhamus sociabilis plumbeus*), and Lake Wales Ridge plants. The project is also within the core foraging areas of four wood stork colonies (Lawne Lake, Eagle Nest Park, Gatorland, and Lake Russell) and within the Central Florida Black Bear Management Unit. Ranges and known localities of protected species were identified using USFWS and FWC databases. No designated Critical Habitat occurs in or adjacent to the project area, so no destruction or adverse modification of Critical Habitat is anticipated.

Through the ETDM system, FWC noted the potential loss of wildlife habitat and water quality degradation from the project. USFWS noted the potential presence of several Federally listed species and noted Best Management Practices (BMPs) should be used to prevent impacts to wetlands.

Habitats are mapped by FLUCCS code in **Figures 1-10** and **1-11** and were confirmed in the field with minor revisions. There were no sightings or indications of protected species during field investigation. Sensitive environmental feature are shown in **Figure 2-1**. The nearest bald eagle (*Haliaeetus leucocephalus*) nest reported by the FWC online bald eagle nest locator tool is approximately 1.81 miles from the project corridor. USFWS and FWC generally do not require any special protective measures or monitoring if a bald eagle nest is further than 660 feet from a project. Below is a description of each species in **Tables 2-1** and **2-2** along with pertinent aspects of their ecology, conservation, and potential habitat in the project area. Federally listed species are also considered to be state listed.

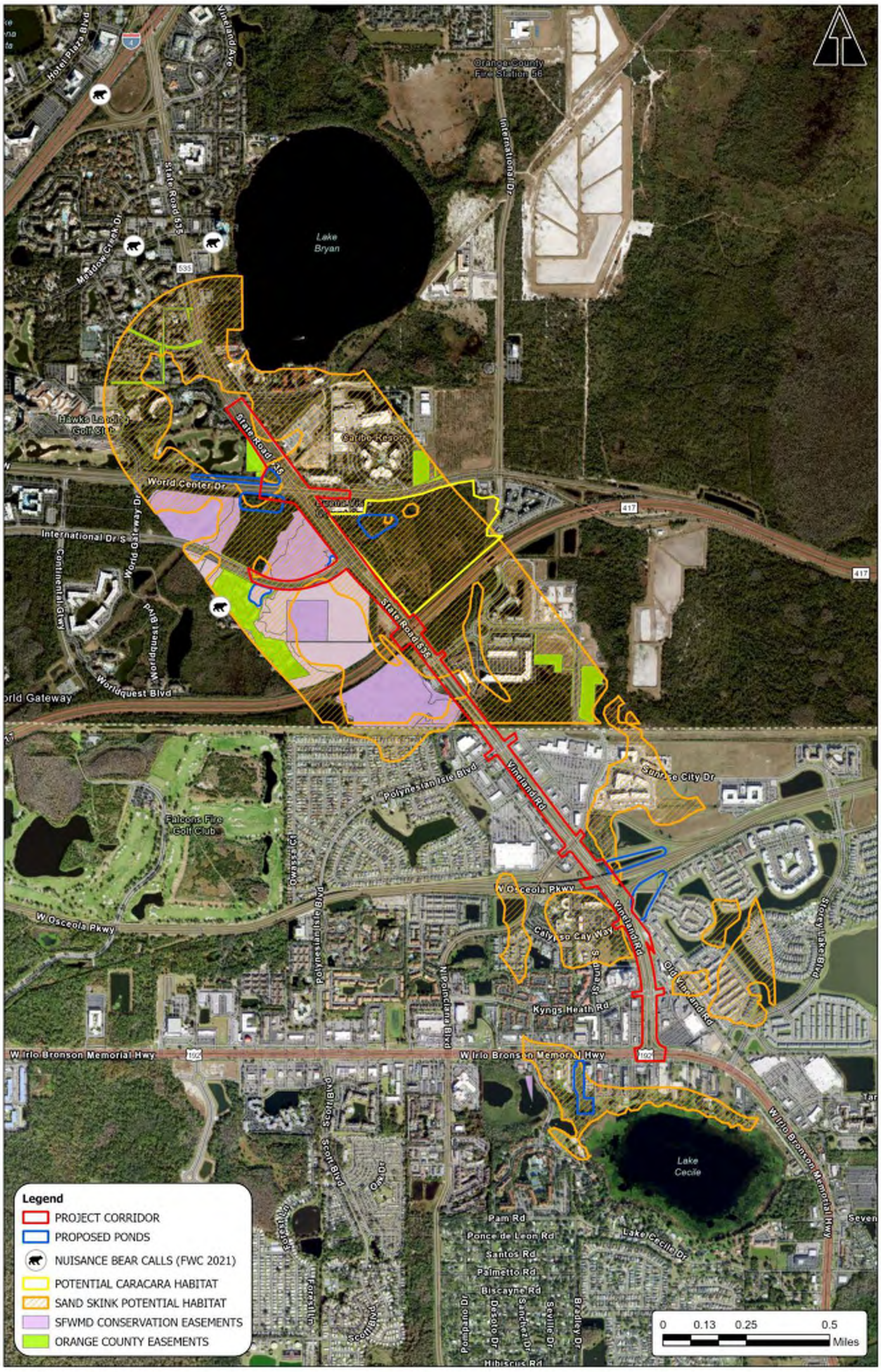


Figure 2-1 Sensitive Environmental Features

3.0 Wetland Evaluation

No wetland impacts are anticipated under the Preferred Alternative. Wetlands are protected under Section 404 of the Clean Water Act. Guidance is provided in Executive Order 11990, Protection of Wetlands, which establishes a national policy to “avoid to the extent possible the long and short-term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative”. The USACE has the authority to regulate work in Waters of the US under Section 10 of the Rivers and Harbors Act of 1899 and the USFWS acts as a commenting body where permitted actions may affect listed species. In Florida, state authority over activities in state surface waters and wetlands is administered by FDEP and the five Water Management Districts.

Wetlands, as stated in Section 373.019(27) F.S. and in 33 CFR 328.3(b) and as used by the USACE in administering Section 404 of the Clean Water Act, are defined as “those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions."

Surface waters are considered by Section 373.019(21) F.S. to be waters on the surface of the earth, contained in bounds created naturally or artificially, including the Atlantic Ocean, the Gulf of Mexico, bays, bayous, sounds, estuaries, lagoons, lakes, ponds, impoundments, rivers, streams, springs, creeks, branches, sloughs, tributaries, and other watercourses. Regulatory agencies do not typically require mitigation for impacts to surface waters other than wetlands.

Surface waters are considered by Section 373.019(21) F.S. to be waters on the surface of the earth, contained in bounds created naturally or artificially, including, the Atlantic Ocean, the Gulf of Mexico, bays, bayous, sounds, estuaries, lagoons, lakes, ponds, impoundments, rivers, streams, springs, creeks, branches, sloughs, tributaries, and other watercourses. Regulatory agencies do not typically require mitigation for impacts to surface waters other than wetlands.

3.1 Methodology

Wetlands and Other Surface Waters (OSWs) were inspected and their locations in the project corridor were field verified. Wetlands are typically mapped in the field using three parameters as indicators of wetlands: presence of hydrophytic vegetation, hydric soils, and hydrology, utilizing methodologies consistent with the USACE *Federal Manual for Identifying and Delineating Jurisdictional Wetlands* (1987), the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region* (2010), Chapter 62-340, Florida Administrative Code, and the *Florida Wetlands Delineation Manual* (Gilbert et. al. 2011).

Through the ETDM system, SFWMD noted the potential presence of wetlands and OSWs associated with SFWMD conservation easements along the west side of S.R. 535 at the

Orange/Osceola County line. USFWS noted the need to avoid and minimize impacts to wetlands and to provide compensatory mitigation for unavoidable impacts.

Comments Regarding Wetlands

The USACE stated that the project would have minimal level of importance. The USEPA does not expect significant impacts on wetlands and surface waters. USFWS expects the proposed project will result in minimal to moderate involvement with wetlands. The FLDEP stated the project would have minimal effects to wetlands; however, impacts must be reduced to the greatest extent practicable, with mitigation measures in place if minimization and avoidance of impacts are exhausted. The SFWMD noted that wetlands resources would be affected. Specifically, there is a conservation easement on the west side of S.R. 535 from World Center Drive to the Orange/Osceola County line and suggest impacts could be reduced by eliminating roadway widening on the west side of the road. NMFS stated the project would have moderate direct impacts and impacts to adjacent wetlands.

Responses to Comments Regarding Wetlands

Impacts to wetlands were avoided and minimized by following the existing SR 535 corridor as much as possible with limited new right-of-way as well as through pond site selection in uplands wherever possible. No impacts to wetlands are anticipated, and further analysis of potential impacts to wetlands and surface waters is anticipated during the Environmental Resource Permit (ERP) and state Section 404 permitting processes.

3.2 Wetlands and Other Surface Waters in the Project Area

No wetlands are located in the project corridor, where direct impacts would occur under the Preferred Alternative. Wetlands do occur in the larger Project Area, including a particularly large patch of forested wetlands west of SR 535, extending both north and south of SR 417.

Field investigations generally confirmed the wetland mapping by SFWMD (**Figures 1-10** and **1-11**). Four wetland types are mapped by SFWMD in the project area. They Mixed Wetland Hardwoods (FLUCCS 6170), Cypress (FLUCCS 6210), Cypress – Mixed Hardwoods (FLUCCS 6216), and Wetland Forested Mixed (FLUCCS 6300). OSWs mapped by SFWMD in the Project Area include Reservoirs (FLUCCS 5300) and Lakes (FLUCCS 5200). Roadside ditches and swales are also considered OSWs. There is no Essential Fish Habitat in the project area.

3.3 Impact Assessment

No wetlands exist in the project corridor, where direct impacts would occur under the Preferred Alternative, so no impacts to wetland are anticipated. Direct impacts are anticipated to OSWs that may include roadside swales and ditches as well as to an area mapped by SFWMD as Reservoirs (FLUCCS 5300). That area, west of SR 535 and south of International Drive, is a manmade stormwater pond.

3.4 Avoidance, Minimization, and Mitigation

Impacts to wetlands were sequentially avoided and then minimized by following the existing S.R. 535 right-of-way as much as possible. Minimization measures, which may include reductions in the typical section, use of retaining walls to minimize roadway embankments, and similar measures, will be considered during the project design phase. FDOT *Standard Specifications for Road and Bridge Construction* will be implemented to further minimize impacts.

4.0 Anticipated Permits

Under operating agreement with the Florida Department of Environmental Protection, the SFWMD maintains state jurisdiction for Environmental Resource Permit reviews under 62-330 FAC for roadway and transportation projects. A SFWMD Environmental Resource Permit is anticipated for modifications to an existing drainage system and for increases in permeable cover. There are no Federally jurisdictional wetlands that will be impacted under the Preferred Alternative. Therefore, no Section 404 permit is anticipated. An FDEP National Pollution Discharge Elimination System Permit will also be required.

5.0 Conclusion

5.1 Protected Species and Habitats

This project was evaluated for impacts to protected plant and animal species and their habitats in accordance with the FDOT's *PD&E Manual, Part 2, Protected Species and Habitat,* which incorporates the requirements of the National Environmental Policy Act (NEPA) and related federal and state laws. Federal and state listed species with potential to occur in the project corridor were identified through research and coordination with US Fish and Wildlife Service, and the Florida Fish and Wildlife Conservation Commission.

There is no Critical Habitat present within the project area. Field investigations of the project area were conducted on multiple days and in different seasons to evaluate the potential presence of protected species and habitats. No adverse impacts are anticipated to any listed species from the Preferred Alternative. Effect determinations for listed species are provided in **Table 5-1**.

5.2 Wetlands and Other Surface Waters

This project was evaluated for impacts to wetlands and other surface waters in accordance with FDOT's *PD&E Manual, Part 2, Wetlands and Other Surface,* which incorporates the requirements of the National Environmental Policy Act (NEPA) and related federal and state laws. There would be no direct impacts to wetlands or other surface waters under the Preferred Alternative.

A SFWMD Environmental Resource Permit is anticipated for modifications to an existing drainage system and for increases in permeable cover. There are no Federally jurisdictional wetlands that will be impacted under the Preferred Alternative. Therefore, no Section 404 permit is anticipated. An FDEP National Pollution Discharge Elimination System Permit will also be required.

5.3 Commitments

In order to assure that the proposed project will not adversely impact protected species with the potential to occur within the project area, the FDOT will adhere to the following commitments:

- Implement the USFWS Standard Protection Measures for the Eastern Indigo Snake.
- The project is within the Central Florida Black Bear Management Unit with known mortality in the region. Therefore, consistent with the 2019 FWC Black Bear Management Plan, garbage and food debris must be properly removed from the construction site daily to eliminate possible sources of food that could encourage and attract bears. Nuisance black bears are to be reported to the FWC at the Wildlife Alert Hotline at 1-888-404-3922.

Table 5.1-1 Species Effect Determinations Under Preferred Alternative

Common Name	Scientific Name	Federal Status	State Status	Occurrence Potential in Project Area	Effect Determination
Fauna Species					
Audubon's crested caracara	Polyborus plancus audubonii	FT	-	Low	No Effect
Blue-tail mole skink	Eumeces egregius lividus	FT	-	Moderate	No Effect
Eastern black rail	Laterallus jamaicensis ssp. jamaicensis	FT	-	Low	No Effect
Eastern indigo snake	Drymarchon corais couperi	FT	-	Low	NLAA
Everglade snail kite	Rostrhamus sociabilis plumbeus	FE	-	Low	No Effect
Florida burrowing owl	Athene cunicularia	-	ST	Low	NAEA
Florida grasshopper sparrow	Ammodramus savannarum floridanus	FE	-	Low	No Effect
Florida pine snake	Pituophis melanoleucus mugitus	-	ST	Low	NAEA
Florida sandhill crane	Grus canadensis pratensis	-	ST	Low	NAEA
Florida sand skink	Neoseps reynoldsi	FT	-	Moderate	NLAA
Florida scrub-jay	Aphelocoma coerulescens	FT	-	Low	No Effect
Gopher tortoise	Gopherus polyphemus	-	ST	Low	NAEA
Little blue heron	Egretta caerulea	-	ST	Low	NAEA
Red-cockaded woodpecker	Picoides borealis	FE	-	Low	No Effect
Roseate spoonbill	Platalea ajaja	-	ST	Low	No Effect Antcipated
Southeastern American kestrel	Falco sparverius paulus	-	ST	Low	NAEA
Tricolored heron	Egretta tricolor	-	ST	Low	No Effect Anticipated
Wood stork	Mycteria americana	FE	-	Low	No Effect
Flora Species					
Beautiful pawpaw	Deeringothamnus pulchellus	FE	-	Low	No Effect
Britton's beargrass	Nolina brittoniana	FE	-	Low	No Effect
Florida greeneyes	Berlandiera subacaulis	FT	-	Low	No Effect
Gray's beaksedge	Rhynchospora grayi	FT	-	Low	No Effect
Lewton's polygala	Polygala lewtonii	FE	-	Low	No Effect

Notes: FE = Federally Endangered, FT = Federally Threatened, ST = State Threatened, NLAA = Not Likely to Adversely Affect, MANLAA = May Affect, Not Likely to Adversely Affect, NAEA = No Adverse Effect Anticipated

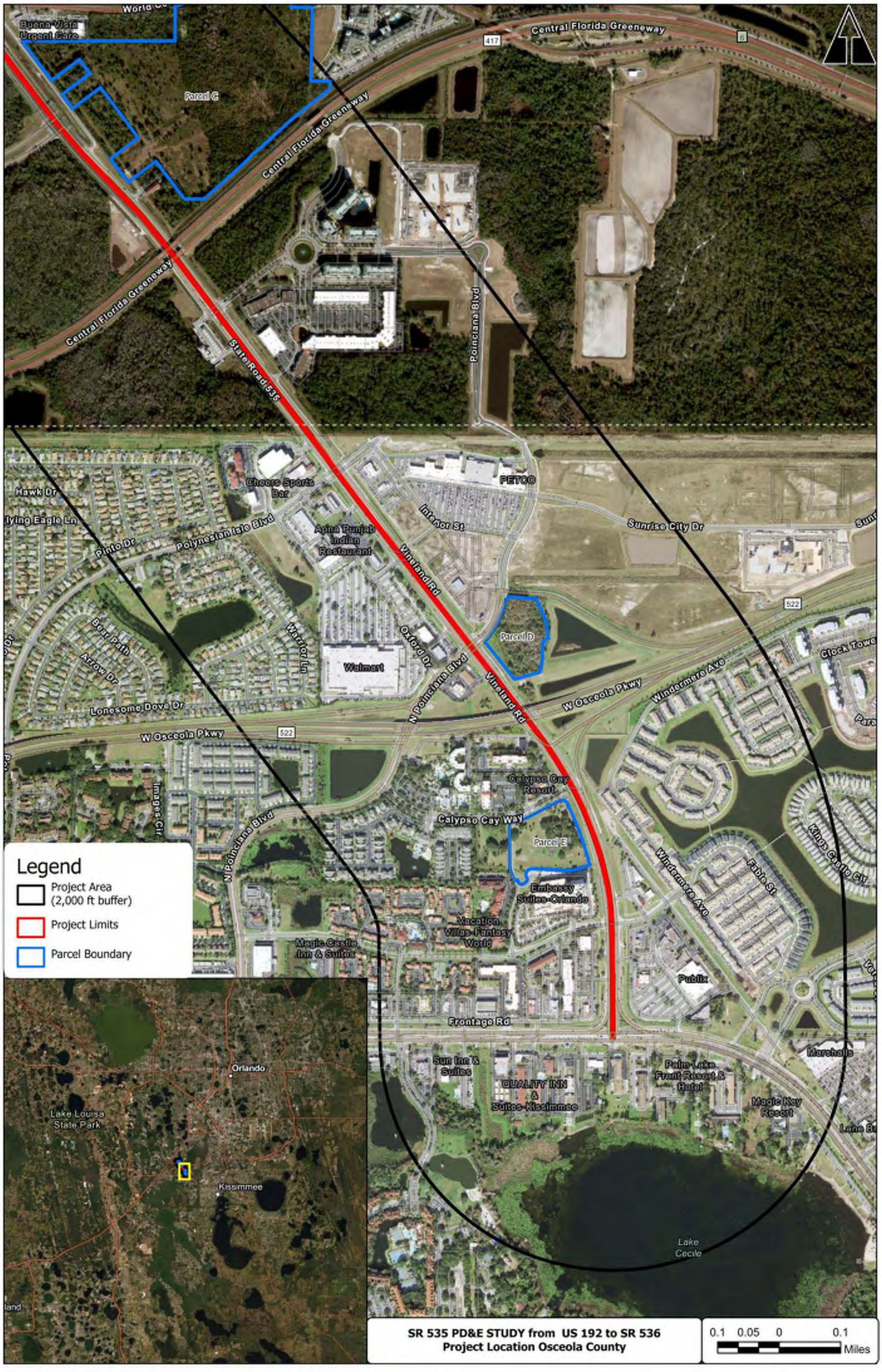


Figure 1- Southern Portion of Project Area

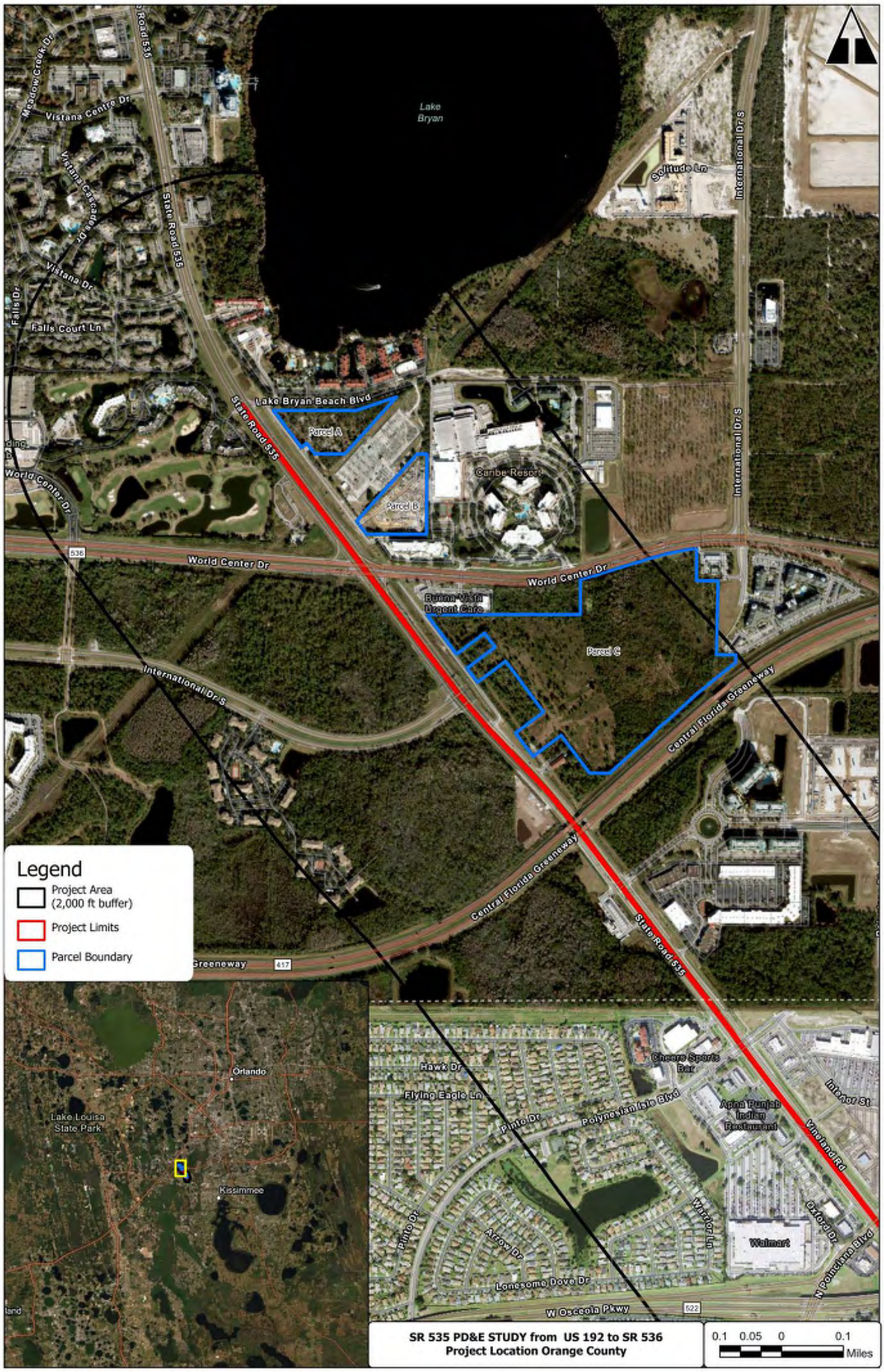


Figure 2- Northern Portion of Project Area

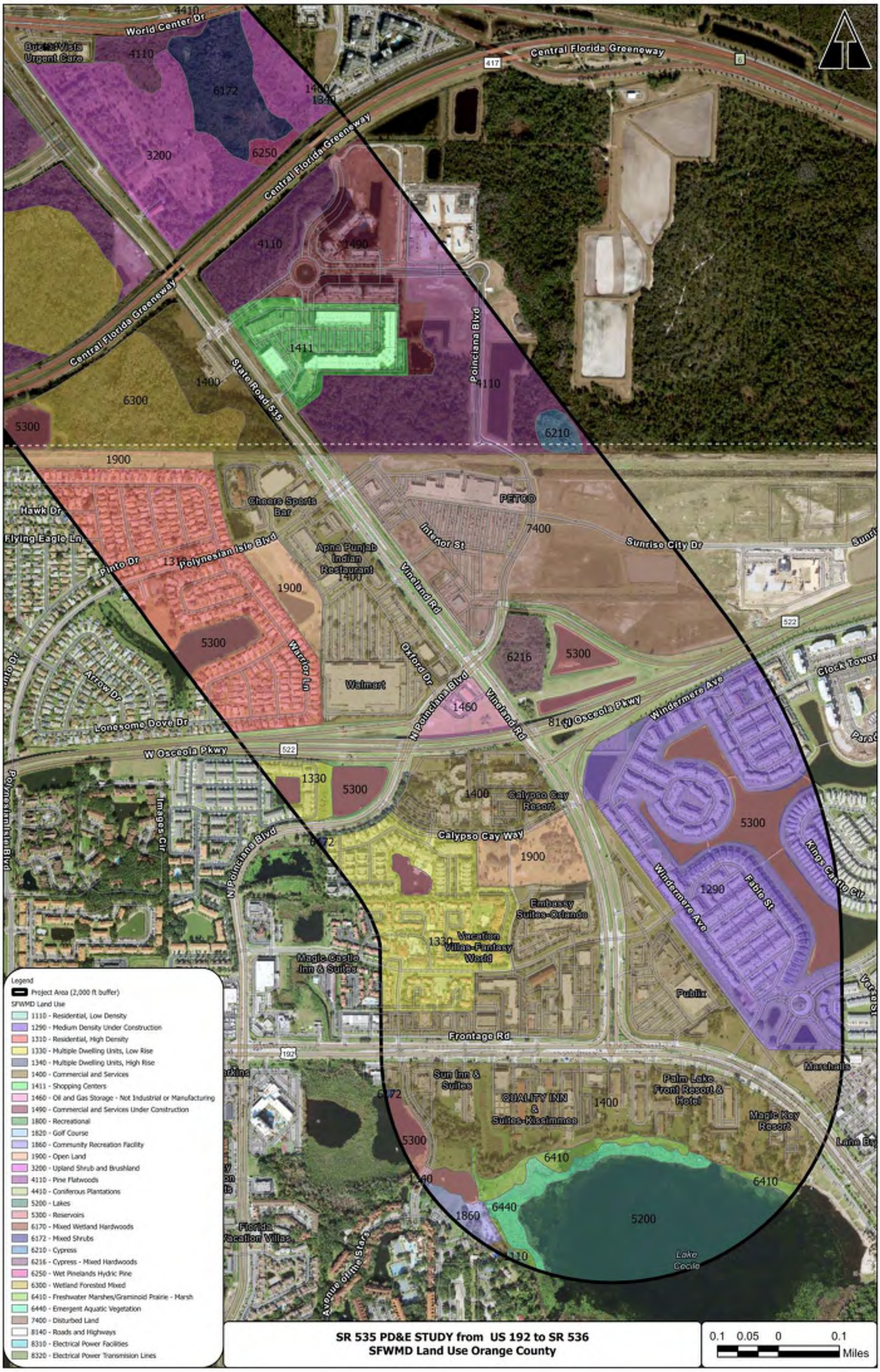


Figure 3- Land Use in the Southern Portion of Project Area

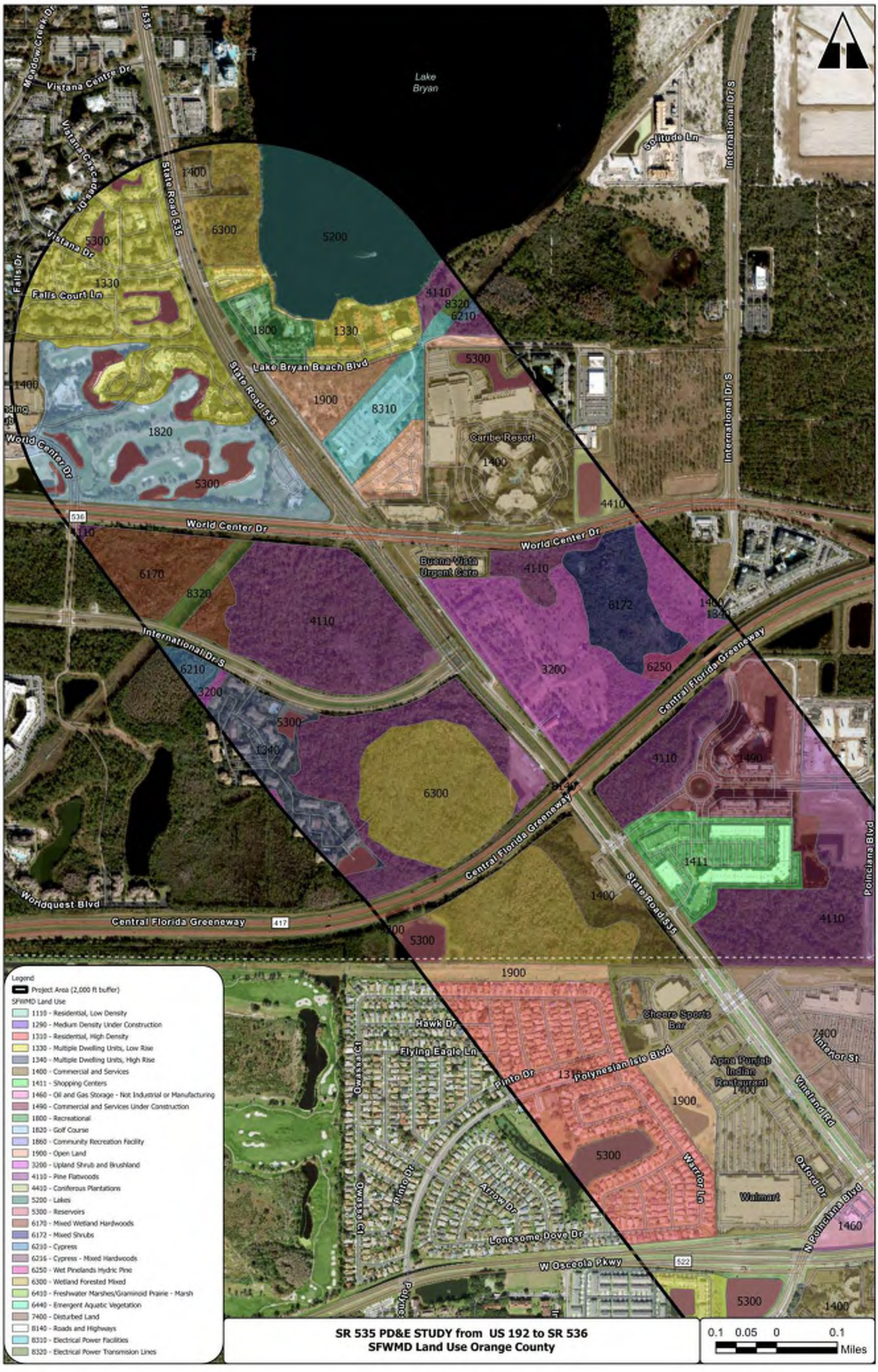


Figure 4- Land Use in the Northern Portion of Project Area

Figure 5- NWI-Mapped Wetlands within the Southern Portion of Project Area

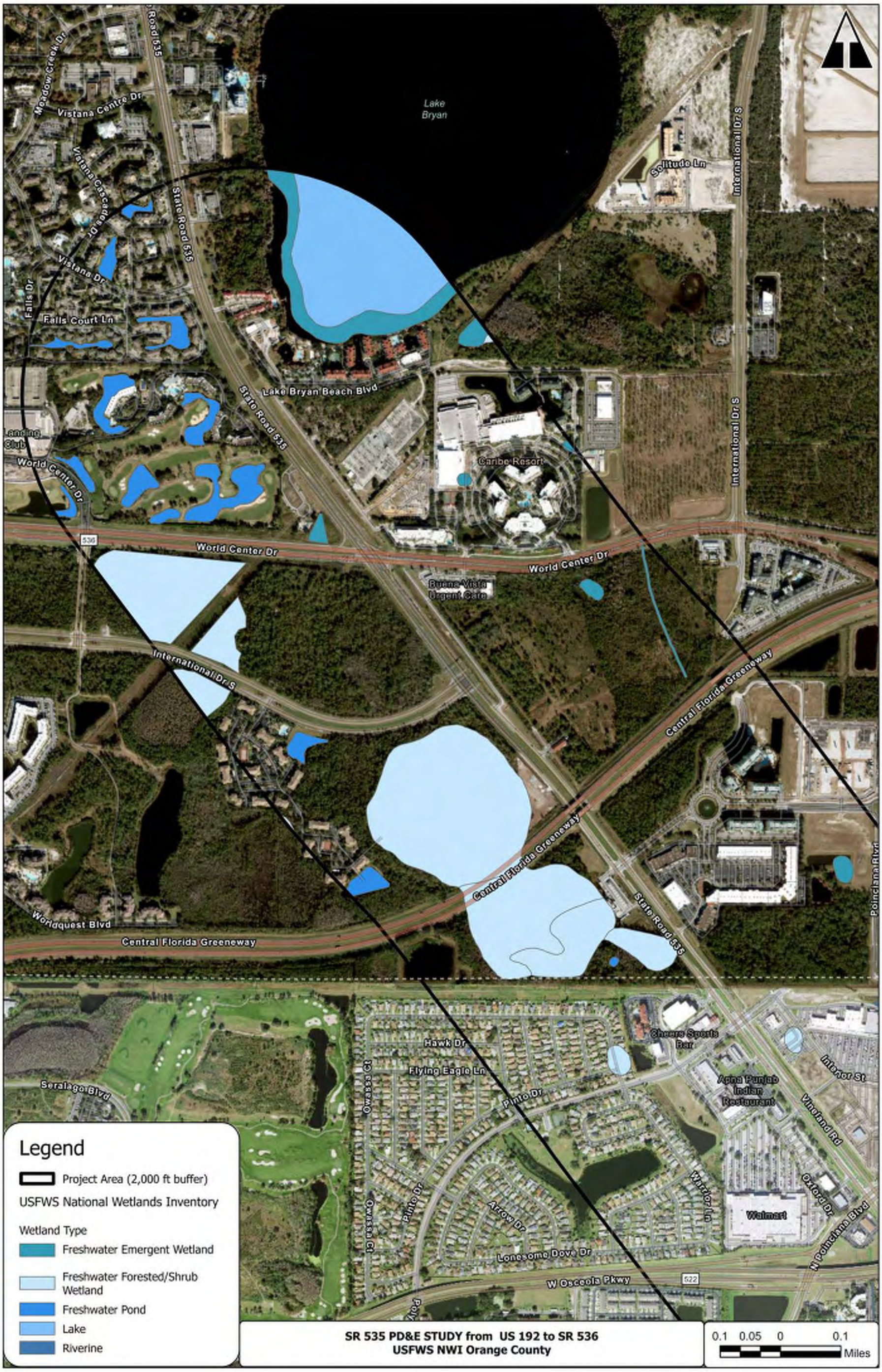


Figure 6- NWI-Mapped Wetlands within the Northern Portion of Project Area

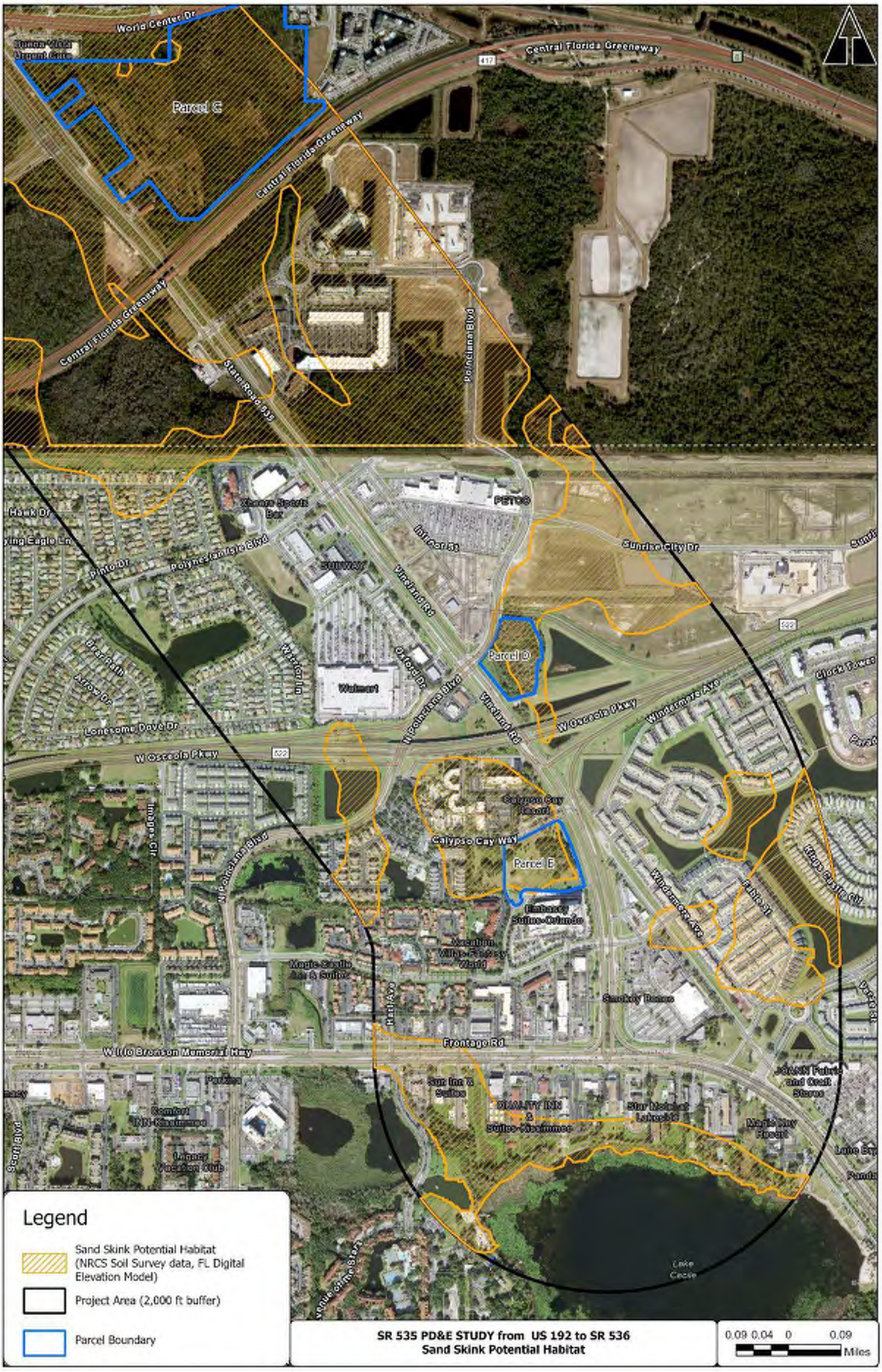


Figure 7- Sand Skink and Blue-tailed Mole Skink Potential Habitat in Osceola County

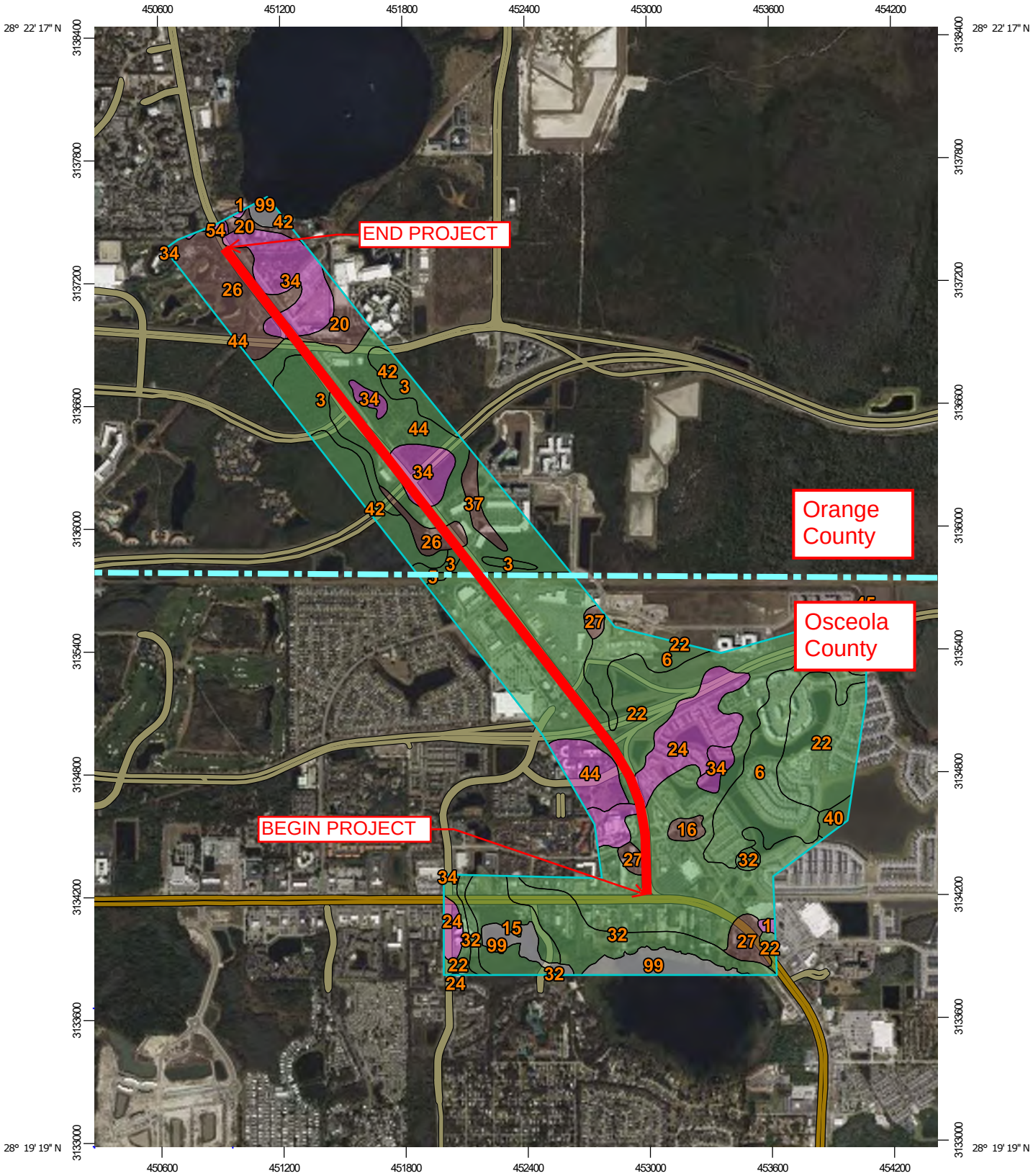
Figure 8- Sand Skink and Blue-tailed Mole Skink Potential Habitat in Orange County

Appendix H

Geotechnical Information

NRCS Web Soil Survey

Hydrologic Soil Group—Orange County, Florida, and Osceola County, Florida
(SR 535 PD&E - Hydrologic Soil Group)



Map Scale: 1:26,700 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 350 700 1400 2100

Feet: 0 1000 2000 4000 6000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

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

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

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

Soil Survey Area: Orange County, Florida
Survey Area Data: Version 20, Aug 28, 2023

Soil Survey Area: Osceola County, Florida
Survey Area Data: Version 21, Sep 5, 2023

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Feb 2, 2020—Mar 21, 2022

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.

Hydrologic Soil Group

Orange County

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
1	Arents, nearly level	A	0.3	0.0%
3	Basinger fine sand, frequently ponded, 0 to 1 percent slopes	A/D	41.8	4.2%
20	Immokalee fine sand	B/D	16.9	1.7%
26	Ona fine sand, 0 to 2 percent slopes	B/D	53.8	5.4%
34	Pomello fine sand, 0 to 5 percent slopes	A	59.2	6.0%
37	St. Johns fine sand	B/D	7.9	0.8%
42	Sanibel muck	A/D	20.9	2.1%
44	Smyrna-Smyrna, wet, fine sand, 0 to 2 percent slopes	A/D	101.5	10.2%
54	Zolfo fine sand, 0 to 2 percent slopes	A	1.6	0.2%
99	Water		4.0	0.4%
Subtotals for Soil Survey Area			**308.1**	**31.1%**
Totals for Area of Interest			**991.5**	**100.0%**

Osceola County

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
1	Adamsville sand, 0 to 2 percent slopes	A	1.2	0.1%
5	Basinger fine sand, 0 to 2 percent slopes	A/D	1.4	0.1%
6	Basinger fine sand, depressional, 0 to 1 percent slopes	A/D	90.1	9.1%
15	Hontoon muck, frequently ponded, 0 to 1 percent slopes	A/D	27.6	2.8%
16	Immokalee fine sand, 0 to 2 percent slopes	B/D	4.4	0.4%
22	Myakka fine sand, 0 to 2 percent slopes	A/D	379.4	38.3%
24	Narcoossee fine sand, 0 to 2 percent slopes	A	53.9	5.4%
27	Ona fine sand, 0 to 2 percent slopes	B/D	15.8	1.6%
32	Placid fine sand, frequently ponded, 0 to 1 percent slopes	A/D	50.1	5.1%

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
34	Pomello fine sand, 0 to 5 percent slopes	A	6.1	0.6%
39	Riviera fine sand, frequently ponded, 0 to 1 percent slopes	A/D	1.3	0.1%
40	Samsula muck, frequently ponded, 0 to 1 percent slopes	A/D	4.9	0.5%
44	Tavares fine sand, 0 to 5 percent slopes	A	20.2	2.0%
45	Wabasso fine sand, 0 to 2 percent slopes	A/D	0.0	0.0%
99	Water		26.8	2.7%
Subtotals for Soil Survey Area			**683.5**	**68.9%**
Totals for Area of Interest			**991.5**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

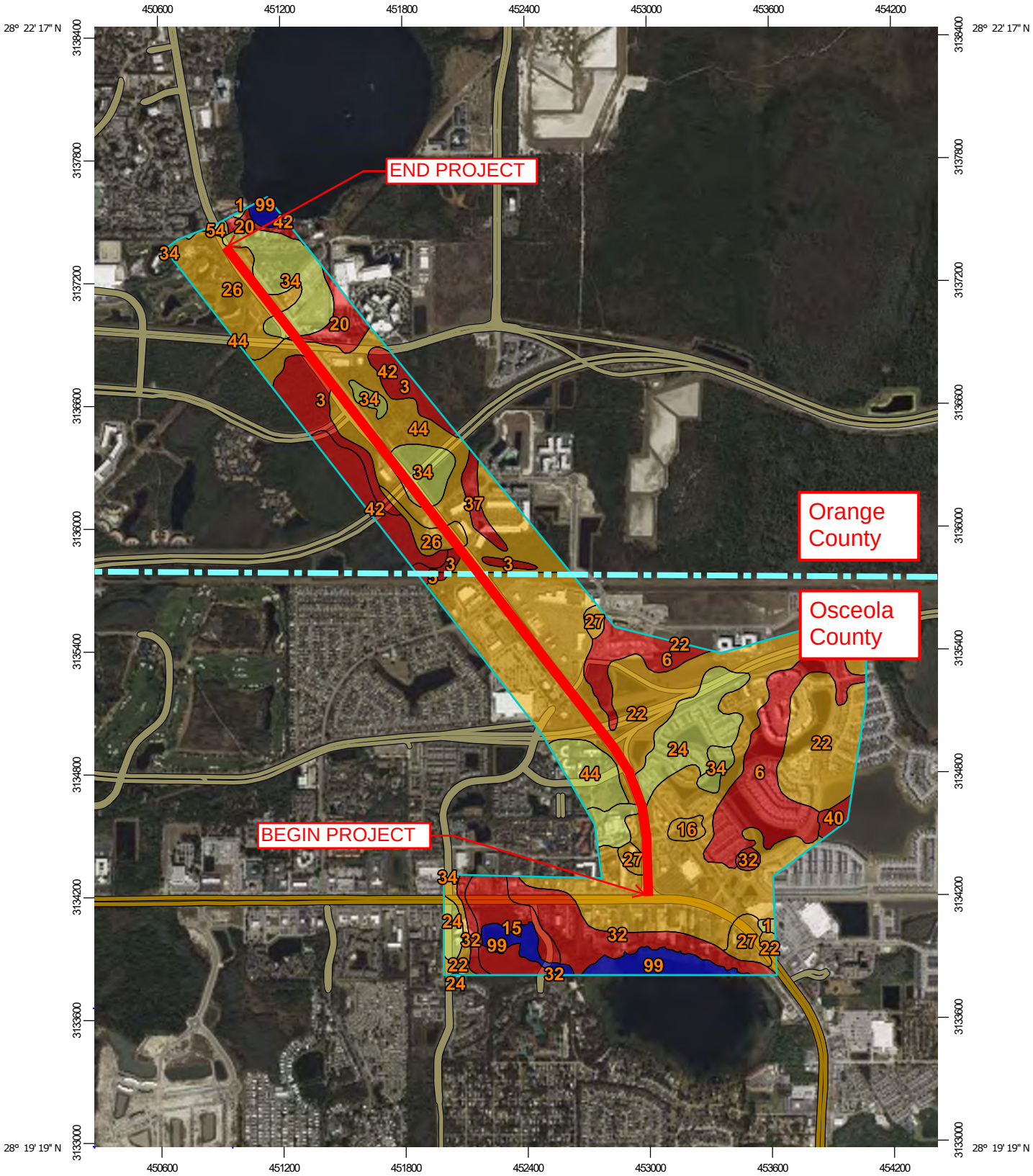
Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Depth to Water Table—Orange County, Florida, and Osceola County, Florida
(SR 535 PD&E - Depth to Groundwater Table)



Map Scale: 1:26,700 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 350 700 1400 2100

Feet
0 1000 2000 4000 6000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

0 - 25

25 - 50

50 - 100

100 - 150

150 - 200

> 200

Not rated or not available

Soil Rating Lines

0 - 25

25 - 50

50 - 100

100 - 150

150 - 200

> 200

Not rated or not available

Soil Rating Points

0 - 25

25 - 50

50 - 100

100 - 150

150 - 200

> 200

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

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

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

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Soil Survey Area: Osceola County, Florida
Survey Area Data: Version 21, Sep 5, 2023

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Feb 2, 2020—Mar 21, 2022

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.

Depth to Water Table

Orange County

Map unit symbol	Map unit name	Rating (centimeters)	Acres in AOI	Percent of AOI
1	Arents, nearly level	76	0.3	0.0%
3	Basinger fine sand, frequently ponded, 0 to 1 percent slopes	0	41.8	4.2%
20	Immokalee fine sand	20	16.9	1.7%
26	Ona fine sand, 0 to 2 percent slopes	31	53.8	5.4%
34	Pomello fine sand, 0 to 5 percent slopes	84	59.2	6.0%
37	St. Johns fine sand	20	7.9	0.8%
42	Sanibel muck	0	20.9	2.1%
44	Smyrna-Smyrna, wet, fine sand, 0 to 2 percent slopes	31	101.5	10.2%
54	Zolfo fine sand, 0 to 2 percent slopes	76	1.6	0.2%
99	Water	>200	4.0	0.4%
Subtotals for Soil Survey Area			**308.1**	**31.1%**
Totals for Area of Interest			**991.5**	**100.0%**

Osceola County

Map unit symbol	Map unit name	Rating (centimeters)	Acres in AOI	Percent of AOI
1	Adamsville sand, 0 to 2 percent slopes	86	1.2	0.1%
5	Basinger fine sand, 0 to 2 percent slopes	15	1.4	0.1%
6	Basinger fine sand, depressional, 0 to 1 percent slopes	0	90.1	9.1%
15	Hontoon muck, frequently ponded, 0 to 1 percent slopes	0	27.6	2.8%
16	Immokalee fine sand, 0 to 2 percent slopes	31	4.4	0.4%
22	Myakka fine sand, 0 to 2 percent slopes	31	379.4	38.3%
24	Narcoossee fine sand, 0 to 2 percent slopes	84	53.9	5.4%
27	Ona fine sand, 0 to 2 percent slopes	31	15.8	1.6%
32	Placid fine sand, frequently ponded, 0 to 1 percent slopes	0	50.1	5.1%

Map unit symbol	Map unit name	Rating (centimeters)	Acres in AOI	Percent of AOI
34	Pomello fine sand, 0 to 5 percent slopes	84	6.1	0.6%
39	Riviera fine sand, frequently ponded, 0 to 1 percent slopes	0	1.3	0.1%
40	Samsula muck, frequently ponded, 0 to 1 percent slopes	0	4.9	0.5%
44	Tavares fine sand, 0 to 5 percent slopes	76	20.2	2.0%
45	Wabasso fine sand, 0 to 2 percent slopes	31	0.0	0.0%
99	Water	>200	26.8	2.7%
Subtotals for Soil Survey Area			**683.5**	**68.9%**
Totals for Area of Interest			**991.5**	**100.0%**

Description

"Water table" refers to a saturated zone in the soil. It occurs during specified months. Estimates of the upper limit are based mainly on observations of the water table at selected sites and on evidence of a saturated zone, namely grayish colors (redoximorphic features) in the soil. A saturated zone that lasts for less than a month is not considered a water table.

This attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

Rating Options

Units of Measure: centimeters

Aggregation Method: Dominant Component

Component Percent Cutoff: None Specified

Tie-break Rule: Lower

Interpret Nulls as Zero: No

Beginning Month: January

Ending Month: December

Geotechnical Investigation for Pond Site Alternatives

TABLE 2
Summary of Seasonal High Groundwater Table Estimates
S.R. 535 PD&E Study from U.S. 192 to North of World Center Drive (S.R. 536)
Orange and Osceola Counties, Florida
FPN: 437174-2-22-01
Tierra Project No: 5511-19-052

Boring Number	Boring Location[1] C/L SR 535		Boring Depth[2]	Ground[1] Surface Elevation	Measured GWT		Date Groundwater Table Recorded	USDA Soil Survey		Estimated SHGWT[4]	
	Station (feet)	Offset (feet)	(feet)	(feet)	Depth Below Ground Surface (feet)	Elevation NAVD 88 (feet)		Soil Map Unit	SHGWT Depth[3] (feet)	Depth Below Ground Surface (feet)	Elevation NAVD 88 (feet)
Osceola County											
AB - 1	491+26	97 LT	5.0	81.7	4.0	77.7	8/17/2021	22	0.5-1.5	3.0	78.7
AB - 2	494+41	100 RT	5.5	81.6	4.0	77.6	8/12/2021	22	0.5-1.5	2.5	79.1
AB - 3	497+28	73 LT	6.0	84.7	5.0	79.7	8/17/2021	22/27	0.5-1.5	4.5	80.2
AB - 4	500+19	95 RT	6.0	82.1	4.0	78.1	8/12/2021	22	0.5-1.5	3.0	79.1
AB - 5	503+26	81 LT	4.5	81.8	3.2	78.6	8/17/2021	22/24	0.5-1.5/2.0-3.5	2.0	79.8
AB - 6	506+26	88 RT	6.0	81.7	4.5	77.2	8/12/2021	22/24	0.5-1.5/2.0-3.5	3.5	78.2
AB - 7	509+34	76 LT	4.5	81.0	2.5	78.5	8/17/2021	22	0.5-1.5	1.5	79.5
AB - 8	512+35	56 RT	10.0	86.3	8.0	78.3	8/12/2021	22	0.5-1.5	7.0	79.3
AB - 9	515+26	76 LT	4.5	83.7	4.0	79.7	8/17/2021	22	0.5-1.5	3.0	80.7
AB - 10	517+60	84 RT	7.5	83.5	6.5	77.0	8/12/2021	22	0.5-1.5	4.0	79.5
AB - 11	521+22	102 LT	4.0	82.4	2.5	79.9	8/17/2021	22	0.5-1.5	1.5	80.9
AB - 12	524+41	88 RT	5.5	82.4	3.0	79.4	8/12/2021	22	0.5-1.5	2.0	80.4
AB - 13	527+44	80 LT	4.5	82.7	1.2	81.5	8/17/2021	22	0.5-1.5	0.0	82.7
AB - 14	530+08	68 RT	3.5	83.6	1.5	82.1	8/12/2021	22	0.5-1.5	0.5	83.1
AB - 15	533+41	83 LT	4.0	83.6	1.2	82.4	8/17/2021	22	0.5-1.5	0.5	83.1
AB - 16	536+17	116 RT	8.0	86.8	5.0	81.8	8/12/2021	22	0.5-1.5	4.0	82.8
AB - 17	539+42	85 LT	4.5	85.9	2.5	83.4	8/17/2021	22	0.5-1.5	1.5	84.4
AB - 18	542+35	79 RT	4.0	83.9	1.5	82.4	8/12/2021	22	0.5-1.5	0.0	83.9
AB - 19	544+62	94 LT	3.5	85.3	1.8	83.5	8/17/2021	22	0.5-1.5	1.0	84.3
AB - 20	548+35	66 RT	4.0	86.0	1.5	84.5	8/12/2021	22	0.5-1.5	0.5	85.5

TABLE 2
Summary of Seasonal High Groundwater Table Estimates
S.R. 535 PD&E Study from U.S. 192 to North of World Center Drive (S.R. 536)
Orange and Osceola Counties, Florida
FPN: 437174-2-22-01
Tierra Project No: 5511-19-052

Boring Number	Boring Location[1] C/L SR 535		Boring Depth[2]	Ground[1] Surface Elevation	Measured GWT		Date Groundwater Table Recorded	USDA Soil Survey		Estimated SHGWT[4]	
	Station (feet)	Offset (feet)	(feet)	(feet)	Depth Below Ground Surface (feet)	Elevation NAVD 88 (feet)		Soil Map Unit	SHGWT Depth[3] (feet)	Depth Below Ground Surface (feet)	Elevation NAVD 88 (feet)
Orange County											
AB - 21	551+36	81 LT	3.5	86.3	1.5	84.8	8/17/2021	44	0.0-3.5	0.5	85.8
AB - 22	554+28	90 RT	4.0	89.2	3.0	86.2	8/13/2021	44	0.0-3.5	2.5	86.7
AB - 23	557+27	77 LT	5.0	87.3	2.5	84.8	8/17/2021	26	0.5-1.5	1.5	85.8
AB - 24	560+20	85 RT	4.5	87.4	3.2	84.2	8/13/2021	44	0.0-3.5	2.0	85.4
AB - 25	563+51	113 LT	4.5	89.3	3.2	86.1	8/16/2021	44	0.0-3.5	2.0	87.3
SH - 26	566+56	70 RT	4.0	90.3	2.5	87.8	8/13/2021	34	2.0-3.5	1.5	88.8
SH - 27	569+80	97 LT	5.0	91.0	2.0	89.0	8/16/2021	34/44	2.0-3.5/0.0-3.5	1.0	90.0
SH - 28	572+29	81 RT	4.0	90.4	1.2	89.2	8/13/2021	34	2.0-3.5	0.0	90.4
SH - 29	575+26	85 LT	4.0	89.6	1.3	88.3	8/16/2021	44	0.0-3.5	0.0	89.6
AB - 30	579+30	120 RT	5.0	91.6	3.0	88.6	8/13/2021	44	0.0-3.5	2.0	89.6
AB - 31	581+30	68 LT	10.0	94.9	7.5	87.4	8/16/2021	44	0.0-3.5	6.5	88.4
AB - 32	584+26	95 RT	4.5	91.3	3.3	88.0	8/16/2021	44	0.0-3.5	2.5	88.8
AB - 33	587+05	84 LT	4.0	93.9	3.5	90.4	8/16/2021	3/44	+2.0-0.0/0.0-3.5	2.5	91.4
AB - 34	590+10	78 RT	3.5	92.2	3.0	89.2	8/16/2021	3/44	+2.0-0.0/0.0-3.5	1.5	90.7
AB - 35	593+29	80 LT	3.0	94.0	2.0	92.0	8/16/2021	3	+2.0-0.0	1.0	93.0
AB - 36	595+49	83 LT	4.0	94.5	3.5	91.0	8/16/2021	3	+2.0-0.0	2.5	92.0
AB - 37	599+35	109 RT	3.5	95.6	1.0	94.6	8/16/2021	34	2.0-3.5	0.0	95.6
AB - 38	602+32	87 RT	3.5	96.5	2.7	93.8	8/16/2021	34	2.0-3.5	1.5	95.0
AB - 39	605+67	111 LT	4.0	97.9	2.7	95.2	8/16/2021	26	0.5-1.5	1.5	96.4

(1) Boring locations and ground surface elevations were provided by WBQ Design & Engineering, Inc.

(2) Depth below existing grades at time of field services.

(3) Seasonal high groundwater table depth reported in the Soil Survey of Orange and Osceola Counties, Florida published by the USDA/NRCS.

(4) Seasonal high groundwater table depth estimated based on soil stratigraphy, measured groundwater levels from the borings, the USDA NRCS Soil Survey information, and surrounding topography.

TABLE 3

Summary of Seasonal High Groundwater Table Estimates for Ponds and FPC Sites
SR 535 PD&E Study from US 192 to North of World Center Drive
Orange and Osceola Counties, Florida
FPN: 437174-2-22-01
Tierra Project No: 5511-19-052

Boring Number	Boring Location[1] C/L Construction		Boring Depth[2]	Ground Surface Elevation NAVD88[1]	Measured GWT		Date Groundwater Table Recorded	USDA Soil Survey		Estimated SHGWT[4]	
	Station	Offset	(feet)	(feet)	Depth Below Ground Surface (feet)	Elevation NAVD88 (feet)		Soil Map Unit	SHGWT Depth[3] (feet)	Depth Below Ground Surface (feet)	Elevation NAVD88 (feet)
OSCEOLA COUNTY											
Pond 2-3											
PBS - 2-3-1	1506+51	165' RT.	8.5	85.0	7.7	77.3	9/11/2023	24	2.0-3.5	7.0	78.0
PBS - 2-3-2	1503+49	356' RT.	7.0	82.2	6.0	76.2	9/11/2023	22	0.5-1.5	4.2	78.0
PBS - 2-3-3	1500+65	173' RT.	5.5	82.4	5.2	77.2	9/11/2023	22	0.5-1.5	3.5	78.9
ORANGE COUNTY											
Pond 3-2											
PBS - 3-2-1	1600+37	622' LT.	5.0	95.7	4.4	91.3	9/18/2023	26	0.5-1.5	3.5	92.2
PBS - 3-2-2	1597+58	327' LT.	5.0	94.7	4.6	90.1	9/18/2023	44	0.0-3.5	2.8	91.9
Pond 3-3											
PBS - 3-3-1	1593+91	239' RT.	9.0	97.7	8.3	89.4	9/11/2023	44	0.0-3.5	7.0	90.7
PBS - 3-3-2	1589+39	536' RT.	Boring was not performed due to underground utilities								
Pond 4-2											
PBS - 4-2-1	1585+38	198' LT.	5.0	92.4	3.3	89.1	9/11/2023	44	0.0-3.5	1.2	91.2
FPC-1											
FPC - 1-1	1586+69	637' RT.	4.0	92.2	1.7	90.5	9/18/2023	44	0.0-3.5	1.3	90.9
FPC - 1-2	1584+92	622' RT.	4.0	91.9	1.5	90.4	9/18/2023	44	0.0-3.5	1.2	90.7
FPC - 1-3	1584+51	886' RT.	3.0	91.6	1.0	90.6	9/15/2023	42	+1.0-2.0	0.5	91.1
FPC-2											
FPC - 2-1	1579+45	569' RT.	4.0	91.1	1.7	89.4	9/18/2023	44	0.0-3.5	1.4	89.7
FPC - 2-2	1577+08	780' RT.	4.0	90.6	1.0	89.6	9/15/2023	44	0.0-3.5	0.7	89.9
FPC - 2-3	1580+65	841' RT.	4.0	91.2	1.8	89.4	9/15/2023	3	+2.0-0.0	1.3	89.9

TABLE 3

Summary of Seasonal High Groundwater Table Estimates for Ponds and FPC Sites
SR 535 PD&E Study from US 192 to North of World Center Drive
Orange and Osceola Counties, Florida
FPN: 437174-2-22-01
Tierra Project No: 5511-19-052

Boring Number	Boring Location[1] C/L Construction		Boring Depth[2]	Ground Surface Elevation NAVD88[1]	Measured GWT		Date Groundwater Table Recorded	USDA Soil Survey		Estimated SHGWT[4]	
	Station	Offset			Depth Below Ground Surface	Elevation NAVD88		Soil Map Unit	SHGWT Depth[3]	Depth Below Ground Surface	Elevation NAVD88
			(feet)	(feet)	(feet)	(feet)			(feet)	(feet)	(feet)
FPC-3											
FPC - 3-1	1576+41	537' RT.	4.0	90.6	1.4	89.2	9/18/2023	44	0.0-3.5	1.2	89.4
FPC - 3-2	1572+38	504' RT.	4.0	90.6	2.1	88.5	9/18/2023	34/44	2.0-3.5/0.0-3.5	1.7	88.9
FPC - 3-3	1574+07	680' RT.	5.0	90.6	1.7	88.9	9/18/2023	44	0.0-3.5	1.3	89.3
FPC-4											
FPC - 4-1	1574+84	192' LT.	4.0	87.0	2.2	84.8	9/11/2023	44	0.0-3.5	0.0	87.0
FPC - 4-2	1571+52	488' LT.	5.5	89.4	3.5	85.9	9/11/2023	3	+2.0-0.0	1.0	88.4
FPC-5											
FPC - 5-1	1567+49	834' RT.	5.0	89.6	3.8	85.8	9/18/2023	34/44	2.0-3.5/0.0-3.5	2.5	87.1
FPC - 5-2	1567+06	498' RT.	5.0	89.6	4.3	85.3	9/18/2023	34	2.0-3.5	2.0	87.6
FPC - 5-3	1564+51	684' RT.	5.0	88.7	4.3	84.4	9/18/2023	44	0.0-3.5	2.0	86.7

[1] Station, offset, and elevation of the borings were based on design files and LiDAR data provided by BCC Engineering, Inc. and GPS coordinates obtained by Tierra, Inc. at the time of fieldwork.

[2] Depth below existing grades at time of field services.

[3] Seasonal high groundwater table depth reported in the Soil Survey of Orange and Osceola Counties, Florida published by the USDA/NRCS.

[4] Seasonal high groundwater table depth estimated based on soil stratigraphy, measured groundwater levels from the borings, the USDA NRCS Soil Survey information, and surrounding topography.

TABLE 4
SUMMARY OF HYDRAULIC CONDUCTIVITY TEST RESULTS
S.R. 535 PD&E Study from U.S. 192 to North of World Center Drive (S.R. 536)
Orange and Osceola Counties, Florida
FPN: 437174-2-22-01
Tierra Project No.: 5511-19-052

Pond ID.	Boring No./Test Location	Boring/Test Location[1]		Ground Surface Elevation[1] (feet, NAVD 88)	Test Elevation (feet, NAVD 88)	Estimated SHGW Elevation (feet, NAVD 88)	Vertical Hydraulic Conductivity[2] (feet/day)	Horizontal Hydraulic Conductivity (feet/day)	Confining Layer Elevation (feet, NAVD 88)	Effective Porosity (%)
		Station	Offset							
2-3	PBS-2-3-1	1506+51	165' RT.	85.0	82.0	78.0	33	50	< 76.5	25
	PBS-2-3-2	1503+49	356' RT.	82.2	79.2	78.0	13	20	< 75.2	20
	PBS-2-3-3	1500+65	173' RT.	82.4	79.4	78.9	12	18	< 76.9	20

Notes:

[1] Station, offset, and elevation of the borings were based on design files and LiDAR data provided by BCC Engineering, Inc. and GPS coordinates obtained by Tierra, Inc. at the time of fieldwork.

[2] Measured hydraulic conductivity rates of soils encountered at the time of testing. No reduction or safety factors have been applied to the values. We recommend the pond designer apply the appropriate safety factors to these values.

Appendix I

Correspondence and Meeting Minutes

FW: SR-535 PD&E - Historical Maintenance Issues & Drainage Connection Permits

Saidallah, Sal <Sal.Saidallah@dot.state.fl.us>
Fri 3/18/2022 12:51 PM
To:Alex George <ageorge@bcceng.com>

Alex`,

Per your request.

Thank you,

From: Saliba, Assaad <Assaad.Saliba@dot.state.fl.us>
Sent: Tuesday, March 15, 2022 9:23 AM
To: Saidallah, Sal <Sal.Saidallah@dot.state.fl.us>
Cc: Koroitamudu, Seta <seta.koroitamudu@dot.state.fl.us>
Subject: RE: SR-535 PD&E - Historical Maintenance Issues & Drainage Connection Permits

Spoke with the inspectors. The only flooding they noticed was around Poinciana, but it was related to construction activities in the area. No other flooding issues have been observed within the section in question.
Please let me know if you have any questions.

Thank you.

Assaad Saliba
Orlando Operations
420 W. Landstreet Rd.
Orlando, FL 32824
(321)319-8113
assaad.saliba@dot.state.fl.us

From: Saidallah, Sal <Sal.Saidallah@dot.state.fl.us>
Sent: Monday, March 14, 2022 2:57 PM
To: Alex George <ageorge@bcceng.com>; Saliba, Assaad <Assaad.Saliba@dot.state.fl.us>
Cc: Sebastian Honigfort <shonigfort@bcceng.com>; Koroitamudu, Seta <seta.koroitamudu@dot.state.fl.us>
Subject: RE: SR-535 PD&E - Historical Maintenance Issues & Drainage Connection Permits

Alex,

Any time on Friday after 10am to review drainage connection permit.

Thank you,

From: Alex George <ageorge@bcceng.com>
Sent: Monday, March 14, 2022 1:30 PM
To: Saliba, Assaad <Assaad.Saliba@dot.state.fl.us>; Saidallah, Sal <Sal.Saidallah@dot.state.fl.us>
Cc: Sebastian Honigfort <shonigfort@bcceng.com>; Koroitamudu, Seta <seta.koroitamudu@dot.state.fl.us>
Subject: RE: SR-535 PD&E - Historical Maintenance Issues & Drainage Connection Permits

Assaad & Sal-

I am available to stop by to discuss any historical drainage issues and review the Drainage Connection permits on Friday (instead of Sebastian), but wouldn't be able to be there until about 10A. I am available all day Friday – please let me know what time works best for you to meet.

Also – I was wondering if I would be able to copy any of the connection permit docs that I review, or if taking a picture of them is my only option.

I'll wait to hear from you.

Thanks,
Alex

Alex George, PE
Senior Drainage Engineer

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t. 407.951.6444 | m. 407.697.2079 | www.bcceng.com

From: Sebastian Honigfort <shonigfort@bcceng.com>
Sent: Monday, March 14, 2022 12:59 PM
To: Alex George <ageorge@bcceng.com>
Subject: FW: SR-535 PD&E - Historical Maintenance Issues & Drainage Connection Permits

Hi Alex,

As you will note below, drainage connection permits can be reviewed at their office but are not allowed to be taken out. I'm trying to schedule a time for a visit and was wondering if you would like me to go, or if it would be easier for you to attend.

Please let me know and I'll coordinate accordingly.

Thanks,

Sebastian Honigfort, PE, ENV SP
Water Resources Engineer

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t. 813.637.0000 | www.bcceng.com

From: Koroitamudu, Seta <seta.koroitamudu@dot.state.fl.us>
Sent: Monday, March 14, 2022 12:16 PM
To: Saidallah, Sal <Sal.Saidallah@dot.state.fl.us>; Saliba, Assaad <Assaad.Saliba@dot.state.fl.us>; Sebastian Honigfort <shonigfort@bcceng.com>
Subject: RE: SR-535 PD&E - Historical Maintenance Issues & Drainage Connection Permits

Please do not release any of our drainage permits out of the office. They can be reviewed here.

Assaad – Please get with the inspectors team(especially Trish) and Samir regarding drainage issues. The one I remember is the flooding issues we had in the median between Poinciana Blvd. and Polynesian Blvd.

Thanks,

Seta Koroitamudu, P.E.
Florida Department of Transportation
Orlando Operations Administrator
(321) 319-8100 (Main)
(321) 319-8102 (Office)
(407) 558-8168 (C)
seta.koroitamudu@dot.state.fl.us

From: Saidallah, Sal <Sal.Saidallah@dot.state.fl.us>
Sent: Monday, March 14, 2022 11:00 AM
To: Saliba, Assaad <Assaad.Saliba@dot.state.fl.us>; shonigfort@bcceng.com
Cc: Koroitamudu, Seta <seta.koroitamudu@dot.state.fl.us>
Subject: RE: SR-535 PD&E - Historical Maintenance Issues & Drainage Connection Permits

Sebastian,

Since we have a lot of drainage connection permits package you need to come to our office and review them or you can take and copy them then bring them back.

If you wants to come to our office on Friday at 8:00 am, or pickup the day and let you know if I am available.

Thank you,

From: Saliba, Assaad <Assaad.Saliba@dot.state.fl.us>
Sent: Thursday, March 10, 2022 2:27 PM
To: Saidallah, Sal <Sal.Saidallah@dot.state.fl.us>
Cc: Koroitamudu, Seta <seta.koroitamudu@dot.state.fl.us>
Subject: FW: SR-535 PD&E - Historical Maintenance Issues & Drainage Connection Permits

Sal,

Could you please forward me any permits you can find for this section of roadway (both Osceola and Orange Counties). Thanks.

Thank you.

Assaad Saliba

Orlando Operations
420 W. Landstreet Rd.
Orlando, FL 32824
(321)319-8113
assaad.saliba@dot.state.fl.us

From: Meade, Ron <Ron.Meade@dot.state.fl.us>
Sent: Thursday, March 10, 2022 2:05 PM
To: Sebastian Honigfort <shonigfort@bcceng.com>
Cc: Koroitamudu, Seta <seta.koroitamudu@dot.state.fl.us>; Saliba, Assaad <Assaad.Saliba@dot.state.fl.us>
Subject: RE: SR-535 PD&E - Historical Maintenance Issues & Drainage Connection Permits

Sebastian,
I will ask our field unit – Orlando Operations to provide this information. They are in this area and know the history and permitting information.

Thanks,
Ron

Ron J. Meade P.E.
District Five Maintenance Engineer
FDOT – District 5
Office (386) 943-5277
Cell (386) 956-8959
Ron.meade@dot.state.fl.us

From: Sebastian Honigfort <shonigfort@bcceng.com>
Sent: Thursday, March 10, 2022 1:48 PM
To: Meade, Ron <Ron.Meade@dot.state.fl.us>
Subject: SR-535 PD&E - Historical Maintenance Issues & Drainage Connection Permits

Good afternoon Ron,

Apologies that I missed your call last Friday. I left another voicemail on your phone earlier but figured it might be easier to just follow up with an email.

As I mentioned, we are part of the team that's currently conducting a PD&E study for the SR-535 corridor, extending from US-192 in Osceola County to just north of SR-536 (World Center Drive) in Orange County.

To get a better understanding of the existing drainage conditions and to facilitate the study, I was wondering if you could help me with the following:

- Are there any historical or recurring maintenance issues that have been documented within the corridor?
- Does the department have any drainage connection permits on file for this area?

Appreciate any help or input you can provide.

Thank you,

Sebastian Honigfort, PE, ENV SP
Water Resources Engineer

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MEETING MINUTES

PROJECT	FPID 437174-2: SR 535 PD&E Study from US 192 to just N of World Center Dr (SR 536)
SUBJECT	Drainage Kickoff Meeting
DATE	May 19, 2021
TIME	9:00 AM

Attendee list provided on attached call-in sheet.

1. **General Information** –
   a. The project involves the widening of SR 535 from 4 to 6 lanes between US 192 to just N of World Center Dr (SR 536), a length of approximately 2.2 miles in Osceola and Orange Counties.
   b. Ms. Windom provided introductions and a brief background of the project. Mr. Rodriguez from Metric Engineering, Inc. (Metric) who introduced the project team and noted that BCC Engineering had recently joined the team as a sub-consultant to lead the drainage for the project. Mr. George will manage the drainage efforts, and Mr. Honigfort will serve as EOR for the Pond Siting Report (PSR) and Location Hydraulic Report (LHR).

2. **Existing Drainage Overview –**
   a. The project corridor falls within South Florida Water Management District (SFWMD) jurisdiction and is located within the Shingle Creek watershed [within Shingle Creek (WBID 3169A) and Reedy Canal (WBID 3169B) WBIDs], which is part of the larger Upper Kissimmee River Basin. The project is also within the Lake Okeechobee Basin Management Action Plan (BMAP) limits.
   b. Mr. George noted that there is partial stormwater treatment along the corridor, and 3 minor cross drains under SR 535 (2-30" near Osceola Parkway, 2-24" pipes in the vicinity of Polynesian Isle Boulevard, and a 1-24" pipe near SR 417 based on the Straight Line Diagrams).
   c. There are Zone A floodplains and conservation easements (CEs) located on the west side of SR 535 in Orange County (see attached exhibit). Ms. Windom stated that any CE release effort would be different if the CEs were for Orange County or SFWMD. The CE information will be investigated. Mr. Hickson stated that the conservation easements should be considered a "soft" constraint for pond siting.

3. **Site Conditions –**
   a. The Osceola County section is highly developed, while the Orange County section is currently relatively undeveloped.

b. There is a lot of current and future development proposed along the corridor based on a review of recent SFWMD Environmental Resource Permit (ERP) activity, so the number of undeveloped parcels will significantly decrease in the future (see attached exhibit).

c. Based on a review of the NRCS Web Soil survey, the soils are poorly drained (hydrologic soil groups A/D and B/D), with high SHGWT anticipated.

d. Florida Gas Transmission (FGT) lines are located across SR 535 just north of Osceola Parkway crossing and along the east side of SR 535 north of Osceola Parkway. The FGT line has been surveyed for this project. FGT status and setback criteria are still being investigated, and will be confirmed with the utility coordinator for this project.

4. Roadway Typical Sections/Drainage Analysis -

a. The existing roadway is a 4-lane divided rural section.

b. There was a planning study prepared for this project, and the typical sections developed for the planning study served as the starting point for the analysis of the proposed roadway typical sections. The proposed typical sections to be evaluated include 6-lane rural and high-speed suburban sections.

c. The typical sections are still being evaluated (including buffered bike lanes and shared use paths), and refined. The location of the FGT line on the east side of SR 535 may eliminate a shared use path on the east side of the roadway. The typical sections, as well as intersection improvements, are being coordinated with George Borchik.

d. The drainage evaluation of the typical sections will consist of a general discussion of the typical sections to assist with the evaluation and selection of a preferred typical section(s).

e. Mr. Hickson inquired whether there were any water table issues within the corridor. No current issues have been identified, but will be investigated. Mr. Hickson stated that base clearance issues on a recent SR 40 project required the addition of underdrain.

f. Mr. McConaghy stated that the integrity of the existing cross drains should be investigated to determine if extension is a viable option. BCC will review the available plans/information to determine when the cross drains were constructed, and coordinate with District Maintenance.

5. Regulatory Criteria –

a. Improvements will require water quality and attenuation to meet SFWMD criteria.

b. Mr. George noted that Shingle Creek is an impaired waterbody, and that nutrient loading will have to be evaluated as part of this study. In turn, he inquired if there are any additional elements that need to be considered for the BMAP. Mr. Hickson responded by stating that SFWMD will likely only be interested in phosphorous loading. He suggested investigating the Daryl Carter Parkway improvements by Horizon Engineering to see what was done for that project.

c. Mr. Hickson noted that FDEP is in the process of implementing the Statewide Stormwater Rule, which may come into effect within a year. Dry detention facilities (e.g., linear treatment swales) may not even be a viable option when this project reaches the design phase, so should not be

used as a primary alternative for stormwater treatment. Mr. Vazquez noted that SFWMD does not currently allow any nutrient load reductions for dry detention.

d. An early coordination meeting will be scheduled with SFWMD to identify/confirm criteria.

6. Environmental Look Around (ELA) –

a. An ELA meeting will be scheduled with the counties and SFWMD to identify potential stormwater pond locations/opportunities (or identifying constraints), including alternatives within the Osceola Parkway interchange footprint.

b. In addition, there appears to be multiple locations where joint-use pond opportunities exist with private development. There is both existing and proposed private development located adjacent to SR 535 that should be investigated.

c. Potential joint-use alternatives were discussed briefly, and included (see attached exhibit):

- The developments and existing stormwater ponds southeast of the SR 535/Osceola Parkway interchange;
- The developments and existing stormwater ponds west of SR 535 and south of Polynesian Isle Blvd (Indian Wells);
- In the vicinity of the Sunrise City Plaza, east of SR 535;
- The future extension of International Parkway, and associated development; and
- The LBV Factory Stores, east of SR 535 and south of SR 417.

d. The goal of the ELA would be to have the joint-use coordination completed prior to design, and documented in the Pond Siting Report. Ms. Snyder noted that ELA options would be vetted first to determine viable alternatives, and then the level of further coordination required can be assessed (along with any work currently not in the scope).

e. Mr. George asked if there are any other considerations for joint-use sites, other than verifying that the sites have sufficient capacity to accept additional runoff. Mr. Hickson stated that an easement would be required to convey runoff to the pond, as well as for the pond itself. The timing of future development (where a project might be in terms of design and permitting) will also factor into the analysis.

7. Pond Siting Alternatives –

a. As-built plans and existing permits still are being reviewed to identify and determine existing drainage patterns and contributing off-site flows. All basins appear to be open basins.

b. There are few undeveloped parcels within the Osceola section of the project. Mr. Hickson noted that since the project is not currently funded for construction (and on tentative 5-year work program for design), the undeveloped parcels will not likely be available at the time of design. Therefore, the evaluation should also include developed parcels. BCC will schedule a meeting with District Right-of-Way to identify potential developed parcels for offsite pond locations.

c. Existing stormwater facilities for Osceola Parkway will be investigated as part of the coordination with Osceola County. There is a relic sinkhole located east of SR 535 which may have previously been evaluated for a pond expansion for the Osceola Convention Center which was not constructed. The FGT line also bisects the ponds within the interchanges infield area, which may limit the potential use of these ponds.

d. The FGT crossing of SR 535 at Osceola Parkway will most likely be used as a basin divide.

e. The pond alternatives will include joint-use facilities determined from the ELA (if found); undeveloped parcels and developed parcels. Swales (if found to be feasible) will be included as an additional option, not a primary alternative.

f. There was a brief discussion about the feasibility of utilizing the rapid infiltration basins (RIBs) located to the east of SR 535 in Orange County. Ms. Windom stated that the Department has previously met with Orange County regarding the RIBs, and that the County stated there was no additional capacity.

8. Floodplains -

a. Mr. George stated that there should only be minimal floodplain encroachment (if any) from the proposed roadway typical sections within the Orange County section. This will also be dependent on what is found regarding the FGT easement requirements.

b. Mr. Hickson suggested to discuss any potential floodplain encroachment early with the SFWMD. He added that even minimal impacts could cause issues. Mr. George concurred and stated that BCC will discuss this with SFWMD at the early coordination meeting.

The meeting adjourned at 10:00 am.

******* END OF MEETING*******

<u>Note:</u> The above reflects the writer's understanding of the contents of the meeting. If any misinterpretations or inaccuracies are included, please contact the author within five (5) days of the submittal date.

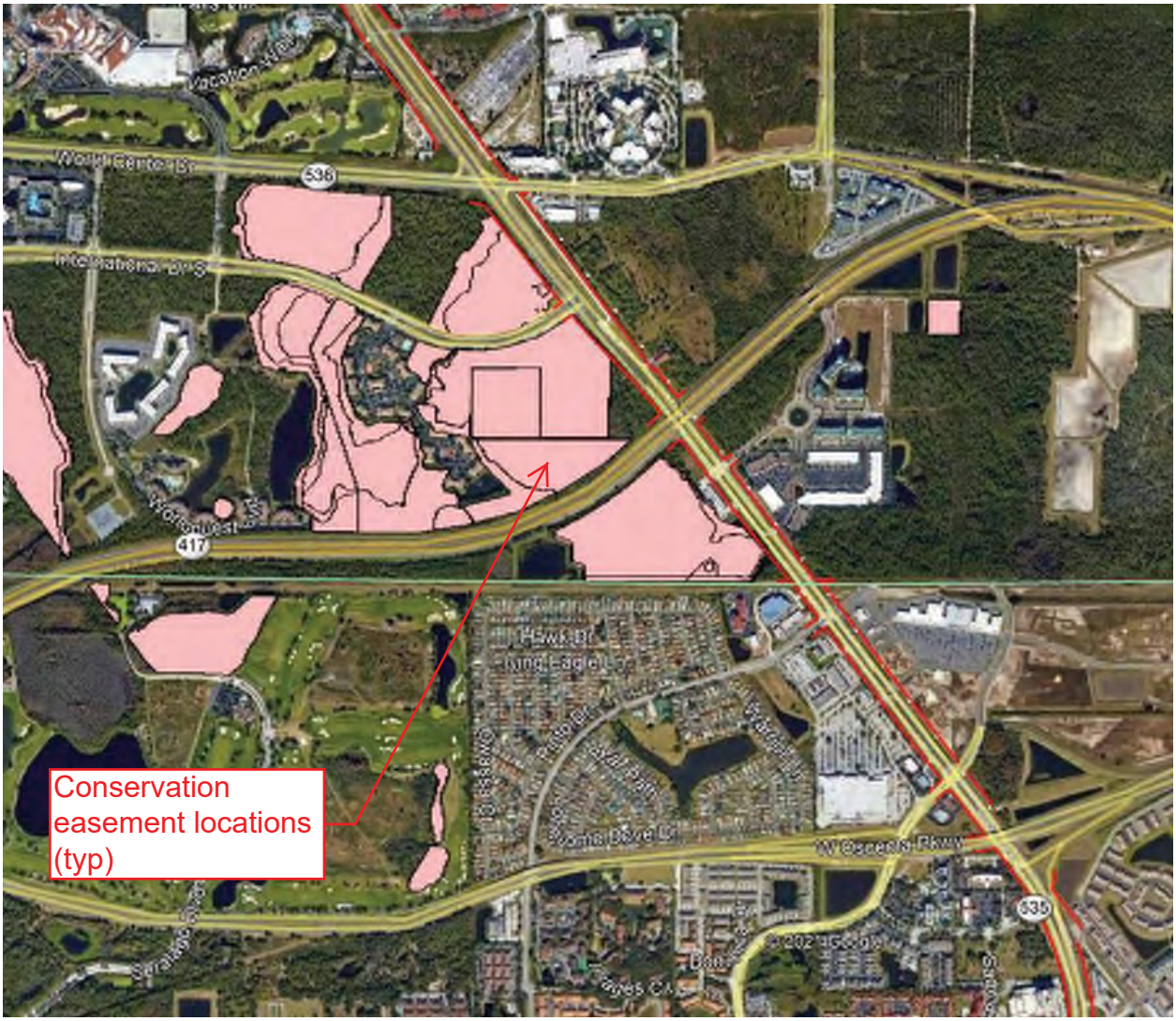
MEETING CALL-IN SHEET

Project:	FPID 437174-2: SR 535 PD&E Study from US 192 to just N of World Center Dr (SR 536)	**Meeting Date:**	5/19/2021
Facilitator:	Amy Windom (FDOT)	**Place/Room:**	Virtual Conference Call

Name	Title	Organization	Phone	E-Mail
Ferrell Hickson	District Drainage Design Engineer	FDOT	(386) 943-5433	ferrell.hickson@dot.state.fl.us
Patrick McConaghy	Drainage Design Engineer	FDOT	(386) 943-5437	patrick.mcconaghy@dot.state.fl.us
Karen Snyder	Project Development Manager	FDOT	(386) 943-5404	karen.snyder@dot.state.fl.us
Amy Windom	Project Manager	FDOT	(386) 943-5074	amy.windom@dot.state.fl.us
Carlos Rodriguez	Project Manager	Metric Enginering	(305) 968-2546	carlos.rodriguez@metriceng.com
Paul Carballo	Project Engineer	Metric Engineering	(305)235-5098	paul.carballo@metriceng.com
Alex George	Senior Drainage Engineer	BCC Engineering	(407)951-6444	ageorge@bcceng.com
Alex Vazquez	Water Resources Director	BCC Engineering	(305)670-2350	avazquez@bcceng.com
Sebastian Honigfort	Water Resources Engineer	BCC Engineering	(813)637-0000	shonigfort@bcceng.com

FPID 437174-2: SR 535 PD&E Study from US 192 to just N of World Center Dr (SR 536)

CONSERVATION EASEMENTS IN THE VICINITY OF THE SR 535 CORRIDOR

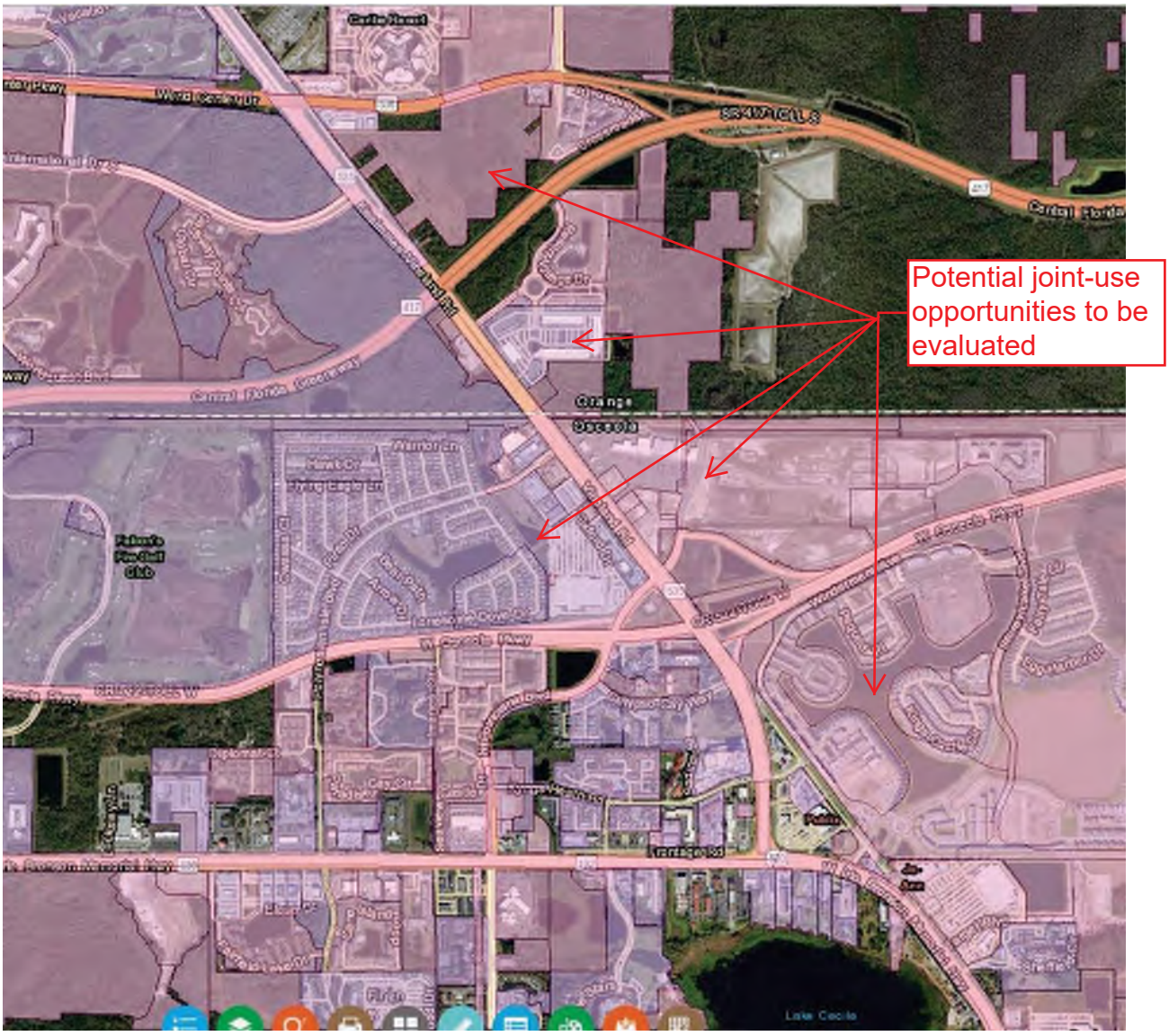


Source: Google Earth ™

ZONE A FLOODPLAINS IN THE VICINITY OF THE SR 535 CORRIDOR

Source: Google Earth ™ with FEMA NFHL layer

ERP APPLICATIONS IN THE VICINITY OF THE SR 535 CORRIDOR



Source: SFWMD (https://apps.sfwmd.gov/WAB/SFWMDMapping/index.html)

MEETING MINUTES

PROJECT	FPID 437174-2: SR 535 PD&E Study from SR 530 (US 192) to just N of SR 536 (World Center Dr)
SUBJECT	Pond Siting Meeting
DATE	July 29, 2022
TIME	10:00 AM

Attendee list is provided on attached call-in sheet. In addition, a kmz showing the pond site alternatives presented is included with these minutes.

1. **General Information**
   The project involves the widening of SR 535 from 4 to 6 lanes between SR 530 to just north of SR 536, a length of approximately 2.2 miles in Osceola and Orange Counties.

2. **Roadway Typical Sections and Intersection Improvements**
   a. The existing roadway is a 4-lane divided rural section within the project limits, with the exception of the southernmost section of roadway between US 192 and Kings Heath Road. This section is an urban roadway with curb and gutter.
   b. Mr. Rodriguez discussed the 3 proposed typical sections still under evaluation. All 3 typical sections are for a 6-lane divided urban roadway (inside widening, outside widening and outside widening with bike lanes.
   c. In addition to the proposed widening of SR 535, various intersection improvements are proposed within the project limits. Intersection improvements are being considered at the following locations:
      i. Poinciana Boulevard
      ii. Polynesian Isle Boulevard
      iii. International Drive
      iv. World Center Drive (SR 536)
   d. It was noted that there is a high groundwater table in the corridor. Mr. Hickson asked if the existing road is exhibiting any pavement failures due to the high groundwater table. Mr. George responded by stating that the Orlando Operations office was contacted to inquire about any historical pavement issues, and no pavement or base failure issues were noted. Inside widening would be preferable to outside widening to maximize the base clearance in the corridor.

3. Project Drainage Basins

The project has been broken into 5 basins for the purpose of evaluating pond site alternatives. The basins are broken out as follows:

i. Basin 1 - SR 535 from US 192 (begin project) to Kyngs Heath Road
ii. Basin 2 - SR 535 from Kyngs Heath Road to SR 536
iii. Basin 3 - SR 535 from SR 536 to north of SR 536 (end project)
iv. Basin 4 – World Center Drive (SR 536) quadrant road
v. Basin 5 – International Drive quadrant road

A discussion of the pond alternatives within each basin ensued.

4. Basin 1 Pond Site Alternatives

a. Basin 1 was improved as part of the SR 530 widening (SFWMD ERP No. 49-00883-P, App. No. 971113-1), and discharges to an existing wet detention pond located on the south side of SR 530 west of Sr 536.
b. Mr. George noted that there is limited change in the hydrologic characteristics, and only a minor increase in impervious area, from existing to proposed conditions. Based on existing permit information, there is some treatment volume available in the existing offsite ponds.
c. Two (2) alternatives were developed for Basin 1:
    i. modify the existing FDOT pond as needed to accommodate minor increase in impervious area; and
    ii. adjust the northern basin boundary at Kyngs Heath Road to reduce the contributing drainage area to the existing pond in order to utilize the existing pond without modification
d. Mr. Hickson asked if the nutrient loading perspective has been considered, and stated that the existing SR 530 likely was not designed to provide net improvement for nutrient loading. Mr. Hickson noted that this was an issue for the I-4 widening projects, given that the projects are within the Okeechobee River Basin BMAP. Mr. George stated that net improvement for nutrient loading would be evaluated. Mr. Hickson suggested that the design team review the nutrient loading calculations performed for the I-4 Ultimate project by AECOM to address this issue. A pre vs. post nutrient loading analysis may not be required for a retrofit of an existing pond, but will likely be required for all new ponds.
e. Mr. Hickson inquired if the project team had initiated discussions yet with SFWMD. He suggested that the project team reach out to SFWMD to discuss and clarify. Mr. George concurred and noted that the project team will set up an early coordination meeting with SFWMD staff to discuss.

5. Basin 2 Pond Site Alternatives

a. Basin 2 extends from Kyngs Heath Road to SR 536. In the existing condition, runoff is conveyed by roadside ditches to an existing FDOT pond within the Osceola Parkway interchange. This pond discharges east along Osceola Parkway, ultimately outfalling to unnamed wetlands associated with Shingle Creek.

b. Four (4) alternatives were developed for Basin 2:
    i. Pond 2-1 – this alternative is a proposed joint-use pond within the Storey Lake development east of SR 535 and south of Osceola Parkway. The Storey Lake development includes multiple wet detention ponds which discharge to Shingle Creek downstream of the existing SR 535 outfall. Based on a review of the existing permit documentation, there is an excess of approximately 11 ac-ft of treatment volume in the candelabra-shaped pond within the development. Mr. George noted that if this alternative becomes the recommended option for Basin 2, then a preliminary ICPR model would be developed to evaluate the extent of modifications needed to the pond control structures, as well as perform a check against the permitted finished floor elevations, in order to document no adverse impacts. Mr. Hickson noted that if this option was pursued, FDOT may require an easement over all interconnected ponds. Further discussion with FDOT R/W and Legal would be required for this option. Mr. George asked how far the coordination for a potential joint-use facility should be taken at this point, given that the project is not funded for design until FY 2026.
    ii. Pond 2-2 – this alternative utilizes a wet detention pond owned by (but located outside of) the Storey Lake development adjacent to Osceola Parkway. This pond currently drains to the candelabra-shaped pond within the development. Mr. Hickson noted that as SFWMD does not have any restriction of co-mingling runoff, it may be a better option to purchase this pond (as it does not appear to provide water quality treatment or attenuation for the development, but may be a borrow pit), treat the new impervious area in Pond 2-2 and re-route the runoff to the existing pond outfall along Osceola Parkway (rather than maintaining the outfall to the Storey Lake development ponds). Mr. Truncone stated that this approach would be preferable from a R/W perspective.
    iii. Pond 2-3 – this alternative consists of a new offsite wet detention pond located on the east side of SR 535, south of Osceola Parkway. This area is a developed site (strip mall and gas station), with potential contamination issues. This pond also includes the roadway R/W for Old Vineland Road, which dead-ends at the northern end of this pond.
    iv. Pond 2-4 - this alternative consists of a new offsite wet detention pond located on the west side of SR 535, south of Osceola Parkway. The pond is located on currently undeveloped parcels, although permits were recently found which shows future development.

c. Mr. Hickson asked about any other potential pond sites on developed sites located north of the Osceola Parkway interchange. Mr. George stated that he would discuss other potential pond site alternatives with Mr. Truncone.

d. Mr. Hickson suggested that the design team evaluate treating SR 535 south of Osceola Parkway in a new pond, and allowing the existing FDOT pond to treat SR 535 north of Osceola Parkway (compensatory treatment approach).

6. **Basin 3 Pond Site Alternatives**
   a. Basin 3 currently drains to an existing wet detention pond located in the northwest quadrant of the SR 535/SR 536 intersection. There are also existing FDOT ponds located in the northwest and southwest quadrants of the intersection.
   b. Two (2) pond option were evaluated for Basin 3:
      i. Pond 3-1 is an expansion of the existing pond in the northwest quadrant of the interchange.
      ii. Pond 3-2 is an expansion of the existing pond in the southwest quadrant of the interchange.

7. **Basins 4 and 5 Pond Alternatives**
   a. Basins 4 and 5 were evaluated as separate basins because it is unknown at this time whether the quadrant road options will ultimately be included as a final alternative.
   b. The quadrant roads are located within environmentally sensitive areas that consist of wetlands, floodplains and conservation easements.
   c. Two (2) new offsite pond alternatives were identified for each basin. The ponds are located on either side of the quadrant road, and sited to minimize the potential environmental and floodplain impacts to the degree feasible.

8. **Osceola Parkway Interchange Infield Area**
   a. While not identified as a separate basin, the proposed intersection improvement at Poinciana Boulevard will impact an existing County pond in the interchange infield area. Therefore, a proposed option to expand this existing pond to the east was provided to provide compensatory storage volume for the portion of the pond impacted by the proposed roadway improvement.
   b. Mr. George noted that there is a relic sinkhole in the vicinity of the Poinciana Parkway intersection improvement, and the geotechnical aspects of a pond expansion in this area would have to be explored in final design. Mr. Graeber also noted that the County did not want to utilize the infield area for potential FDOT ponds in prior discussions. The County would prefer to keep this area for potential future stormwater needs for Osceola Parkway.

9. **Floodplain Impacts and Compensation**
   a. The west side of SR 535 within the Orange County section is designated as a FEMA Zone A floodplain.
   b. The floodplain elevation was estimated using the simplified method (overlaying the floodplain on LiDAR contours) to determine an approximate floodplain depth and impact volume.
   c. The proposed quadrant roads within Basins 4 and 5 will result in significant floodplain impacts.
   d. The NRCS soil survey indicates that the groundwater table depth west of SR 535 is generally at the existing ground elevation. Therefore, floodplain compensation sites to mitigate for the floodplain impacts have been located on the east side of SR 535. Proposed cross drains under SR 535 will be required to hydraulically connect the floodplain compensation sites to the Zone A floodplain.
   e. Mr. Hickson noted that it may be worthwhile to state in the reports that any ditches located on the west side of SR 535 may be able to provide some floodplain compensation, pending geotech analysis in final design.

f. Three (3) floodplain compensation sites have been identified on the east side of SR 535 (FPC-1, FPC-2 and FPC-3).
g. Given the size of the floodplain, there is the potential that floodplain impacts due to SR 535 improvements (excluding the quadrant roads) could be could be addressed with roadside ditches or hydraulic modeling during final design.

10. Environmental Discussion

a. There are wetlands and existing conservation easements along the west side of SR 535 in the Orange County section.
b. The areas adjacent to SR 535 have also been identified as potential sand skink habitat.
The meeting adjourned at 11:00 am.

11. Other Items

a. Mr. Hickson suggested that the feasibility of the quadrant roads be established before performing any geotech for the ponds and FPC options in Basins 4 and 5 in order to avoid unnecessary geotechnical investigation. Mr. Rodriguez stated that the quadrant road evaluation should be complete with the next couple of months. Mr. George will hold off on requesting the geotech work in these basins until the determination on the quadrant roads has been made.
b. Mr. Hickson suggested that FDOT Legal and R/W be consulted to determine the R/W required for Pond 2-1 (the joint-use alternative with the Storey Lake development).

******* END OF MEETING*******

Note: The above reflects the writer's understanding of the contents of the meeting. If any misinterpretations or inaccuracies are included, please contact the author within five (5) days of the submittal date.

MEETING CALL-IN SHEET			
Project:	FPID 437174-2: SR 535 PD&E Study from US 192 to just N of World Center Dr (SR 536)	**Meeting Date:**	7/29/2022
Facilitator:	Alex George (BCC)	**Place/Room:**	Virtual Conference Call

Name	Title	Organization	Phone	E-Mail
Ferrell Hickson	District Drainage Design Engineer	FDOT	(386) 943-5433	ferrell.hickson@dot.state.fl.us
Casey Lyon	Environmental Permits Coordinator	FDOT	(386)943-5436	casey.lyon@dot.state.fl.us
David Graeber	Project Manager	FDOT	(386)943-5392	david.graeber@dot.state.fl.us
Nick Truncone	R/W Project Manager	FPC Group	(850)906-9997	nick@fpc-group.com
Carlos Rodriguez	Project Manager	Metric Engineering	(305) 968-2546	carlos.rodriguez@metriceng.com
Paul Carballo	Project Engineer	Metric Engineering	(305)235-5098	paul.carballo@metriceng.com
Rob Myers	Senior Environmental Scientist	Metric Engineering	(512)517-5121	rob.myers@metriceng.com
Gabriela Garcia	Project Engineer	Metric Engineering	(305)235-5098 x1403	gabriela.garcia@metriceng.com
Alex George	Senior Drainage Engineer	BCC Engineering	(407)951-6444	ageorge@bcceng.com
Carlos Formoso	Drainage Project Engineer	BCC Engineering	(305)670-2350	cformoso@bcceng.com
Zhimin Li	Drainage Engineer	BCC Engineering	(407)951-6444	zli@bcceng.com

MEETING MINUTES

PROJECT	FPID 437174-2: SR 535 PD&E Study from SR 530 (US 192) to just N of SR 536 (World Center Dr)
SUBJECT	SFWMD Pre-application meeting
DATE	November 16, 2022
TIME	10:00 AM

Attendees

Name	Agency/Firm	Email
Richard Lott	SFWMD	rlott@sfwmd.gov
Patty Therrien	SFWMD	ptherrie@sfwmd.gov
Ferrell Hickson	FDOT	fhickson@dot.state.fl.us
Casey Lyon	FDOT	casey.lyon@dfot.state.fl.us
Carlos Rodriguez	Metric Engineering	carlos.rodriguez@metriceng.com
Paul Carballo	Metric Engineering	paul.carballo@metriceng.com
Alex George	BCC Engineering	ageorge@bcceng.com
Carlos Formoso	BCC Engineering	cformoso@bcceng.com
Zhimin Li	BCC Engineering	zli@bcceng.com

Ms. Therrien noted that any decisions/remarks made by SFWMD representatives during this meeting would not be binding at the time of permit submittal. The purpose of this meeting is to provide the PD&E team with guidelines to develop the stormwater and floodplain compensation area alternatives for the Pond Siting Report. A separate meeting to discuss potential environmental impacts will be held with Lisa Prather (SFWMD).

1. **Project Overview**
   a. The project involves the widening of SR 535 from 4 to 6 lanes between SR 530 to just north of SR 536, a length of approximately 2.2 miles in Osceola and Orange Counties.
   b. The existing roadway is a 4-lane divided rural section within the project limits, with the exception of the southernmost section of roadway between US 192 and Kings Heath Road. This section is an urban roadway with curb and gutter.
   c. Proposed typical sections are still being evaluated. All 3 typical sections under evaluation are for a 6-lane divided roadway (urban and rural sections) with sidewalks and/or a shared use path.

2. Existing Drainage Overview

a. FDEP MapDirect shows northern portion of project in WBID 3169B (Reedy Canal) and remainder of project within WBID 3169A (Shingle Creek). The WBID boundary at the northern end of the project is generally located along SR 535. However, previous permits indicate that runoff from SR 535 within the project limits flows to Shingle Creek.
b. Shingle Creek is impaired for nutrients (macrophytes).
c. There are no OFWs in the vicinity of the project.
d. The project is located within the Lake Okeechobee BMAP boundary.
e. All basins within the project limits are open basins.
f. In general, there is a high groundwater table in the vicinity of SR 535 within the project limits, especially within the Orange County section.

3. Permit History

a. SR 535 original construction from US 192 to south of SR 536 was previously permitted under Permit No. 85-00118-S (dated 10/10/85). However, prior SR 535 improvements at either end of the project limits were permitted separately under the following permits:
    - Southern portion of project (SR 535 from US 192 to Kyngs Heath Rd) previously permitted under Permit No. 49-00883-P (dated 3/12/98) as part of US 192 reconstruction
    - Northern portion of project (SR 535 from north of International Dr to end project) previously permitted under Permit No. 48-00582-S (dated 11/20/90)
    - Also, the existing permitted stormwater system for SR 535 within the Osceola Parkway interchange was modified under Osceola Pkwy Permit No. 49-00653-S (modified 4/14/94)
b. There are existing stormwater facilities (wet detention and dry detention) within each of the previously permitted sections of SR 535.
c. Ms. Therrien stated that a new ERP would be issued for this project that references the previous permits.

4. Design Criteria

a. <u>Water quality criteria</u>:
    i. Water quality treatment: min. 2.5" over the new impervious area plus compensation for loss of existing treatment volume
    ii. Ms. Therrien noted that impervious area subject to non-vehicular traffic (e.g., sidewalk and shared use paths) should be separated out from the total new impervious area. For the purposes of the PD&E analysis, the sidewalk and shared use path impervious area will be included in the treatment volume calculations.
    iii. SFWMD requested 50% additional treatment volume due to location within Lake Okeechobee BMAP wherever feasible. If not feasible, provide SFWMD with a description of the site constraints/reasons that this cannot be provided
b. <u>Water quantity/attenuation criteria (open basin)</u>: 25yr/72hr pre-post peak discharge

c. Nutrient loading requirements:
   i. Project is located within the Lake Okeechobee BMAP boundary. Therefore, net improvement for total phosphorus (TP) is required.
   ii. Mr. George asked if it is acceptable to perform a nutrient loading analysis for only the land use change for the new impervious area rather than for the basins as a whole (e.g., using an existing open space land use and proposed impervious (DCIA or non-DCIA as appropriate) land use for the new impervious area only, and utilize any new wet pool volume provided to document that net improvement criteria is being met). Ms. Therrien stated that this approach would be acceptable, pending SFWMD review.
   iii. Shingle Creek is impaired for nutrients (macrophytes). Ms. Therrien stated that net improvement for nutrient loading is not required for discharges to Shingle Creek due to the type of nutrient impairment.
   iv. Mr. George asked if net improvement calculations would be required for basins where only there were only minor changes to the hydrologic characteristics of the basin and retrofits of existing permitted stormwater facilities were proposed (given that these ponds were designed and permitted prior to nutrient loading requirements). Mr. Lott stated that net improvement calculations would be required for all basins, regardless of whether an existing pond was modified or a new pond was proposed.
   v. Mr. George asked if nutrient load requirements could be evaluated on a project-wide basis rather than by individual basin, given that all existing SR 535 ponds discharge to Shingle Creek. Mr. Lott and Ms. Therrien stated that it may be acceptable in concept, but that additional information and discussion would need to take place at the time of permit application in order to formally approve the idea.

d. Mr. Lott reminded everyone that dry detention facilities (existing or proposed) will not receive any credit for providing nutrient load reduction.

5. Project Drainage Basins

The project has been broken into 5 basins for the purpose of evaluating pond site alternatives. The basins are broken out as follows:

i. Basin 1 - SR 535 from US 192 (begin project) to Kyngs Heath Road
ii. Basin 2 - SR 535 from Kyngs Heath Road to SR 536
iii. Basin 3 - SR 535 from SR 536 to north of SR 536 (end project)
iv. Basin 4 – World Center Drive (SR 536) quadrant road
v. Basin 5 – International Drive quadrant road

Basins 1-3 are located on the SR 535 mainline. Basins 4 and 5 have been identified as separate basins because it is unknown at this time whether the quadrant road alternatives would ultimately remain as feasible alternatives in the PD&E. A discussion of the pond alternatives within each basin ensued.

6. Basin 1 Pond Site Alternatives

a. Basin 1 was improved as part of the SR 530 widening (SFWMD ERP No. 49-00883-P, App. No. 971113-1), and discharges to an existing wet detention pond located on the south side of SR 530 west of US 192.

b. Mr. George noted that there is limited change in the hydrologic characteristics, and only a minor increase in impervious area, from existing to proposed conditions.

c. Two (2) alternatives were developed for Basin 1:

   i. modify the existing FDOT pond as needed to accommodate minor increase in impervious area; and

   ii. adjust the northern basin boundary at Kyngs Heath Road to reduce the contributing drainage area to the existing pond in order to utilize the existing pond without modification

d. No additional issues were discussed for these alternatives. Mr. Lott reiterated the need for net improvement calculations for all basins, as this my affect the recommended alternative.

7. Basin 2 Pond Site Alternatives

a. Basin 2 extends from Kyngs Heath Road to SR 536 (SFWMD ERP No. 85-001118-S, App. No. X000008640), and discharges to an existing wet detention pond within the Osceola Parkway interchange. This pond was modified as part of the Osceola Parkway improvements (SFWMD ERP No. 49-00653-S, App. No. 930909-1). In the existing condition, runoff is conveyed to the pond via roadside ditches. The pond discharges east along Osceola Parkway, ultimately outfalling to unnamed wetlands associated with Shingle Creek.

b. Four (4) alternatives were developed for Basin 2:

   i. <u>Pond 2-1</u> – this alternative is a proposed joint-use pond within the Storey Lake development east of SR 535 and south of Osceola Parkway. The Storey Lake development includes multiple wet detention ponds which discharge to Shingle Creek downstream of the existing SR 535 outfall. This alternative would also require analysis to meet flood protection requirements for building floors, parking lots and roads as outlined in Sections 3.4 and 3.5 of the Applicant's Handbook, Vol. II.

   ii. <u>Pond 2-2</u> – existing pond originally permitted as part of Storey Lake development, but now owned by Shingle Creek CDD. Based on review of permits, this pond does not provide water quality or attenuation for the development and may have been a borrow pond. Currently connected to Storey Lake stormwater system via DBI and pipe, but connection would be severed if pond is used for SR 535. Pond would be converted to wet pond and interconnected with existing wet pond at Osceola Pkwy interchange.

   iii. <u>Pond 2-3</u> – this alternative consists of a new offsite wet detention pond located on the east side of SR 535, south of Osceola Parkway. Construction of pond would necessitate removal of existing impervious and commercial area which may assist with meeting nutrient loading criteria.

iv. Pond 2-4 - this alternative consists of a new offsite wet detention pond located on the west side of SR 535, south of Osceola Parkway. The pond is located on currently undeveloped parcels, although permits were recently found which shows future development. Therefore, this alternative may be dropped at a later date.

c. Mr. George inquired about the use of compensatory treatment in this basin if the 2 ponds (the existing pond and a proposed pond) were used to provide treatment and attenuation for Basin 2 without being interconnected. Mr. George explained that it may not be feasible to expand the existing pond in Basin 2 due to site constraints. Therefore, the existing pond may not be able to provide adequate treatment to accommodate the new impervious area draining to it – but that the new pond could potentially be sized to provide overtreatment. Ms. Therrien requested some sample calculations in order to review and provide direction. Mr. George stated that he will prepare sample calculations for this approach, as well as the steps involved. Note that compensatory treatment would not be an issue if the Basin 2 ponds were interconnected.

8. Basin 3 Pond Site Alternatives

a. Basin 3 currently drains to existing interconnected ponds located in the northwest and southwest quadrants of the SR 535/SR 536 intersection. Multiple ponds and multiple outfalls based on permit

b. Two (2) pond option were evaluated for Basin 3:
   i. Pond 3-1 is an expansion of the existing wet detention pond in the northwest quadrant of the interchange.
   ii. Pond 3-2 is an expansion of existing dry detention pond or conversion to a wet pond in the southwest quadrant of the interchange.

c. Mr. Lott reiterated SFWMD's desire to maximize nutrient load reduction along the corridor, and that dry detention will not receive any credit for nutrient load reduction.

9. Basins 4 and 5 Pond Site Alternatives

a. Basins 4 and 5 were evaluated as separate basins because it is unknown at this time whether the quadrant road options will ultimately be included as a final alternative.

b. The quadrant roads are located within environmentally sensitive areas that consist of wetlands, floodplains and conservation easements.

c. Two (2) new offsite pond alternatives were identified for each basin. The ponds are located on either side of the quadrant road, and sited to minimize the potential environmental and floodplain impacts to the degree feasible.

d. Ms. Therrien strongly suggested that the team discuss the feasibility of obtaining an ERP for the quadrant roads with Lisa Prather (SFWMD), as the roads themselves and some associated pond alternatives would require SFWMD conservation easement releases. The design team will set up a separate meeting with Ms. Prather to discuss the quadrant roads if the quadrant roads are deemed feasible alternatives.

10. Floodplain Impacts and Compensation

a. Osceola County: FIRM panel no. 12097C0055G (2013) – no floodplains
b. Orange County: FIRM panel no. 12095C0605F (2009) – Zone A floodplains west of SR 535
c. SFWMD criteria - No net encroachment into the floodplain between the average wet season groundwater table and the 100-year floodplain elevation
d. The west side of SR 535 within the Orange County section is designated as a FEMA Zone A floodplain.
e. The proposed quadrant roads within Basins 4 and 5 will result in significant floodplain impacts.
f. The NRCS soil survey indicates that the groundwater table depth west of SR 535 is generally at the existing ground elevation. Therefore, floodplain compensation sites to mitigate for the floodplain impacts have been located on the east side of SR 535. Proposed cross drains under SR 535 will be required to hydraulically connect the floodplain compensation sites to the Zone A floodplain.
g. Ms. Therrien stated that volumetric compensation (cup for cup) is acceptable for floodplain compensation, but that hydraulic connectivity between the floodplain and any floodplain compensation site is documented.
h. Ms. Therrien noted that SFWMD allows the use of the average wet season water table, not the seasonal high groundwater table (SHGWT) – this is typically 1' below the SHGWT
i. Any ditches located on the west side of SR 535 may be able to provide some floodplain compensation, pending geotech analysis in final design.
j. Three (3) floodplain compensation sites have been identified on the east side of SR 535 (FPC-1, FPC-2 and FPC-3).
k. Given the size of the floodplain, there is the potential that floodplain impacts due to SR 535 improvements (excluding the quadrant roads) could be addressed with roadside ditches or hydraulic modeling during final design.

11. Action Items

a. Mr. George will prepare sample calculations for a nutrient loading if 2 unconnected ponds are used to provide treatment for Basin 2, and email Ms. Therrien the steps that would be taken to document compensatory treatment.
b. The PD&E team will contact Lisa Prather to discuss any impacts to the SFWMD conservation easements with the proposed alternatives, as well as any other environmental permitting issues for this project.

******* END OF MEETING*******

Note: The above reflects the writer's understanding of the contents of the meeting. If any misinterpretations or inaccuracies are included, please contact the author within five (5) days of the submittal date.

Appendix J

Excerpts from Previous Plans, Studies, Reports and Permits

State Project No. 92090-3543
SFWMD App. No. 971113-1/
Permit No. 49-00883-P
SR 530 (US 192) from Bonnet Creek to SR 535
Permit Documents Excerpt
(Basin 1)

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

ePermitting

Application #:	971113-1	**Permit#:**	49-00883-P	**Final Action Date:**	12-Mar-1998
Issuing Office:	ORL/SFWMD	**Permit Status:**	ACTIVE	**Application Status:**	Complete
Permit Type:	Environmental Resource (New Construction/Operation)			**Expiration Date:**	
Project Name:	Sr 530 (Us 192) Bonnet Creek To Sr 535			**Project Acres:**	91.95
Landuse(s):	Transportation	**Location:**	Osceola S2,3,4,5,8,9,10,11/T25/R28		
Receiving Body:	Reedy Creek And Shingle Creek Via Swm System.				

Applicant: Florida Department Of Transportation District V Permittee
719 South Woodland Boulevard Deland FL 32720

Engr Consultant: Greenhorne & O'Mara, Incorporated Earl Wills
701 Northpoint Parkway Suite 100 West Palm Beach FL 33407

Oper Entity: Florida Department Of Transportation District V
9999999999 FL

Project Description:

Contact Email Id: permits@sfwmd.gov

Documents List by date

	Document Type	Date Posted	Size	Seal Verified?
Applications(1)				
Application Documents(1)				
Calculations - Design Plans(1)				
Calculation & Design Information(1)				
971113-1_AllPlans_83969		Jan 16, 2007	2 MB	
Compliance - Engineering(1)				
Compliance Information(1)				
971113-1_CertReminder_20020110_626161		Jun 4, 2010	100 KB	
Compliance - Other(1)				
PostPermitCompliance(3)				
971113-1_EngrCert_83970		Jan 16, 2007	376 KB	
971113-1_CertAccept_83973		Jan 16, 2007	82 KB	
971113-1_compmemo_83971		Jan 16, 2007	26 KB	
Permit File History(1)				
Permit History(3)				
971113-1_PermitFileHistory_694104	Historical Records	Oct 27, 2010	312 KB	
971113-1_5	Historical Records	Jun 6, 2008	2 MB	
971113-1	Historical Records	Mar 12, 2008	31 MB	

Close Me

SPECIAL CONDITIONS

1. DISCHARGE FACILITIES:

BASIN: 1A:

1-4.92' WIDE SHARP CRESTED WEIR WITH CREST AT ELEV. 79.72' NGVD.
196.2 LF OF 2' DIA. RCP CULVERT.

RECEIVING BODY : RCID C-1 CANAL

CONTROL ELEV : 77 FEET NGVD. /77 FEET NGVD DRY SEASON.

BASIN: 1B:

1-4.92' WIDE SHARP CRESTED WEIR WITH CREST AT ELEV. 78.9' NGVD.
240.4 LF OF 3' DIA. RCP CULVERT.

RECEIVING BODY : RCID C-1 CANAL

CONTROL ELEV : 76 FEET NGVD. /76 FEET NGVD DRY SEASON.

BASIN: 2:

1-3' WIDE SHARP CRESTED WEIR WITH CREST AT ELEV. 76.7' NGVD.
1-60 DEG. V-NOTCH WITH INVERT AT ELEV. 76' NGVD.
538.8 LF OF 3' DIA. RCP CULVERT.

RECEIVING BODY : REEDY CREEK VIA EXISTING BOX CULVERT

CONTROL ELEV : 76 FEET NGVD. /76 FEET NGVD DRY SEASON.

BASIN: 3.

1-3' WIDE SHARP CRESTED WEIR WITH CREST AT ELEV. 78.24' NGVD.
1-30 DEG. V-NOTCH WITH INVERT AT ELEV. 77' NGVD.
963.4 LF OF 2.5' DIA. RCP CULVERT.

RECEIVING BODY : REEDY CREEK VIA EXISTING BOX CULVERT

CONTROL ELEV : 77 FEET NGVD. /77 FEET NGVD DRY SEASON.

BASIN: 4:

1-2.75' WIDE SHARP CRESTED WEIR WITH CREST AT ELEV. 76.5' NGVD.
1-20 DEG. V-NOTCH WITH INVERT AT ELEV. 75' NGVD.
38.7 LF OF 2.5' DIA. RCP CULVERT.

RECEIVING BODY : SHINGLE CREEK VIA EXISTING DITCH

CONTROL ELEV : 75 FEET NGVD. /75 FEET NGVD DRY SEASON.

2. THE PERMITTEE SHALL BE RESPONSIBLE FOR THE CORRECTION OF ANY EROSION, SHOALING OR WATER QUALITY PROBLEMS THAT RESULT FROM THE CONSTRUCTION OR OPERATION OF THE SURFACE WATER MANAGEMENT SYSTEM.

3. MEASURES SHALL BE TAKEN DURING CONSTRUCTION TO INSURE THAT SEDIMENTATION AND/OR TURBIDITY PROBLEMS ARE NOT CREATED IN THE RECEIVING WATER.

PROPOSED FACILITIES:

Construction proposed consists of widening the four lane divided rural roadway to a six lane divided urban curb and gutter section. The drainage improvements consist of a series of storm drain piping which convey stormwater runoff to french drains (Basin 1) or wet detention ponds (Basin 2, 3, & 4) for water quality treatment and attenuation. Final outfall is to Reedy Creek (Basin 1, 2, & 3) and Shingle Creek (Basin 4) via existing cross culverts.

A separate parallel storm sewer system will be constructed to intercept offsite runoff, which was previously collected in the roadside swales, and convey this runoff to Reedy Creek or Shingle Creek via the aforementioned existing cross culverts.

BASIN INFORMATION:

Basin	Area Acres	WSWT Elev (ft, NGVD)	Normal/Dry Ctrl Elev (ft, NGVD)	Method of Determination
1A	1.38	77.00	77/77	WET SEASON SOIL BORINGS
1B	14.82	76.00	76/76	WET SEASON SOIL BORINGS
2	26.20	76.00	76/76	WET SEASON SOIL BORINGS
3	19.03	77.00	77/77	WET SEASON SOIL BORINGS
4	30.94	75.00	75/75	WET SEASON SOIL BORINGS

DISCHARGE STRUCTURE INFORMATION:

Water Quality Structures:

Basin	Str. #	Bleeder Type	Dimensions	Invert Elev. (ft, NGVD)
2	1	V-NOTCH	60 degrees	76.00
3	1	V-NOTCH	30 degrees	77.00
4	1	V-NOTCH	20 degrees	75.00

Major Discharge Structures:

Basin	Str. #	Description	Crest Elev. (ft, NGVD)
1A	1	4.92' wide SHARP CRESTED weir	79.72
1B	1	4.92' wide SHARP CRESTED weir	78.90
2	1	3' wide SHARP CRESTED weir	76.70
3	1	3' wide SHARP CRESTED weir	78.24
4	1	2.75' wide SHARP CRESTED weir	76.50

Discharge Culverts:

Basin	Str. #	Description
1A	1	196.2' long, 2' dia. RCP
1B	1	240.4' long, 3' dia. RCP
2	1	73.2' long, 3' dia. RCP
3	1	963.4' long, 2.5' dia. RCP
4	1	38.7' long, 2.5' dia. RCP

Receiving Body:

Basin	Str. #	Receiving Body
1A	1	RCID C-1 CANAL
1B	1	RCID C-1 CANAL
2	1	REEDY CREEK VIA EXISTING BOX CULVERT
3	1	REEDY CREEK VIA EXISTING BOX CULVERT
4	1	SHINGLE CREEK VIA EXISTING DITCH

III. PROJECT EVALUATION

Discharge Rate:

As shown in the table below, the proposed project discharge is within the allowable limit for the area.

Discharge Storm Frequency: 10YR/72HR Design Rainfall: 7.00

Basin	Allow Disch (cfs)	Method of Determination	Design Disch (cfs)	Design Stage (ft, NGVD)
1A	4.1	PRE VS. POST	4.1	78.1
1B	18.6	PRE VS. POST	18.6	77.5

Basin	Allow Disch (cfs)	Method of Determination	Design Disch (cfs)	Design Stage (ft, NGVD)
2	31.9	PRE VS. POST	21.7	78.2
3	31.4	PRE VS. POST	24.6	80.6
4	47.4	PRE VS. POST	43.9	79.3

WATER QUALITY:

Water quality provided for 2.5" times the percent impervious area for Basin 2 and Basin 3, and for 2.5" times the additional percent impervious area in Basin 1 and Basin 4.

Basin	Treatment Method	Vol Req'd. (ac-ft)	Vol Prov'd (ac-ft)
1A	94 LF 4 ft deep EXFILTRATION TRENCH	0.06	0.06
1B	249 LF 4 ft deep EXFILTRATION TRENCH	0.20	0.20
2	7 acres WET DETENTION	3.25	3.25
3	4.23 acres WET DETENTION	2.44	2.49
4	3.34 acres WET DETENTION	0.58	2.07

ROAD DESIGN:

As shown in the following table, minimum road center lines have been set at or above the calculated design storm flood elevation.

Design Storm Freq: 10YR/72HR Design Rainfall: 7.00 inches

Basin	Flood Elevation (ft., NGVD)	Minimum Centerline Elevation (ft, NGVD)
1A	78.03	82.02
1B	77.46	82.02
2	78.22	78.74
3	80.65	82.02
4	79.3	82.01

IV. ENVIRONMENTAL ASSESSMENT

SPECIAL CONDITIONS

1. DISCHARGE FACILITIES:

BASIN: 1A:

1-4.92' WIDE SHARP CRESTED WEIR WITH CREST AT ELEV. 79.72' NGVD.
196.2 LF OF 2' DIA. RCP CULVERT.

RECEIVING BODY : RCID C-1 CANAL

CONTROL ELEV : 77 FEET NGVD. /77 FEET NGVD DRY SEASON.

BASIN: 1B:

1-4.92' WIDE SHARP CRESTED WEIR WITH CREST AT ELEV. 78.9' NGVD.
240.4 LF OF 3' DIA. RCP CULVERT.

RECEIVING BODY : RCID C-1 CANAL

CONTROL ELEV : 76 FEET NGVD. /76 FEET NGVD DRY SEASON.

BASIN: 2:

1-3' WIDE SHARP CRESTED WEIR WITH CREST AT ELEV. 76.7' NGVD.
1-60 DEG. V-NOTCH WITH INVERT AT ELEV. 76' NGVD.
538.8 LF OF 3' DIA. RCP CULVERT.

RECEIVING BODY : REEDY CREEK VIA EXISTING BOX CULVERT

CONTROL ELEV : 76 FEET NGVD. /76 FEET NGVD DRY SEASON.

BASIN: 3:

1-3' WIDE SHARP CRESTED WEIR WITH CREST AT ELEV. 78.24' NGVD.
1-30 DEG. V-NOTCH WITH INVERT AT ELEV. 77' NGVD.
963.4 LF OF 2.5' DIA. RCP CULVERT.

RECEIVING BODY . REEDY CREEK VIA EXISTING BOX CULVERT

CONTROL ELEV : 77 FEET NGVD. /77 FEET NGVD DRY SEASON.

BASIN: 4:

1-2.75' WIDE SHARP CRESTED WEIR WITH CREST AT ELEV. 76.5' NGVD.
1-20 DEG. V-NOTCH WITH INVERT AT ELEV. 75' NGVD.
38.7 LF OF 2.5' DIA. RCP CULVERT.

RECEIVING BODY : SHINGLE CREEK VIA EXISTING DITCH

CONTROL ELEV : 75 FEET NGVD. /75 FEET NGVD DRY SEASON.'

TABLE 4
POND DATA

Wetland ID	SHWL (ft)	NWL (ft)	ELEVATION AT WETLAND/ UPLAND INTERFACE (ft)	CONTROL ELEVATION (ft)	DISTANCE BETWEEND POND AND WETLAND (ft)	MEETS GRADIENT CRITERIA (Y OR N)
WRA-2	79.75[1]	75.90	Varies 76.71 to 78.38	76.00	0.00	NO[4]
WRA-4	77.00[2]	75.00[3]	Varies 75.00 to 79.33	75.00	0.00	YES[5]

[1] Calculated 100-year design high water elevation for the existing 36" culvert
[2] 100 year Flood stage reported by FEMA
[3] Normal water surface elevation in Lake Cecile & connected drainage ditch.
[4] Sheel sheet piling added to WRA-2 to prevent adverse groundwater flow from wetland to WRA-2.
[5] The normal water level observed & reported by FEMA for Lake Cecile and the existing drainage ditch along the south and west sides of the proposed WRA-4 is 75.00 ft.

Roadway Basin 3 (Sta 154+20.00 to Sta 162+67.00)

This roadway drainage basin encompasses 7.70ha (19.03ac) which includes a 1.71ha (4.23ac) water retention pond designated as WRA-3 and located along the north R/W line of SR-530 at approximately station 157+50. In addition per previous agreement between FDOT, Osceola County and the owner of the 1.71ha (4.23ac) Camping World site the offsite Camping World property has been included into the roadway basin to provide both water quality treatment and attenuation. The quality treatment volume provided within WRA-3 is in excess of 2.5" over the total impervious which includes 1.49ha (3.68ac) of impervious area from the Camping World site as provided by Engineering & Environmental Design, Inc. The outfall for this proposed WRA-3 is through control structure S-173 via a 750mm (30") pipe to an existing 1.830m x 0.900m (6ft x 3ft) concrete box culvert located at approximatly station 155+00. The peak 25YR discharge from this system is 26.33cfs which is well below the allowable of 72.78cfs.

Roadway Basin 4 (Sta 162+67.00 to Sta 174+77.972)

This roadway basin encompasses 12.52ha (30.94ac) which includes a 1.35ha (3.34ac) water retention area (WRA-4) located along the south side of SR-530 at station 166+60. In addition this basin also includes 4.34ha (10.72ha) of offsite property which could not economically be separated from the roadway area. Due to the highly developed commercial nature of the adjacent property within this basin there was only one vacant parcel of property available within the basin which was suitable for use as a water retention suit. All the contiguois vacant property within this basin is proposed to be aquired for use as WRA-4 unfo rtunatly the size of this site is not adequate to provide a water quality treatment volume equal to 2.5" over the total impervious area. As previously indicated the size of the WRA-4 site has been maximized and will provide a treatment volume equal to 1.82" over the impervious area or in excess of 1" over the R/W. The peak post development design discharge from WRA-4 is 20.23cfs which is well below the allowable peak of 95.91cfs as computed using the rational method.

GREENHORN & O'MARA, INC.

PLANNING • SITE ENGINEERING • TRANSPORTATION
ENVIRONMENTAL • SURVEYING/MAPPING

BY ..... DATE .....
CHKD. BY ..... DATE .....
REV. BY ..... DATE .....

SUBJECT SR-530
BONNET CR TO SR-535
STATE PROJECT NO. 92090-3543

SHEET NO. 1 OF .....
JOB NO. .....
FILE NO. .....

WATER QUALITY CALCULATIONS

NOTE: 1.) IN PREVIOUS MEETINGS WITH SOUTH FLORIDA WATER MANAGEMENT DISTRICT STAFF IT WAS RECOGNIZED THAT DUE TO THE HIGHLY DEVELOPED NATURE OF THE CORRIDOR THE ACQUISITION OF STORMWATER DETENTION SITES MAY NOT BE POSSIBLE

2.) IN LIGHT OF NOTE ONE ABOVE, IN AREAS WHERE IT CAN BE DEMONSTRATED SUFFICIENT STORMWATER RETENTION SITES ARE NOT AVAILABLE WITHIN A PARTICULAR RUNOFF BASIN A MINIMUM TREATMENT VOLUME OF 2.5" OVER THE ADDITIONAL IMPERVIOUS AREA WILL BE REQUIRED.

ROADWAY BASIN 1 (STA 126+29.258 - 134+56.000)

BASIN SIZE = 16.20 AC

BASIN IS DIVIDED INTO 2 SUB-BASINS 1A & 1B BY BONNET CREEK

BASIN 1A (126+29.258 TO 138+27.000)

BASIN 1A = 1.38 AC

IMPERVIOUS AREA = 1.17 AC
PERVIOUS AREA = 0.21 AC
1.38 AC

EXISTING IMPERVIOUS AREA = 0.87 AC

ADD'L IMP. AREA = 1.17 AC - 0.87 AC = 0.30 AC

MIN WATER QUALITY REQ'D = 2.5" X 0.30 = 0.75 AC-IN

BASIN 1A
WATER QUA. VOL = 0.75 AC-IN

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BY _____ DATE _____ SUBJECT _____
CHKD. BY _____ DATE _____
REV. BY _____ DATE _____
SHEET NO 3 OF _____
JOB NO. _____
FILE NO. _____

ROADWAY BASIN 3 (154+20.000 TO 162+67.000)

BASIN SIZE = 19.03 AC

ROWY IMPERVIOUS AREA	= 8.02 AC
CAMPING WORLD IMP AREA	= 3.68 AC
PERVIOUS AREA	= 3.10 AC
WRA-3 AREA	= 4.23 AC
TOTAL	= 19.03 AC

TOTAL IMPERV. AREA = 11.70 AC. (INCL'D CAMPING WORLD)

WATER QUALITY VOLUME REQ'D

2.5" X 11.70 AC. X 1/12" = 2.44 AC·FT

BASIN 3
WATER QUAL. VOL = 2.44 AC·FT

ROADWAY BASIN 4 (162+67.000 TO 174+77.972)

TOTAL BASIN SIZE = 30.94 AC

ROWY IMPERV. AREA	= 13.60 AC
PERVIOUS AREA	= 3.28 AC
OFFSITE AREA	= 10.72 AC
WRA-4	= 3.34 AC
TOTAL	= 30.94 AC

EXISTING IMPERV AREA = 10.82 AC

MIN WATER QUALITY REQ'D = (13.6 AC - 10.82 AC) X 2.5" X 1/12" = 0.58 AC·FT

MIN QUALITY VOL = 0.58 AC·FT

DESIRABLE WATER QUALITY VOL

13.60 AC X 2.5" X 1/12" = 2.83 AC·FT

BASIN 4
MIN QUALITY VOL = 0.58 AC·FT
MAX QUALITY VOL = 2.83 AC·FT

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BY ..... DATE .....
CHKD. BY ..... DATE .....
REV. BY ..... DATE .....

SUBJECT SR-530
SPN 97090-3543
V-NOTCH DESIGN CALCULATIONS

SHEET NO. 3 OF .....
JOB NO. .....
FILE NO. .....

ADDITIONAL INFORMATION

DEC 0 1 1997

ORLANDO SERVICE CENTER

APP # 971113-1

BASIN 4

WRA-4 CONTROL STRUCTURE S-219

TREATMENT VOLUME = 2.07 AC-FT = 90,169.2 FT³
OPEN RECOVERY TIME ($\frac{1}{2}$ TV) (t_{min}) = 24 hrs
TREATMENT VOLUME DEPTH (76.50 - 75.00) = 1.50 FT
1/2 TREATMENT VOL. DEPTH = 0.75 FT

AVG HEIGHT ABOVE NOTCH INV. (h) = (1.5 + 0.75)/2

h = 1.125 FT

MAX ALLOWABLE V-NOTCH ANGLE θ_{max}

$$\theta_{max} = 2 \tan^{-1}\left[\frac{TV}{5\, t_{min}\, CF\, h^{2.5}}\right]$$

$$\theta_{max} = 2 \tan^{-1}\left[\frac{9016.}{(5)(24)(3600)(1.125)^{2.5}}\right]$$

$\theta_{max} = 17.7°$

NOTE: MIN ALLOWABLE V-NOTCH ANGLE IS 20° TO PROTECT AGAINST DEBRIS CLOGGING THE BLEED-DOWN NOTCH

$\theta_{PROVIDED}$ (S-219) = 20°

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BY ..... DATE ..... SUBJECT .....
CHKD. BY ..... DATE .....
REV. BY ..... DATE .....

SHEET NO. 9 OF .....
JOB NO. .....
FILE NO. .....

RONJY BASIN 4 (162+67.00 - 174+77.972)

EXISTING CONDITIONS

IMPERVIOUS AREA = 10.82 AC
PERVIOUS AREA = 6.06 AC
OFFSITE AREA = 10.72 AC
WRA-4 AREA = 3.34 AC
TOTAL = 30.94 AC

NOTE: FOR THIS BASIN IT IS ASSUMED THAT THE 10.72 AC OF OFFSITE PROPERTY IS BEING FULLY TREATED AND ATTENUATED PRIOR TO DISCHARGE INTO SR-530 R/W.

- PRE DEVELOPMENT RUNOFF COEF.

$$C_{PRE} = \frac{0.95(10.82) + 0.35(6.06) + 0.35(10.72) + 0.35(3.34\,AC)}{30.94}$$

$$C_{PRE} = 0.56$$

FOR 25YR RETURN FREQ $C_{PRE} = 1.1 \times 0.56 = 0.62$

- TIME OF CONCENTRATION t_c

SCALE

$S_{AVG} = 0.20\%$ $L = 2500$ FT

$$t_c = 0.0078 \frac{(2500)^{0.77}}{(0.002)^{0.385}}$$

$t_c = 35$ MIN

- $W/t_c = 35$ MIN, FROM DRAIN. MANUAL FIG. 5-8 (ZONE 7)

$I = 5.0$ IN/HR

- 25YR PEAK DISCHARGE

$Q_{PEAK} = (0.62)(5.0)(30.94) = 95.91$ CFS

$Q_{25} = 95.91$ CFS

BY ..... DATE ..... SUBJECT .....
CHKD. BY ..... DATE .....
REV. BY ..... DATE .....

SHEET NO. 10 OF .....
JOB NO. .....
FILE NO. .....

POST DEVELOPMENT (BASIN 4)

IMPERVIOUS AREA = 13.60 AC (RNWY)
PERVIOUS AREA = 3.28 AC (RNWY)
OFFSITE AREA = 10.72 AC (PERV. AREA)
WRA-4 = 3.34
TOTAL = 30.94

- AVAILABLE SOIL STORAGE

AVG DEPTH TO WATER TABLE = 1 FT

% PERV. AREA = 14.0 AC / 27.6 AC X 100 = 50%

SOIL STORAGE = 8.19" X 0.50 = 4.09"

WRA-4 STAGE-STORAGE RELATIONSHIP

STAGE (FT NGVD)	AREA (AC)	INC. STORAGE (AC-FT)	CUMM. STORAGE (AC-FT)
75.00	1.25 AC	0.00	0.00
75.50	1.33	0.65	0.65
76.00	1.42	0.69	1.34
76.50	1.50	0.73	2.07
77.00	1.58	0.77	2.84
77.50	1.67	0.81	3.65
78.00	1.75	0.86	4.51
78.50	1.83	0.90	5.41
79.00	1.91	0.94	6.35
79.50	2.00	0.98	7.33
80.00	2.08	1.02	8.35
80.10	2.10	0.21	8.56
81.10	2.80	2.45	11.01

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BY ..... DATE ..... SUBJECT ..... SHEET NO. 11 OF .....
CHKD. BY ..... DATE ..... JOB NO. .....
REV. BY ..... DATE ..... FILE NO. .....

MIN WATER QUALITY TREATMENT VOL = 0.58 AC-FT
(2.5" OVER AMI'L IMP)
DESIRABLE WATER QUALITY VOL = 2.83 AC-FT

MIN WEIR ELEV (X) $\frac{76.50 - X}{76.50 - 75.0} = \frac{0.65 - 0.58}{0.65 - 0.00}$

X = 75.45 FT

DESIRABLE WEIR EL (Y) = 77.00 FT

NOTE: IN ORDER TO CONTAIN THE 25YR DESIGN STORM WITHIN THE W/RA THE MAX WEIR ELEVATION IS 76.50 FT. WHICH WILL PROVIDE A WATER QUALITY VOLUME OF 3.07 AC-FT.

3.07 AC-FT DETENTION PROVIDES A TREATMENT VOLUME EQUAL TO 1.82" OVER THE IMPERVIOUS AREA

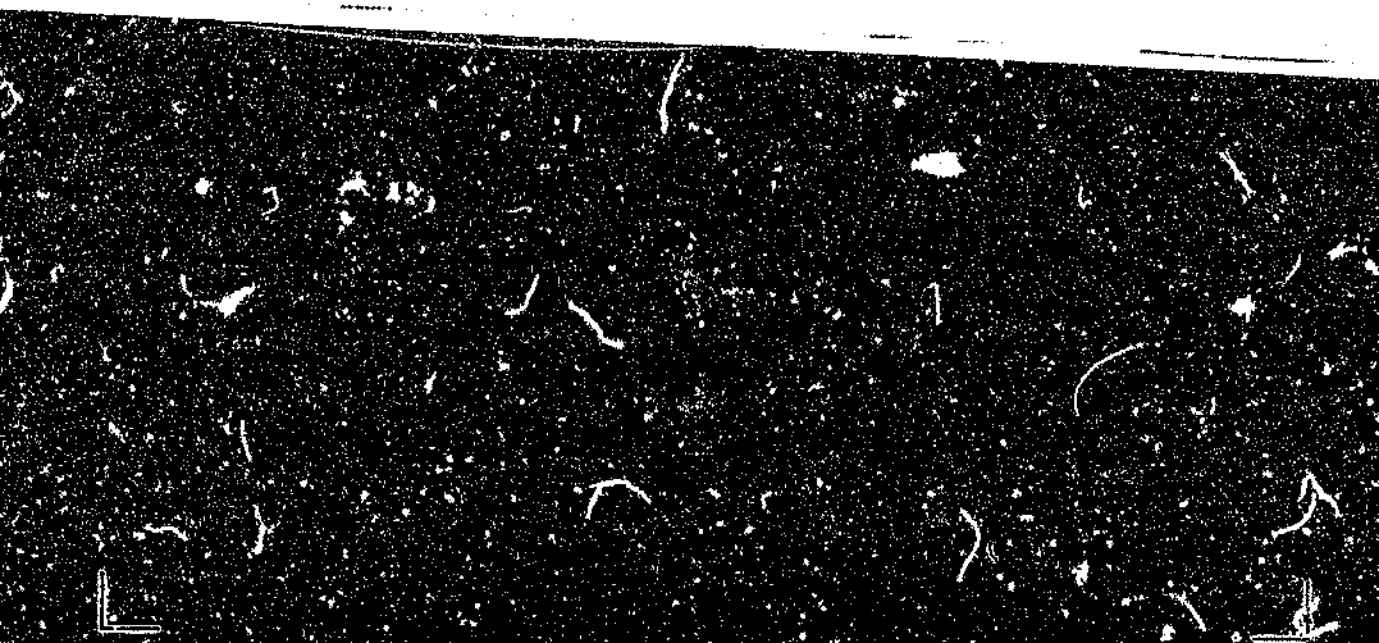
S.R. - 530 (U.S. - 192)
LAND USE SUMMARY

STATE PROJECT NUMBER 92000 - 3543
WPI NO. 5115727
Osceola County

BASIN NO.	BASIN AREA ha (ac)	PRE - DEVELOPMENT CONDITION			POST - DEVELOPMENT CONDITION				
		Impervious ha (ac)	Pervious ha (ac)	Offsite ha (ac)	Impervious ha (ac)	Pervious ha (ac)	Offsite ha (ac)	WRA ha (ac)	
1A	0.558 (1.38)	0.352 (0.87)	0.206 (0.51)	0.000 (0.00)	0.473 (1.17)	0.085 (0.21)	0.000 (0.00)	N/A	1.3
1B	5.998 (14.82)	1.954 (4.83)	1.392 (3.44)	2.651 (6.55)	2.343 (5.79)	1.004 (2.48)	2.651 (6.55)	N/A	14.
2	10.603 (26.20)	5.253 (12.98)	2.517 (6.22)	2.833 (7.00)	5.305 (15.58)	1.457 (3.60)	0.000 (0.00)	2.840 (7.02)	26
3	7.701 (19.03)	4.260 (10.55)	1.720 (4.25)	1.712 (4.23)	4.735 (11.70)	1.255 (3.10)	see note 2	1.712 (4.23)	19.
4	12.521 (30.94)	4.379 (10.82)	2.452 (6.06)	5.690 (14.06)	5.564 (13.60)	1.327 (3.28)	4.338 (10.72)	1.352 (3.34)	30.
	92.37				47.84	12.67	17.27	14.59	92.

NOTES:

1. Pre-Development offsite areas include the proposed water retention sites for basins 2, 3 & 4
2. Basin No. 3 includes 1.71ha (4.22ac) from the Camping World site. Land use within the Camping World site is as follows: 1.489ha (3.68ac) Impervious and 0.221ha (0.54ac) Pervious per site design by Engineering & Environmental Design Inc.
3. The runoff coefficients used in the calculations are as follows: C = 0.95 for Impervious areas and C = 0.35 for Pervious areas
4. It is assumed that all runoff from offsite areas which flow into the R/W, with the exception of the Camping World site, has been treated and attenuated based on this assumption all offsite areas have been given a runoff coefficient of C = 0.35.



SR - 530 (US-192) PRE/POST - DEVELOPMENT DISCHARGE DESIGN SUMMARY

STATE PROJECT NUMBER 92090-3543
WPI No. 5115727
Osceola County

REVISED: November 26, 1997

BASIN NO.	BASIN AREA ha (ac)	PRE-DEVEL IMPERV. AREA ha (ac)	POST-DEVEL IMPERV. AREA ha (ac)	PRE - DEVELOPMENT		POST - DEVELOPMENT	
				10YR PEAK cms (cfs)	25YR PEAK cms (cfs)	10YR PEAK cms (cfs)	25YR PEAK cms (cfs)
1A	0.558 (1.38)	0.352 (0.87)	0.473 (1.17)	0.114 (4.04)	0.150 (5.30)	0.117 (4.14)	0.152 (5.37)
1B	5.988 (14.82)	1.954 (4.83)	2.343 (5.79)	0.506 (17.86)	0.667 (23.57)	0.528 (18.65)	0.692 (24.43)
2	10.603 (26.20)	5.253 (12.98)	6.305 (15.58)	0.904 (31.93)	1.205 (42.54)	0..614 (21.70)	0.909 (32.10)
3	7.701 (19.03)	4.269 (10.55)	4.735 (11.70)	0.889 (31.41)	1.179 (41.63)	0.697 (24.60)	0.796 (28.1?)
4	12.521 (30.94)	4.379 (10.82)	5.504 (13.60)	1.342 (47.39)	1.808 (63.86)	1.243 (43.90)	1.795 (6

NOTES:

1. Basins 1A and 1B discharge to Bonnet Creek (RCID C-1 Canal) and utilize french drain to provide water quality treatment. All other basins utilize wet detention ponds to provide the required water quality treatment and attenuation.

2. SFWMD 72 hour rainfall distribution was used for all basins with a 10YR - 1 DAY rainfall of 7.0 inches and a 25YR - 1DAY rainfall of 9.0 inches

3. The SCS Unit hydrograph methodology (Peak Factor=256) in conjunction with the Adicpr stormwater modeling software was used to determine pre and post development peak discharge rates for basins 1A and 1B. Basin 1A CN = 88 (Pre-Devel) and CN = 93 (Post-Devel) Basin 1B CN = 87 (Pre-Devel) and CN = 89 (Post-Devel). Offsite Areas within basin 1B have NOT been included in the runoff modeling since onsite attenuation has been provided for these properties

4. Peak Pre-Development discharge rates shown were calculated for all basins using the SCS Unit hydrograph methodology and the Adicpr software for 10YR and 25YR design frequencies. Post development peak discharges for basins 1A and 1B were determined using by routing the 10Yr & 25Yr post-development SCS Unit Hydrograph through the proposed storm sewer system. All other basins utilized SFWMD software (RC-4) the route the design storms though the proposed water retention areas.

APP # 971113-1[redacted]

ADDITIONAL INFORMATION

DEC 0 1 1997

ORLANDO SERVICE CENTER

WEIR LENGTH	2.75 FT.
WEIR ELEVATION	76.5 FT. NGVD
WEIR COEFFICIENT	3.13
TYPE OF BLEEDER SLOT	V-NOTCH
SLOT INVERT ELEV.	75 FT. NGVD
NOTCH ANGLE	60 DEG.

RDWY BASIN 4
CONTROL STRUCTURE S-219

PIPE DATA	
DIAMETER	2.5 FT.
LENGTH	40 FT.
N-VALUE	.012

STAGE	WEIR FLOW IN CFS			PIPE FLOW	
	WEIR	BLEEDER	TOTAL		
LOW					
75.00	0.00	0.00	0.00	.00	.00
75.50	0.00	0.28	0.28	20.68	.28
76.00	0.00	1.61	1.61	29.25	1.61
76.50	0.00	4.42	4.42	35.82	4.42
77.00	3.04	6.24	9.28	41.37	9.28
77.50	8.61	7.64	16.25	46.25	16.25
78.00	15.81	8.82	24.63	50.66	24.63
78.50	24.35	9.86	34.21	54.72	34.21
79.00	34.02	10.80	44.82	58.50	44.82
79.50	44.73	11.67	56.40	62.05	56.40
80.00	56.36	12.47	68.83	65.41	65.41
80.19	58.79	12.63	71.42	66.06	66.06
81.10	84.92	14.08	99.00	72.24	72.24

S C S P R O G R A M

PROJECT NAME . . . . . : SR 530, BASIN-4, WRA-4
REVIEWER . . . . . : GREENHORNE & O'MARA
PROJECT AREA . . . . . : 30.94 ACRES
GROUND STORAGE . . . . : 4.09 INCHES
TERMINATION DISCHARGE : 95.91 CFS
DISTRIBUTION TYPE . . : SFWMD
RETURN FREQUENCY . . . : 25.00 YEARS
RAINFALL DURATION . . : 3-DAY
24-HOUR RAINFALL . . . : 9.00 INCHES
REPORTING SEQUENCE . : STANDARDIZED

STAGE (FT)	STORAGE (AF)	DISCHARGE (CFS)
75.00	.00	.00
75.50	.65	.28
76.00	1.34	1.61
76.50	2.07	4.42
77.00	2.84	9.28
77.50	3.65	16.25
78.00	4.51	24.63
78.50	5.41	34.21
79.00	6.35	44.82
79.50	7.33	56.40
80.00	8.35	65.41
80.10	8.56	66.06
81.10	11.01	72.24

TIME (HR)	RAIN FALL (IN)	ACCUM. RUNOFF (IN)	BASIN DISCHGE (CFS)	ACCUM. INFLOW (AF)	RESERVOIR VOLUME (AF)	RESERVOIR ACCUM. OUTFLOW (AF)	RESERVOIR INSTANT DISCHGE (CFS)	RESERVOIR AVERAGE DISCHGE (CFS)	RESERVOIR STAGE (FT)
.00	.00	.00	.0	.0	.0	.0	.0	.0	75.00
4.00	.22	.00	.0	.0	.0	.0	.0	.0	75.00
8.00	.44	.00	.0	.0	.0	.0	.0	.0	75.00
12.00	.66	.00	.0	.0	.0	.0	.0	.0	75.00
16.00	.88	.00	.0	.0	.0	.0	.0	.0	75.00
20.00	1.09	.02	.2	.0	.0	.0	.0	.0	75.03
24.00	1.31	.05	.3	.1	.1	.0	.1	.0	75.09
28.00	1.63	.14	.8	.3	.3	.0	.1	.1	75.23
32.00	1.95	.25	1.[illegible]	.6	.5	.1	.2	.2	75.40
36.00	2.27	.38	[illegible]	1.0	.8	.2	.5	.3	[illegible].58
40.00	2.59	.54	1.3	1.4	1.0	.4	.8	.7	75.71
44.00	2.91	.71	1.4	1.8	1.1	.7	1.1	1.0	75.80
48.00	3.23	.90	1.5	2.3	1.2	1.1	1.3	1.2	75.87
52.00	3.64	1.15	2.5	3.0	1.4	1.6	1.6	1.4	76.00
56.00	4.46	1.72	6.0	4.4	2.0	2.4	3.8	2.4	76.39

TIME (HR)	RAIN FALL (IN)	ACCUM. RUNOFF (IN)	BASIN DISCHGE (CFS)	ACCUM. INFLOW (AF)	RESERVOIR VOLUME (AF)	RESERVOIR ACCUM. OUTFLOW (AF)	RESERVOIR INSTANT DISCHGE (CFS)	RESERVOIR AVERAGE DISCHGE (CFS)	RESERVOIR STAGE (FT)
58.00	5.15	2.23	9.4	5.7	2.5	3.2	6.4	4.9	76.70
59.00	5.65	2.62	14.1	6.8	2.9	3.9	8.6	7.4	76.93
59.50	6.10	2.98	22.6	7.7	3.4	4.3	12.0	10.1	77.20
59.75	7.45	4.10	140.4	10.6	5.9	4.7	24.2	18.1	77.97
60.00	9.14	5.58	183.6	14.4	8.9	5.5	52.7	38.5	79.34
60.50	9.79	6.16	36.9	15.9	8.0	7.9	58.8	59.5	79.63
61.00	10.13	6.47	19.3	16.7	6.6	10.1	45.5	52.5	79.03
62.00	10.59	6.89	11.0	17.8	4.8	13.0	26.4	34.9	78.09
64.00	11.15	7.40	7.7	19.1	3.2	15.9	12.0	17.4	77.19
68.00	11.80	8.00	4.7	20.6	2.3	18.3	5.5	7.5	76.61
72.00	12.23	8.40	3.1	21.7	1.9	19.8	3.7	4.3	76.37

SUMMARY INFORMATION

MAXIMUM STAGE WAS 79.88 FEET AT 60.25 HOURS
MAXIMUM DISCHARGE WAS 63.2 CFS AT 60.25 HOURS

TIME (HR)	RAIN FALL (IN)	ACCUM. RUNOFF (IN)	BASIN DISCHGE (CFS)	ACCUM. INFLOW (AF)	RESERVOIR VOLUME (AF)	RESERVOIR ACCUM. OUTFLOW (AF)	RESERVOIR INSTANT DISCHGE (CFS)	RESERVOIR AVERAGE DISCHGE (CFS)	RESERVOIR STAGE (FT)
58.00	4.00	1.40	6.5	3.6	2.6	1.0	3.5	2.3	76.80
59.00	4.40	1.67	9.9	4.3	3.0	1.3	5.1	4.2	77.01
59.50	4.75	1.92	16.0	5.0	3.4	1.5	7.6	6.2	77.22
59.75	5.80	2.73	100.9	7.0	5.2	1.8	15.5	11.5	77.80
60.00	7.11	3.81	134.3	9.8	7.5	2.3	34.4	24.9	78.86
60.50	7.62	4.24	27.3	10.9	6.9	4.0	40.4	40.6	79.14
61.00	7.88	4.47	14.3	11.5	6.0	5.5	32.0	36.3	78.73
62.00	8.24	4.78	8.8	12.3	4.7	7.6	19.6	25.2	78.06
64.00	8.67	5.17	5.8	13.3	3.5	9.8	9.3	13.3	77.37
68.00	9.18	5.61	3.5	14.5	2.7	11.8	4.3	5.8	76.90
72.00	9.51	5.91	2.4	15.2	2.4	12.8	2.8	3.3	76.70

SUMMARY INFORMATION

MAXIMUM STAGE WAS 79.30 FEET AT 60.25 HOURS
MAXIMUM DISCHARGE WAS 43.9 CFS AT 60.25 HOURS

Min. road elevation 82.01 ft

ADDITIONAL INFORMATION

DEC 0 1 1997

ORLANDO SERVICE CENTER

10 yr-3 day event
Peak stage vs. min road el.

APP # 971113-1

EXHIBIT 4

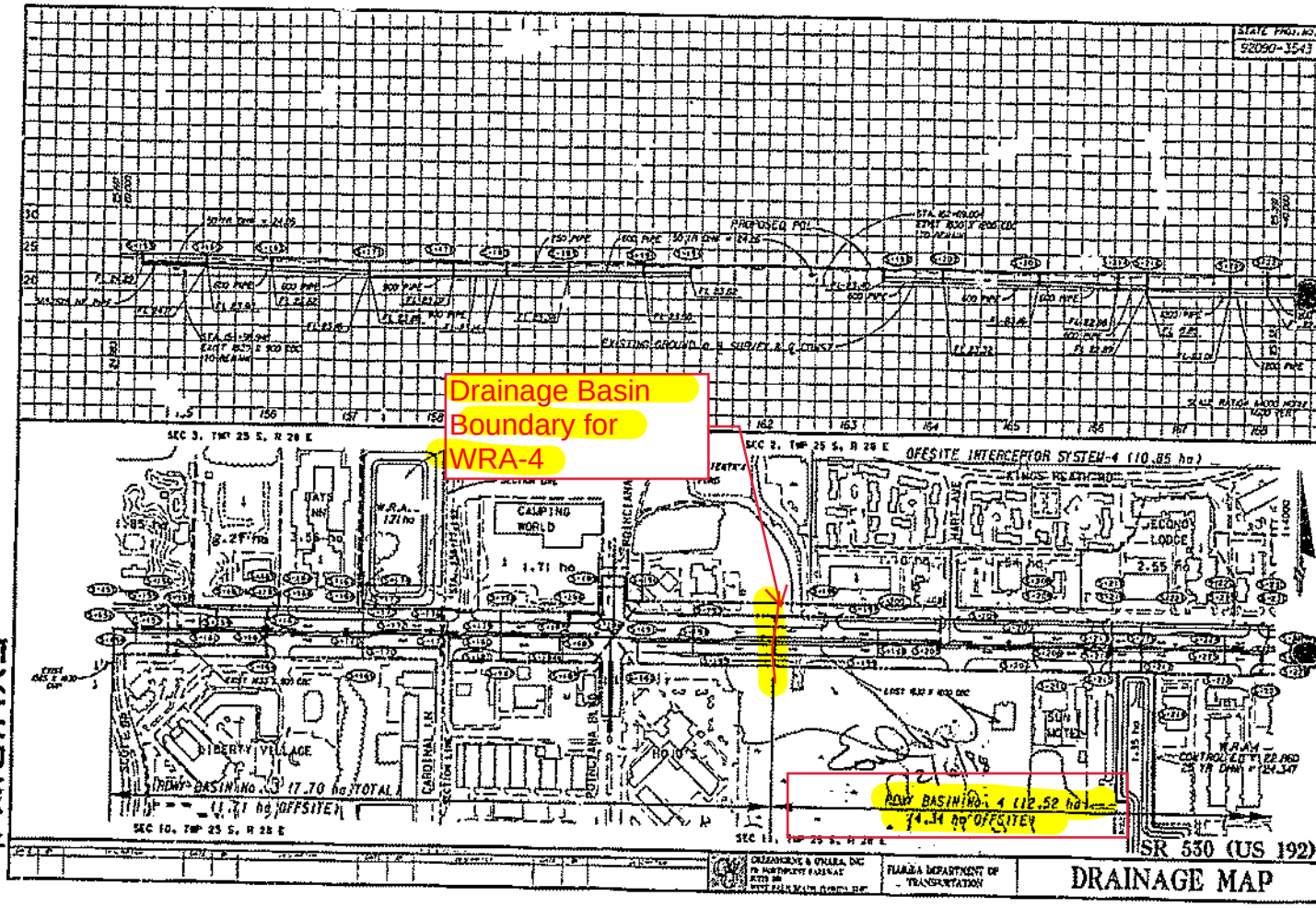
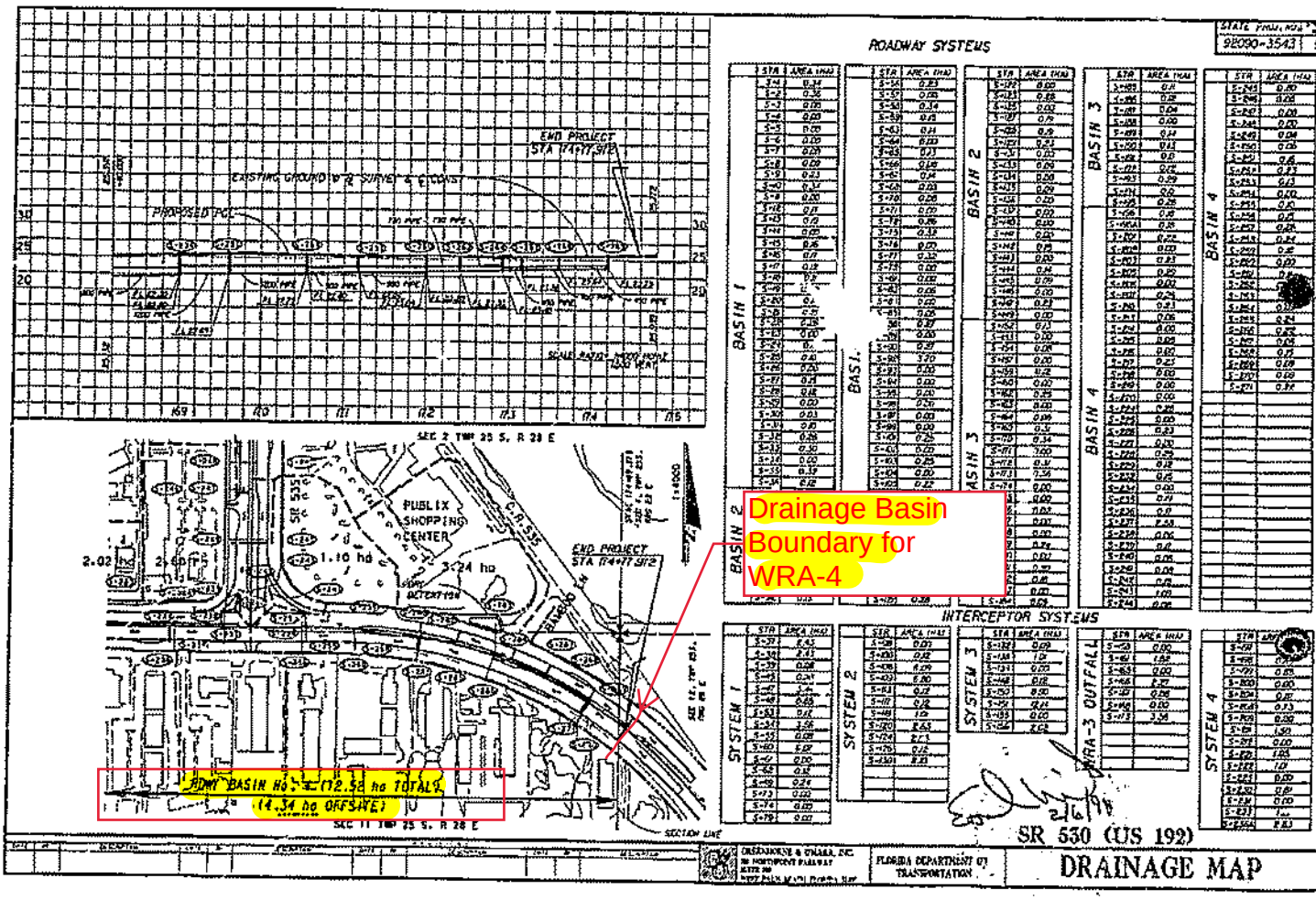

Drainage Basin Boundary for WRA-4
OFFSITE INTERCEPTOR SYSTEM-4 (10.85 ha)
WRA-4 17.1 ha
CAMPING WORLD
LIBERTY VILLAGE
DRAINAGE BASIN #3 17.70 ha TOTAL
11.71 ha OFFSITE
DRAINAGE BASIN #4 (12.52 ha
14.34 ha OFFSITE)
SR 530 (US 192)
DRAINAGE MAP

EXHIBIT 5

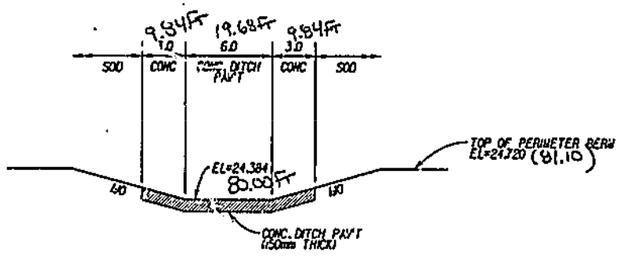

ROADWAY SYSTEMS
STATE PROJ. NO.
92090-3543
BASIN 1
BASIN 2
BASIN 3
BASIN 4
INTERCEPTOR SYSTEMS
SYSTEM 1
SYSTEM 2
SYSTEM 3
SYSTEM 4
WRA-3 OUTFALL
EXISTING GROUND
PROPOSED P.G.
END PROJECT
STA 114+77.91
PUBLIX SHOPPING CENTER
SR 535
C.R. 535
1.10 ha
3.24 ha
2.02
Drainage Basin Boundary for WRA-4
TOTAL AREA = 12.58 ha TOTAL
(4.34 ha OFFSITE)
SR 530 (US 192)
DRAINAGE MAP
FLORIDA DEPARTMENT OF TRANSPORTATION

STATE PROJ. NO.	SHEET NO.
92090-3543	103

ADDITIONAL INFORMATION

JAN 1 2 1998

ORLANDO SERVICE CENTER



EMERGENCY OVERFLOW DETAIL

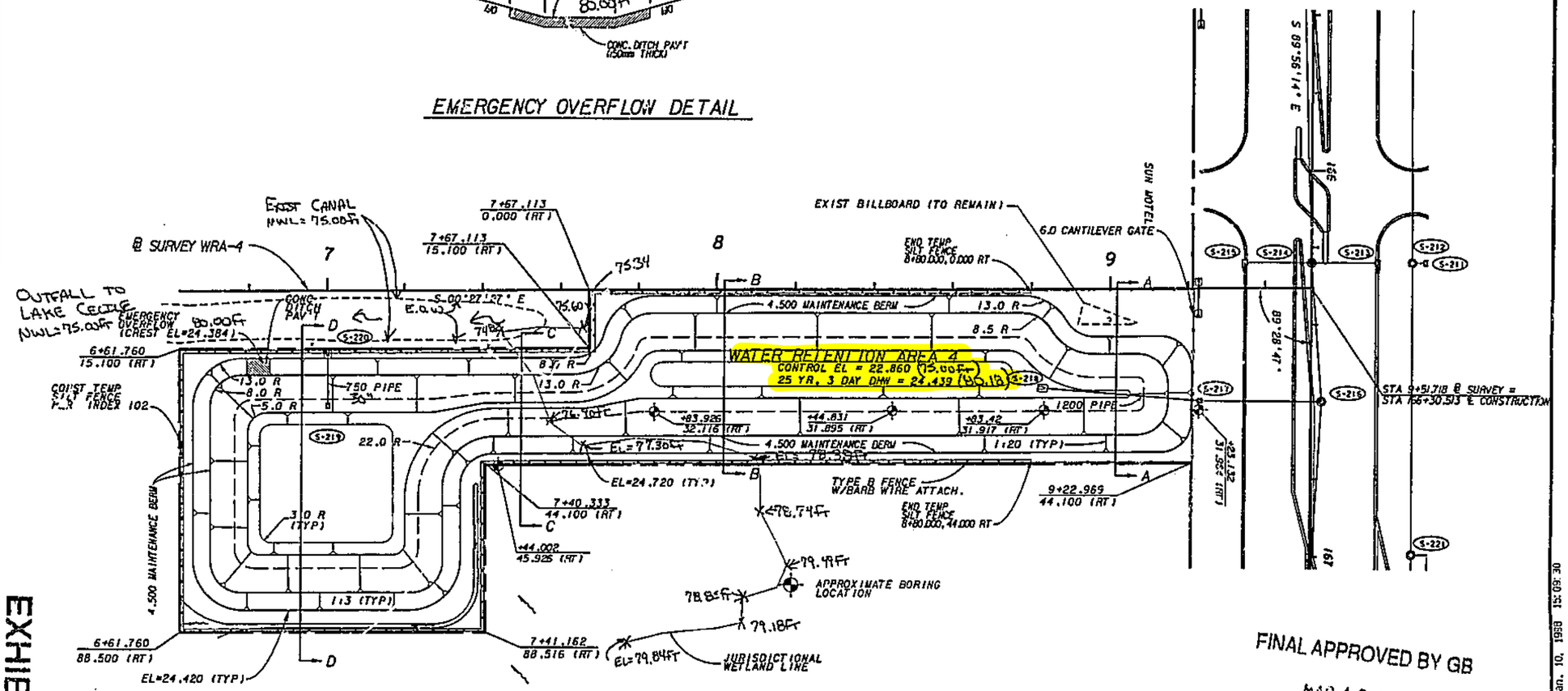


EXHIBIT 10

FINAL APPROVED BY GB

MAR 1 2 1998

WRA 4 SR 530

REVISIONS							
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

GREENHORNE & O'MARA, INC.
701 NORTHPOINT PARKWAY
SUITE 100
WEST PALM BEACH, FLORIDA 33407

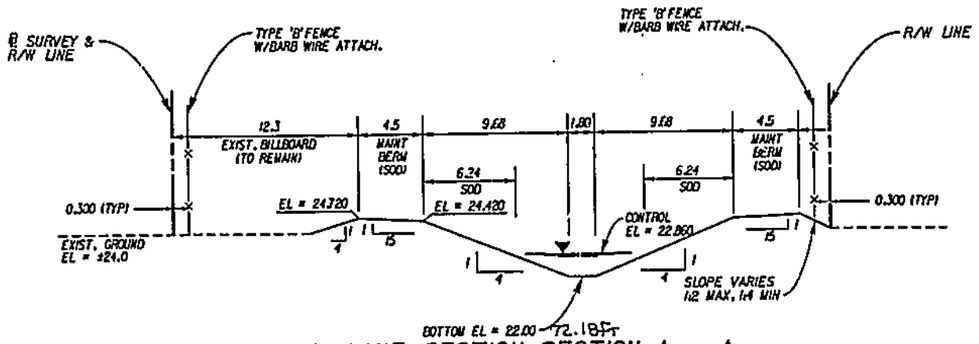
FLORIDA DEPARTMENT OF TRANSPORTATION

WATER RETENTION AREA DETAIL SHEET

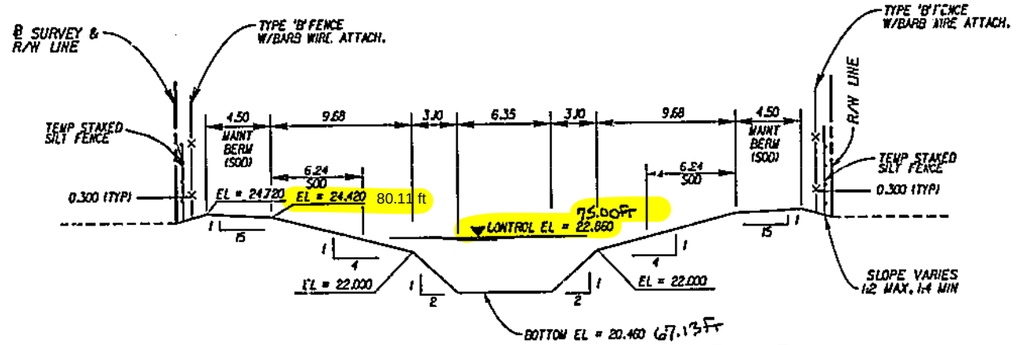
1:\530_2\cadd\wra4d.dgn Jan. 10, 1998 15:09:30

49-00883-P 971113-1

STATE PROJ. NO. | SHEET NO.
92090-3543 | 104



WRA-4 LAKE SECTION SECTION A - A



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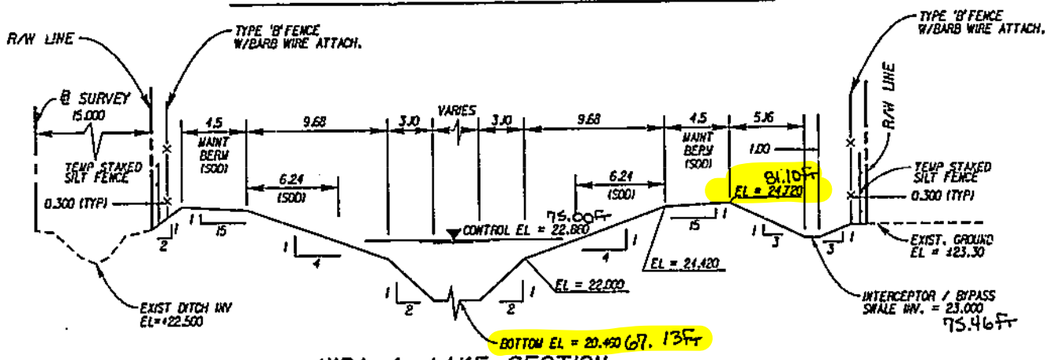


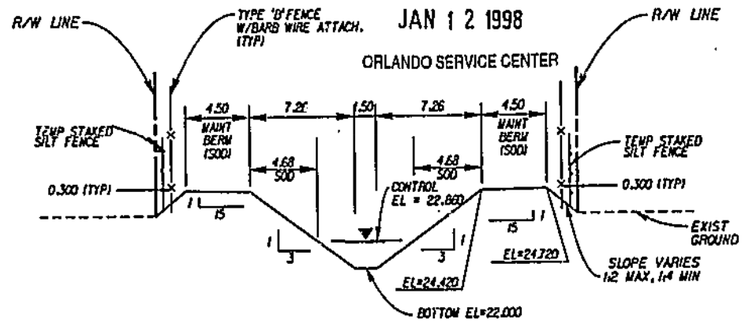
WRA-4 LAKE SECTION
SECTION D - D

EXHIBIT II

ADDITIONAL INFORMATION

JAN 1 2 1998

ORLANDO SERVICE CENTER

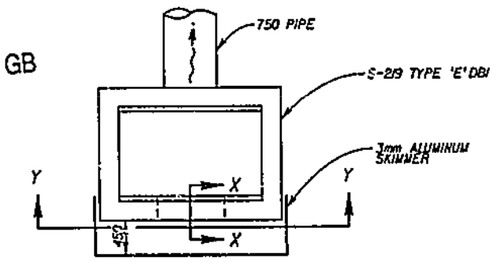


WRA-4 LAKE SECTION
SECTION C - C

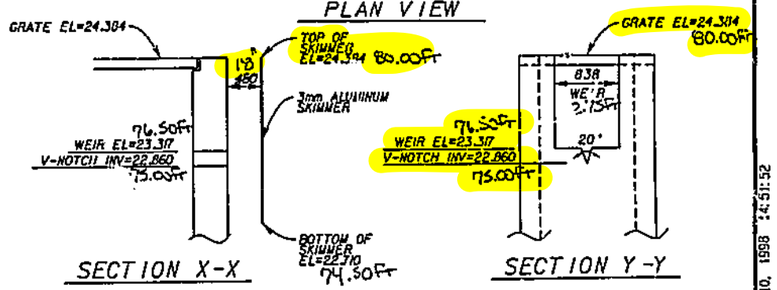
FINAL APPROVED BY GB

MAR 1 2 1998

WPB



PLAN VIEW



CONTROL STRUCTURE S-219

STA. 7+00.000, 30.000 RT (@ SURVEY WRA-4)

NOTE: CONTROL STRUCTURE S-219 SHALL BE A TYPE 'E' DBI W/ALUMINUM SKIMMER PLATE ATTACHED.

WRA 4 SR 530

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

REVISIONS

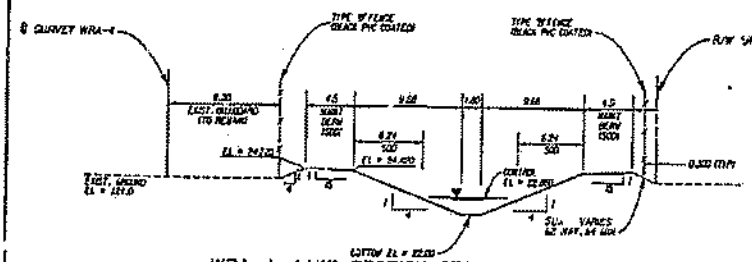
GREENHORNE & O'MARA, INC.
701 NORTHPOINT PARKWAY
SUITE 100
WEST PALM BEACH, FLORIDA 33407

FLORIDA DEPARTMENT OF TRANSPORTATION

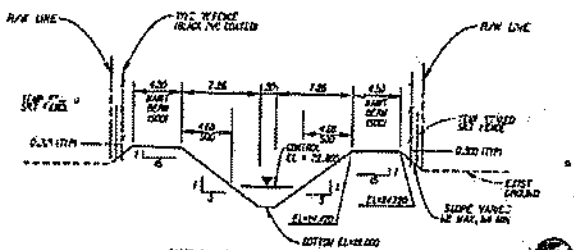
WATER RETENTION AREA
DETAIL SHEET

49-00883-P 971113-1

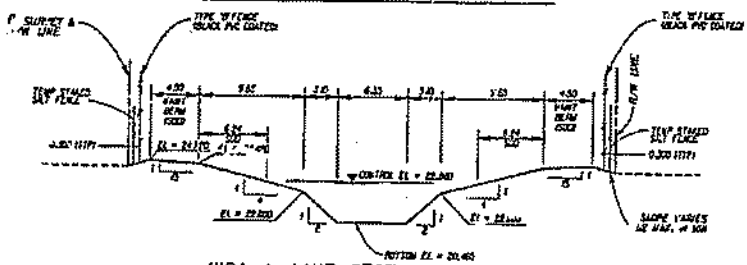
I:\530_2\cadd\wra4b.dgn Jan. 10, 1998 14:51:52



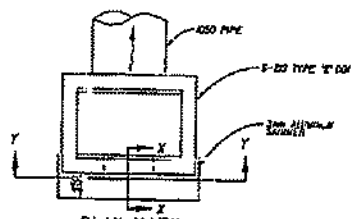
WRA-4 LAKE SECTION SECTION A - A

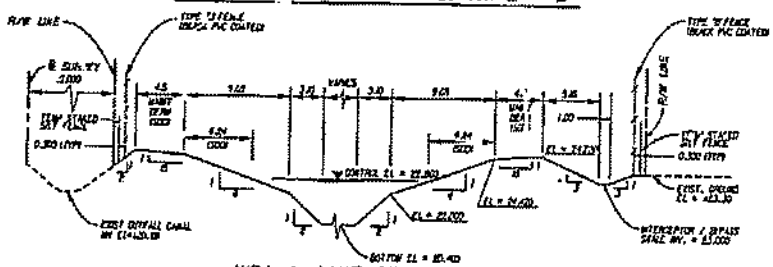


WRA-4 LAKE SECTION
SECTION C - C

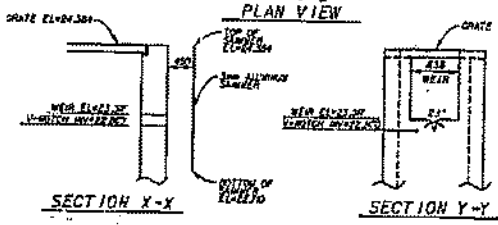


WRA-4 LAKE SECTION SECTION B - B





WRA-4 LAKE SECTION
SECTION D - D



CONTROL STRUCTURE S-219

STA. 7+00.000, 30.000 RT (R SURVEY WRA-4)

NOTE: CONTROL STRUCTURE S-219 SHALL BE A TYPE 'S' DOI WITH A ____ SKIMMER PLATE ATTACHED.

2/6/98

WRA 4

SR 530

GREENHORNE & O'MARA, INC. FL NORTHWEST PARKWAY SUITE 100 TALLAHASSEE, FLORIDA 32301

FLORIDA DEPARTMENT OF TRANSPORTATION

WATER RETENTION AREA 4 DETAIL SHEET

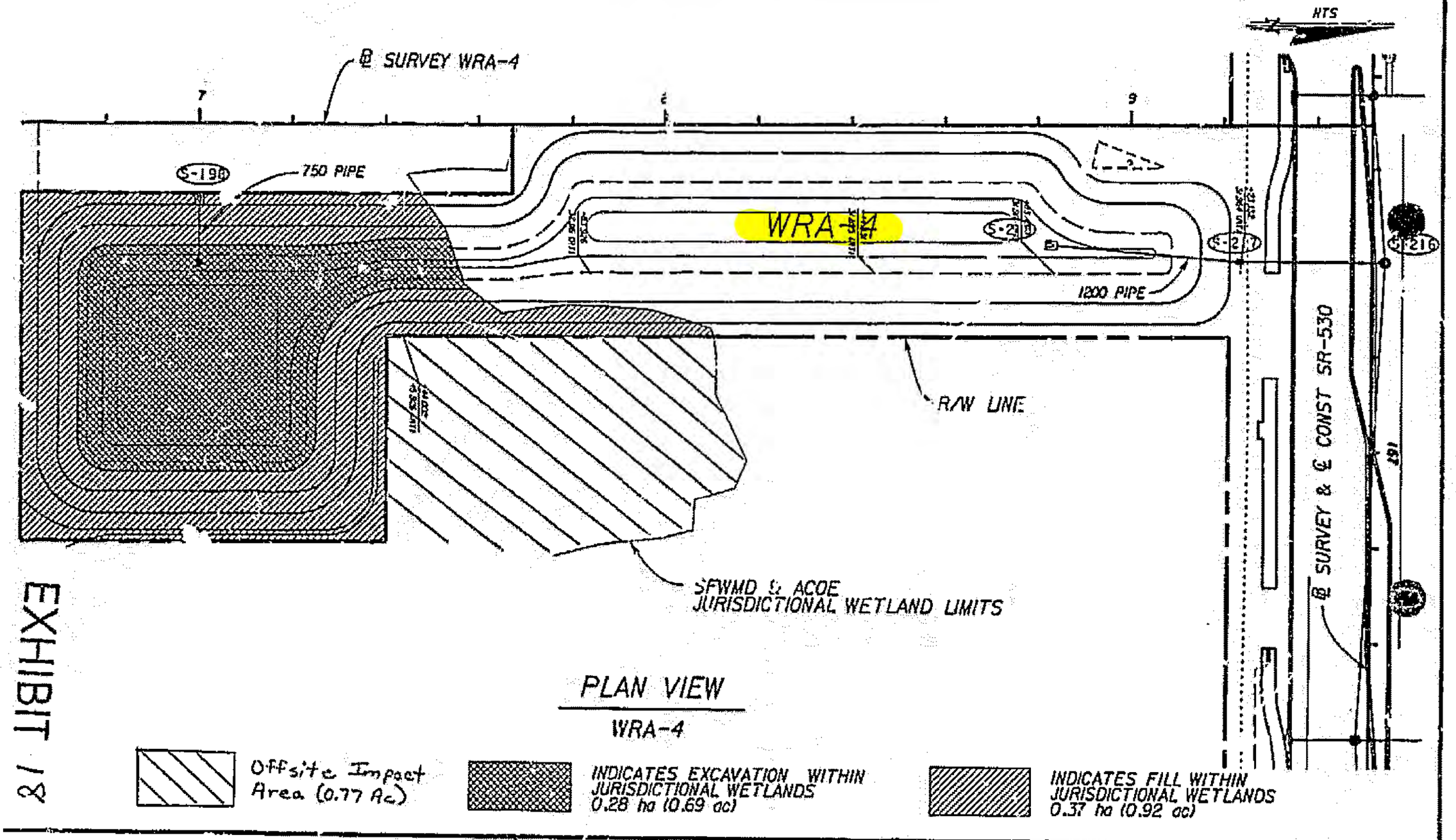


EXHIBIT 18

PLAN VIEW

WRA-4

Offsite Impact Area (0.77 Ac)

INDICATES EXCAVATION WITHIN JURISDICTIONAL WETLANDS 0.28 ha (0.69 ac)

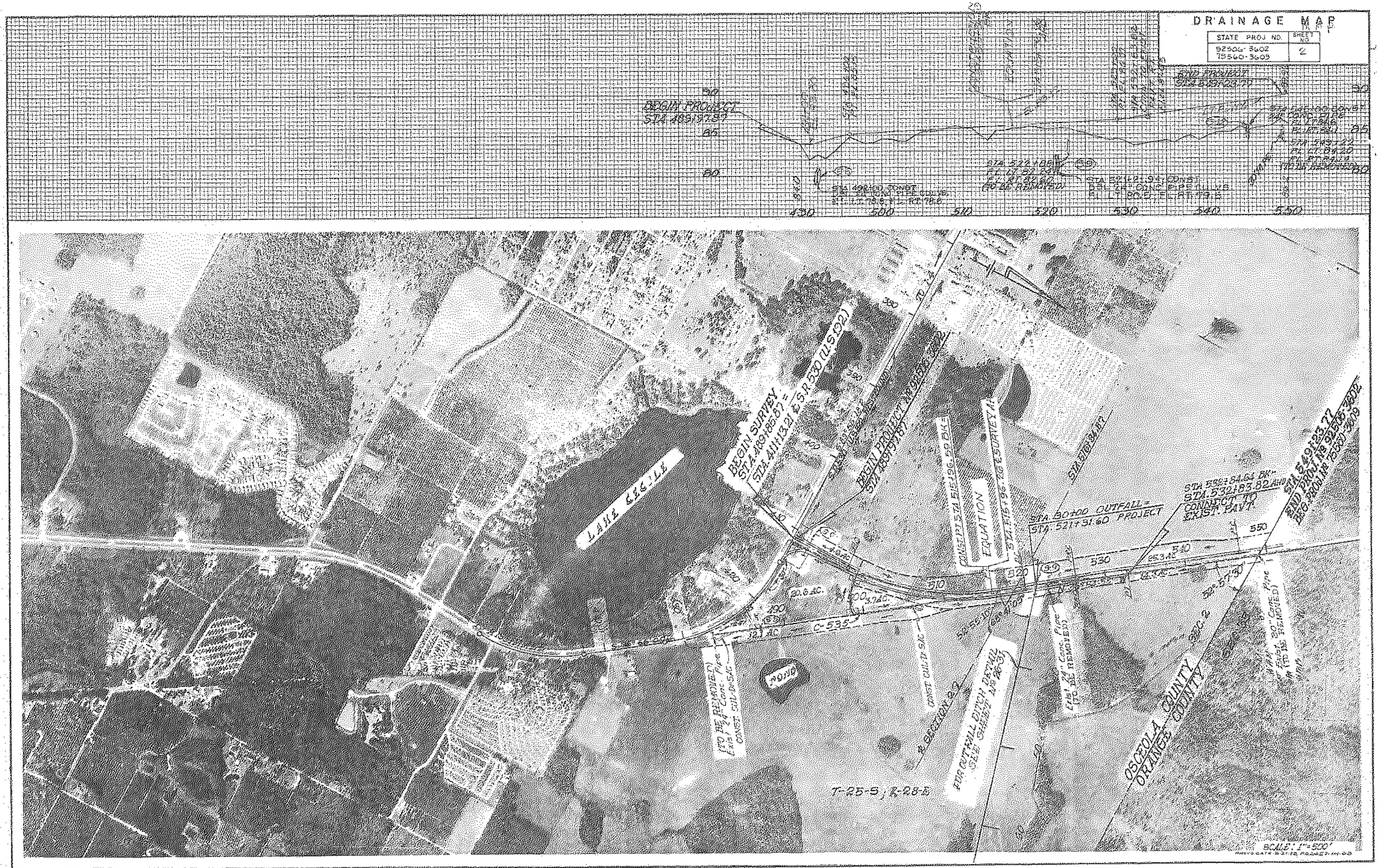
INDICATES FILL WITHIN JURISDICTIONAL WETLANDS 0.37 ha (0.92 ac)

FLORIDA DEPARTMENT OF TRANSPORTATION				
NAME: EARL WILLS	STATE PROJECT No. 92090-3543 W.P.I. No. 31857274	DER	CG	SHEET 10 OF 11
SIGNATURE	COUNTY: OSCEOLA			
CERTIFICATE No. 44194 DATE: 10/10/97	PROJECT DESCRIPTION SR 530 (US 192) BONNET CREEK TO SR 535	COE	WMD	DATE

State Project No. 75560-3609
SR 535 from SR 530 (US 192) to North of the Orange County line
Plan Excerpt
(Basin 2)

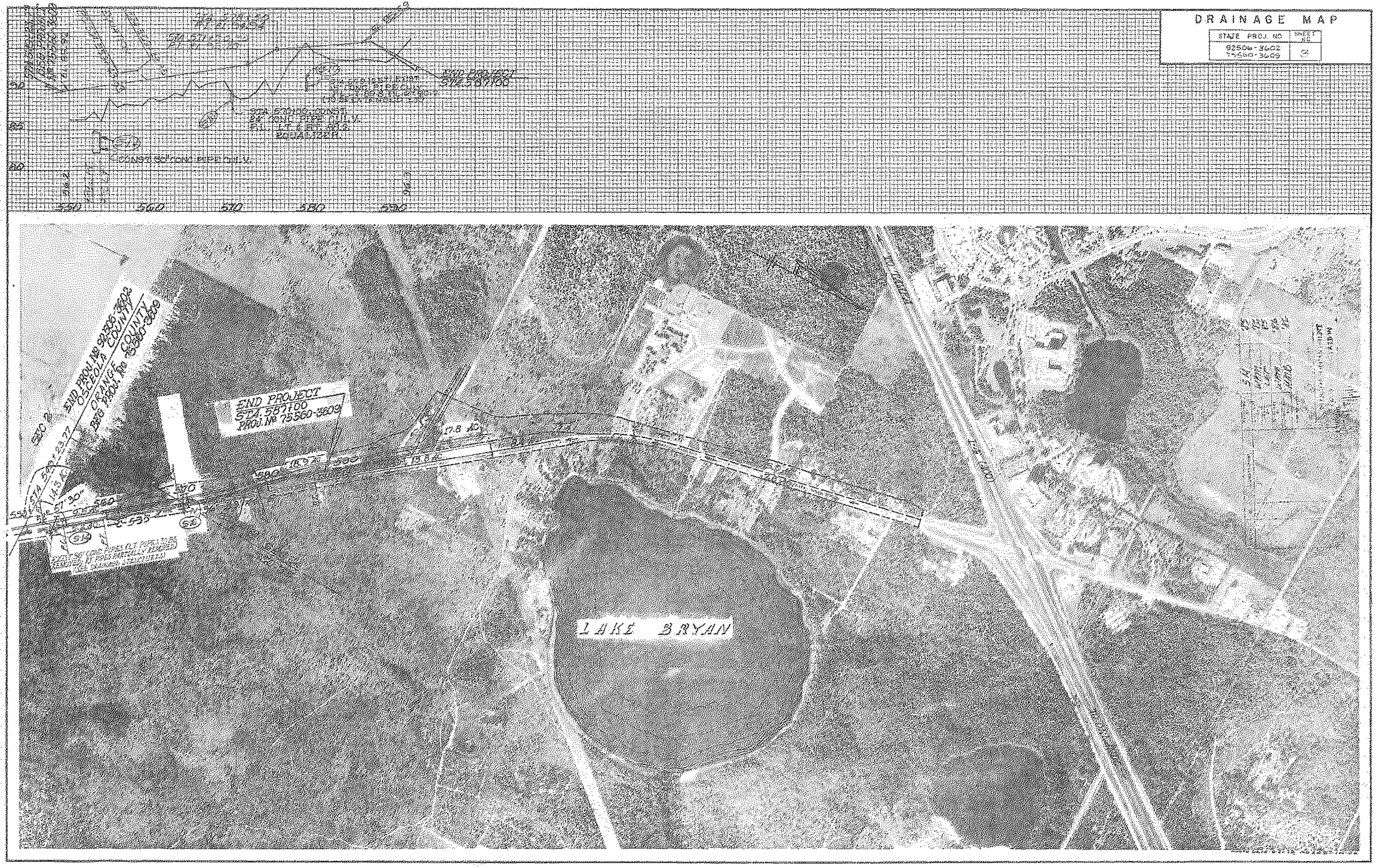
DRAINAGE MAP

STATE PROJ NO.	SHEET NO.
92506-3402 75560-3609	2

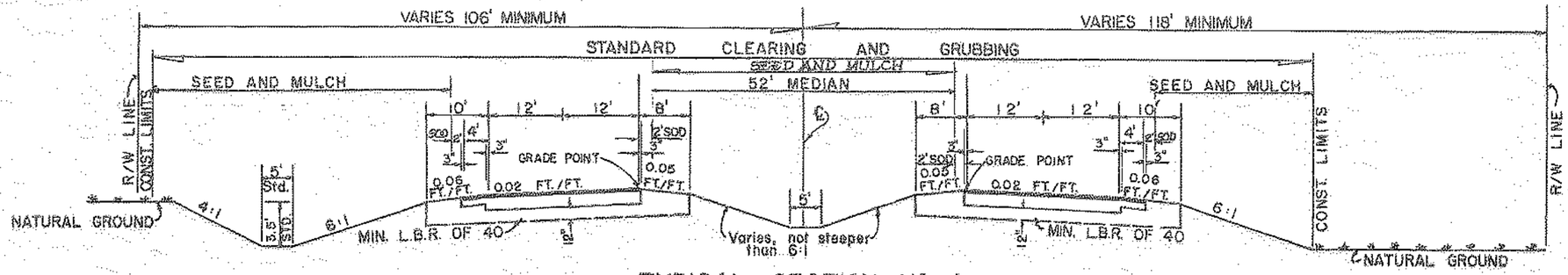


DRAINAGE MAP

STATE PROJ. NO.	SHEET NO.
92506-3602 75560-3609	04



STATE PROJ. NO.	SHEET NO.
75560-3609 B	4
92506-3602	



TYPICAL SECTION NO. 1

STA. 489+97.87 TO STA. 532+84.64 BK.
STA. 532+83.82 AHD.

ROADWAY
OPTIONAL BASE GROUP 12 (FOR THICKNESS SEE BELOW) WITH TYPE S STRUCTURAL COURSE (2" THICK) AND ASPHALTIC CONCRETE FRICTION COURSE FC-2 (5/8")

OPTIONAL BASE COURSES PERMITTED	OPTION CODE
12 1/2" LIMEROCK BASE	441
11" ASPHALT BASE COURSE (TYPE 1)	445
9" ASPHALT BASE COURSE (TYPE 2)	446
7 1/2" ASPHALT BASE COURSE (TYPE 3)	447

FOR ADDITIONAL INFORMATION SEE INDEX NO'S. 001,002

DESIGN SPEED 55 M.P.H.

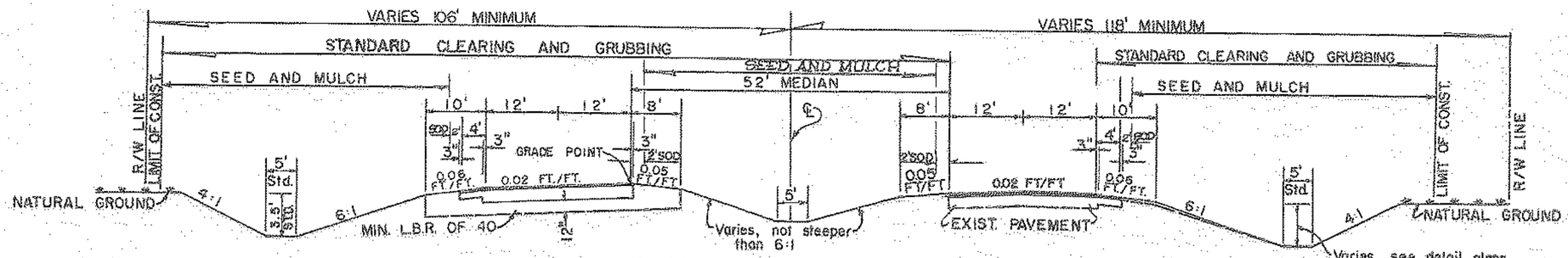
SHOULDERS LT. & RT.
CONSTRUCT OPTIONAL BASE GROUP 16 (FOR THICKNESS, SEE BELOW) WITH TYPE S STRUCTURAL COURSE (2" THICK) AND ASPHALTIC CONCRETE FRICTION COURSE FC-2 (5/8")

OPTIONAL BASE COURSES PERMITTED	OPTION CODE
4" LIMEROCK BASE	981
3" ASPHALT BASE COURSE (TYPE 1)	604
3" ASPHALT BASE COURSE (TYPE 2)	605
3" ASPHALT BASE COURSE (TYPE 3)	606

TRAFFIC DATA

1985	19,342
1990	21,636
2005	28,520

K=11% D=55% T=10%



TYPICAL SECTION NO. 2

STA 532+83.82 TO STA. 549+61.50

PROPOSED SHOULDER (LT)
CONSTRUCT OPTIONAL BASE GROUP 16 (FOR THICKNESS SEE BELOW) WITH TYPE S STRUCTURAL COURSE (2" THICK) AND ASPHALTIC CONCRETE FRICTION COURSE FC-2 (5/8")

OPTIONAL BASE COURSES PERMITTED	OPTION CODE
4" LIMEROCK BASE	981
3" ASPHALT BASE COURSE (TYPE 1)	604
3" ASPHALT BASE COURSE (TYPE 2)	605
3" ASPHALT BASE COURSE (TYPE 3)	606

PROPOSED ROADWAY
OPTIONAL BASE GROUP 12 (FOR THICKNESS SEE BELOW) WITH TYPE S STRUCTURAL COURSE (2" THICK) AND ASPHALTIC CONCRETE FRICTION COURSE FC-2 (5/8")

OPTIONAL BASE COURSES PERMITTED	OPTION CODE
12 1/2" LIMEROCK BASE	441
11" ASPHALT BASE COURSE (TYPE 1)	445
9" ASPHALT BASE COURSE (TYPE 2)	446
7 1/2" ASPHALT BASE COURSE (TYPE 3)	447

FOR ADDITIONAL INFORMATION SEE INDEX NO'S. 001,002

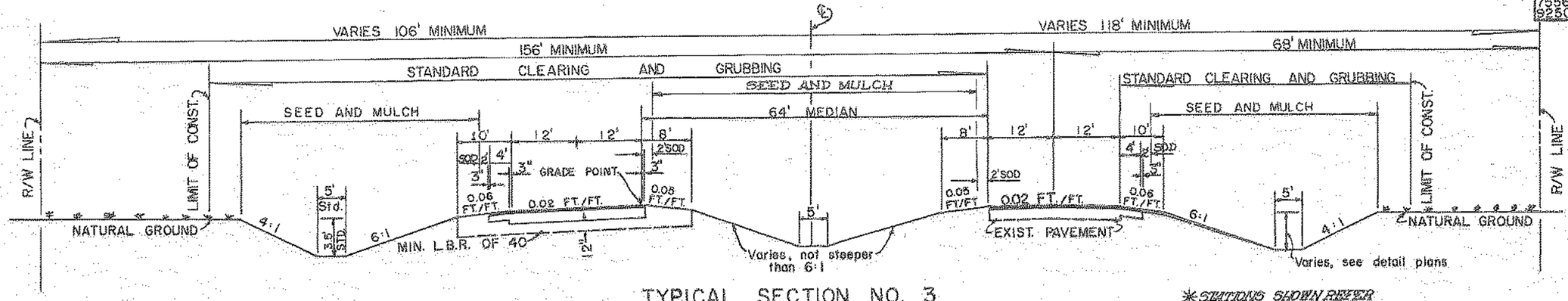
DESIGN SPEED 55 M.P.H.

EXIST. PAVEMENT
CONSTRUCT TYPE III ASPHALTIC CONCRETE LEVELING COURSE (75 LBS. PER SQ. YD. AVG) WITH TYPE S ASPHALTIC CONCRETE STRUCTURAL COURSE (200 LBS. PER SQ. YD.) AND ASPHALTIC CONCRETE FRICTION COURSE FC-2 (5/8")

EXIST. SHOULDER (RT)
CONSTRUCT OPTIONAL BASE GROUP 16 (FOR THICKNESS SEE BELOW) WITH TYPE S STRUCTURAL COURSE (200 LBS. / SQ. YD.) AND ASPHALTIC CONCRETE FRICTION COURSE FC-2 (5/8")

OPTIONAL BASE COURSES PERMITTED	OPTION CODE
4" LIMEROCK BASE	981
3" ASPHALT BASE COURSE (TYPE 1)	604
3" ASPHALT BASE COURSE (TYPE 2)	605
3" ASPHALT BASE COURSE (TYPE 3)	606

STATE PROJ. NO.	SHEET NO.
75560-3609 & 92506-3602	15



TYPICAL SECTION NO. 3

STA. 549+61.50 — STA. 587+00*

*STATIONS SHOWN REFER TO LEFT ROADWAY

STA. 549+83.77 TO STA. 569+50
EXIST. PAVEMENT

CONSTRUCT TYPE III ASPHALTIC CONCRETE LEVELING COURSE (75 LBS./SQ. YD. AVG) WITH TYPE S ASPHALTIC CONCRETE STRUCTURAL COURSE (200 LBS./SQ. YD.) AND ASPHALTIC CONCRETE FRICTION COURSE FC-2 (5/8").

PROPOSED SHOULDER (LT.)

CONSTRUCT OPTIONAL BASE GROUP 16 (FOR THICKNESS SEE BELOW) WITH TYPE S STRUCTURAL COURSE (2" THICK) AND ASPHALTIC CONCRETE FRICTION COURSE FC-2 (5/8")

OPTIONAL BASE COURSES PERMITTED		OPTION CODE
4" LIMEROCK BASE		981
3" ASPHALT BASE COURSE	(TYPE 1)	604
3" ASPHALT BASE COURSE	(TYPE 2)	605
3" ASPHALT BASE COURSE	(TYPE 3)	606

PROPOSED ROADWAY

⊕ OPTIONAL BASE GROUP 12 (FOR THICKNESS SEE BELOW) WITH TYPE S STRUCTURAL COURSE (2" THICK) AND ASPHALTIC CONCRETE FRICTION COURSE FC-2 (5/8")

OPTIONAL BASE COURSES PERMITTED		OPTION CODE
12 1/2" LIMEROCK BASE		441
11" ASPHALT BASE COURSE	(TYPE 1)	445
9" ASPHALT BASE COURSE	(TYPE 2)	446
7 1/2" ASPHALT BASE COURSE	(TYPE 3)	447

FOR ADDITIONAL DETAILS SEE INDEX NO'S. 001,002

DESIGN SPEED 55 M.P.H.

EXIST. SHOULDER (RT.)

CONSTRUCT OPTIONAL BASE GROUP 16 (FOR THICKNESS SEE BELOW) WITH TYPE S STRUCTURAL COURSE (200 LBS./SQ. YD.) AND ASPHALTIC CONCRETE FRICTION COURSE FC-2 (5/8")

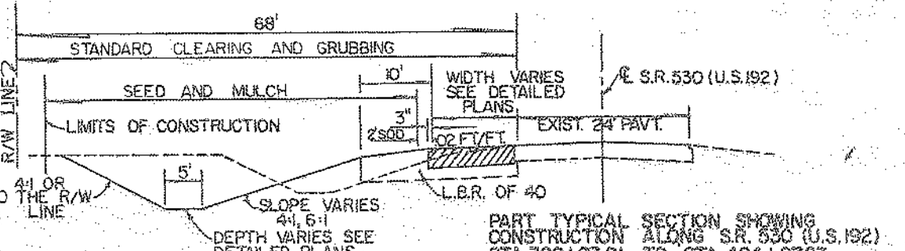
OPTIONAL BASE COURSES PERMITTED		OPTION CODE
4" LIMEROCK BASE		981
3" ASPHALT BASE COURSE	(TYPE 1)	604
3" ASPHALT BASE COURSE	(TYPE 2)	605
3" ASPHALT BASE COURSE	(TYPE 3)	606

GENERAL NOTES

1. Traffic will be maintained in accordance with the State of Florida Manual of Traffic Control and Safe Practices for Street and Highway Construction, Maintenance and Utility Operations.
2. The Contractor should identify the proposed option on which his initial bid is based by entering the three digit option code to the right side of the item number of optional base item on the submitted bid proposal.
3. None of the existing limerock base that is removed is to be used in the contruction of the limerock base.

PAY ITEM NOTES

1. Item no. 120-1 The pay quantity for this item shall be the plan quantity.
2. Item no. 570-5 Based on two applications.
3. Item no. 430-14-329 & 430-14-333 includes 80 lin. ft. of 30" conc. pipe culvert & 60 of 24" conc. pipe culvert as a contingency.
4. Item no. 102-74 thru 102-77 will be paid for on the basis of per unit per day in use. The quantity shown is based on an estimated average.
   102-74 20 barricades for 315 days.
   102-75 20 signs for 315 days.
   102-76 1 arrow boards for 315 days.
   102-77 10 flashing lights for 315 days.
   Special attention is directed to Case III, IV, VII, VIII, IX of the Traffic Control Manual and Section 8-4.3 of the Standard Specifications.
5. Cross drain mitered end sections shall be 5½ inches thick in lieu of the 3 inches shown in Standard Index 272. Concrete quantities listed in the tables in Standard Index 272 must be multiplied by an factor of 1.8.
   Item № 440-73-3 Includes the cost of concrete pad & concrete collar. See detail sheet № 33.
   Item № 110-1 Includes the removal of existing asphalt pavement & base as shown on the plans.



PART TYPICAL SECTION SHOWING CONSTRUCTION ALONG S.R. 530 (U.S. 192) STA. 399+93.21 TO STA. 424+27.63

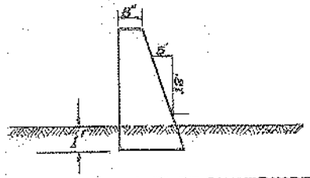
DESIGN SPEED 55 M.P.H.

NOTE: ⊕ BASE COURSES SAME AS ABOVE.

TRAFFIC DATA

1985	19,342
1990	21,636
2005	28,520

K=11% D=55% T=10%



GRAVITY WALL TO BE CONSTRUCTED FT. & STA. 548+00 TO STA. 554+00 FOR ADDITIONAL DETAIL SEE INDEX № 520

NOTE: GRAVITY WALL TO BE CONSTRUCTED 2.3' ABOVE DITCH GRADE. (TOP OF WALL)

DATE	DESCRIPTION	DESIGNED	DRAWN	CHECKED	QUANTITIES	CHECKED	SUPERVISED
		L.E.F.	A.P.C.	W.A.M.	A.P.C.	W.A.M.	W.A.M.
'85		'85	'85	'86	'85	'86	'86

APR 8 1986

FLORIDA DEPARTMENT OF TRANSPORTATION

SUMMARY OF SIDEDRAIN PIPE AND MITERED END SECTIONS

	STATION TO STATION	SIDE	SIZE	PIPES LIN FT 18"	24"	30"	SECTIONS EACH 18"	24"	30"
P	495+91 (S.R. 535)	LT.	18"	32'			2		
F									
P	495+91 (S.R.535)	RT.	18"	32'			2		
F									
P	510+20 (S.R.535)	RT.	24"		24'			2	
F									
P	517+00 (S.R. 535)	LT.	24"		24'			2	
F									
P	414+00-414+50(U.S.192)	LT.	30"			48'			1
F									
P	414+50-418+50(U.S.192)		30"			452			1
F									
P	421+00-423+00		24"		208			2	
F									
	TOTALS			64'	256	500	4	6	2

Note: Turnouts and Sidedrains are to be constructed at locations designated by the Engineer in accordance with Index No. 515.

SUMMARY OF FUTURE SIDE DRAIN PIPES

STATION TO STATION	LEFT CONC. PIPE	LEFT CORR. METAL PIPE	RIGHT CONC. PIPE	RIGHT CORR. METAL PIPE
480+00-510+00 (NEW S.R.535)	24"	30"	24"	30"
480+00-510+00 (OLD S.R.535)	24"	30"	18"	24"
510+00-521+15	30"	36"	24"	30"
521+15-571+90	30"	36"	30"	36"
571+90-584+00	24"	30"	24"	30"

Note: The sidedrain pipe dimensions are presented in standard diameters. The department's engineer shall determine if the effective ditch and back slope requires an equivient pipe arch or elliptical pipe.

SUMMARY OF SODDING

LOCATION	SIDE LEFT	SIDE MEDIAN	SIDE RIGHT	TOTAL	P	F	
OSCEOLA COUNTY							
487+00	11.00		11.00	22			
492+00	18.00		18.00	36			
* 492+50	59.00		59.00	118.00			* WEIRS LT. & RT. @ PROJECT
491+59.86-549+92	1320.694			1,320.694			△ INCLUDES RETURN AND ACCELERATION LANE.
505+00	11.00			11.00			
513+00	11.00			11.00			
521+21.94	74.00		74.00	144.00			
495+50 - 498+50			467.00	467.00			
495+25 - 497+25	289.00			289.00			
528+00	11.00	23.00		34.00			
536+00	11.00	23.00		34.00			
545+00	14.00		14.00	28.00			
492+39.91-549+10			△1449.60	1449.60△			△ INCLUDES RETURN AND DECELERATION LANE.
S.R. 192 (U.S. 530)							
410+01.41 (S.D.)	25.00			25.00			
414+00 (S.D.)	31.00			31.00			
418+50 (S.D.)	31.00			31.00			
421+00 (S.D.)	28.00			28.00			
423+00 (S.D.)	28.00			28.00			
399+93.21 - 409+13.23	204.44			204.44			
U.S. 192							
414+05.25 - 421+05.39	155.58			155.58			
411+13.21 (CROSSOVER)		152.21		152.21			
421+50 (CROSSOVER)		181.20		181.20			
421+50 (CONNECTOR RD.)	70.44			70.44			
421+50 (CONNECTOR RD.)		72.20		72.20			
S.R. 535							
RETURN NO.1 PROJECT	51.55			51.55			
RETURN NO.2 PROJECT		81.77		81.77			
491+59.86 - 549+74		1292.03		1292.03			
492+39.91 - 549+33		1265.13		1265.13			
499+29.97 (CONNECTOR)	109.69			109.69			
499+29.97 (CONNECTOR)		112.79		112.79			
ORANGE COUNTY							
550+00	11.00	15		26.00			
549+53 - 587+00		832.67		832.67			
555+00	11.00	15.00		26.00			
570+00	14.00			14.00			
579+25	11.00			11.00			
549+92 - 587+00	824.00			824.00			
549+10 - 569+00			442.22	442.22			
552+81 - 553+82	157			157.00			
OSCEOLA COUNTY				8092.32			
ORANGE COUNTY				2332.89			
GRAND TOTAL				10,389.81			

Note: The limits of sodding indicated are approximate and are to be adjusted where necessary, as directed by the Engineer, to provide for continuity of construction or to suit the actual requirements.

L.F. '85
W.A.M. '86
A.R.C. '85
W.A.M. '86
W.M.B. '86

APR 8 1986

REVISIONS											
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

	NAME	DATE
DESIGNED BY	L.E.F.	6-85
CHECKED BY	L.E.F.	8-85
DRAWN BY	A.R.C.	8-85
CHECKED BY	W.A.M.	'86
SUPERVISED BY	W.A.M.	'86

FLORIDA DEPARTMENT OF TRANSPORTATION
APPROVED BY
DATE

SUMMARY OF QUANTITIES

STATE PROJ. NO.	SHEET NO
92506-3602	7
75560-3609	

P.I. STA. 507+05.07
Δ = 37°00'10" LT.
D = 2°00'
T = 958.62'
L = 1850.14'
R = 2864.79'
P.C. STA. 497+46.45
P.T. STA. 515+96.59
SUPERELEV. RATE 0.060 FT.

CROSSOVER QUANTITY

SURFACE	1651.40 S.Y.
BASE	1647.27 S.Y.
STABILIZATION	1412.09 S.Y.

CROSSOVER QUANTITIES
SURFACE = 878.54 S.Y.
BASE = 873.96 S.Y.
STABILIZATION = 1438.47 S.Y.

STA 485+86.87 ℄ PROJ. =
STA 411+13.21 ℄ U.S. 192
BASELIN SURVEY

RETURN № 1
STA. 492+50 CONST. WELR) FOR DETAILS SEE SHEET № 33
RIW LINE
CONST 4" PAVED SHDR.
℄ SURVEY ℄ ALIGN. C.R. 555
N 0°05'12" E
PROPOSED
TO BE REMOVED
BEGIN PROJECT STA 489+97.87
RETURN № 2
FOR ADDITIONAL INTERSECTION DETAILS SEE SHEET № 23, 24
U.S. 192
℄ ROAD
STA 10+00 CONNECTOR ROAD STA 499+29.57 ± PROJ.
FOR CONNECTOR ROAD DETAILS SEE SHEET № 21-22
SCALE: 1"=60'

B.M. № 41 ELEV. 81.57
4"x4" D.O.T. C.M. WITH BRASS DISK
65' LT. ℄ STA. 414+00 U.S. 192

B.M. № 50-A 4"x4" C.M. WITH BRASS DISK ELEV. 84.23
110' RT. REVISED ℄ STA. 497+46.45

FOR COMPLETE INFORMATION R/W LINES REFER TO R/W MAP.

1-B.M. DATA IS NATIONAL GEODETIC VERTICAL DATUM OF 1929 (NGVD-'29)
2-GRADES SHOWN ARE FINISHED GRADES.
3-EXISTING DRAINAGE STRUCTURES WITHIN THE CONSTRUCTION LIMITS SHALL BE REMOVED UNLESS OTHERWISE NOTED.
4-UTILITIES TO BE ADJUSTED BY OTHERS IN ACCORDANCE WITH THE UTILITY ACCOMODATION GUIDE.
5-ANY PUBLIC LAND CORNER WITHIN THE LIMITS OF CONSTRUCTION IS TO BE PROTECTED. IF A CORNER MONUMENT IS IN DANGER OF BEING DESTROYED AND HAS NOT BEEN PROPERLY REFERENCED THE PROJECT ENGINEER SHOULD NOTIFY THE DISTRICT LOCATION SURVEYOR WITHOUT DELAY BY PHONE.
6-THE LOCATION OF PROPOSED UTILITIES SHOWN IN PLANS ARE APPROXIMATE ONLY; THE EXACT LOCATION SHALL BE DETERMINED BY THE ENGINEER DURING CONSTRUCTION.
7-ANY 'NGVD' 29 MONUMENT WITHIN THE LIMITS OF CONSTRUCTION IS TO BE PROTECTED. IF IN DANGER OF DAMAGE THE PROJECT ENGINEER SHOULD NOTIFY:
MR CHARLES NOVAC
GEODETIC INFORMATION CENTER
ATTN: MARK MAINTENANCE SECTION
ATTN. N/CG-162, 6001 EXECUTIVE BLVD.
ROCKVILLE, MARYLAND 20852
TELEPHONE № (301) 443-8319

SEE SHEET NO. 24 FOR CONNECTION PROFILES TO EXIST U.S. 192 (S.R. 530)
MED. D.P.I. 82.3
SPEC. MED. +0.10%
MED. D.P.I. 83.8
RT. D.P.I. 81.7
SPEC. RT. D.T. -0.10%
L.T. D.P.I. 81.5
SPEC. LT. D.T. -0.05%
SPEC. LT. & RT. D.T. +0.05%
SEE INTERSECTION PROFILES FOR ADDITIONAL DITCH WORK AROUND RETURNS, SHEET № 24
FOR SUMMARY OF FUTURE SIDE DRAIN PIPES SEE SHEET № 6

UTILITY OWNERS
PROJECT № 92506-3602
ORLANDO UTILITIES COMMISSION
FLA. POWER CORPORATION
CITY OF KISSIMMEE
PEOPLES GAS SYSTEM, INC.
FLA. GAS TRANSMISSION

PROJECT № 75560-3609
PEOPLES GAS SYSTEM, INC.
UNITED TELEPHONE SYSTEMS
FLA. GAS TRANSMISSION CO.
FLA. POWER CORPORATION

STATE PROJ NO	SHEET NO
92506-3402 75540-3409	8

Scale: 1"=50'

Scale: 1"=50'

STATE PROJ. NO.	SHEET NO.
92506-3602 75260-3609	5

P.I. STA. 522+21.20
Δ=22°28'28" LT.
D=10°00'00"
T=301.00'
L=642.32'
R=171.83.73'
P.C. STA. 520+00.00
P.T. STA. 526+42.32
NO S.E. REQ'D.

P.I. STA. 522+63.52
Δ=20°31'00" RT.
D=20°00'00"
T=271.00'
L=642.35'
R=171.83.73'
P.C. STA. 519+42.32
P.T. STA. 523+84.67
NO S.E. REQ'D.

SCATTERED PINES
PASTURE
IMPROVED PASTURE
THICK BRUSH
EXIST. 8" CONC. PIPE
EXIST. 18" CONC. PIPE
EXIST. 24" CONC. PIPE
EXIST. 24" PAVT.
CONST. 24" PAVT.
CONST. 4" PAVED SHDR.
C-535
N 36°54'58" W
STA 521+51.60
℄ OUTFALL DITCH
STA 526+57.55
℄ CROSSOVER
F.L. 522
F.L. 523
F.L. 524
F.L. 525
F.L. 526
F.L. 527
F.L. 528
F.L. 529
F.L. 530
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F.L. 538
F.L. 539
F.L. 540
F.L. 541
F.L.

STATE PROJ NO	SHEET NO
92500-3602	10
75560-3605	

Fla Power Corp. Plotted 10/1/85 FAR
BK. No 1025465 Bench Marks NAVM
BK. No 1023035 Aligned Targets Mast

S.M. No 84 EL. 85.04
4"x4" R.O.T.C.M. WITH BRASS DISC
105' RT. E. STA. 84+00

Scale-1"=50'

STATE PROJ. NO	SHEET NO.
92560-3602	
75560-3608	11

OSCEOLA COUNTY

ORANGE COUNTY

R/W LINE

BEG. PROJECT NO 75560-3609

(1)
P.I. STA. 549+41.68
Δ = 12°47'27" LT.
D = 0°-20'
T = 268.65'
L = 537.25'
R = 17,188.30'
P.C. STA. 546+73.03
P.T. STA. 552+10.28
NO S.E. REQD.

(2)
P.I. STA. 559+00.81
Δ = 1°41'13" RT.
D = 0°-20'
T = 253.06'
L = 506.09'
R = 17,188.30'
P.C. STA. 554+37.75
P.T. STA. 559+43.12
NO S.E. REQD.

550 555 560

(BT) DUCT

(TO BE REMOVED)

EXIST. PAVT. (TO REMAIN)

N 38°42'26" W

N 37°01'12" W

N 36°53'46" W

C-535

52°57'30"

STA 549+29.77
21" RCP
(TO BE REMOVED)

R/W LINE

CONST GRAVITY WALL 13'00" INSIDE R/W LINE EXCEPT AT TRANS (SEE DETAIL) SHEET No 34

STA. 554+00, END GRAVITY WALL

CROSSOVER QUANTITIES

SURFACE	= 387.75 S.Y.
BASE	= 386.58 S.Y.
STABILIZATION	= 329.83 S.Y.

STA 559+43.85 R/W

STA 559+48.85 R/W

EXIST. 24" RCP

EXIST. 30" RCP

Scale: 1"=50'

B.M. No 55 EL 88.39
4"x4" D.O.T. C.M. WITH BRASS DISC
64' RT. & STA. 550+00

B.M. No 56 EL 88.20
4"x4" D.O.T. C.M. WITH BRASS DISC
30' RT. & STA. 560+00

STA 548+23.77
BEGIN PROJECT No 75560-3609

+0.13% GR

-0.10% GR

MED. DITCH EL 86.4

78' Dual

STA 548+62 EXIST. 30" CONC. PIPE CULVT. R.C. EL 84.20 F.I. RT. EL 84.14 (TO BE REMOVED)

STA 558+23.77 EXIST. 30" CONC. PIPE CULVT. R.C. EL 87.20 F.I. RT. EL 87.14 (TO BE REMOVED)

EXIST. 24" CONC. PIPES AT ±45° SKEW

EXIST. 30" CONC. PIPES AT ±45° SKEW

TOWN DRAIN PIPES AS SHOWN

DRAINAGE STRUCTURES

RT. OF 36' BELOW SHOULDER

MED. DITCH 2.0' BELOW LT. SHOULDER

EDUCATION

EL 91.33

+0.15%

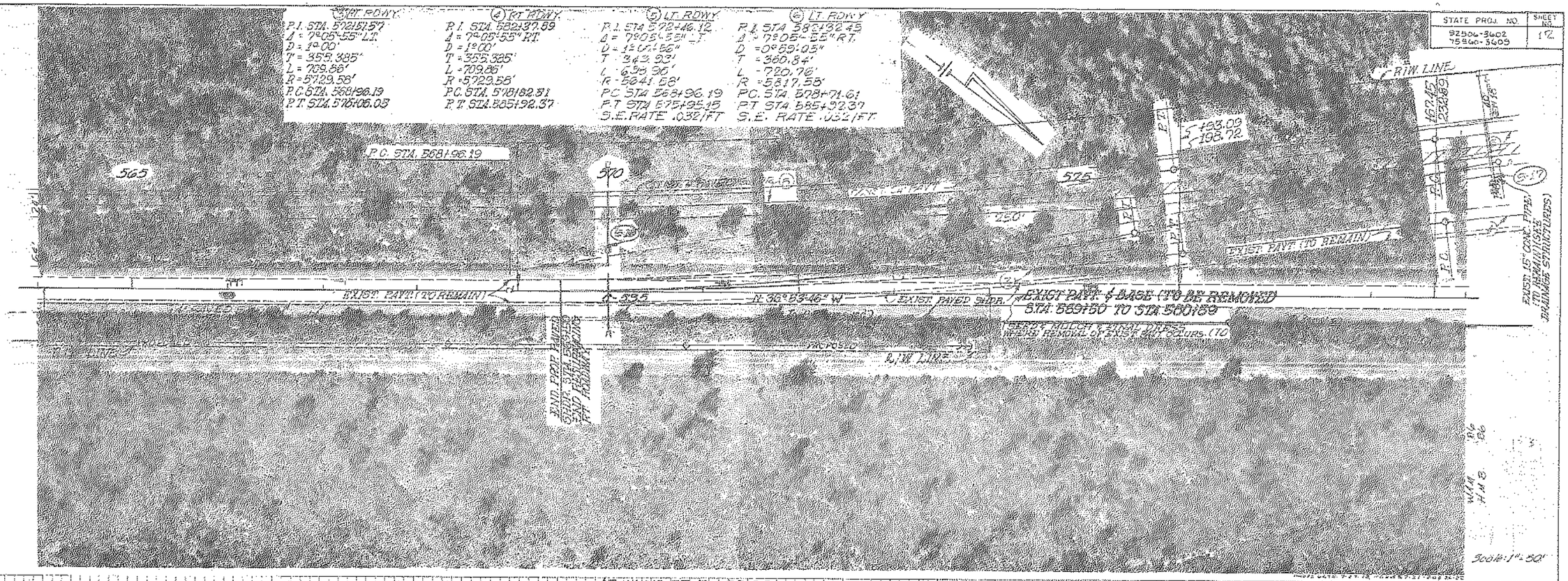
STA 559+43.85 R/W

STA 559+48.85 R/W

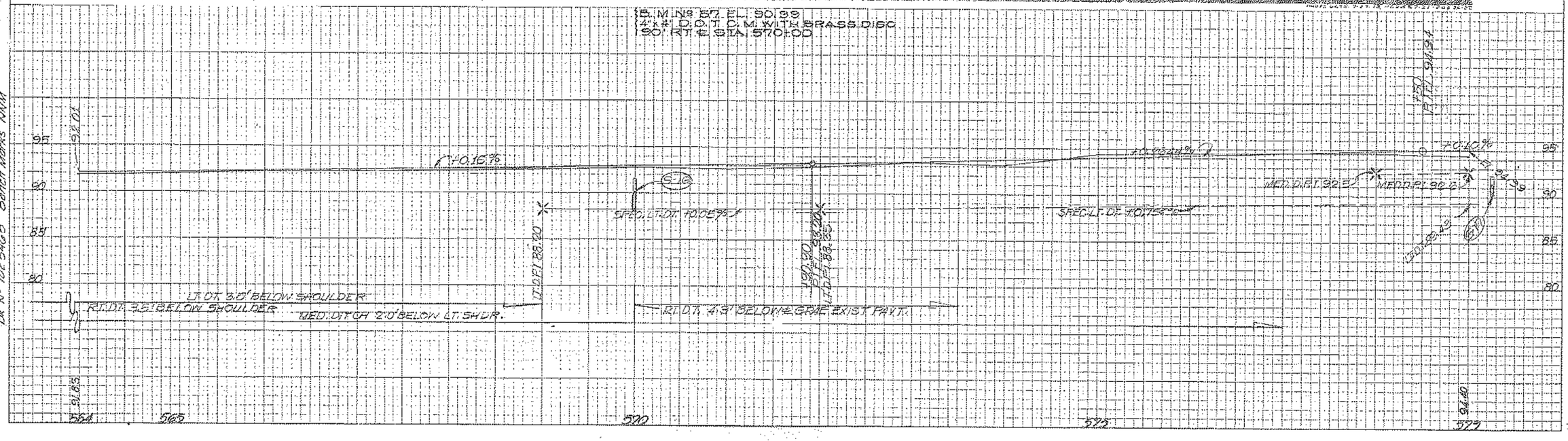
550 555 560 564

STATE PROJ. NO.	SHEET NO.
9290b-3602 7590c-3405	12

③ RT. ROW'Y.	④ RT. ROW'Y.	⑤ LT. ROW'Y.	⑥ LT. ROW'Y.
P.I. STA. 570+51.57	P.I. STA. 582+37.89	P.I. STA 572+46.12	P.I. STA 580+32.45
Δ = 7°05'55" LT.	Δ = 7°05'55" RT.	Δ = 7°05'55" LT.	Δ = 7°05'55" RT.
D = 1°00'	D = 1°00'	D = 1°00'55"	D = 0°59'05"
T = 355.385'	T = 355.385'	T = 343.93'	T = 360.84'
L = 709.86'	L = 709.86'	L = 685.96'	L = 720.76'
R = 5729.58'	R = 5729.58'	R = 5641.08'	R = 5817.55'
P.C. STA. 568+96.19	P.C. STA. 576+82.51	P.C. STA 568+96.19	P.C. STA 578+71.61
P.T. STA. 576+05.05	P.T. STA. 585+92.37	P.T. STA 575+95.15	P.T. STA 585+92.37
		S.E. RATE .032/FT	S.E. RATE .032/FT



B.M. No. 57, EL. 90.99
(4"x4" D.O.T. C.M. WITH BRASS DISC
90' RT. ℄ STA. 570+00



FHWA Form Revised 10/66 & R.C.
BR No. 102-5465 Bench Marks NWW

BR No. 102-5465 HIGH & ROADS NWW

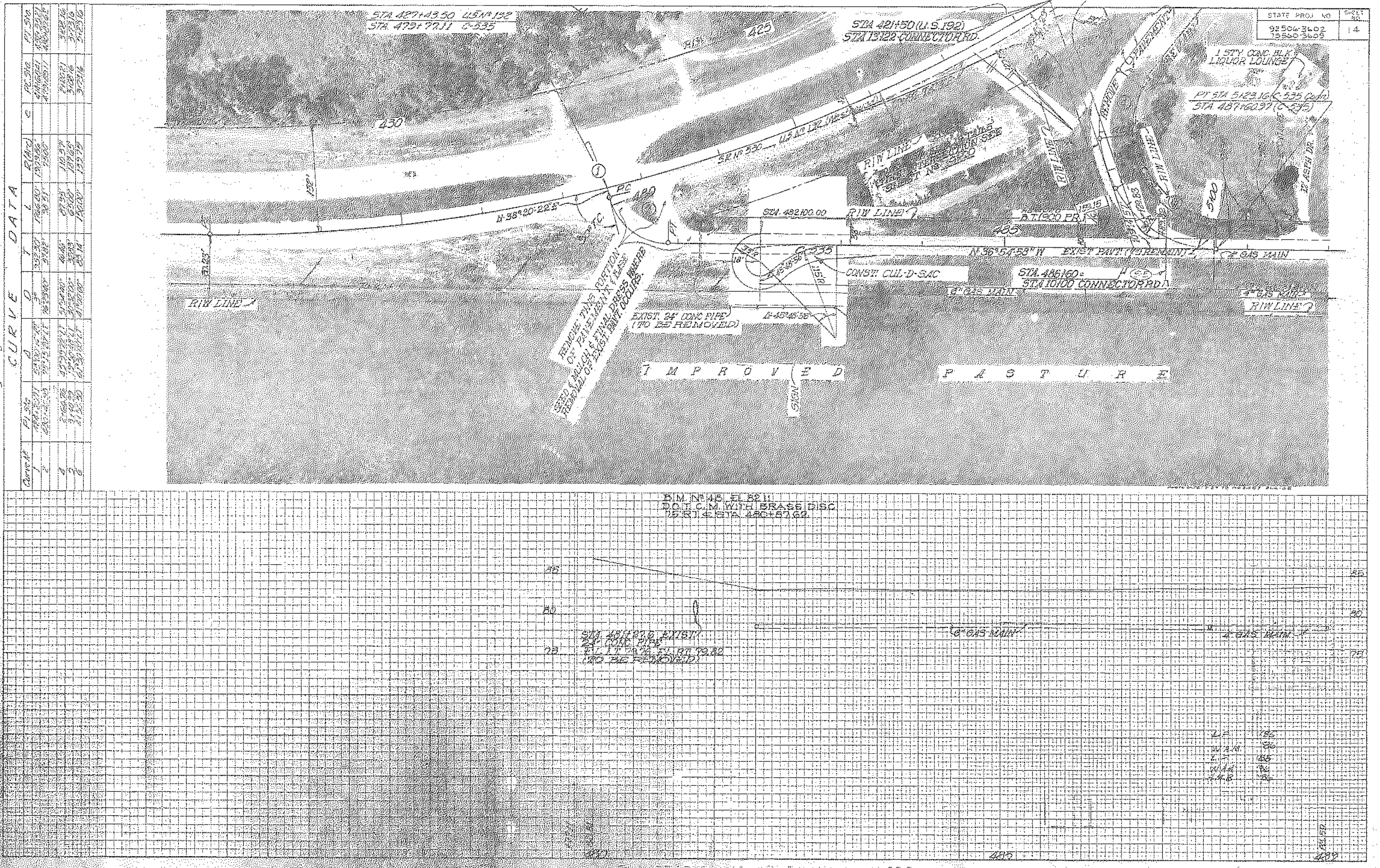
STATE PROJ NO	SHEET NO
92506-3602 78960-3409	13

R.I.W. L
(AT) DUCT
STA 579+72.46
72.86
72.40
213' STORAGE
260' TAPER
EXIST. 24" R.C.P.
STA 580+28.63
585
EXIST. 24" R.C.P.
STA 585+98.66
PVT. STA 585+98.37
STA. 585+86.65 AHD
END PROJECT
STA. 587+00
590
(TO BE REMOVED)
N 36° 53' 46" W
6-535
EXIST. B4VT (TO REMAIN)
EXIST. S.W. LINE 30'

SCALE: 1"=50'

Fo Power Plotted Values Min.

END PROJECT
STA 587+00
5.5%
-4.0%
SPEC. MED. GR. +0.10%
MED. GR. 1.92%
MED. P.I. 93.2
SPEC. GR. -4.0%
LEVEL 50.0'
579
580
585
590



CURVE DATA

Curve №	PI Sta.	Δ	D	T	L	R (Arc)	e	PC Sta.	PT Sta.
1	458+72.71	53°00'42" RT	3°	957.30'	1766.80'	1909.86'		411+60.91	430+27.71
2	483+26.53	75°15'20" LT	76°23'40"	37.82'	78.51'	75.00'		479+89.11	480+87.62
4	3+66.70	45°37'22" LT	51°54'40"	46.46'	87.95'	110.37'		2+82.21	3+28.16
5	3+10.99	19°40'48" LT	30°32'05"	32.83'	65.00'	187.65'		3+08.16	3+73.16
6	3+32.20	61°30'30" RT	41°10'00"	83.14'	150.00'	139.75'		3+73.16	5+23.16

STATE PROJ NO.	SHEET NO.
G2506·3602 75960·3603	15

405 410 415 420

SR№530 N 89°50'15"E U.S № 192 (Westbound)

68' 125' 89°21' 132' 132' 40'

CONST TAPER

CONST STORAGE LANE

Asphalt Pavement

24" C.M.P. Pipe

Asphalt Drive

18" C.M. Pipe

Asphalt Drive

Lawton Drive

CURVE DATA
PI STA 428+20.71
Δ = 53°00'14" RT.
D = 3°
T = 952.30'
L = 1766.80'
R = 1909.86'
E =
PC STA 414+68.41
PT STA 432+35.21
Scale: 1" = 50'

B.M. N94 LT B 55'
3"x3" D.O.T. C.M. WITH BRASS DIST
65' LT B STA. 414+00

S.R. 530

SCALE: 1"=50' SHEET 16 OF

STATE PROJ NO.	SHEET NO.
9250b-3602	16
7556b-3605	

EXIST R/W LINES

EXIST PAVEMENT & BASE TO BE REMOVED

SEED & MULCH & FINAL DRESS WHERE REMOVAL OF EXISTING PAVEMENT OCCURS.

EXIST R/W LINE

EXIST PAVEMENT & BASE TO BE REMOVED

STA 421+41.24

U.S. Rte 192 (Eastbound)

Rte No 530

EXIST CURB

Asphalt Pavement

18" C.M. Pipe

Exist Sand Drive

Exist Asphalt Drive

24" C.M. Pipe

Asphalt Pavement

Asphalt Drive

EXIST R/W LINE

EXIST PAVT. & BASE (TO BE REMOVED) (* SEE NOTE FOR SEED & MULCH)

EXIST R/W LINE

STA 427+43.50 U.S. Rte 192
STA 479+77.11 C-535

Scale: 1"=50'

CURVE DATA						
Curve No.	Δ	D	R	T	L	E
1	90°00'00"	11°27'33"	500.00'	500.00'	785.40'	214.64'
2	90°00'00"	11°27'33"	500.00'	500.00'	785.40'	214.64'
3	90°00'00"	11°27'33"	500.00'	500.00'	785.40'	214.64'
4	90°00'00"	11°27'33"	500.00'	500.00'	785.40'	214.64'
5	90°00'00"	11°27'33"	500.00'	500.00'	785.40'	214.64'
6	90°00'00"	11°27'33"	500.00'	500.00'	785.40'	214.64'
7	90°00'00"	11°27'33"	500.00'	500.00'	785.40'	214.64'
8	90°00'00"	11°27'33"	500.00'	500.00'	785.40'	214.64'

Bk No 162035 Page 4 Angels KHM

STATE PROJ. NO.	SHEET NO.
82506-3602 75960-3605	23

CURVE DATA C-535 & PROJ.
P.I. STA. 507+05.07
Δ = 37°00'10" LT.
D = 2°00'00"
T = 958.62'
L = 1850.14'
R = 2864.79'
P.C. STA. 497+46.45'
P.T. STA 515+96.59
S.E. RATE .050 FT.

NOSE DETAIL AT BEGINNING OF PROJECT
SEE INTERSECTION

CURVE DATA U.S 192-S.R 530
P.I. STA. 424+20.71
Δ = 53°00.14" RT.
D = 3°00'
T = 952.30'
L = 1768.80'
R = 1902.86'
P.C. STA. 414+68.41
P.T. STA. 432+35.21

SEE SHEET No 19 FOR STATIONS AND DETAILS AHEAD

INTERSECTION DETAILS S.R.535 AND U.S.192-(S.R.530)

SCALE 1"=50'

STATE PROJ. NO.	SHEET NO.
92506-3602 75560-3605	25

STA. 39+00 OUTFALL DITCH Rt. & Lt.
STA. 52+31.60 PROJECT

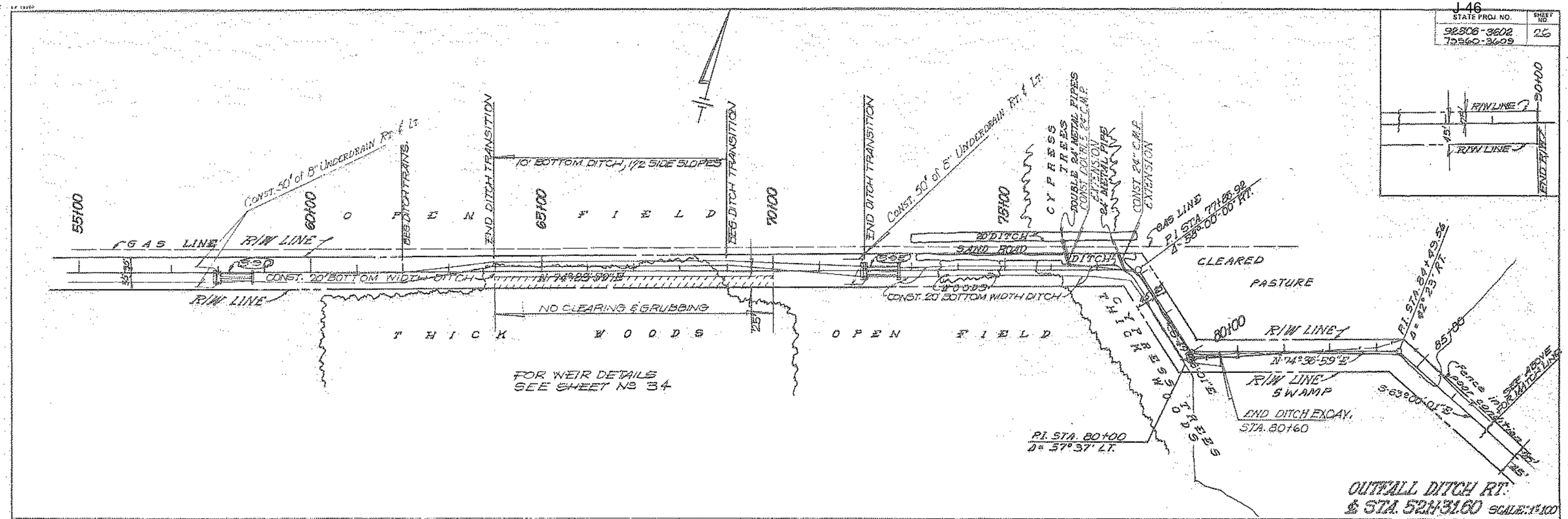
RW LINE ℄
CONST. 20' DITCH PAVT.
PROP. 24' PAVT. ℄
N. 74°28'59"E.
STA. 51+15 S. METAL BOX
FLA. TRANSMISSION GAS LINE
RW LINE
CONST. 28.4 SQ YD. OF DITCH PAVEMENT SEE SHEET No 30
S-9
STA 52+21.60 2 DBL. 30" CONC. PIPES
RW LINE
RW LINE ℄
CONST. 50' of 8" UNDERDRAIN Rt & Lt.
S-24
S-25
S-26
S-27
S-28
S-29
S-30
N. 74°28'59"E. ℄ CONST. 20' BOTTOM WIDTH DITCH
RW LINE
RW LINE
GAS LINE
CONST. 50' of 8" UNDERDRAIN Rt & Lt.
RW LINE
S C A T T E R E D P I N E & P A L M E T T O
S C A T T E R E D P I N E & P A L M E T T O
35+00
40+00
45+00
50+00
55+00
NOTE: ℄ OF OUTFALL DITCH VARIES SEE CROSS SECTIONS
FOR WEIR DETAILS SEE SHEET No 34
TYPE 'K' INLET SPECIAL AT STA. 43+00, STA. 58+00, STA 72+00. LOCATIONS MIGHT VARY; EXACT LOCATIONS AT OPTION OF PROPERTY OWNER.

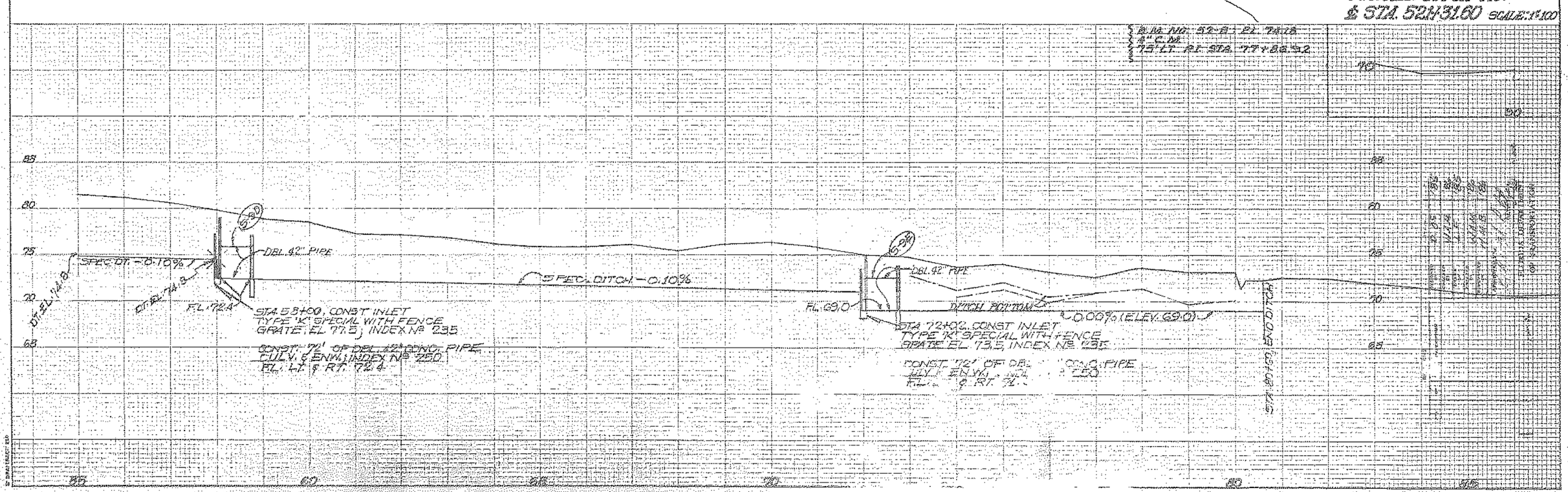
OUTFALL DITCH Rt. & STA. 52+31.60 SCALE: 1"=100'

20' BOTTOM WIDTH DITCH
2:1 & 4:1 SIDE SLOPES AS SHOWN
DITCH EXCAVATION 38969 CU.YD.
R/W WIDTH 70'
CLEAR & GRUB, 70' WIDE

CONST. DITCH PAVT. SEE DRAINAGE SHEET No 30
86.43
86.43
CONST. DITCH PAVT.
DBL. 42" PIPE
FL. 80.50
FL. 79.5
CONST. DBL. 30" CONC. PIPES
0.00% (EL. 76.3)
FL. 76.3
STA 39+00 CONST. INLET TYPE 'K' SPECIAL WITH FENCE GRATE EL. 81.3, INDEX No 235
CONST. 72' OF DBL. 42" CONC. PIPE CULVERTS & ENDWALLS INDEX No 250, FL. LT & RT. 76.3
SEE SHEET No 32 FOR DETAILS
DBL. 42" PIPE
-0.10%
FL. 76.3
STA. 40+40, CONST. 72' OF DBL. 42" CONC. PIPE CULVERTS & ENDWALLS INDEX No 250, FL. LT & RT. 76.3
DBL. 42" PIPE
0.10%
FL. 75.3
STA 43+00 CONST. INLET TYPE 'K' SPECIAL WITH FENCE GRATE EL. 80.5, INDEX No 235
CONST. 72' OF DBL. 42" CONC. PIPE CULVERTS & ENDWALLS INDEX No 250, FL. LT & RT. 75.3
C.M.P. PIPE CULVERTS
12" S.M.
STA 47+00 Lt @ STA. 30+00
STA. 50+00
STA. 52+00
STA. 54+00
STA. 56+00
STA. 58+00
STA. 60+00
STA. 62+00
STA. 64+00
STA. 66+00
STA. 68+00
STA. 70+00
STA. 72+00
STA. 74+00
STA. 76+00
STA. 78+00
STA. 80+00
STA. 82+00
STA. 84+00
STA. 86+00
STA. 88+00
STA.

STATE PROJ. NO.	SHEET NO.
92506-3602	25
75560-3609	





75560-3602 27

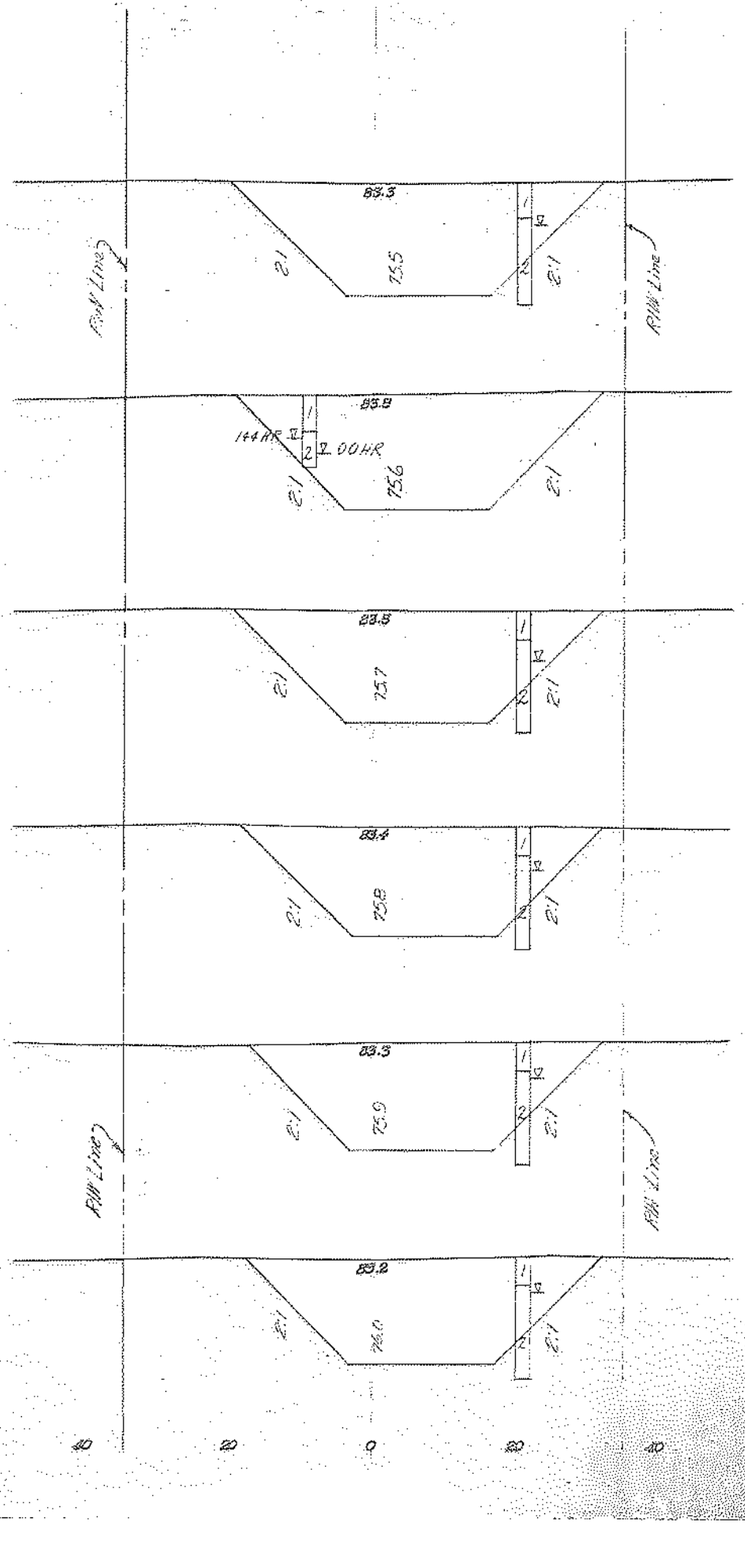
A.Z.A.B. Mast Ditch Excav		
36100	295	
		1046
35100	280	
		1004
34100	262	
		902
33100	225	
		838
32100	260	
		425
Begin Earthwork Sta. 31+11.63	0	
31100		

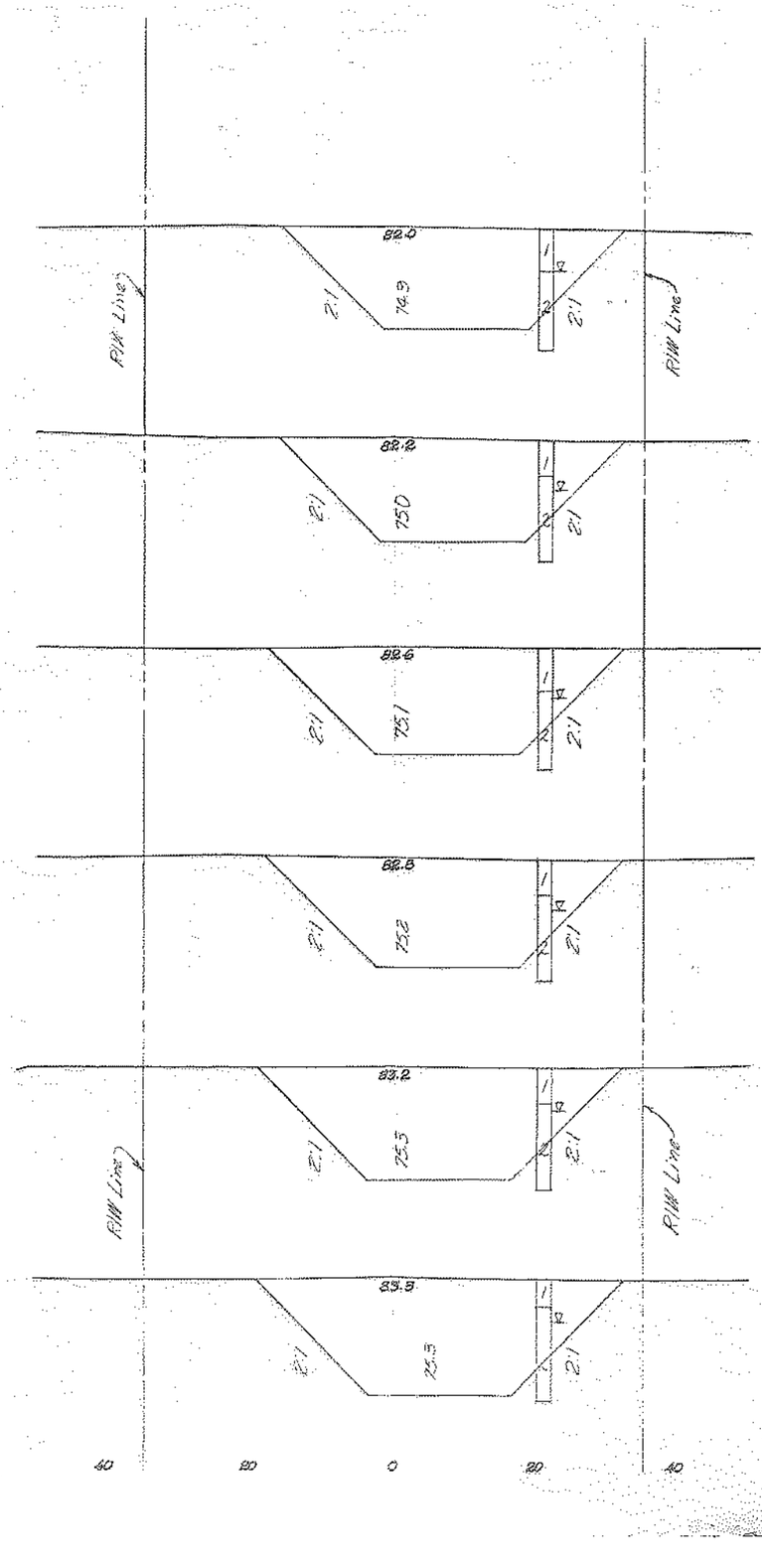
A.Z.A.B. Mast Ditch Excav		
42100	240	
		944
41100	270	
		991
40100	265	
		1012
39100	285	
		1073
38100	300	
		1065
37100	290	
		285

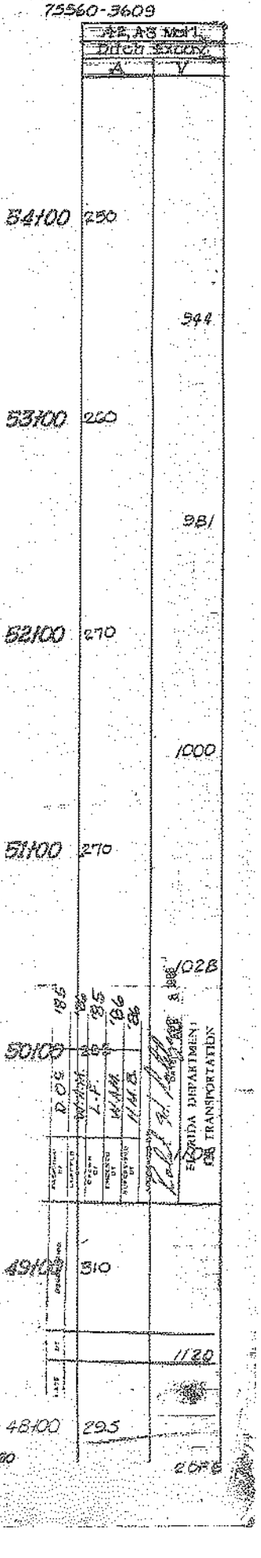
OUTFALL RT. & STA. 52+13.60
SCALE: 1"=10' HORIZ.
1"=5' VERT.

FLOOD CONTROL DEPARTMENT
COUNTY OF SAN JOAQUIN
STOCKTON, CALIFORNIA
DATE MAR 5 1965
0.05 CFS
1.7%
4+44.8
500'
APPROVED
DIRECTOR OF PUBLIC WORKS

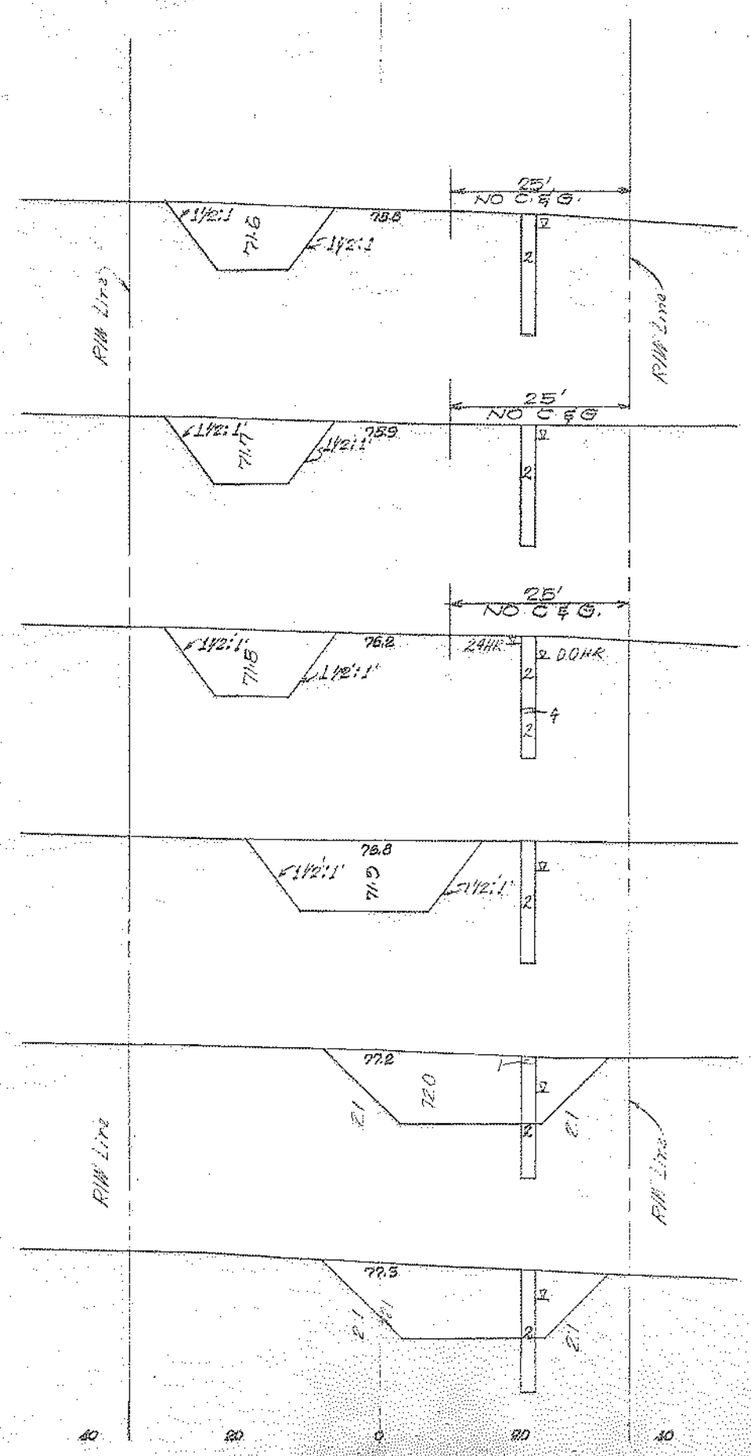
1-06

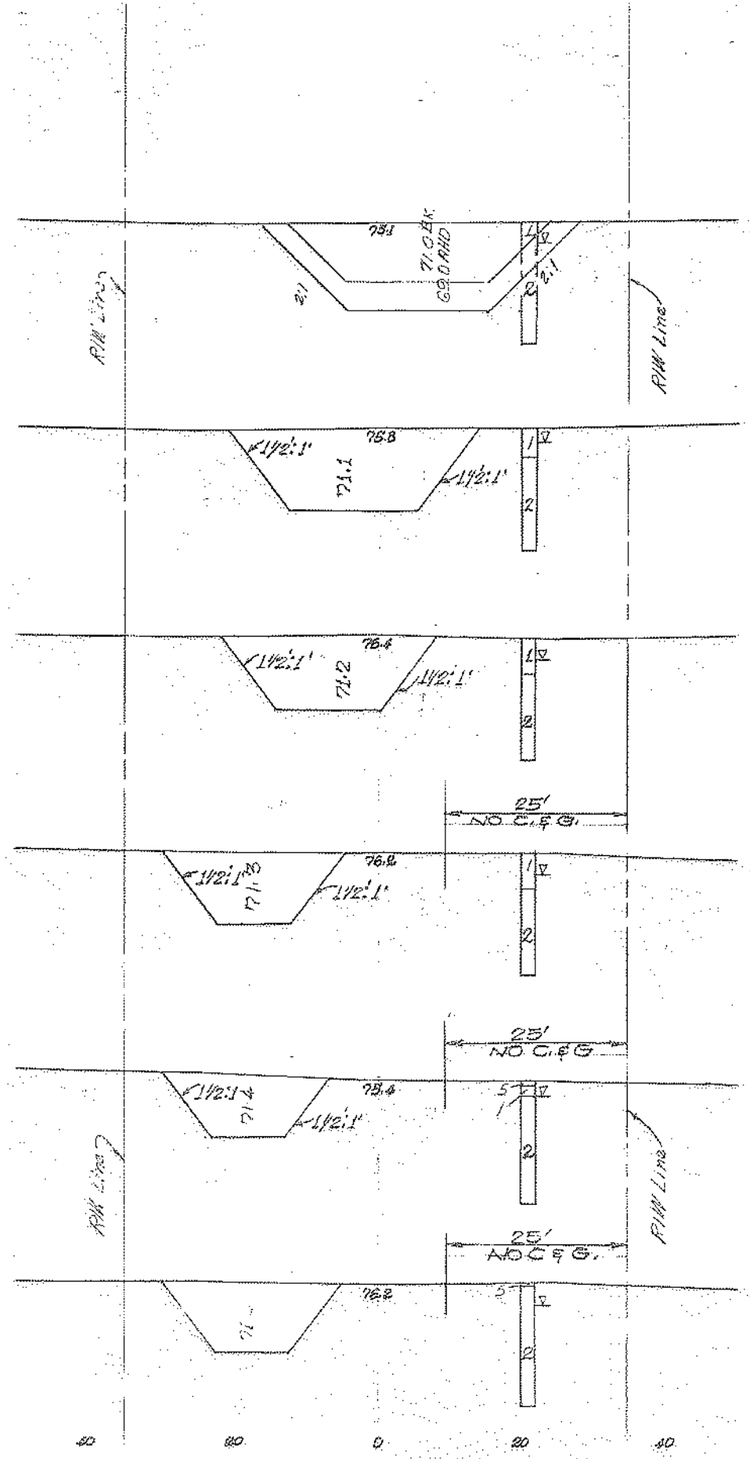

RW Line
83.3
2:1
75.5
1
12
2
2:1
RW Line
48100
295
1035
85.8
1.44HR
2
1.00HR
75.6
47100
295
1093
83.5
75.7
46100
295
1061
83.4
75.8
45100
275
1006
83.3
75.9
44100
265
951
83.2
76.0
43100
245
905
42100
240

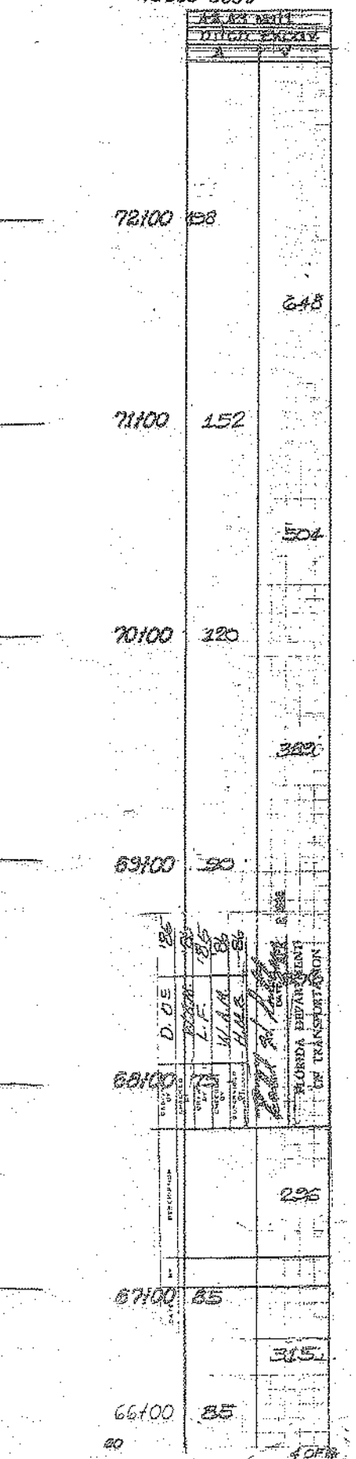

RW Line
82.0
2:1
74.9
1
12
2
2:1
RW Line
54100
250
944
82.2
75.0
53100
260
981
82.6
75.1
52100
270
1000
82.8
75.2
51100
270
1028
83.2
75.5
50100
285
83.3
75.3
49100
310
1120
48100
295

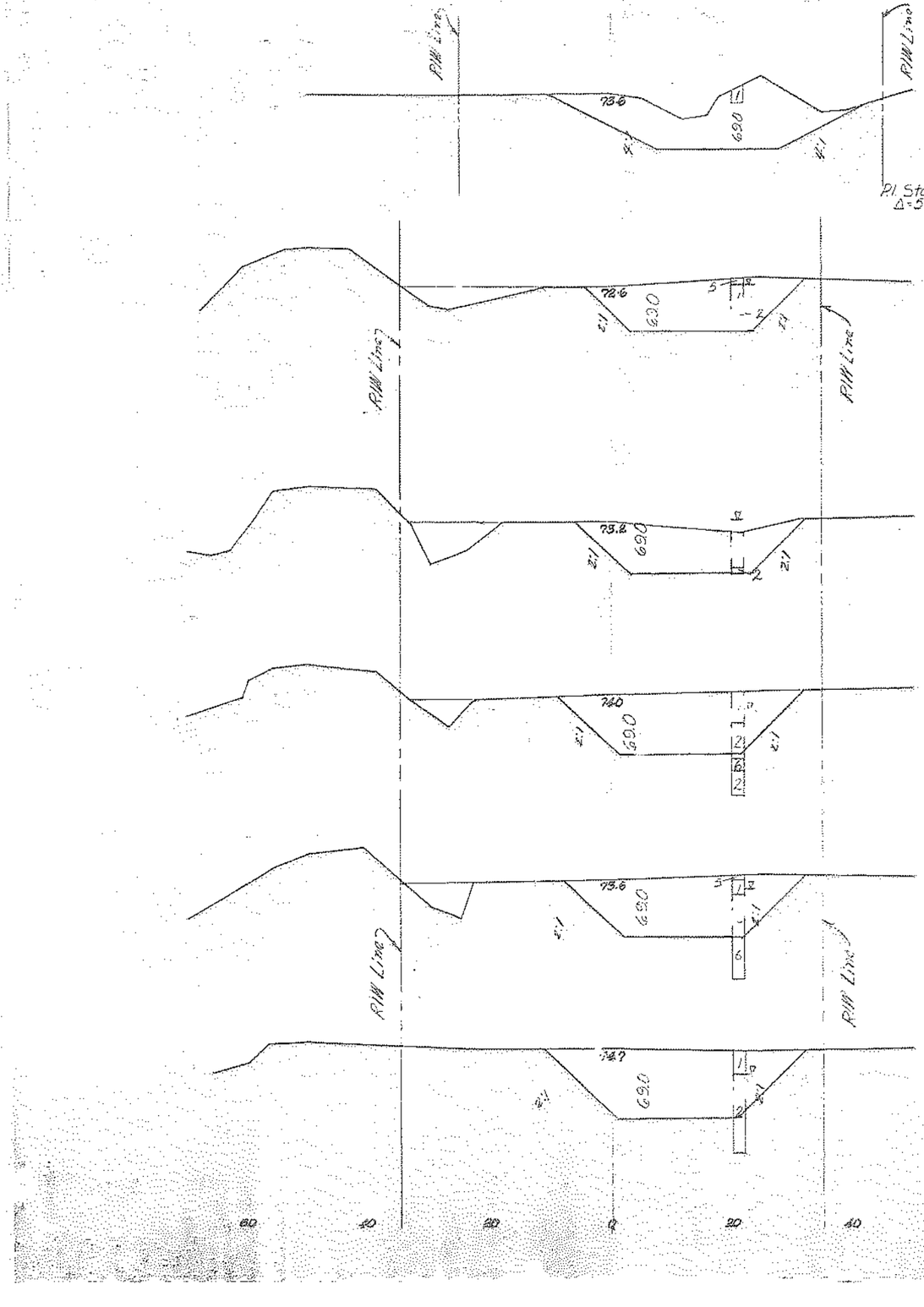

A2, A3 Mat'l.
Ditch Excav.
A
V
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

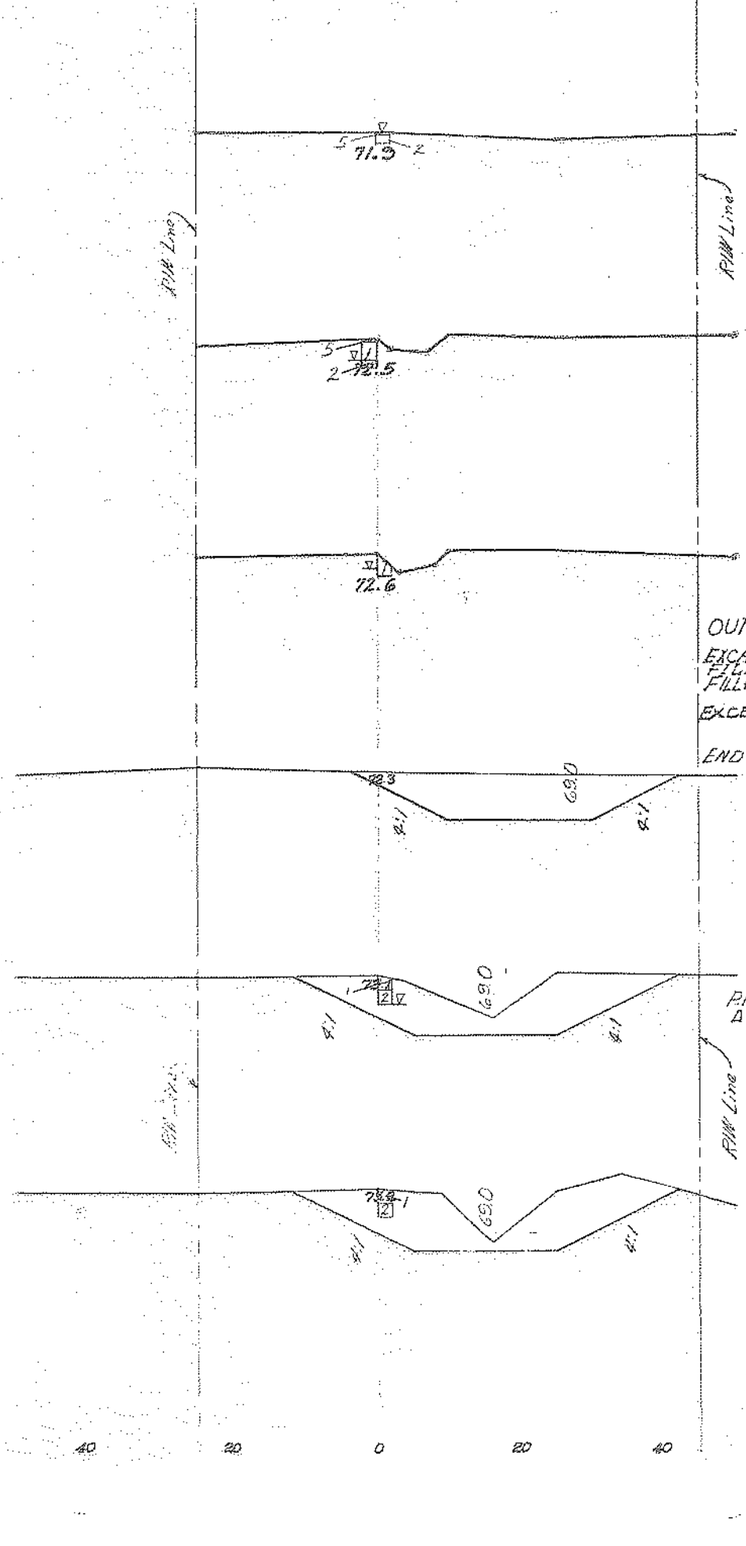
60100
213
78.5
2:1
75.5
2:1
RAW Line
RAW Line
820
59100
230
78.9
2:1
76.3
2:1
922
58100
228
79.8
2:1
2:1
Note:
Earthwork Calculated
To Depth Of 74.5 DPI
857
57100
195
80.6
2:1
74.6
2:1
769
56100
224
81.2
2:1
74.7
2:1
RAW Line
RAW Line
55100
225
81.5
2:1
74.5
2:1
680
54100
250
60
40
20
0
20
40
60


25'
NO C & G.
RW Line
RW Line
1½:1
1½:1
76.6
71.6
25'
NO C & G.
RW Line
RW Line
1½:1
1½:1
76.9
71.7
25'
NO C & G.
24HR
2 DOHR
RW Line
RW Line
1½:1
1½:1
76.2
71.5
4
63100 130
76.8
1½:1
1½:1
71.6
62100 150
77.2
2:1
2:1
72.0
RW Line
RW Line
61100 160
77.5
2:1
2:1
72.1
60100 213


RW Line
RW Line
2:1
2:1
75.1
71.0 BK.
69.0 RHD
25'
NO C & G.
RW Line
RW Line
1½:1
1½:1
75.8
71.1
25'
NO C & G.
RW Line
RW Line
1½:1
1½:1
76.4
71.2
25'
NO C & G.
RW Line
RW Line
1½:1
1½:1
76.8
71.3
25'
NO C & G.
RW Line
RW Line
1½:1
1½:1
75.4
71.4
25'
NO C & G.
RW Line
RW Line
76.2
71.5


92560-3602
75560-3609
50
72100 158
648
71100 152
504
70100 320
322
69100 90
68100 125
296
67100 85
315
66100 85
4 OF 4
FLORIDA DEPARTMENT OF TRANSPORTATION


RW Line
73.6
690
4:1
PI Sta. 77+86.92
Δ=58°00' Rt.
72.6
5
2
72.5
73.2
73.6
6
7.2
RW Line
78+00
77+00
76+00
75+00
74+00
73+00
72+00
A2, A3 Mat'l
Cut
Fill
A
V
150
0
193
48
116
26
419
107
110
32
193
85
156
14
567
63
150
20
613
37
181
0
200
33
60
40
20
0
20
40
60


RW Line
71.3
72.6
72.5
72.3
73.9
83+00
82+00
81+00
80+60
80+00
75+00
78+00
A2, A3 Mat'l
Ditch Excav
A
V
0
105
252
182
134
526
150
OUTFALL DITCH
EXCAV = 37,667 CY.
FILL 340 CY.
FILL 150% = 510 CY.
EXCESS 37,157. CY.
END EXCAV.
PI Sta. 80+00
Δ=57°37'41"
60
40
20
0
20
40
50

52

73560-3609

69.8

69.7

70.8

70.7

70.3

71.5

70.1

83+00

88+00

87+00

86+00

85+00

84+00

80+00

ROW Line

ROW Line

ROW Line

ROW Line

ROW Line

40 20 0 20 40

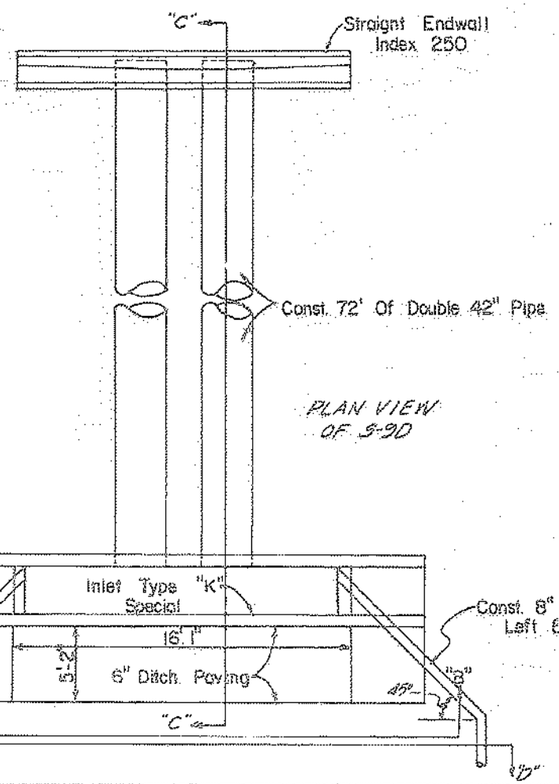
40 20 0 20 40

85
86
85
86
86

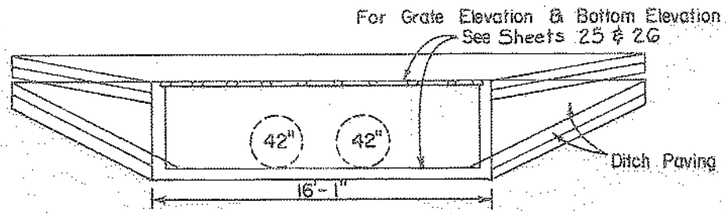
FLORIDA DEPARTMENT OF TRANSPORTATION

6 OF 6

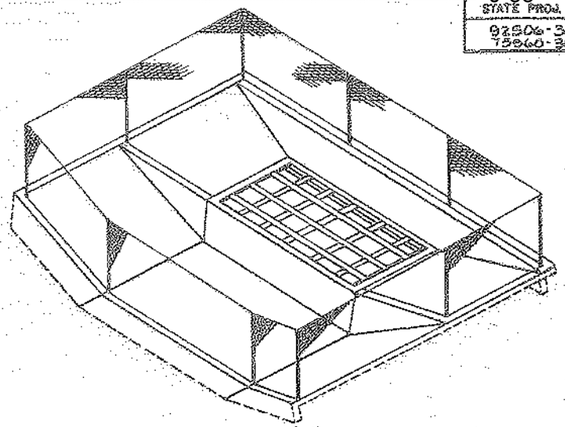
STATE PROJ. NO.	SHEET NO.
92506-3402 75560-3405	34



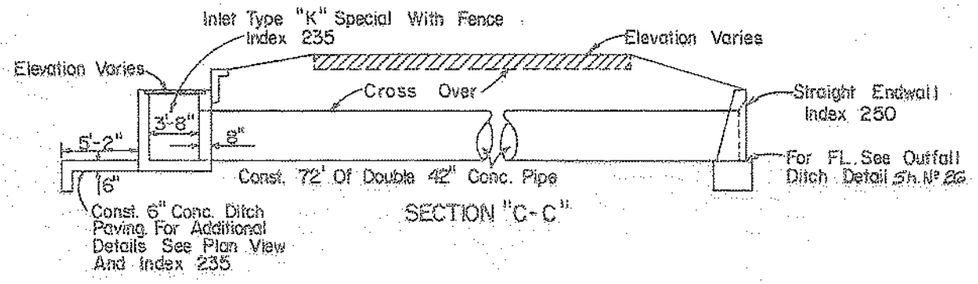
PLAN VIEW
OF S-90



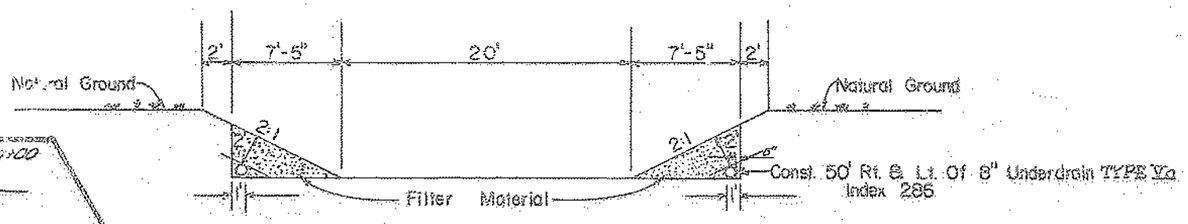
SECTION "B-B"



ISOMETRIC OF INLET TYPE "K" SPECIAL WITH FENCE

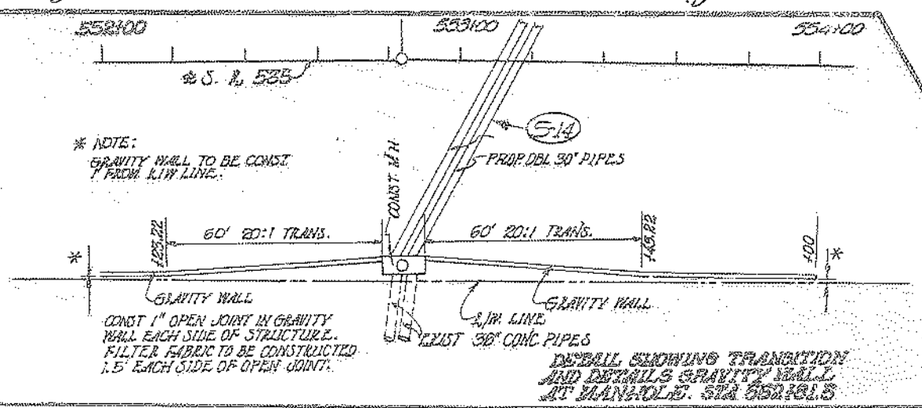


SECTION "C-C"



SECTION "D-D"

Note: Filter Material to meet requirements set forth in Section 902-4 of the Standard Specifications for Road and Bridge Construction.



DETAIL SHOWING TRANSITION
AND DETAILS GRAVITY WALL
AT MANHOLE STA 553+61.5

NON FEDERAL AID

FOR STATIONING SEE PLAN & PROFILE

REVISIONS											
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

DESIGNED BY	S.M.	-0-	DRAWN BY	ARC	8-85
CHECKED BY	LEF	8-85	CHECKED BY	W.H.M.	8-85
SUPERVISED BY					

FLORIDA DEPARTMENT OF TRANSPORTATION

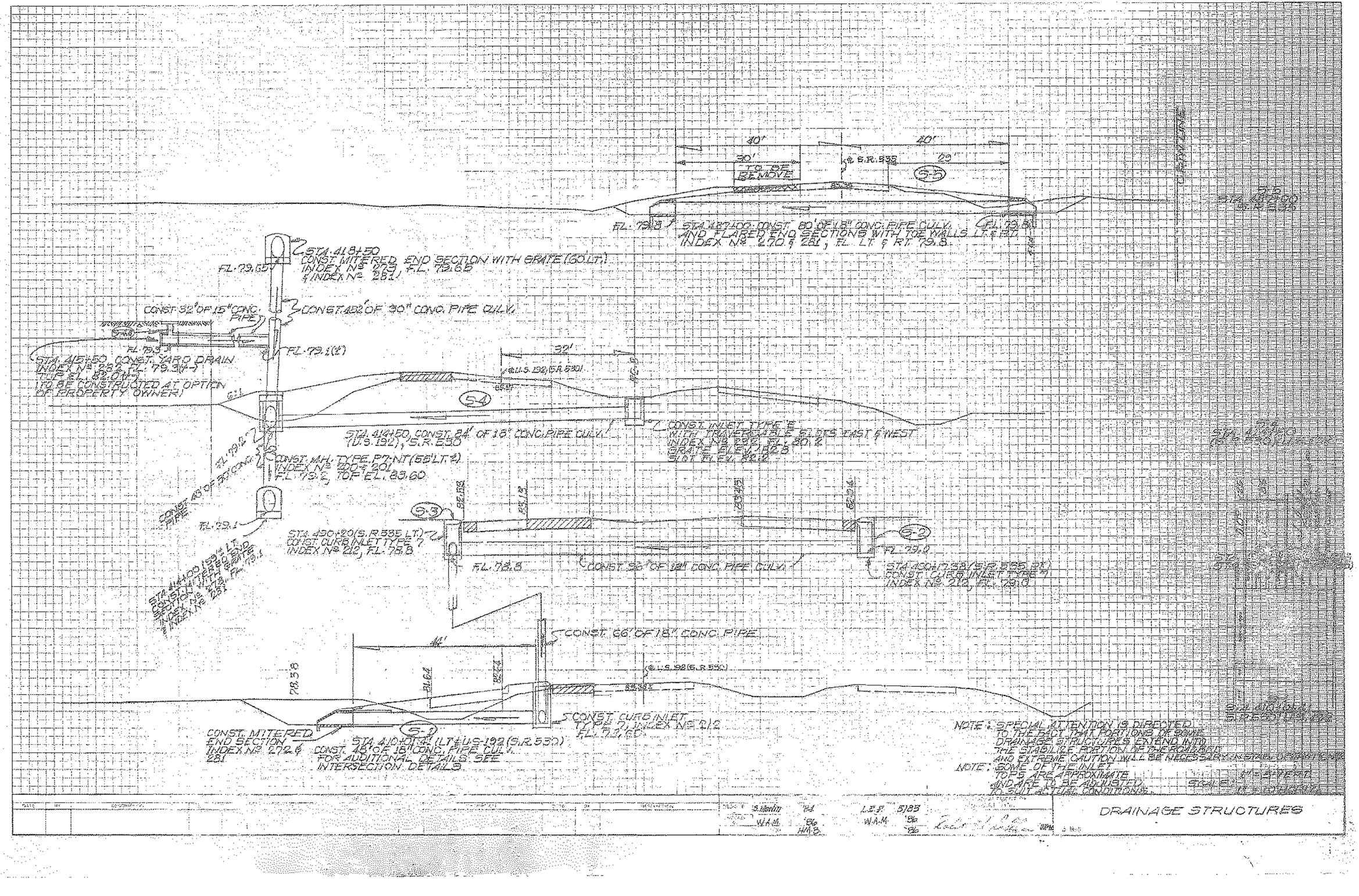
APPROVED BY [illegible] APP. ENGR.

INLET TYPE "K" SPECIAL WITH FENCE &
DETAIL OF GRAVITY WALL AT M.H. STA 553+61.50

PLEASE RETAIN THIS SHEET FOR STANDARD PROFILE SHEET YOUR PERMANENT FILES

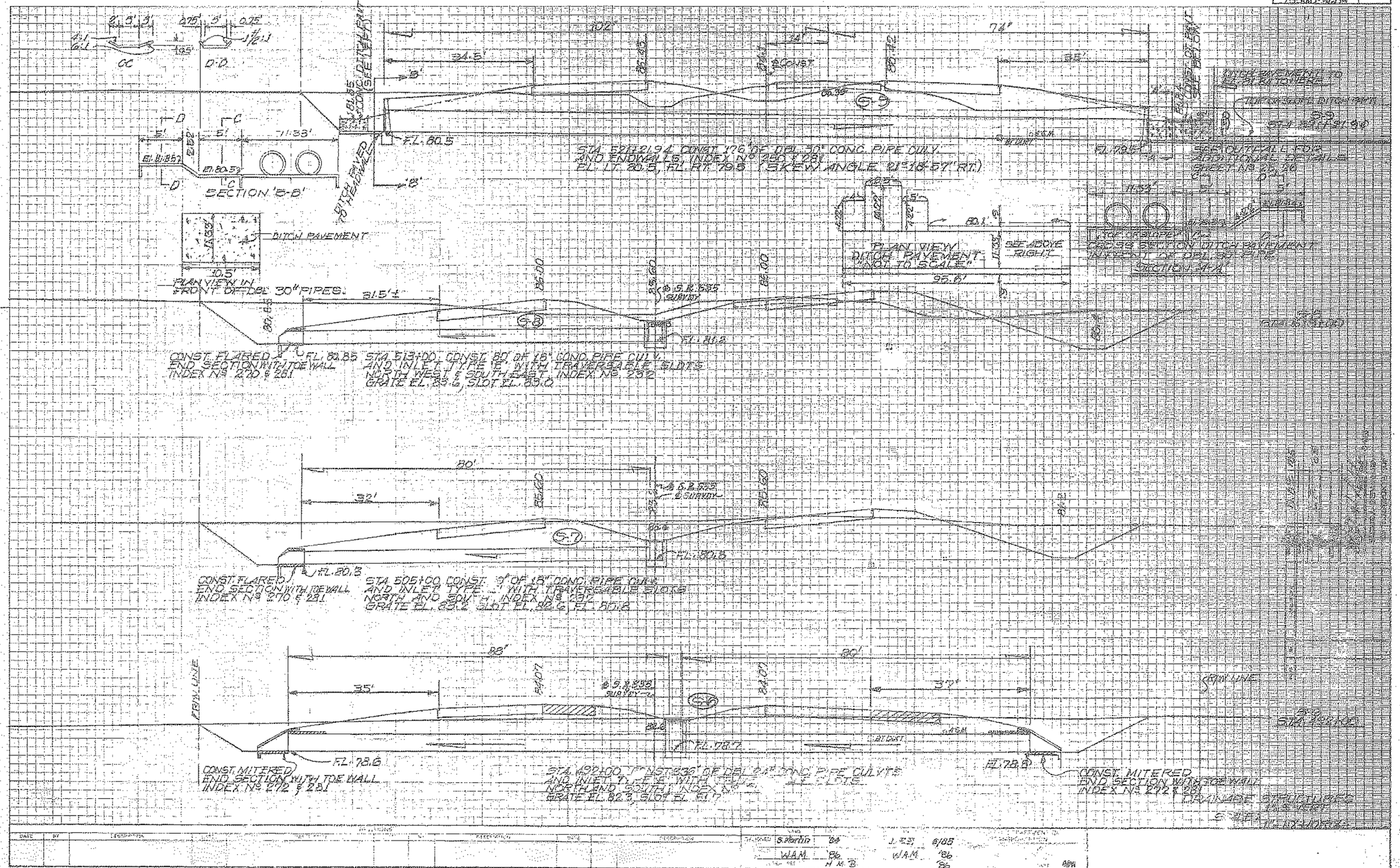
STATE PROJ. NO.	SHEET NO.
92505-3502	55
75560-3609	

154



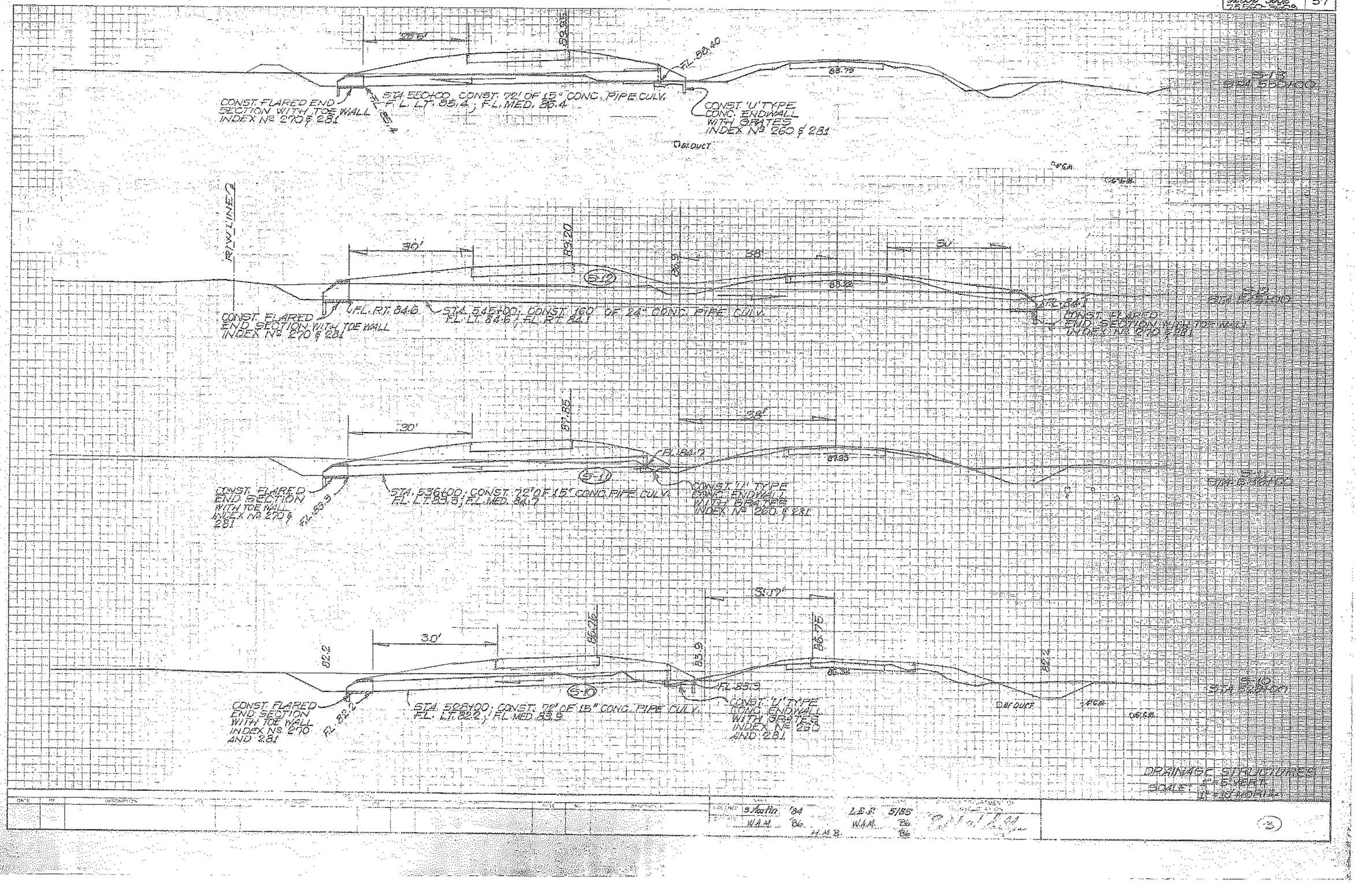
STATE PROJ. NO.	SHEET NO.
J-55	
92500-3602	36
25360-3608	

PLEASE RETAIN THIS SHEET FOR STANDARD PROFILE SHEET YOUR PERMANENT FILES.



PLEASE RETAIN THIS SHEET FOR STANDARD PROFILE SHEET YOUR PERMANENT FILES

STATE PROJ. NO.	SHEET NO.
92300-3602	37
75050-5529	



DATE	BY	DESCRIPTION

DESIGNED S. Martin '84 W.A.M. '86 H.M.B.
DRAWN L.B.S. 5/185 W.A.M. '86 '86
CHECKED

3

PLEASE RETAIN THIS SHEET FOR STANDARD PROFILE SHEET YOUR PERMANENT FILES

STATE PROJ. NO	SHEET NO.
~~9506-3402~~ 7506-3409	38

R/W LINE
10'
EL. 88.0
95.00
90.48
89.80
89.50
89.70
REMOVE (W/O) PORTION OF PIPE AND ENDWALL
S-12
EL. 84.00
EL. 82.96
EXISTING 30" CONC PIPE
EL. 88.65
EL. 88.70
CONST 228' OF DOUBLE 30" CONC. PIPE CULVERT
STA 552+31.32 CONST. ENDWALL MODIFIED INDEX No 250, F.L. 82.1
*ENDWALL SHOWN IS DESIGN FOR A 54" CONC. PIPE CULV. DUE TO THE EXTRA HEIGHT SHOWN ABOVE TO HOLD A BERM ELEV OF 88.0
STA 552+81.5 CONST. M.H. OUTPUT B (1'-9") INDEX No 252 (W) F.L. 82.1, GRATE EL. 88.00
40'
95.05
89.47
CONST. INLET TYPE 'D' INDEX No 232 WITH TRAVERSABLE SLOPES SLOT OPENING NORTHWEST GRATE EL. 92.3, SLOT EL. 91.7, F.L. 90.1
S-17
CONST. FLARED END SECTION WITH TOE WALL INDEX No 270 & 281
FL. 89.4
CONST. PIPE COLLAR REMOVE EXIST. HEADWALL
EXIST 15" CONC PIPE CULV & INLET F.L. LT 89.8, F.L. RT 90.2
REMOVE EXIST. INLET & PIPE
STA 573+25(±) CONST. 40' OF 15" CONC. PIPE CULV.
STA 573+65
30'
92.92
44'
CONST M.H. TYPE P7-N.T. ALT 'B' INDEX No 200-201 GRATE EL. 91.6, F.L. 88.2
30'
S-16
STA 570+00
FL. 88.2
CONST FLARED END SECTION WITH TOE WALL INDEX No 270 & 281
FL. 88.2
STA 570+00 CONST. 168' OF 24" CONC. PIPE CULV.
FL. LT. 88.2 FL. RT. 88.2
92.70
70.87'
30'
30'
S-13
STA 568+00
FL. 86.1
FL. 87.7
CONST FLARED END SECTION WITH TOE WALL INDEX No 270 & 281
STA 568+00 CONST. 80' OF 15" CONC. PIPE CULV.
FL. LT. 86.1, F.L. MED. 87.7
CONST 'J' TYPE CONC. ENDWALL WITH GRATES INDEX No 260 & 281
TOP STRUCTURE EL. 92.70
SEE TOP OF SHEET
DRAINAGE STRUCTURES
SCALE: 1" = 10'

DATE	BY	DESCRIPTION

S. Martin '86
W.A.M. '86
H.M.B.
L.S.P. '85
W.A.W. '86

J-58

STATE PROJ. NO.	SHEET NO.
92506-3602 75560-3608	39

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH
CROSS SECTION SOIL SURVEY
REPORT OF TESTS

LOCATION:

TOWNSHIP: 25 S
RANGE : 28 E
SECTION : 2

PROJECT NO.: 92506-3602
ROAD NO.: C.R. 535
DISTRICT NO.: FIVE
LABORATORY NO.: D-3184
SUBMITTED BY: T.O. MALERK

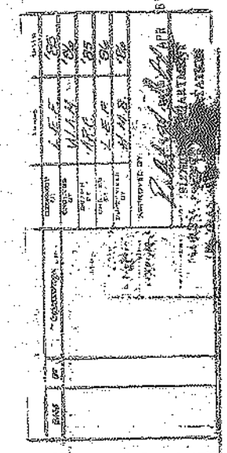
DATE OF SURVEY: 9-27 TO 10-3, 1983
SURVEYED BY: FRANCO & BIXLER
SURVEY BEGINS STA. NO.: 491+00
SURVEY ENDS STA. NO.: 549+22 ±
DATE REPORTED: 10-24-83

MECHANICAL ANALYSIS

STRATUM NO.	LBR VALUE	% PASS 10 MESH	% PASS 40 MESH	% PASS 60 MESH	% PASS 100 MESH	% PASS 200 MESH	CONSTANTS MATERIAL PASS NO. 40 SIEVE LIQUID LIMIT	PLASTIC INDEX	NO. LBR TESTS	NO. GRAD. TESTS	NO. LL - PI TESTS	CLASSIFICATION GROUP	MATERIAL DESCRIPTION
1	34-35	100	80-93	45-69	25-37	5-7		-NP-	3	9	—	A-3	LIGHT TO DARK GRAY SAND, LOOSE & MOIST.
2	20-26	100	81-92	49-71	26-39	5-8		-NP-	3	9	—	A-3	PALE BROWN TO DARK BROWN SAND, LOOSE TO COMPACT & MOIST.
3	28-45	88-100	75-91	48-71	25-35	6-13		-NP-	3	8	—	A-3 A-2-4	MIXTURE OF BROWN & GRAY SANDS, TRACE OF ROCK & CLAY, LOOSE TO COMPACT & MOIST, (FILL)
4	45-66	100	72-74	40-42	22-26	6-11		-NP-	3	5	—	A-3 A-2-4	LIGHT TO DARK BROWN SAND, TRACE OF SILT, DENSE TO VERY DENSE & MOIST. (HARDPAN)
5	—	—	—	—	—	—	—	—	—	—	—	A-8	DARK BROWN TO BLACK MUCK, SOFT & WET.
6	—	100	93-96	72-79	41-49	13-22		-NP-	—	2	—	A-2-4	PALE BROWN TO BROWN SAND, TRACE OF SILT TO SILTY, COMPACT & MOIST.

NOTE:

1. STRATA BOUNDARIES ARE APPROXIMATE AND REPRESENT SOIL STRATA AT EACH TEST HOLE LOCATION ONLY. STRATUM CONNECTING LINES ARE SHOWN FOR ESTIMATING EARTHWORK ONLY AND DO NOT INDICATE ACTUAL STRATUM LIMITS.
2. LEGEND ▽ WATER TABLE WHERE ENCOUNTERED. [HIGHEST WATER AT EACH STATION]
3. REMOVAL OF MUCK AND PLASTIC MATERIAL OCCURRING WITHIN THE ROADWAY SHALL BE ACCOMPLISHED IN ACCORDANCE WITH INDEX NO. 500 AND THAT MATERIAL UTILIZED IN EMBANKMENT CONSTRUCTION SHALL BE IN ACCORDANCE WITH INDEX NO. 505.
4. ANALYSIS OF STRATUM NO. 4 FROM 75560-3609.
5. STRATA 4, 5 & 6 WERE PRESENT ON THE OUTFALL RIGHT OF STA. 521+31.6 ℄ SURVEY.
6. STRATUM NO. 6 IS LIKELY TO RETAIN EXCESS MOISTURE AND MAY BE DIFFICULT TO DRY.



R.S. Russ

R. S. RUSS, P.E.
DISTRICT MATERIALS ENGINEER
FL. ENG. REG. NO. 8919
DATE: 11/1/83

PLEASE RETAIN THIS SHEET FOR STANDARD MYLAR SHEET IN YOUR PERMANENT FILES.

STATE PROJ. NO.	SHEET NO.
92560-3602 75560-3609	40

LOCATION:

TOWNSHIP: 24 S
RANGE : 28 E
SECTION : 27, 34 & 35

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH
CROSS SECTION SOIL SURVEY
REPORT OF TESTS

PROJECT NO.: 75560-3609
ROAD NO. : C.R. 535
DISTRICT NO.: FIVE
LABORATORY NO.: D-3221
SUBMITTED BY: T.O. MALERK

DATE OF SURVEY : 10-4 TO 10-12-83
SURVEYED BY : FRANCO & BIXLER
SURVEY BEGINS STA. NO.: 549+20±
SURVEY ENDS STA. NO. : 593+00
DATE REPORTED: 10-24-83

MECHANICAL ANALYSIS

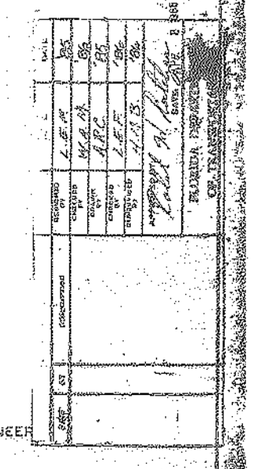
STRATUM NO.	LBR VALUE	% PASS 10 MESH	% PASS 40 MESH	% PASS 60 MESH	% PASS 100 MESH	% PASS 200 MESH	CONSTANTS MATERIAL PASS NO. 40 SIEVE LIQUID LIMIT	PLASTIC INDEX	NO. LBR TESTS	NO. GRAD. TESTS	NO. LL - PI TESTS	CLASSIFICATION GROUP	MATERIAL DESCRIPTION
1	28-41	100	72-80	36-49	17-26	5-8		-NP-	3	7	-	A-3	LIGHT TO DARK GRAY SAND, LOOSE & MOIST.
2	24-43	100	71-86	38-68	18-27	6-10		-NP-	3	8	-	A-3	PALE BROWN TO DARK BROWN SAND, LOOSE TO COMPACT & MOIST.
3	23-66	97-100	62-84	43-60	25-38	9-18		-NP-	3	8	-	A-3 A-2-4	MIXTURE OF BROWN & GRAY SANDS, TRACE OF ROCK & CLAY, LOOSE TO COMPACT & MOIST. (FILL)
4	45-66	100	72-74	40-42	22-26	6-11		-NP-	3	5	-	A-3 A-2-4	LIGHT TO DARK BROWN SAND, TRACE OF SILT, DENSE TO VERY DENSE & MOIST. (HARDPAN)
5	-	-	-	-	-	-	-	-	-	-	-	A-8	DARK BROWN TO BLACK MUCK, SOFT & WET.

NOTE:

1. STRATA BOUNDARIES ARE APPROXIMATE AND REPRESENT SOIL STRATA AT EACH TEST HOLE LOCATION ONLY. STRATUM CONNECTING LINES ARE SHOWN FOR ESTIMATING EARTHWORK ONLY AND DO NOT INDICATE ACTUAL STRATUM LIMITS.
2. LEGEND ▽ WATER TABLE WHERE ENCOUNTERED [HIGHEST WATER AT EACH STATION]
3. REMOVAL OF MUCK AND PLASTIC MATERIAL OCCURRING WITHIN THE ROADWAY SHALL BE ACCOMPLISHED IN ACCORDANCE WITH INDEX NO. 500 AND THAT MATERIAL UTILIZED IN EMBANKMENT CONSTRUCTION SHALL BE IN ACCORDANCE WITH INDEX NO. 505.

R.S. Russ

R. S. RUSS, P.E.
DISTRICT MATERIALS ENGINEER
FL. ENG. REG. NO. 8919
DATE: 11/1/83



PLEASE RETAIN THIS SHEET FOR STANDARD MYLAR SHEET YOUR PERMANENT FILES

PROJECT NO	SHEET NO
923-F60(032) 75560-3629	4-3

483+00.00

482+00.00

481+00.00

480+00.00

479+77.00

PROJECT

SEE EARTHWORKS

BEGIN OF PROJECT

PROJECT NO.	SHEET NO.
925-J-61602 75560-3609	42

489+00.00

488+00.00

ROADWAY EXC. = 1260 CY
FILL = 1258 CY

487+00.00

"CROSS OVER"

486+00.00

485+00.00

484+00.00

OLD S.R. 735 ALT.
BEGIN PROJECT

Sta. 423+00

SCALE:
1"=10' Horiz.
1"=5' Vert.

STATE PROJ NO.	SHEET NO.
42[illegible]3602	43
75560-3609	

Book No. 1025141

EARTHWORK
SR 1530/US 190
CONNECTOR STA. 11+00.00 -L-
TO STA. 16+37.25

SCALE:
1" = 10' Horiz.
1" = 5' Vert.

STATE PROJ. NO.	SHEET NO.
9231-63-3602 7556.0-3609	44

DITCH BLOCK

DITCH BLOCK

Book No 10291/61

Tele. Cables

Tele. Cable (TYP.)

24 HR-B

STATE PROJ. NO.	SHEET NO.
9264-03-3602 7554-03-3609	45

SCALE:
1"=10' Horiz.
1"= 5' Vert.

Book No 1029/61

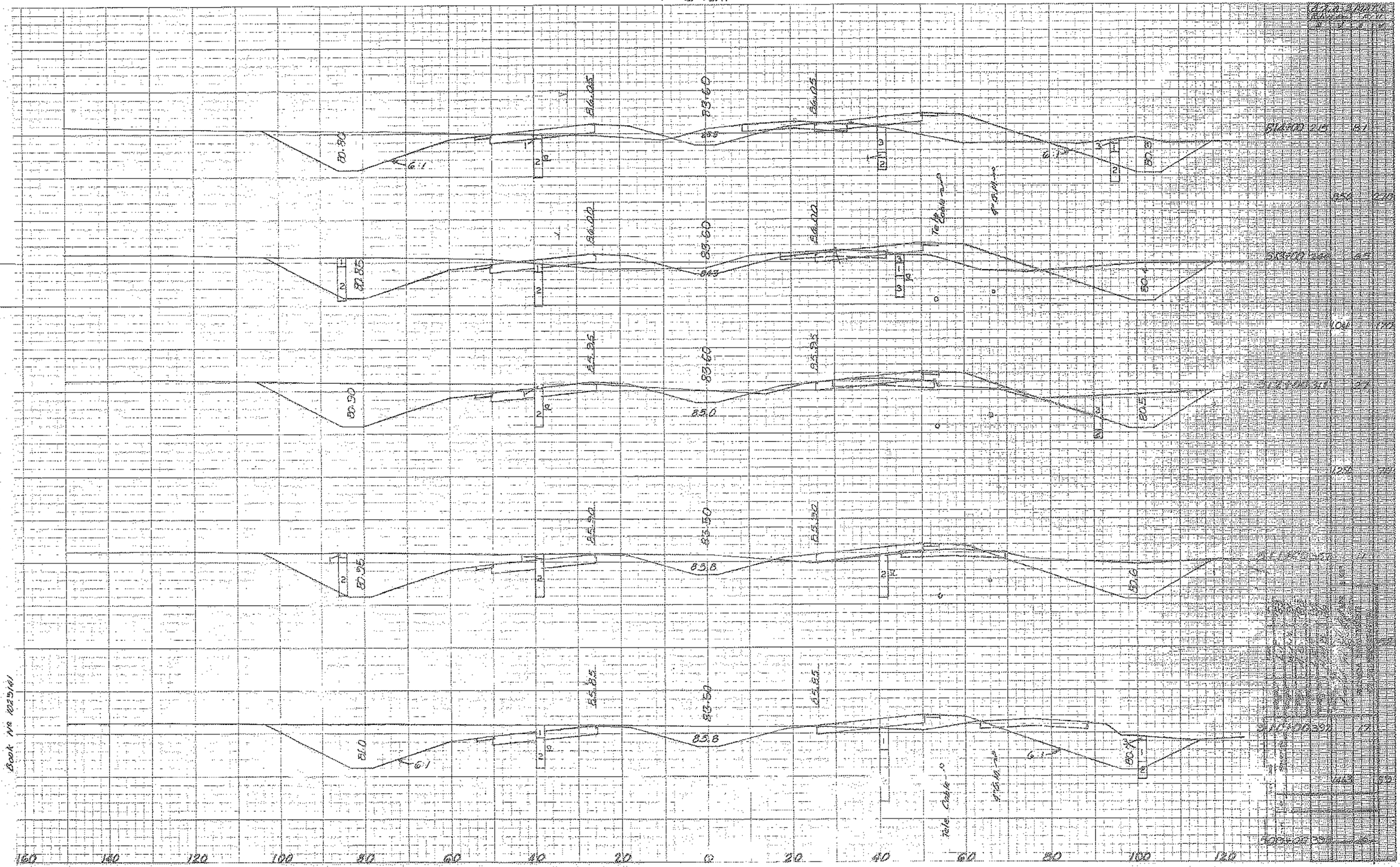
SCALE:
1" = 10' Horiz.
1" = 5' Vert.

STATE PROJ. NO.	SHEET NO.
9250-1-65 7556O-3609	46

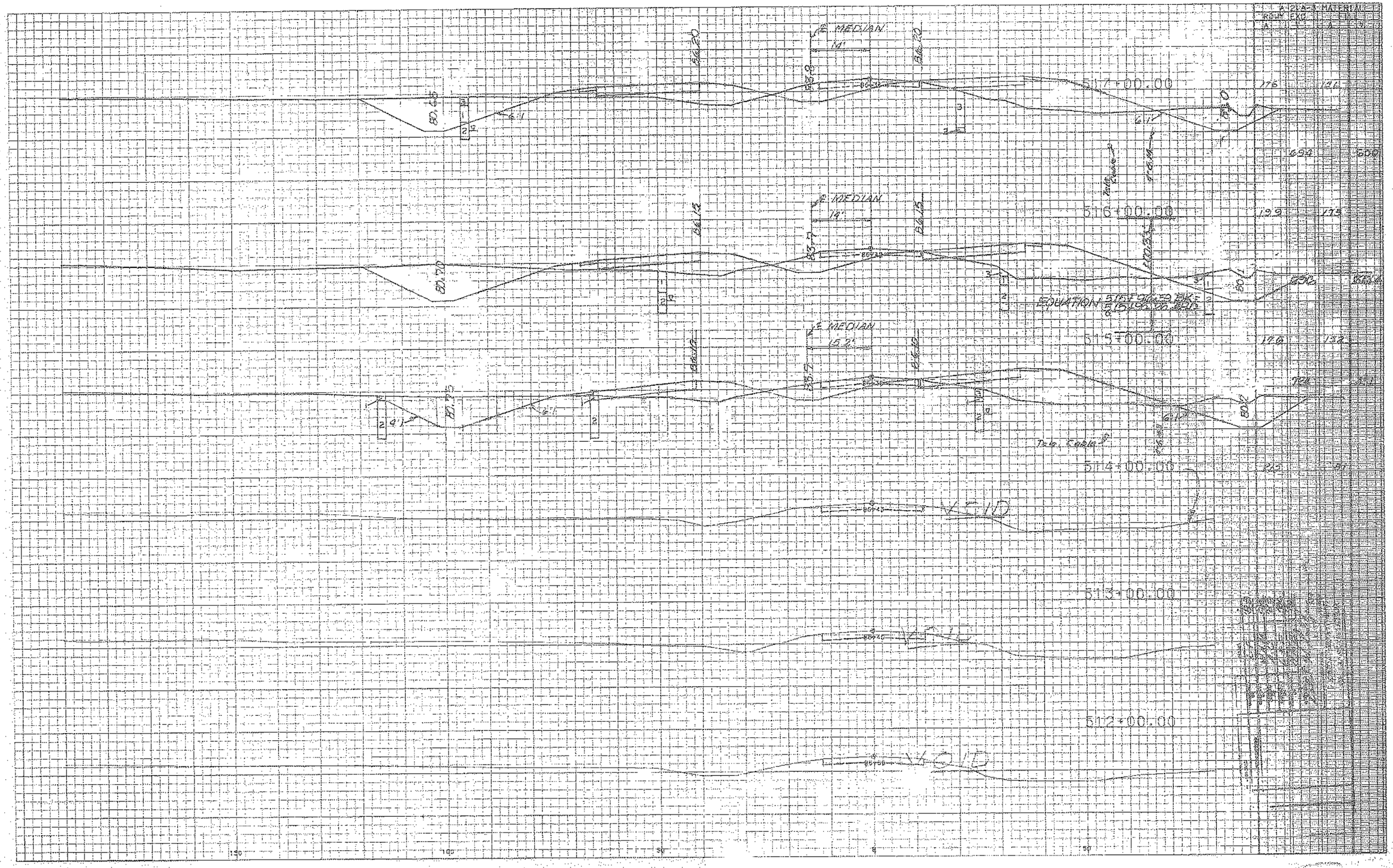
Book No 1023/41

STATE PROJ NO.	SHEET NO.
9310-66-3602 75560-3609	47

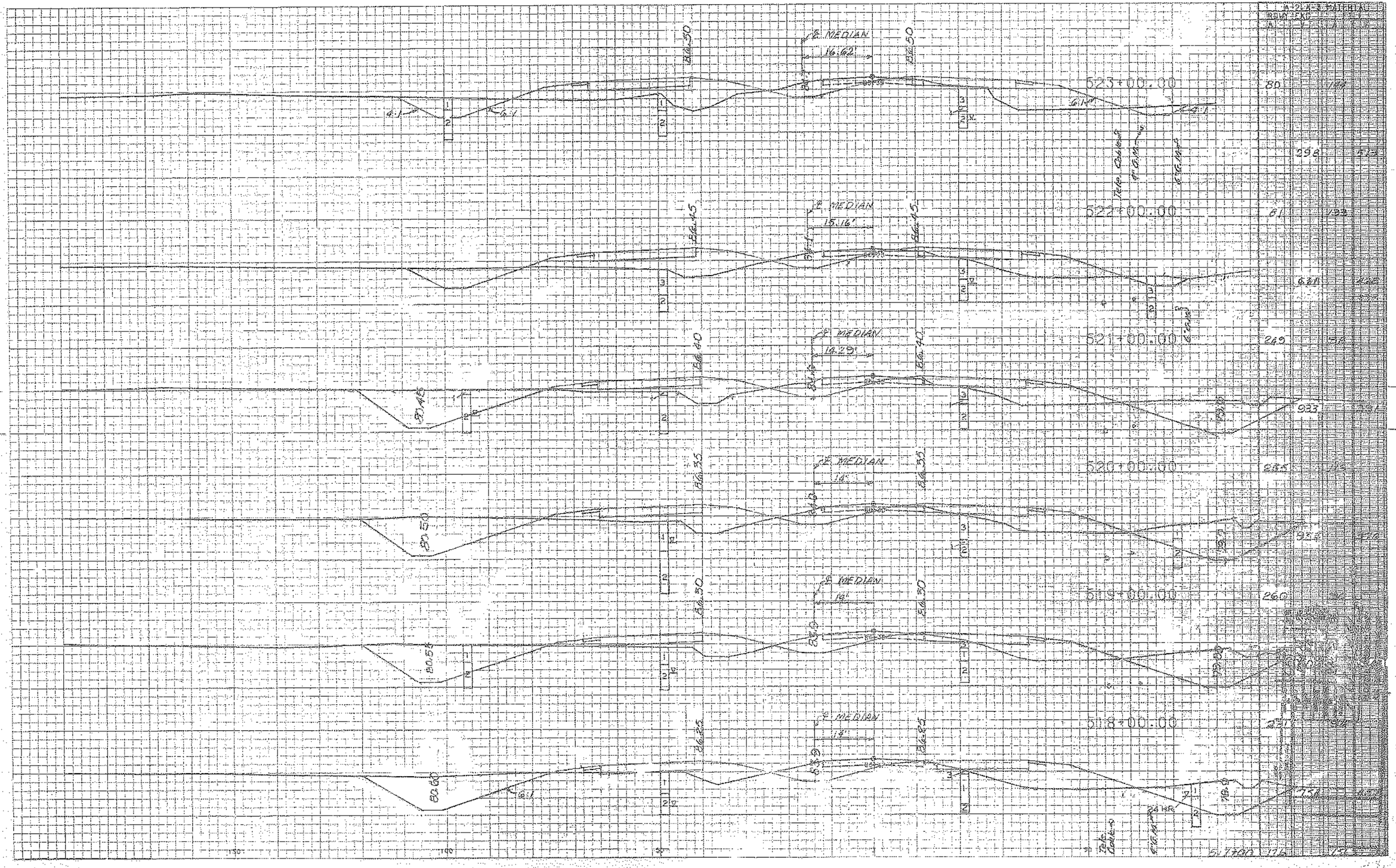
SCALE:
1" = 10' Horiz.
1" = 5' Vert.



PROJECT NO.	SHEET NO.
92506-3602	48
9554-067609	



PROJECT NO.	SHEET NO.
4250(502) 75560-3609	49



PROJECT NO.	SHEET NO.
9250(6) 3602 7556(6) 609	50

F-69

ASPHALT MATERIAL

PROJECTED

529+00.00

528+00.00

527+00.00

526+00.00

525+00.00

524+00.00

12' MEDIAN

33.70'

31.17'

28.06'

24.91'

21.27'

18.66'

84.80

84.75

84.70

84.65

84.60

84.55

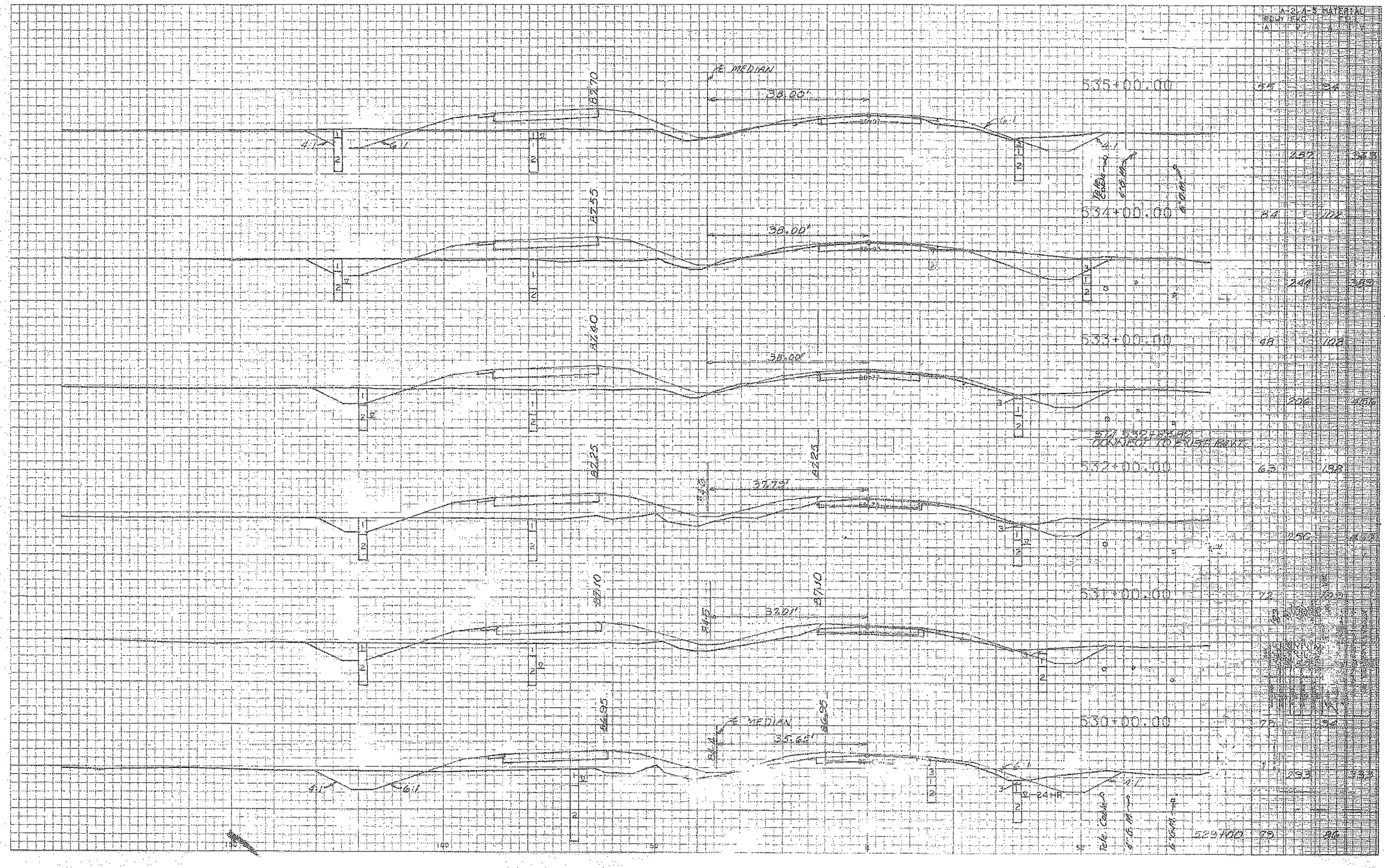
4:1

2:1

PROJECT NO.	SHEET NO.
9251-70-3602 75560-3609	51

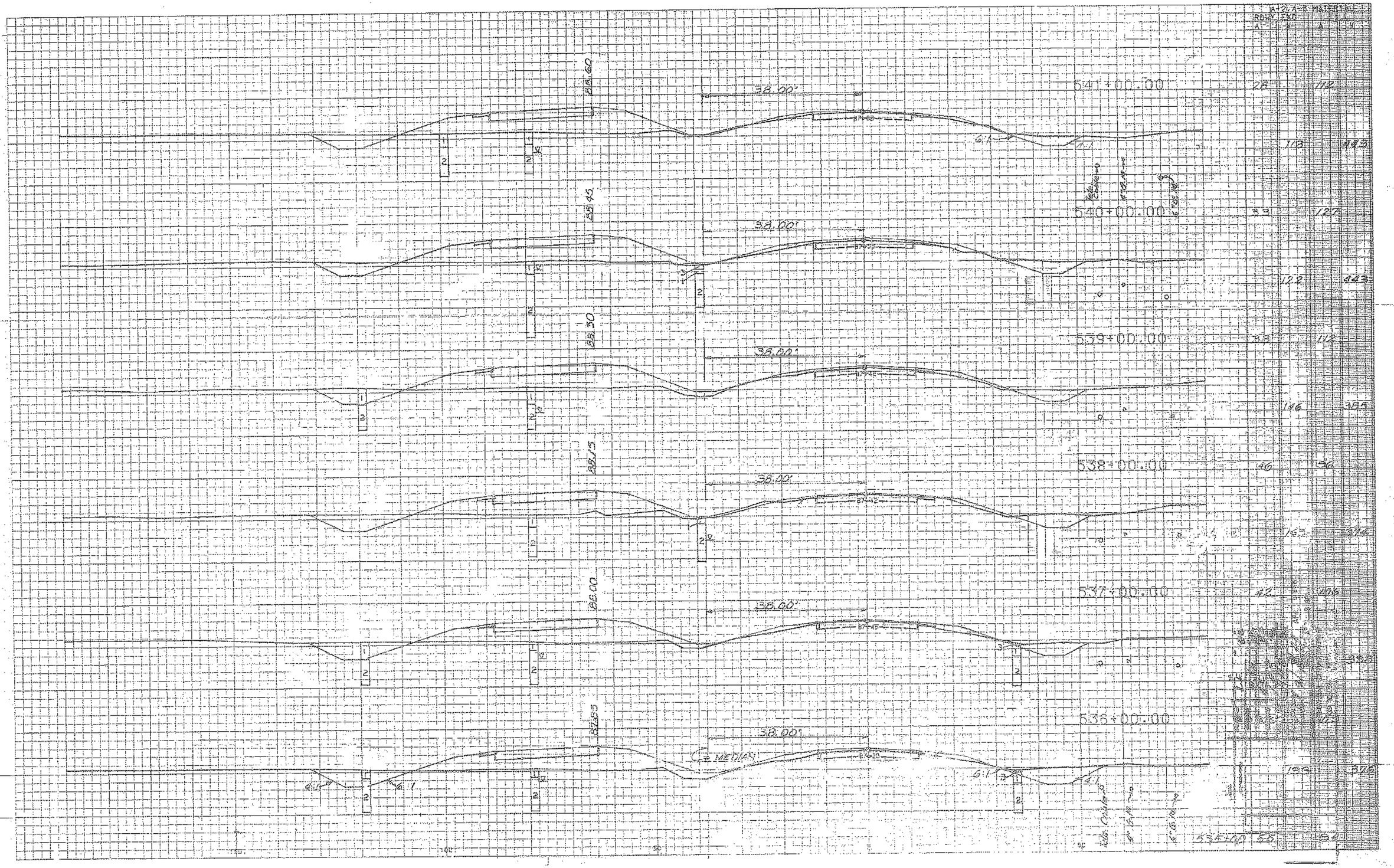
A-2-4-5 MATERIAL

535+00.00	65	34	
	257	38	
534+00.00	84	102	
	244	389	
533+00.00	98	103	
	206	1016	
532+00.00	65	198	
	250	433	
531+00.00	72	198	
	253	433	
530+00.00	78	92	
	253	333	
529+00	79	96	



PROJECT NO.	SHEET NO.
92506-3602 7556-3909	52

J-71



PROJECT NO.	SHEET NO.
9250(6)-3602 7558(7)-3609	53

547+00.00

546+00.00

545+00.00

544+00.00

543+00.00

542+00.00

541+00.00

STA	RDWY	CUT	FILL
	A		
547+00.00		59	96
		224	592
546+00.00		62	104
		213	460
545+00.00		33	113
		168	424
544+00.00		32	114
		14	42
543+00.00		43	178
		0	0
542+00.00		43	178
		181	452
541+00.00		110	110

PROJECT NO.	SHEET NO.
2562-73-3609 2562-73-3682	54

PROJECT NO.	SHEET NO.
92586-3602 75560-3609	55

NOTE: GRAVITY WALL TOP IS TO BE CONSTRUCTED 2.5' ABOVE BRIDGE

SCALE:
1"=10' HORIZ.
1"= 5' VERT.

S2506-3602
S2560-3605

56

Station	Offset	Elevation
	L	R
564+00	53	204
	155	259
563+00	31	205
	104	311
562+00	25	233
	158	324
561+00	50	211
	157	264
560+00	35	208
	155	263
559+00	30	208
	120	187
558+00	43	226

564+00
32.03
51.83
4:1
6:1
6:1
4:1
RW LINE
RW LINE

563+00
32.50
51.77

24.75
76.00'

562+00
51.57

24.60
76.00'

561+00
51.27

24.45
76.00'

560+00
50.94

24.30
75.94'

559+00
50.74
4:1
6:1
6:1
4:1
RW LINE
RW LINE

558+00

180 160 140 120 100 80 60 40 20 0 20 40 60 80

SCALE
1" = 10' HORIZ.
1" = 5' VERT.

9256-76
9256-3602
9360-3609

57

92.80
88.20
4:1
6:1
92.54
6:1
4:1
RW LINE
563+00

92.65
92.49
4
2
568+00

92.50
92.34
4
567+00

92.35
92.33
4
2
▽-48 HR.
566+00

92.20
92.00
4:1
6:1
6:1
4:1
565+00

564+00

180 160 140 120 100 80 60 40 20 0 20 40 60 80

80	105		
	230	520	
44	172		
	211	600	
70	152		
	207	672	
42	211		
	282		
58	213		
	208	702	
53	204		

SCALE:
1" = 10' HORIZ.
1" = 5' VERT.

STATE PROJ. NO.	SHEET NO.
~~8250-3602~~ 7550-3609	58

CENTERLINE

28.68

28.50

28.30

28.25

23.51

23.25

23.10

22.95

24.00

23.90

23.36

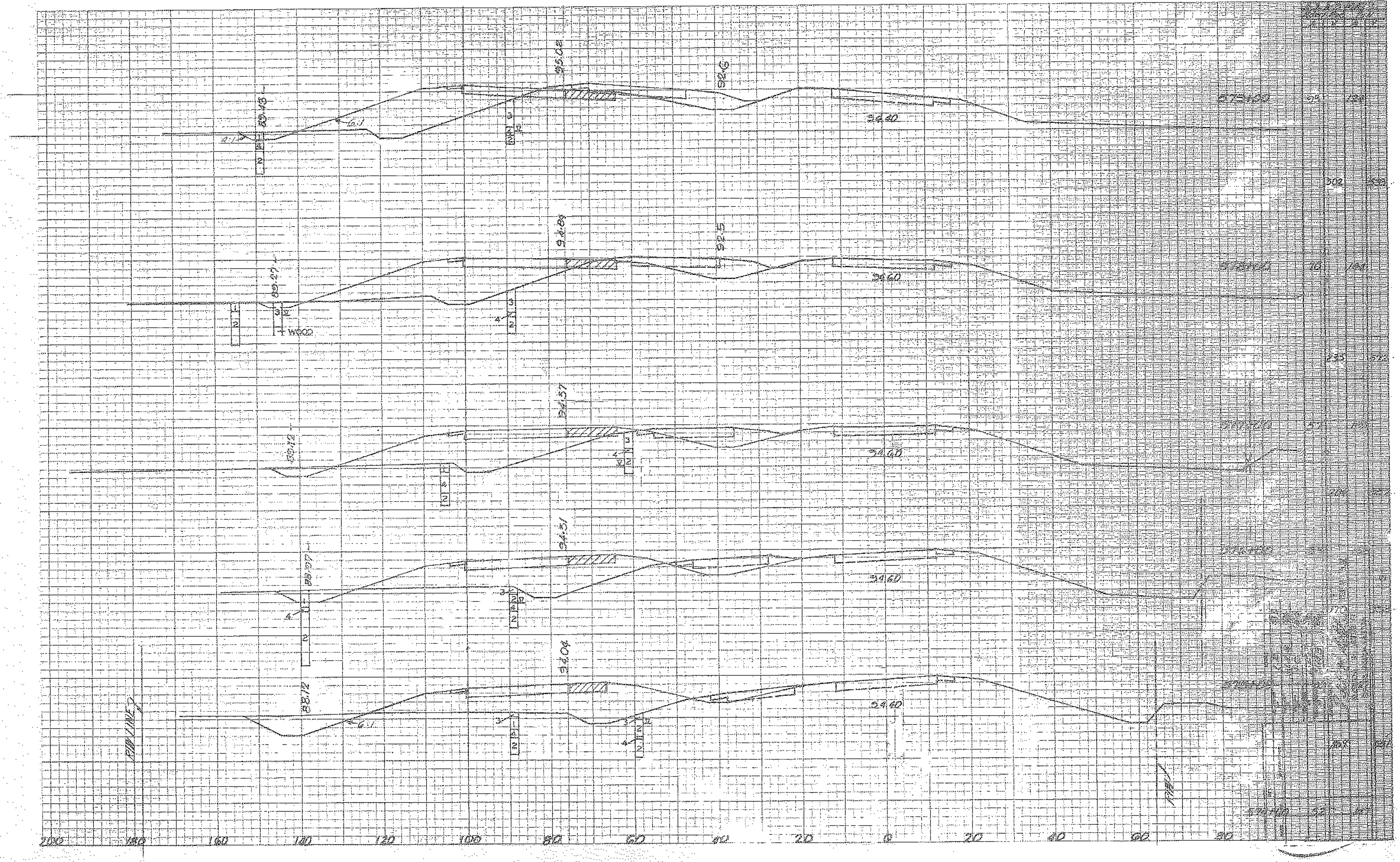
23.30

CENTERLINE

2100 180 160 140 120 100 80 60 40 20 0 20 40 60 80

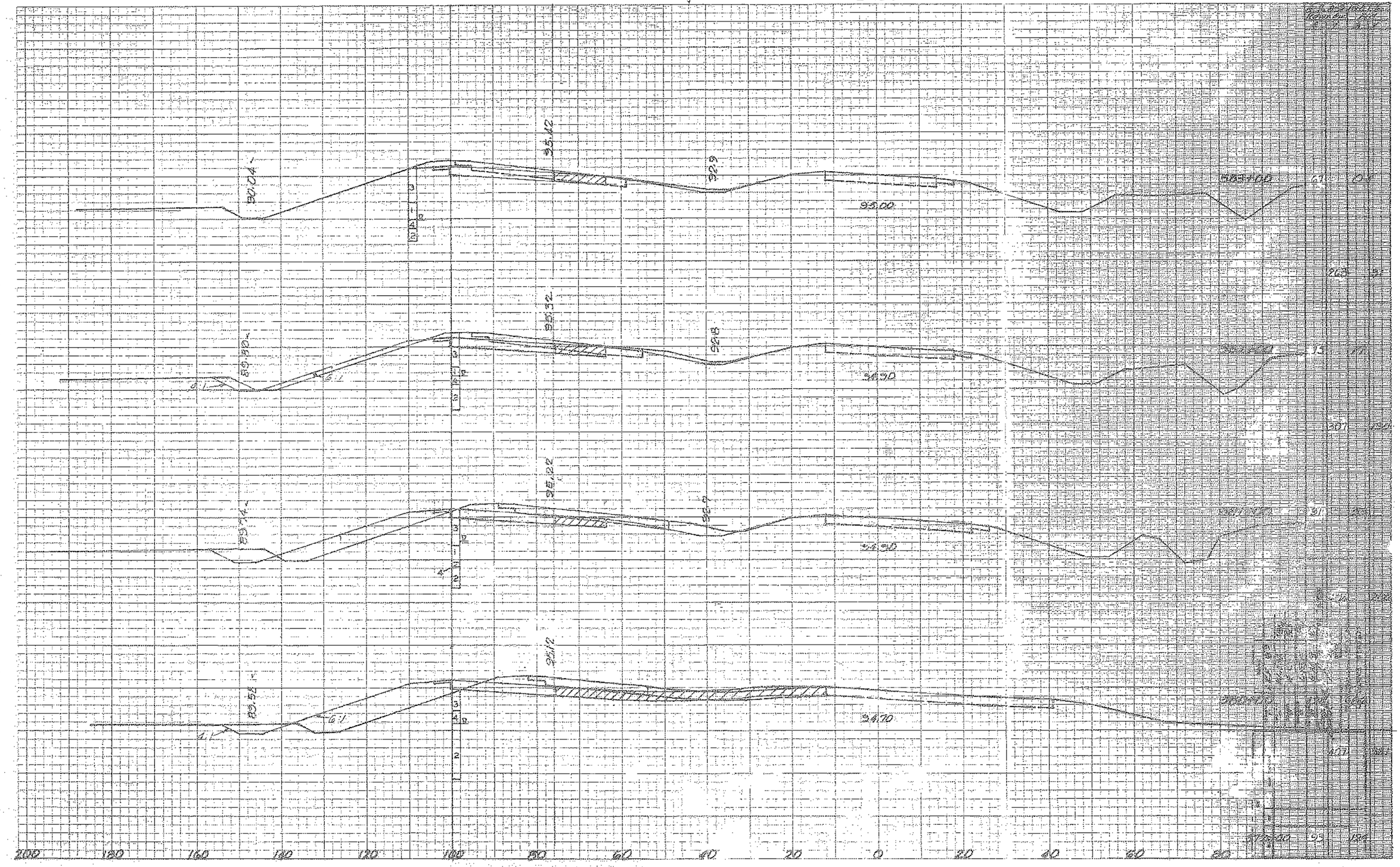
SCALE:
1"=10' HORIZ.
1"=5' VERT.

STATE PROJ. NO.	SHEET NO.
93578-3607 75660-3608	59



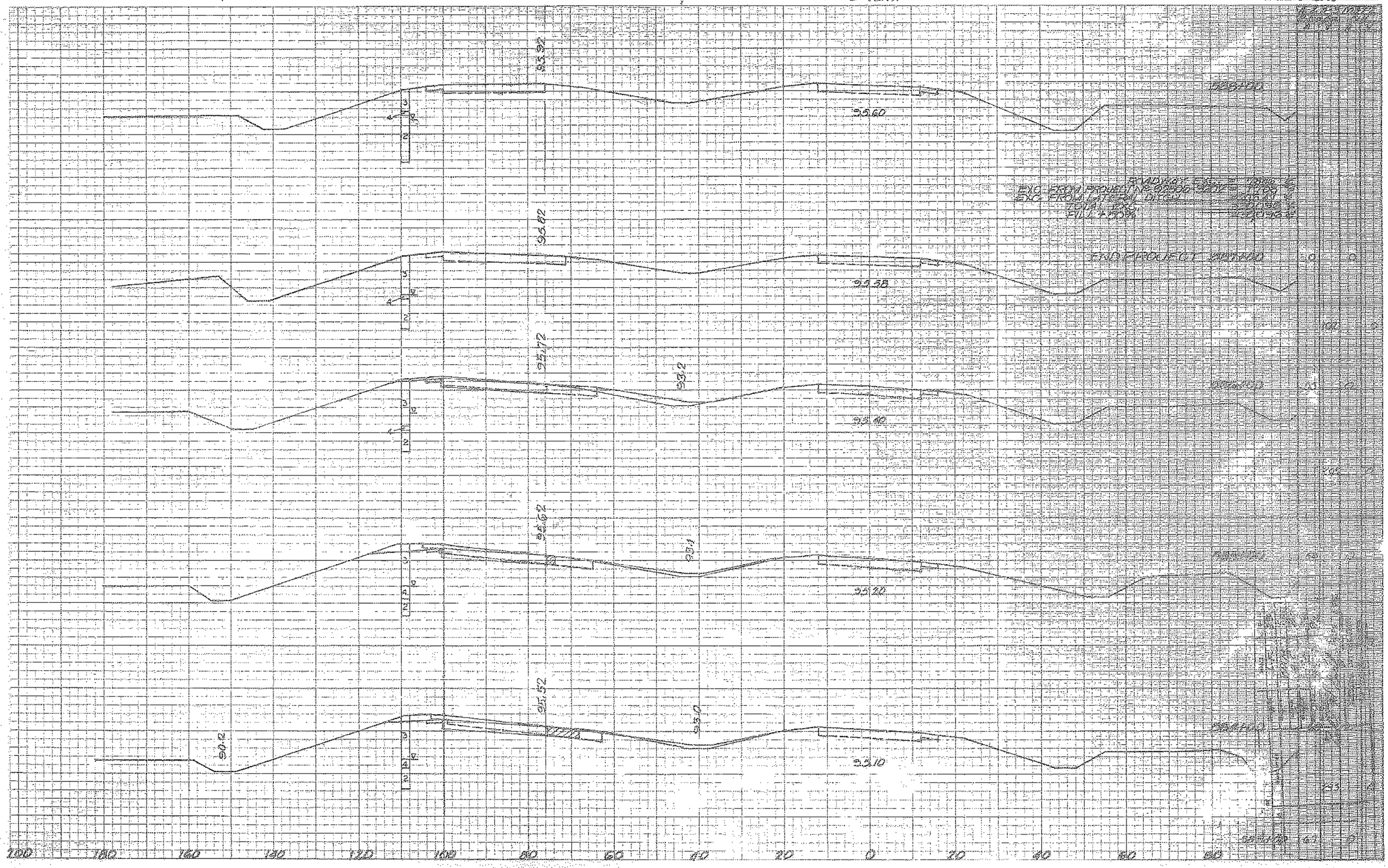
STATE PROJ. NO	SHEET NO
9154-36-02	60
9154-D-36-05	

SCALE:
1"=10' HORIZ.
1"= 5' VERT.



SCALE:
1"=10' HORIZ.
1"= 5' VERT.

STATE PROJ. NO.
~~9180~~-3602
7556-3605



SFWMD App. No. 930909-1/
Permit No. 49-00653-S
Osceola Parkway at SR 535 Interchange
(Basin 2)

Application #:	930909-1	**Permit#:**	49-00653-S	**Final Action Date:**	14-Apr-1994
Issuing Office:	ORL/SFWMD	**Permit Status:**	ACTIVE	**Application Status:**	Complete
Permit Type:	Surface Water Management (Construction/Operation Modification)			**Expiration Date:**	
Project Name:	Osceola Parkway Shingle Creek Mitigation Program			**Project Acres:**	110.49
Landuse(s):	Transportation	**Location:**	Osceola S36/T24/R27 S31,32/T24/R28 S1-5/T25/R28 S1-6/T25/R29 S4-6/T25/R30		
Receiving Body:	Shingle Creek Via Existing Systems Or Existing Wetlands				
Applicant:	Osceola County Planning & Environmental Services Mr. Rod Schultz 1 Courthouse Square, Suite 1400 Kissimmee FL 34741				
Owner:	Osceola County Engineering 17 South Vernon Avenue Room 249 Kissimmee FL 34741				
Engr Consultant:	Kendrick, Lynn, P.E. Mr. Lynn Kendrick, P.E 800 S. Orlando Avenue Maitland FL 32741-5627				
Oper Entity:	Osceola County 9999999999				

Project Description:

Contact Email Id: permits@sfwmd.gov

Documents **List by date**

	Document Type	Date Posted	Size	Seal Verified?
Applications(5)				
Application Documents(2)				
Correspondence(11)				
Fee Information(1)				
Legal Documents(3)				
RAI Information(9)				
Calculations - Design Plans(4)				
Calculations(2)				
Maps(4)				
Plans(14)				
Reports(8)				
Compliance - Engineering(3)				
Correspondence(1)				
Engineering Certification(1)				
Inspection Information(1)				
Compliance - Environmental(4)				
Compliance Information(2)				
Correspondence(1)				
Mitigation Information(3)				
Monitoring(5)				
Permit & Staff Report Information(2)				

- **Permit(1)**
- **Staff Report(7)**
- **Permit File History(1)**
- **Permit History(7)**

Close Me

Server : 24p

TABLE IV–8 REVISED 6/94
POND SUMMARY TABLE

EXIST. POND 2-1

POND #		A	B*	C	D	E(1)	F(2)	TOTAL
TOTAL BASIN AREA		10.93	13.41	9.58	11.80	0.00	2.63	54.97(3)
STATION TO STATION		302+47 314+00	314+00 350+00	350+00 373+00	373+00 400+80	EXPAN–SION	ON RAMP	
WATER MANAGEMENT AREA		3.49	2.53	2.07	1.20		0.65	9.94
IMPERVIOUS AREA		4.14	6.96	4.44	6.97		0.53	23.04
PERVIOUS AREA		3.30	3.92	3.07	3.63		1.45	15.37
SEASONAL HIGH ELEV.		82.00	73.39	72.63	72.50		82.00	
PROPOSED CONTROL ELEV.		82.30	74.00	73.00	72.50		82.50	
WATER QUAL. REQRD.(ac–ft)		0.91	1.45	0.93	1.45			4.74
WATER QUAL. PROVIDED(ac–ft)		1.06	1.56	1.05	1.54			5.21
25YR / 72HR	PRE	8.70	10.73	7.66	9.60			36.69
DISCHARGE (cfs)	POST	6.40	8.70	9.60	8.70			33.40
MAX. STAGE ELEVATION		83.80	76.60	74.90	76.40			
MIN. E/P ELEV.		85.85	79.05	77.45	78.49			
WEIR LENGTH (ft)		1.40	1.10	1.75	0.60			
WEIR ELEV.		82.60	74.63	73.50	73.70			
3" dia. BLEEDER EVEV.		82.30	74.00	73.00	72.50			
CULVERT SIZE (in.)		24	30	30	24	2–48"	18"	
UPSTREAM INVERT		81.10	72.13	71.50	71.00			
DOWNSTREAM INVERT		81.04	72.06	71.38	70.88			
OUTLET VELOCITY		2.04	1.77	1.96	N/A			

(1) POND 'E' IS AN EXPANSION OF THE FIRST SECTION OF THE EXISTING FDOT LINEAR DETENTION SYSTEM. SEE 335 ADICPR ROUTING FOR ADDITIONAL DETAILS.

(2) POND 'F' IS PROVIDED FOR TREATMENT ONLY. REFER TO SR 535 ROUTING FOR POND 'F' DATA.

(3) THIS TOTAL REFLECTS 6.06 acres (NWL) FROM COMPENSATING STORAGE AREA # 2.

* POND B REVISED 6/94

535 ADICPR
ROUTING OUTPUT

STATE ROAD 535
ROADWAY WIDENING FOR
OSCEOLA PARKWAY

The proposed construction of Osceola Parkway and the access from SR 535 will require the addition of both left and right turn lanes along SR 535. The existing roadway is a rural section with a 50 ft. grassed median. With the exception of the superelevated sections the entire roadw · drains to the roadside swales. The stormwater treatment and attenuation for this portion of SR 535, which includes 140 acres of basin area, is provided in linear retention system constructed by the FDOT at the time SR 535 was widened to 4 lanes. The system consists of a series of ditches with control structures which step, down to the outfall elevation in the receiving wetland. Each control structure also has 6" underdrain pipe which will serve to draw down the treatment volume between the weir elevation and the structure invert. These existing structures are shown on the project plans.

Out of the 140 acre basin, the proposed widening along SR 535 will replace 0.8 acres of existing pervious area with impervious . The construction of Osceola Parkway will also impact the retention system itself. A portion of the ditch will be replaced with pipe to convey the water under Osceola Parkway and the westbound off ramp. To compensate for the loss of treatment and storage area and to provide for the additional impervious area, the existing ditch section, immediately downstream from SR 535, will be expanded to utilize all of the space available between the Osceola Parkway ROW and the existing gas pipe line easement.

The expanded ditch and the proposed control structure replaces the treatment volume being displaced in the existing system and also provides treatment volume for 2.5" of runoff from the impervious area being added. The proposed system also appears to do a better job of attenuating the project runoff, reducing the peak discharge from 141 CFS to 128 CFS. To convert the original FDOT SCS model to an ICPR model for the existing and proposed conditions, several ICPR stormwater models were developed. A node diagram of each model can be found in the attached figures. Table 1 presents a tabulation of the results for each of the models which are described below:

FDOT Existing Conditions

FDOT prepared a stormwater model in 1984 to depict the benefits of the linear stormwater system described above. The "State of the Art" software for stormwater modelling at that time was certainly not as flexible or user friendly as that available today and as a result the model that was developed approximated the existing conditions as closely as possible. The information shown in Table 1, for this model, was obtained from a copy of that output provided by FDOT.

FDOT/G&R Existing Conditions

This is an ICPR model which was prepared as a "calibration" model for comparison to the "FDOT Existing Conditions" model. Input data from the

FDOT model was utilized as can be seen in Table 1. The stage/discharge for the two models compared surprisingly well considering the difference in the complexity of the software.

G&R Existing Conditions

As stated above, the earlier stormwater modelling programs did not provide the flexibility available in today's software. Because of this, the above models did not represent the actual field conditions as accurately as is possible today. The "G&R Existing Conditions" model is based on the actual field conditions. The nodes for this model and the "Proposed Conditions Model" were renumbered to denote that they were different from the previous models even though they represented the same basic areas. The acreage for Nodes 10 and 20 are based on the actual acreages shown on the FDOT Drainage Map for the SR 535 widening from 2 to 4 lanes and are slightly different than the previous models. The acreages for Nodes 30 thru 60 are the same.

The stage/storage volumes in the "FDOT Existing Conditions" model appeared to include flooding of significant areas beyond the ROW or easement lines. While this may be what actually occurs should these stages be achieved, this area is beyond the limits of land under the control of FDOT and is not available for storage. The "G&R Existing Conditions" model includes only storage volume available within the ditches and within the ROW

easement, therefore development of the surrounding area will not affect the model. The stage and discharge from this model is the baseline for the evaluation the effectiveness of the proposed modifications to the overall system.

G&R Proposed Conditions

The "Proposed Conditions Model" includes revised curve numbers for the basins tributary to Nodes 10 and 20 to reflect the additional impervious area being added along SR 535. The basins which discharge to Node 20 have also acquired additional area to account for the portions of the new roadways which will drain directly to the SR 535 ROW. Node 90 which is the treatment pond located in the SE quadrant of the Osceola Parkway and SR 535 intersection has also been added. This node provides for treatment of the runoff from the Osceola Parkway eastbound on ramp prior to discharge to the SR 535 ROW. The pipe connection between this pond and the SR 535 ditch will allow exchange of the water and utilization of the pond storage.

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PROPOSED 535 G&R
8/31/93

NODE NAME	NODE TYPE	INI STAGE (ft)	X-COOR (ft)	Y-COOR (ft)	LENGTH (ft)	STAGE (ft)	AR/TM/STR (ac/hr/af)
N-10	STRG	80.410	.000	.000	.000	80.450	.000
						80.950	.070
						81.450	.300
						81.950	.670
						82.450	1.190
						82.950	1.850
						83.450	2.670
						83.950	3.630
						85.050	6.280
						86.000	8.830
N-20	STRG	79.600	.000	.000	.000	79.600	.000
						80.100	.050
						80.600	.220
						81.100	.490
						81.600	.860
						82.100	1.350
						82.600	1.940
						83.100	2.640
						83.600	3.450
						84.000	4.180
N-30	STRG	75.300	.000	.000	.000	75.300	.000
						76.000	1.120
						77.000	2.840
						78.000	4.700
						79.000	6.720
						80.000	8.890
						81.000	11.210
						82.000	13.670
						84.000	19.050
N-60	STRG	72.300	.000	.000	.000	72.300	.000
						72.500	.250
						72.700	.500
						73.000	.750
						74.000	1.650
						75.000	2.650
						76.000	4.650
N-70	TIME	72.300	.000	.000	.000	72.300	.000
						72.300	1000.000

EXIST. POND 2-1
STAGE-VOLUME TABLE
(FROM PROPOSED
CONDITIONS ICPR MODEL
FOR POND E EXPANSION)

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PROPOSED 535 G&R
8/31/93

>>REACH NAME : R-10
FROM NODE : N-10
TO NODE : N-20
REACH TYPE : CULVERT, CIRCULAR w/ ROADWAY
FLOW DIRECTION : POSITIVE AND NEGATIVE FLOWS ALLOWED
TURBO SWITCH : OFF

CULVERT DATA :
SPAN (in): 30.000 RISE (in): 30.000 LENGTH (ft): 80.000
U/S INVERT (ft): 80.470 D/S INVERT (ft): 79.240 MANNING N: .012
ENTRNC LOSS: .500 # OF CULVERTS: 2.000

POSITION A : NOT USED

POSITION B : NOT USED

NOTE:

>>REACH NAME : R-90
FROM NODE : N-90
TO NODE : N-20
REACH TYPE : CULVERT, CIRCULAR w/ ROADWAY
FLOW DIRECTION : POSITIVE AND NEGATIVE FLOWS ALLOWED
TURBO SWITCH : OFF

CULVERT DATA :
SPAN (in): 18.000 RISE (in): 18.000 LENGTH (ft): 75.000
U/S INVERT (ft): 82.500 D/S INVERT (ft): 82.500 MANNING N: .012
ENTRNC LOSS: .500 # OF CULVERTS: 1.000

POSITION A : NOT USED

POSITION B : NOT USED

NOTE:

```
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        PROPOSED 535 G&R
        8/31/93

>>REACH NAME      : R-20
  FROM NODE       : N-20
  TO NODE         : N-30
  REACH TYPE      : DROP STRUCTURE w/ CIRC. CULVERT
  FLOW DIRECTION  : POSITIVE AND NEGATIVE FLOWS ALLOWED
  TURBO SWITCH    : OFF

  CULVERT DATA    :
        SPAN (in):  42.000      RISE (in):  42.000     LENGTH (ft):  72.000
   U/S INVERT (ft): 76.300 D/S INVERT (ft):  76.300       MANNING N:    .012
      ENTRNC LOSS:    .500   # OF CULVERTS:   2.000

  POSITION A      : RECTANGULAR RISER SLOT
    CREST EL. (ft): 81.300  CREST LN. (ft):  16.000    OPENING (ft): 999.000
        WEIR COEF.:   3.200      GATE COEF.:    .600 NUMBER OF ELEM.:   1.000

  POSITION B      : NOT USED

             NOTE:

>>REACH NAME      : R-30
  FROM NODE       : N-30
  TO NODE         : N-60
  REACH TYPE      : DROP STRUCTURE w/ CIRC. CULVERT
  FLOW DIRECTION  : POSITIVE AND NEGATIVE FLOWS ALLOWED
  TURBO SWITCH    : OFF

  CULVERT DATA    :
        SPAN (in):  48.000      RISE (in):  48.000     LENGTH (ft):1675.000
   U/S INVERT (ft): 73.500 D/S INVERT (ft):  72.400       MANNING N:    .012
      ENTRNC LOSS:    .500   # OF CULVERTS:   2.000

  POSITION A      : RECTANGULAR RISER SLOT
    CREST EL. (ft): 80.000  CREST LN. (ft):  16.000    OPENING (ft): 999.000
        WEIR COEF.:   3.200      GATE COEF.:    .600 NUMBER OF ELEM.:   1.000

  POSITION B      : NOT USED

             NOTE:
```

EXIST. POND 2-1
OUTFALL (2-48" PIPES)
(FROM PROPOSED
CONDITIONS ICPR MODEL
FOR POND E EXPANSION)

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PROPOSED 535 G&R
8/31/93

>>REACH NAME : R-60
FROM NODE : N-60
TO NODE : N-70
REACH TYPE : DROP STRUCTURE w/ CIRC. CULVERT
FLOW DIRECTION : POSITIVE AND NEGATIVE FLOWS ALLOWED
TURBO SWITCH : OFF

CULVERT DATA :
SPAN (in): 42.000 RISE (in): 42.000 LENGTH (ft): 72.000
U/S INVERT (ft): 69.000 D/S INVERT (ft): 69.000 MANNING N: .012
ENTRNC LOSS: .500 # OF CULVERTS: 2.000

POSITION A : RECTANGULAR RISER SLOT
CREST EL. (ft): 73.500 CREST LN. (ft): 16.000 OPENING (ft): 999.000
WEIR COEF.: 3.200 GATE COEF.: .600 NUMBER OF ELEM.: 1.000

POSITION B : NOT USED

NOTE:

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PROPOSED 535 G&R
8/31/93

REACH SUMMARY
****

INDEX	RCHNAME	FRMNODE	TONODE	REACH TYPE
1	R-10	N-10	N-20	CULVERT, CIRCULAR w/ ROADWAY
2	R-90	N-90	N-20	CULVERT, CIRCULAR w/ ROADWAY
3	R-20	N-20	N-30	DROP STRUCTURE w/ CIRC. CULVERT
4	R-30	N-30	N-60	DROP STRUCTURE w/ CIRC. CULVERT
5	R-60	N-60	N-70	DROP STRUCTURE w/ CIRC. CULVERT

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PROPOSED 535 G&R
8/31/93

NODAL MIN/MAX/TIME CONDITIONS REPORT

NODE ID	PARAMETER	MINIMUMS VALUE	MINIMUMS TIME (hr)	MAXIMUMS VALUE	MAXIMUMS TIME (hr)
N-10	STAGE (ft):	80.41	.00	85.74	62.00
	VOLUME (af):	.00	9.00	8.15	62.00
	RUNOFF (cfs):	.00	9.00	118.63	60.00
	OFFSITE (cfs):	.00	80.00	.00	80.00
	OTHER (cfs):	.00	80.00	.00	80.00
	OUTFLOW (cfs):	.00	14.00	79.14	62.00
N-20	STAGE (ft):	79.60	8.00	83.59	62.00
	VOLUME (af):	.00	8.00	3.45	62.00
	RUNOFF (cfs):	.00	8.00	64.54	60.00
	OFFSITE (cfs):	.00	80.00	.00	80.00
	OTHER (cfs):	.00	14.00	80.49	62.00
	OUTFLOW (cfs):	.00	22.00	121.76	61.00
N-30	STAGE (ft):	75.30	4.00	81.81	62.00
	VOLUME (af):	.00	4.00	13.21	62.00
	RUNOFF (cfs):	.00	80.00	22.44	60.00
	OFFSITE (cfs):	.00	80.00	.00	80.00
	OTHER (cfs):	.00	22.00	121.76	61.00
	OUTFLOW (cfs):	.00	43.00	124.32	62.00
N-60	STAGE (ft):	72.30	11.00	75.35	62.00
	VOLUME (af):	.00	10.00	3.68	62.00
	RUNOFF (cfs):	.00	80.00	36.51	60.00
	OFFSITE (cfs):	.00	80.00	.00	80.00
	OTHER (cfs):	.00	43.00	124.32	62.00
	OUTFLOW (cfs):	.00	45.00	127.72	62.00
N-70	STAGE (ft):	72.30	80.00	72.30	80.00
	VOLUME (af):	.00	45.00	98.32	80.00
	RUNOFF (cfs):	.00	80.00	.00	80.00
	OFFSITE (cfs):	.00	80.00	.00	80.00
	OTHER (cfs):	.00	45.00	127.72	62.00
	OUTFLOW (cfs):	.00	80.00	.00	80.00

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PROPOSED 535 G&R
8/31/93

NODAL MIN/MAX/TIME CONDITIONS REPORT

NODE ID	PARAMETER	MINIMUMS VALUE	MINIMUMS TIME (hr)	MAXIMUMS VALUE	MAXIMUMS TIME (hr)
N-90	STAGE (ft):	82.50	17.00	83.63	62.00
	VOLUME (af):	.00	17.00	.78	62.00
	RUNOFF (cfs):	.00	80.00	9.74	60.00
	OFFSITE (cfs):	.00	80.00	.00	80.00
	OTHER (cfs):	.00	80.00	.00	80.00
	OUTFLOW (cfs):	.00	18.00	1.95	63.00

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PROPOSED 535 G&R
8/31/93

NODAL MAXIMUM CONDITIONS REPORT

NODE ID	STAGE (ft)	VOLUME (af)	INFLOW |<------- RUNOFF (cfs)	INFLOW OFFSITE (cfs)	INFLOW OTHER (cfs)>|	OUTFLOW (cfs)
N-10	85.74	8.15	118.63	.00	.00	79.14
N-20	83.59	3.45	64.54	.00	80.49	121.76
N-30	81.81	13.21	22.44	.00	121.76	124.32
N-60	75.35	3.68	36.51	.00	124.32	127.72
N-70	72.30	98.32	.00	.00	127.72	.00
N-90	83.63	.78	9.74	.00	.00	1.95

DHW FOR EXIST. POND
2-1 (NGVD 29 DATUM)

TABLE 1

EXISTING CONDITIONS 535 - F.D.O.T.

NODE NO.	AREA (ac-ft)	BASINS	No. OF PIPES & DIA. (ft)	WEIR LENGTH (ft)	MAX STAGE	MAX DISCHARGE
1	96.2	10	1/99	20	87.3	90.4
2	43.3	20	2/3.5	10.8	84.4	120.2
3	15.2	30	2/3.5	10.8	83.5	130.0
4	6.2	40	2/3.5	10.8	82.4	134.2
5	5.0	50	2/3.5	10.8	79.4	137.8
6	8.7	60	2/3.5	10.8	75.5	148.6
7		OUTFALL				

* All information based on FDOT model dated Sept. 28, 1984.

EXISTING CONDITIONS 535 - F.D.O.T./G & R

NODE NO.	AREA (ac-ft)	BASINS	No. OF PIPES & DIA. (ft)	WEIR LENGTH (ft)	MAX STAGE	MAX DISCHARGE
1	96.2	10	1/99	20	88.45	70.14
2	43.3	20	2/3.5	10.8	84.37	104.48
3	15.2	30	2/3.5	10.8	83.34	117.10
4	6.2	40	2/3.5	10.8	82.01	122.90
5	5.0	50	2/3.5	10.8	79.05	127.90
6	8.7	60	2/3.5	10.8	75.28	146.60
7		OUTFALL				

* ICPR model using input information from FDOT model dated Sept. 28, 1984.

EXISTING CONDITIONS 535 - G & R

NODE NO.	AREA (ac-ft)	BASINS	No. OF PIPES & DIA. (ft)	WEIR LENGTH (ft)	MAX STAGE	MAX DISCHARGE
10	4.6,86.5	10,20	2/2.5	30	86.12	73.31
20	3.7,40.9	30,40	2/3.5	10.8	84.25	112.65
30	15.2	50	2/3.5	10.8	83.09	119.21
40	6.2	60	2/3.5	10.8	81.98	124.50
50	5.0	70	2/3.5	10.8	79.02	129.36
60	8.7	80	2/3.5	10.8	75.18	142.15
70		OUTFALL			72.30**	0.00

* ICPR Model based on actual existing conditions.
** Stage in Outfall wetland.

PROPOSED 535 CONDITIONS - G & R

NODE NO.	AREA (ac-ft)	BASINS	No. OF PIPES & DIA. (ft)	WEIR LENGTH (ft)	MAX STAGE	MAX DISCHARGE
10	4.6,86.5	10,20	2/2.5	-	85.76	79.47
20	4.87,41.52	30,40	2/3.5	16	83.60	120.89
30	15.2	50	2/3.5	16	81.81	124.55
60	8.7	60	2/3.5	16	75.35	128.01
70		OUTFALL			72.30	0.00
90**	2.63	20	1/1.5	-	83.63	1.97

* ICPR Model of modified system including additional storage pavement and culverts.
** POND F located in SE Quadrant of Osceola Parkway and SR 535 Intersection.

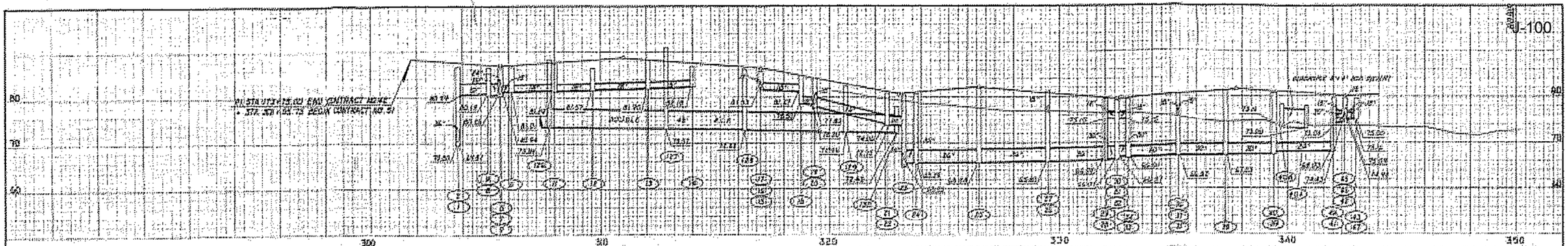
TABLE II

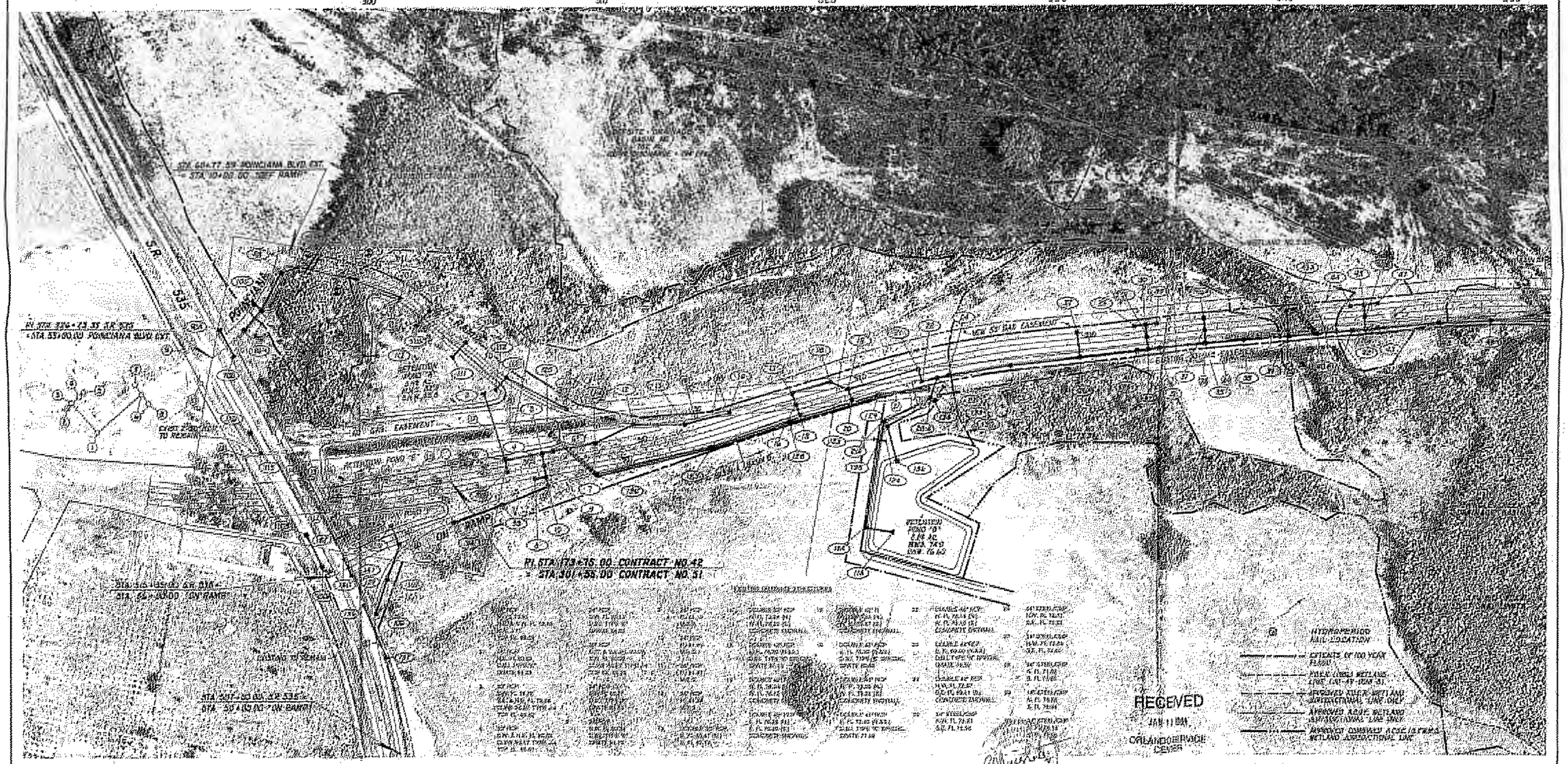
TREATMENT VOLUME COMPARISON

Node No.	30 (ac ft)	40 (ac ft)	50 (ac ft)	Total (ac ft)
Pre Treatment Volume Provided	2.28	2.61	1.3	6.19
Post Treatment Volume Provided	8.89	-	-	8.89

$6.19_{(existing)}$ + 0.17 ac ft $_{(additional\ required)}$ < 8.89 ac ft (provided).

TREATMENT VOLUME IN EXIST. POND 2-1




STA 604+77.59 POINCIANA BLVD. EST.
= STA 10+00.00 "SEF RAMP"
S.R. 535
POINCIANA
EXIST. 230' TO REMAIN
EXIST. EASEMENT
RETENTION POND 'E'
EXIST. 230' TO REMAIN
STA. 56+48.00 (SR 535)
STA. 64+48.00 (SR RAMP)
EXISTING TO REMAIN
STA 307+00.00 (SR 535)
STA. 307+00.00 (SR RAMP)
NEW 50' R/W EASEMENT
RETENTION POND 'F'
EXIST. 230' TO REMAIN
RETENTION POND 'G'
EXIST. 230' TO REMAIN
RETENTION POND 'H'
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RETENTION POND 'III'
EXIST. 230' TO REMAIN
RETENTION POND 'JJJ'
EXIST. 230' TO REMAIN
RETENTION POND 'KKK'
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EXIST. 230' TO REMAIN
RETENTION POND 'SSS'
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RETENTION POND 'TTT'
EXIST. 230' TO REMAIN
RETENTION POND 'UUU'
EXIST. 230' TO REMAIN
RETENTION POND 'VVV'
EXIST. 230' TO REMAIN
RETENTION POND 'WWW'
EXIST. 230' TO REMAIN
RETENTION POND 'XXX'
EXIST. 230' TO REMAIN
RETENTION POND 'YYY'
EXIST. 230' TO REMAIN
RETENTION POND 'ZZZ'
EXIST. 230' TO REMAIN
RETENTION POND 'AAAA'
EXIST. 230' TO REMAIN
RETENTION POND 'BBBB'
EXIST. 230' TO REMAIN
RETENTION POND 'CCCC'
EXIST. 230' TO REMAIN
RETENTION POND 'DDDD'
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RETENTION POND 'GGGG'
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RETENTION POND 'IIII'
EXIST. 230' TO REMAIN
RETENTION POND 'JJJJ'
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RETENTION POND 'KKKK'
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RETENTION POND 'RRRR'
EXIST. 230' TO REMAIN
RETENTION POND 'SSSS'
EXIST. 230' TO REMAIN
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EXIST. 230' TO REMAIN
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RETENTION POND 'UUUUUUUUUUUUUUUUU'
EXIST. 230' TO REMAIN
RETENTION POND 'VVVVVVVVVVVVVVVV

EXIST. POND 2-1

RETENTION POND "E"
M.W.S. 75.3
D.H.W. 80.0

DHW ON THIS SHEET REPRESNTS WEIR ELEVATION OF CONTROL STRUCTURE (SEE NEXT PAGE)

DHW FROM ICPR OUTPUT = 81.81 FT NGVD 29 (EL. 80.91 FT NAV 88)

PLACE FABRIC FORMED CONCRETE RIPRAP FROM EL. 76.40 TO EL. 74.30 WITHIN LIMITS OF OUTFALL STRUCTURE.

EARTHWORK & POND "E"

MATCH EXIST. GRADING SO AS TO MAINTAIN EXIST. DRAINAGE IN THIS AREA

EXISTING INLETS TYPE "K" W/DOUBLE 42" R.C.P. TO REMAIN

TOP OF BERM

764 EXIST. DITCH BOTTOM

EXIST. 10' DRAINAGE EASEMENT

60' GAS EASEMENT

THIS PIPE IS TO BE CONSTRUCTED UNDER THE GAS LINE AND IN ACCORDANCE WITH FLORIDA GAS GUIDELINES AND PROCEDURES. AT THE TIME OF CONSTRUCTION THE CONTRACTOR IS TO CONTACT THE FLORIDA GAS COMPANY.

CONST. 312' ± 36" R.C.P. @ CLASS I

EXISTING STRUCTURES & PIPE TO BE REMOVED

STA. 305+35.00 ± 140 LT.
CONST. MODIFIED INLET TYPE "K" SPECIAL W/ DOUBLE 48" R.C.P. SEE SHEET 38 FOR DETAILS

CONST. 10' DOUBLE SWING GATE

ACCESS ROAD SEE SHEET 14 FOR DETAILS

HWL 75.3

TYPE "B" FENCE

M.S.E. WALL

STA. 173+75.00 BACK END CONTRACT NO.42
STA. 301+55.75 AHEAD BEGIN CONTRACT NO. 51

OSCEOLA PARKWAY

DOUBLE 48" R.C.P.

SCALE 1"=40'

STA. 57+68.00 ± 131' LT.
CONST. STRAIGHT ENDWALL WITH BAFFLE
FDOT INDEX NO.
FL. 82.5

END FENCE @ R.E.WALL

CONST. DOUBLE 10' GATE

POND "F"
M.W.S. 82.5
D.H.W. 83.43

SEE SKIMMER DETAIL BELOW

TYPE "B" FENCE

"ON RAMP"

CONST. 45' ± 18" R.C.P. @ 0.5%

DITCH

STA. 56+99.00 ± 131' LT.
FLARED END SECTION
FDOT INDEX NO. 270
EL. 82.43

S.R. 535

M.S.E. WALL CONTRACT NO.42

VARIES 20' MIN.

TO EXISTING DRAINAGE EASEMENT

EXISTING GROUND

MATCH EXISTING GROUND

MATCH EXIST. GROUND

M.W.S. 75.3

BOTTOM EL. 65.0
BOTTOM WIDTH VARIES

SECTION A-A
N.T.S.

CONCRETE ENDWALL

18" R.C.P.

3/8" Ø STAINLESS STEEL HILTI KWIK BOLT OR EQUIVALENT 4½" EMBEDMENT

FIBERGLASS OIL SKIMMER

L 2"x2"x¼"

3/8" Ø STAINLESS STEEL BOLTS

PLAN

3/8" Ø STAINLESS STEEL HILTI KWIK BOLT OR EQUAL 4½" EMBEDMENT (SEE DETAIL "B" NEXT SHT.)

CONST. CONCRETE ENDWALL

POND M.W.S.

POND SIDE SLOPE

NOTE: CONTRACTOR SHALL NOTCH SKIMMER TO CONFORM TO ENDWALL FOOTER

ELEVATION

ENDWALL BAFFLE
N.T.S.

NOTE: PRIOR TO INSTALLATION CONTRACTOR IS TO SUBMIT SHOP DRAWINGS OF SKIMMER FOR APPROVAL.

TYPE "B" FENCE

EXISTING GROUND

TOP OF BERM 20:1

EL. 85.0

M.W.S. 82.5

BOTTOM EL. 73.0

SECTION B-B
N.T.S.

SEE PLANS FOR ELEVATIONS

20' STABILIZED ROADWAY

VARIES

SEE PLAN FOR GRADING

SECTION A-A
N.T.S.

NO.	BY	REVISIONS	DATE	APPROVED	DESIGNED	KPD	DATE 1-93
					DRAWN	WJH	DATE 1-93
					CHECKED	KPD	DATE 1-93
					APPROVED	LAK	DATE 1-93

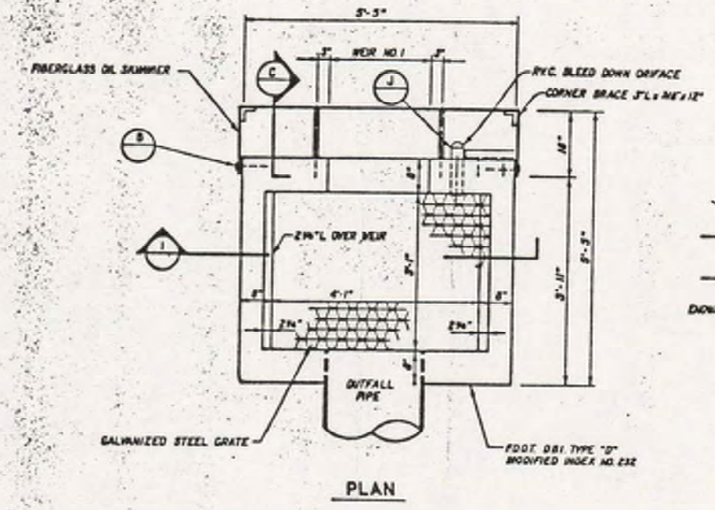
GLACE & RADCLIFFE, Inc.
Consulting Engineers, Planners & Surveyors

OSCEOLA PARKWAY
OSCEOLA COUNTY, FLORIDA

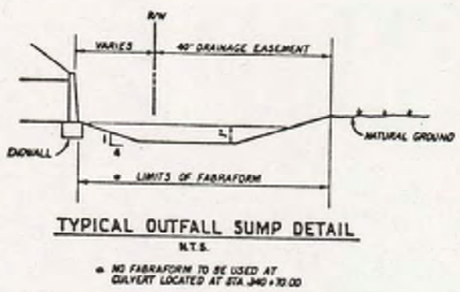
RETENTION PONDS "E" & "F"

JAN 1 0 1994

SCALE	SHEET NO.
1"=40'	37
JOB NO. 93503	OF



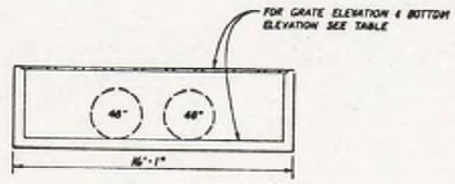
PLAN



TYPICAL OUTFALL SUMP DETAIL

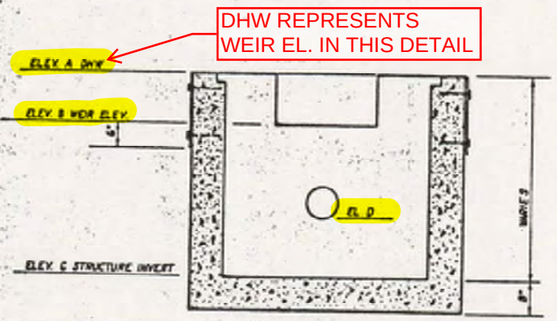
N.T.S.

* NO FABRAFORM TO BE USED AT CULVERT LOCATED AT STA. 340+70.00



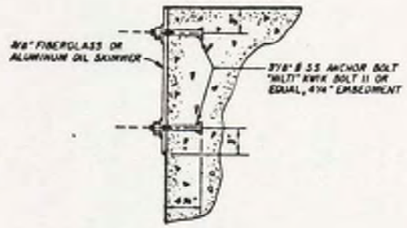
SECTION B-B

DHW REPRESENTS WEIR EL. IN THIS DETAIL

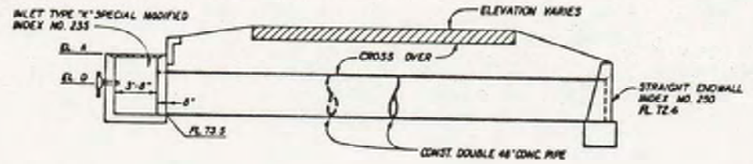


NOTE: REFER TO F.D.O.T. INDEX NO. 232 FOR CONC. REINFORCEMENT, ADDITIONAL NOTES AND DIMENSIONS

① SECTION



Ⓑ DETAIL

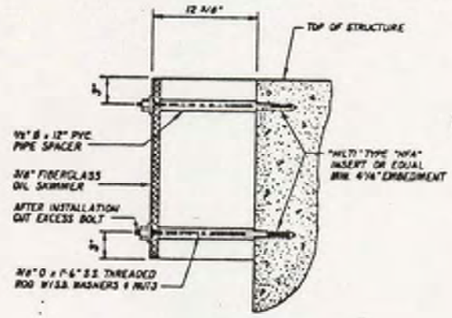


SECTION C-C

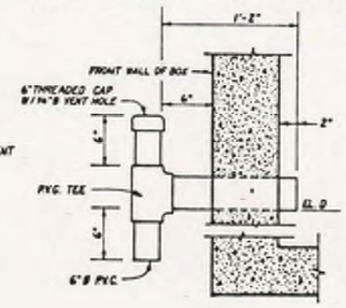
STRUCTURE NO.	WEIR NO. 1	WEIR NO. 2	WEIR NO. 3	ELEVATIONS A	B	C	D	PIPE SIZE	ORIFICE DIAM.
117	1.4"	N/A	N/A	83.80	82.60	81.10	82.30	18"	3"
119	1.1"	N/A	N/A	76.60	74.60	74.00	74.00	24"	3"
84A	1.75"	N/A	N/A	74.90	73.50	71.30	73.00	24"	3"
121	0.6"	N/A	N/A	76.40	73.70	71.70	72.50	24"	3"
125 *	16"	N/A	N/A	80.00	N/A	73.00	75.30	DBL. 48"	6"

* MODIFIED TYPE "K"

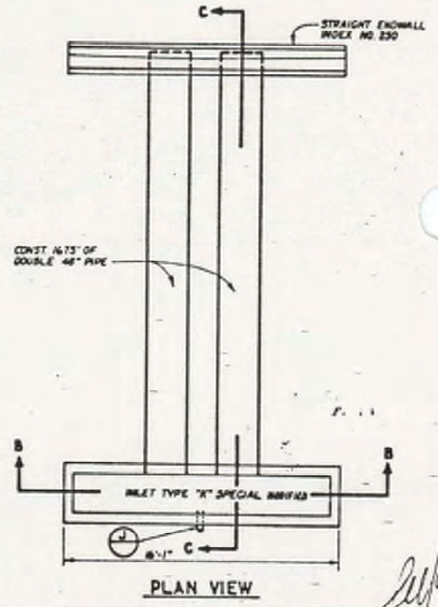
OUTFALL STRUCTURE TYPE II



Ⓒ DETAIL



Ⓙ DETAIL



PLAN VIEW

EXHIBIT 25

NO	BY	REVISIONS	DATE

DESIGNED — DATE
DRAWN — DATE
CHECKED — DATE
APPROVED — DATE

GLACE & RADCLIFFE, Inc.
Consulting Engineers, Planners & Surveyors

OSCEOLA PARKWAY
OSCEOLA COUNTY, FLORIDA

DRAINAGE DETAILS

SCALE: AS NOTED
JOB NO: 93503
SHEET NO: 38 OF

NOV 04 1993

SFWMD App. No. 150611-22/
Permit No. 49-00908-P
Orchid Bay/Storey Lake
(Basin 2)

Application #:	150611-22	**Permit#:**	49-00908-P	**Final Action Date:**	03-Aug-2015
Issuing Office:	ORL/SFWMD	**Permit Status:**	ACTIVE	**Application Status:**	Complete
Permit Type:	Environmental Resource (Construction/Operation Modification)			**Expiration Date:**	
Project Name:	Orchid Bay/Storey Lake			**Project Acres:**	16.29
Landuse(s):	Residential	**Location:**	Osceola S1,2/T25/R28		
Receiving Body:	Shingle Creek Via Existing On-Site Stormwater Pond				

Applicant: Osceola Trace L L C Patrick Bonin
4600 West Cypress Street Suite 200 Tampa FL 33607

Engr Consultant: Askey Hughey Incorporated James F Askey
25 East 13th St Ste 9 St Cloud FL 34769

Oper Entity: Storey Lake H O A Carlos De La Ossa
8390 Championsgate Blvd Championsgate FL 33896

Project Description:

Contact Email Id: permits@sfwmd.gov

Documents **List by date**

Document Type	Date Posted	Size	Seal Verified?

- **Applications(5)**
  - **Application Documents(3)**
  - **Correspondence(6)**
  - **Fee Information(1)**
  - **Legal Documents(2)**
  - **RAI Information(4)**
- **Calculations - Design Plans(5)**
  - **Calculations(2)**
  - **Maps(4)**
  - **Plans(5)**
  - **Reports(1)**
  - **Sealed Document Authentication(3)**
- **Compliance - Engineering(1)**
  - **Engineering Certification(3)**
- **Compliance - Other(1)**
- **Permit & Staff Report Information(1)**
  - **Permit(1)**
- **Wetland & Mitigation Information(1)**
  - **Maps(2)**

Close Me

Server : 24p

J-105
150611-22

PROJECT SUMMARY

Storey Lake, formally known as Lennar/US Homes at Legacy Resort within the Osceola Trace development, is currently under construction. Several recent Letter Modifications have been issued which document slight changes in layouts within various phases and confirm associated imperviousness.

This submittal is for a modification of the surface water management system serving 16.29 acres (13.73 ac for Phase 2 layout and 2.56 ac LEN POND 1 basin) of the I-300B drainage basin, which totals 190.12 acres. The purpose of this permit application is:

1. Elimination of the original 2.56 ac recreation area included in Phase 1A and replacement with a 2.56 ac wet detention pond to acquire additional fill. No water quality is proposed within this new wet detention pond (LEN POND 1) as 100% of the required water quality treatment is obtained within interconnected ponds I-300A and I-300B.
2. Revision to previously identified "Phase 2" referred to in Letter Modification Application 140807-22 to be now known as "Phase 3". This is simply a name change and reflects no design changes.
3. Revision to new "Phase 2" layout as shown in this modification application site plans.
4. Revision to Basin I-300B overall drainage basin area to reflect the new wet detention pond, LEN POND 1. Please refer to Table 4 in Tab 2.

As previously stated, all water quality treatment and peak flow attenuation are still being provided in interconnected ponds I-300A and I-300B, and outfall to Shingle Creek with no changes to the previously permitted control structures. No wetlands or surface waters are affected with this modification.

This project is located within Sections 1 and 2 of Township 25 South and Range 28 East. More specifically, the project is located south of Osceola Parkway, west of Shingle Creek, and east of SR 535.

A summary of the recent project/phase breakdown Letter Modification impervious/pervious, including the new Phase 2 and LEN Pond 1 proposed herein is as follows:

Basin I-300B Phase Talley Breakdown

	Phase Description	Phase Area (ac)	Impervious (ac)	Pervious (ac)
	Orchid Bay Lane Ph 1	9.10	3.24	5.86
(1)	Orchid Bay Ph 1A	8.20	5.31	2.89
	Orchid Bay Ph 1B1/1B2	17.53	13.15	4.38
(2)	Orchid Bay Ph 2	13.73	8.90	4.83
(3)	Orchid Bay Ph 3	15.19	8.84	6.35
	Storey Lake Blvd Ph 1	4.55	3.18	1.37
	Tract J	25.96	16.56	9.40
	Totals	94.26	59.18	35.08
(4)	Max Allowable	190.12	88.70	70.17

(1) This Phase includes Phase 1A and the new wet pond, LEN POND 1

(2) This is the current "Phase 2"

(3) This Phase 3 was f.k.a "Phase 2" in Letter Mod App 140807-22

(4) This shows the sum of Basin I-300B + Basin LEN POND 1 being modified herewith

TABLE 1
LENNAR / US HOMES AT LEGACY RESORT
PERMIT SUMMARY SHEET

150611-22

LOCATION: OSCEOLA COUNTY, S1,2/T25S/R28E

OWNER: OSCEOLA TRACE LLC
L E N O T HOLDINGS LLC

ENGINEER: ASKEY HUGHEY, INC.

PROJECT AREA: 16.29 AC **DRAINAGE AREA:** 511.3 AC

PROJECT USE: COMMERCIAL TOURIST

EXISTING: The site is presently under construction through previously approved permits and permit modifications. This site is located west of Shingle Creek, east of SR 535 and south of Osceola Parkway in Osceola County, Florida.

PROPOSED: Modification of the previously issued permit for a portion of the surface water management known as Basin I-300B, which totals 190.12 acres of the entire 511.3 acres drainage area. The purpose of this permit application is:

1. Elimination of the original 2.56 ac recreation area included in Phase 1A and replacement with a 2.56 ac wet detention pond to acquire additional fill. No water quality is proposed within this new wet detention pond (LEN POND 1) as 100% of the required water quality treatment is obtained within interconnected ponds I-300A and I-300B. This is consistent with the original permit and all subsequent modifications.
2. Revision to previously identified "Phase 2" referred to in Letter Modification Application 140807-22 to be now known as "Phase 3". This is simply a name change and reflects no design changes.
3. Revision to new "Phase 2" layout as shown in this modification application site plans.
4. Revision to Basin I-300B overall drainage basin area to reflect the new wet detention pond basin, LEN POND 1. This is simply a reduction in area of Basin I-300B from 190.12 ac to 187.56 ac due to the removal of 2.56 ac, which is now new Basin LEN POND 1.

All water quality treatment and peak flow attenuation is still being provided in interconnected ponds I-300A and I-300B, and outfall to Shingle Creek with no changes to the previously permitted control structures. No wetlands or surface waters are affected with this modification.

DRAINAGE BASIN: SHINGLE CREEK

RECEIVING BODY: SHINGLE CREEK

LOCAL ROAD CRITERIA: 10-YEAR/24-HOUR STORM

BASIN DESIGN FREQUENCY: 10-YEAR/72-HOUR STORM

TABLE 2 (CONT'D)

LENNAR / US HOMES AT LEGACY RESORT
DISCHARGE STRUCTURE TABLE

STRUCTURE NAME	*DS-LEN POND 1 (NEW THIS MOD)*
OVERFLOW DEVICE	TYPE H INLET
'C'	3.20
Length	37"
Width	49"
Crest Elevation	79.6
OUTFALL CULVERT	18" RCP
Length	440'
Upstream Invert Elev.	75.56
Downstream Invert Elev.	70.00

AHI NO. AH05026
5/8/2015

TABLE 3
LENNAR / STOREY LAKE
STAGE VS. STORAGE

Pond Number	Stage (fmsl)	Area (acres)	Storage (ac-ft)
LEN Pond 1 (MOD THIS APPLICATION)	79.6	1.83	0.00
	80.0	1.88	0.74
	81.0	2.00	2.68
	82.0	2.13	4.75
	83.0	2.26	6.94
	84.0	2.56	9.35
I-300A (NO MOD PROPOSED)	73	33.35	0.00
	74	34.04	33.70
	75	34.75	68.09
	76	35.46	103.20
	77	36.17	139.01
	78	36.88	175.54
	79	38.32	213.14
I-300B (NO MOD PROPOSED)	73	29.43	0.00
	74	31.09	30.26
	75	32.75	62.18
	76	34.42	95.77
	77	36.10	131.03
	78	37.77	167.96
	79	41.14	207.42
I-300C (NO MOD PROPOSED)	74	2.30	0.00
	75	2.64	2.47
	76	2.82	5.20
	77	3.00	8.11
	78	3.41	11.32
	79	4.38	15.21

AHI NO. AH05026
5/8/2015

TABLE 4
LENNAR / STOREY LAKE
DRAINAGE BASIN TABLE

BASINS WITHIN PREVIOUS APPROVED MODIFICATION (APP NO. 060815-19):

Basin ID	Impervious (acres)	Water Management (acres @NWL)	Pervious (acres)	TOTAL (acres)
POND 1	14.30	1.50	11.62	27.42
POND I-300M	25.01	0.00	23.07	48.08
I-300A [1]	50.77	33.35	26.73	110.85
I-300B	89.51	29.43	71.18	190.12
I-300C [2]	6.96	2.30	6.00	15.26
H-100	0.00	0.00	0.88	0.88
J-100	0.00	0.00	2.00	2.00
			Total:	394.61

[1] Imperviousness (20.31 ac Housepads, 0 ac S/W, 30.46 ac Pvm't, C/G, D/W) from previous Mod
[2] Imperviousness (0 ac Housepads, 0 ac S/W, 6.96 ac Pvm't, C/G, D/W) from previous Mod

PROPOSED MODIFICATION TO BASIN I-300B:

Below refelcts the proposed revision to Drainage Basin I-300B based upon the current plans for Development. The addition of Basin LEN Pond 1 reduces the basin area/impervious/pervious areas of Basin I-300B by the same amount. All water quality is still obtained within interconnected ponds I-300A and I-300B per original permit and subsequent permit modifications.

This modification adresses the following:

1. Elimination of Ph 1A Rec Area and replacement with wet pond (LEN Pond 1) to acquire fill dirt.
2. Revision of Letter Mod App. 140807-22 "Phase 2" label to "Phase 3".
3. Reflects revision to layout of new "Phase 2" and associated impervious/pervious areas within this "Phase 2".
4. Reflects reduction in Basin I-300B area by the same area as the new Basin LEN Pond 1

BASIN I-300B THIS MODIFICATION:			NEW BASIN LEN POND 1 THIS MODIFICATION:	
Impervious			Impervious	
Housepads	31.39		Housepads	0.00
Sidewalks	0.00		Sidewalks	0.00
Pav't, C/G, D/W	57.30		Pav't, C/G, D/W	0.00
Sub-Total	88.70		Sub-Total	0.00
Water Management			Water Management	
Wet (@NWL)	29.43		Wet (@NWL)	1.83
Pervious	69.44		Pervious	0.73
TOTAL	187.56	[1]	TOTAL	2.56
No. of Dwelling Units:	1024		No. of Dwelling Units:	0

[1] The sum of modified BASIN I-300B + new BASIN LEN POND 1 = 190.12 ac which equals the original I-300B area.

AHI NO. AH05026
Revised 5/8/2015

TABLE 5
LENNAR / STOREY LAKE
POST DEVELOPMENT HYDROLOGIC DATA

Rainfall

10 Year / 72 Hour 9.6 Inches
100 Year / 72 Hour 14.4 Inches

Hydrologic Data

Basin No.		Node No.	Total Drainage Area (ac)	(Use HSG "D") CN = 80 Type A/D, B/D	CN = 98 Impervious	Water Surface @ NWL	Weighted Runoff CN	Time of Conc. (minutes)
I-300A		I-300A	110.85	26.73	50.77	33.35	94	30
I-300B	(3)	I-300B	187.56	69.44	88.70	29.43	92	30
POND 1	(1)	POND 1	27.42	11.92	14.30	1.20	90	25
POND I-300M	(1)	I-300B	48.08	23.07	25.01	0.00	89	25
I-300C		I-300C	15.26	6.00	6.96	2.30	91	15
LEN Pond 1	(3)	LEN Pond 1	2.56	0.73	0.00	1.83	94	15
		TOTAL	**391.73**	(2)				

(1) Basins POND 1 and POND I-300M are included in this table because they are routed to Basin I-300A in the ICPR model. Basins POND 1 and POND I-300M ARE NOT being modified with this application.

(2) When basins POND 1 and I-300M are added in, the total is 391.73 acres. Excluding these 2 basins (27.42 acres and 48.08 acres) yields 316.23 acres, which is the total basin area that was previously modified in Application 060815-19.

(3) I-300B basin being modified and basin LEN Pond 1 being added this modification

AHI NO. AH05026
5/8/2015

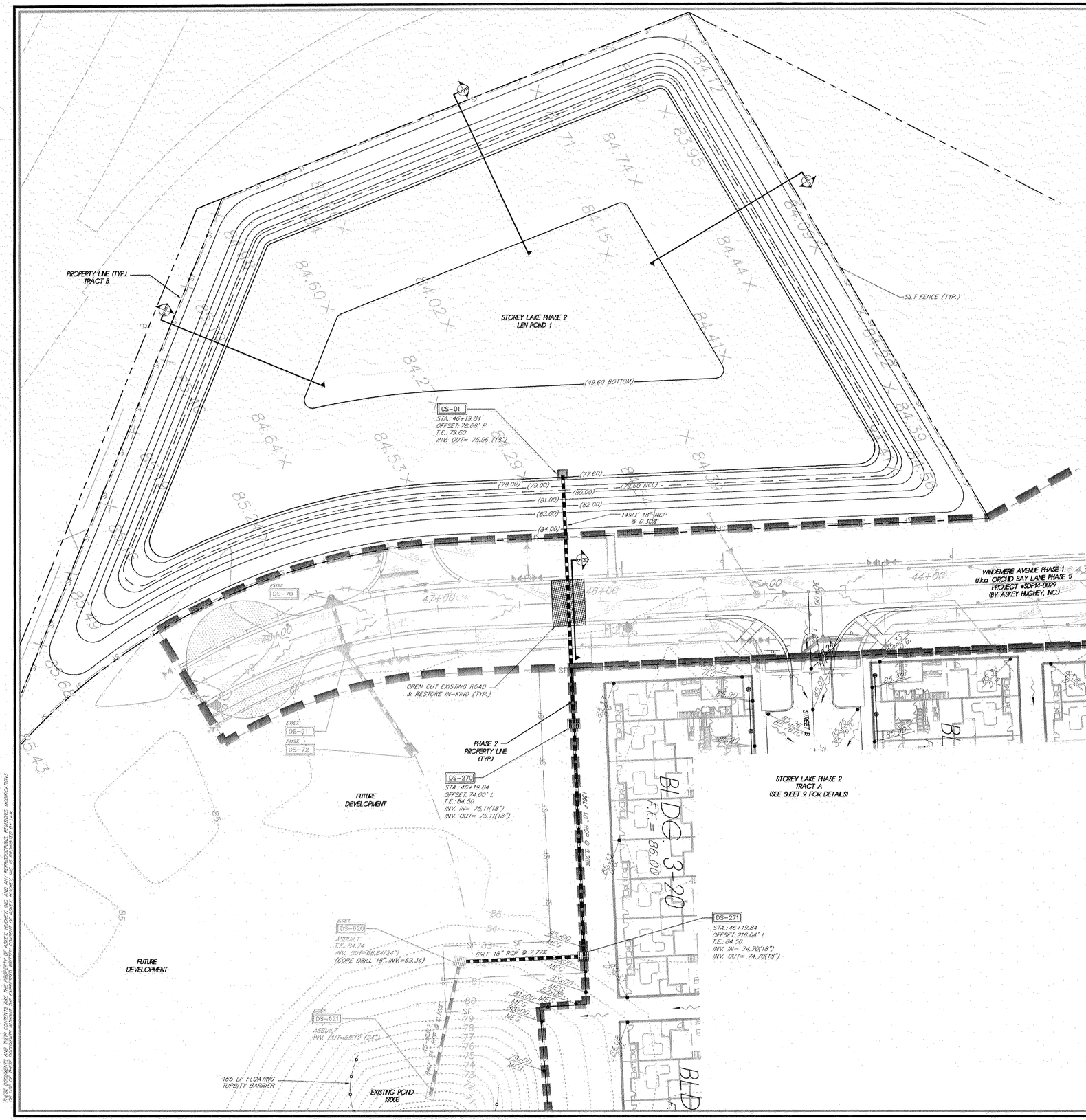
TABLE 9
LENNAR / STOREY LAKE
SUMMARY OF PEAK DISCHARGES AND STAGES

PEAK STAGE COMPARISON BETWEEN THE UPDATED MODEL AND THE PREVIOUS PERMIT RESULTS									
	10 Year / 24 Hour			10 Year / 72 Hour			100 Year / 72 Hour		
	Previous	Permit		Previous	Permit		Previous	Permit	
Node Name	Mod	Modification	Difference	Mod	Modification	Difference	Mod	Modification	Difference
A	75.67	75.67	0.00	75.67	75.67	0.00	76.32	76.32	0.00
B	73.32	73.32	0.00	73.32	73.32	0.00	76.15	76.15	0.00
BYPASS1	74.37	74.37	0.00	74.37	74.37	0.00	76.66	76.66	0.00
BYPASS2	73.84	73.84	0.00	73.84	73.84	0.00	76.55	76.55	0.00
C	74.49	74.48	0.01	74.49	74.48	0.01	76.43	76.43	0.00
H-100	73.43	73.43	0.00	73.43	73.43	0.00	76.13	76.13	0.00
I-300A	76.07	76.07	0.00	76.07	76.07	0.00	77.80	77.80	0.00
I-300B	76.19	76.19	0.00	76.19	76.19	0.00	78.79	78.79	0.00
I-300C	76.39	76.39	0.00	76.39	76.39	0.00	77.72	77.72	0.00
LEN POND 1	N/A	79.85	New	N/A	79.85	New	N/A	79.98	New
K-100	73.42	73.42	0.00	73.42	73.42	0.00	76.17	76.17	0.00
POND1	77.74	77.74	0.00	77.74	77.74	0.00	80.58	80.58	0.00
SHINGLE	73.30	73.30	0.00	73.30	73.30	0.00	76.10	76.10	0.00
535N-10	84.35	84.33	0.02	84.35	84.33	0.02	86.58	86.51	0.07
535N-20	83.04	83.03	0.01	83.04	83.03	0.01	84.03	84.01	0.02
535N-30	81.52	81.52	0.00	81.52	81.52	0.00	82.29	82.27	0.02
535N-60	76.39	76.37	0.02	76.39	76.37	0.02	77.24	77.23	0.01
535N-90	83.45	83.46	-0.01	83.45	83.46	-0.01	84.04	84.01	0.03
OS-K	77.81	77.81	0.00	77.81	77.81	0.00	77.91	77.91	0.00
SOL2	79.11	79.11	0.00	79.11	79.11	0.00	80.09	80.09	0.00
WETLAND	76.51	76.51	0.00	76.51	76.51	0.00	76.68	76.68	0.00
OP-A	83.68	83.68	0.00	83.68	83.68	0.00	84.20	84.20	0.00
OP-W	82.57	82.57	0.00	82.57	82.57	0.00	83.00	83.00	0.00

AHI NO. AH05026
5/8/2015

TABLE 9 (CONT'D)
LENNAR / STOREY LAKE
SUMMARY OF PEAK DISCHARGES AND STAGES

PEAK DISCHARGE COMPARISON BETWEEN THE UPDATED MODEL AND THE PREVIOUS PERMIT RESULTS									
	10 Year / 24 Hour			10 Year / 72 Hour			100 Year / 72 Hour		
Node Name	Previous Permit Mod	Permit Modification	Difference	Previous Permit Mod	Permit Modification	Difference	Previous Permit Mod	Permit Modification	Difference
A-B	96.79	96.88	-0.09	96.79	96.88	-0.09	317.07	317.05	0.02
DS-1300A	14.06	14.06	0.00	14.06	14.06	0.00	43.20	43.16	0.04
DS-1300B	14.06	14.06	0.00	14.06	14.06	0.00	43.20	43.16	0.04
DS-1300C	14.06	14.06	0.00	14.06	14.06	0.00	43.20	43.16	0.04
DS-1300D	14.06	14.06	0.00	14.06	14.06	0.00	43.20	43.16	0.04
DS-1300E	14.06	14.06	0.00	14.06	14.06	0.00	43.20	43.16	0.04
DS-POND1	25.05	25.05	0.00	25.05	25.05	0.00	28.59	28.59	0.00
DS-I300C	8.90	8.90	0.00	8.90	8.90	0.00	20.66	20.67	-0.01
DS-LEN POND 1	N/A	5.83	New	N/A	5.83	New	N/A	7.03	New
EC-C	66.47	65.95	0.52	66.47	65.95	0.52	102.43	101.64	0.79
RC-A	272.40	272.44	-0.04	272.40	272.44	-0.04	259.58	259.91	-0.33
RC-B	162.70	163.50	-0.80	162.70	163.50	-0.80	393.94	394.27	-0.33
RC-BYPSS	391.13	390.17	0.96	391.13	390.17	0.96	623.91	622.37	1.54
RC-H100	365.40	365.34	0.06	365.40	365.34	0.06	392.99	392.86	0.13
RW-K100	98.18	98.13	0.05	98.18	98.13	0.05	171.19	171.08	0.11
TC-BYPSS	101.68	101.61	0.07	101.68	101.61	0.07	165.40	165.34	0.06
WETLAND	198.58	198.64	-0.06	198.58	198.64	-0.06	303.05	303.13	-0.08
DS-OSK1	7.92	7.92	0.00	7.92	7.92	0.00	12.13	12.13	0.00
DS-OSK2	7.92	7.92	0.00	7.92	7.92	0.00	12.13	12.13	0.00
DS-OSK3	7.92	7.92	0.00	7.92	7.92	0.00	12.13	12.13	0.00
DS-OSK4	7.92	7.92	0.00	7.92	7.92	0.00	12.13	12.13	0.00
DS-SOL2	4.39	4.39	0.00	4.39	4.39	0.00	8.13	8.13	0.00
535R-10	61.88	61.61	0.27	61.88	61.61	0.27	86.19	85.37	0.82
535R-20	95.84	95.30	0.54	95.84	95.30	0.54	130.36	129.79	0.57
535R-30	96.25	95.73	0.52	96.25	95.73	0.52	127.82	127.40	0.42
535R-60	96.20	95.69	0.51	96.20	95.69	0.51	127.84	127.42	0.42
535R-80	1.85	1.87	-0.02	1.85	1.87	-0.02	3.98	3.93	0.05
CC-OPW	5.97	5.97	0.00	5.97	5.97	0.00	9.68	9.68	0.00
DS-OPA	5.35	5.35	0.00	5.35	5.35	0.00	8.72	8.72	0.00



NORTH
(ELEVATION DATUM N.G.V.D. 1929)

LEGEND

- = ELEV. SLAB DIR GRADE
- = ELEV. MATCH EXISTING GRADE
- = TOP OF CURB
- = SPOT ELEVATION
- = EXISTING ELEVATION
- = ADJACENT PROJECT DESIGN ELEVATION
- = DRAINAGE FLOW
- = SLOPE
- = SOIL BORING
- = SWALE
- = PROPOSED CURB INLETS, D.B.I. INLETS, MANHOLE, STORM PIPING AND MITERED END SECTION
- DS-1 = PROPOSED DRAINAGE STRUCTURE NUMBER
- YD-00 = PROPOSED YARD DRAIN NUMBER
- = PROPOSED DRAINAGE SWALE & FLOW DIRECTION
- = EXISTING GROUND CONTOUR
- =EXISTING STORM DRAIN, CURB INLET, MANHOLE DITCH BOTTOM INLET
- PP = POWER POLE
- = PROPOSED UNDERDRAIN AND CLEANOUT
- SF = PROPOSED SILT FENCE
- = PROPOSED FLOATING TURBITY BARRIER
- = PROPOSED ORANGE SAFETY BARRIER

POST-DEVELOPMENT POND ELEVATIONS					
POND ID#	N.C.L.	10 YR./24 HR.	10 YR./72 HR.	100 YR./72 HR. (SFWMD)	POND BOTTOM
LEN POND 1	79.60	79.85	79.85	79.98	49.60

NOTES:

1. ELEVATIONS SHOWN FOR EACH BUILDING PAD REPRESENT THE DESIGNED FINISH FLOOR ELEVATION. CONTRACTOR SHALL CONSTRUCT FINISHED PAD GRADE 8" BELOW THE FINISHED FLOOR ELEVATION AND COMPACT TO 95% OF MODIFIED PROCTOR AASHTO T-180.

2. THE SIZE AND LOCATION OF THE BUILDING PADS SHOWN ARE FOR GRADING PURPOSES ONLY. ACTUAL LOCATION OF HOUSE FOOTPRINT SHALL BE STAKED OUT BY OTHERS.

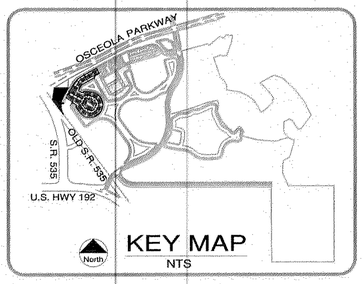
3. TOPOGRAPHIC INFORMATION SHOWN ON THIS PLAN HAS BEEN PREPARED BY A FL. REGISTERED SURVEYOR. CONTRACTOR SHALL NOTIFY THE OWNER IN WRITING OF ANY DISCREPANCIES PRIOR TO THE COMMENCEMENT OF WORK.

4. THE BUILDINGS SHOULD BE CONSTRUCTED WITHIN THE BUILDING PAD SHOWN AND TO THE DESIGN FINISHED FLOOR ELEVATION. IF THE BUILDER DESIRES ALTERNATE LOCATION OR BUILD A LARGER BUILDING THAN THE ENVELOPE PROVIDED; THE PROPOSED CHANGES MUST BE RESUBMITTED TO OSCEOLA COUNTY FOR APPROVAL. SHOULD THE BUILDER DESIRE TO CHANGE THE LOT GRADING AND/OR FINISHED FLOOR ELEVATIONS SHOWN, THE THE BUILDER SHALL PROVIDE FINAL LOT GRADES THAT PROVIDE POSITIVE DRAINAGE AWAY FROM THE BUILDING, AND MEET FHA GRADING REQUIREMENTS AND DO NOT HAVE AN ADVERSE IMPACT TO ADJACENT BUILDINGS/AMENITIES.

5. ALL STORMWATER PIPE JOINTS SHALL BE FILTER FABRIC WRAPPED PER FDOT #280.

6. ALL ELEVATIONS REFERENCE 1929 NGVD DATUM.

SILT FENCE NOTE:
SILT FENCE INSTALLATION SHALL BE ACCOMPLISHED PRIOR TO THE COMMENCEMENT OF CLEARING AND SHALL REMAIN IN PLACE AS SHOWN ON PLANS AND BE MAINTAINED BY CONTRACTOR UNTIL SUCH TIME THAT CONSTRUCTION IS DEEMED COMPLETE AND ADJACENT/ABUTTING GRADES HAVE BEEN STABILIZED.



Askey Hughey, Inc.
Civil Engineering / Land Planning
Certificate of Authorization Number: 26233
25 E. 13th Street Suite 9, St. Cloud, Fl 34769
Phone: (407) 957-3308 • Fax: (407) 957-1019

REVISIONS

NO.	DATE	DESCRIPTION	BY

PAVING, GRADING & DRAINAGE PLAN

STOREY LAKE PHASE 2
LENNAR HOMES, LLC

SEC 18&2, TWP 25S, RNG 28E
OSCEOLA COUNTY, FLORIDA

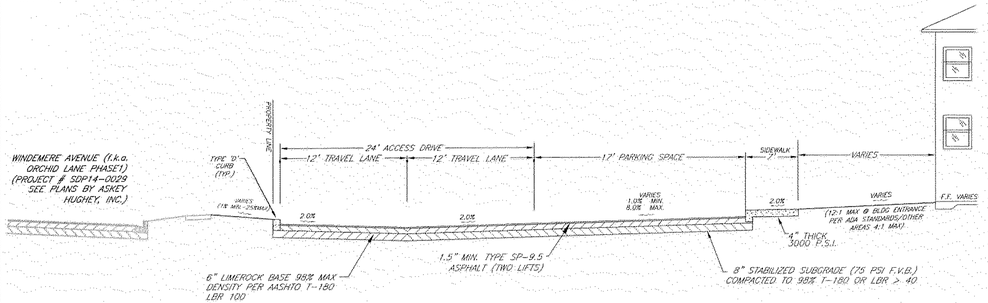
PROJECT NO./FILE NAME: 05026-PH2-SF-09-10.PGD	DSGN: JFA
AH JOB #: AH05026	DRWN: CJF
SCALE: 1"=30'	CHKD: JFA

SCALE BAR
0 60'

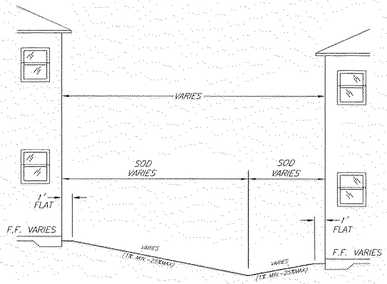
JAMES F. ASKEY, JR. — STATE OF FLORIDA — PROFESSIONAL ENGINEER — INFORMATIONAL ONLY NOT VALID WITHOUT ORIGINAL SIGNATURE AND EMBOSSED SEAL

APPROVED
JAMES F. ASKEY, JR. P.E.
FL. REG. NO. 45134
DATE JUN 1 1 2013

SHEET NO. 10
OF 15



TYPICAL SECTION - A
NTS



TYPICAL SECTION - B
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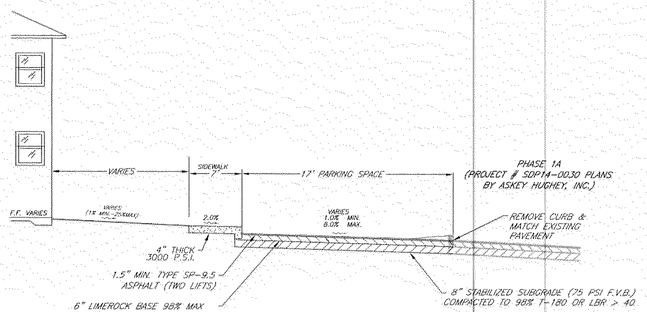

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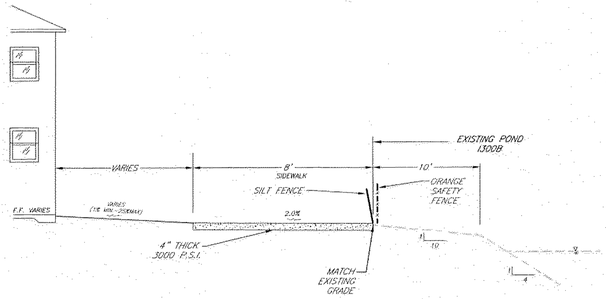

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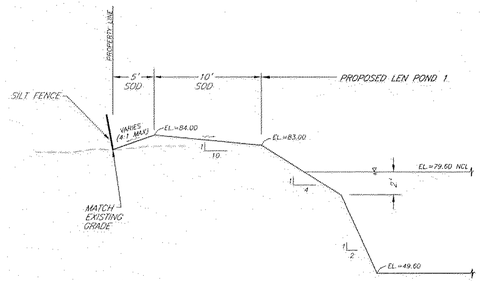
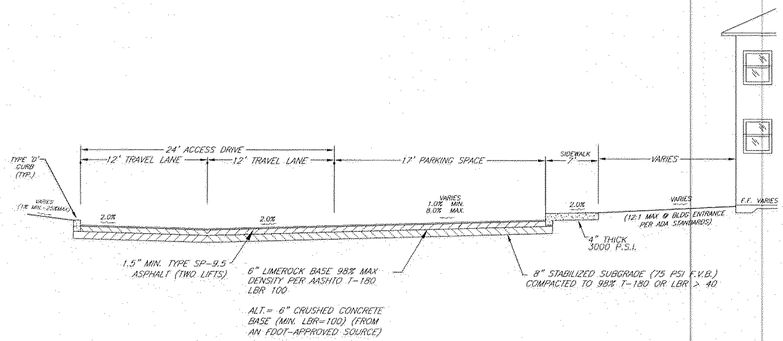


TYPICAL POND SECTION - E
NTS



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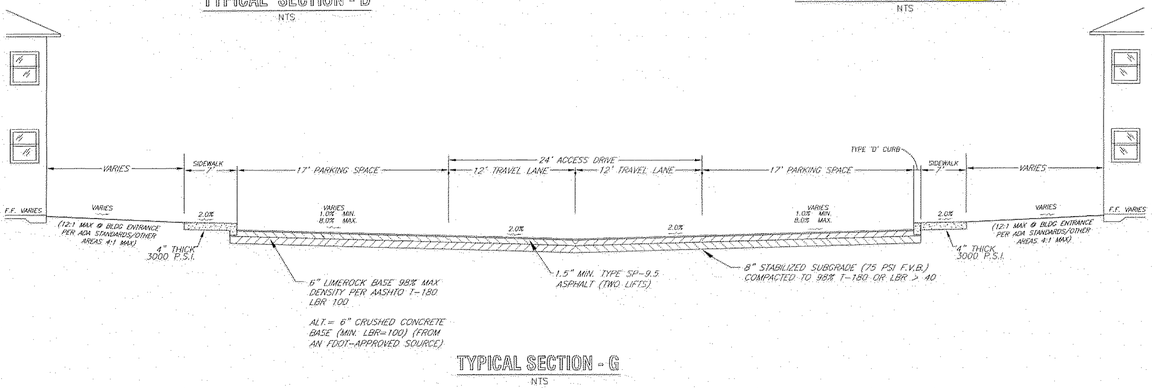

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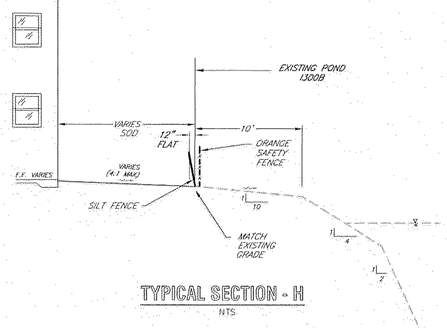

TYPICAL SECTION - H
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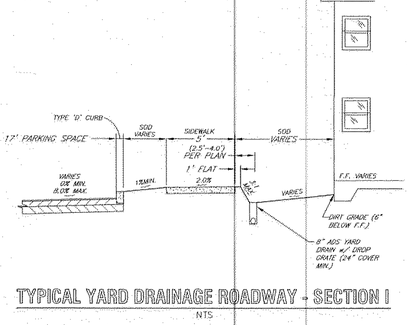
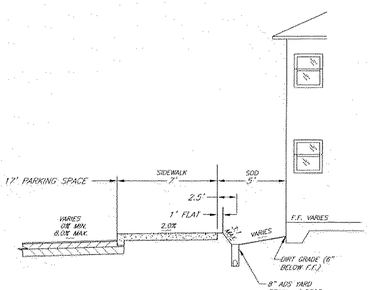
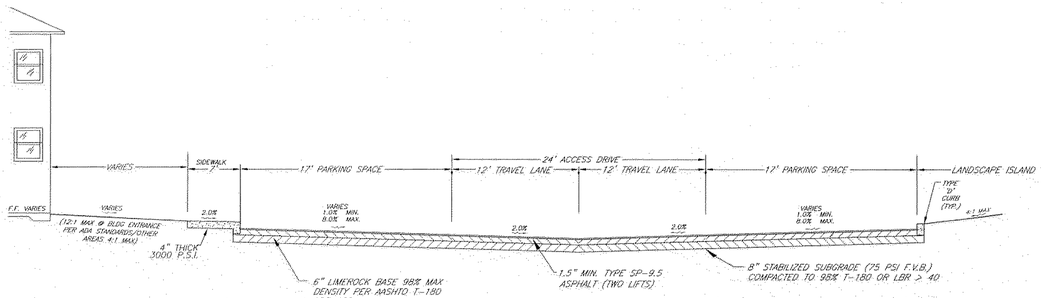


TYPICAL YARD DRAINAGE ROADWAY - SECTION I
NTS



TYPICAL YARD DRAINAGE FRONT PARKING - SECTION J
NTS



TYPICAL SECTION - K
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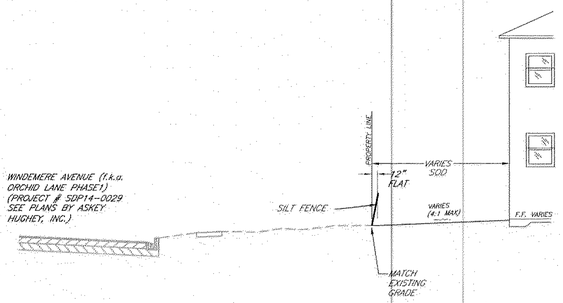


TYPICAL SECTION - L
NTS

Askey Hughey, Inc.
Civil Engineering / Land Planning
Certificate of Authorization Number: 26233
25 E. 13th Street Suite 9, St. Cloud, Fl 34769
Phone: (407) 957-3308 • Fax: (407) 957-1019

REVISIONS

NO.	DATE	DESCRIPTION	BY

CROSS SECTION DETAILS

STOREY LAKE PHASE 2
LENNAR HOMES, LLC

SEC 18Z, TWP 25S, RNG 28E
OSCEOLA COUNTY, FLORIDA

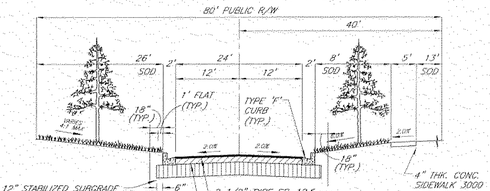
PROJECT NO./FILE NAME: 05026-PH2-SF-05 CROSS	DSGN: JFA
AH JOB #: AH05026	DRWN: CJF
SCALE: N.T.S.	CHKD: JFA
SCALE BAR: 0 N/A N/A	

INFORMATIONAL COPY ONLY, UNLESS EMBOSSED WITH PROFESSIONAL ENGINEERS SEAL

JAMES F. ASKEY, P.E. APPROVED BY LICENSED PROFESSIONAL ENGINEER STATE OF FLORIDA
JAMES F. ASKEY, P.E.
FL REG. NO. 45133
DATE: JUN 1 2015

SHEET NO. 5 OF 15

NOTE: 1. SOD ALL DISTURBED AREAS WITHIN R/W.
2. ALL LOTS ABUTTING R/W SHALL HAVE A 10' UTILITY/DRAINAGE EASEMENT.
3. PLACEMENT OF TREES SHALL BE AS SHOWN ON LANDSCAPE PLANS.



* ALTERNATE BASE NOTE
9" SOIL CEMENT BASE DESIGN 250-300 PSI IN 7 DAYS

WINDEMERE AVENUE PHASE 1
(f.k.a. ORCHID BAY LANE PHASE 1)
PROJECT #SDP14-0029
(BY ASKEY HUGHEY, INC.)

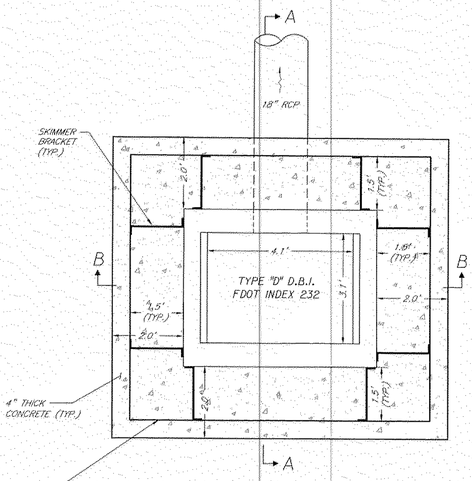
STA.: 43+60.28 - 48+59.08

TYPICAL R/W ROADWAY w/24' PAVEMENT - SECTION M

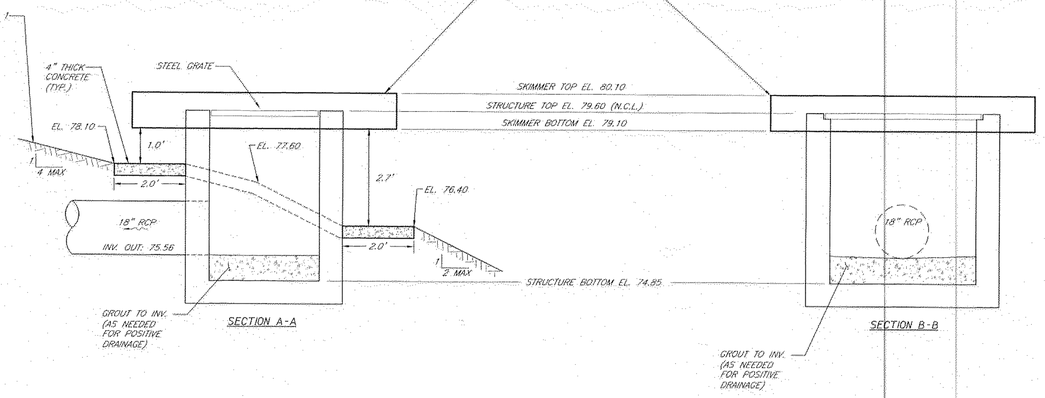
NTS

NOTES:

1. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS TO BE REVIEWED BY ENGINEER FOR ALL DRAINAGE STRUCTURES BEFORE FABRICATION.
2. STRUCTURE TO INCLUDE GRATES AND CHAINS.
3. CONTRACTOR SHALL SET A BRASS DISK BENCH MARK ON TOP OF OUTFALL STRUCTURE.
4. SKIMMER TO BE MOUNTED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.
5. FIBERGLASS SKIMMER TO BE GREY IN COLOR.



PLAN



CONTROL STRUCTURE CS-01 (LEN POND 1)

1"=2'-0"

Askey Hughey, Inc.
Civil Engineering / Land Planning
Certificate of Authorization Number: 26233
25 E. 13th Street Suite 9, St. Cloud, Fl 34769
Phone: (407) 957-3308 • Fax: (407) 957-1019

REVISIONS

NO.	DATE	DESCRIPTION	BY

CONTROL STRUCTURE DETAILS

STOREY LAKE PHASE 2
LENNAR HOMES, LLC

SEC 18&2, TWP 25S, RNG 28E
OSCEOLA COUNTY, FLORIDA

PROJECT NO./FILE NAME	DSGN
05026-PH2-SF-06-CNTRL	JFA
AH JOB #	DRWN
AH05026	CJF
SCALE	CHKD
AS NOTED	JFA

SCALE BAR
0 2 4

INFORMATIONAL USE ONLY UNLESS EMBOSSED WITH PROFESSIONAL ENGINEER SEAL

APPROVED BY:
JAMES F. ASKEY, P.E.
FL. REG. NO. 45134
DATE: JUN 1 1 2015

SHEET NO.
6
OF 15

15061 1-22

POST–DEVELOPMENT HYDROGRAPH and ROUTING 10-Year/72-Hour (*Design & Roads*)

```
           Basin Name: KOA
           Group Name: OFFSITE
           Simulation: 10YR72HR
            Node Name: WETLAND
           Basin Type: SCS Unit Hydrograph

      Unit Hydrograph: UH256
        Peaking Fator: 256.0
  Spec Time Inc (min): 3.33
  Comp Time Inc (min): 3.33
         Rainfall File: SFWMD72
Rainfall Amount (in): 9.600
Storm Duration (hrs): 72.00
               Status: Offsite
  Time of Conc (min): 25.00
    Time Shift (hrs): 0.00
           Area (ac): 34.150
Vol of Unit Hyd (in): 1.000
        Curve Number: 92.000
           DCIA (%): 0.000

      Time Max (hrs): 60.11
      Flow Max (cfs): 98.35
  Runoff Volume (in): 8.627
Runoff Volume (ft3): 1069437
```

```
           Basin Name: LEN POND 1
           Group Name: BASE
           Simulation: 10YR72HR
            Node Name: LEN POND 1
           Basin Type: SCS Unit Hydrograph

      Unit Hydrograph: Uh484
        Peaking Fator: 484.0
  Spec Time Inc (min): 2.00
  Comp Time Inc (min): 2.00
         Rainfall File: SFWMD72
Rainfall Amount (in): 9.600
Storm Duration (hrs): 72.00
               Status: Onsite
  Time of Conc (min): 15.00
    Time Shift (hrs): 0.00
           Area (ac): 2.560
Vol of Unit Hyd (in): 1.001
        Curve Number: 94.000
           DCIA (%): 0.000

      Time Max (hrs): 60.00
      Flow Max (cfs): 12.04
  Runoff Volume (in): 8.862
Runoff Volume (ft3): 82356
```

```
           Basin Name: OP-A
           Group Name: OSCPKWY
           Simulation: 10YR72HR
            Node Name: OP-A
           Basin Type: SCS Unit Hydrograph

      Unit Hydrograph: UH256
        Peaking Fator: 256.0
  Spec Time Inc (min): 3.12
  Comp Time Inc (min): 3.12
         Rainfall File: SFWMD72
Rainfall Amount (in): 9.600
Storm Duration (hrs): 72.00
               Status: Offsite
  Time of Conc (min): 23.40
    Time Shift (hrs): 0.00
           Area (ac): 10.930
Vol of Unit Hyd (in): 1.000
        Curve Number: 92.000
           DCIA (%): 0.000

      Time Max (hrs): 60.11
      Flow Max (cfs): 32.56
  Runoff Volume (in): 8.624
Runoff Volume (ft3): 342175
```

DHW

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
535N-10	535	10YR24HR	15.10	85.25	86.00	0.0031	113458	13.50	95.82	15.23	73.56
535N-20	535	10YR24HR	14.83	83.40	84.00	0.0014	71735	14.24	115.91	14.69	113.48
535N-30	535	10YR24HR	15.22	81.73	84.00	0.0009	109960	14.61	114.99	15.21	113.33
535N-60	535	10YR24HR	15.28	76.85	77.00	0.0024	10598	15.21	113.33	15.28	113.31
535N-90	535	10YR24HR	13.22	83.48	85.00	0.0006	31376	12.00	10.34	13.66	2.09
A	BASE	10YR24HR	13.51	75.87	76.10	0.0016	7017	13.50	488.23	13.51	488.21
B	BASE	10YR24HR	13.50	73.34	76.10	0.0050	7876	13.50	238.68	13.50	238.67
BYPASS1	BASE	10YR24HR	12.44	74.91	77.00	0.0031	35582	12.25	147.12	12.51	142.32
BYPASS2	BASE	10YR24HR	12.41	74.38	77.00	0.0027	187445	12.25	602.35	12.41	548.45
C	BASE	10YR24HR	13.03	74.98	76.10	0.0031	5394	13.00	91.96	13.03	91.72
H-100	BASE	10YR24HR	14.04	73.47	77.00	0.0198	22608	14.04	414.91	14.04	414.90
I-300A	BASE	10YR24HR	18.03	76.14	80.00	0.0015	1548943	12.25	854.20	18.03	73.74
I-300B	BASE	10YR24HR	14.15	76.27	80.00	0.0019	1518870	12.25	1484.84	12.65	136.39
I-300C	BASE	10YR24HR	13.21	76.57	80.00	0.0014	127321	12.00	86.35	13.21	14.26
K-100	BASE	10YR24HR	12.17	73.53	76.10	0.0008	580529	12.00	236.28	12.17	140.67
LEN POND 1	BASE	10YR24HR	12.27	79.95	84.00	0.0004	81708	12.00	22.78	12.27	9.46
OP-A	OSCPKWY	10YR24HR	14.14	83.77	86.00	0.0009	163433	12.25	49.32	14.10	5.89
OP-W	OSCPKWY	10YR24HR	15.69	82.69	84.00	0.0007	154097	12.00	48.86	15.69	6.92
OS-K	OFFSITE	10YR24HR	12.26	77.91	80.00	0.0004	7218	12.25	49.36	12.26	48.93
POND1	BASE	10YR24HR	12.88	78.60	78.00	0.0039	93628	12.25	167.09	12.59	30.88
SHINGLE	BASE	10YR24HR	0.00	73.30	77.00	0.8000	8668	12.75	1213.52	0.00	0.00
SOL2	OFFSITE	10YR24HR	12.83	79.50	80.00	0.0020	38325	12.00	37.58	12.83	5.98
WETLAND	OFFSITE	10YR24HR	12.08	76.64	78.00	0.0025	4356	12.08	281.28	12.08	281.28
535N-10	535	10YR72HR	62.77	84.33	86.00	0.0029	100023	61.58	74.79	62.90	61.61
535N-20	535	10YR72HR	62.59	83.03	84.00	0.0013	64487	62.16	96.60	62.52	95.30
535N-30	535	10YR72HR	62.84	81.52	84.00	0.0009	108280	62.50	96.54	62.84	95.73
535N-60	535	10YR72HR	62.92	76.37	77.00	0.0024	11743	62.84	95.73	62.92	95.69
535N-90	535	10YR72HR	61.02	83.46	85.00	0.0005	31301	60.08	7.56	61.02	1.87
A	BASE	10YR72HR	61.51	75.67	76.10	0.0010	7016	61.50	369.34	61.51	369.33
B	BASE	10YR72HR	61.70	73.32	76.10	-0.0050	7876	61.50	137.25	61.70	163.50
BYPASS1	BASE	10YR72HR	60.35	74.37	77.00	0.0031	32265	60.25	103.39	60.37	101.61
BYPASS2	BASE	10YR72HR	60.28	73.84	77.00	0.0027	167151	60.17	405.90	60.28	390.17
C	BASE	10YR72HR	61.00	74.48	76.10	0.0031	5485	60.92	65.97	61.00	65.95
H-100	BASE	10YR72HR	62.01	73.43	77.00	0.0198	22703	62.00	365.34	62.01	365.34
I-300A	BASE	10YR72HR	64.54	76.07	80.00	0.0009	1546956	60.11	549.41	64.54	70.30
I-300B	BASE	10YR72HR	62.23	76.19	80.00	0.0014	1513541	60.08	946.85	60.57	108.35
I-300C	BASE	10YR72HR	61.26	76.39	80.00	0.0010	125894	60.08	54.69	61.26	8.90
K-100	BASE	10YR72HR	60.10	73.42	76.10	0.0008	578997	60.00	121.05	60.10	98.13
LEN POND 1	BASE	10YR72HR	60.22	79.85	84.00	0.0003	81359	60.00	12.03	60.22	5.83
OP-A	OSCPKWY	10YR72HR	61.91	83.68	86.00	0.0005	162743	60.08	32.25	61.89	5.35
OP-W	OSCPKWY	10YR72HR	64.05	82.57	84.00	0.0005	147287	60.00	28.86	64.05	5.97
OS-K	OFFSITE	10YR72HR	60.18	77.81	80.00	0.0004	6498	60.17	31.79	60.18	31.69
POND1	BASE	10YR72HR	60.78	77.74	78.00	0.0031	84279	60.08	114.55	60.52	25.05
SHINGLE	BASE	10YR72HR	0.00	73.30	77.00	0.8000	8668	60.46	940.90	0.00	0.00
SOL2	OFFSITE	10YR72HR	60.76	79.11	80.00	0.0015	36627	60.00	21.83	60.76	4.39
WETLAND	OFFSITE	10YR72HR	60.08	76.51	78.00	0.0019	4356	60.08	198.76	60.08	198.64

POST–DEVELOPMENT HYDROGRAPH and ROUTING 100-Year/72-Hour (*Buildings*)

```
           Basin Name: KOA
           Group Name: OFFSITE
           Simulation: 100YR72H
            Node Name: WETLAND
           Basin Type: SCS Unit Hydrograph

      Unit Hydrograph: UH256
        Peaking Fator: 256.0
  Spec Time Inc (min): 3.33
  Comp Time Inc (min): 3.33
        Rainfall File: SFWMD72
Rainfall Amount (in): 14.400
Storm Duration (hrs): 72.00
              Status: Offsite
  Time of Conc (min): 25.00
    Time Shift (hrs): 0.00
           Area (ac): 34.150
Vol of Unit Hyd (in): 1.000
        Curve Number: 92.000
           DCIA (%): 0.000

      Time Max (hrs): 60.11
      Flow Max (cfs): 148.93
  Runoff Volume (in): 13.402
Runoff Volume (ft3): 1661366
```

```
           Basin Name: LEN POND 1
           Group Name: BASE
           Simulation: 100YR72H
            Node Name: LEN POND 1
           Basin Type: SCS Unit Hydrograph

      Unit Hydrograph: Uh484
        Peaking Fator: 484.0
  Spec Time Inc (min): 2.00
  Comp Time Inc (min): 2.00
        Rainfall File: SFWMD72
Rainfall Amount (in): 14.400
Storm Duration (hrs): 72.00
              Status: Onsite
  Time of Conc (min): 15.00
    Time Shift (hrs): 0.00
           Area (ac): 2.560
Vol of Unit Hyd (in): 1.001
        Curve Number: 94.000
           DCIA (%): 0.000

      Time Max (hrs): 60.00
      Flow Max (cfs): 18.14
  Runoff Volume (in): 13.643
Runoff Volume (ft3): 126782
```

```
           Basin Name: OP-A
           Group Name: OSCPKWY
           Simulation: 100YR72H
            Node Name: OP-A
           Basin Type: SCS Unit Hydrograph

      Unit Hydrograph: UH256
        Peaking Fator: 256.0
  Spec Time Inc (min): 3.12
  Comp Time Inc (min): 3.12
        Rainfall File: SFWMD72
Rainfall Amount (in): 14.400
Storm Duration (hrs): 72.00
              Status: Offsite
  Time of Conc (min): 23.40
    Time Shift (hrs): 0.00
           Area (ac): 10.930
Vol of Unit Hyd (in): 1.000
        Curve Number: 92.000
           DCIA (%): 0.000

      Time Max (hrs): 60.11
      Flow Max (cfs): 49.30
  Runoff Volume (in): 13.398
Runoff Volume (ft3): 531573
```

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
535N-10	535	100YR72H	63.32	86.51	86.00	0.0030	129320	61.50	119.63	63.30	85.37
535N-20	535	100YR72H	63.34	84.01	84.00	0.0013	83644	61.83	136.78	62.67	129.79
535N-30	535	100YR72H	63.92	82.27	84.00	0.0007	113504	62.56	131.59	63.94	127.40
535N-60	535	100YR72H	63.84	77.23	77.00	0.0025	8403	63.94	127.40	63.98	127.42
535N-90	535	100YR72H	63.48	84.01	85.00	0.0006	32712	60.08	12.64	61.29	3.93
A	BASE	100YR72H	61.50	76.32	76.10	-0.0036	7016	61.50	576.96	61.50	576.96
B	BASE	100YR72H	61.42	76.15	76.10	-0.0067	4532	61.47	380.09	61.42	394.27
BYPASS1	BASE	100YR72H	60.26	76.66	77.00	0.0031	46799	60.25	163.55	60.34	165.34
BYPASS2	BASE	100YR72H	60.24	76.55	77.00	0.0027	236309	60.17	638.05	60.24	622.37
C	BASE	100YR72H	60.93	76.43	76.10	0.0032	4414	60.92	101.65	60.93	101.64
H-100	BASE	100YR72H	61.42	76.13	77.00	0.0198	23781	61.67	392.78	61.69	392.86
I-300A	BASE	100YR72H	62.36	77.80	80.00	0.0011	1600315	60.08	802.93	62.40	215.79
I-300B	BASE	100YR72H	61.67	78.79	80.00	0.0020	1760632	60.08	1434.36	61.03	148.38
I-300C	BASE	100YR72H	60.98	77.72	80.00	0.0010	143531	60.08	82.94	60.96	20.67
K-100	BASE	100YR72H	60.04	76.17	76.10	0.0009	619466	60.00	183.18	60.04	171.08
LEN POND 1	BASE	100YR72H	60.31	79.98	84.00	0.0003	81815	60.00	18.14	59.98	7.03
OP-A	OSCPKWY	100YR72H	61.84	84.20	86.00	0.0007	166706	60.08	48.83	61.76	8.72
OP-W	OSCPKWY	100YR72H	63.55	83.00	84.00	0.0005	172168	60.00	44.02	63.55	9.68
OS-K	OFFSITE	100YR72H	60.18	77.91	80.00	0.0003	7201	60.17	48.67	60.18	48.52
POND1	BASE	100YR72H	60.93	80.58	78.00	0.0031	115250	60.08	174.14	60.72	28.59
SHINGLE	BASE	100YR72H	60.00	76.10	77.00	0.8000	437	60.70	1541.42	0.00	0.00
SOL2	OFFSITE	100YR72H	60.69	80.09	80.00	0.0014	41419	60.00	34.36	60.69	8.13
WETLAND	OFFSITE	100YR72H	60.08	76.68	78.00	0.0016	4356	60.08	303.28	60.08	303.13

POST–DEVELOPMENT HYDROGRAPH and ROUTING INPUT DATA

```
        Name: K-100                     Node: K-100                     Status: Onsite
       Group: BASE                      Type: SCS Unit Hydrograph CN

    Unit Hydrograph: UH484                      Peaking Factor: 484.0
      Rainfall File: SFWMD72              Storm Duration(hrs): 72.00
Rainfall Amount(in): 9.600                  Time of Conc(min): 10.00
           Area(ac): 19.640                   Time Shift(hrs): 0.00
       Curve Number: 94.00                Max Allowable Q(cfs): 999999.000
            DCIA(%): 0.00


        Name: XOA                       Node: WETLAND                   Status: Offsite
       Group: OFFSITE                   Type: SCS Unit Hydrograph CN

    Unit Hydrograph: UH256                      Peaking Factor: 256.0
      Rainfall File: SFWMD72              Storm Duration(hrs): 72.00
Rainfall Amount(in): 9.600                  Time of Conc(min): 25.00
           Area(ac): 34.150                   Time Shift(hrs): 0.00
       Curve Number: 92.00                Max Allowable Q(cfs): 999999.000
            DCIA(%): 0.00


        Name: LEN POND 1                Node: LEN POND 1                Status: Onsite
       Group: BASE                      Type: SCS Unit Hydrograph CN

    Unit Hydrograph: Uh484                      Peaking Factor: 484.0
      Rainfall File: Sfwmd72                Storm Duration(hrs): 72.00
Rainfall Amount(in): 9.600                  Time of Conc(min): 15.00
           Area(ac): 2.560                    Time Shift(hrs): 0.00
       Curve Number: 94.00                Max Allowable Q(cfs): 999999.000
            DCIA(%): 0.00

NEW THIS APPLICATION


        Name: OP-A                      Node: OP-A                      Status: Offsite
       Group: OSCPKWY                   Type: SCS Unit Hydrograph CN

    Unit Hydrograph: UH256                      Peaking Factor: 256.0
      Rainfall File: SFWMD72                Storm Duration(hrs): 72.00
Rainfall Amount(in): 9.600                  Time of Conc(min): 23.40
           Area(ac): 10.930                   Time Shift(hrs): 0.00
       Curve Number: 92.00                Max Allowable Q(cfs): 999999.000
            DCIA(%): 0.00


        Name: OP-W                      Node: OP-W                      Status: Offsite
       Group: OSCPKWY                   Type: SCS Unit Hydrograph CN

    Unit Hydrograph: UH256                      Peaking Factor: 256.0
      Rainfall File: SFWMD72                Storm Duration(hrs): 72.00
Rainfall Amount(in): 9.600                  Time of Conc(min): 10.00
           Area(ac): 6.260                    Time Shift(hrs): 0.00
       Curve Number: 98.00                Max Allowable Q(cfs): 999999.000
            DCIA(%): 0.00


        Name: OS-A1                     Node: A                         Status: Offsite
       Group: OFFSITE                   Type: SCS Unit Hydrograph CN

    Unit Hydrograph: UH256                      Peaking Factor: 256.0
      Rainfall File: SFWMD72                Storm Duration(hrs): 72.00
Rainfall Amount(in): 9.600                  Time of Conc(min): 10.00
           Area(ac): 0.010                    Time Shift(hrs): 0.00
       Curve Number: 0.01                 Max Allowable Q(cfs): 999999.000
            DCIA(%): 0.00


        Name: OS-A2                     Node: A                         Status: Offsite
       Group: OFFSITE                   Type: SCS Unit Hydrograph CN

    Unit Hydrograph: UH256                      Peaking Factor: 256.0
      Rainfall File: SFWMD72                Storm Duration(hrs): 72.00
```

Type: Stage/Area

OP POND

Stage(ft)	Area(ac)
74.000	2.3000
75.000	2.6400
76.000	2.8200
77.000	3.0000
78.000	3.4100
79.000	4.3800

Name: K-100 Base Flow(cfs): 0.000 Init Stage(ft): 72.500
Group: BASE Warn Stage(ft): 76.100
Type: Stage/Area

Stage(ft)	Area(ac)
72.500	12.9800
77.000	14.5000

Name: LEN POND 1 Base Flow(cfs): 0.000 Init Stage(ft): 79.600
Group: BASE Warn Stage(ft): 84.000
Type: Stage/Area

NEW POND THIS APPLICATION

Stage(ft)	Area(ac)
79.400	1.8300
80.000	1.8800
81.000	2.0000
82.000	2.1300
84.000	2.5600

Name: OP-A Base Flow(cfs): 0.000 Init Stage(ft): 82.300
Group: OSCPKWY Warn Stage(ft): 86.000
Type: Stage/Volume

OSCEOLA PKWY POND 'A' FROM GLACE & RADCLIFFE CALCS

Stage(ft)	Volume(af)
82.300	0.0000
83.300	3.5800
84.300	7.3400
85.300	11.2700
86.000	14.1300

Name: OP-W Base Flow(cfs): 0.000 Init Stage(ft): 81.000
Group: OSCPKWY Warn Stage(ft): 84.000
Type: Stage/Area

WETLAND AREA IN OSCEOLA PKWY / SR 535 INTERCHANGE

Stage(ft)	Area(ac)
81.000	0.1000
82.000	2.6300
83.000	3.9500
84.000	5.8100

Name: OS-K Base Flow(cfs): 0.000 Init Stage(ft): 77.500
Group: OFFSITE Warn Stage(ft): 80.000
Type: Stage/Area

INTERCEPTOR DITCH ADJACENT TO PROPOSED ROAD

Stage(ft)	Area(ac)
77.500	0.1000
78.000	0.1800
79.000	0.5500
80.000	0.9200

Name: POND1 Base Flow(cfs): 0.000 Init Stage(ft): 73.000
Group: BASE Warn Stage(ft): 78.000
Type: Stage/Area

```
              Rise(in): 79.00                 Control Elev(ft): 76.400

*** Weir 2 of 3 for Drop Structure DS-I300C ***
                                                                      TABLE
                 Count: 1                      Bottom Clip(in): 0.000
                  Type: Vertical: Mavis          Top Clip(in): 0.000
                  Flow: Both                   Weir Disc Coef: 3.200
              Geometry: Circular             Orifice Disc Coef: 0.600

              Span(in): 5.50                        Invert(ft): 74.000
              Rise(in): 5.50                  Control Elev(ft): 74.000

*** Weir 3 of 3 for Drop Structure DS-I300C ***
                                                                      TABLE
                 Count: 1                      Bottom Clip(in): 0.000
                  Type: Vertical: Mavis          Top Clip(in): 0.000
                  Flow: Both                   Weir Disc Coef: 3.200
              Geometry: Rectangular          Orifice Disc Coef: 0.600

              Span(in): 13.20                       Invert(ft): 74.700
              Rise(in): 20.40                 Control Elev(ft): 74.700

-------------------------------------------------------------------------------

        Name: DS-LEN POND 1       From Node: LEN POND 1         Length(ft): 440.00
       Group: BASE                  To Node: I-300B                Count: 1

              UPSTREAM       DOWNSTREAM              Friction Equation: Average Conveyance
    Geometry: Circular       Circular                Solution Algorithm: Automatic
    Span(in): 18.00          18.00                             Flow: Both
    Rise(in): 18.00          18.00                   Entrance Loss Coef: 0.500
  Invert(ft): 75.560         70.000                      Exit Loss Coef: 1.000
Manning's N: 0.013000        0.013000                  Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000          0.000                      Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000          0.000                       Solution Incs: 0

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

NEW DROP STRUCTURE THIS APP

*** Weir 1 of 1 for Drop Structure DS-LEN POND 1 ***
                                                                      TABLE
                 Count: 1                      Bottom Clip(in): 0.000
                  Type: Horizontal               Top Clip(in): 0.000
                  Flow: Both                   Weir Disc Coef: 3.200
              Geometry: Rectangular          Orifice Disc Coef: 0.600

              Span(in): 37.00                       Invert(ft): 79.600
              Rise(in): 49.00                 Control Elev(ft): 79.600

-------------------------------------------------------------------------------

        Name: DS-OPA              From Node: OP-A               Length(ft): 100.00
       Group: OSCPKWY               To Node: OP-N                  Count: 1

              UPSTREAM       DOWNSTREAM              Friction Equation: Average Conveyance
    Geometry: Circular       Circular                Solution Algorithm: Automatic
    Span(in): 30.00          30.00                             Flow: Both
    Rise(in): 30.00          30.00                   Entrance Loss Coef: 0.500
  Invert(ft): 79.800         79.500                      Exit Loss Coef: 1.000
Manning's N: 0.012000        0.012000                  Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000          0.000                      Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000          0.000                       Solution Incs: 0

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

OSCEOLA PKWY POND 'A' OUTFALL - GLACE & RADCLIFFE

*** Weir 1 of 2 for Drop Structure DS-OPA ***
                                                                      TABLE
                 Count: 1                      Bottom Clip(in): 0.000
                  Type: Vertical: Mavis          Top Clip(in): 0.000
                  Flow: Both                   Weir Disc Coef: 3.200
              Geometry: Rectangular          Orifice Disc Coef: 0.600

              Span(in): 16.80                       Invert(ft): 82.600
              Rise(in): 999.00                Control Elev(ft): 82.600

*** Weir 2 of 2 for Drop Structure DS-OPA ***
```

State Project No. 75560-3610
SR 535 from SR 530 (US 192) to North of the Orange County line
Plan and Drainage Calcs Excerpt
(Basin 3)

Florida Department Of Transportation
State Project No. 75560-3610
Work Program No. 5124117
SR-535 from SR-536 to SR 400 (I-4)
Orange County, Florida

Drainage Permit Calculations
For
South Florida Water Management
District Permit
Oct. 31, 1990

District Five Drainage Department

Approved by Anthony J. Bryan P.E.
District Drainage Engineer

CR535 PERMITS

- COVER SHEET
- PROJECT DESCRIPTION/LOCATION ← INCLUDE MAP
- PROJECT SUMMARY (PRE/POST DISCHARGE - WETLANDS IF ANY)
- PRE-DEVELOPMENT
  - NODAL DIAGRAM
  - CN CALCS
  - TC CALCS
    STORAGE CALCS
  - EBUH
  - ICPR
- POST-DEVELOPMENT
  - NODAL DIAGRAM
  - CN CALCS
  - TC CALCS
    STORAGE CALCS
  - EBUH
  - ICPR
- POLLUTION ABATEMENT / RECOVERY
- SECONDARY (JUST SEWER TABS)
- CROSS DRAIN CALCS (IF ANY)

BY WEDNESDAY OCTOBER 31
4PM

THANK

STATE PROJ. NO. 75560-3610 SHEET NO. 1

BEGIN PROJECT
BEGIN WIDENING & RESURF.
STA. 583+00.00

EQUATION
AT STA. 585+92.37 BK
STA. 585+80.63 AH

END WIDENING & RESURF.
BEGIN RECONSTRUCTION
STA. 603+85.36

STRUCTURE NO.	STATION	DESIGN FLOOD		BASE FLOOD		OVERTOPPING FLOOD		GREATEST FLOOD			
		DISCHARGE	HW ELEV.	DISCHARGE	HW ELEV.	DISCHARGE	HW ELEV.	DISCHARGE	HW ELEV.	TYPE	FREQ.
B-32	584+20	26.00	90.30	30.10	90.82	30.68	90.86	30.68	90.86	H.W.	25
B-33	588+00	24.00	88.20	28.12	88.81	30.68	89.16	-	-	H.W.	50

BASIS OF ELEVATIONS: BASIS ELEVATIONS SHOWN ON THIS DRAWING ARE REFERENCED TO NATIONAL GEODETIC VERTICAL DATUM OF 1929 AS ESTABLISHED BY U.S. COAST AND GEODETIC SURVEY AND ADOPTED BY THE FLORIDA DEPARTMENT OF TRANSPORTATION. THE MEAN FLOOD ELEVATIONS SHOWN ARE INTERPOLATED BETWEEN THE ELEVATIONS DETERMINED FOR THE 10 AND 25 YEAR FLOODS. THE MEAN FLOOD ELEVATIONS WERE PARTICULARLY OF APPROPRIATE CONSIDERATION, SPECULATION, ORGANIZATION, AND FLOOD LOSS. BOUNDS OF THIS DATA ESTABLISHED AGAINST THE ELEVATIONS OF INVESTIGATION WITHIN CAN NOT BE ASSURED. CONSIDERABLE ADJUSTMENTS ARE EXPECTED FOR SECOND AND STAGES LIKE TO FIRST, (REVISED, 1979).

DESIGN FLOOD: THE FLOOD SELECTED BY F.D.O.T. TO BE UTILIZED TO ASSURE A STANDARD LEVEL OF HYDRAULIC PERFORMANCE.

BASE FLOOD: THE FLOOD HAVING A 1 % CHANCE OF BEING EXCEEDED IN ANY YEAR. (100 YR. FREQUENCY)

OVERTOPPING FLOOD: THE FLOOD WHERE FLOW OCCURS (A) OVER THE HIGHEST (B) OVER A DEPRESSED SECTION OF THE ROAD ADJACENT TO THE STRUCTURE, (C) THE MOST RESTRICTIVE FLOOD WHICH CAN BE PERMITTED WHERE OVERTOPPING IS NOT PRACTICABLE. NORMALLY THIS WITH A 4 % CHANCE OF BEING EXCEEDED IN ANY YEAR. (50 YR. FREQUENCY)

GREATEST FLOOD: THE FLOOD WHICH HAS THE GREATEST DISCHARGE OF (A) THE DESIGN FLOOD, (B) THE BASE FLOOD, (C) THE OVERTOPPING FLOOD.

DATA ADAPTED FROM: HYDROMETEOROLOGICAL FLOOD ROUTING PROGRAM CALCULATIONS BOOKLET

PREPARED BY: BILL GREEN

DATE: 9/24/79

APPROVED FOR USE ON THIS PROJECT BY: TONY J. DEESA

DATE:

25yr Pre-Dev 7.9 cfs
* Post-Dev. 7.37 cfs

25yr Post-Dev. W.L. Stage 97.41 EL

* 25yr Pre- 41.7 cfs
Post-Dev. 36.94 cfs

25yr Pre 8.2 cfs
* Post-Dev. 7.91 cfs

25yr Post-Dev. W.L.
Stage 97.83 EL

25yr Pre-Dev. 30.3 cfs
* Post-Dev. 24.52 cfs

25yr Post-Dev.
Stage: 94.20 EL

25yr Post-Dev.
Stage: 97.84 EL

25yr Post-Dev.
Stage 100.45 EL

25yr Post-Dev.
Stage 100.81 EL

25yr Post-Dev.
Stage 101.12 EL

WPD 11/05/20

Design Storm SCS Type III 25yr - 24hr.

REVISIONS											
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

DESIGNED BY: JWT 3/80 | DRAWN BY: A 3/80 | CHECKED BY: M GAB 10/80 | QUANTITIES BY: M GAB 10/80 | INSPECTION BY: JOAB

FLORIDA DEPARTMENT OF TRANSPORTATION
APPROVED BY: KENNETH A. HARTMANN
DATE:

DRAINAGE MAP

Summary of Allowable Pre-Development & Post-Development outfall Discharge Rates & Stage Elev.

PROJECT LOCATION MAP
STATES
F THE INTERIOR
L SURVEY

PROJECT LOCATION
PROJ. # 75560-3610
WPI # 5124117
10/90 WPP

SHINGLE CREEK BASIN

J-130

STA: 668+00 END PROJECT

STA: 209+38

STA: 192+00

Lake Buena Vista

Lake Bryan

Black Lake

Buena Vista

LAKE BUENA VISTA

ORANGE CO
OSCEOLA CO

Golf Course

Subject: SR535 Pre-Dev. CN Calcs. West Side SR535 To Existing 36" Pipe Under SR536.	Sheet of	WPI No. 5124117	
	Project No. 75560 - 3610		
	Prepared by B. Deese	Date 8/09/90	
	Checked by	Date	

(1) See Attached Dedn. Map for SR535 with the following Drng. Areas Draining South along the West Side SR 535.

Note: A Review of SCS Soils Map for this area indicate that the primary soil type for this area are as follows:

(A) #54 Zoofa fine Sand Type "C"

(B) #26 Ona fine Sand Type "A/D"

Note: A Soil Type "C" was selected for this Project

(2) From the DOT Drng. Map for SR535 the Pre-Dev. Drainage Area Contributing to the Existing 36" Culvert West of SR535 + Undec SR536 at Sta: 2067+30 are as follows

		CN Type "C"	CN * Area$_{AC}$
.90 AC	Roadway + Swale	92	82.8
1.40 AC	Roadway + Swale	92	128.80
1.20 AC	Roadway + Swale	92	110.40
21.2 AC	Woods Fair Condition	78	1547.60
24.7 AC	Total Pre-Dev West SR535		1869.60

$$CN_W = \frac{1869.60}{24.7} = 75.69 \Rightarrow 75.7$$

Note Used this CN for Pre-Dev.

Subject: PRE-DEV. NORTH SIDE SR 536 TO EXISTING CULVERT AT STA: 206+30 UNDER SR 536 WEST SIDE OF SR 535	Sheet of	WPI No. 5124117	
	Project No. 75560 - 3610		
	Prepared by WPD	Date 8/10/96	
	Checked by	Date	

PRE-DEVELOPMENT CONDITION: WEST SIDE SR 535

Note:

EXAMINATION OF PRE-DEV. CONDITION FROM EXISTING DRAINAGE MAP FOR THIS AREA SHOWS THE FOLLOWING:

- ROADWAY + SWALE 1.4 AC
- ROADWAY + SWALE 1.2 AC.
- ROADWAY + SWALE .9 AC.
- OFFSITE D.A. 24.0 AC. *(NOTE THIS 24 ACRES INCLUDES A 2.8 AC PORTION NORTH OF SR 536 (24.0 AC - 2.8 = 21.2)

TOTAL PRE-DEV. 27.5 AC CONTRIBUTING TO EXISTING 36" CULVERT AT STA: 206+30 UNDER SR 536 WEST OF SR 535.

PRE-DEV. BASIN 100 NODE #10.

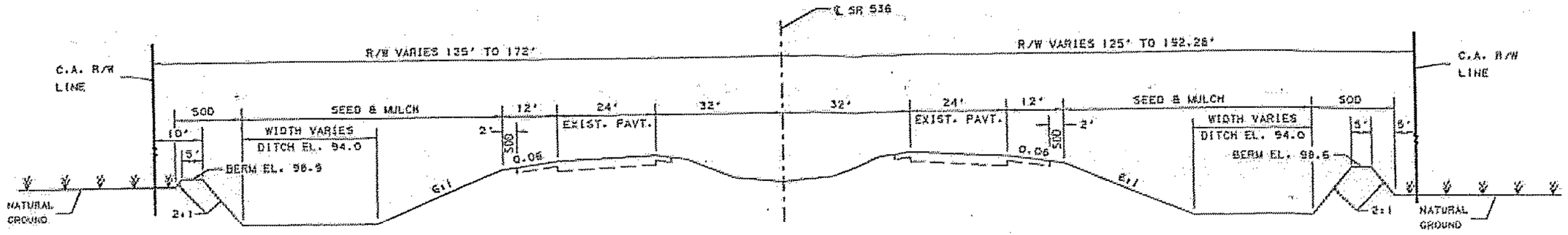
NOTE THE FOLLOWING D.A. BREAKDOWN WILL BE USED FOR THE PRE-DEV. TO STA 206+30 (EXISTING 36" UNDER SR 536)

	D.A.	CN		D.A * CN
ROADWAY + SWALE	1.4 AC	92		128.80
ROADWAY + SWALE	1.2 AC	92		110.40
ROADWAY + SWALE	.9 AC	92		82.80
OFFSITE CONTRIBUTING	21.2 AC	73	(WOODS, FAIR CONDITION)	1547.60
	24.7 AC			1869.60

$$CN_W = \frac{1869.60}{24.7} \rightarrow 75.7$$

$$T_{c(MIN)} = 123.60$$

STATE PROJ. NO.	SHEET NO.
75560-3610	10



TYPICAL SECTION NO. 5

STA. 192+83.40 - STA. 203+84.84 LT ℄ SR 536
STA. 192+83.40 - STA. 207+40.00 RT ℄ SR 536

Construction Note:

Project Special Bottom Width Ditch LEFT

Station (LEFT)	Special Ditch Bottom Width
Sta: 203+85	40 ft
Sta: 196+00	40 ft
Sta: 194+38	35' ft
Sta: 192+83	30' ft

Construction Note:

Project Special Bottom Width Ditch Right

Station	Special Ditch Bottom Width.
Sta: 207+20	Match
Sta: 206+30	50 ft
Sta: 203+75	30 ft
Sta: 194+75	30 ft
Sta: 192+83	20' ft

	NAME	DATE		NAME	DATE
DESIGNED BY	JWM	10/89	DRAWN BY	JWM	10/89
CHECKED BY	GAB	10/90	CHECKED BY	GAB	10/90

REVIEWED BY: GAB

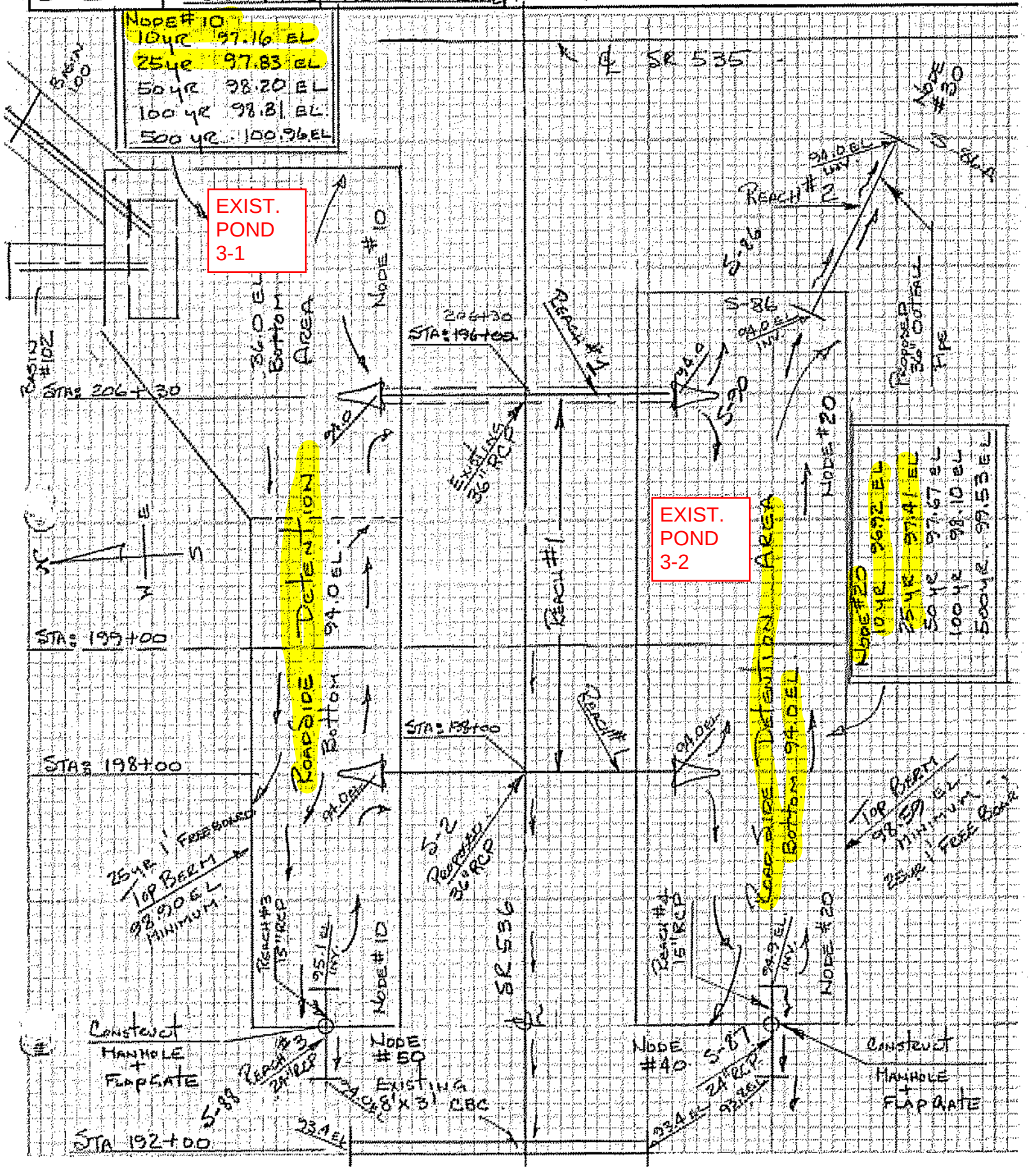
FLORIDA DEPARTMENT OF TRANSPORTATION
APPROVED BY: KENNETH A. HARTMANN
DATE:

REVISIONS

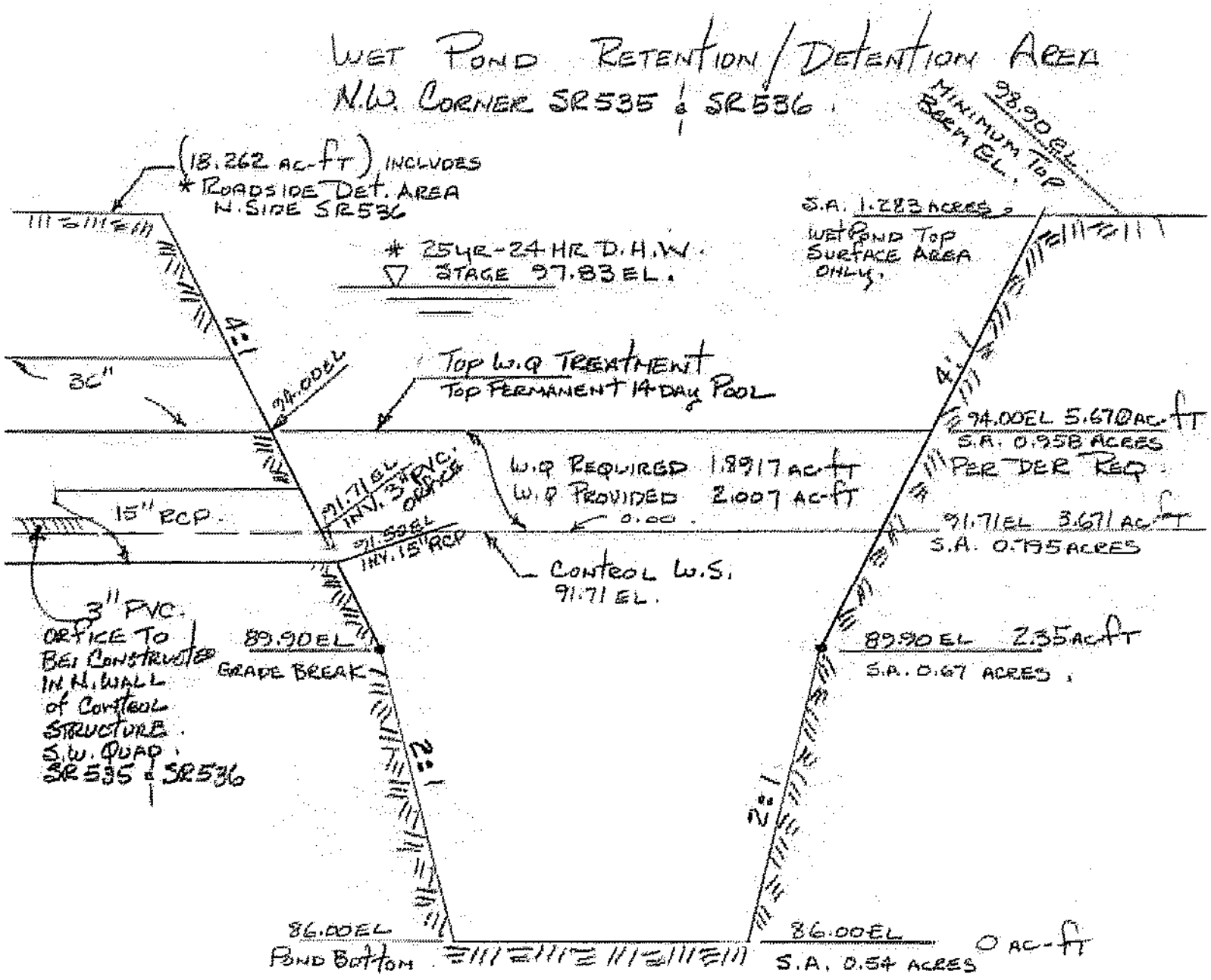
TYPICAL SECTIONS

J-134

Subject: FINAL STAGE - FREQ. CALCULATIONS FOR PROPOSED PONDED DETENTION AREA USING ICPR FROM SUMMARY POST-DEV. CONN	Sheet of	WPI No. 5124117
	Project No. 75560 - 3610	
	Prepared by BILL DEESE	Date 9/04/90
	Checked by	Date



Subject: TOTAL STORAGE IN PROPOSED WET POND N.W. QUADRANT SR535 AND SR536. POST-DEVELOPMENT	Sheet 1 of 1	WPI No. 5124117
	Project No. 75560-3610	
	Prepared by WPD	Date 9/04/90
	Checked by	Date

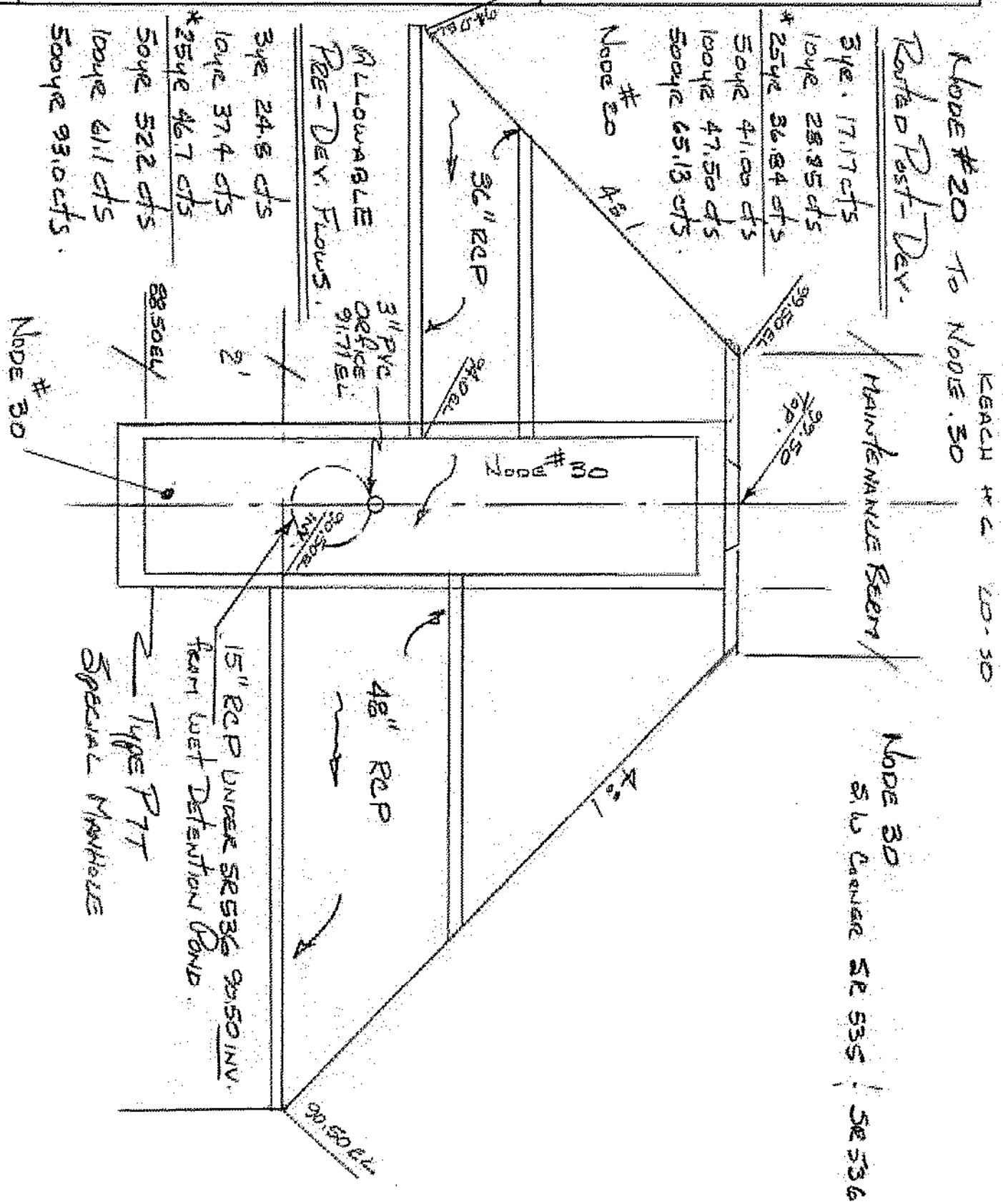


REACH #2 NODE #20 TO NODE #30

FORM 625-020-01-a
STRUCTURES - 03/00

J-136

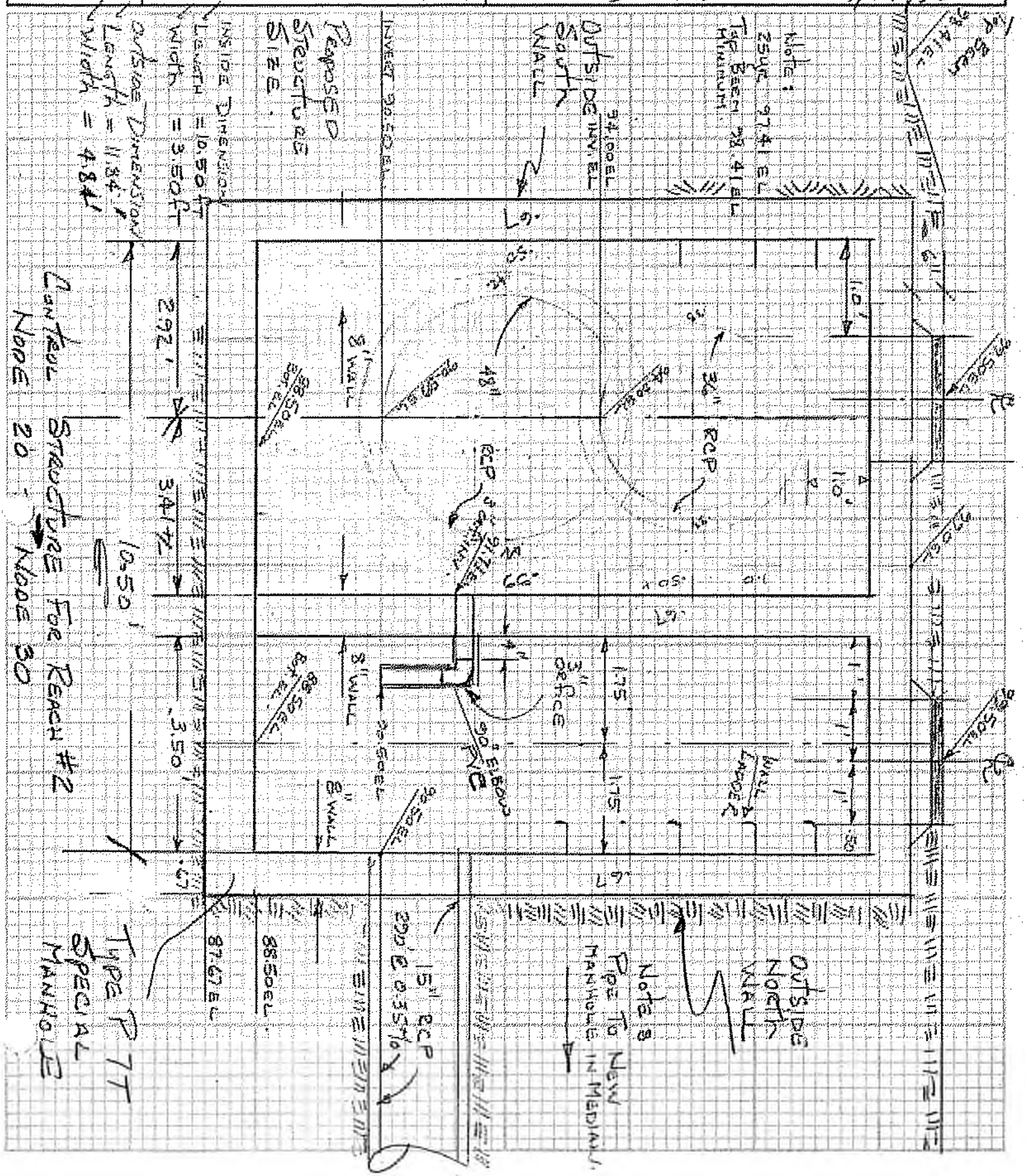
Subject: SR535 Proposed Outfall Structure at S.W. Quadrant of SR535 & SR536 with Pollution Abatement Control.	Sheet 1 of 1 — WPI No. 5124117
	Project No. 7560 - 3610
	Prepared by BILL DEASE — Date 9/04/90
	Checked by — Date



REACH # 2 NODE 20 TO NODE 30

J-137

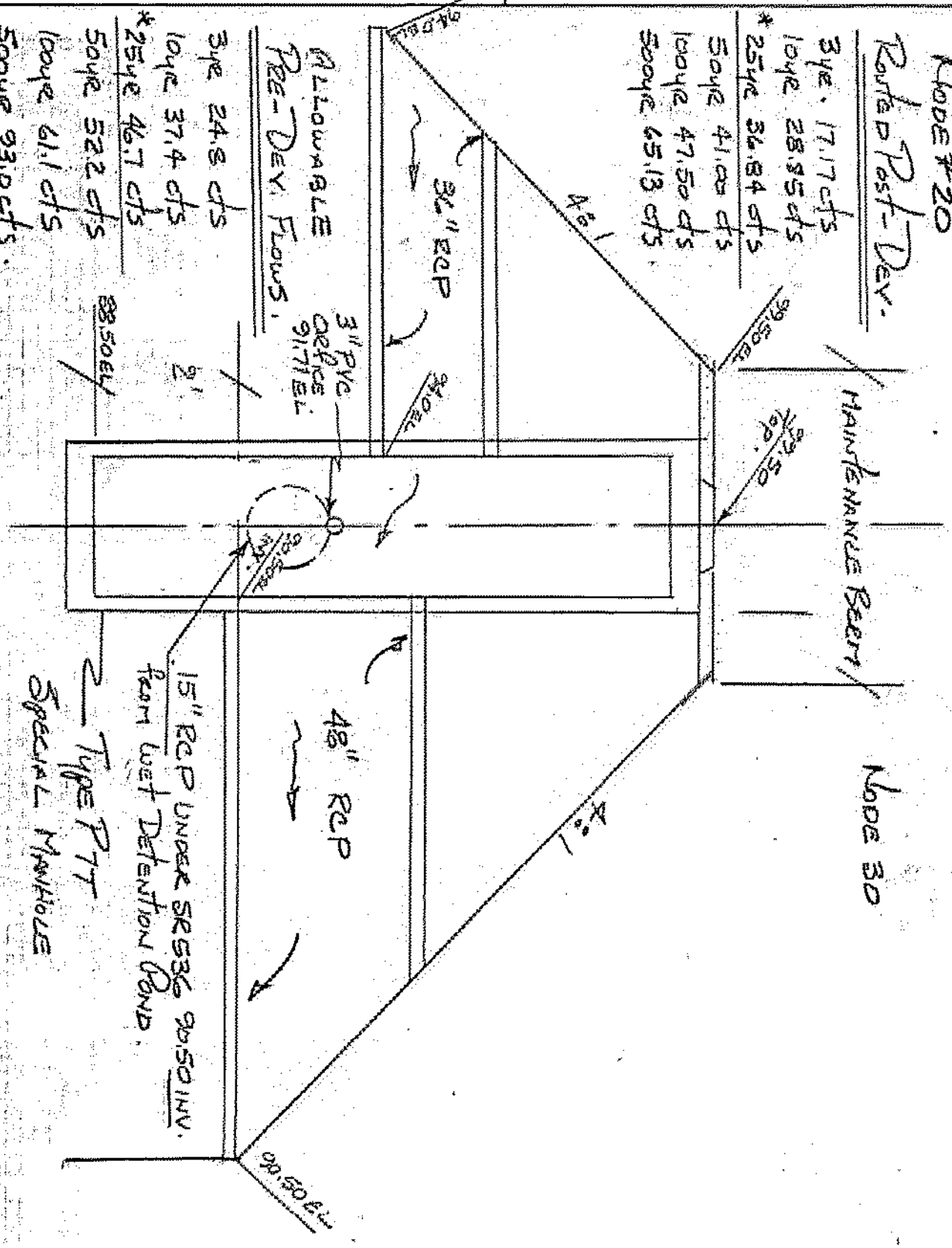
Subject: SR535 Proposed Outfall Structure at S.W. Corn. SR535 & SR536 with Pollution Abatement Control	Sheet 1 of 1	WPI No. 5124117
	Project No. 75560 - 3610	
	Prepared by BILL DEESE	Date 8/20/90
	Checked by REVISED WAD	Date 9/04/90



REACH #2 NODE #20 TO NODE #30

FORM 625-020-01-a
STRUCTURES - 03/92

Subject: SR 535 Proposed Outfall Structure at S.W. Quadrant of SR 535 & SR 536 with Pollution Abatement Control	Sheet 1 of 1
	WPI No. 5124917
	Project No. 7560 - 3610
	Prepared by BILL DEESE Date 9/04/90
	Checked by Date

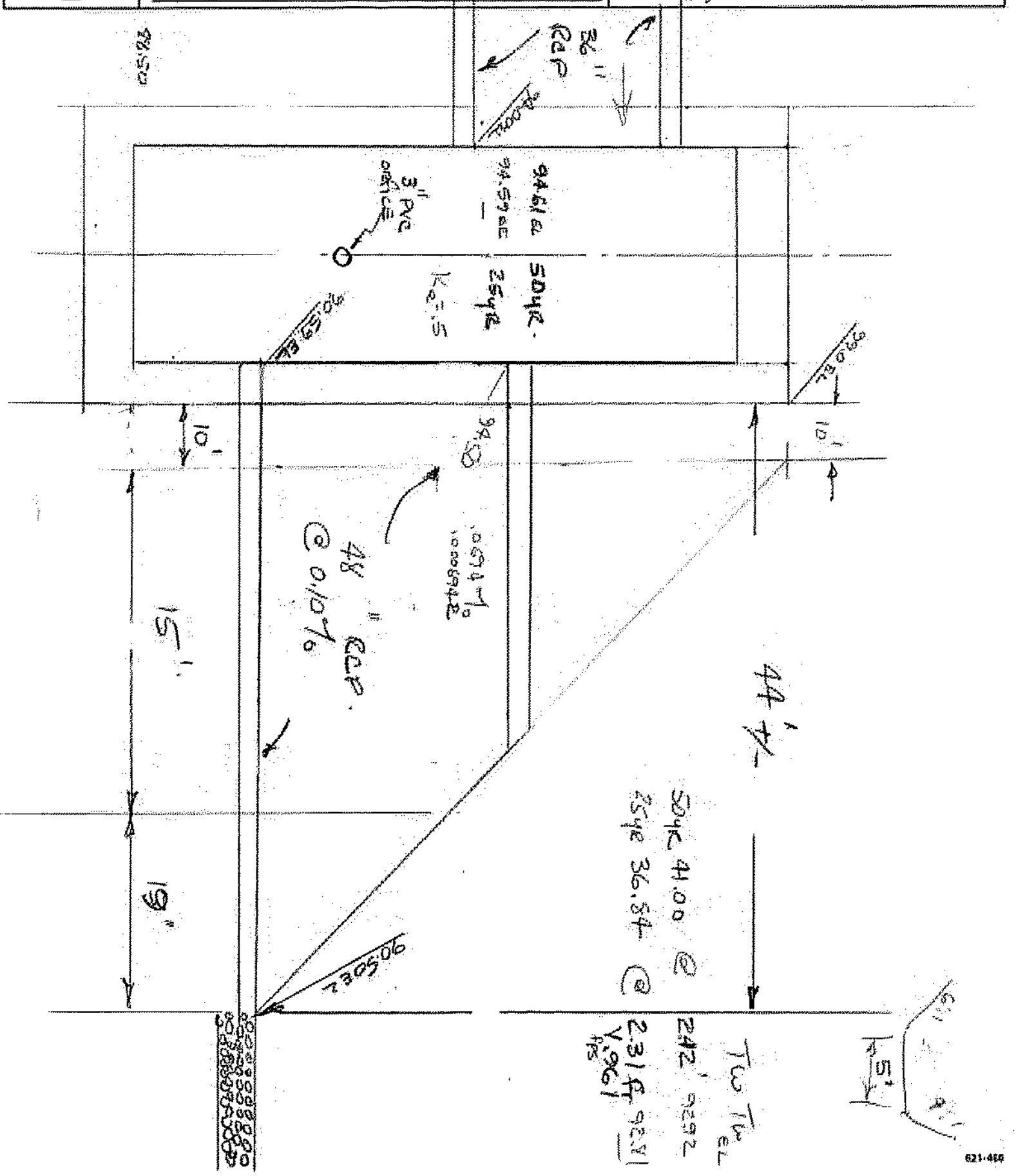


625-460

FORM 625-030-01-a
STRUCTURES - 01/10

J-139

Subject: SR535 Proposed Outfall Structure at SW Corner of SR535 + SR532 with Pollut	Sheet 1 of 1	WPI No. 5124117
	Project No. 75560-3610	
	Prepared by BILL DEESE	Date 7/04/90
	Checked by	Date



621-459

9/04/90
WAP

Data For Control Structure In Southwest Quadrant of SR 535 & SR 536.

Node 20 To Node 30

Out Fall Control Structure.

Results From Flood Routings. (ICPR)

ATTACHMENT A : SHEET NO. 1 OF 1

ROADWAY FLOOD DATA :

(BRIDGE ___ OR CULVERT BARREL X) 36" RCP 50 L.F.

PROJECT DESIGN DATA :

STATION : 597+75 LEFT ON STATE PROJ. NO. 75560-3610
STRUCTURE NO. S-86 ON STATE PROJ. NO. _____
OVERTOPPING PLAN CENTERLINE GRADE ELEV. 98.60 Top Berm SR 536
(SEE ATTACH PROFILE IF NOT FLAT) YES ____ NO ____
DESIGN H.W. DATA : (D.H.W)
D.H.W. STAGE 97.41 ELEV.; DISCHARGE (CFS) 36.84
DESIGN TAILWATER 94.00 ELEV.; OUTLET VELOCITY __.__ FPS
PROJ. D.H.W. FREQ. 25 YRS. ; PROBABILITY 4 %

(BRIDGE ___ OR BARREL X) PERFORMANCE CURVE DATA :

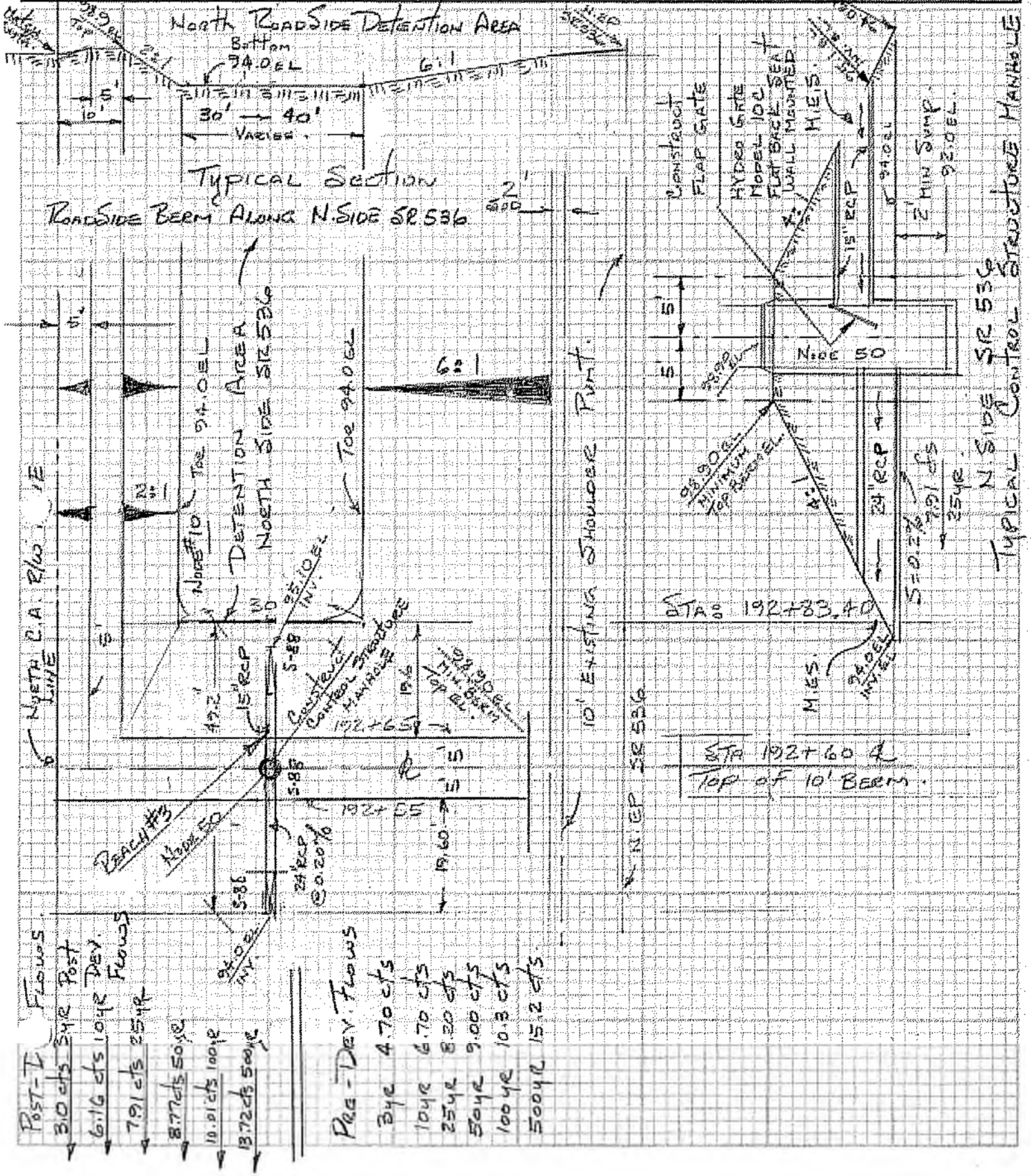
Peak Dis. Time (HRS)

FREQ. YR.	PROB. %	STAGE EL.	Routed Outflow Q (CFS.)	T.W. EL.	VFPS
2 YR (*INT)	50%	96.04	15.50	———	———
3 YR	33.33%	96.15	17.17	———	———
5 YR (*INT)	20%	96.37	20.51	———	———
10 YR	10%	96.92	28.85	———	———
(13.67) Hrs. 25 YR	4%	97.41	36.84	—	———
50 YR	2%	97.67	41.00	———	———
100 YR (BASE)	1%	98.10	47.50	———	———
200 YR (*INT)	.5%	98.46	51.91	———	———
500 YR	.2%	99.53	65.13	———	———
1000 YR (*INT)	.1%	101.32	87.17	———	———
OVERTOPPING FLOOD FREQ. Top Berm S.R.536					
239.86 YR	.42%	98.60	53.66	———	———
GREATEST FLOOD FREQ.					
____ YR	____	____	____	____	____

Reach #3 Node #10 To Node #50

J-141

Subject: Outfall Structure on N. Side SR 536 West of SR 535. Outfall To Existing 2'x3' Conc Box Sta 192+00 N. Side SR 536	Sheet 1 of 1
	WPI No. 5124117
	Project No. 7560-3610 WPD
	Prepared by Bill Deese Date 9/04/1990
	Checked by Date



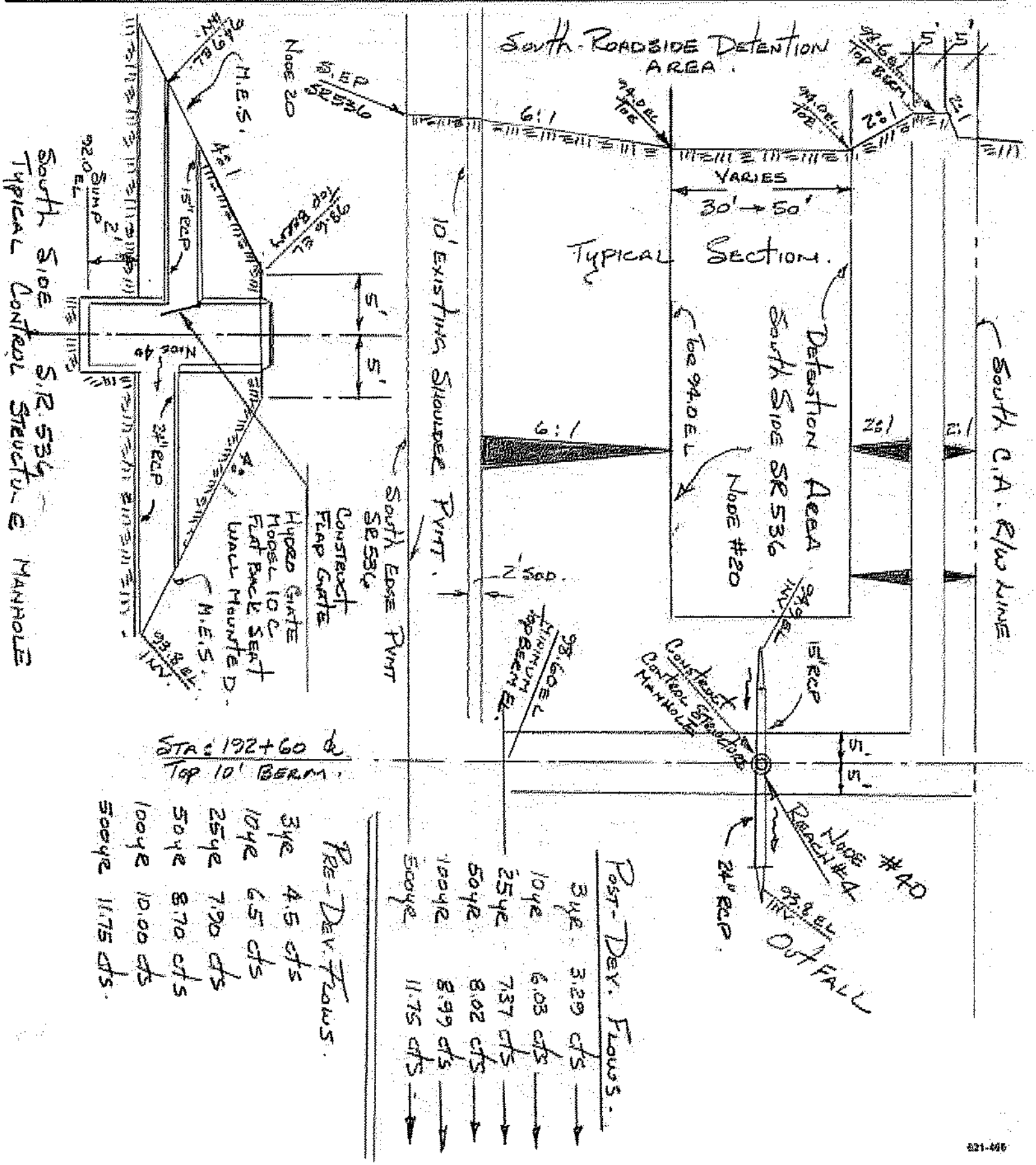
Post-D Flows:
3.0 cfs 3yr
6.16 cfs 10yr
7.91 cfs 25yr
8.77 cfs 50yr
10.01 cfs 100yr
13.72 cfs 500yr

Pre-Dev. Flows
3yr 4.70 cfs
10yr 6.70 cfs
25yr 8.20 cfs
50yr 9.00 cfs
100yr 10.3 cfs
500yr 15.2 cfs

Reach #4 Node #20 to Node #40

FORM 625-020-01-a
STRUCTURES - 03/90

Subject: Outfall Structure On S.Side SR 536 West of SR 535 Outfall To Existing Box Culvert 8'x3' Conc Box Sta. 192+00 South Side SR 536	Sheet 1 of 1
	WPI No. 5124117
	Project No. 75560 - 3610
	Prepared by Bill Deese Date 9/04/90
	Checked by Date



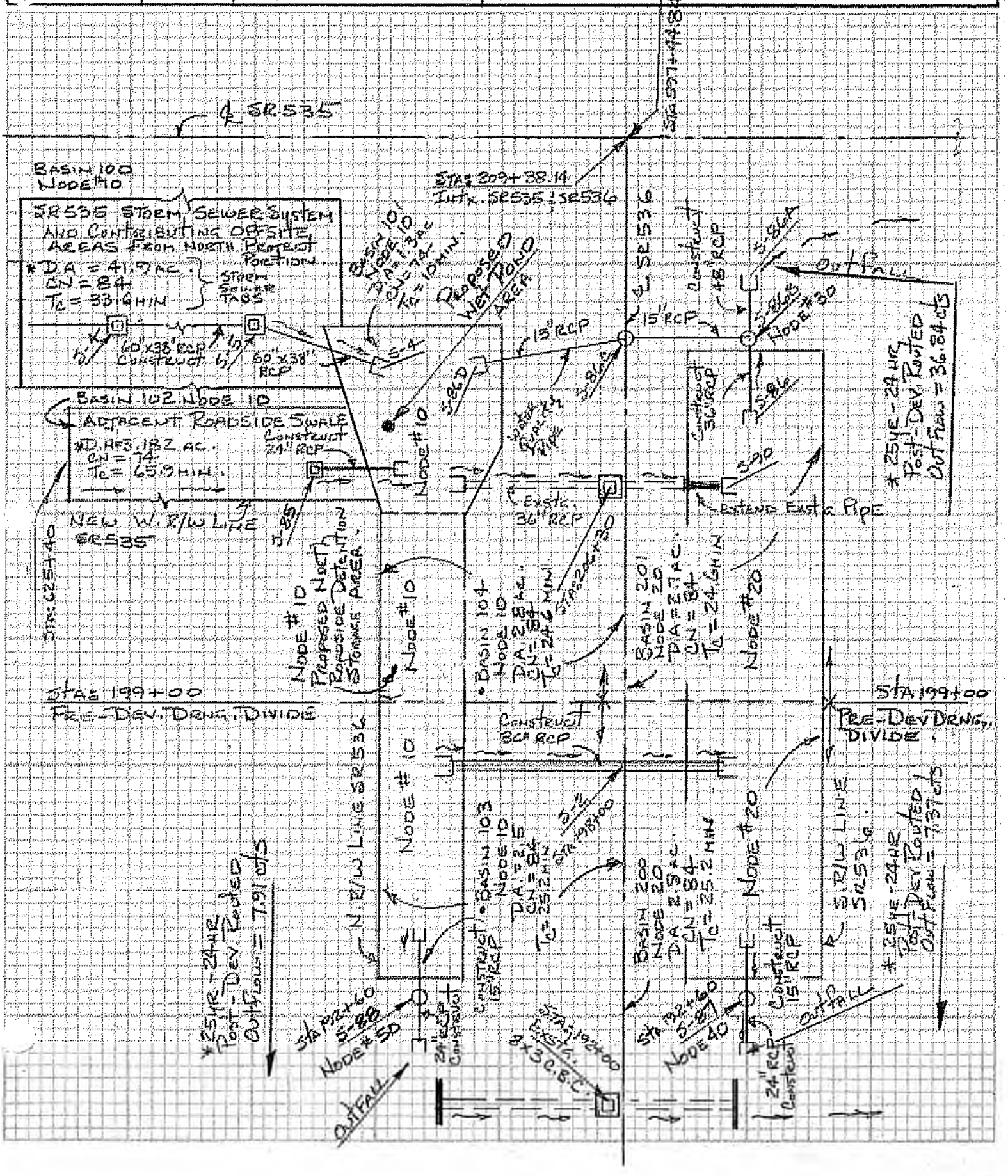
Subject: Storage Calculations along N. Side SR536 only including the Proposed Pond in the N.W. Corner of SR535 + SR536 with Roadside Storage along N. Side SR536	Sheet 1 of 2	WPI No. 5124117	
	Project No. 7560-3610		
	Prepared by Bill Deese	Date 8/20/90	
	Checked by	Date	

Total Storage along N. Side SR536 only including Proposed Pond in N.W. Corner of SR535 + SR536 with the Roadside Storage along N. Side SR536

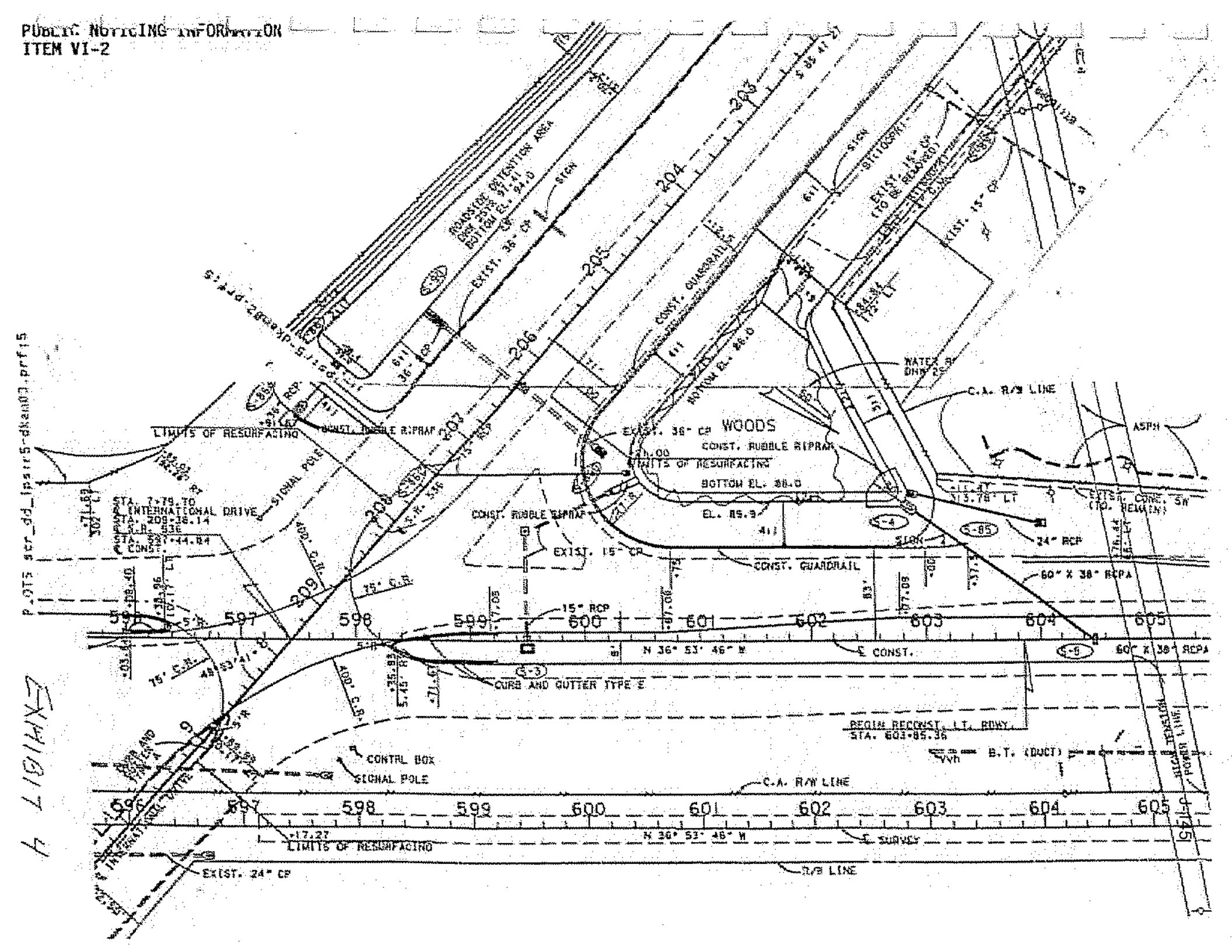
Stage	H Ft Depth Ft	10.1 N Side 536 Sta 192+95 To Sta 196+00 Storage Ac-Ft	10.2 N. Side 536 Sta 196+00 To Sta 202+915 Storage Ac-Ft	10.3 Pond N.W. Corn. SR535+SR536 Storage Ac-Ft	Node #10 Total Storage Σ Total Storage Along N. Side 536 Storage Ac-Ft
98.00	6.20	1.475	4.070	6.355	11.900
97.75	5.95	1.356	3.748	6.048	11.152
97.50	5.70	1.240	3.434	5.746	10.420
97.25	5.45	1.125	3.130	5.448	9.703
97.00	5.20	1.019	2.824	5.155	9.008
96.75	4.95	1.356	1.494	4.868	7.718
96.50	4.70	.813	2.271	4.564	7.668
96.25	4.45	.716	2.003	4.306	7.025
96.00	4.20	.621	1.744	4.031	6.396
95.75	3.95	.531	1.494	3.762	5.787
95.50	3.70	.444	1.253	3.497	5.194
95.25	3.45	.361	1.022	3.236	4.619
95.00	3.20	.282	.799	2.980	4.061
94.75	2.95	.206	.586	2.728	3.520
94.50	2.70	.133	.381	2.481	2.995
94.25	2.45	.065	.186	2.378	2.629
94.00	2.20	0	0	1.999	1.999
93.75	1.95	—	—	1.764	1.764
93.00	1.20	—	—	1.086	1.086
92.75	0.95	—	—	.867	.867
92.50	0.70	—	—	.653	.653
92.40	0.60	—	—	.569	.569
92.25	0.45	—	—	.443	.443
92.00	0.20	—	—	.237	.237
91.894	0	—	—	.078	.078
91.710	Note INV. of 2¼" orifice		3.671	0	0
86.00			0		

Reference Attachment #10.3 (Values obtained from Tr-21 Routing Results)

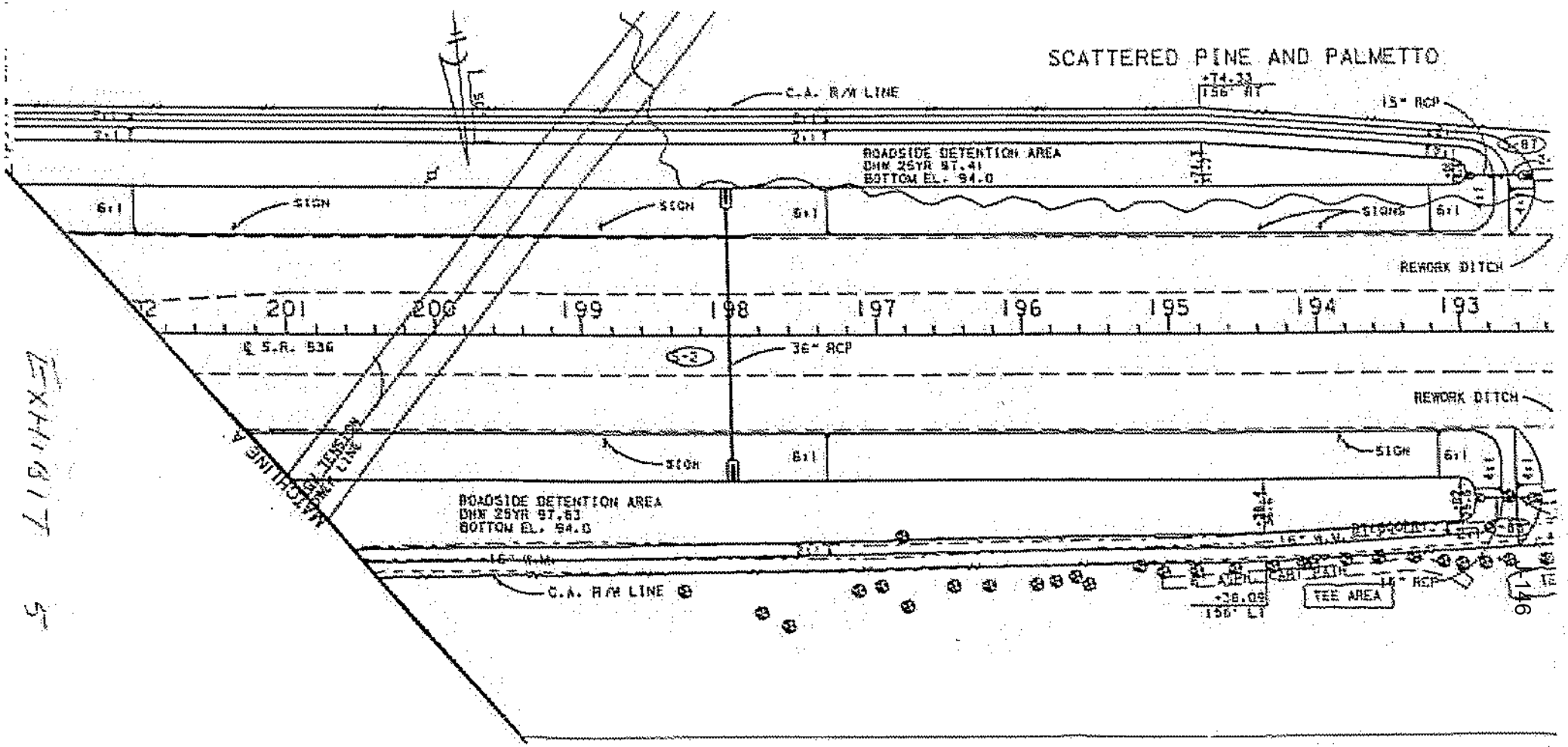
Subject: SR 535 Post-Development Basin / Node Data West Side SR 535 North & South of SR 536	Sheet of	WPI No. 5124117	
	Project No. 75560-3610		
	Prepared by WDO	Date 11/05/90	
	Checked by	Date	



PUBLIC NOTICING INFORMATION
ITEM VI-2



ITEM VI-2


SCATTERED PINE AND PALMETTO
C.A. R/W LINE
+74.33
156' RT
15" RCP
ROADSIDE DETENTION AREA
DHW 25YR ST.41
BOTTOM EL. 94.0
6:1
SIGN
SIGN
SIGN
REWORK DITCH
201
200
199
198
197
196
195
194
193
℄ S.R. 536
C-2
36" RCP
REWORK DITCH
SIGN
SIGN
ROADSIDE DETENTION AREA
DHW 25YR 97.63
BOTTOM EL. 94.0
16" R.C.P.
C.A. R/W LINE
+38.09
156' LT
TEE AREA
16" RCP
146

SR 535 WIDENING

PERMIT SUMMARY SHEET

APPLICATION NO. 901113-1 LOCATION Orange County S27,34/T24S/R28E

PROJECT AREA 24.9 ACRES BASIN AREA 24.9 ACRES

PROJECT USE Public Highway

FACILITIES:

1. EXISTING: Two lane roadway with minimum drainage facilities.

2. PROPOSED: Widening the roadway to six lanes, installation of improved drainage facilities for water quality treatment and storm attenuation. Eventual discharge will continue to be to Shingle Creek.

ENVIRONMENTAL: No wetland impacts associated with this project.

APPLICABLE LAND USE

TOTAL	24.9 ACRES	
WATER MANAGEMENT	0.80 ACRES	and 616 LF of exfiltration trench
IMPERVIOUS	14.2 ACRES	

DRAINAGE BASIN Upper Kissimmee RECEIVING BODY Shingle Creek

EXHIBIT 6

FLORIDA DEPARTMENT OF TRANSPORTATION
BOB MARTINEZ
GOVERNOR
BEN G. WATTS
SECRETARY

719 South Woodland Boulevard
DeLand, Florida 32720

November 9, 1990

Mr. Alan Leavens
South Florida Water Management District
701 East Oak Street
Kissimmee, Florida 34744

Re: State Project No.: 75560-3610
Work Program No.: 5124117
Federal Aid Project No.: RS-5905 (4)
S.R. 535 from S.R. 536 to I-4
Orange County

Dear Mr. Leavens:

I have enclosed Forms RC-1A and RC-1S and documentation supporting an application for a General Highway Surface Water Management Permit. The project consists of the six-laning of the existing four lanes of S.R. 535 between S.R. 536 and I-4. Project right of way totals 24.9 acres, of which 12.9 acres (51.8%) will be impervious. Surface water will be carried by pipes to exfiltration pipes and a wet detention facility. You have agreed previously to the use of a 25 year, 24 hour design storm distributed by the SCS Type III method, and to the use of a 3-inch orifice to bleed down the detention pond. ITEM II-1.

No land fills, wells, lakes or Outstanding Florida Waters will be effected by the project ITEMS II-5 and III-6. As shown on the accompanying floodplain maps (120179-0375, 0500, 0525), the project is outside the floodplains of Lake Bryan and Shingle Creek. ITEM II-6. Other than isolated pockets in the roadway ditches there are no wetlands on site. ITEMS I-3, 4, and 5.

The existing water management system consists of swales which convey water south to an existing permitted system, which discharges via a 4700 foot outfall canal into Shingle Creek wetlands. ITEM IV-1. This system was permitted in October 1985 (Permit No. unknown). ITEM IV-2. The proposed system will convey water by pipes to treatment and attenuation facilities located within the existing right of way. Runoff from S.R. 535 will be treated in an exfiltration system and in a wet detention pond in the northwest quadrant of the S.R. 535/S.R. 536 intersection. This pond will discharge by three structures. Structures 87 and 88 are at Station 192 + 60 of S.R. 536; both discharge to S.R. 536 ditches. This water runs northwesterly to an existing permitted system (48-00099-S, 7-9-81) at the I-4/Epcot interchange. The eventual discharge is to wetlands associated with Bonnet Creek.

The majority of the discharge from the wet pond is by Structure 86B at the Station 207 + 45 (S.R. 535/536 intersection); it discharges into the existing S.R. 535 swales. As discussed previously, this water runs south and eventually reaches Shingle Creek wetlands. Portions of the northbound lanes of S.R. 535 will discharge into swales which will function as retention/detention facilities. Flow will be controlled by the existing 24-inch pipe at Station 580 + 70. This water will also run south along S.R. 535. ITEM III-3. Flow out of the exfiltration pipes will be controlled by weirs placed in the various junction boxes. Groundwater flow out of the wet pond will be controlled by an orifice (S-86B) and the three weirs, discussed above ITEM IV-3. Design details for the proposed system are in the enclosed drainage calculation package and plans.

Erosion will be controlled during construction by the methods described in Standard Specifications for Road and Bridge Construction, Section 104. These will most likely consist of staked hay bales and/or silt fence, seed and mulch, and sodding. ITEM III-4.

All right of way for S.R. 535 in Sections 27 and 34, Township 24S, Range 28E to be utilized for the proposed construction are, or will be, owned by FDOT by virtue of fee title, record easement, temporary construction easement, and Chapter 95 and 337 Florida Statutes. ITEMS II-5 and V-1. FDOT agrees to operate and maintain the proposed facility in a manner consistent with Chapter 40E-40, F.A.C. ITEM V-2.

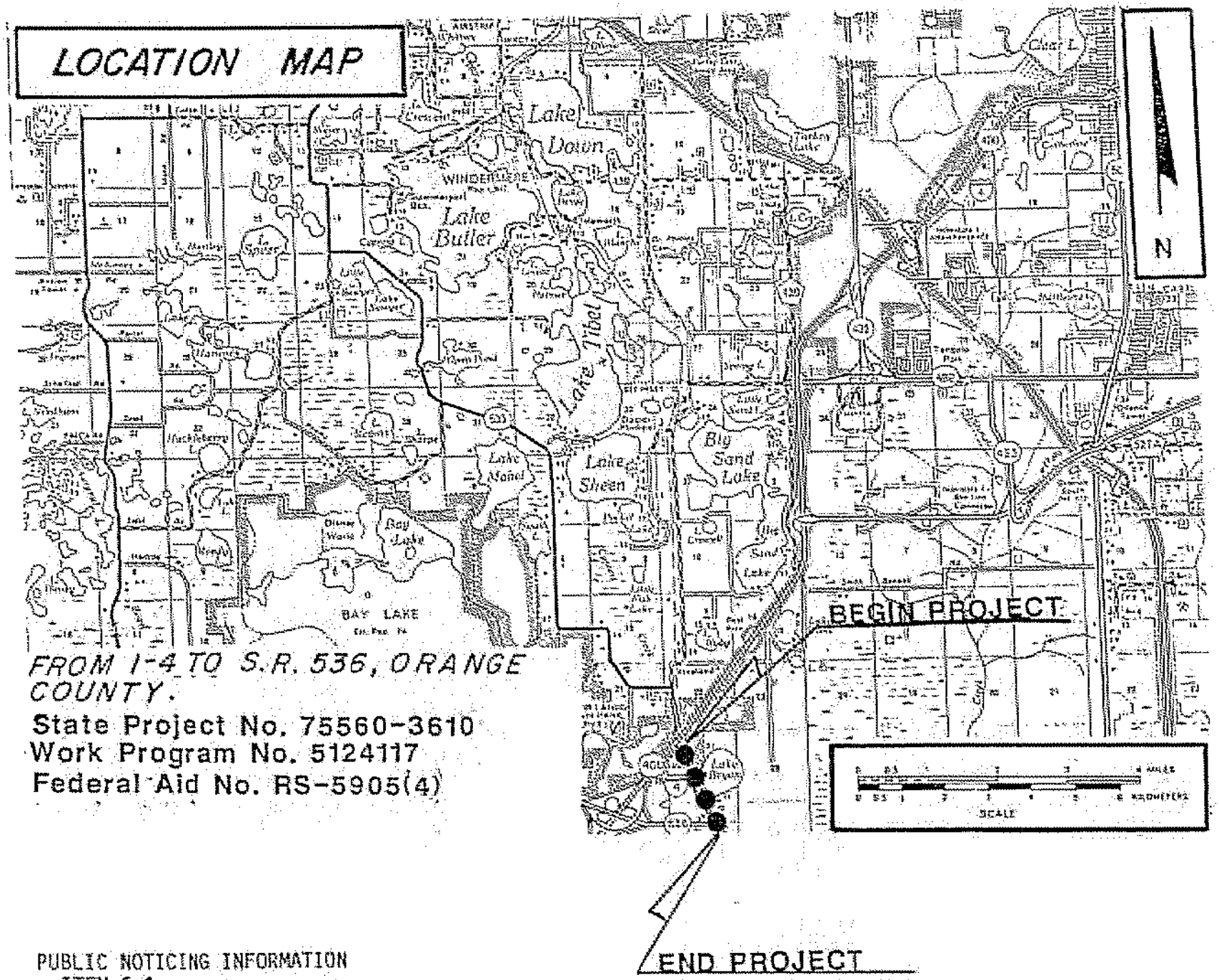
Should further information be required, please contact me at SUNCOM 383-5444. Thank you for your attention.

Sincerely,

Bryon J. Russell
Environmental Specialist

BJR/ksh
Enclosure

LOCATION MAP

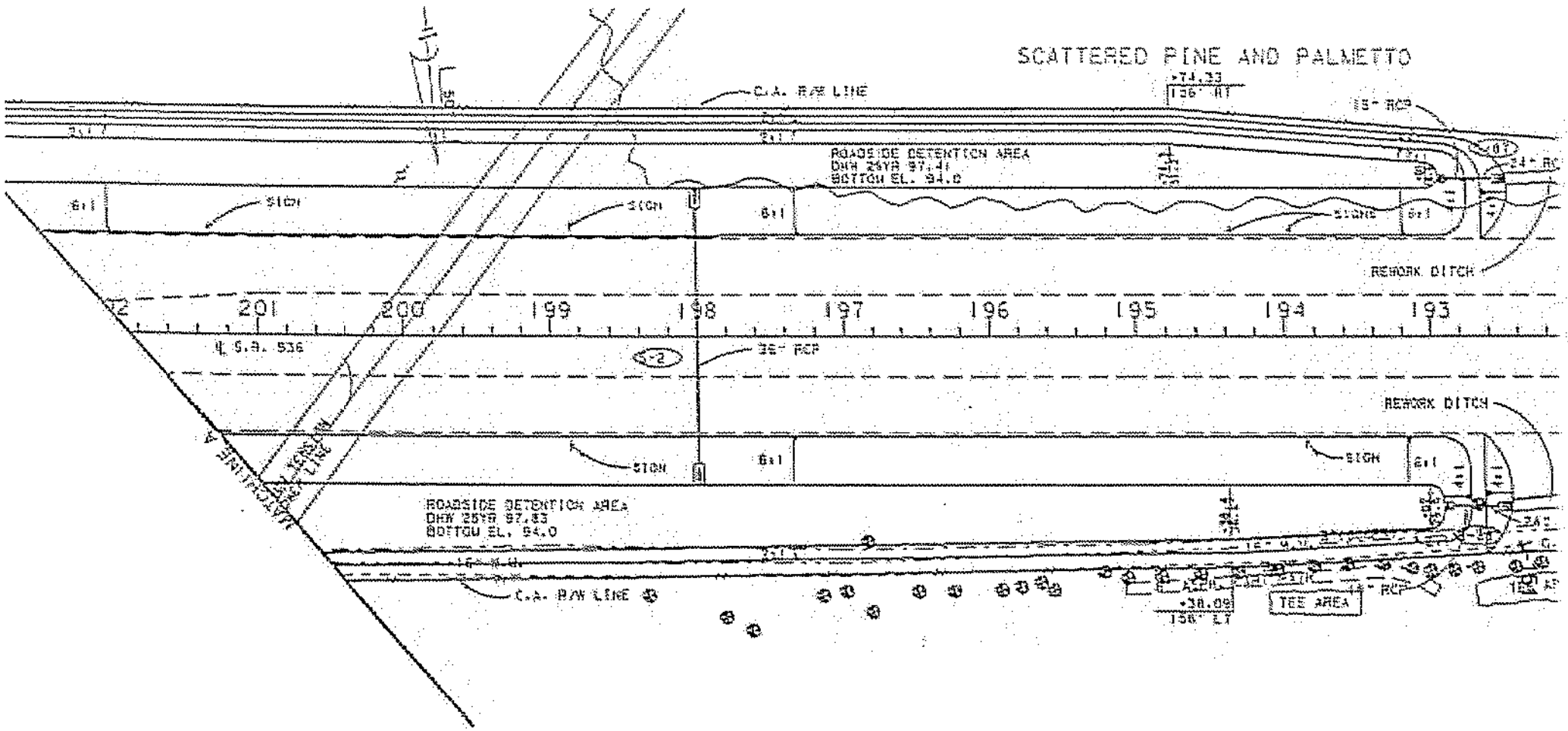


FROM I-4 TO S.R. 536, ORANGE COUNTY.

State Project No. 75560-3610
Work Program No. 5124117
Federal Aid No. RS-5905(4)

PUBLIC NOTICING INFORMATION
ITEM 6-1

UBLIC NOTICE INFORMATION
TEM VI-2



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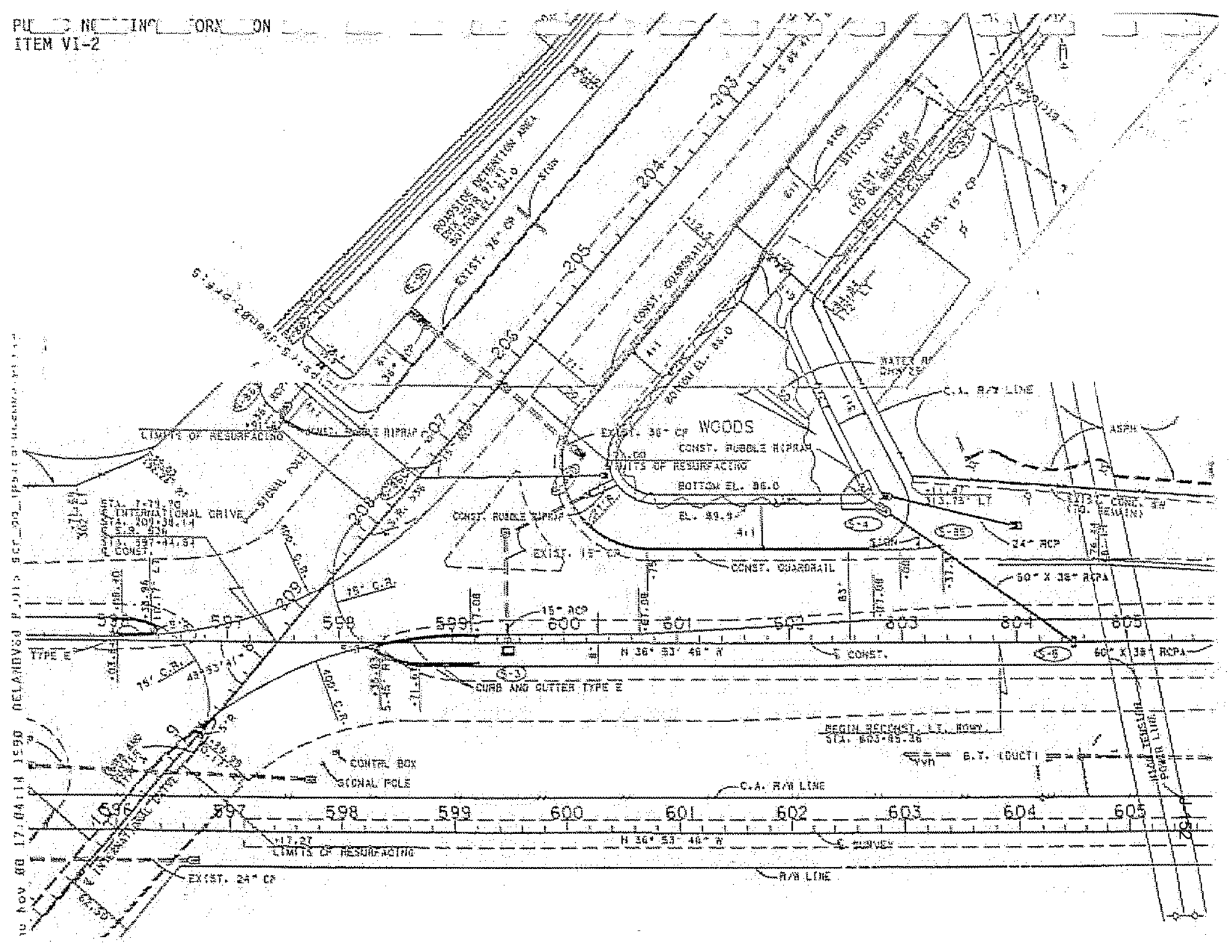
ITEM VI-2



THIS CONTRACT PLAN SET INCLUDES:
ROADWAY PLANS
SIGNING AND PAVEMENT MARKING PLANS
SIGNALIZATION PLANS

A DETAILED INDEX APPEARS ON THE KEY SHEET OF EACH GROUP OF PLANS

INDEX OF ROADWAY PLANS

SHEET NO.	SHEET DESCRIPTION
1	KEY SHEET
2-3	SUMMARY OF PAY ITEMS
4-5	DRAINAGE MAPS
6-10	TYPICAL SECTIONS
11	SUMMARY OF QUANTITIES
12-14	SUMMARY OF DRAINAGE STRUCTURES
15-26	PLAN AND PROFILES
27-28	SUPERELEVATION DETAILS
29-30	BACK OF SIDEWALK PROFILES
31-33	INTERSECTION DETAILS
34-47	DRAINAGE STRUCTURES
48	FRENCH DRAIN DETAIL
49	SOIL SURVEY
50-76	CROSS SECTIONS
77-78	TRAFFIC CONTROL SHEETS
79-84	UTILITY ADJUSTMENT SHEETS

ROADWAY AND TRAFFIC DESIGN STANDARDS
(BOOKLET DATED JANUARY, 1990)

REVISIONS
ROADWAY SHEETS 1,2,12,14,35,36 (REVISED 1-7-91)

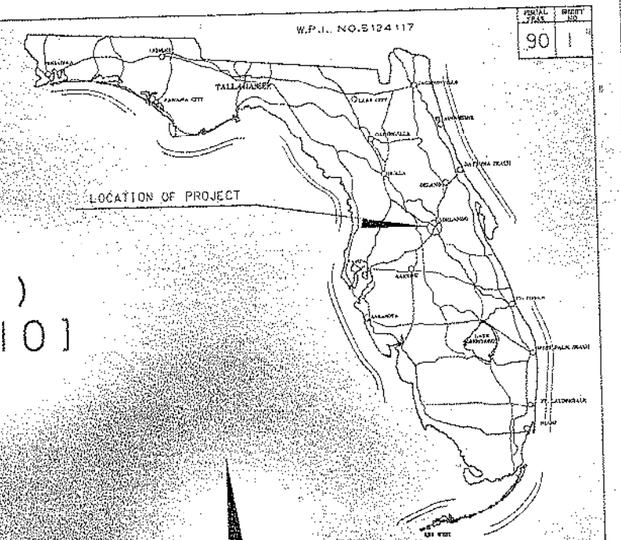
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY

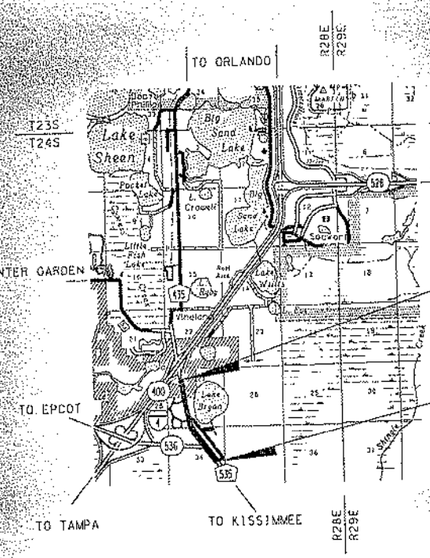
F.A. PROJ. NO. RS-5905(4)
[STATE PROJ. NO. 75560-3610]
ORANGE COUNTY
S.R. NO. 535

W.P.I. NO. 5124117

FISCAL YEAR	SHEET NO.
90	1



LOCATION OF PROJECT



END PROJECT
STA. 668+00.00

BEGIN PROJECT
STA. 583+00.00
M.P. NO. 0.639

NOTE: PROJECT LENGTH IS BASED ON ℄ SURVEY STATIONS.

LENGTH OF PROJECT

	LINEAR FT.	MILES
ROADWAY	8500.00	1.609
BRIDGES	0.00	0.00
NET LENGTH OF PROJ.	8500.00	1.609
EXCEPTIONS	0.00	0.00
GROSS LENGTH OF PROJ.	8500.00	1.609

ROADWAY PLANS ENGINEER OF RECORD

GEORGE A. BORCHIK, P.E.
FLORIDA DEPT. OF TRANSPORTATION
DISTRICT 5 OFFICE
719 SOUTH WOODLAND BLVD.
DELAND, FLORIDA 32720

ATTENTION IS DIRECTED TO THE FACT THAT THESE PLANS MAY HAVE BEEN REDUCED IN SIZE BY REPRODUCTION. THIS MUST BE CONSIDERED WHEN OBTAINING SCALED DATA.

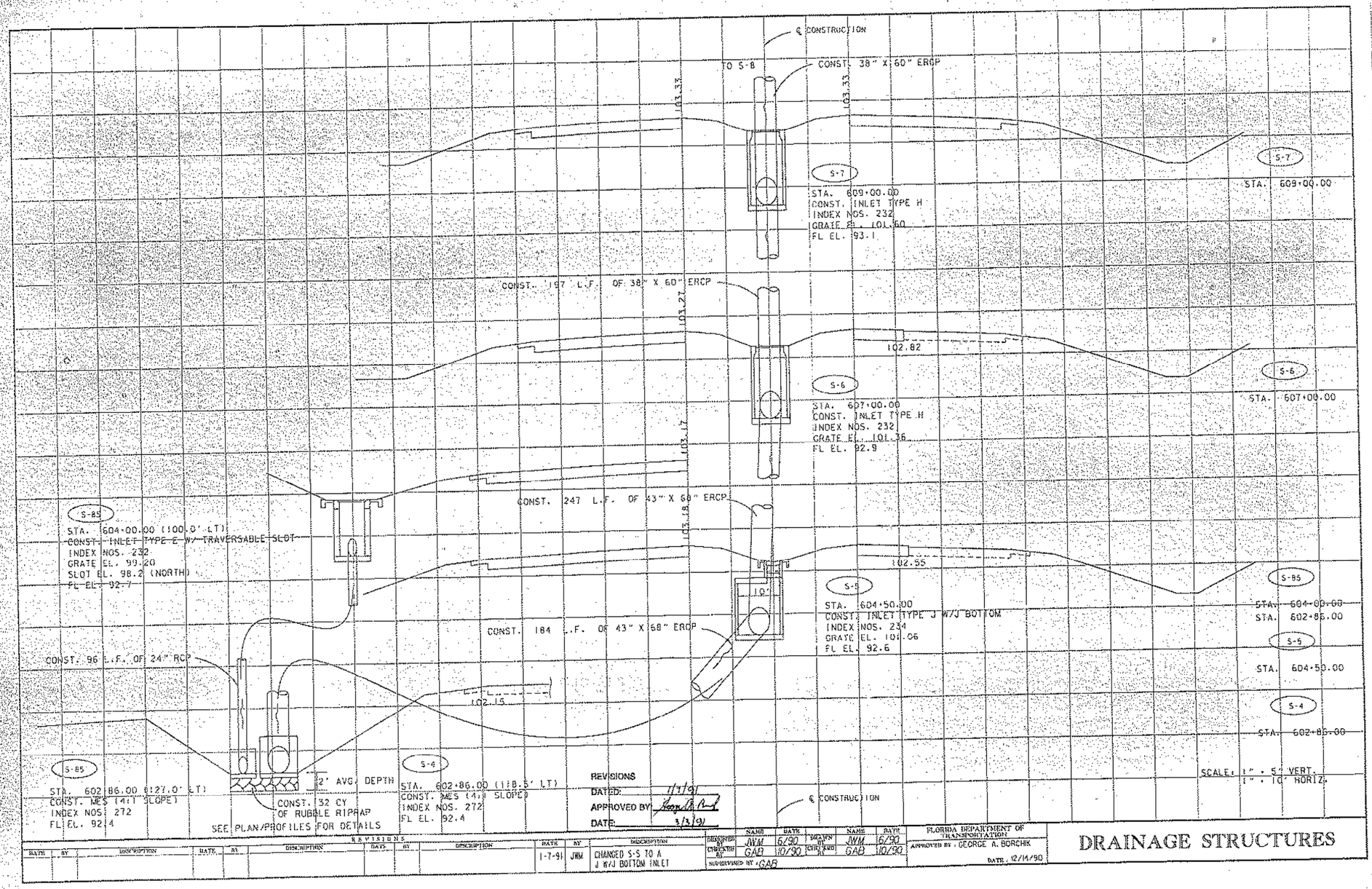
GOVERNING SPECIFICATIONS: STATE OF FLORIDA, DEPARTMENT OF TRANSPORTATION, STANDARD SPECIFICATIONS, DATED 1986 AND SUPPLEMENTS THERETO IF NOTED IN THE SPECIAL PROVISIONS FOR THIS PROJECT.

REVISIONS
DATED: 1/7/91
APPROVED BY: [signature]
DATE: 1/7/91

ROADWAY PLANS APPROVED BY: George A. Borchik, P.E.
DATE: 12/14/90
P.E. NO.: 40053

DESIGNER: JASON W. MCCRAY PROJECT MANAGER: GEORGE A. BORCHIK

STATE PROJ. NO.	SHEET NO.
75560-3610	35



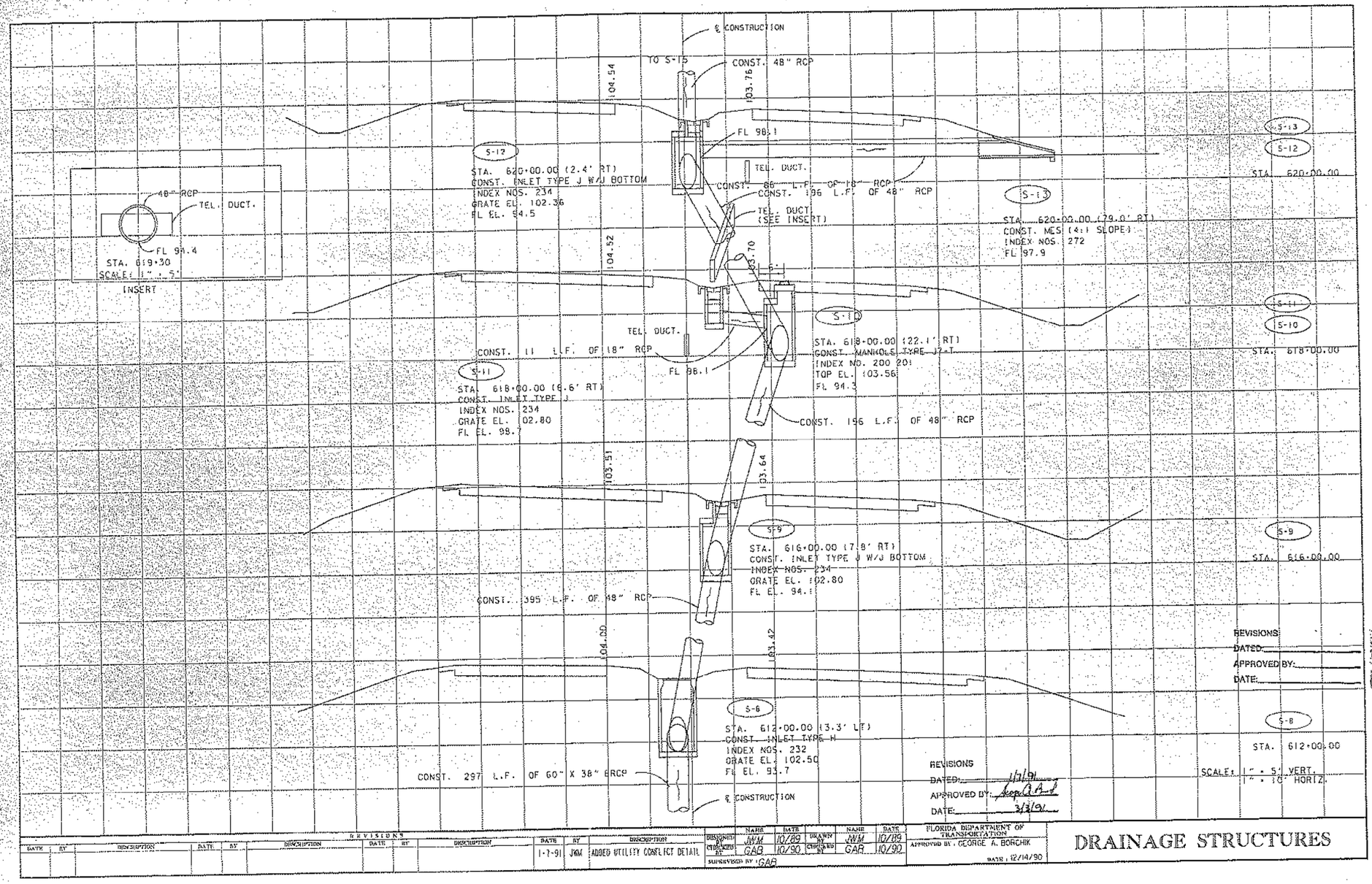
REVISIONS									
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
									1-7-91	JWM	CHANGED S-5 TO A J W/J BOTTOM INLET

	NAME	DATE		NAME	DATE
DESIGNED BY	JWM	6/90	DRAWN BY	JWM	6/90
CHECKED BY	GAB	10/90	CHECKED BY	GAB	10/90
SUPERVISED BY	GAB				

FLORIDA DEPARTMENT OF TRANSPORTATION
APPROVED BY: GEORGE A. BORCHIK
DATE: 12/14/90

DRAINAGE STRUCTURES

STATE PROJ. NO.	SHEET NO.
75560-3610	36



REVISIONS								
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
						1-7-91	JWM	ADDED UTILITY CONFLICT DETAIL

	NAME	DATE		NAME	DATE
DESIGNED BY	JWM	10/89	DRAWN BY	JWM	10/89
CHECKED BY	GAB	10/90	CHECKED BY	GAB	10/90
SUPERVISED BY	GAB				

FLORIDA DEPARTMENT OF TRANSPORTATION
APPROVED BY: GEORGE A. BORCHIK
DATE: 12/14/90

DRAINAGE STRUCTURES

THIS CONTRACT PLAN SET INCLUDES
ROADWAY PLANS
SIGNING AND PAVEMENT MARKING PLANS
SIGNALIZATION PLANS

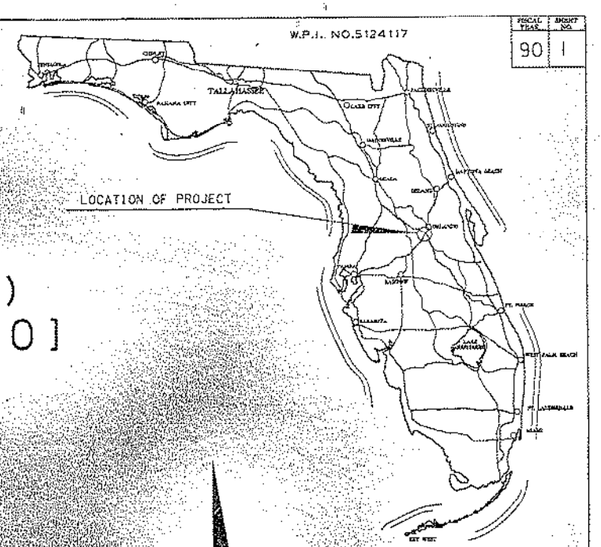
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY

F.A. PROJ. NO. RS-5905(4)
[STATE PROJ. NO. 75560-3610]
ORANGE COUNTY
S.R. NO. 535

W.P.I. NO. 5124117

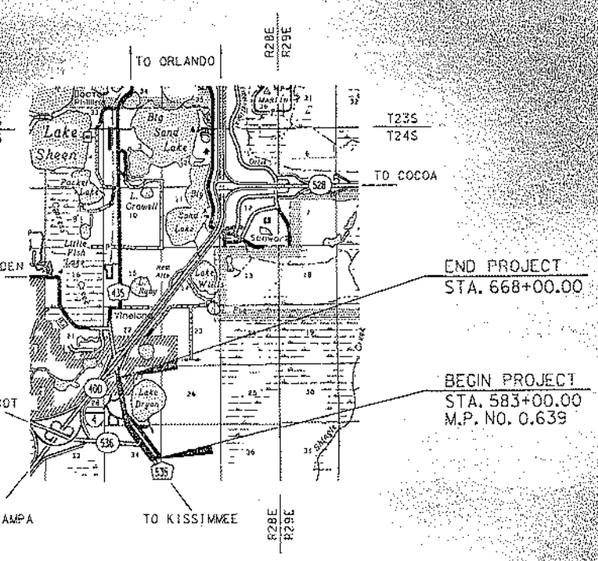
FISCAL YEAR	SHEET NO.
90	1



A DETAILED INDEX APPEARS ON THE KEY SHEET OF EACH GROUP OF PLANS

INDEX OF ROADWAY PLANS

SHEET NO.	SHEET DESCRIPTION
1	KEY SHEET
2-3	SUMMARY OF PAY ITEMS
4-5	DRAINAGE MAPS
6-10	TYPICAL SECTIONS
11	SUMMARY OF QUANTITIES
12-14	SUMMARY OF DRAINAGE STRUCTURES
15-26	PLAN AND PROFILES
27-28	SUPERELEVATION DETAILS
29-30	BACK OF SIDEWALK PROFILES
31-33	INTERSECTION DETAILS
34-47	DRAINAGE STRUCTURES
48	FRENCH DRAIN DETAIL
49	SOIL SURVEY
50-76	CROSS SECTIONS
77-78	TRAFFIC CONTROL SHEETS
79-84	UTILITY ADJUSTMENT SHEETS



END PROJECT
STA. 668+00.00

BEGIN PROJECT
STA. 583+00.00
M.P. NO. 0.639

1 MILE

ROADWAY AND TRAFFIC DESIGN STANDARDS
(BOOKLET DATED JANUARY, 1990)

NOTE: PROJECT LENGTH IS BASED ON ℄ SURVEY STATIONS.

LENGTH OF PROJECT

	LINEAR FT.	MILES
ROADWAY	8500.00	1.609
BRIDGES	0.00	0.00
NET LENGTH OF PROJ.	8500.00	1.609
EXCEPTIONS	0.00	0.00
GROSS LENGTH OF PROJ.	8500.00	1.609

ROADWAY PLANS ENGINEER OF RECORD

GEORGE A. BORCHIK, P.E.
FLORIDA DEPT. OF TRANSPORTATION
DISTRICT 5 OFFICE
719 SOUTH WOODLAND BLVD.
DELAND, FLORIDA 32720

ATTENTION IS DIRECTED TO THE FACT THAT THESE PLANS MAY HAVE BEEN REDUCED IN SIZE BY REPRODUCTION. THIS MUST BE CONSIDERED WHEN OBTAINING SCALED DATA.

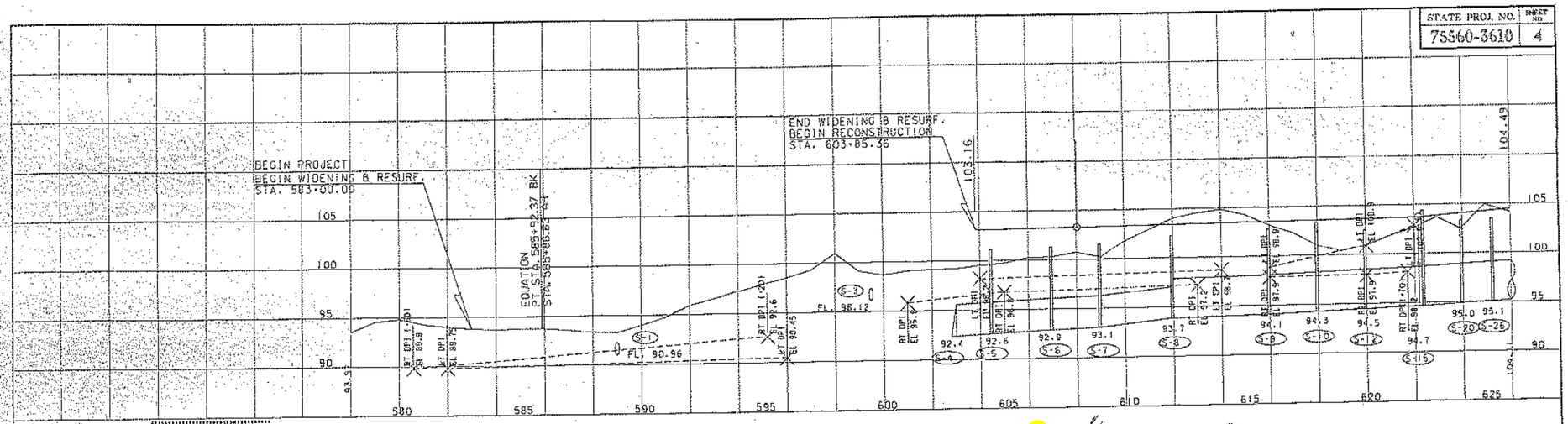
GOVERNING SPECIFICATIONS: STATE OF FLORIDA, DEPARTMENT OF TRANSPORTATION, STANDARD SPECIFICATIONS, DATED 1986 AND SUPPLEMENTS THERETO IF NOTED IN THE SPECIAL PROVISIONS FOR THIS PROJECT.

12/21/90

ROADWAY PLANS APPROVED BY: George A. Borchik, P.E.
DATE: 12/14/90
P.E. NO.: 40953

DESIGNER: JASON W. MCCRAY PROJECT MANAGER: GEORGE A. BORCHIK

STATE PROJ. NO.	SHEET NO.
75560-3610	4



STATE PROJECT NO. 75560-3610
F.A. PROJECT NO. M5-5905(4)
A.P.I. NO. 5574117
DATE: 08/29/90

SHEET 1 OF 1

LOCATION NO.	STATION	DESIGN FLOOD 24 HOUR, 100 YR/FREQ		BASE FLOOD 24 HOUR, 100 YR/FREQ		OVERTOPPING FLOOD				GREATEST FLOOD			
		DISCHARGE	STAGE	DISCHARGE	STAGE	DISCHARGE	STAGE	TYP	DUR HRS	DISCHARGE	STAGE	TYP	DUR
S-80	584+36	76.85	88.20	30.12	86.81	30.68	88.30	.36	116.7	-	-	-	-
S-7	598+00	89.02	98.20	30.12	90.81	30.68	98.00	.84	116.7	-	-	-	-

NOTE: THE HYDRAULIC DATA IS SHOWN FOR INFORMATIONAL PURPOSES ONLY. TO INDICATE THE FLOOD DISCHARGES AND WATER SURFACE ELEVATIONS WHICH MAY BE ANTICIPATED DURING THE DESIGN YEAR. THIS DATA WAS GENERATED USING HISTORIC RAINFALL FACTORS DETERMINED BY A STUDY OF THE WATERSHED. MANY JUDGEMENTS AND ASSUMPTIONS ARE REQUIRED TO ESTABLISH THESE FACTORS. THE RESULTANT HYDRAULIC DATA IS SENSITIVE TO CHANGES, PARTICULARLY TO ANTECEDENT CONDITIONS, URBANIZATION, CHANNELIZATION, AND LAND USE. USERS OF THIS DATA ARE CAUTIONED AGAINST THE ASSUMPTION OF PRECISION WHICH CAN NOT BE ATTAINED. DISCHARGES ARE IN CUBIC FEET PER SECOND AND STAGES ARE IN FEET, NGVD, 1929.

DEFINITIONS:

DESIGN FLOOD: THE FLOOD SELECTED BY F.D.O.T. TO BE UTILIZED TO ASSURE A STANDARD LEVEL OF HYDRAULIC PERFORMANCE.

BASE FLOOD: THE FLOOD HAVING A 1% CHANCE OF BEING EXCEEDED IN ANY YEAR. (100 YR. FREQUENCY)

OVERTOPPING FLOOD: THE FLOOD WHERE FLOW OCCURS (1) OVER THE HIGHWAY (2) OVER A NATURAL DIVIDE OR (3) INTO EMERGENCY RELIEF STRUCTURES.

GREATEST FLOOD: THE MOST SEVERE FLOOD WHICH CAN BE PREDICTED WHERE OVERTOPPING IS NOT PRACTICABLE. NORMALLY ONE WITH A 0.2% CHANCE OF BEING EXCEEDED IN ANY YEAR. (500 YR. FREQUENCY)

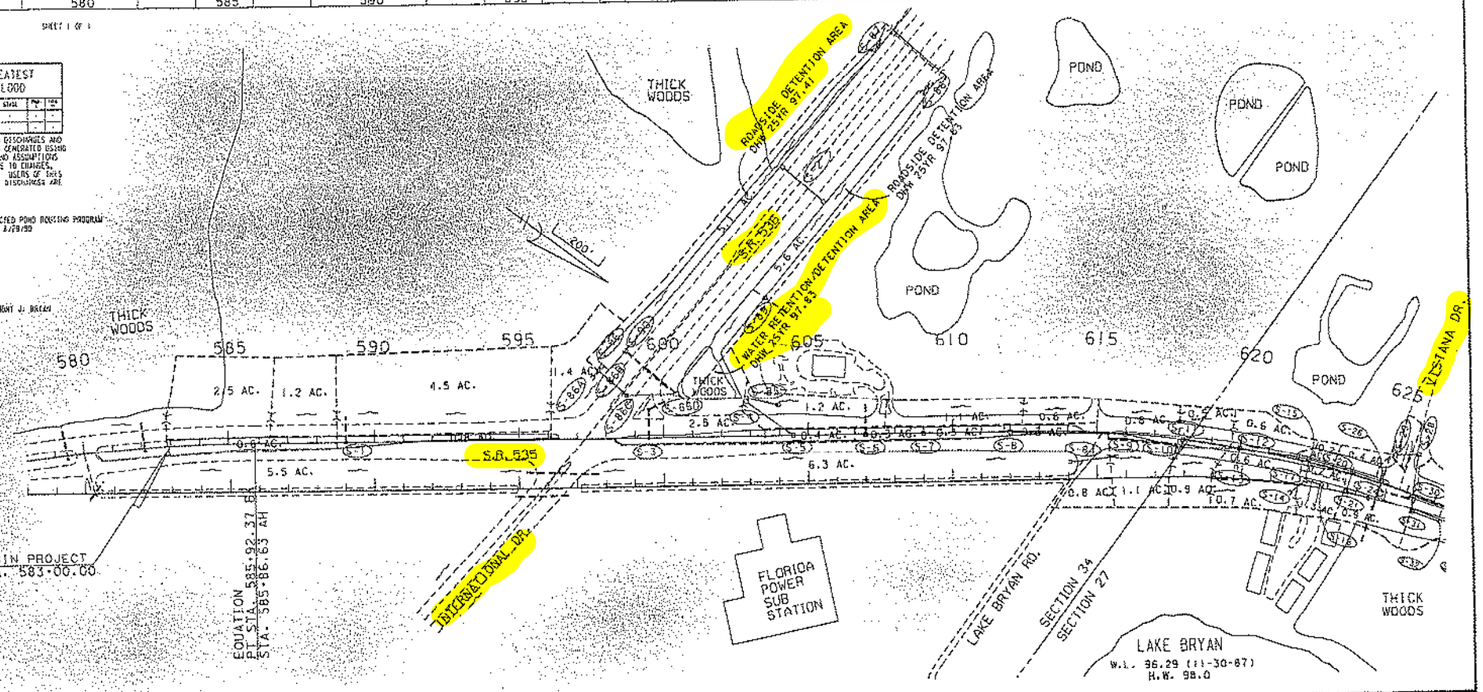
DATA ADAPTED FROM: INTERCONNECTED POND ROUTING PROGRAM CALCULATED 8/29/90

PREPARED BY: GREG DYESS

DATE: 9/04/90

APPROVED FOR USE ON THIS PROJECT BY: ANTHONY J. BRAND

DATE: 9/04/90



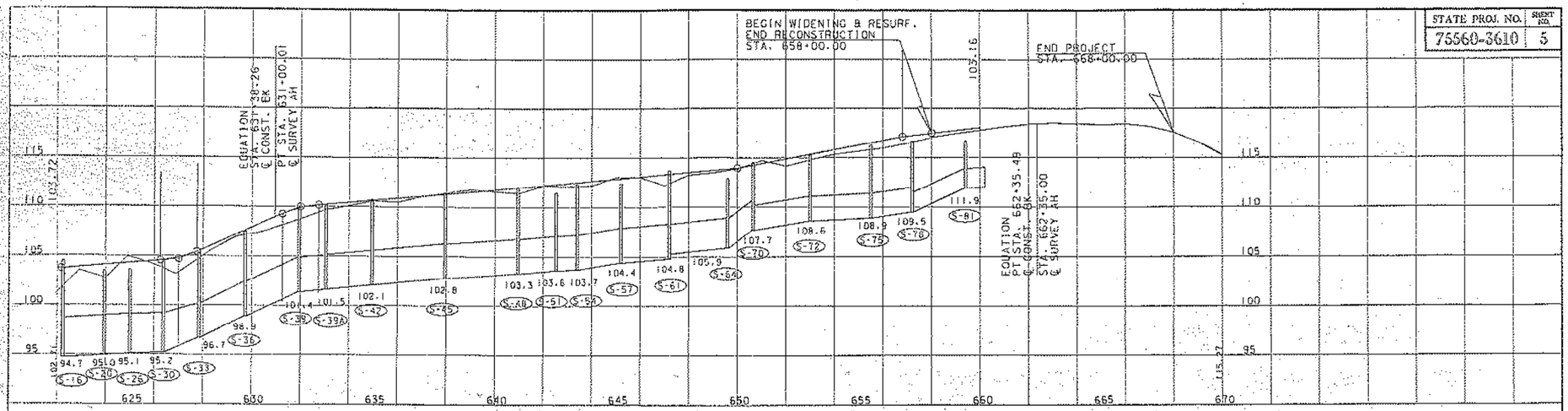
REVISIONS									
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

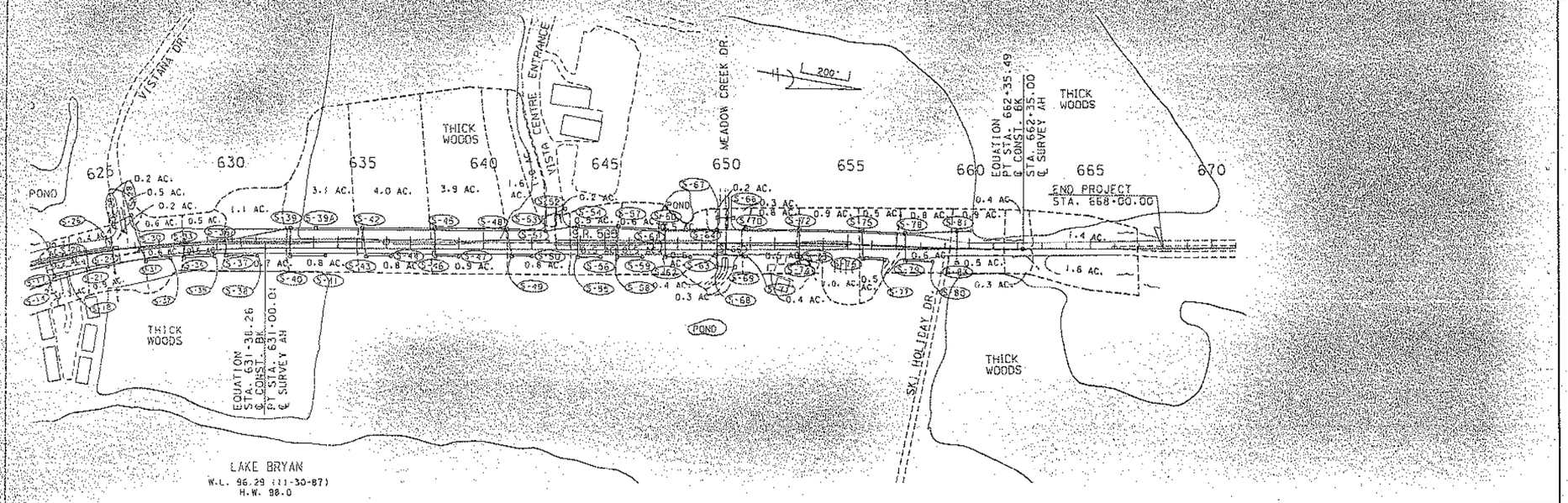
	NAME	DATE		NAME	DATE
DESIGNED BY	JWM	3/90	DRAWN BY	JWM	3/90
CHECKED BY	GAB	10/90	CHECKED BY	GAB	10/90
SUPERVISED BY: GAB					

FLORIDA DEPARTMENT OF TRANSPORTATION
APPROVED BY: GEORGE A. BORCHIK
DATE: 12/14/90

DRAINAGE MAP

STATE PROJ. NO.	SHEET NO.
75560-3610	5





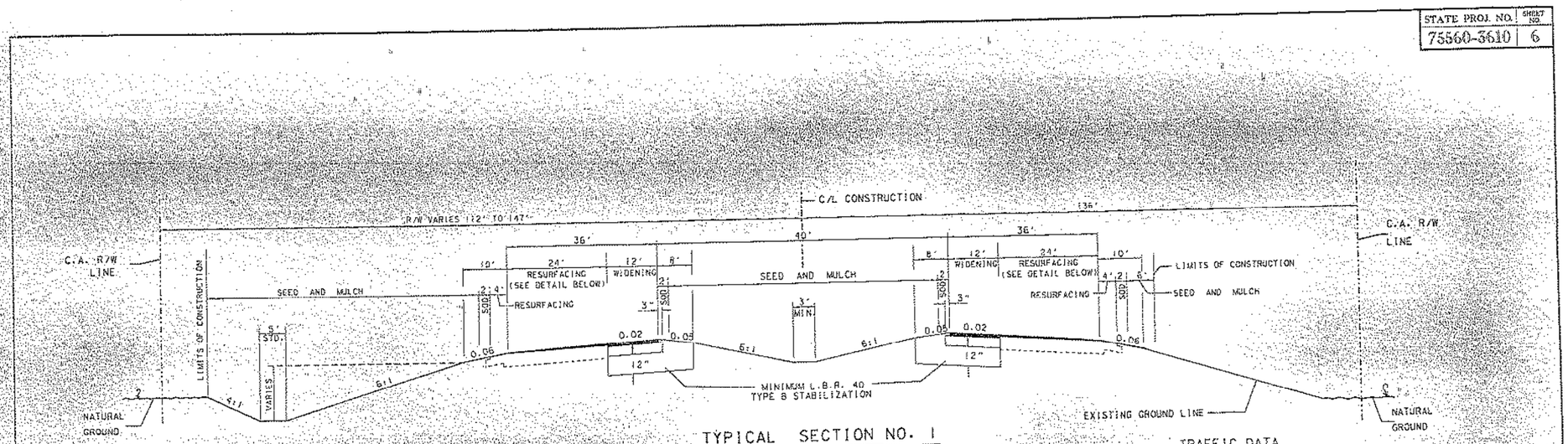
REVISIONS											
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

	NAME	DATE		NAME	DATE
DESIGNED BY	JWM	3/90	DRAWN BY	JWM	3/90
CHECKED BY	GAB	10/90	CHECKED BY	GAB	10/90
SUPERVISED BY : GAB					

FLORIDA DEPARTMENT OF TRANSPORTATION
APPROVED BY : GEORGE A. BORCHIK
DATE : 12/14/90

DRAINAGE MAP

STATE PROJ. NO.	SHEET NO.
75560-3610	6



TYPICAL SECTION NO. 1

STA. 583+00.00 - STA. 603+85.36 LT. RDWY.
STA. 583+00.00 - STA. 608+03.58 RT. RDWY.

WIDENING

OPTIONAL BASE GROUP 10 (FOR THICKNESS, SEE BELOW) WITH TYPE S STRUCTURAL COURSE (3") AND FRICTION COURSE FC-2 (5/8")

OPTIONAL BASE COURSES PERMITTED

	OPTION CODE
10 1/2" LIMEROCK BASE	983
6 1/2" ASPHALT BASE COURSE (TYPE 3)	367

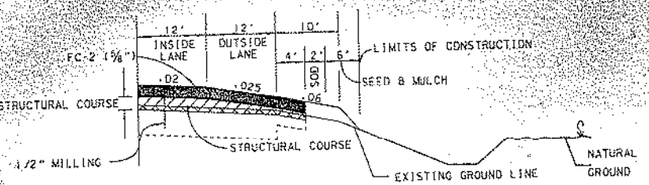
FOR ADDITIONAL DETAILS SEE INDEX NOS. 105,500,513,515

TRAFFIC DATA

1987 ADT= 17,865
1991 ADT= 20,557
2011 ADT= 36,000
K=12%, D=58%, T=8%.
Design Speed: 55 MPH

TYPICAL SECTION NOTES

1. NONE OF THE EXISTING LIMEROCK BASE THAT IS REMOVED IS TO BE USED IN THE CONSTRUCTION OF THE NEW LIMEROCK BASE.
2. ALL OF THE EXISTING LIMEROCK BASE THAT IS REMOVED IS TO BE INCORPORATED IN THE STABILIZED PORTION OF THE SUBGRADE.
3. FOR MEDIAN STABILIZING SEE STANDARD INDEX NO. 500.
4. FOR STABILIZING AT INTERSECTIONS, TURNOUTS AND GRADED CONNECTIONS SEE STANDARD INDEX NO. 515. SEE TYPICAL SECTION FOR DEPTH AND LBR.
5. THE CONTRACTOR SHOULD IDENTIFY THE 'PROPOSED' OPTION ON WHICH HIS INITIAL BID IS BASED BY ENTERING THE THREE DIGIT OPTION CODE TO THE RIGHT SIDE OF THE ITEM NUMBER OF OPTIONAL BASE ITEM ON THE SUBMITTED BID PROPOSAL.
6. IF ALT. AA IS USED ON TYPICALS 3 AND 4, ONLY ONE DENSE GRADED FRICTION COURSE (FC-1 OR 4) IS TO BE USED THROUGHOUT THE LIMITS OF THE PROJECT.
7. ACTUAL WIDTH OF BASE WIDENING MAY VARY DUE TO ACTUAL EXISTING PAVEMENT WIDTH. CONTRACTOR MAY ELECT TO PLACE UNIFORM WIDTH BASE WIDENING STRIP AT NO ADDITIONAL COST.
8. THE CONTRACTOR SHALL BID ON ONLY ONE FRICTION COURSE ALTERNATE ON TYPICAL SECTIONS NO. 3 AND NO. 4.



RESURFACING DETAIL

MILL EXISTING ASPHALT CONCRETE PAVEMENT (1/2" AVG. DEPTH)

INSIDE LANE

TYPE S STRUCTURAL COURSE 150 LBS/S.Y. AVG. AND FRICTION COURSE FC-2 (5/8")

OUTSIDE LANE

TYPE S STRUCTURAL COURSE 112.5 LBS/S.Y. AVG. AND FRICTION COURSE FC-2 (5/8")

PAVED SHOULDER

TYPE S STRUCTURAL COURSE 75 LBS/S.Y. AVG. AND FRICTION COURSE FC-2 (5/8")

REVISIONS											
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

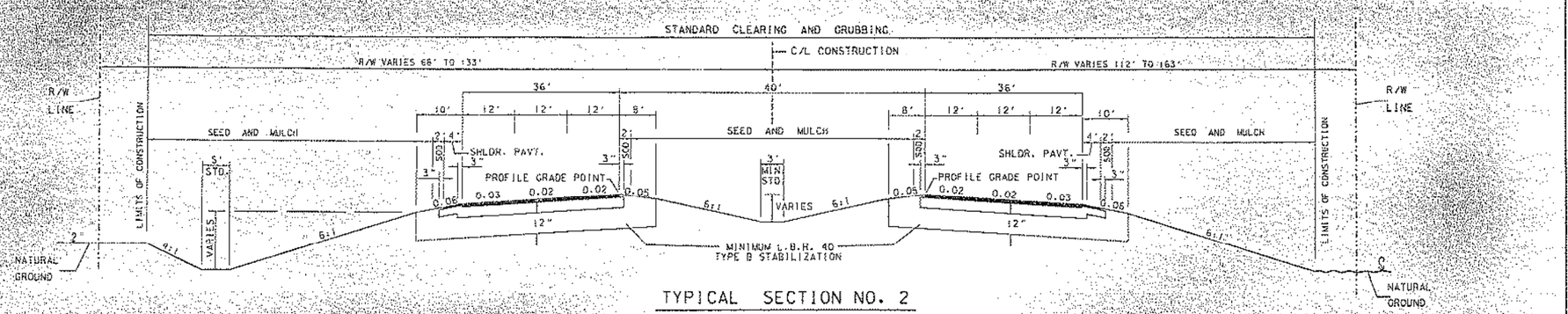
	NAME	DATE
DESIGNED BY	JWM	10/89
CHECKED BY	GAB	10/90
SUPERVISED BY	GAB	

	NAME	DATE
DRAWN BY	JWM	10/89
CHECKED BY	GAB	10/90

FLORIDA DEPARTMENT OF TRANSPORTATION
APPROVED BY: GEORGE A. SORCHIK
DATE: 12/14/90

TYPICAL SECTIONS

STATE PROJ. NO.	SHEET NO.
75560-3610	7



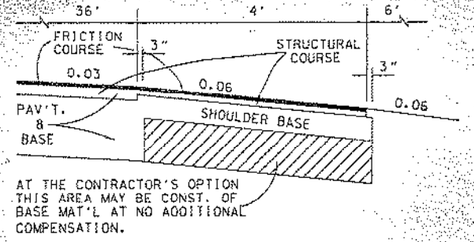
TYPICAL SECTION NO. 2

STA. 603+85.36 - STA. 622+27.31 LT. RDWY.
STA. 608+03.58 - STA. 622+27.31 RT. RDWY.

OPTIONAL BASE GROUP 9 (FOR THICKNESS, SEE BELOW) WITH TYPE S STRUCTURAL COURSE (3 1/2") AND FRICTION COURSE FC-2 (5/8 ")

OPTIONAL BASE COURSES PERMITTED	OPTION CODE
10" LIMEROCK BASE	990
6" ASPHALT BASE COURSE (TYPE 3)	327

FOR ADDITIONAL DETAILS SEE INDEX NOS. 500,511,513,515
DESIGN SPEED: 45 MPH



AT THE CONTRACTOR'S OPTION THIS AREA MAY BE CONST. OF BASE MAT'L AT NO ADDITIONAL COMPENSATION.

SHOULDER PAVEMENT DETAIL

OPTIONAL BASE GROUP 16 (FOR THICKNESS, SEE BELOW) WITH TYPE S STRUCTURAL COURSE (1 ") AND FRICTION COURSE FC-2 (5/8 ")

OPTIONAL BASE COURSES PERMITTED	OPTION CODE
4" LIMEROCK BASE	981
3" ASPHALT BASE COURSE (TYPE 1)	604
3" ASPHALT BASE COURSE (TYPE 2)	605
3" ASPHALT BASE COURSE (TYPE 3)	606

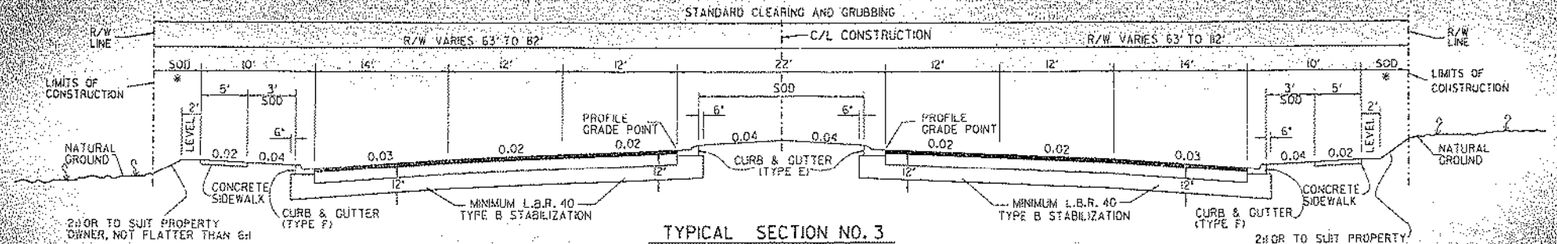
REVISIONS											
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

	NAME	DATE		NAME	DATE
DESIGNED	JWM	10/89	DRAWN BY	JWM	10/89
CHECKED BY	GAB	10/90	CHECKED BY	GAB	10/90
SUPERVISED BY: GAB					

FLORIDA DEPARTMENT OF TRANSPORTATION
APPROVED BY: GEORGE A. BORCHIK
12/26/90 DATE: 12/14/90

TYPICAL SECTIONS

STATE PROJ. NO.	SHEET NO.
75560-3610	8



TYPICAL SECTION NO. 3

STA. 622+27.31 - STA. 658+60.00

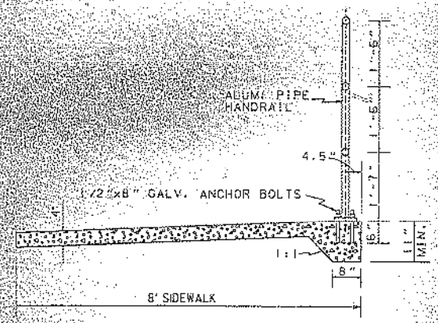
NOTE: CONCRETE SIDEWALK ENDS AT STA 650+60 LT.

* WIDTH VARIES, SEE CROSS SECTIONS

OPTIONAL BASE GROUP 9 (FOR THICKNESS, SEE BELOW) WITH EITHER TYPE S STRUCTURAL COURSE (3 ") AND FRICTION COURSE FC-1 OR 4 (1") ALT. AA OR TYPE S STRUCTURAL COURSE (3 1/2") AND FRICTION COURSE FC-2 (5/8") ALT. AB

OPTIONAL BASE COURSES PERMITTED	OPTION CODE
10" LIMEROCK BASE	990
6" ASPHALT BASE COURSE (TYPE 3)	327

FOR ADDITIONAL DETAILS SEE INDEX NOS. 300;500,510,513,515
DESIGN SPEED: 45 MPH



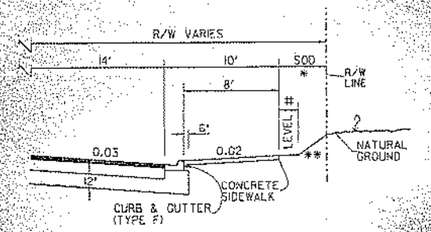
DETAIL OF ALUMINUM PIPE HANDRAIL

STA. 652+50 TO STA. 683+50 RT.

NOTE: STATIONING SHOWN ABOVE IS APPROXIMATE. EXACT STATIONS ARE TO BE DETERMINED BY THE ENGINEER DURING CONSTRUCTION.

EXTRA CONCRETE UNDER ALUMINUM PIPE HANDRAIL IS TO BE PAID FOR UNDER ITEM NO. 522-1 CONC. SIDEWALK (4" THICK)

FOR ADDITIONAL DETAILS SEE INDEX NO. 520



SPECIAL DETAIL

STA. 650+72.11 TO STA. 658+00.00 RT.

\# STA 652+50 TO STA 653+50 RT VARIES AS REQUIRED TO MATCH EXISTING GROUND LINES, 1' MIN.

** STA 652+50 TO STA 653+50 RT. SLOPE VARIES AS REQUIRED TO MATCH GROUND LINES AT RIGHT OF WAY, 1.5:1 MAX.

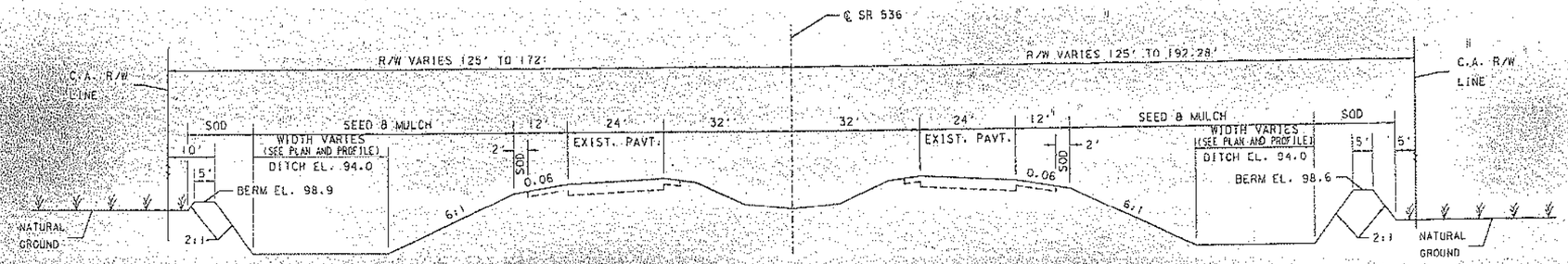
REVISIONS											
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

	NAME	DATE		NAME	DATE
DESIGNED BY	JWH	10/89	DRAWN BY	JWH	10/89
CHECKED BY	GAB	10/90	CHECKED BY	GAB	10/90
SUPERVISED BY: GAB					

FLORIDA DEPARTMENT OF TRANSPORTATION
APPROVED BY: GEORGE A. BORCHIK
DATE: 12/14/90

TYPICAL SECTIONS

STATE PROJ. NO.	SHEET NO.
75560-3610	10



TYPICAL SECTION NO. 5

STA. 192+83.40 - STA. 203+84.84 LT ℄ SR 536
STA. 192+83.40 - STA. 207+40.00 RT ℄ SR 536

REVISIONS																			
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION								

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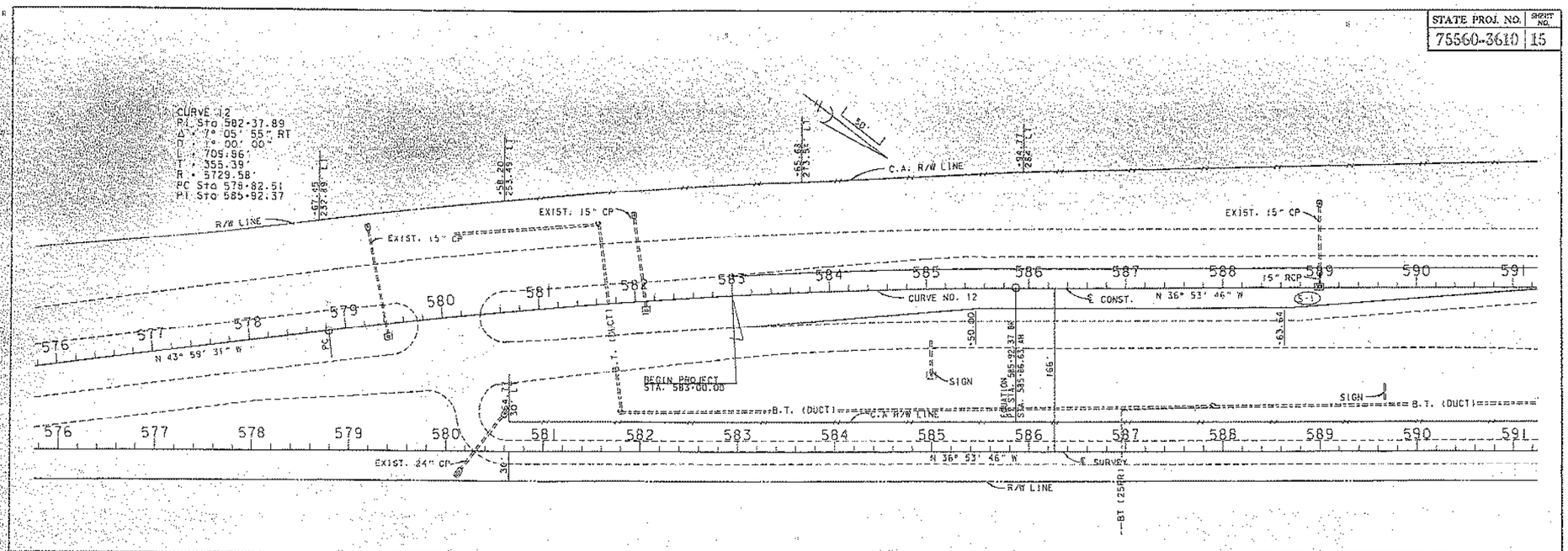
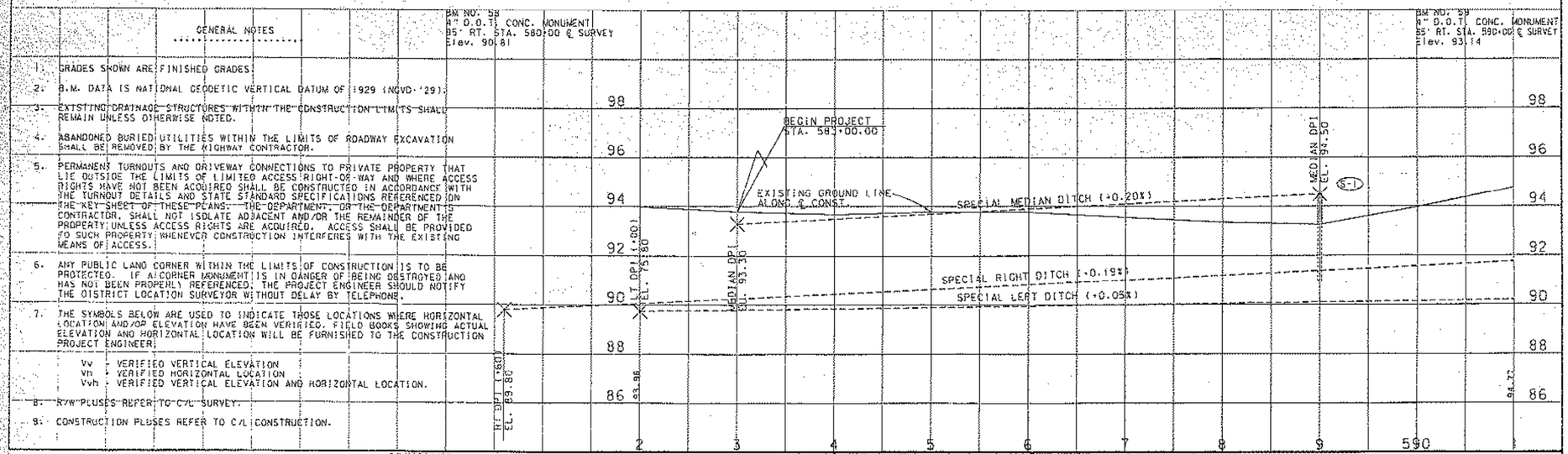
SUPERVISED BY : GAB					

FLORIDA DEPARTMENT OF TRANSPORTATION
APPROVED BY : GEORGE A. BORCHIK
DATE : 12/14/90

TYPICAL SECTIONS

STATE PROJ. NO.	SHEET NO.
75560-3610	15





GENERAL NOTES

1. GRADES SHOWN ARE FINISHED GRADES.
2. B.M. DATA IS NATIONAL GEODETIC VERTICAL DATUM OF 1929 (NGVD-'29).
3. EXISTING DRAINAGE STRUCTURES WITHIN THE CONSTRUCTION LIMITS SHALL REMAIN UNLESS OTHERWISE NOTED.
4. ABANDONED BURIED UTILITIES WITHIN THE LIMITS OF ROADWAY EXCAVATION SHALL BE REMOVED BY THE HIGHWAY CONTRACTOR.
5. PERMANENT TURNOUTS AND DRIVEWAY CONNECTIONS TO PRIVATE PROPERTY THAT LIE OUTSIDE THE LIMITS OF LIMITED ACCESS RIGHT-OF-WAY AND WHERE ACCESS RIGHTS HAVE NOT BEEN ACQUIRED SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE TURNOUT DETAILS AND STATE STANDARD SPECIFICATIONS REFERENCED ON THE KEY SHEET OF THESE PLANS. THE DEPARTMENT, OR THE DEPARTMENT'S CONTRACTOR, SHALL NOT ISOLATE ADJACENT AND/OR THE REMAINDER OF THE PROPERTY UNLESS ACCESS RIGHTS ARE ACQUIRED. ACCESS SHALL BE PROVIDED TO SUCH PROPERTY WHENEVER CONSTRUCTION INTERFERES WITH THE EXISTING MEANS OF ACCESS.
6. ANY PUBLIC LAND CORNER WITHIN THE LIMITS OF CONSTRUCTION IS TO BE PROTECTED. IF A CORNER MONUMENT IS IN DANGER OF BEING DESTROYED AND HAS NOT BEEN PROPERLY REFERENCED, THE PROJECT ENGINEER SHOULD NOTIFY THE DISTRICT LOCATION SURVEYOR WITHOUT DELAY BY TELEPHONE.
7. THE SYMBOLS BELOW ARE USED TO INDICATE THOSE LOCATIONS WHERE HORIZONTAL LOCATION AND/OR ELEVATION HAVE BEEN VERIFIED. FIELD BOOKS SHOWING ACTUAL ELEVATION AND HORIZONTAL LOCATION WILL BE FURNISHED TO THE CONSTRUCTION PROJECT ENGINEER.

   Vv - VERIFIED VERTICAL ELEVATION
   Vh - VERIFIED HORIZONTAL LOCATION
   Vvh - VERIFIED VERTICAL ELEVATION AND HORIZONTAL LOCATION.

8. R/W PLUSES REFER TO C/L SURVEY.
9. CONSTRUCTION PLUSES REFER TO C/L CONSTRUCTION.

BM NO. 58
4" D.O.T. CONC. MONUMENT
85' RT. STA. 580+00 ℄ SURVEY
Elev. 90.81

BM NO. 59
4" D.O.T. CONC. MONUMENT
85' RT. STA. 590+00 ℄ SURVEY
Elev. 93.14

REVISIONS														
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION			

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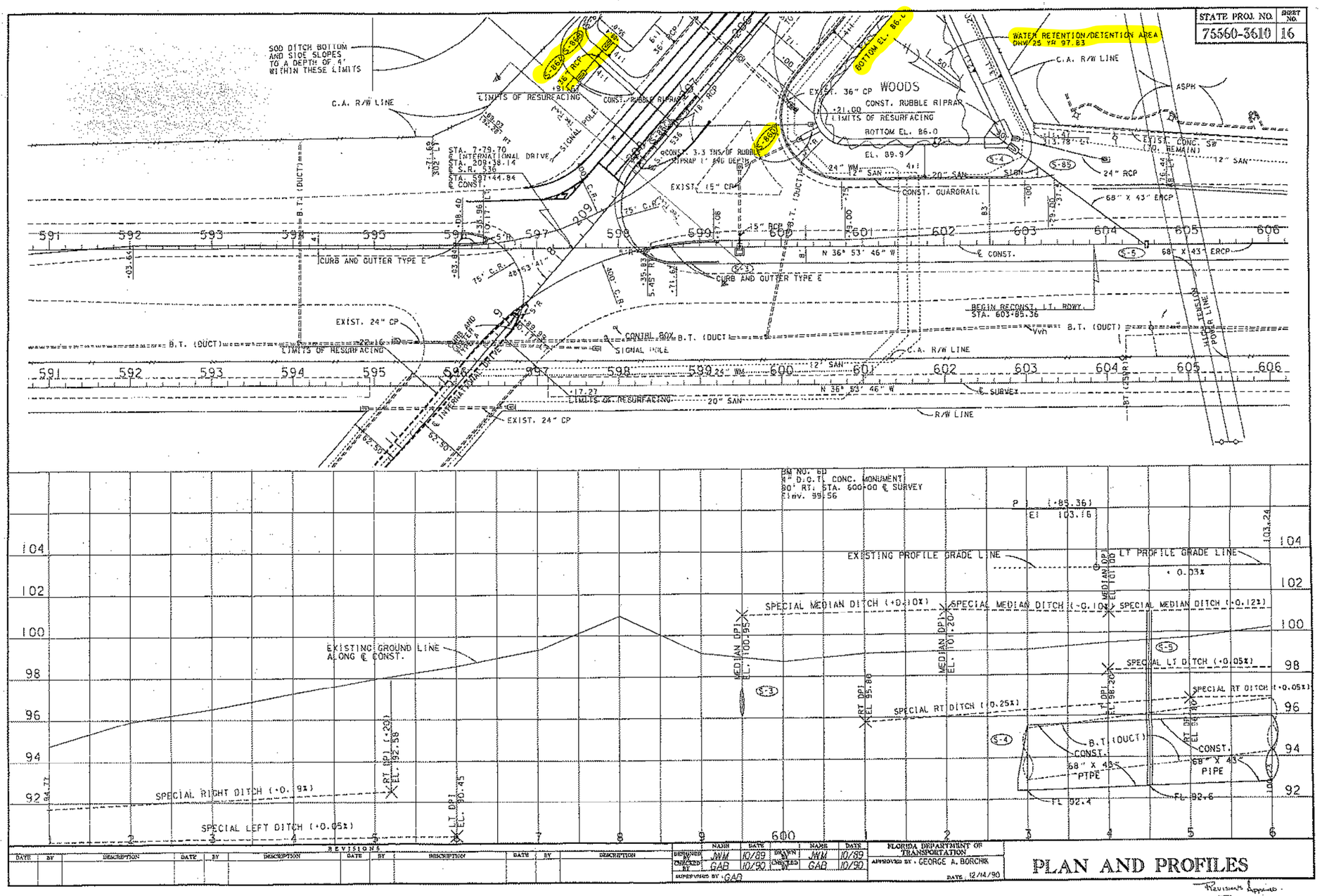
CHECKED BY	GAB	10/90	CHECKED BY	GAB	10/90
SUPERVISED BY	GAB				

FLORIDA DEPARTMENT OF TRANSPORTATION
APPROVED BY GEORGE A. BORCHIK
DATE: 12/14/90

PLAN AND PROFILES

STATE PROJ. NO.	SHEET NO.
75560-3610	16



REVISIONS												
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	NAME	DATE		NAME	DATE
DESIGNED BY	JWM	10/89	DRAWN BY	JWM	10/89
CHECKED BY	GAB	10/90	CHECKED BY	GAB	10/90
SUPERVISED BY	GAB				

FLORIDA DEPARTMENT OF TRANSPORTATION
APPROVED BY: GEORGE A. BORCHIK
DATE: 12/14/90

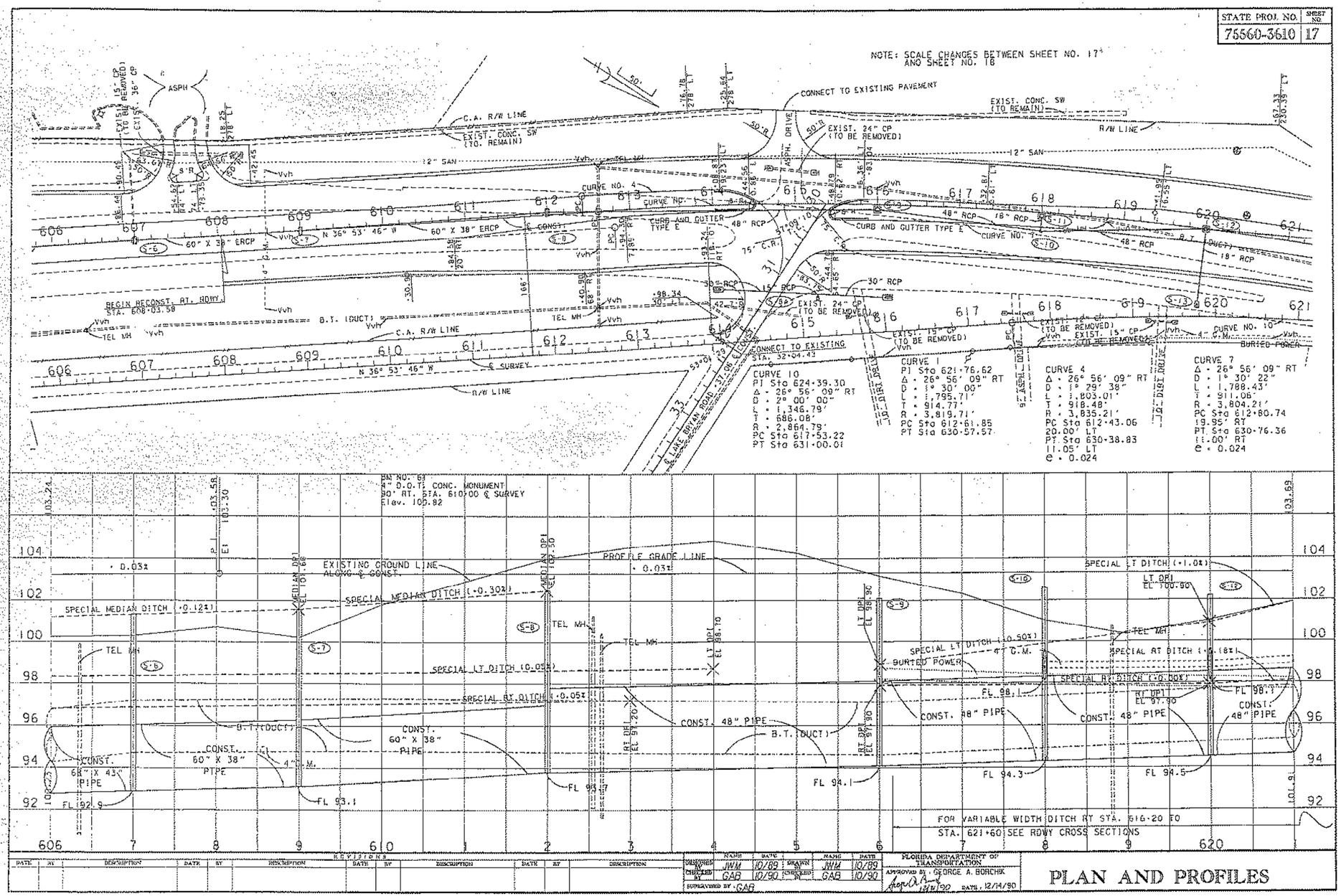
PLAN AND PROFILES

Revisions Approved
By [signature]
12/18/92

MS Dgn: 3d 083206 856
2542C5560SHPSHEETLAYOUT.DGN

STATE PROJ. NO.	SHEET NO.
75560-3610	17

NOTE: SCALE CHANGES BETWEEN SHEET NO. 17 AND SHEET NO. 18



REVISIONS												
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

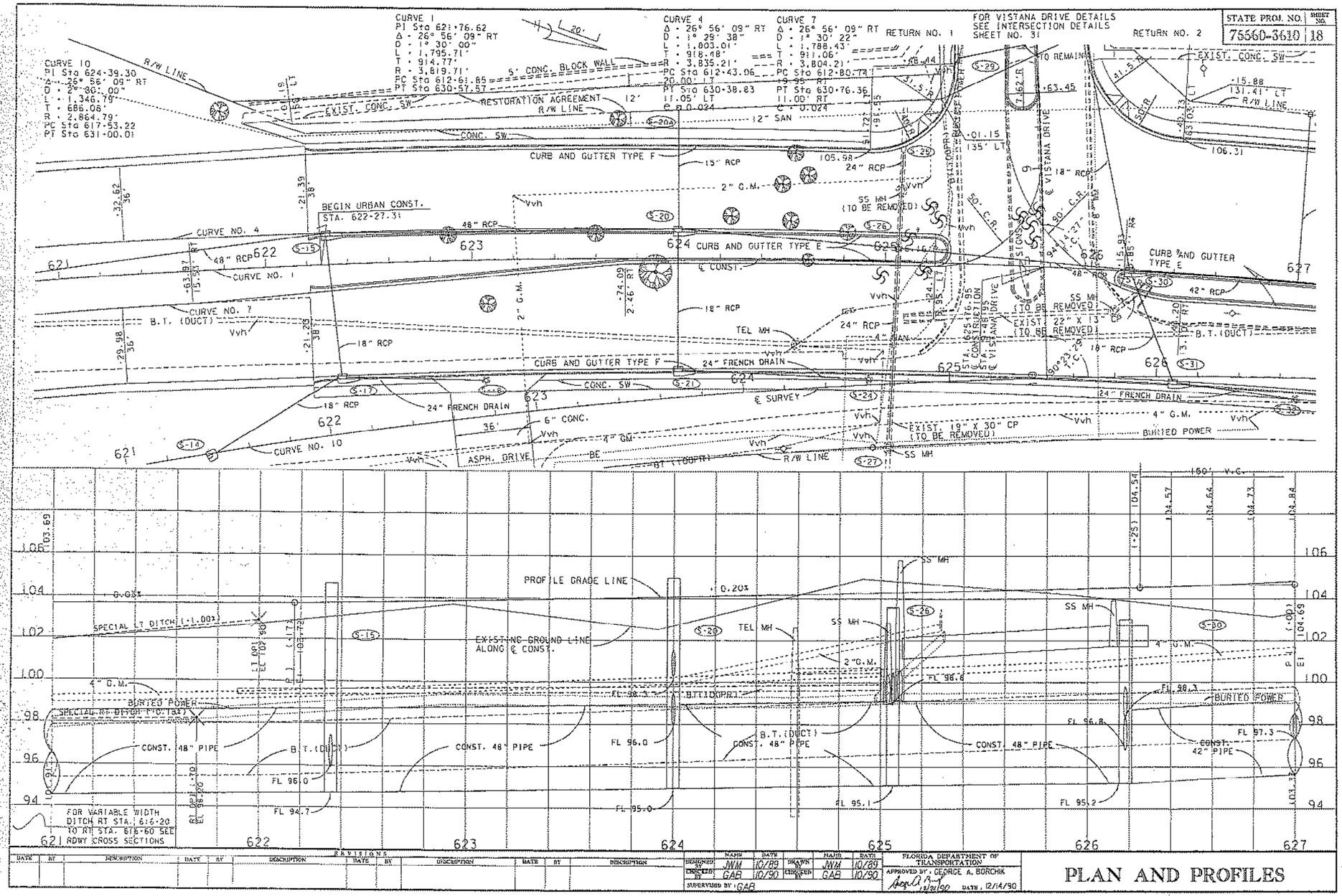
	NAME	DATE
DESIGNED BY	JWM	10/89
CHECKED BY	GAB	10/90
SUPERVISED BY	GAB	

	NAME	DATE
DRAWN BY	JWM	10/89
CHECKED BY	GAB	10/90

FLORIDA DEPARTMENT OF TRANSPORTATION
APPROVED BY: GEORGE A. BORCHIK
DATE: 12/14/90

PLAN AND PROFILES

STATE PROJ. NO.	SHEET NO.
75560-3610	18



REVISIONS											
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

	NAME	DATE
DESIGNED BY	JWM	10/89
CHECKED BY	GAB	10/90
SUPERVISED BY	GAB	
DRAWN BY	JWM	10/89
CHECKED BY	GAB	10/90

FLORIDA DEPARTMENT OF TRANSPORTATION
APPROVED BY: GEORGE A. BORCHIK
DATE: 12/14/90

PLAN AND PROFILES

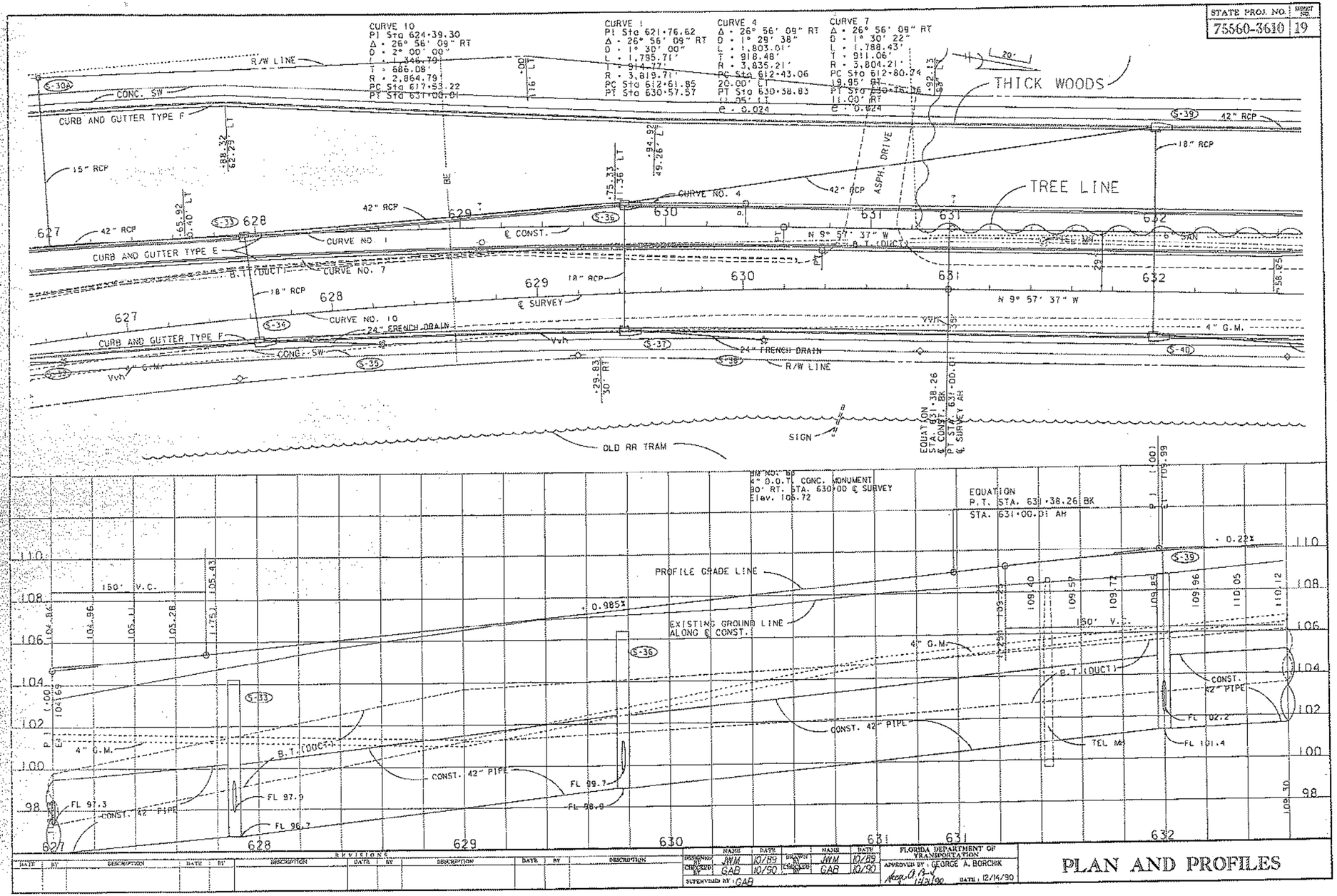
STATE PROJ. NO.	SHEET
75560-3610	19

CURVE 10
PI Sta 624+39.30
Δ = 26° 56' 09" RT
D = 2° 00' 00"
L = 1,346.79'
T = 686.08'
R = 2,864.79'
PC Sta 617+53.22
PT Sta 631+00.01

CURVE 1
PI Sta 621+76.62
Δ = 26° 56' 09" RT
D = 1° 30' 00"
L = 1,795.71'
T = 914.77'
R = 3,819.71'
PC Sta 612+61.85
PT Sta 630+57.57

CURVE 4
Δ = 26° 56' 09" RT
D = 1° 29' 38"
L = 1,803.01'
T = 918.48'
R = 3,835.21'
PC Sta 612+43.06
20.00' LT
PT Sta 630+38.83
(1.05' LT
e = 0.024

CURVE 7
Δ = 26° 56' 09" RT
D = 1° 30' 22"
L = 1,788.43'
T = 911.06'
R = 3,804.21'
PC Sta 612+80.74
19.95' RT
PT Sta 630+19.26
11.00' RT
e = 0.024



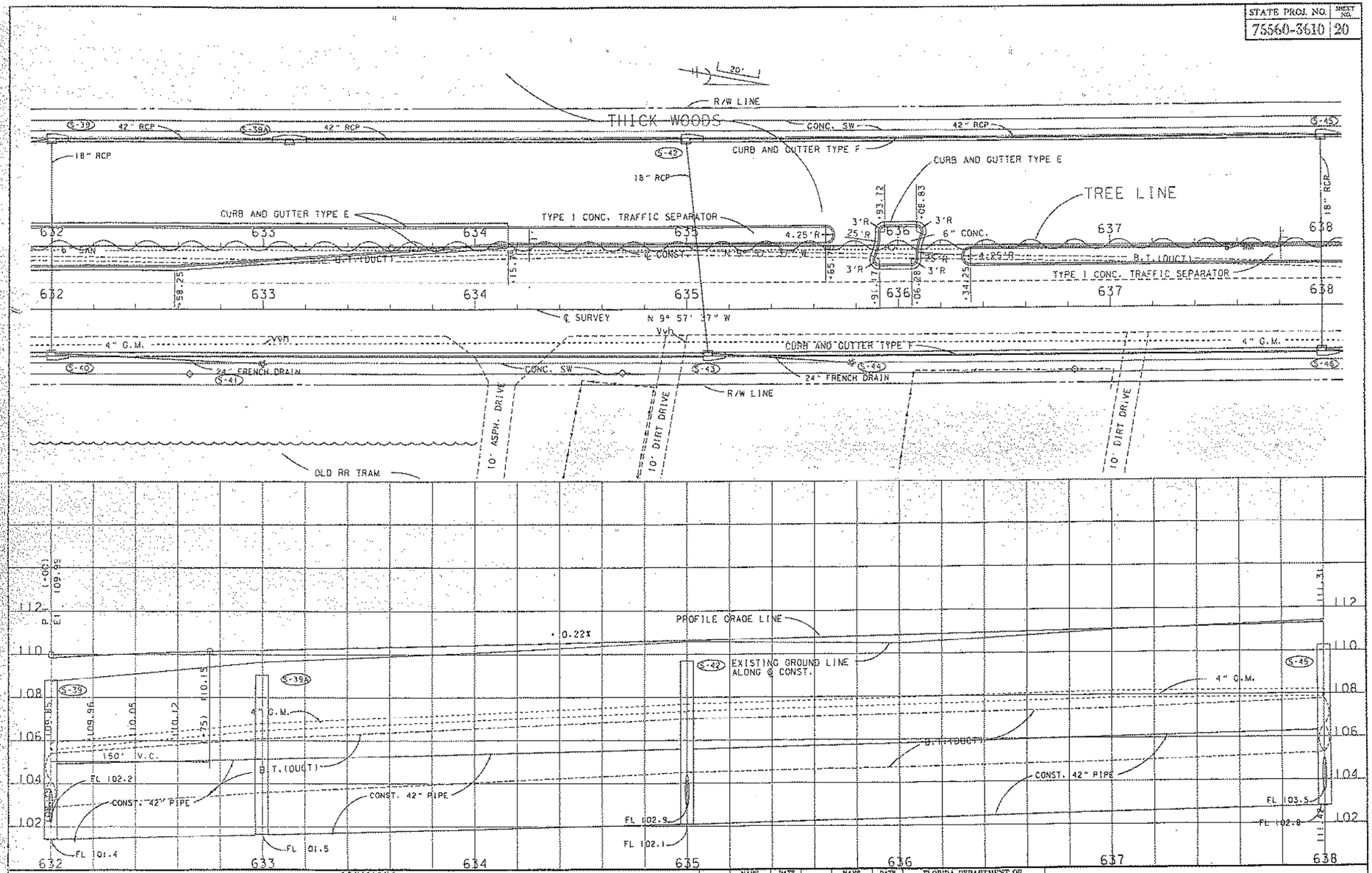
REVISIONS							
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

	NAME	DATE		NAME	DATE
DESIGNED BY	JWM	10/89	DRAWN BY	JWM	10/89
CHECKED BY	GAB	10/90	CHECKED BY	GAB	10/90
SUPERVISED BY: GAB					

FLORIDA DEPARTMENT OF TRANSPORTATION
APPROVED BY: GEORGE A. BORCHIK
DATE: 12/14/90

PLAN AND PROFILES

STATE PROJ. NO.	SHEET NO.
75560-3610	20



REVISIONS											
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

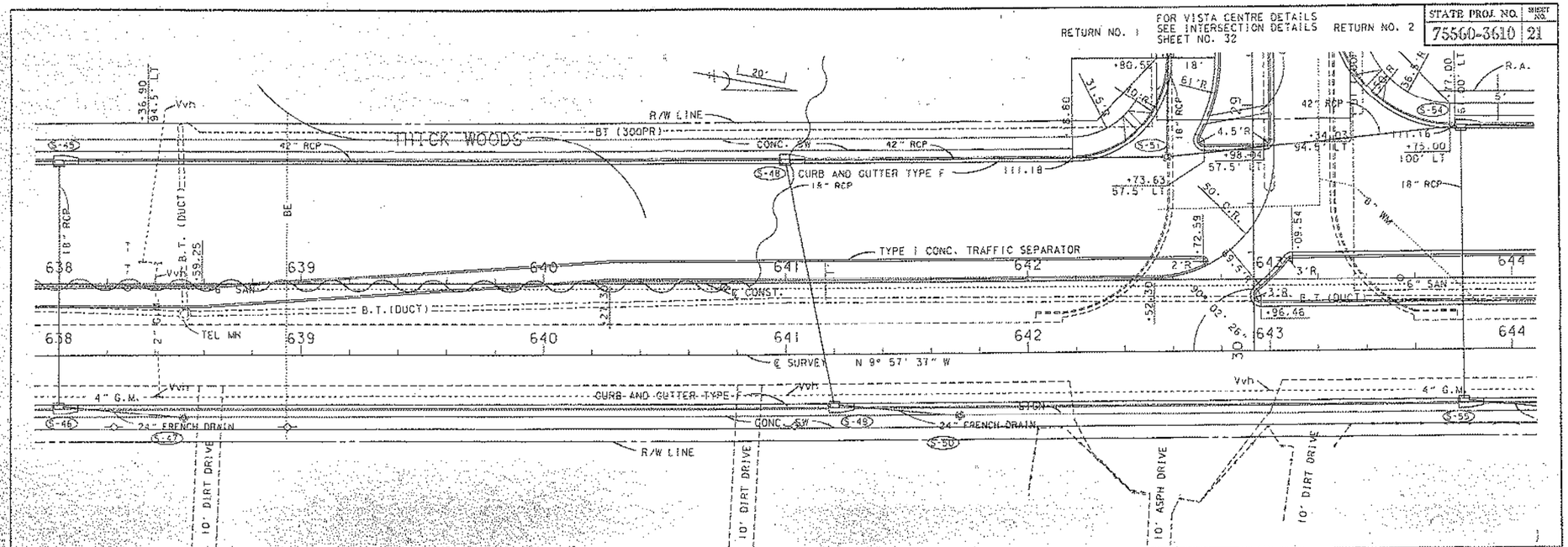
	NAME	DATE		NAME	DATE
DESIGNED BY	JWM	10/89	DRAWN BY	JWM	10/89
CHECKED BY	GAB	10/90	CHECKED BY	GAB	10/90
SUPERVISED BY	GAB				

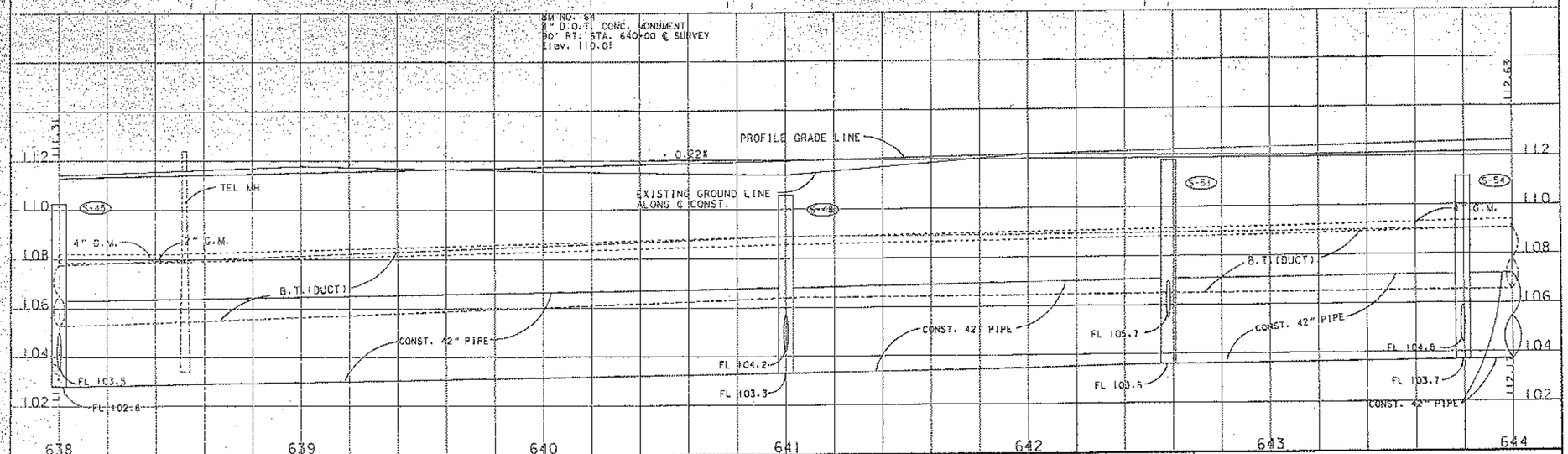
FLORIDA DEPARTMENT OF TRANSPORTATION
APPROVED BY: GEORGE A. BORCHIK
DATE: 12/14/90

PLAN AND PROFILES

STATE PROJ. NO.	SHEET NO.
75560-3610	21

RETURN NO. 1 — FOR VISTA CENTRE DETAILS SEE INTERSECTION DETAILS SHEET NO. 32 — RETURN NO. 2





REVISIONS							
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

	NAME	DATE		NAME	DATE
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CHECKED BY	GAB	10/90	CHECKED BY	GAB	10/90
SUPERVISED BY GAB					

FLORIDA DEPARTMENT OF TRANSPORTATION
APPROVED BY: GEORGE A. BORCHIK
DATE: 12/14/90

PLAN AND PROFILES

STATE PROJ. NO.	SHEET NO.
75560-3610	22

FOR MEADOW CREEK DETAILS SEE INTERSECTION DETAILS SHEET NO. 33

RETURN NO. 1

RESTORATION AGREEMENT

42" RCP

50.00' LT

20'

R/W LINE

THICK WOODS

CONC. SW

18" RCP

LOW AREA

36" RCP

42" RCP

CURB AND GUTTER TYPE F

18" RCP

SIGN

8" SAN

18' DIRT ROAD

BT (60PR)

CURB AND GUTTER TYPE E

TYPE I CONC. TRAFFIC SEPARATOR

4.25'R

644 645 646 647 648 649 650

BT (200PR)

B.T. (DUCT)

8" VW

BT&WTD

23.70'

℄ SURVEY

N 9° 57' 37" W

4" C.M.

CURB AND GUTTER TYPE F

24" FRENCH DRAIN

CONC. SW

R/W LINE

EXIST. 12" X 18" CP (TO BE REMOVED)

CONTRL BOX

SIGNAL POLE

EXIST. CONC. BLOCK WALL

RETURN NO. 3

EXIST. CONC. SW

FOR APT COMPLEX DETAILS SEE INTERSECTION DETAILS SHEET NO. 33

PROFILE GRADE LINE

- 0.22%

EXISTING GROUND LINE ALONG ℄ CONST.

TEL MH

4" C.M.

B.T. (DUCT)

CONST. 42" PIPE

FL 105.2

FL 104.4

FL 107.7

FL 104.8

6" C.M.

FL 105.3

CONST. 36" PIPE

FL 107.9

FL 106.4

FL 105.9

36" PIPE

112.63 114 112 110 108 106 104 113.89

REVISIONS									
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

	NAME	DATE		NAME	DATE
DESIGNED BY	MW	10/89	DRAWN BY	MW	10/89
CHECKED BY	GAB	10/90	CHECKED BY	GAB	10/90
SUPERVISED BY : GAB					

FLORIDA DEPARTMENT OF TRANSPORTATION

APPROVED BY : GEORGE A. BORCHIK

DATE : 12/14/90

PLAN AND PROFILES

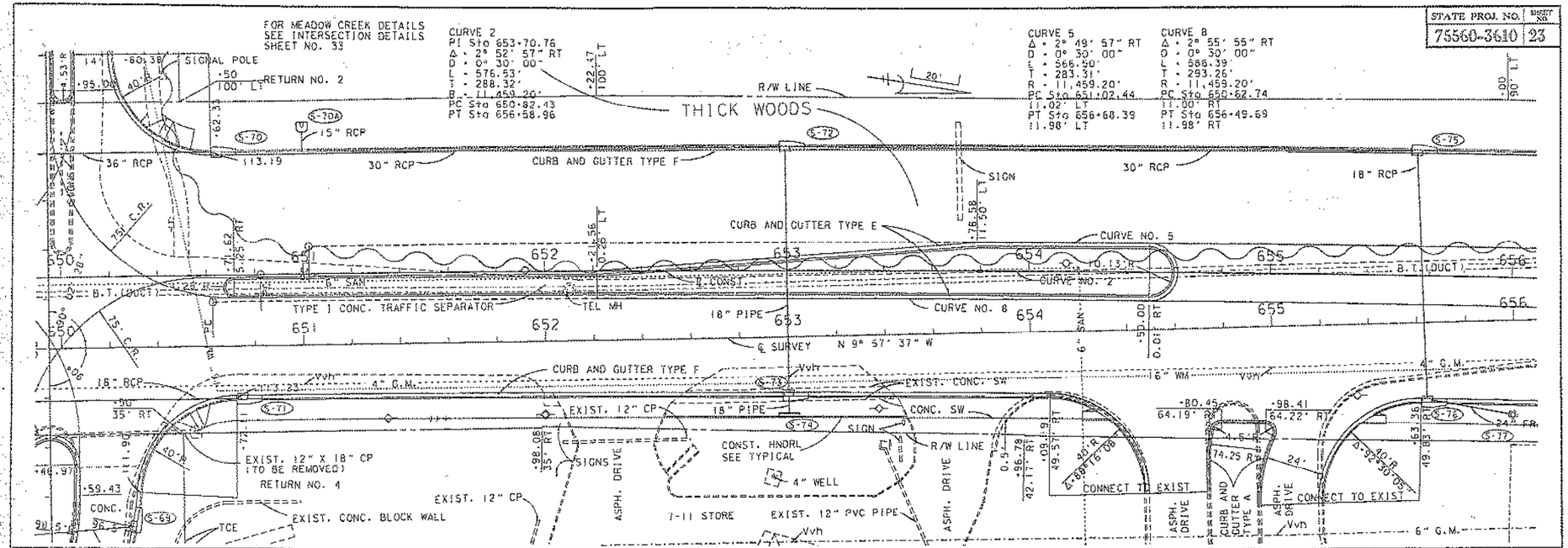
STATE PROJ. NO.	SHEET NO.
75560-3610	23

FOR MEADOW CREEK DETAILS
SEE INTERSECTION DETAILS
SHEET NO. 33

CURVE 2
PI Sta 653+70.76
Δ = 2° 52' 57" RT
D = 0° 30' 00"
L = 576.53'
T = 288.32'
R = 11,459.20'
PC Sta 650+82.43
PT Sta 656+58.96

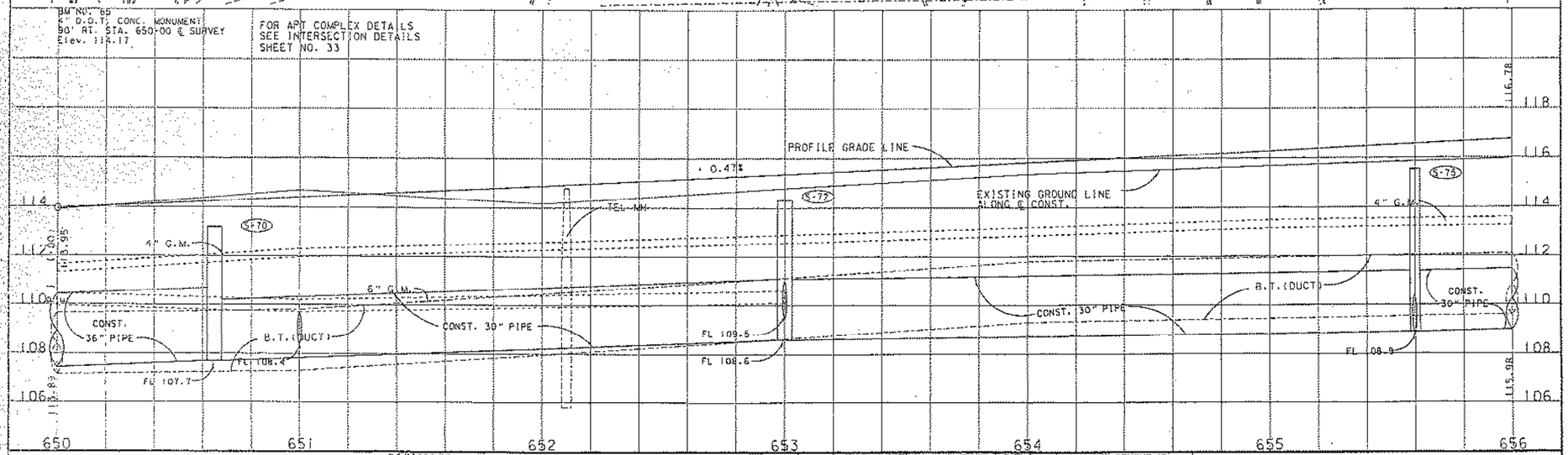
CURVE 5
Δ = 2° 49' 57" RT
D = 0° 30' 00"
L = 566.50'
T = 283.31'
R = 11,459.20'
PC Sta 651+02.44
11.02' LT
PT Sta 656+68.39
11.98' LT

CURVE 8
Δ = 2° 55' 55" RT
D = 0° 30' 00"
L = 586.39'
T = 293.26'
R = 11,459.20'
PC Sta 650+62.74
11.00' RT
PT Sta 656+49.69
11.98' RT



BM NO. 65
4" D.O.T. CONC. MONUMENT
90' RT. STA. 650+00 ℄ SURVEY
Elev. 114.17

FOR APT COMPLEX DETAILS
SEE INTERSECTION DETAILS
SHEET NO. 33



REVISIONS											
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

	NAME	DATE		NAME	DATE
DESIGNED BY	JWM	10/89	DRAWN BY	JWM	10/89
CHECKED BY	GAB	10/90	CHECKED BY	GAB	10/90
SUPERVISED BY	GAB				

FLORIDA DEPARTMENT OF TRANSPORTATION
APPROVED BY: GEORGE A. BORCHIK
DATE: 12/14/90

PLAN AND PROFILES

STATE PROJ. NO.	SHEET NO.
75560-3610	24

CURVE 2
PI Sta 653+70.76
Δ = 2° 52' 57" RT
D = 0° 30' 00"
L = 576.53'
T = 288.32'
R = 11,459.20'
PC Sta 650+82.43
PT Sta 656+58.96

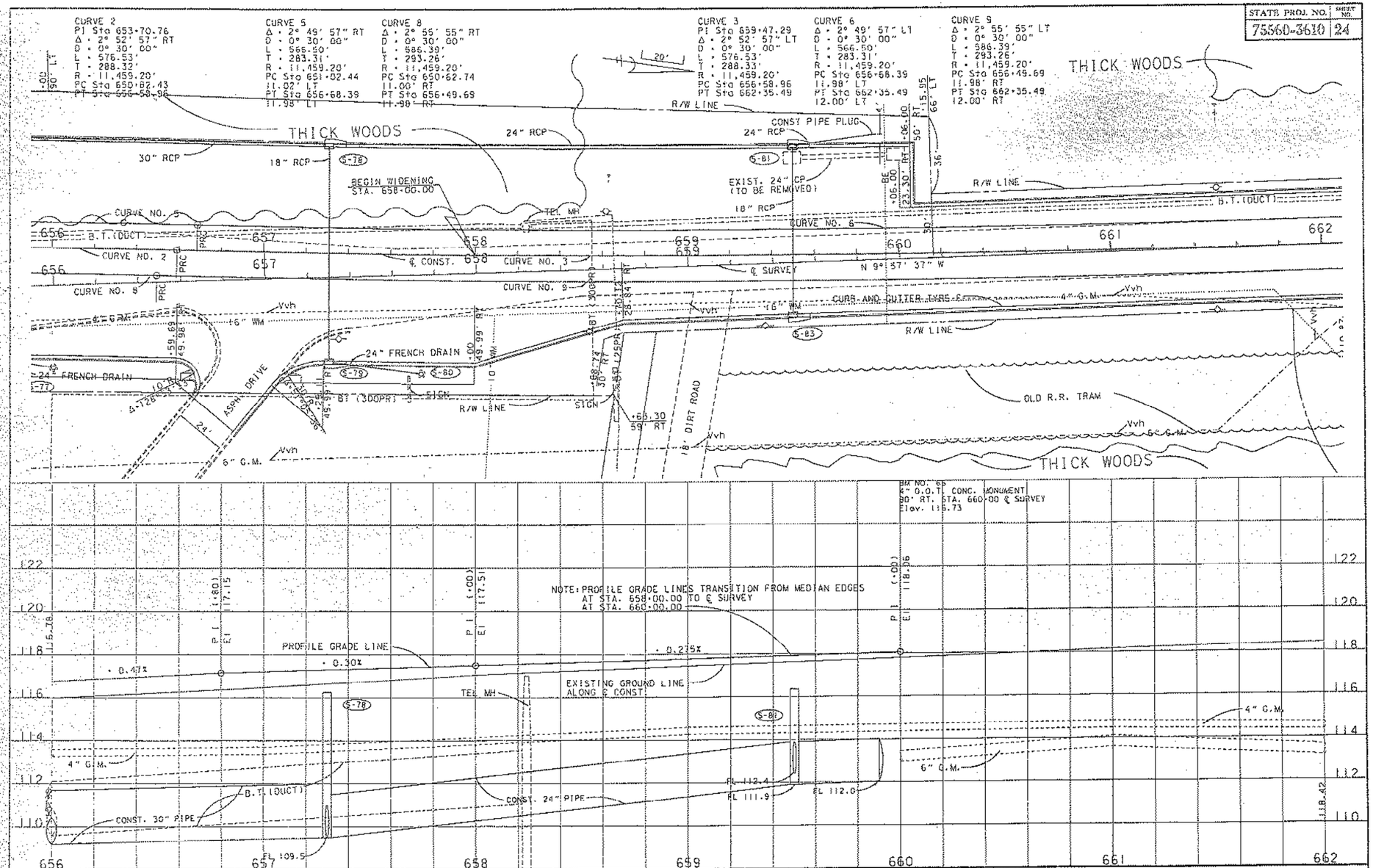
CURVE 5
Δ = 2° 49' 57" RT
D = 0° 30' 00"
L = 566.50'
T = 283.31'
R = 11,459.20'
PC Sta 651+02.44
11.02' LT
PT Sta 656+68.39
11.98' LT

CURVE 8
Δ = 2° 55' 55" RT
D = 0° 30' 00"
L = 586.39'
T = 293.26'
R = 11,459.20'
PC Sta 650+62.74
11.00' RT
PT Sta 656+49.69
11.98' RT

CURVE 3
PI Sta 659+47.29
Δ = 2° 52' 57" LT
D = 0° 30' 00"
L = 576.53'
T = 288.33'
R = 11,459.20'
PC Sta 656+58.96
PT Sta 662+35.49
12.00' LT

CURVE 6
Δ = 2° 49' 57" LT
D = 0° 30' 00"
L = 566.50'
T = 283.31'
R = 11,459.20'
PC Sta 656+68.39
11.98' LT
PT Sta 662+35.49
12.00' LT

CURVE 9
Δ = 2° 55' 55" LT
D = 0° 30' 00"
L = 586.39'
T = 293.26'
R = 11,459.20'
PC Sta 656+49.69
11.98' RT
PT Sta 662+35.49
12.00' RT



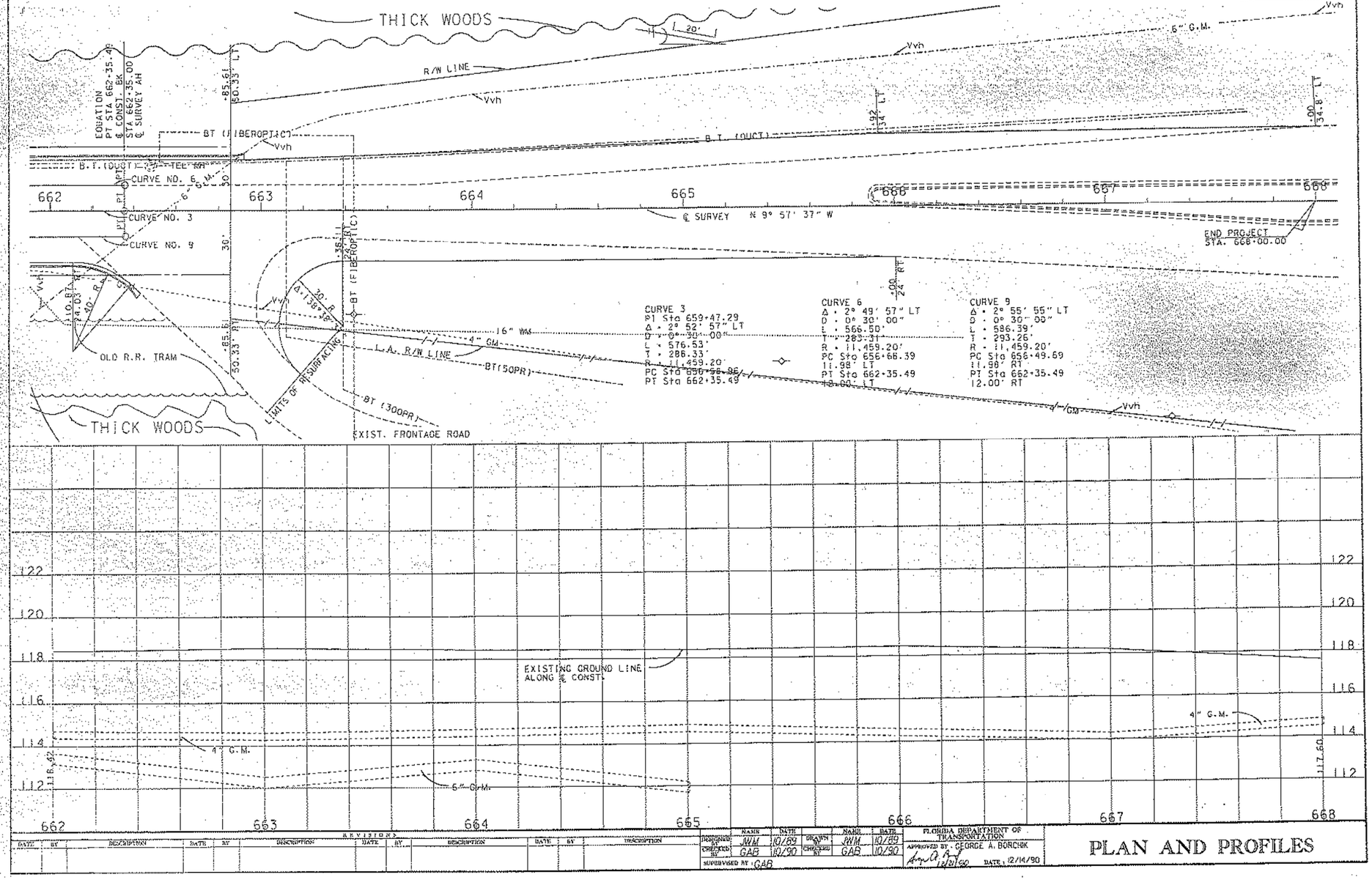
REVISIONS											
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

	NAME	DATE		NAME	DATE
DESIGNED BY	JWM	10/90	DRAWN BY	JWM	10/90
CHECKED BY	GAB	10/90	CHECKED BY	GAB	10/90
SUPERVISED BY	GAB				

FLORIDA DEPARTMENT OF TRANSPORTATION
APPROVED BY: GEORGE A. BORCHIK
DATE: 12/19/90

PLAN AND PROFILES

STATE PROJ. NO.	SHEET NO.
75560-3610	25



REVISIONS												
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	

	NAME	DATE		NAME	DATE
DESIGNED BY	AWM	10/89	DRAWN BY	AWM	10/89
CHECKED BY	GAB	10/90	CHECKED BY	GAB	10/90
SUPERVISED BY : GAB					

FLORIDA DEPARTMENT OF TRANSPORTATION
APPROVED BY : GEORGE A. BORCHIK
DATE : 12/14/90

PLAN AND PROFILES

STATE PROJ. NO.	SHEET NO.
75560-3610	26

EXIST. POND 3-2

EXIST. POND 3-1

ROADSIDE DETENTION AREA DHW 25YR 97.41 BOTTOM EL. 94.0

ROADSIDE DETENTION AREA DHW 25YR 97.41 BOTTOM EL. 94.0

ROADSIDE DETENTION AREA DHW 25YR 97.83 BOTTOM EL. 94.0

SCATTERED PINE AND PALMETTO

WOODS

EXISTING GROUND LINE ALONG ℄ SR 536

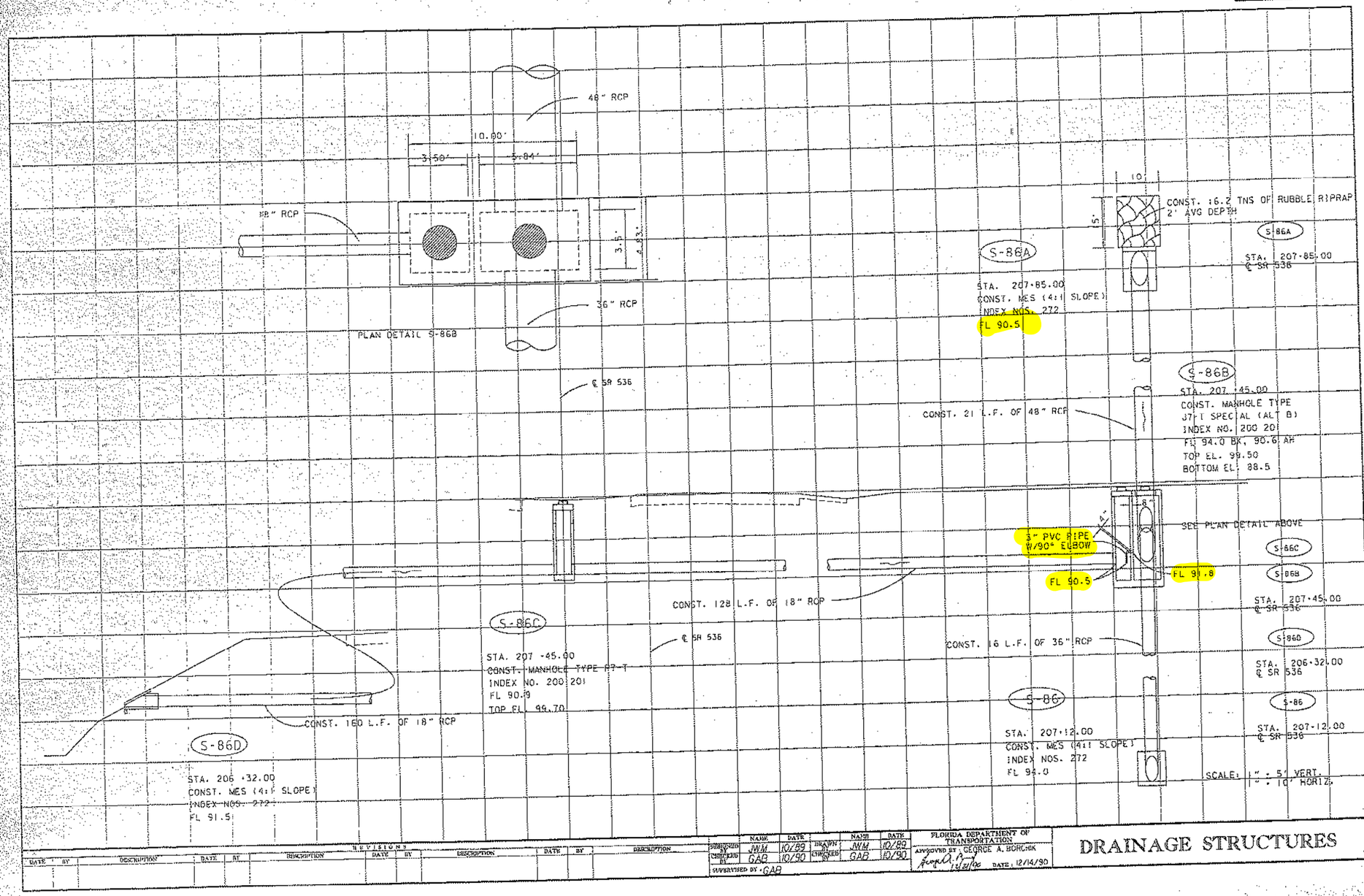
PLAN AND PROFILES ALONG SR 536

FLORIDA DEPARTMENT OF TRANSPORTATION

APPROVED BY : GEORGE A. BORCHIK

DATE : 12/14/90

STATE PROJ. NO.	SHEET NO.
75560-3610	46



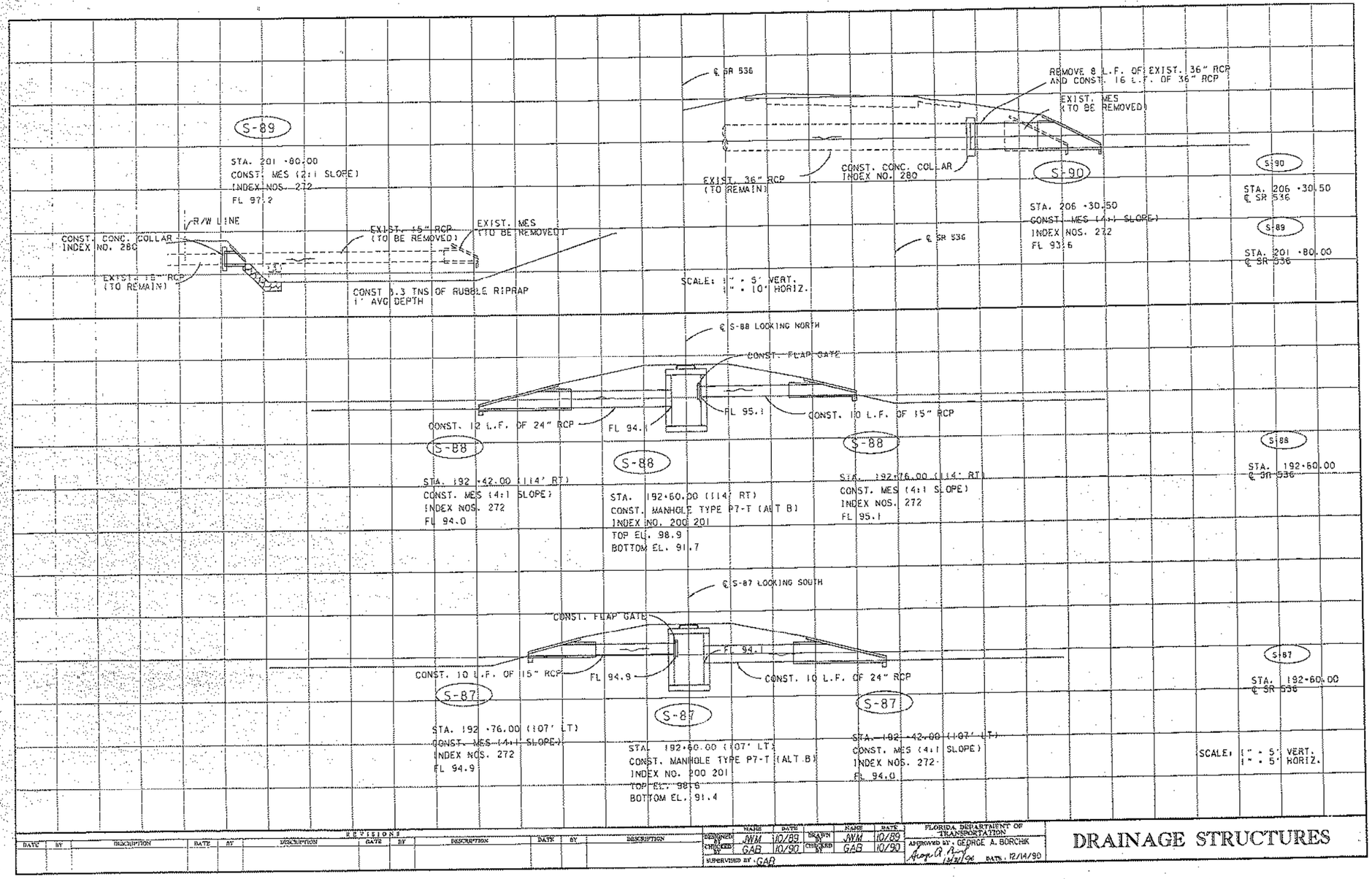
REVISIONS								
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

	NAME	DATE		NAME	DATE
DESIGNED BY	JWM	10/89	DRAWN BY	JWM	10/89
CHECKED BY	GAB	10/90	CHECKED BY	GAB	10/90
SUPERVISED BY	GAB				

FLORIDA DEPARTMENT OF TRANSPORTATION
APPROVED BY: GEORGE A. BORCHIK
DATE: 12/14/90

DRAINAGE STRUCTURES

STATE PROJ. NO.	SHEET NO.
75560-3610	47



REVISIONS													
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION		

	NAME	DATE		NAME	DATE
DESIGNED BY	NWM	10/89	DRAWN BY	NWM	10/89
CHECKED BY	GAB	10/90	CHECKED BY	GAB	10/90

SUPERVISED BY: GAB

FLORIDA DEPARTMENT OF TRANSPORTATION
APPROVED BY: GEORGE A. BORCHIK
DATE: 12/14/90

DRAINAGE STRUCTURES

STATE PROJ. NO.	SHEET NO.
75560-3610	49

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH
CROSS SECTION OF SOIL SURVEY
REPORT OF TESTS

PROJECT NO.: 75560-3610
ROAD NO.: S.R. 535 FROM S.R. 536 TO S.R. 400(I-4)
DISTRICT NO.: 5
LABORATORY NO.: N/A
SUBMITTED BY: ARDAMAN AND ASSOCIATES

DATE OF SURVEY: 4/2/87 TO 7/28/87 (FLORIDA DEPARTMENT OF TRANSPORTATION)
AND 4/10/89 TO 4/12/89 AND 8/22/90 TO 8/23/90
(ARDAMAN AND ASSOCIATES)
SURVEYED BY: DAWSON(FLORIDA DEPARTMENT OF TRANSPORTATION)
JACKSON AND JOHNSON (ARDAMAN AND ASSOCIATES)
SURVEY BEGINS STA. NO.: 609+00
SURVEY ENDS AT STA. NO.: 659+00
DATE REPORTED: 7/10/87 (FLORIDA DEPARTMENT OF TRANSPORTATION)
6/30/89 (ARDAMAN AND ASSOCIATES)
9/10/90 (ARDAMAN AND ASSOCIATES)

LOCATION:
TOWNSHIP: 24 SOUTH
RANGE: 28 EAST
SECTION: 27 & 34

MECHANICAL ANALYSIS

STRATUM NO.	LBR VALUE	% PASS 10 MESH	% PASS 40 MESH	% PASS 60 MESH	% PASS 100 MESH	% PASS 200 MESH	CONSTANTS MATERIAL PASS NO. 40 SIEVE LIQUID LIMIT	PLASTIC INDEX	NO. LBR TESTS	NO. GRAD TESTS	NO. LL-PI TESTS	CLASSIFICATION GROUP	MATERIAL DESCRIPTION	pH	RESISTIVITY ohm-cm	CHLORIDES ppm	SULFATES ppm
1	22-41	100	74-80	30-39	7-14	3-4	-NP-	-NP-	2	3	0	A-3	GRAY TO BROWN TO LIGHT BROWN FINE SAND	6.4-7.5	9,000-40,000	4-23	4-14
2	36-41	100	66-85	36-45	11-20	5-15	-NP-	-NP-	2	6	1	A-3 OR A-2-4	DARK GRAY TO BROWN SLIGHTLY SILTY TO SILTY FINE SAND WITH OCCASIONAL TRACE ORGANICS (O.C.:0.2-4.7)	5.8-8.3	8,000-26,000	1-18	3-29
3									0	0	0	A-8	DARK GRAY MUCK (O.C.:5.1-14.7)				
4	29-36	99-100	72-84	32-42	10-16	3-10	-NP-	-NP-	3	5	0	A-3	LIGHT TO DARK GRAY SAND, LOOSE & MOIST	5-7.4	42,000-160,000	30	32-115
5	14-44	100	71-81	28-39	8-15	2-7	-NP-	-NP-	3	5	0	A-3	PALE TO DARK BROWN SAND, LOOSE TO COMPACT & MOIST	4.3-5.7	15,000-42,000	30	16-108
6	21-29	89-100	57-77	39-65	19-42	4-16	NP	NP	3	5	0	A-3 OR A-2-4	MIXTURE OF BROWN AND GRAY SANDS, TRACE OF ROCK & CLAY, LOOSE TO COMPACT & MOIST (FILL)	4.1-7.3	27,000-54,000	30	13-115
7	34	100	53-76	25-34	13-14	6-11	NP	NP	1	3	0	A-3 OR A-2-4	LIGHT TO DARK BROWN SAND; TRACE OF SILT, DENSE TO VERY DENSE & MOIST (HARDPAN)				
8		100	65-81	34-47	12-20	5-8	NP	NP	0	6	0	A-3	PALE BROWN TO BROWN SAND, TRACE SILT TO SILTY, COMPACT & MOIST	4.8	56,000	30	13

NOTES:
1. STRATA BOUNDARIES ARE APPROXIMATE AND REPRESENT SOIL STRATA AT EACH TEST HOLE LOCATION ONLY. STRATUM CONNECTING LINES ARE SHOWN FOR ESTIMATING EARTHWORK ONLY AND DO NOT INDICATE ACTUAL STRATUM LIMITS.
2. LEGEND ▽ WATER TABLE WHERE ENCOUNTERED. ONE REPRESENTS GROUNDWATER NOT ENCOUNTERED.
3. REMOVAL OF MUCK AND PLASTIC MATERIAL OCCURRING WITHIN THE ROADWAY SHALL BE ACCOMPLISHED IN ACCORDANCE WITH INDEX NO. 500 AND THE MATERIAL UTILIZED IN EMBANKMENT CONSTRUCTION SHALL BE IN ACCORDANCE WITH INDEX NO. 505.
4. IF THE SYMBOL "-" IS PRESENT IT REPRESENTS UNMEASURED SOIL PARAMETERS.

REVISIONS												
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	

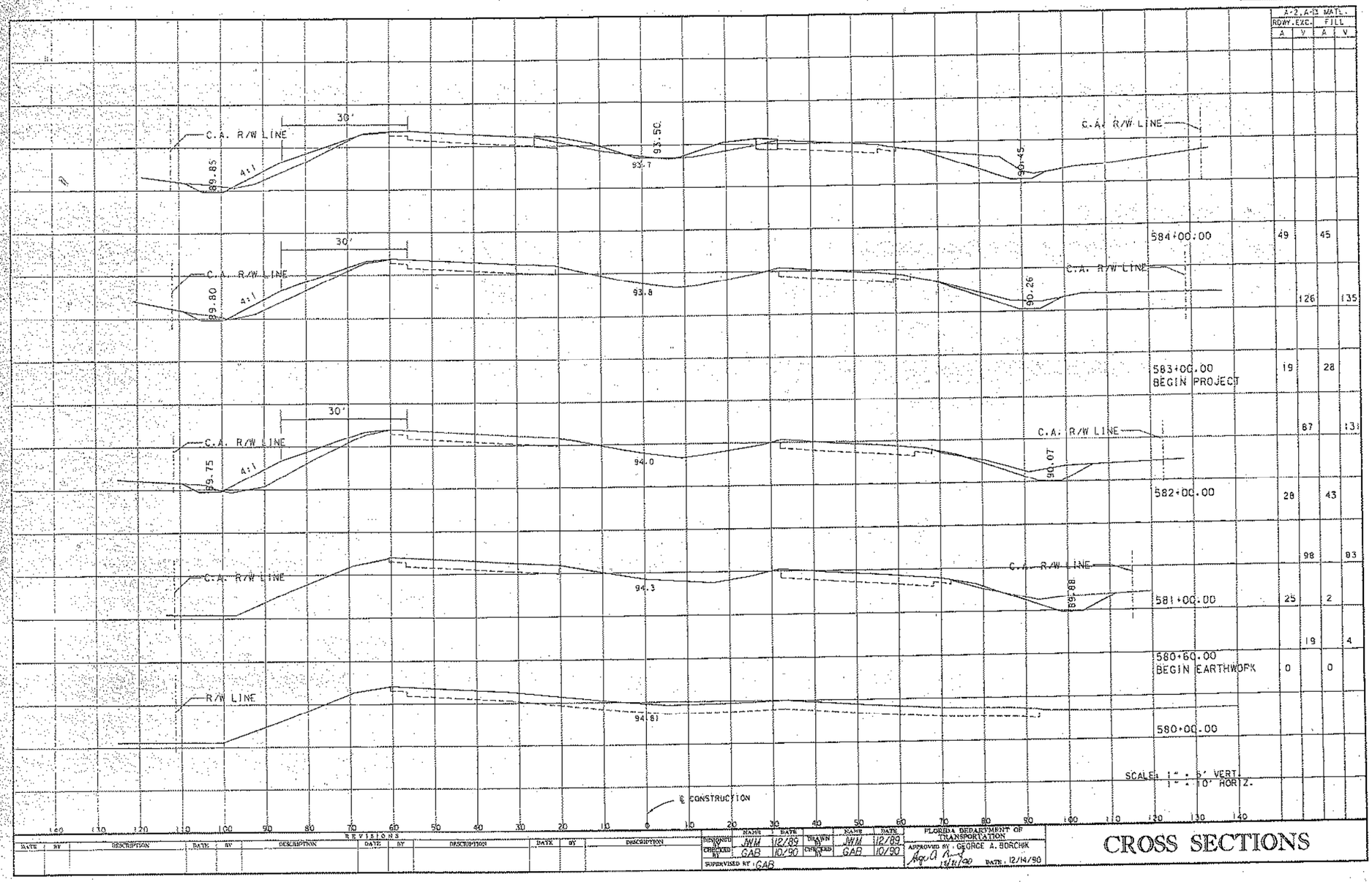
	NAME	DATE		NAME	DATE
DESIGNED BY	MSV	6/89	DRAWN BY	MSV	6/89
CHECKED BY	CHC	6/89	CHECKED BY	CHC	6/89

SUPERVISED BY: S.W. DAVIDSON

FLORIDA DEPARTMENT OF TRANSPORTATION
APPROVED BY: S. W. DAVIDSON, P.E.
P.E. NO. 31934 DATE: 10/30/90

ROADWAY SOIL SURVEY

STATE PROJ. NO.	SHEET NO.
75560-3610	50



	A-2, A-3 MATL. ROWY. EXC. FILL A	V
584+00.00	49	45
	126	135
583+00.00 BEGIN PROJECT	19	28
	87	131
582+00.00	28	43
	98	83
581+00.00	25	2
	19	4
580+60.00 BEGIN EARTHWORK	0	0
580+00.00		

SCALE: 1" = 5' VERT.
1" = 10' HORIZ.

REVISIONS

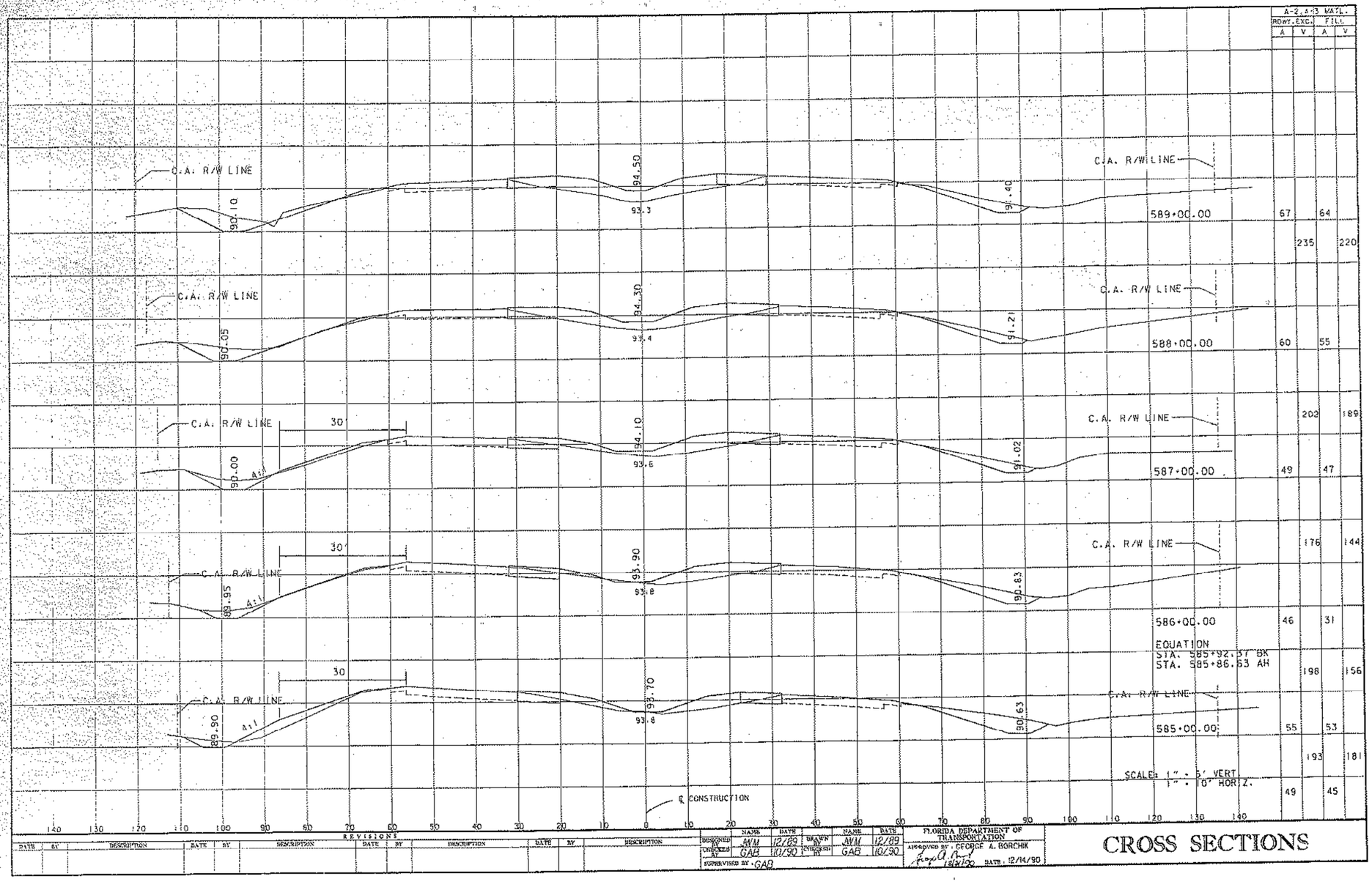
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

	NAME	DATE
DESIGNED BY	JWM	12/89
CHECKED BY	GAB	10/90
DRAWN BY	JWM	12/89
CHECKED BY	GAB	10/90
SUPERVISED BY	GAB	

FLORIDA DEPARTMENT OF TRANSPORTATION
APPROVED BY: GEORGE A. BORCHIK
DATE: 12/14/90

CROSS SECTIONS

STATE PROJ. NO.	SHEET NO.
75560-3610	51



A-2,A-3 MATL.			
ROWY. EXC.		FILL	
A	V	A	V
67		64	
	235		220
60		55	
	202		189
49		47	
	176		144
46		31	
	198		156
55		53	
	193		181
49		45	

REVISIONS							
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

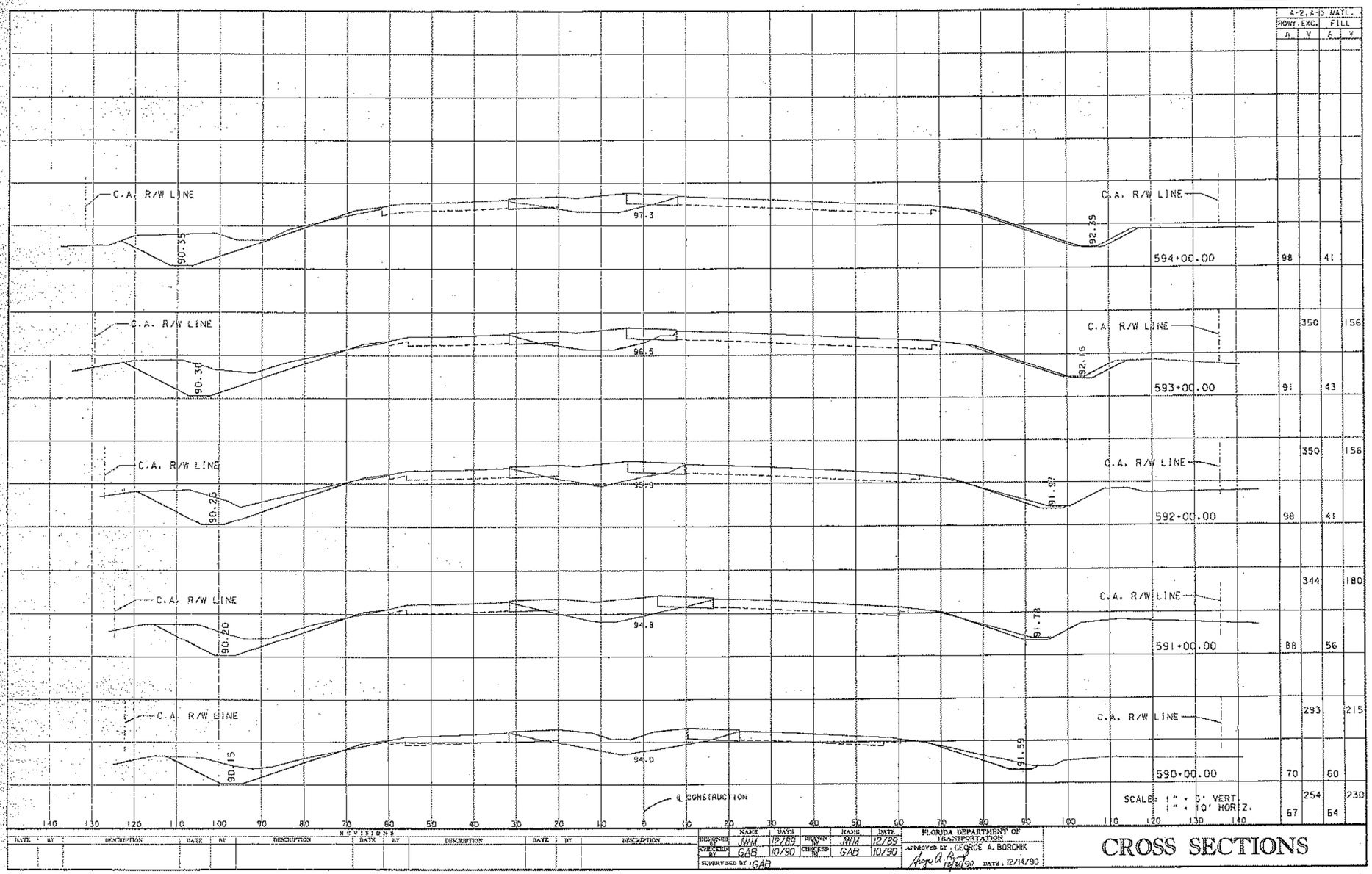
	NAME	DATE
DESIGNED BY	AWM	12/89
CHECKED BY	GAB	10/90
SUPERVISED BY	GAB	

	NAME	DATE
DRAWN BY	AWM	12/89
CHECKED BY	GAB	10/90

FLORIDA DEPARTMENT OF TRANSPORTATION
APPROVED BY: GEORGE A. GORCHIK
DATE: 12/14/90

CROSS SECTIONS

STATE PROJ. NO.	SHEET NO.
75560-3610	52



A-2, A-3 MATL.			
ROWT. EXC.		FILL	
A	V	A	V
98		41	
	350		156
91		43	
	350		156
98		41	
	344		180
88		56	
	293		215
70		60	
	254		230
67		64	

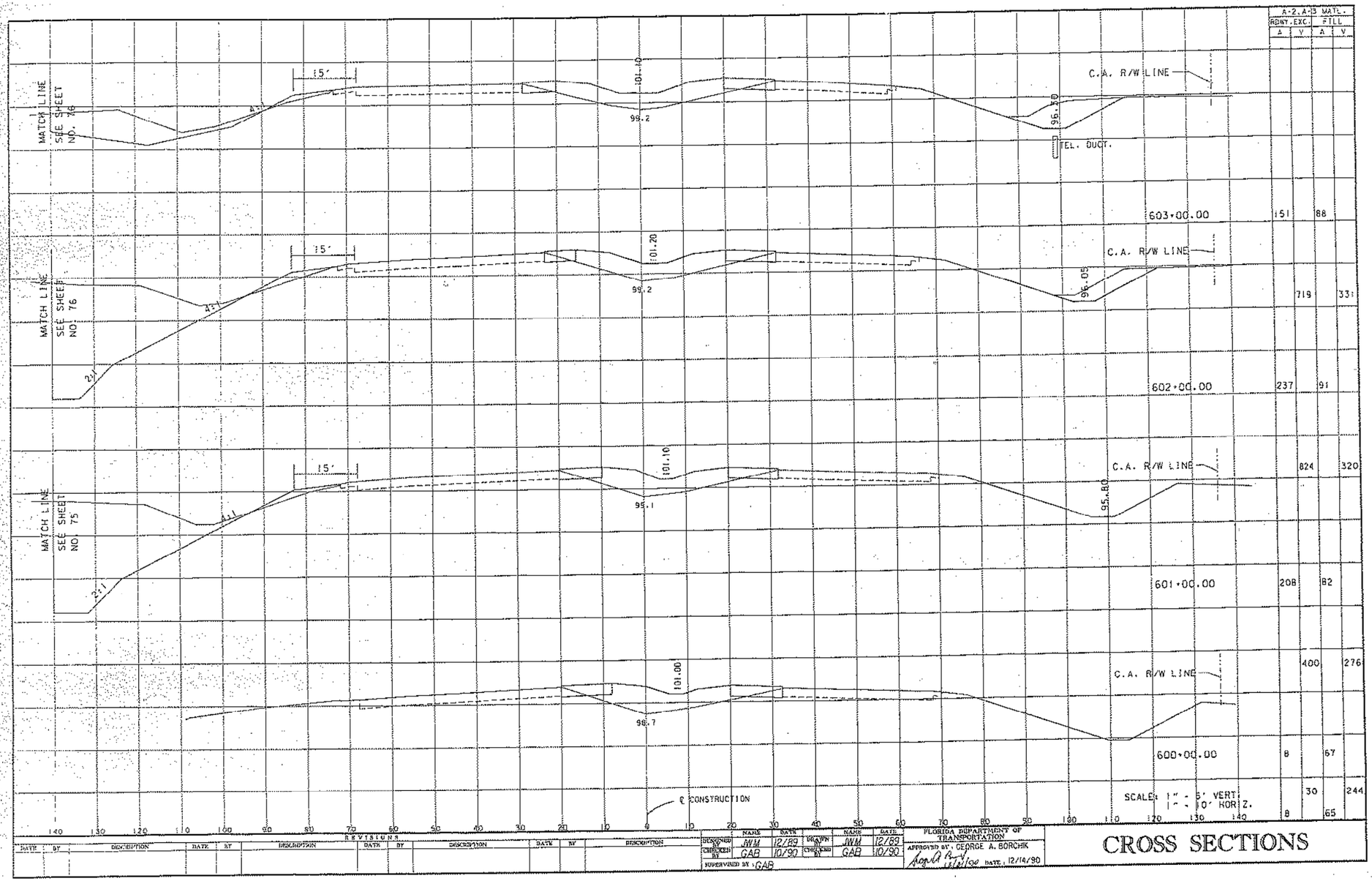
REVISIONS											
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

	NAME	DATE		NAME	DATE
DESIGNED BY	JMM	12/89	DRAWN BY	JMM	12/89
CHECKED BY	GAB	10/90	CHECKED BY	GAB	10/90
SUPERVISED BY : GAB					

FLORIDA DEPARTMENT OF TRANSPORTATION
APPROVED BY : GEORGE A. BORCHIK
DATE : 12/14/90

CROSS SECTIONS

STATE PROJ. NO.	SHEET NO.
75560-3610	54



A-2, A-3 MATL.			
RDWY. EXC.		FILL	
A	V	A	V
151		88	
		719	331
237		91	
		824	320
208		82	
		400	276
8		67	
		30	244
8		65	

SCALE: 1" = 5' VERT.
1" = 10' HORIZ.

REVISIONS

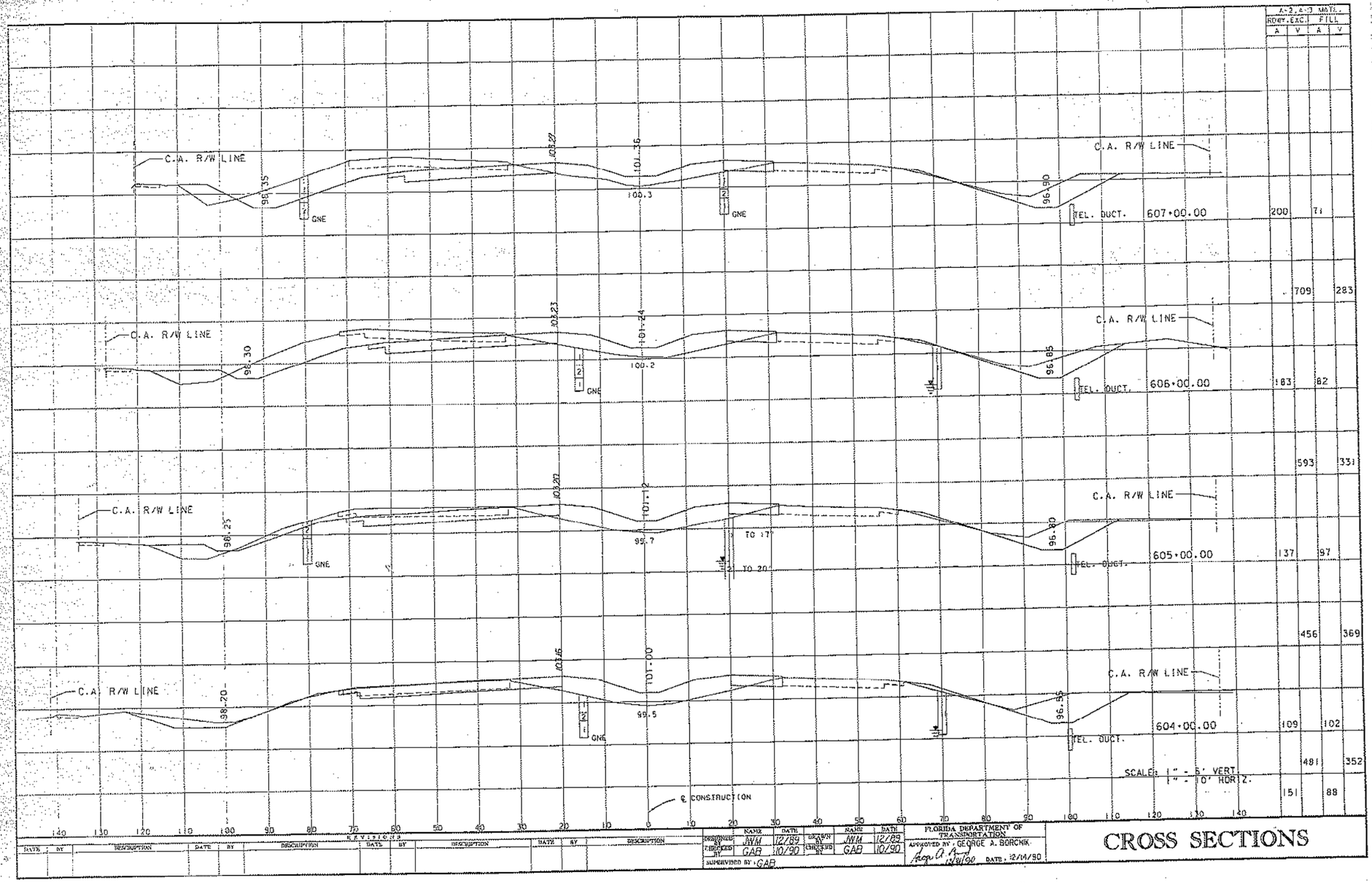
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

	NAME	DATE		NAME	DATE
DESIGNED BY	JWW	12/89	DRAWN BY	JWW	12/89
CHECKED BY	GAB	10/90	CHECKED BY	GAB	10/90
SUPERVISED BY	GAB				

FLORIDA DEPARTMENT OF TRANSPORTATION
APPROVED BY: GEORGE A. SORCHIK
DATE: 12/14/90

CROSS SECTIONS

STATE PROJ. NO.	SHEET NO.
75560-3610	55



A-2 A-3 MATL.			
ROW EXC.		FILL	
A	V	A	V
200		71	
	709		283
183		82	
	593		331
137		97	
	456		369
109		102	
	481		352
151		88	

SCALE: 1" - 5' VERT
1" - 10' HORIZ.

REVISIONS											
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

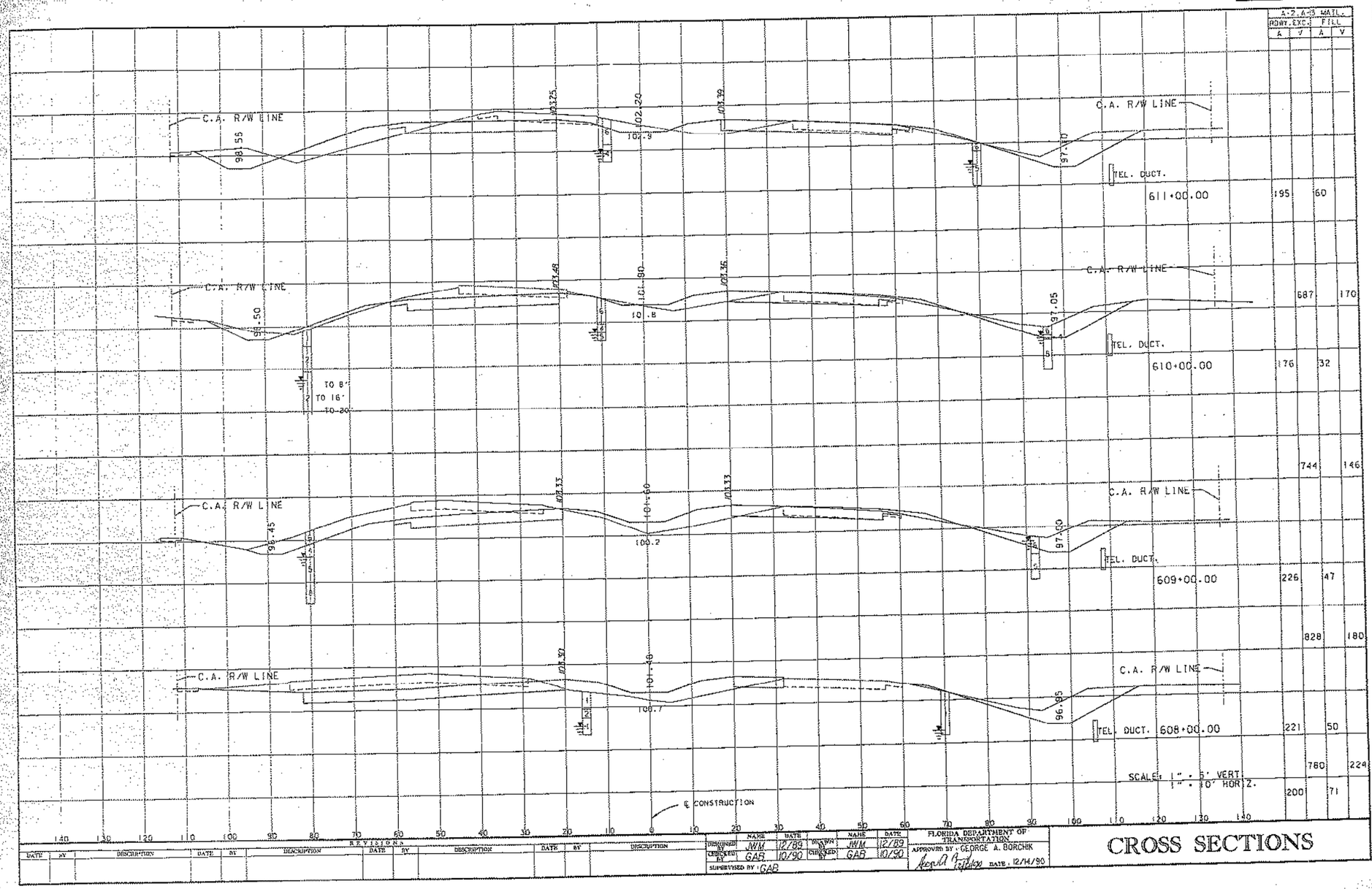
	NAME	DATE		NAME	DATE
DESIGNED BY	JWM	12/89	DRAWN BY	JWM	12/89
CHECKED BY	GAB	10/90	CHECKED BY	GAB	10/90

SUPERVISED BY: GAB

FLORIDA DEPARTMENT OF TRANSPORTATION
APPROVED BY: GEORGE A. BORCHIK
DATE: 12/11/90

CROSS SECTIONS

STATE PROJ. NO.	SHEET No.
75560-3610	56



A-2 A-3 MATL.			
ROWY. EXC.		FILL	
A	V	A	V
195	60		
587	170		
176	32		
744	146		
226	47		
828	180		
221	50		
760	224		
200	71		

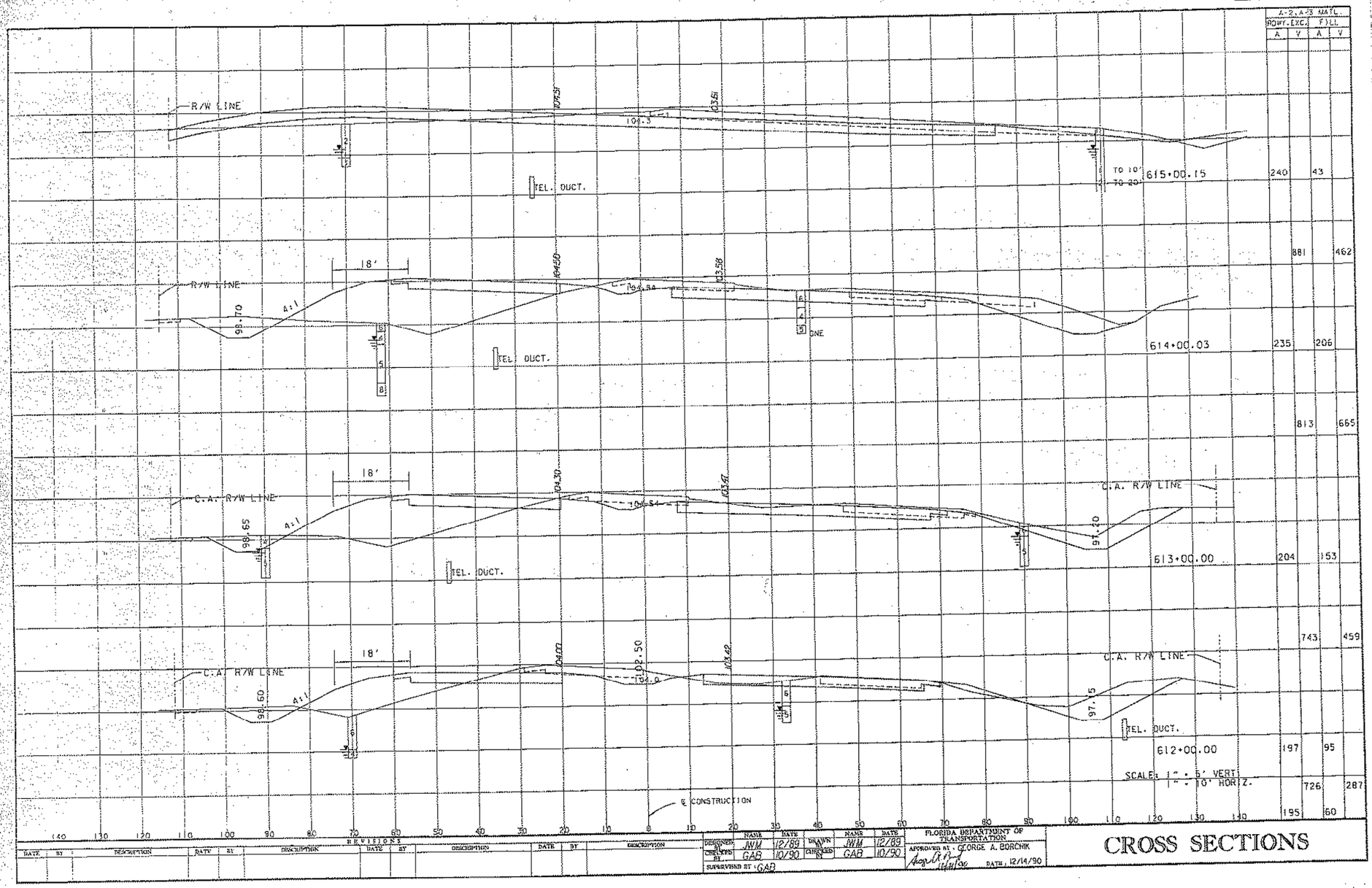
REVISIONS							
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

	NAME	DATE		NAME	DATE
DESIGNED	JWM	12/89	DRAWN	JWM	12/89
CHECKED	GAB	10/90	CHECKED	GAB	10/90
SUPERVISED BY : GAB					

FLORIDA DEPARTMENT OF TRANSPORTATION
APPROVED BY : GEORGE A. BORCHIK
DATE : 12/14/90

CROSS SECTIONS

STATE PROJ NO.	SHEET NO.
75560-3610	57



A-2, A-3 MATL.			
ROWY. EXC.		FILL	
A	V	A	V
240		43	
881		462	
235		206	
813		665	
204		153	
743		459	
197		95	
726		287	
195		60	

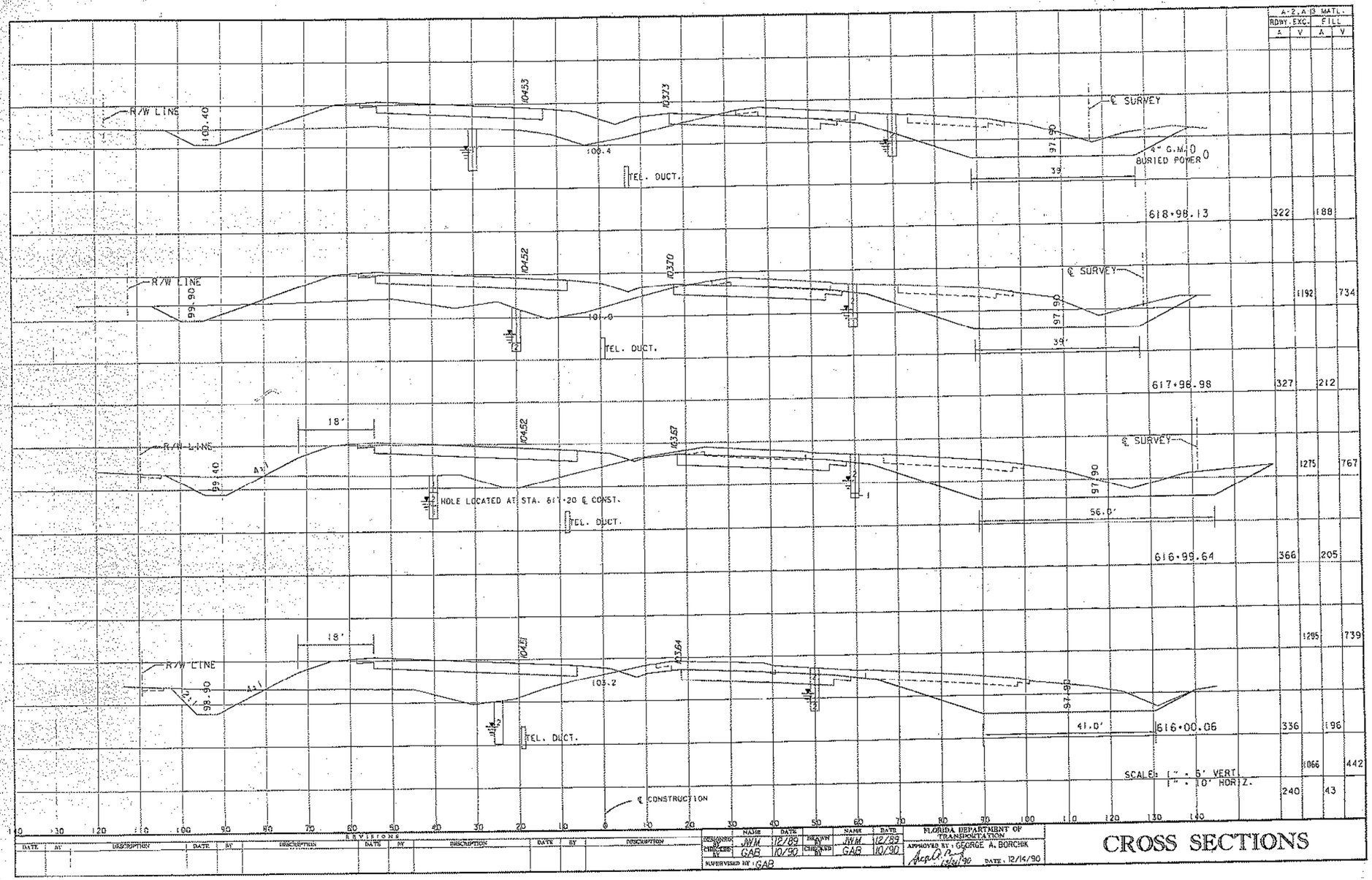
REVISIONS											
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

	NAME	DATE		NAME	DATE
DESIGNED BY	JWM	12/89	DRAWN BY	JWM	12/89
CHECKED BY	GAB	10/90	CHECKED BY	GAB	10/90
SUPERVISED BY	GAB				

FLORIDA DEPARTMENT OF TRANSPORTATION
APPROVED BY: GEORGE A. BORCHIK
DATE: 12/14/90

CROSS SECTIONS

STATE PROJ. NO.	SHEET NO.
75560-3610	58



	A-2, A-3 MATL.			
	RDWY. EXC.		FILL	
	A	V	A	V
618+98.13	322		188	
	1192		734	
617+98.98	327		212	
	1275		767	
616+99.64	366		205	
	1285		739	
616+00.06	336		196	
	1066		442	
	240		43	

REVISIONS

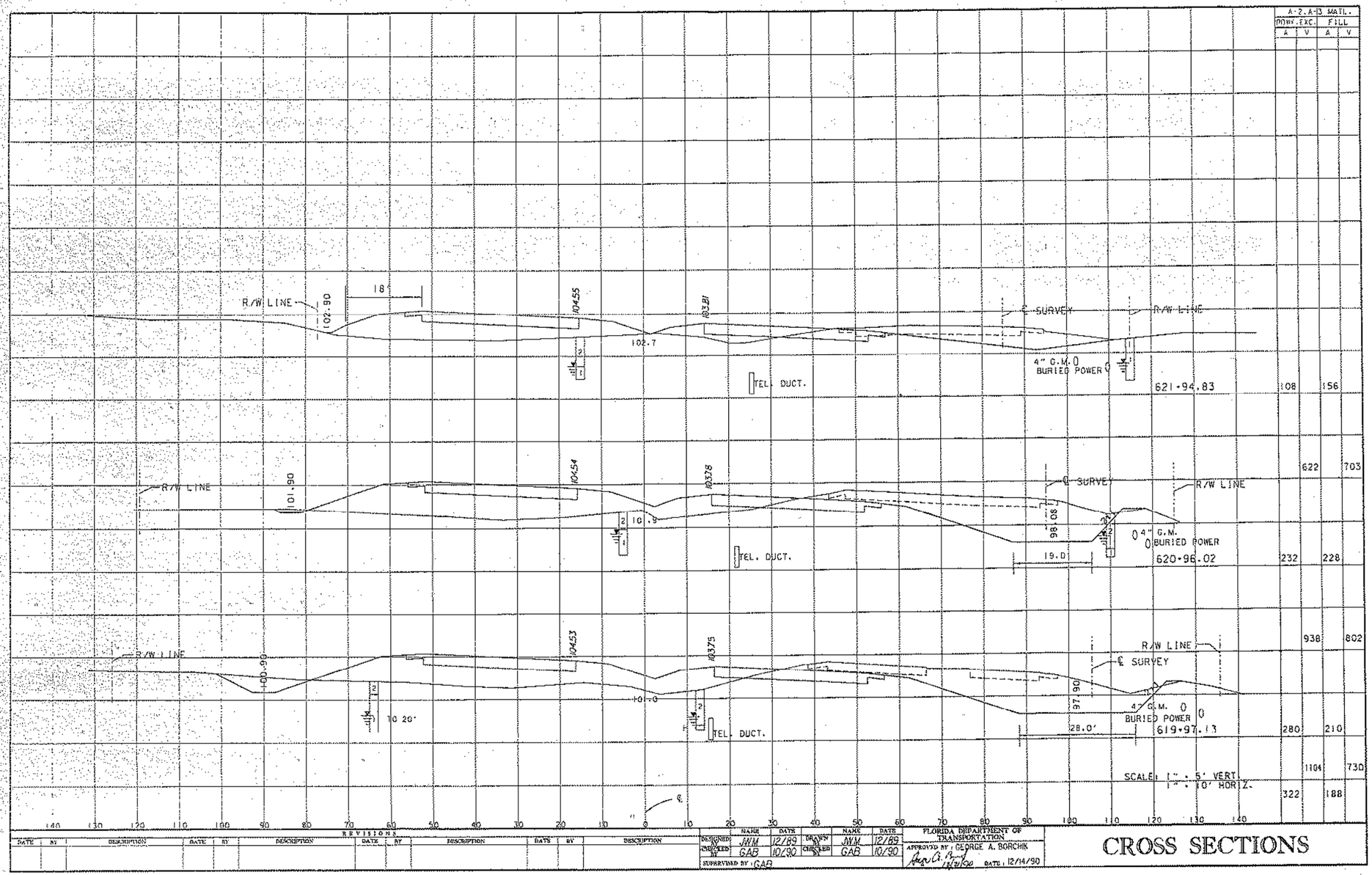
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

	NAME	DATE		NAME	DATE
DESIGNED BY	JWM	12/89	DRAWN BY	JWM	12/89
CHECKED BY	GAB	10/90	CHECKED BY	GAB	10/90
SUPERVISED BY	GAB				

FLORIDA DEPARTMENT OF TRANSPORTATION
APPROVED BY: GEORGE A. BORCHIK
DATE: 12/14/90

CROSS SECTIONS

STATE PROJ. NO.	SHEET NO.
75560-3610	59



A-2, A-3 MATL.			
DIFF. EXC.		FILL	
A	V	A	V
108		156	
622		703	
232		228	
938		802	
280		210	
1104		730	
322		188	

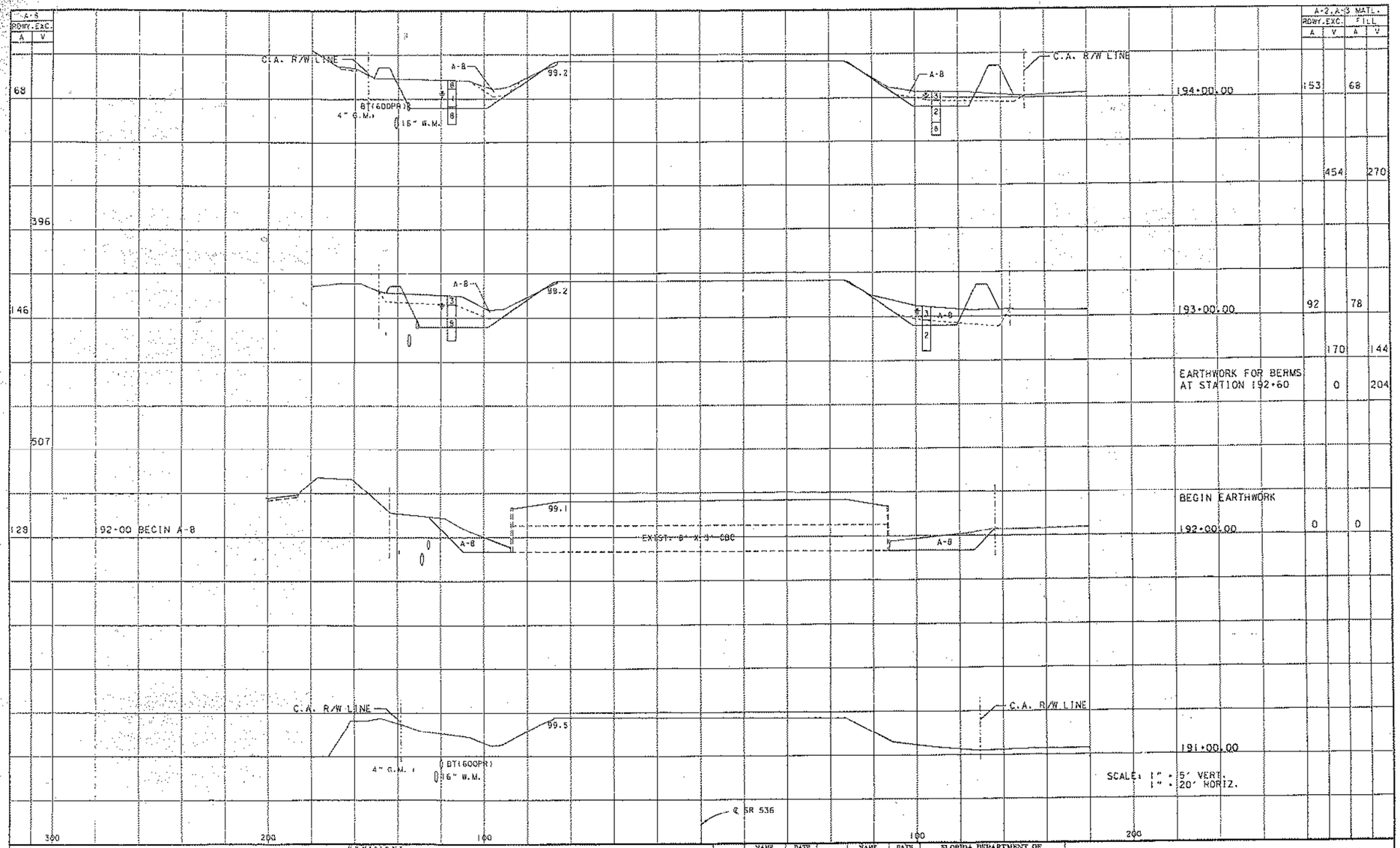
REVISIONS											
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

	NAME	DATE		NAME	DATE
DESIGNED BY	JWM	12/89	DRAWN BY	JWM	12/89
CHECKED BY	GAB	10/90	CHECKED BY	GAB	10/90
SUPERVISED BY: GAB					

FLORIDA DEPARTMENT OF TRANSPORTATION
APPROVED BY: GEORGE A. BORCHIS
DATE: 12/14/90

CROSS SECTIONS

STATE PROJ. NO.	SHEET NO.
75560-3610	72



	A-2, A-3 MATL.			
	RDWY. EXC.		FILL	
	A	V	A	V
194+00.00	153		68	
		454		270
193+00.00	92		78	
		170		144
EARTHWORK FOR BERMS AT STATION 192+60		0		204
BEGIN EARTHWORK 192+00.00	0		0	

REVISIONS											
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

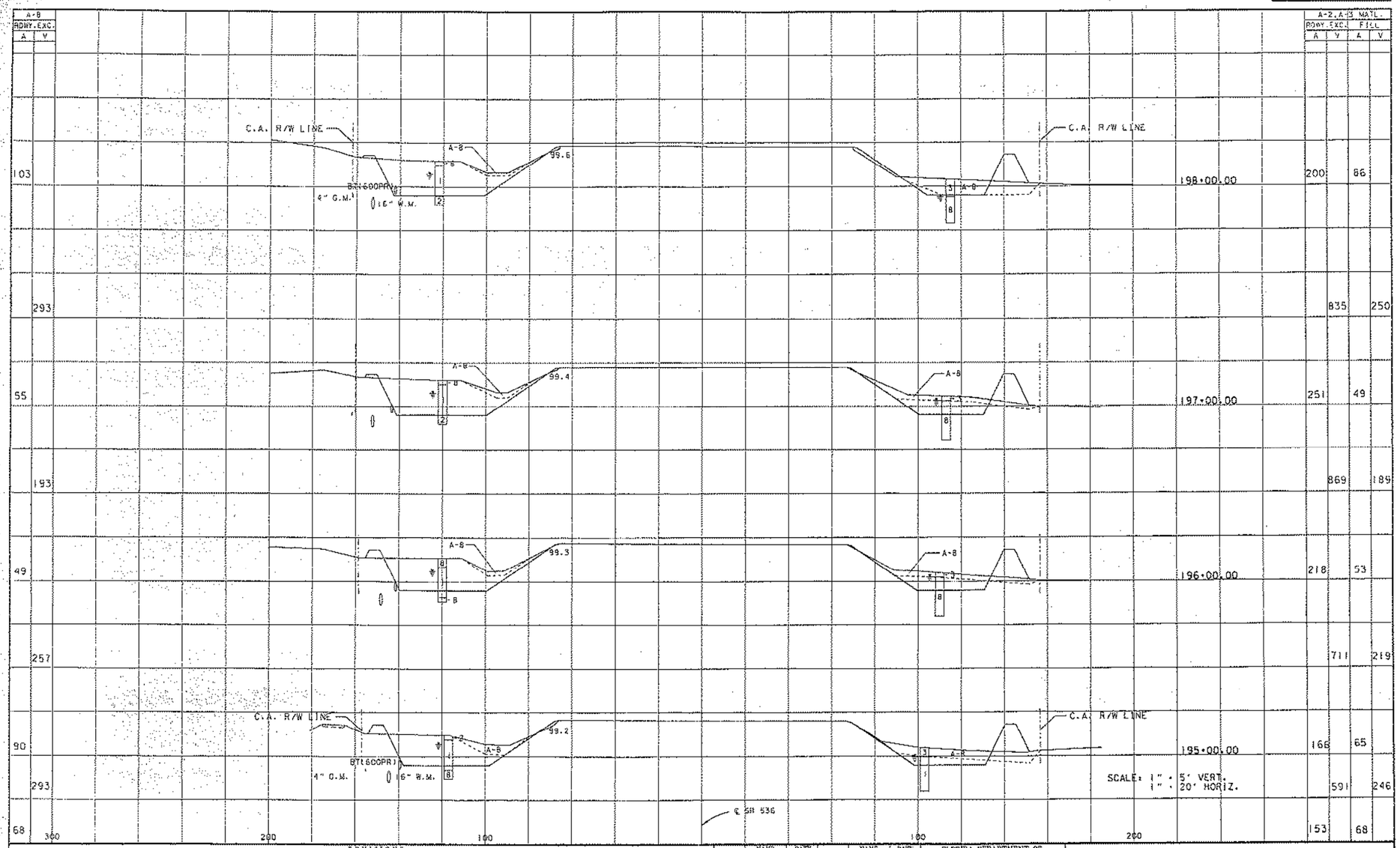
	DESIGNED BY	NAME	DATE	DRAWN BY	NAME	DATE
		JWM	8/90	JWM	JWM	8/90
	CHECKED BY	GAB	10/90	CHECKED BY	GAB	10/90
	SUPERVISED BY: GAB					

FLORIDA DEPARTMENT OF TRANSPORTATION
APPROVED BY: GEORGE A. BORCHIK
DATE: 12/14/90

CROSS SECTIONS ALONG SR 536

STATE PROJ. NO.	SHEET NO.
75560-3610	73

A-B RDWY. EXC. A	A-B RDWY. EXC. V	A-2, A-3 MATL. RDWY. EXC. A	A-2, A-3 MATL. RDWY. EXC. V	A-2, A-3 MATL. FILL A	A-2, A-3 MATL. FILL V
103				200	86
	293			835	250
55				251	49
	193			869	185
49				218	53
	257			711	219
90				168	65
	293			591	246
68				153	68



SCALE: 1" = 5' VERT.
1" = 20' HORIZ.

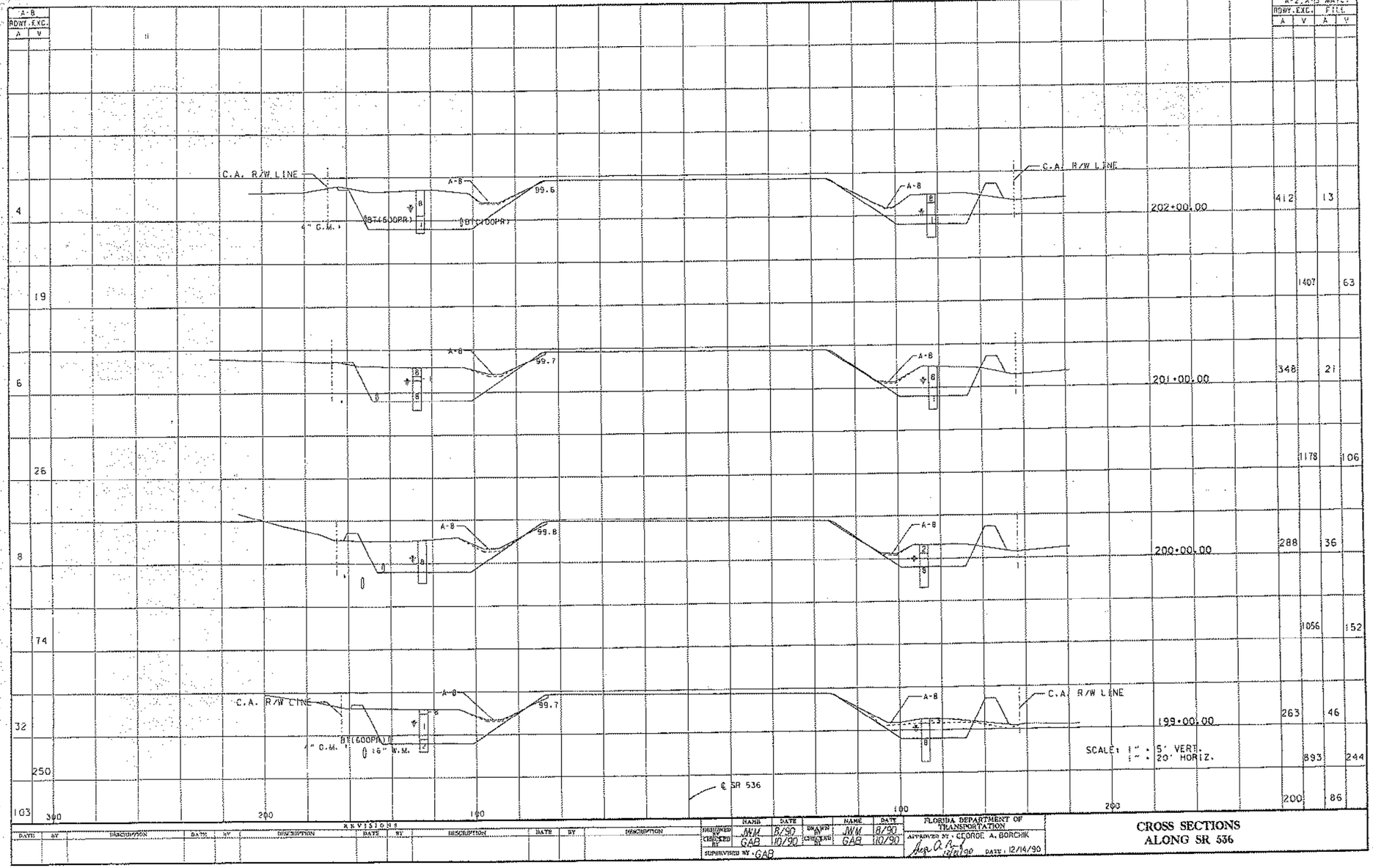
REVISIONS									
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

	NAME	DATE		NAME	DATE
DESIGNED BY	JWH	8/90	DRAWN BY	JWH	8/90
CHECKED BY	GAB	10/90	CHECKED BY	GAB	10/90
SUPERVISED BY	GAB				

FLORIDA DEPARTMENT OF TRANSPORTATION
APPROVED BY: GEORGE A. BORCHIK
DATE: 12/14/90

CROSS SECTIONS ALONG SR 536

STATE PROJ. NO.	SHEET NO.
75560-3610	74



REVISIONS

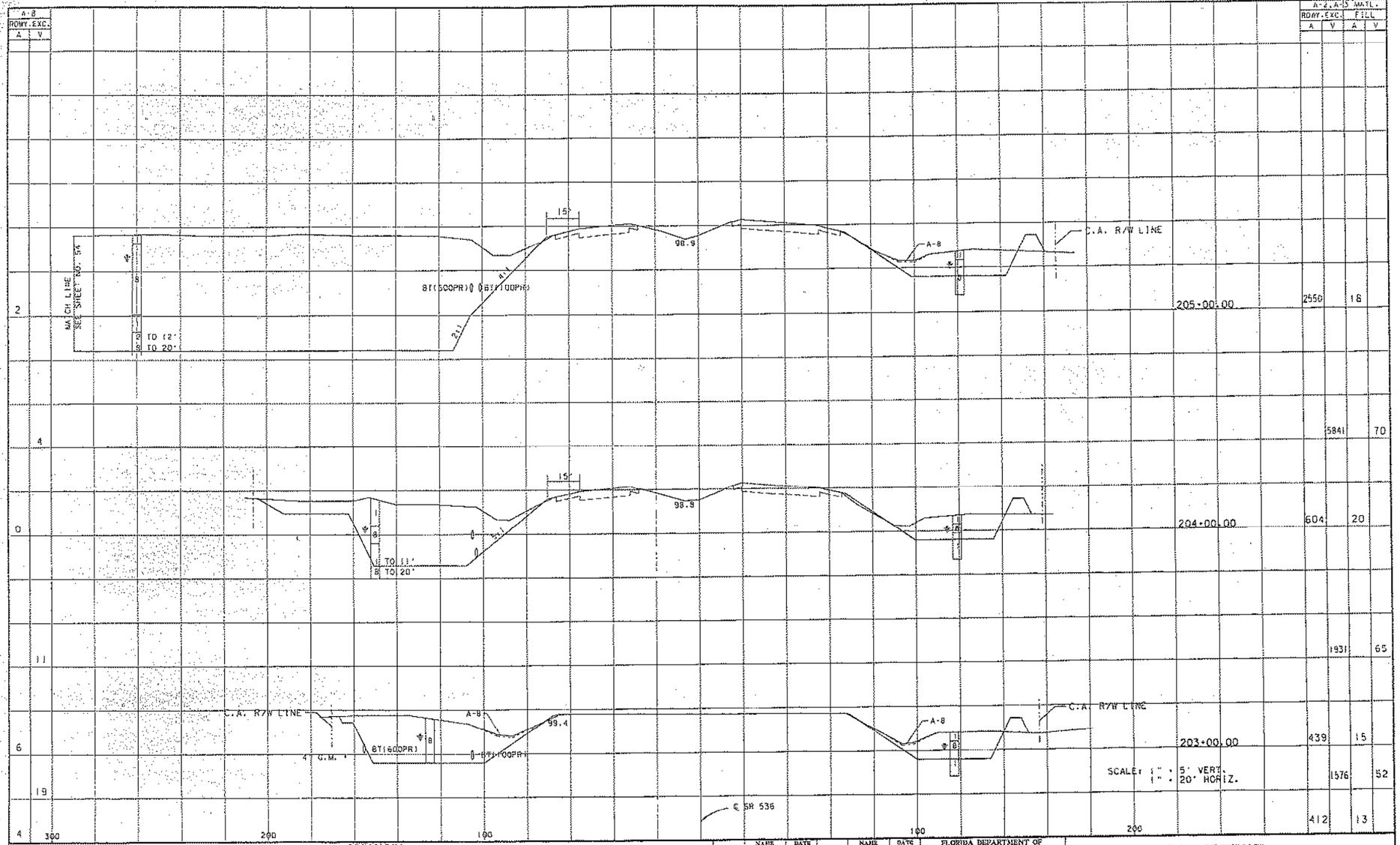
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

	NAME	DATE		NAME	DATE
DESIGNED BY	JWM	8/90	DRAWN BY	JWM	8/90
CHECKED BY	GAB	10/90	CHECKED BY	GAB	10/90
SUPERVISED BY: GAB					

FLORIDA DEPARTMENT OF TRANSPORTATION
APPROVED BY: GEORGE A. BORCHIK
DATE: 12/14/90

CROSS SECTIONS ALONG SR 536

STATE PROJ. NO.	SHEET NO.
75560-3610	75



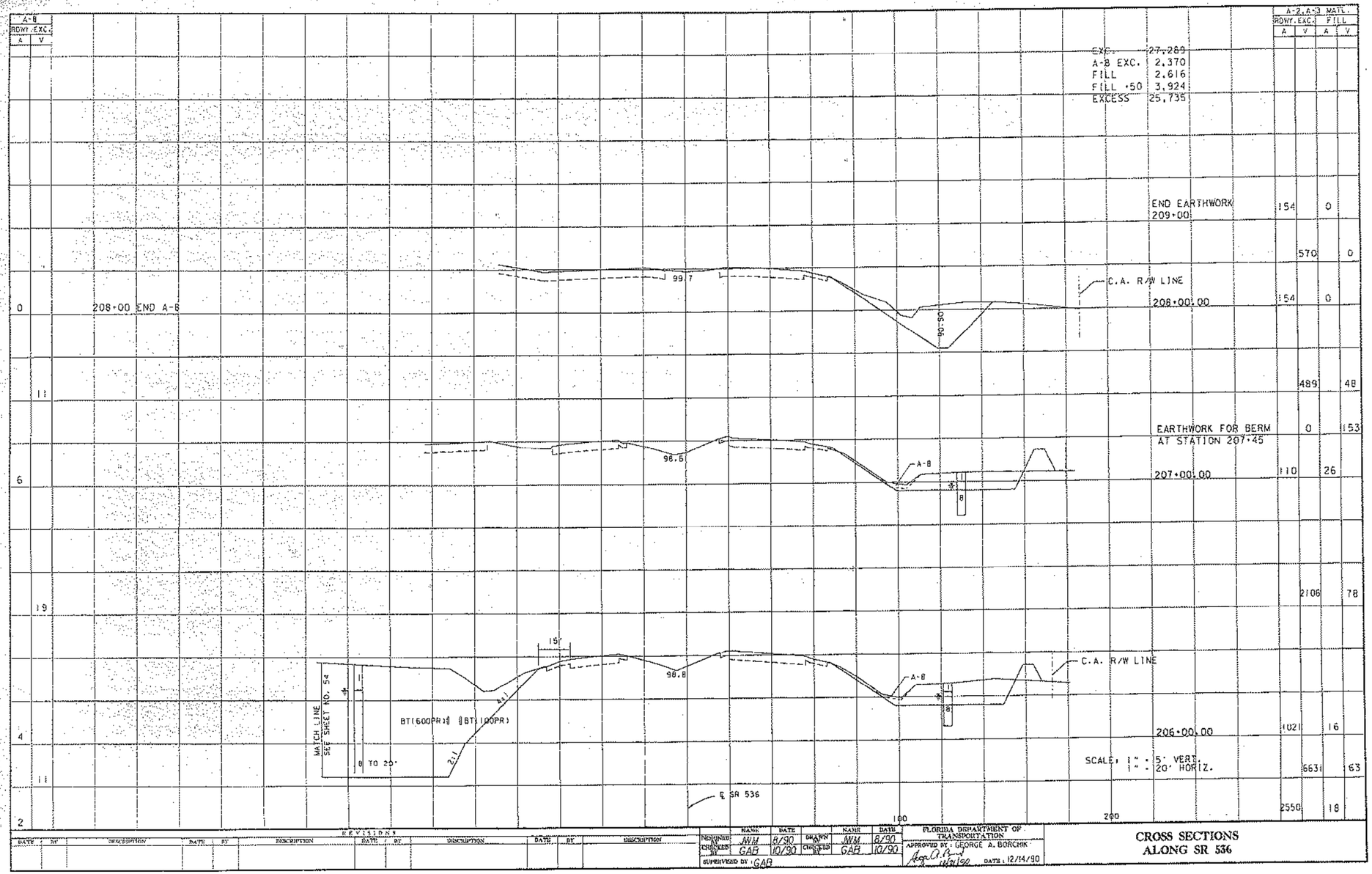
REVISIONS											
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

	NAME	DATE		NAME	DATE
DESIGNED BY	JWM	8/90	DRAWN BY	JWM	8/90
CHECKED BY	GAB	10/90	CHECKED BY	GAB	10/90
SUPERVISED BY : GAB					

FLORIDA DEPARTMENT OF TRANSPORTATION
APPROVED BY : GEORGE A. BORCHIK
DATE : 12/14/90

CROSS SECTIONS ALONG SR 536

STATE PROJ. NO.	SHEET NO.
75660-3610	76



REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

	NAME	DATE		NAME	DATE
DESIGNED BY	JWH	8/90	DRAWN BY	JWH	8/90
CHECKED BY	GAB	10/90	CHECKED BY	GAB	10/90
SUPERVISED BY	GAB				

FLORIDA DEPARTMENT OF TRANSPORTATION
APPROVED BY: GEORGE A. BORCHIK
DATE: 12/14/90

CROSS SECTIONS ALONG SR 536

SFWMD App. No. 970417-8/
Permit No. 49-00866-S
Greene Property Phase II
(International Drive)
(Basin 4)

Application #:	970417-8	**Permit#:**	48-00866-S	**Final Action Date:**	12-Nov-1998
Issuing Office:	ORL/SFWMD	**Permit Status:**	ACTIVE	**Application Status:**	Complete
Permit Type:	Environmental Resource (Construction/Operation Modification)			**Expiration Date:**	
Project Name:	Greene Property Phase Ii			**Project Acres:**	9.89
Landuse(s):	Transportation	**Location:**	Orange S32,33,34,35/T24/R28		
Receiving Body:	Shingle Creek Via Existing Wetlands				

Applicant: Gcb Associates Ltd Chien Ee Liew
Sparknight Inc 5840 S Semoran Blvd Suite C Orlando FL 32822

Engr Consultant: Dyer Riddle Mills & Precourt Inc Michelle K Stevens
1505 E Colonial Drive Orlando FL 32803

Oper Entity: A Master Association
9999999999

Project Description:

Contact Email Id: permits@sfwmd.gov

Documents **List by date**

	Document Type	Date Posted	Size	Seal Verified?
Applications(1)				
Correspondence(1)				
970417-8_Phone_20080917_458515		Feb 12, 2009	38 KB	
Calculations - Design Plans(1)				
Calculation & Design Information(1)				
970417-8_As-builts_456293		Feb 4, 2009	1 MB	
Compliance - Other(1)				
PostPermitCompliance(4)				
Conversion to Operation Transfers(2)				
Conversion Transfer Information(9)				
Correspondence(1)				
Enforcement(2)				
Enforcement Information(2)				
Notice of Violation(2)				
Permit File History(1)				
Permit History(1)				
970417-8	Historical Records	Apr 24, 2008	89 MB	

Close Me

Server : 24p

CONSTRUCTION PLANS
for
GREENE PROPERTY
PHASE II INFRASTRUCTURE PLAN
ORANGE COUNTY, FLORIDA

INDEX OF SHEETS

Prepared For

GCB ASSOCIATES, LTD.

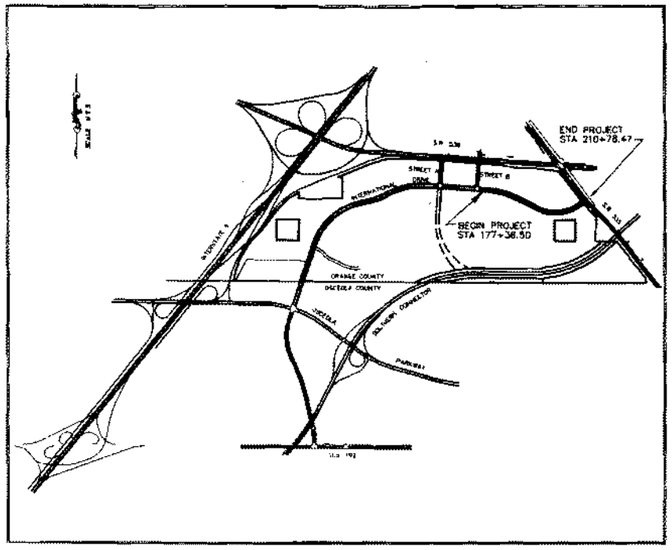
Consultant List

ENGINEER & SURVEYOR
DYER, RIDDLE, MILLS, & PRECOURT, INC.
1505 EAST COLONIAL DRIVE
ORLANDO, FLORIDA 32853-8505
(407) 896-0594

PLANNER
GLATTING JACKSON KERCHER ANGLIN LOPEZ RINEHART, INC.
33 EAST PINE ST.
ORLANDO, FLORIDA 32801
(407) 843-6552

ENVIRONMENTAL CONSULTANT
LOTSPEICH AND ASSOCIATES, INC.
422 FAIRBANKS AVE., SUITE 201
WINTER PARK, FLORIDA 32789
(407) 740-8482

GEOTECHNICAL ENGINEER
PROFESSIONAL SERVICES INDUSTRIES, INC.
JAMMAL & ASSOCIATES DIVISION
1675 LEE ROAD
WINTER PARK, FLORIDA 32789
(407) 645-5560



VICINITY MAP
LENGTH OF PROJECT 3,341.97 FT (0.633 MILES)

RECORD DRAWING
WATER & SANITARY SEWER ONLY
8 JUNE 1999
INFORMATION CONTAINED IN THIS RECORD SET
WAS FURNISHED BY THE CONTRACTOR.

RECORD DRAWING
STORM ONLY
2 AUGUST 1999
INFORMATION CONTAINED IN THIS RECORD SET
WAS FURNISHED BY THE CONTRACTOR.

PLANS HAVE BEEN REDUCED IN SCALE.
SCALE IS 46% OF PLAN SCALE AS NOTED
ON THESE DRAWINGS.

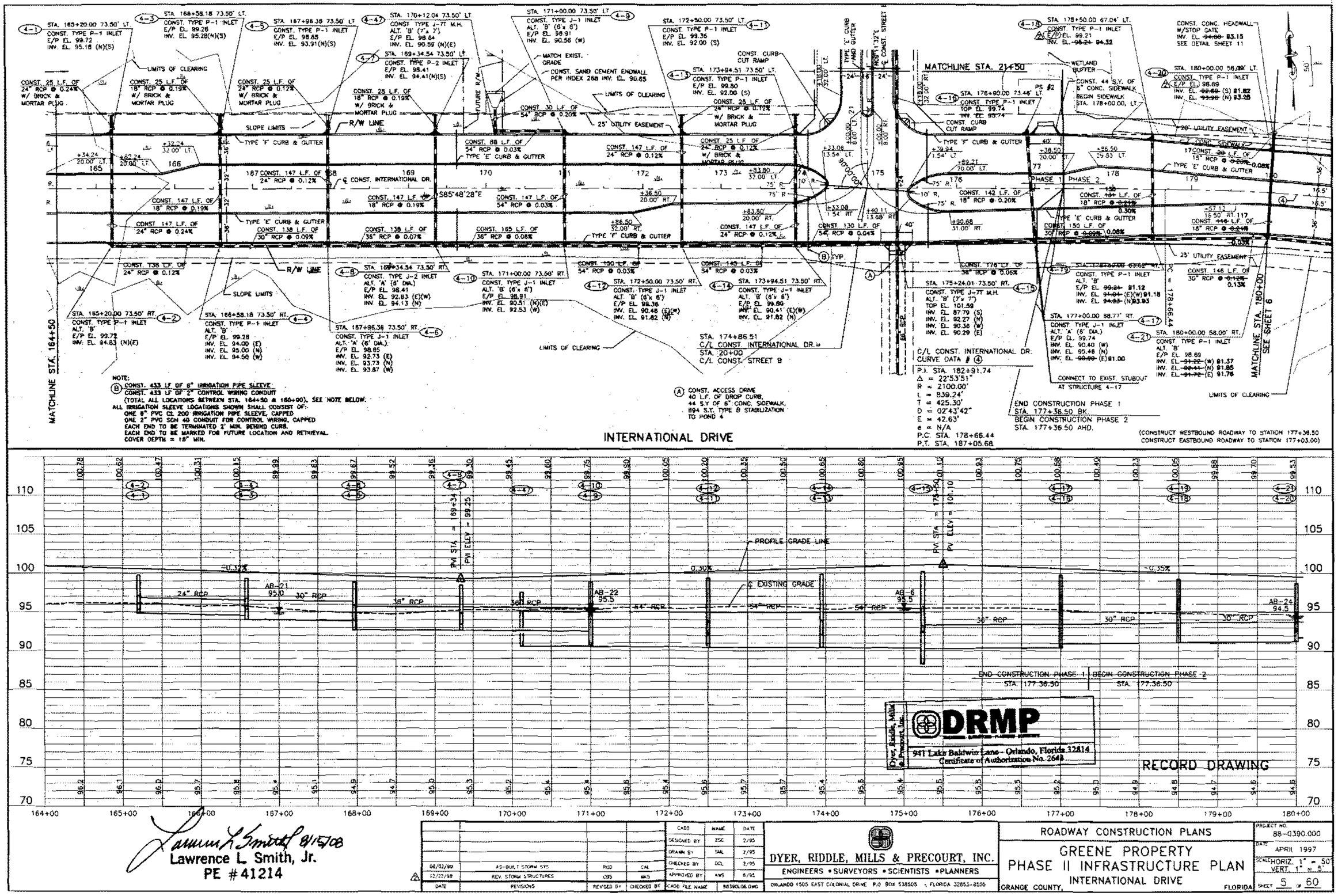
Dyer, Riddle, Mills & Precourt, Inc.
DRMP
941 Lake Baldwin Lane - Orlando, Florida 32814
Certificate of Authorization No. 2648

Note:
ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE LATEST ORANGE COUNTY STANDARDS AND SPECIFICATIONS AND THE FLORIDA DEPARTMENT OF TRANSPORTATION MANUAL OF UNIFORM MINIMUM STANDARDS FOR DESIGN, CONSTRUCTION AND MAINTAINCE FOR STREETS AND HIGHWAYS (GREEN BOOK).

Lawrence L. Smith, Jr.
8/15/08 PE #41214

DRMP
ENGINEERS • SURVEYORS • SCIENTISTS • PLANNERS
1505 EAST COLONIAL DRIVE, P.O. BOX 538505, ORLANDO, FLORIDA 32853-8505

JOB NUMBER 88-0390 000
SHEET 1 OF 60


INTERNATIONAL DRIVE
MATCHLINE STA. 164+50
MATCHLINE STA. 180+00 SEE SHEET 6
MATCHLINE STA. 21+50
STA. 165+20.00 73.50' LT. CONST. TYPE P-1 INLET E/P EL. 99.72 INV. EL. 95.18 (N)(S)
STA. 166+58.18 73.50' LT. CONST. TYPE P-1 INLET E/P EL. 99.28 INV. EL. 95.28(N)(S)
STA. 167+98.38 73.50' LT. CONST. TYPE P-1 INLET E/P EL. 98.85 INV. EL. 93.91(N)(S)
STA. 169+34.54 73.50' LT. CONST. TYPE P-2 INLET E/P EL. 98.41 INV. EL. 94.41(N)(S)
STA. 170+12.04 73.50' LT. CONST. TYPE J-7T M.H. ALT. 'B' (7'x 7') E/P EL. 98.64 INV. EL. 90.59 (N)(E)
STA. 171+00.00 73.50' LT. CONST. TYPE J-1 INLET ALT. 'B' (6'x 6') E/P EL. 98.91 INV. EL. 90.56 (W)
STA. 172+50.00 73.50' LT. CONST. TYPE P-1 INLET E/P EL. 99.36 INV. EL. 92.00 (S)
STA. 173+94.51 73.50' LT. CONST. TYPE P-1 INLET E/P EL. 99.80 INV. EL. 92.00 (S)
STA. 175+24.01 73.50' LT. CONST. TYPE J-7T M.H. ALT. 'B' (7'x 7') TOP EL. 101.59 INV. EL. 87.79 (S) INV. EL. 92.27 (W) INV. EL. 90.58 (W) INV. EL. 90.29 (E)
STA. 176+80.00 73.46' LT. CONST. TYPE P-1 INLET TOP EL. 99.74 INV. EL. 95.74
STA. 178+50.00 67.04' LT. CONST. TYPE P-1 INLET E/P EL. 99.21 INV. EL. ~~95.24~~ 94.32
STA. 180+00.00 56.09' LT. CONST. TYPE P-1 INLET E/P EL. 98.69 INV. EL. ~~92.69~~ (S) 91.82 INV. EL. ~~93.98~~ (N) 93.28
STA. 177+00.00 88.77' RT. CONST. TYPE J-1 INLET ALT. 'A' (6' DIA.) E/P EL. 99.74 INV. EL. 90.40 (W) INV. EL. 95.46 (N) INV. EL. ~~90.00~~ (E)91.00
STA. 180+00.00 58.00' RT. CONST. TYPE P-1 INLET ALT. 'B' E/P EL. 98.69 INV. EL. ~~91.22~~ (W) 91.37 INV. EL. ~~90.41~~ (N) 91.85 INV. EL. ~~91.92~~ (E) 91.78
STA. 185+20.00 73.50' RT. CONST. TYPE P-1 INLET ALT. 'B' E/P EL. 99.72 INV. EL. 94.63 (N)(E)
STA. 166+58.18 73.50' RT. CONST. TYPE P-1 INLET ALT. 'B' E/P EL. 99.28 INV. EL. 94.00 (E) INV. EL. 95.00 (N) INV. EL. 94.50 (W)
STA. 167+98.38 73.50' RT. CONST. TYPE J-1 INLET ALT. 'A' (6' DIA.) E/P EL. 98.85 INV. EL. 92.73 (E) INV. EL. 93.73 (N) INV. EL. 93.87 (W)
STA. 169+34.54 73.50' RT. CONST. TYPE J-2 INLET ALT. 'A' (8' DIA.) E/P EL. 98.41 INV. EL. 92.63 (E)(W) INV. EL. 94.13 (N)
STA. 171+00.00 73.50' RT. CONST. TYPE J-1 INLET ALT. 'B' (6'x 6') E/P EL. 98.91 INV. EL. 90.51 (N)(E) INV. EL. 92.53 (W)
STA. 172+50.00 73.50' RT. CONST. TYPE J-1 INLET ALT. 'B' (6'x 6') E/P EL. 99.36 INV. EL. 90.46 (E)(W) INV. EL. 91.82 (N)
STA. 173+94.51 73.50' RT. CONST. TYPE J-1 INLET ALT. 'B' (6'x 6') E/P EL. 99.80 INV. EL. 90.41 (E)(W) INV. EL. 91.82 (N)
STA. 174+86.51 C/L CONST. INTERNATIONAL DR. STA. 20+00 C/L CONST. STREET B
CONST. 25 L.F. OF 24" RCP @ 0.24% W/ BRICK & MORTAR PLUG
CONST. 25 L.F. OF 18" RCP @ 0.19% W/ BRICK & MORTAR PLUG
CONST. 25 L.F. OF 24" RCP @ 0.12% W/ BRICK & MORTAR PLUG
CONST. 30 L.F. OF 54" RCP @ 0.20%
CONST. 88 L.F. OF 54" RCP @ 0.03% TYPE 'E' CURB & GUTTER
CONST. 147 L.F. OF 24" RCP @ 0.12%
CONST. 147 L.F. OF 18" RCP @ 0.19%
CONST. 138 L.F. OF 30" RCP @ 0.09%
CONST. 139 L.F. OF 36" RCP @ 0.07%
CONST. 165 L.F. OF 36" RCP @ 0.08%
CONST. 150 L.F. OF 54" RCP @ 0.03%
CONST. 145 L.F. OF 54" RCP @ 0.03%
CONST. 130 L.F. OF 54" RCP @ 0.04%
CONST. 142 L.F. OF 18" RCP @ 0.20%
CONST. 150 L.F. OF 30" RCP @ ~~0.09%~~ 0.08%
CONST. 176 L.F. OF 36" RCP @ 0.06%
CONST. 146 L.F. OF 30" RCP @ ~~0.12%~~ 0.13%
CONST. ~~44~~ L.F. OF 18" RCP @ ~~0.21%~~ 0.30%
CONST. ~~20~~ L.F. OF 15" RCP @ ~~0.20%~~ 0.06%
CONST. ~~44~~ L.F. OF 18" RCP @ ~~0.21%~~ 0.30%
CONST. ~~44~~ L.F. OF 18" RCP @ ~~0.21%~~ 0.30%
CONST. 146 L.F. OF 30" RCP @ ~~0.12%~~ 0.13%
CONST. 138 L.F. OF 24" RCP @ 0.12%
CONST. 147 L.F. OF 24" RCP @ 0.24%
CONST. 147 L.F. OF 18" RCP @ 0.19%
CONST. 147 L.F. OF 24" RCP @ 0.12%
CONST. 147 L.F. OF 54" RCP @ 0.03%
CONST. 147 L.F. OF 24" RCP @ 0.12%
CONST. 138 L.F. OF 24" RCP @ 0.12%
CONST. 433 L.F. OF 6" IRRIGATION PIPE SLEEVE
CONST. 433 L.F. OF 2" CONTROL WIRING CONDUIT
(TOTAL ALL LOCATIONS BETWEEN STA. 164+50 & 180+00). SEE NOTE BELOW.
ALL IRRIGATION SLEEVE LOCATIONS SHOWN SHALL CONSIST OF:
ONE 6" PVC CL 200 IRRIGATION PIPE SLEEVE, CAPPED
ONE 2" PVC SCH 40 CONDUIT FOR CONTROL WIRING, CAPPED
EACH END TO BE TERMINATED 2' MIN. BEHIND CURB.
EACH END TO BE MARKED FOR FUTURE LOCATION AND RETRIEVAL.
COVER DEPTH = 18" MIN.
CONST. ACCESS DRIVE 40 L.F. OF DROP CURB, 44 S.Y. OF 6" CONC. SIDEWALK, 894 S.Y. TYPE B STABILIZATION TO POND 4
C/L CONST. INTERNATIONAL DR. CURVE DATA # 4
P.I. STA. 182+91.74
Δ = 22°53'51"
R = 2100.00'
L = 839.24'
T = 425.30'
D = 02°43'42"
E = 42.63'
e = N/A
P.C. STA. 178+66.44
P.T. STA. 187+05.68
END CONSTRUCTION PHASE 1 STA. 177+36.50 BK.
BEGIN CONSTRUCTION PHASE 2 STA. 177+36.50 AHD.
(CONSTRUCT WESTBOUND ROADWAY TO STATION 177+36.50 CONSTRUCT EASTBOUND ROADWAY TO STATION 177+03.00)
CONNECT TO EXIST. STUBOUT AT STRUCTURE 4-17
LIMITS OF CLEARING
SLOPE LIMITS
R/W LINE
FUTURE R/W
TYPE 'F' CURB & GUTTER
TYPE 'E' CURB & GUTTER
CONST. CURB CUT RAMP
CONST. SAND CEMENT ENDWALL PER INDEX 268 INV. EL. 90.65
MATCH EXIST. GRADE
25' UTILITY EASEMENT
CONST. INTERNATIONAL DR.
S85°48'28"E
WETLAND BUFFER
CONST. 44 S.Y. OF 5" CONC. SIDEWALK BEGIN SIDEWALK STA. 178+00.00, LT.
CONST. CONC. HEADWALL W/STOP GATE
SEE DETAIL SHEET 11
PHASE 1
PHASE 2
TYP.
NOTE:
(B)
PVI STA. = 169+34
PVI ELEV. = 99.25
PVI STA. = 175+50
PVI ELEV. = 101.10
PROFILE GRADE LINE
EXISTING GRADE
24" RCP
30" RCP
36" RCP
54" RCP
AB-21 95.0
AB-22 95.5
AB-6 95.5
AB-24 94.5
-0.37%
0.30%
-0.35%
END CONSTRUCTION PHASE 1 STA. 177+36.50
BEGIN CONSTRUCTION PHASE 2 STA. 177+36.50
DRMP
Dyer, Riddle, Mills & Precourt, Inc.
941 Lake Baldwin Lane - Orlando, Florida 32814
Certificate of Authorization No. 2648
RECORD DRAWING
Lawrence L. Smith, Jr.
PE #41214
08/02/99 AS-BUILT STORM SYS. RGD CAL
12/22/98 REV. STORM STRUCTURES CBS MKS
DATE REVISIONS REVISED BY CHECKED BY
CADD NAME DATE
DESIGNED BY ZSC 2/95
DRAWN BY SML 2/95
CHECKED BY DCL 2/95
APPROVED BY KWS 8/95
CADD FILE NAME 8839DL06.DWG
DYER, RIDDLE, MILLS & PRECOURT, INC.
ENGINEERS • SURVEYORS • SCIENTISTS • PLANNERS
ORLANDO 1505 EAST COLONIAL DRIVE P.O. BOX 538505 , FLORIDA 32853-8505
ROADWAY CONSTRUCTION PLANS
GREENE PROPERTY
PHASE II INFRASTRUCTURE PLAN
INTERNATIONAL DRIVE
ORANGE COUNTY, FLORIDA
PROJECT NO. 88-0390.000
DATE APRIL 1997
SCALE HORIZ. 1" = 50' VERT. 1" = 5'
SHEET 5 OF 60

CONSERVATION TRACT

LIMITS OF CLEARING

WETLAND BUFFER

STA. 183+00.00 58.00' LT. (4-24) CONST. TYPE P-1 INLET E/P EL. 97.64 INV. EL. ~~93.64~~ 93.51

STA. 184+50.00 58.00' LT. (4-26) CONST. TYPE P-2 INLET E/P EL. 97.11 INV. EL. ~~93.11~~ 93.22

STA. 186+00.00 58.00' LT. (4-28) CONST. TYPE P-1 INLET E/P EL. 97.56 INV. EL. ~~93.56~~ 93.80

STA. 188+39.61 106.80' LT. (DS4) CONST. DITCH BOTTOM INLET TYPE 'D', INDEX No. 232 (MODIFIED W/ CONC. APRON & FENCE SEE DETAIL SHEET 11) TOP EL. ~~93.69~~ 93.84 INV. EL. ~~89.89~~ 89.54

STA. 189+50.00 67.49' LT. (5-7) CONST. TYPE P-1 INLET E/P EL. 97.21 INV. EL. ~~93.03~~ (E)(S) 92.91

STA. 191+50.00 73.50' LT. (5-4) CONST. TYPE P-1 INLET E/P EL. 98.41 INV. EL. ~~96.15~~ (E)(S)(W) 92.11

STA. 193+50.00 73.50' LT. (5-6) CONST. TYPE P-2 INLET E/P EL. 95.61 INV. EL. ~~90.80~~ (E) 90.68 INV. EL. ~~91.35~~ (S) 91.28 INV. EL. ~~91.30~~ (W) 91.29

STA. 194+90.00 73.50' LT. (5-8) CONST. TYPE P-1 INLET ALT. 'B' E/P EL. 96.03 INV. EL. ~~90.84~~ (S) INV. EL. ~~90.68~~ (W) 90.24(S) 90.84(W)

STA. 192+66.29 C/L CONST. INTERNATIONAL DR. = STA. 0+00 C/L CONST. FUTURE DRIVEWAY

END SIDEWALK STA. 189+18.41, LT.

CONSERVATION TRACT

CONST. 40 L.F. OF DROP CURB, 34 S.Y. OF 6" CONC. SIDEWALK

20' UTILITY EASEMENT

CONST. ~~116~~ L.F. OF 18" RCP @ ~~0.20%~~ 0.24%

CONST. ~~116~~ L.F. OF 18" RCP @ ~~0.24%~~ 0.27%

CONST. ~~116~~ L.F. OF 24" RCP @ 0.12%

CONST. ~~116~~ L.F. OF 18" RCP @ ~~0.24%~~ 0.27%

CONST. ~~116~~ L.F. OF 18" RCP @ ~~0.20%~~ 0.19%

CONST. ~~116~~ L.F. OF 18" RCP @ ~~0.24%~~ 0.23%

CONST. ~~116~~ L.F. OF 18" RCP @ ~~0.31%~~ 0.27%

CONST. 180 L.F. OF 36" RCP @ ~~0.10%~~ 0.17%

CONST. 200 L.F. OF 18" RCP @ 0.40%

CONST. 200 L.F. OF 18" RCP @ ~~0.37%~~ 0.41%

CONST. ~~136~~ L.F. OF 18" RCP @ ~~0.28%~~ 0.32%

CONST. ~~116~~ L.F. OF 24" RCP @ ~~0.12%~~ 0.24%

CONST. ~~142~~ L.F. OF 18" RCP @ ~~0.31%~~ 0.21%

CONST. ~~36~~ L.F. OF 30" RCP @ ~~0.10%~~ 0.23%

CONST. ~~142~~ L.F. OF 18" RCP @ ~~0.31%~~ 0.12%

CONST. ~~146~~ L.F. OF 18" RCP @ 0.27%

CONST. ~~146~~ L.F. OF 24" RCP @ ~~0.10%~~ 0.13%

CONST. ~~136~~ L.F. OF 18" RCP @ ~~0.28%~~ 0.32%

CONST. ~~116~~ L.F. OF 24" RCP @ ~~0.12%~~ 0.24%

CONST. ~~142~~ L.F. OF 18" RCP @ ~~0.31%~~ 0.21%

CONST. ~~36~~ L.F. OF 30" RCP @ ~~0.10%~~ 0.23%

CONST. ~~142~~ L.F. OF 18" RCP @ ~~0.31%~~ 0.12%

7' CONC. SIDEWALK

25' UTILITY EASEMENT

TYPE 'F' CURB & GUTTER

TYPE 'E' CURB & GUTTER

TYPE 'F' CURB & GUTTER

℄ CONST. INTERNATIONAL DR.

R/W LINE

R/W LINE

PT = 187+05.68

PC = 194+85.06

MATCHLINE STA. 196+00 SEE SHEET 7

MATCHLINE STA. 180+00 SEE SHEET 5

BEGIN SIDEWALK STA. 180+98.82, RT.

END SIDEWALK STA. 189+75.18, RT.

BEGIN SIDEWALK STA. 195+56.9 73. RT.

STA. 180+50.00 58.00' RT. (4-23) CONST. TYPE P-1 INLET E/P EL. 98.18 INV. EL. ~~91.00~~ (E)(W) 91.95 INV. EL. ~~93.86~~ (N) 93.92

STA. 183+00.00 58.00' RT. (4-25) CONST. TYPE P-1 INLET E/P EL. 97.64 INV. EL. ~~92.08~~ (W) 92.13 INV. EL. ~~93.36~~ (N) 93.23 INV. EL. ~~92.68~~ (E) 92.58

STA. 184+50.00 58.00' RT. (4-27) CONST. TYPE P-2 INLET E/P EL. 97.11 INV. EL. ~~92.66~~ (N)(E)(W) 92.96 (N) 92.93 (E&W)

STA. 186+00.00 58.00' RT. (4-29) CONST TYPE P-1 INLET E/P EL. 97.58 INV. EL. ~~93.33~~ (N)(W) 93.37 (N) 93.32 (W)

STA. 189+50.00 70.57' RT. (5-1) CONST. TYPE P-1 INLET E/P EL. 97.21 INV. EL. ~~93.24~~ 93.38

STA. 191+50.00 73.50' RT. (5-3) CONST. TYPE P-1 INLET E/P EL. 98.41 INV. EL. 92.41

STA. 193+50.00 73.50' RT. (5-5) CONST. TYPE P-1 INLET E/P EL. 95.89 INV. EL. ~~91.44~~ 91.44

STA. 194+90.00 25.50' RT. (5-7) CONST. TYPE P-1 INLET ALT. 'B' E/P EL. 96.03 INV. EL. ~~90.90~~ (N)(E) 90.01

C/L CONST. INTERNATIONAL DR. CURVE DATA # ④
P.I. STA. 182+91.74
Δ = 22°53'51"
R = 2100.00'
L = 839.26'
T = 425.30'
D = 02°43'42"
E = 42.63'
e = N/A
P.C. STA. 178+66.44
P.T. STA. 187+05.68

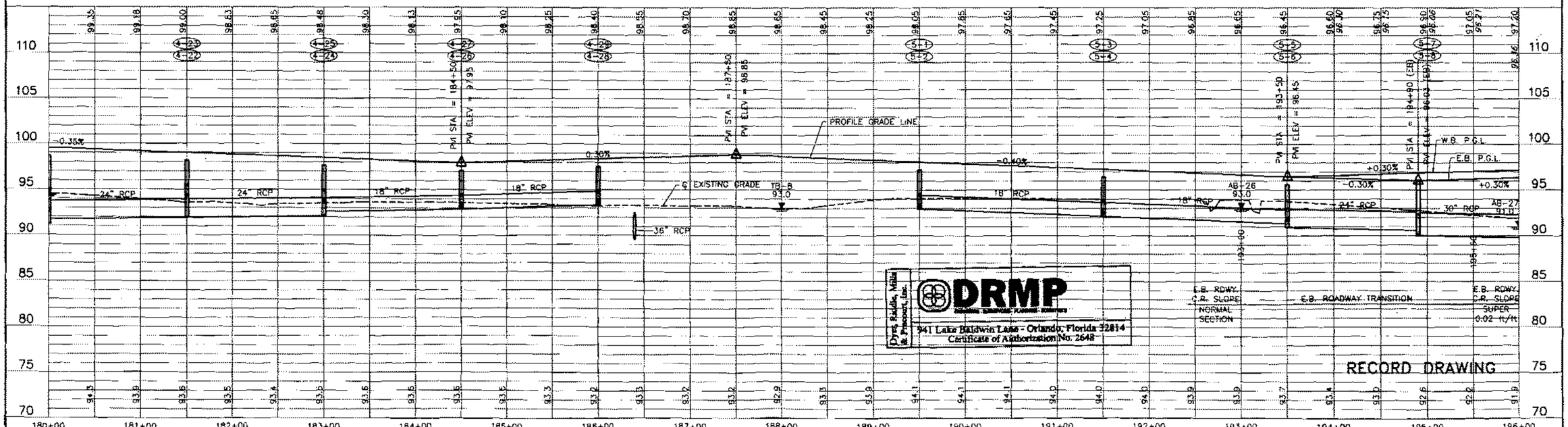
C/L CONST. INTERNATIONAL DR. CURVE DATA # ⑤
P.I. STA. 202+80.98
Δ = 64°01'13"
R = 1273.24'
L = 1422.67'
T = 795.92'
D = 04°30'00"
E = 220.30'
e = N/A
P.C. STA. 194+85.06
P.T. STA. 209+07.73

W.B. P.G.L. CURVE DATA # ⑥
Δ = 62°36'15"
R = 1175.00'
L = 1283.86'
T = 714.47'

E.B. P.G.L. CURVE DATA # ⑦
Δ = 56°23'37"
R = 1370.00'
L = 1348.43'
T = 734.49'

NOTE:
Ⓑ CONST. 462 LF OF 6" IRRIGATION PIPE SLEEVE
CONST. 462 LF OF 2" CONTROL WIRING CONDUIT (TOTAL ALL LOCATIONS BETWEEN STA. 180+00 & 196+00), SEE NOTE BELOW.
ALL IRRIGATION SLEEVE LOCATIONS SHOWN SHALL CONSIST OF:
ONE 6" PVC CL 200 IRRIGATION PIPE SLEEVE, CAPPED
ONE 2" PVC SCH 40 CONDUIT FOR CONTROL WIRING, CAPPED
EACH END TO BE TERMINATED 2' MIN. BEHIND CURB.
EACH END TO BE MARKED FOR FUTURE LOCATION AND RETRIEVAL.
COVER DEPTH = 18" MIN.

INTERNATIONAL DRIVE



DRMP
941 Lake Baldwin Lane - Orlando, Florida 32814
Certificate of Authorization No. 2648
Dyer, Riddle, Mills & Precourt, Inc.

Lawrence L. Smith, Jr.
PE #41214
8/15/98

DATE	REVISIONS	REVISED BY	CHECKED BY
08/07/98	AS-BUILT STORM SYS	ROD	CAL
12/22/98	REVISED STORM STRUCTURES	CBS	MKS

	CADD	NAME	DATE
	DESIGNED BY	ZSC	2/95
	DRAWN BY	SML	2/95
	CHECKED BY	DCL	2/95
	APPROVED BY	AWS	6/95
	CADD FILE NAME	8830L06.DWG	

DYER, RIDDLE, MILLS & PRECOURT, INC.
ENGINEERS • SURVEYORS • SCIENTISTS • PLANNERS
ORLANDO 1505 EAST COLONIAL DRIVE • P.O. BOX 538505 • FLORIDA 32853-9505

ROADWAY CONSTRUCTION PLANS
GREENE PROPERTY
PHASE II INFRASTRUCTURE PLAN
INTERNATIONAL DRIVE
ORANGE COUNTY, FLORIDA

PROJECT NO. 88-0390.000
DATE APRIL 1997
SCALE HORIZ. 1" = 50 VERT. 1" = 5
SHEET 6 OF 60

\\S1\J0\8830\DOT\J2K\SIM\Phase2\ds-final\1\8830L06.dgn Thu Aug 13 08:44:36 1998 8== 400

EXIST. POND 4-1

EXIST. POND 4-2

BEGIN SIDEWALK STA. 195+75.00 LT.

LIMITS OF CLEARING

CONST. 315 L.F. OF 30" RCP @ 0.17%

20' UTILITY EASEMENT

CONST. 83 L.F. OF 18" RCP @ 0.11%

CONST. 45 L.F. OF DROP CURB

CONST. 127 S.Y. OF TYPE B STABILIZATION

POND 5 SEE DETAIL SHEET 9

INV. EL. 85.85

MATCHLINE STA. 198+00.00 SEE SHEET 10

STA. 198+00.00 18.11' RT. CONST. TYPE J-1 INLET ALT. 'B' (9' S.) E/P EL. 98.18 INV. EL. 88.54 (W) 88.54 INV. EL. 88.54 (S) 88.04

CONST. 15" DRAINAGE & ACCESS EASEMENT

WETLAND BUFFER

TOP OF FARMFORM EL. 92.50

W.B. P.G.L. CURVE DATA # 6
Δ = 62°38'15"
R = 1175.00'
L = 1283.86'
T = 714.47'

E.B. P.G.L. CURVE DATA # 7
Δ = 56°23'07"
R = 1370.00'
L = 1348.43'
T = 734.49

CONSERVATION TRACT

WETLAND BUFFER

STA. 198+00.00 65.83' LT. CONST. TYPE J-1 INLET ALT. 'A' (6' DIA.) E/P EL. 96.06 INV. EL. ~~89.09~~ (S) 88.60 INV. EL. ~~88.60~~ (E) 88.56

C/L CONST. INTERNATIONAL DR. CURVE DATA # 5
P.I. STA. 202+80.98
Δ = 64°01'13"
R = 1273.24'
L = 1422.67'
T = 795.92'
D = 04°30'00"
E = 228.30'
e = N/A
P.C. STA. 194+85.06
P.T. STA. 209+07.73

STA. 199+50.00 63.18' LT. CONST. TYPE P-1 INLET ALT. 'B' E/P EL. 95.61 INV. EL. ~~89.02~~ (E)(W) 88.85(S) 88.77(W) INV. EL. ~~91.44~~ (S) 90.90(S) INV. EL. ~~90.97~~ (N) 90.93(N)

CONST. HEADWALL W/STOP GATE INV. EL. 91.00 SEE DETAIL SHEET 11

CONST. 142 L.F. OF 30" RCP @ 0.13%

STA. 201+00.00 61.86' LT. CONST. TYPE P-2 INLET ALT. 'B' E/P EL. 95.16 INV. EL. ~~90.06~~ (W) 90.04 INV. EL. ~~91.08~~ (S) 90.83 INV. EL. ~~90.80~~ (E) 90.37

CONST. 144 L.F. OF 24" RCP @ 0.29%

CONST. 77 L.F. OF 18" RCP @ 0.40%

CONST. 78 L.F. OF 18" RCP @ 0.80%

STA. 202+50.00 61.95' LT. CONST. TYPE P-1 INLET E/P EL. 95.61 INV. EL. ~~90.51~~ (E)(W) 90.74(E) 90.73(W) INV. EL. ~~91.41~~ (S) 91.10(S)

R/W LINE

CONST. 142 L.F. OF 24" RCP @ 0.49%

WEIR EL. 91.37 INV. EL. 89.07

TYPE 'F' CURB & GUTTER

TYPE 'E' CURB & GUTTER

℄ CONST. INTERNATIONAL DR.

STA. 204+00.00 62.81' LT. CONST. TYPE P-1 INLET E/P EL. 96.06 INV. EL. ~~91.36~~ (W) 91.43 INV. EL. ~~92.50~~ (E) 92.50 INV. EL. ~~91.86~~ (S) 91.86

CONST. 168 L.F. OF 18" RCP @ 0.32%

CONST. 186 L.F. OF 18" RCP @ 0.32%

CONST. 91 L.F. OF 18" RCP @ 0.51%

CONST. 85 L.F. OF 18" RCP @ 0.32%

CONST. 78 L.F. OF 18" RCP @ 0.28%

STA. 199+50.00 15.98' RT. CONST. TYPE P-1 INLET E/P EL. 95.61 INV. EL. ~~91.61~~ 91.54

STA. 201+00.00 14.84' RT. CONST. TYPE P-2 INLET E/P EL. 95.18 INV. EL. ~~91.18~~ 91.14

STA. 202+50.00 14.70' RT. CONST. TYPE P-1 INLET E/P EL. 95.61 INV. EL. ~~91.61~~ 91.71

STA. 204+00.00 15.56' RT. CONST. TYPE P-1 INLET E/P EL. 96.06 INV. EL. ~~92.06~~ 92.11

R/W LINE

(8) TYP.

(DS1) SEE DETAIL SHEET 10 & 11

LIMITS OF CLEARING

STA. 205+75.00 17.81' RT. CONST. TYPE P-1 INLET E/P EL. 96.98 INV. EL. ~~93.50~~ 93.56

INTERNATIONAL DRIVE

STA. 207+50.00 69.37' LT. CONST. TYPE P-1 INLET E/P EL. 97.71 INV. EL. ~~93.66~~ (W)(S) 93.49

STA. 205+75.00 65.28' LT. CONST. TYPE P-1 INLET E/P EL. 96.66 INV. EL. ~~93.66~~ (E)(W) 93.03 INV. EL. ~~93.10~~ (S) 93.30

POND PARCEL TRACTS

STA. 209+90.00 73.50' LT. CONST. TYPE P-1 INLET E/P EL. ~~97.98~~ 97.98 INV. EL. ~~93.42~~ (N) 93.28 INV. EL. ~~93.42~~ (S) 93.40

WETLAND BUFFER

POND 6 (SEE DETAIL SHEET 10 & 11)

CONST. 18" M.E.S. INV. EL. 93.20 (FIELD ADJUST)

CONST. ACCESS DRIVE 40 L.F. OF DROP CURB, 34 S.Y. OF 6" CONC. SIDEWALK, 33 S.Y. TYPE B STABILIZATION

CONST. 54 L.F. OF 18" RCP @ 0.37%

CONST. 77 L.F. OF 18" RCP @ 0.37%

END SIDEWALK STA. 210+17.35 LT.

STA. 211+36.78 C/L CONST. INTERNATIONAL DR. = STA. 400+00 B/L SURVEY S.R. 535

SURVEY S.R. 535

N59°04'10"E

S35°54'34"E

PT = 208+65.35

PT = 209+48.21

STA. 209+90.00 14.50' RT. CONST. TYPE P-1 INLET E/P EL. 98.38 INV. EL. ~~93.88~~ 93.73

STA. 207+50.00 21.37' RT. CONST. TYPE P-1 INLET E/P EL. 98.27 INV. EL. ~~93.70~~ 93.77

WETLAND BUFFER

END SIDEWALK STA. 210+24.35 RT.

MATCHLINE STA. 210+00.00 SEE SHEET 8

INV. EL. 90.14

END PROJECT
END CONSTRUCTION
STA. 210+78.47
MATCH EXISTING

NOTE:
(8) CONST. 285 LF OF 6" IRRIGATION PIPE SLEEVE
CONST. 285 LF OF 2" CONTROL WIRING CONDUIT
(TOTAL ALL LOCATIONS BETWEEN STA. 198+00 & 210+00), SEE NOTE BELOW.
ALL IRRIGATION SLEEVE LOCATIONS SHOWN SHALL CONSIST OF:
ONE 6" PVC CL 200 IRRIGATION PIPE SLEEVE, CAPPED
ONE 2" PVC SCH 40 CONDUIT FOR CONTROL WIRING, CAPPED
EACH END TO BE TERMINATED 2' MIN. BEHIND CURB
EACH END TO BE MARKED FOR FUTURE LOCATION AND RETRIEVAL
COVER DEPTH = 18" MIN.

PVI STA = 196+50 PVI ELEV = 97.35 (W.B.) 96.51 (E.B.)
PVI STA = 201+00 PVI ELEV = 96.00 (W.B.) 96.16 (E.B.)
PVI STA = 204+85 PVI ELEV = 96.31 (E.B.)
PVI STA = 206+50 PVI ELEV = 97.35 (W.B.)
PVI STA = 209+00 PVI ELEV = 99.75 (E.B. & W.B.)

0.30% -0.30% -0.30% 0.30% 0.30% 0.60% (W.B.) 0.74% (E.B.)

30" RCP 30" RCP 30" RCP 24" RCP 24" RCP 18" RCP 18" RCP 30" RCP

W.B. P.G.L. E.B. P.G.L.

AB-30 90.5 AB-31 89.6 AB-33 91.0

℄ EXISTING GRADE

250.00' VC

EVCS. 208+25 (W.B.) BVCE: 98.00 (W.B.) BVCE: 98.82 (E.B.)

EVCS. 210+75 EVCE: 96.86

E.B. RDWY. CROSS SLOPE SUPER @ 0.02 ft/ft

E.B. TRANSITION

SUPER @ 0.02 ft/ft TO SUPER @ 0.01 ft/ft

0.02 ft/ft TO 0.01 ft/ft W.B. TRANSITION

SEE INTERSECTION DETAIL SHEET 8 OF 60

SEE INTERSECTION DETAIL SHEET 8 OF 60

RECORD DRAWING

Dyer, Riddle, Mills & Precourt, Inc.
DRMP
941 Lake Baldwin Lane - Orlando, Florida 32814
Certificate of Authorization No. 2648

Lawrence L. Smith, Jr. 8/15/08
Lawrence L. Smith, Jr.
PE #41214

DATE	REVISIONS	REVISED BY	CHECKED BY
08/02/98	AS-BUILT STORM SYS	RDD	CAL
12/22/98	REVISED STORM STRUCTURES	CBS	MKS

	CADD	NAME	DATE
DESIGNED BY	ZSC	2/95
DRAWN BY	SWL	2/95
CHECKED BY	DCL	2/95
APPROVED BY	AWS	6/95
CADD FILE NAME	88390L08.DWG	

DYER, RIDDLE, MILLS & PRECOURT, INC.
ENGINEERS • SURVEYORS • SCIENTISTS • PLANNERS
ORLANDO 1505 EAST COLONIAL DRIVE P.O. BOX 538505 FLORIDA 32853-8505

ROADWAY CONSTRUCTION PLANS
GREENE PROPERTY
PHASE II INFRASTRUCTURE PLAN
INTERNATIONAL DRIVE
ORANGE COUNTY, FLORIDA

PROJECT NO. 88-0390.000
DATE APRIL 1997
SCALE HORIZ. 1" = 50' VERT. 1" = 5'
SHEET 7 OF 60

S.R. 535

STA. 400+00.00
B/L SURVEY S.R. 535 =
STA. 211+36.70
C/L CONST. INTERNATIONAL DRIVE

N53°04'10"E

22H WOVEN WIRE

272 L.F. OF 18" RCP @ ~~0.00%~~ 0.22%

REMOVE EXIST. INLET & 6 L.F. OF EXIST. PIPE

TYPE "E" CURB & GUTTER

MATCH EXIST. PAVEMENT

SAW-CUT AND REMOVE EXISTING SHOULDER

SOD ALL DISTURBED AREAS

STA. 398+74, RT.
CONST. TYPE "C" INLET
PER FDOT INDEX 232
GR. EL. ~~91.00~~ 93.55
INV. EL. ~~90.50~~ (SE) 90.25

℄ CONST. S.R. 535

℄ SURVEY S.R. 535

S36°54'34"E

18" SOD

REMOVE EXIST. PAVEMENT

16" SOD

SAW-CUT AND REMOVE EXISTING SHOULDER

SOD ALL DISTURBED AREAS

148 L.F. OF 30" RCP @ ~~0.00%~~ 0.16%

STA. 404+21.55, LT.
CONST. TYPE "C" INLET
PER FDOT INDEX 232
GR. EL. 92.50
INV. EL. 89.99 (SW)

REMOVE EXISTING INLET & 12 L.F. OF EXISTING PIPE

STA. 401+54, LT.
CONST. TYPE "D" INLET
PER FDOT INDEX 232
GR. EL. 93.20
INV. EL. ~~90.50~~ (NW) 90.19
INV. EL. ~~90.41~~ (SW) 90.15

22H WOVEN WIRE

STA. 397+50.00, RT.
CONST. 30" M.E.S.
PER FDOT INDEX 273
INV. EL. ~~91.10~~ 90.84

STA. 401+20.59, RT.
CONST. 30" M.E.S.
PER FDOT INDEX 273
INV. EL. ~~90.35~~ 90.14

R/W LINE

R/W LINE

STA. 399+00.00, RT.
CONST. TYPE P-T M.H.
TOP EL. 98.03
INV. EL. ~~90.84~~ (N)(S) 90.81

229 L.F. OF 30" RCP @ ~~0.00%~~ 0.21%

LIMIT OF CLEARING

PT = 209+07.73

℄ CONST. INTERNATIONAL DRIVE

MATCHLINE STA. 210+00
SEE SHEET 7

LIMIT OF CLEARING

MEDIAN OPENING POINT DATA

POINT	LOCATION
M1	STA. 398+70.44 27.35' RT.
M2	STA. 398+69.95 15.82' LT.
M3	STA. 398+15.00 1.28' RT.
M4	STA. 398+69.95 15.82' LT.
M5	STA. 398+60.92 58.92' RT.
M6	STA. 401+26.29 23.01' LT.
M7	STA. 401+25.85 17.80' RT.
M8	STA. 400+84.98 1.21' RT.
M9	STA. 401+14.67 36.81' LT.
M10	STA. 401+25.28 32.21' RT.

NOTES:

1. ALL SOUTHBOUND SHOULDER SLOPE AREAS ARE TO BE SHAPED AS SHOWN ON TYPICALS. PLACE 16" OF SOD ADJACENT TO NEW AND EXISTING SHOULDERS (AS A MINIMUM). SOD REMAINING DISTURBED AREAS TO R/W LINE.
2. REGRADE MEDIAN AREAS TO DRAIN. MAXIMUM SIDE SLOPE = 6:1. PLACE 16" OF SOD ADJACENT TO NEW OR EXISTING SHOULDERS OR EXISTING CURB (AS A MINIMUM). SOD ALL AREAS DISTURBED.
3. MEDIAN CROSSOVER PAVEMENT DESIGN SHALL MATCH THE WIDENING PAVEMENT DESIGN SHOWN ON THE TYPICAL SECTION.

BEGIN SWALE
STA. 394+26.00
EL. 92.22

BOTTOM OF PROPOSED SWALE

EXIST. GRADE AT PROPOSED SWALE

EXIST. GRADE AT WEST R/W LINE
0.34%

℄ INTERNATIONAL DRIVE

INV. EL. 91.10

30" RCP

36" RCP

INV. EL. 90.36

110 105 100 95 90 85 80 75 70

392+00 393+00 394+00 395+00 396+00 397+00 398+00 399+00 400+00 401+00 402+00 403+00 404+00 405+00 406+00 407+00 408+00

RECORD DRAWING

Lawrence L. Smith, Jr.
PE #41214

08/12/99	AS-BUILT STORM SYS	ROO	CAL
1/21/99	ADDED MEDIAN OPENING GEOMETRY	CBS	MKS
12/22/98	REVISED PAVEMENT GRADES	CBS	MKS
12/01/98	REM. EXIST. INLETS STA. 403+54 & 404+21.55 REV. INV. INLET STA. 398+74 & OUTFALL PIPE SLOPE	CBS	MKS
DATE	REVISIONS	REVISED BY	CHECKED BY

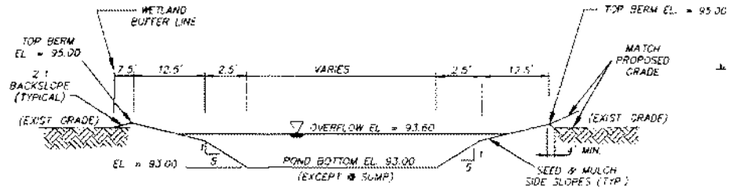
CADD	NAME	DATE
DESIGNED BY	ZSC	2/95
DRAWN BY	SMK	2/95
CHECKED BY	DCI	2/95
APPROVED BY	AWS	3/95
CADD FILE NAME	88390L06.DWG	

DYER, RIDDLE, MILLS & PRECOURT, INC.
ENGINEERS • SURVEYORS • SCIENTISTS • PLANNERS
ORLANDO 1505 EAST COLONIAL DRIVE P.O. BOX 538505 • FLORIDA 32853-8505

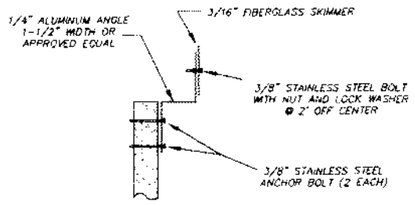
DRMP
941 Lake Baldwin Lane - Orlando, Florida 32814
Certificate of Authorization No. 2648

ROADWAY CONSTRUCTION PLANS
GREENE PROPERTY
PHASE II INFRASTRUCTURE PLAN
S.R. 535
ORANGE COUNTY, FLORIDA

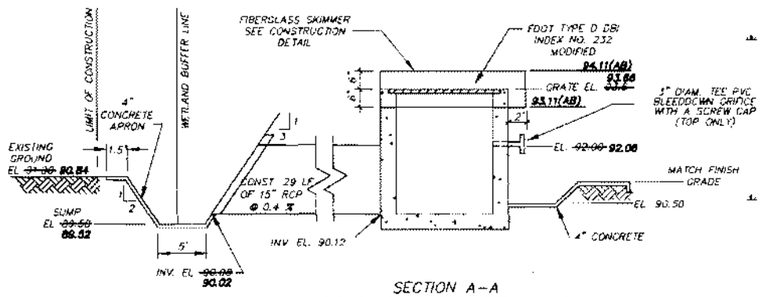
PROJECT NO. 88-0390.000
DATE APRIL 1997
SCALE HORIZ. 1" = 50'
VERT. 1" = 5'
SHEET 8 OF 60



POND #6 TYPICAL SECTION
NOT TO SCALE



SKIMMER CONNECTION DETAIL (TYP.)
NOT TO SCALE



SECTION A-A
POND #6 CONTROL STRUCTURE
NOT TO SCALE

REF. PT.	NORTHING	EASTING
1	7481.84	14368.47
2	7520.76	14359.95
3	7531.27	14353.43
4	7531.27	14395.33
5	7538.42	14403.86
6	7602.58	14402.70
7	7499.09	14379.67
8	7483.37	14356.12
9	7349.54	14169.84
10	7178.19	14234.78

Lawrence L. Smith, Jr.
8/15/08 PE #41214

END SILT FENCE AT STA. 393+00
℄ CONSTRUCTION S.R. 535
SCALE: 1" = 40'
EXIST. POND 4-2
S.F.W.M.D. WETLAND LINE
PROPERTY LINE
POND PARCEL TRACT
CONST. RETENTION POND #6 NWL 92.00 DHW 94.05 (10 YEAR) DHW 94.05 (25 YEAR)
BACKSLOPE @ 2:1 TO MATCH EXIST. GRADE
CONSTRUCT FDOT TYPE II SILT FENCE INDEX NO. 102
CONST. POND #6 CONTROL STRUCTURE SEE DETAILS THIS SHEET
CONST 30 LF OF 15" RCP @ 0.40 %
CONST. SUMP AREA SEE DETAILS
D53 CONST. TYPE "J" BOX 6' x 3' ALT. B FDOT INDEX #200 WITH DBI GRATE "D" & CONC. APRON & FENCE 20' WEIR @ EL. 91.0 TOP EL. 93.67 INV. EL. 89.00 SEE DETAIL SHEET 11
EDGE OF PAVEMENT
7' CONC. SIDEWALK
BACK OF CURB
30' UTILITY EASEMENT
℄ INTERNATIONAL DRIVE
CONST. 218 LF OF 15" RCP @ 0.40 %
R/W
20' UTILITY EASEMENT
D53 CONST. SUMP SEE DETAIL SHEET 11
CONSTRUCT FDOT TYPE II SILT FENCE INDEX NO. 102
UPLAND BUFFER
S.F.W.M.D. WETLAND LINE
20 L.F. BALED HAY
CONSERVATION TRACT
CONSERVATION TRACT
396
397
398
399
400
401
402
212
213
211
210
209
208
207
206
205
204
92
91
90

DRMP
Dyer, Riddle, Mills & Precourt, Inc.
941 Lake Baldwin Lane - Orlando, Florida 32814
Certificate of Authorization No. 2648

RECORD DRAWING

DATE	REVISIONS	REVISED BY	CHECKED BY
3-24-99	AS-BUILT STORM SYSTEM ONLY	ROD	CAL

CADD	NAME	DATE
DESIGNED BY	WRM	3/95
DRAWN BY	RPB	3/95
CHECKED BY	ESC	3/95
APPROVED BY	JDH	6/95
FILE NAME	WB 04/16/97 POND6.DWG	

DYER, RIDDLE, MILLS & PRECOURT, INC.
ENGINEERS • SURVEYORS • SCIENTISTS • PLANNERS
ORLANDO 1505 EAST COLONIAL DRIVE • P.O. BOX 538505 • FLORIDA 32853-8505

RETENTION POND DETAILS
GREENE PROPERTY
PHASE II INFRASTRUCTURE PLAN
POND NO. 6
ORANGE COUNTY, FLORIDA

PROJECT NO 88-0390.000
DATE APRIL 1997
SCALE HORIZ. 1" = 40'
SHEET 10 OF 60

D:\DATA\Projects\88-0390\dgn\POND6.dwg Mon Sep 07 14:03:23 1998 BY: RUD

PROPOSED FACILITIES:

Construction proposed consists of extending International Drive from its present terminus, at a project entrance road, eastward, to SR 535. The water management system will consist of one wet and one dry detention pond, serving 9.89 acres discharging to existing wetlands which drain to Shingle Creek. The remaining 6.67 acres drains to existing Pond 4 which was permitted with the first phase of construction and is presently under construction.

BASIN INFORMATION:

Basin	Area Acres	WSWT Elev (ft, NGVD)	Normal/Dry Ctrl Elev (ft, NGVD)	Method of Determination
POND 5	8.70	91.00	91/91	PERMIT NO 48-00866-S
POND 6	1.19	92.00	92/92	PERMIT NO 48-00866-S

DISCHARGE STRUCTURE INFORMATION:

Water Quality Structures:

Basin	Str. #	Bleeder Type	Dimensions	Invert Elev. (ft, NGVD)
POND 5	1	CIRCULAR ORIFICE	.25' dia.	91.00
POND 6	1	CIRCULAR ORIFICE	.25' dia.	92.00

Major Discharge Structures:

Basin	Str. #	Description	Crest Elev. (ft, NGVD)
POND 5	1	10' wide BROAD CRESTED weir	93.00
POND 6	1	4.42' wide X 5.42' long drop inlet	93.60

Discharge Culverts:

Basin	Str. #	Description
POND 6	1	29' long, 1.25' dia. RCP

PROPOSED FACILITIES:

Construction proposed consists of extending International Drive from its present terminus, at a project entrance road, eastward, to SR 535. The water management system will consist of one wet and one dry detention pond, serving 9.89 acres discharging to existing wetlands which drain to Shingle Creek. The remaining 6.67 acres drains to existing Pond 4 which was permitted with the first phase of construction and is presently under construction.

BASIN INFORMATION:

Basin	Area Acres	WSWT Elev (ft, NGVD)	Normal/Dry Ctrl Elev (ft, NGVD)	Method of Determination
POND 5	8.70	91.00	91/91	PERMIT NO 48-00866-S
POND 6	1.19	92.00	92/92	PERMIT NO 48-00866-S

DISCHARGE STRUCTURE INFORMATION:

Water Quality Structures:

Basin	Str. #	Bleeder Type	Dimensions	Invert Elev. (ft, NGVD)
POND 5	1	CIRCULAR ORIFICE	.25' dia.	91.00
POND 6	1	CIRCULAR ORIFICE	.25' dia.	92.00

Major Discharge Structures:

Basin	Str. #	Description	Crest Elev. (ft, NGVD)
POND 5	1	10' wide BROAD CRESTED weir	93.00
POND 6	1	4.42' wide X 5.42' long drop inlet	93.60

Discharge Culverts:

Basin	Str. #	Description
POND 6	1	29' long, 1.25' dia. RCP

Receiving Body:

Basin	Str. #	Receiving Body
POND 5	1	EXISTING WETLANDS
POND 6	1	EXISTING WETLANDS

III. PROJECT EVALUATION

Discharge Rate:

As shown in the table below, the proposed project discharge is within the allowable limit for the area. Discharges from this phase are to existing wetlands which provide additional attenuation prior to leaving the site.

Discharge Storm Frequency: 25 YR 24 HR Design Rainfall: 8.60

Basin	Allow Disch (cfs)	Method of Determination	Design Disch (cfs)	Design Stage (ft, NGVD)
POND 5	15	PERMIT NO 48-00866-S	14.7	93.6
POND 6	2	PERMIT NO 48-00866-S	1.9	94.1

WATER QUALITY:

Water quality treatment in excess of 2.5 inches times the percentage of impervious coverage is provided in one wet and one dry detention pond prior to discharge to the existing wetlands. A portion of the pavement being constructed with this modification drains to an existing permitted pond which provides full water quality treatment.

Basin	Treatment Method	Vol Req'd. (ac-ft)	Vol Prov'd (ac-ft)
POND 5	.8 acres WET DETENTION	1.03	1.80
POND 6	.25 acres DRY DETENTION	0.18	0.19

ROAD DESIGN:

As shown in the following table, minimum road center lines have been set at or above the calculated design storm flood elevation.

Design Storm Freq: 25 YR 24 HR Design Rainfall: 8.60 inches

Greene/World Gateway Project

Treatment Volume Calculations

Basin Pond No. 5

International Drive: Sta. 187+50 - Sta. 209+50

(Note: Basin Pond No. 4 includes International Drive from Sta. 177+36.50 - Sta. 187+50 which was included in the Phase I Permit (Permit Application No. 940615-15))

Total Basin Area:	8.70 ac
Curve Number:	
pervious area	2.13 ac @ CN = 80
impervious area	4.94 ac @ CN = 98
wet pond area	1.63 ac @ CN = 98
Weighted CN	CN = 93.48

Treatment Volume:

(1 inch)*(8.70 ac) * (1 ft/ 12 in) = 0.73 ac-ft

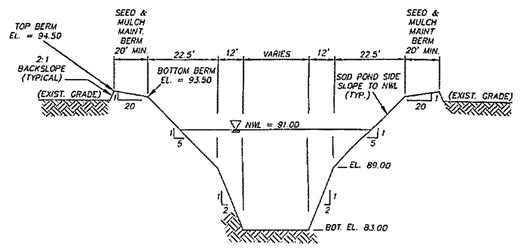
(2.5 inch)*(4.94 ac) * (1 ft/ 12 in) = 1.03 ac-ft Use this value

Pond 5 EL	Stage - Storage Area	Incremental Storage (ac-ft)	Storage (ac-ft)
91.0	0.8		
93.0	1.01	1.81	1.81
93.5	1.07	0.52	2.33
94.5	1.63	1.35	3.68

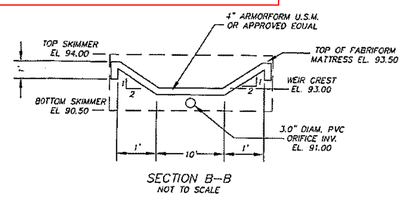
Control elevation is 93.0 and treats 1.03 ac-ft of pollution abatement volume (PAV)

PAV required = 1.03 ac-ft

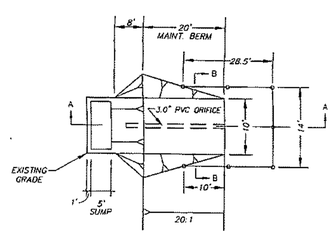
PAV provided = 1.81 ac-ft



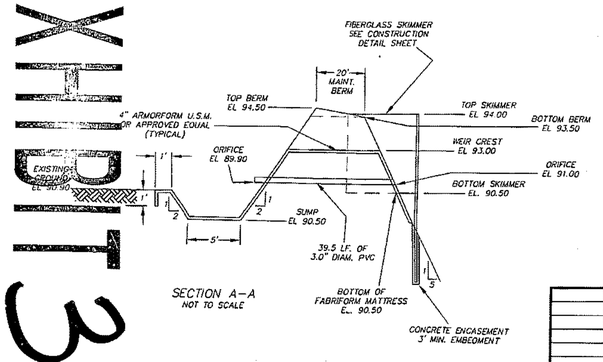
POND #5 TYPICAL SECTION
NOT TO SCALE



SECTION B–B
NOT TO SCALE

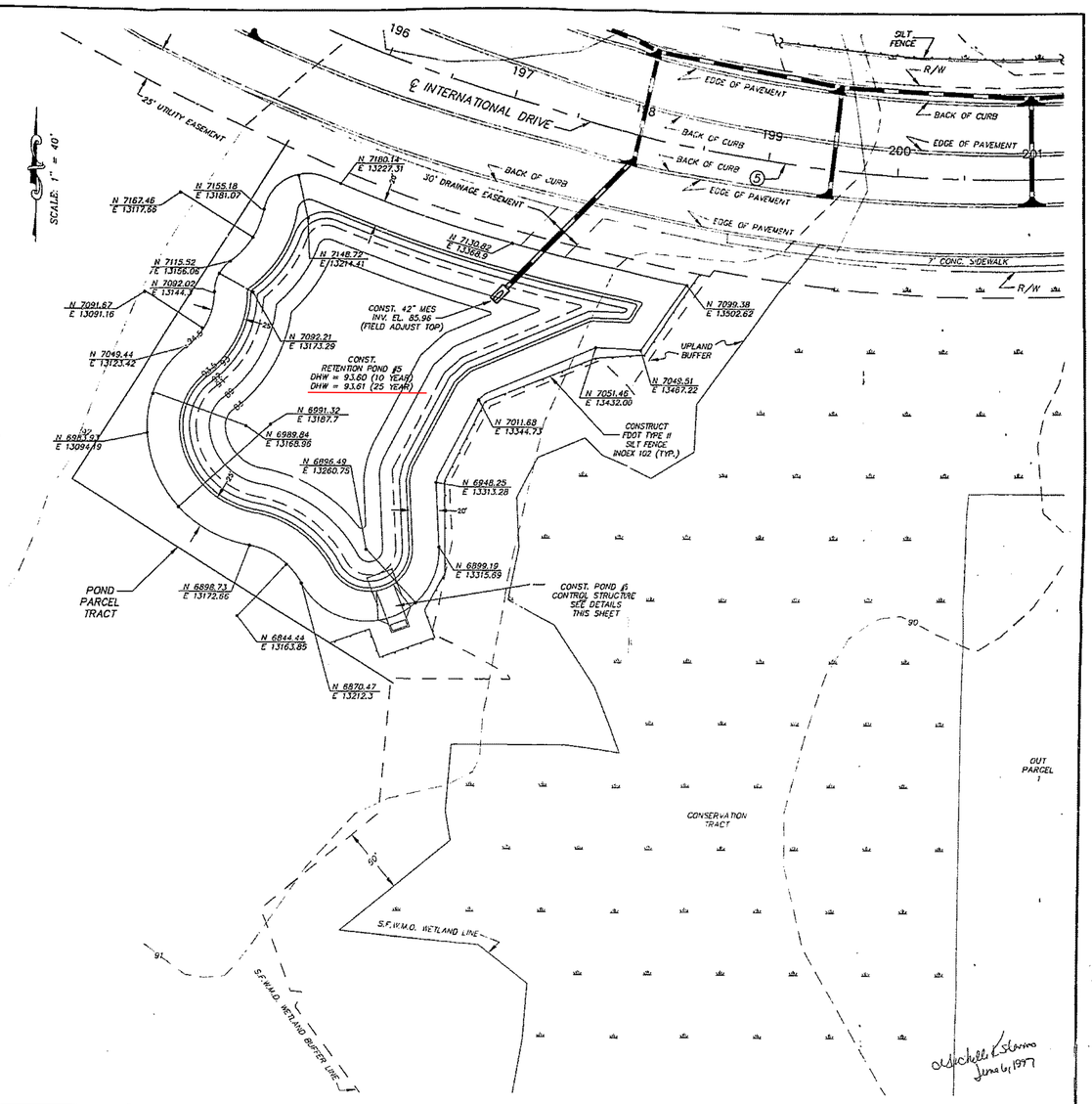


#5 CONTROL STRUCTURE
NOT TO SCALE



SECTION A–A
NOT TO SCALE

EXHIBIT 3



Mitchell K. Storms
June 6, 1997

DATE	REVISIONS	REVISED BY	CHECKED BY

	CADD	NAME	DATE
DESIGNED BY	MDS		3/95
DRAWN BY	RFB		3/95
CHECKED BY	ZSC		3/95
APPROVED BY	JDH		6/95
FILE NAME	RFB 04/15/97 POND5.DWG		

DYER, RIDDLE, MILLS & PRECOURT, INC.
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ORLANDO • 1505 EAST COLONIAL DRIVE • P.O. BOX 538505 • FLORIDA 32853–8505

RETENTION POND DETAILS

GREENE PROPERTY
PHASE II INFRASTRUCTURE PLAN
POND NO. 5

ORANGE COUNTY, FLORIDA

PROJECT NO. 88-0390.000
DATE APRIL 1997
SCALE HORIZ. 1" = 40'
SHEET 9 OF 60

48-008665
970417-S JUN 06 1997

K:\LDV\DESIGN\PHASE2\POND5 Thu Jun 5 09:12:15 1997 BY rp

Greene/World Gateway Project

Littoral Zone Calculations

Basin Pond No. 5

Pond 5 EL	Stage - Storage Area	Incremental Storage (ac-ft)	Storage (ac-ft) perm. pool	Storage (ac-ft) detention
83.0	0.41			
89.0	0.61	3.06	3.06	
91.0	0.8	1.41	4.47	0
93.0	1.01	1.81	-	1.81
93.5	1.07	0.52	-	2.33
94.5	1.63	1.35	-	3.68

Littoral Zone Requirements
Required coverage:
Lesser of:
20% of 0.80 ac = 0.16 ac use this criteria
or
2.5% of 8.70 ac = 0.22 ac

provided coverage:
between elevation 89 and 91
area of coverage = 0.80 - 0.41 = 0.39 ac

Greene/World Gateway Project

Treatment Volume Calculations

Basin Pond No. 6

International Drive: Sta. 209+50 - Sta. 210+33

Total Basin Area: 1.19 ac

Curve Number:

pervious area	0.06 ac @ CN = 80
impervious area	0.83 ac @ CN = 98
dry pond area	0.30 ac @ CN = 80
Weighted CN	CN = 92.55

Treatment Volume:

(1 inch)*(1.19 ac) * (1 ft/ 12 in) =	0.10 ac-ft *0.75 =	0.07	
(2.5 inch)*(0.83 ac) * (1 ft/ 12 in) =	0.17 ac-ft *0.75 =	0.13	Use this value

Pond 6 EL	Stage - Storage Area	Incremental Storage (ac-ft)	Storage (ac-ft)
92.0	0.005		
93.0	0.12	0.06	0.06
93.9	0.16	0.13	0.19
95.0	0.25	0.23	0.41

Control elevation is 93.6 and treats 0.15 ac-ft of pollution abatement volume (PAV)

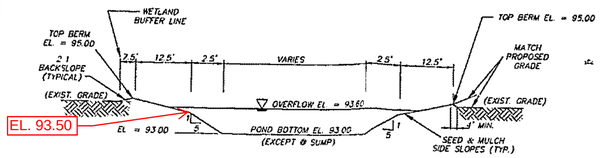
PAV required =	0.13 ac-ft + 0.05 ac-f	0.18 ac-ft
PAV provided =	0.19 ac-ft	

Compensating Storage

FDOT requires compensating PAV for the portion of the ditch that is to be filled adjacent to Pond 6 and S.R. 535.

S.R. 535 turn lanes into I - Drive

Area = (930 ft)(12 ft)(1 ac/ 43,560 ft) =	0.26
TV = (2.5 in)(0.26 ac)(1 ft/ 12 in) =	0.05



POND #6 TYPICAL SECTION
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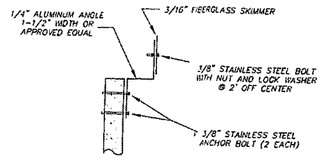
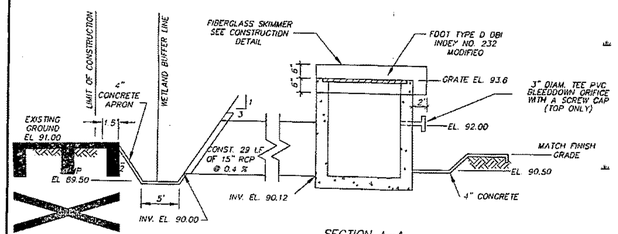


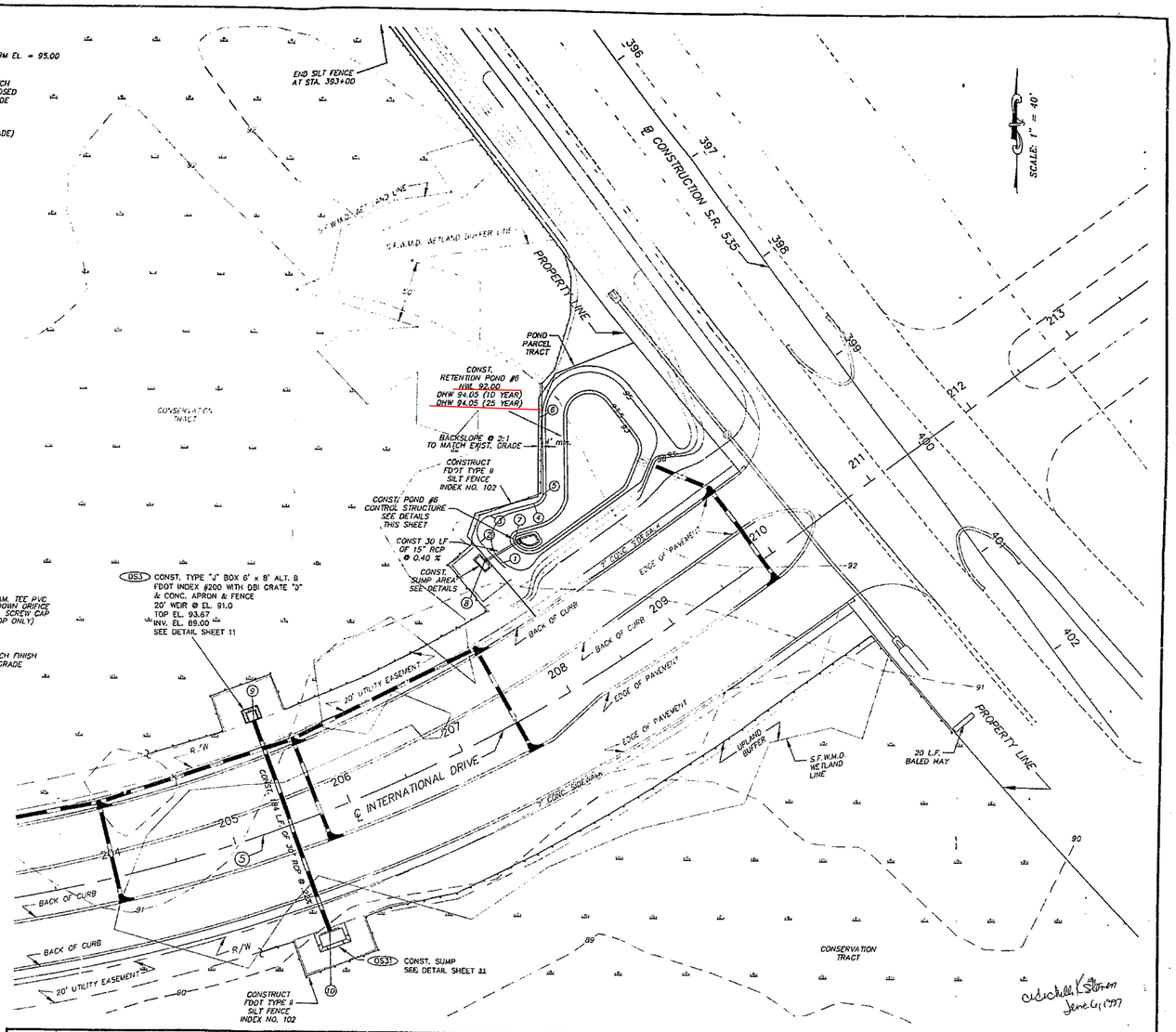
SKIMMER CONNECTION DETAIL (TYP.)
NOT TO SCALE



SECTION A–A
POND #6 CONTROL STRUCTURE
NOT TO SCALE

REF. PT.	NORTHING	EASTING
1	7481.64	14388.47
2	7520.74	14359.95
3	7531.27	14383.43
4	7531.27	14395.33
5	7538.42	14403.86
6	7602.58	14402.70
7	7499.08	14379.67
8	7483.37	14356.12
9	7349.54	14169.84
10	7178.19	14234.79

EXHIBIT 4



DATE	REVISIONS	REVISED BY	CHECKED BY

	CADD	NAME	DATE
DESIGNED BY	MRM		3/95
DRAWN BY	RFB		3/95
CHECKED BY	TSC		3/95
APPROVED BY	JDH		6/95
FILE NAME	RS2 04/15/97 PONDS.DWG		

DYER, RIDDLE, MILLS & PRECOURT, INC.
ENGINEERS • SURVEYORS • SCIENTISTS • PLANNERS
ORLANDO · 1505 EAST COLONIAL DRIVE · P.O. BOX 538505 · FLORIDA 32853-8505

RETENTION POND DETAILS
GREENE PROPERTY
PHASE II INFRASTRUCTURE PLAN
POND NO. 6
ORANGE COUNTY, FLORIDA

PROJECT NO. 88-0390.000
DATE APRIL 1997
SCALE HORIZ. 1" = 40'
SHEET 10 OF 60

48-00866-S
970417-8
JUN 23 1997

K:\DWG\88390\PONDS\PONDS6 Mon Jun 2 07:54:04 1997 BY: dP

Greene/World Gateway Project
Drawdown Analysis

Phase II Ponds Dawdown Analysis

As per Rule 7.2.A, District Criteria requires that gravity control devices be designed to discharge a maximum of one half of the detention volume in 24 hours.

Pond 5 (see attached ICPR 1.4 drawdown analysis)

Total	TV =	1.03 ac-ft
	1/2 TV =	0.515 ac-ft

The 3.00 inch orifice in Pond 5 drawsdown 1/2 the treatment volume in 68.50 hours and the entire volume in 14 days.

Pond 6 (see attached ICPR 1.4 drawdown analysis)

Total	TV =	0.18 ac-ft
	1/2 TV =	0.09 ac-ft

The 3.0 inch orifice in Pond 6 drawsdown 1/2 the treatment volume in 10.50 hours and the entire volume in 27.75 hours.
As per Rule 7.2.A, since Pond 6 orifice is the minimum design size allowable it is presumed to meet the discharge criteria.

Advanced Interconnected Channel & Pond Routing (adICPR Ver 1.40)
Copyright 1999, Streamline Technologies, Inc.

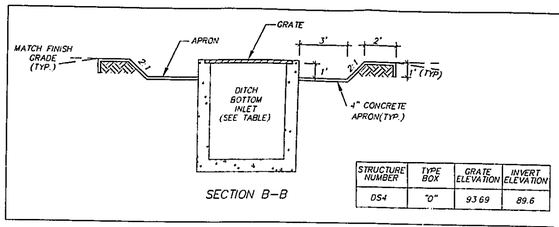
GREENE PROPERTY - PROPOSED CONDITION - 10 YEAR, 24 HOUR
MAY 30, 1997

BASIN NAME NODE NAME	POND1 POND1	POND2 POND2	POND3 POND3	POND4 POND4	POND5 POND5
TIME INCREMENT (min)	5.00	5.00	5.00	5.00	5.00
RAINFALL FILE	ORANGE	ORANGE	ORANGE	ORANGE	ORANGE
RAIN AMOUNT (in)	7.50	7.50	7.50	7.50	7.50
STORM DURATION (hrs)	24.00	24.00	24.00	24.00	24.00
AREA (ac)	6.78	8.48	13.79	30.26	8.70
CURVE NUMBER	92.85	92.12	93.95	94.73	93.48
DCIA (%)	.00	.00	.00	.00	.00
TC (mins)	10.00	10.00	10.00	10.00	10.00
LAG TIME (hrs)	.00	.00	.00	.00	.00
BASIN STATUS	ONSITE	ONSITE	ONSITE	ONSITE	ONSITE

BASIN	QMX (cfs)	TMX (hrs)	VOL (in)	NOTES
POND1	10.20	8.92	6.65	I-DRIVE RETENTION POND #1
POND2	12.69	8.92	6.56	I-DRIVE RETENTION POND #2
POND3	20.89	8.92	6.78	I-DRIVE RETENTION POND #3
POND4	46.07	8.92	6.87	I-DRIVE RETENTION POND #4
POND5	13.15	8.92	6.72	I-DRIVE RETENTION POND #5

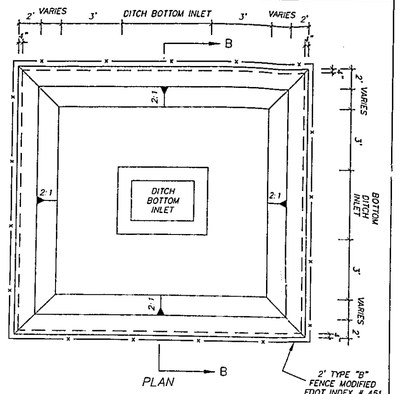
BASIN NAME NODE NAME	POND6 POND6	W1A W1A	W1B W1B	W1C W1C	W3A W3A
TIME INCREMENT (min)	5.00	5.00	5.00	5.00	5.00
RAINFALL FILE	ORANGE	ORANGE	ORANGE	ORANGE	ORANGE
RAIN AMOUNT (in)	7.50	7.50	7.50	7.50	7.50
STORM DURATION (hrs)	24.00	24.00	24.00	24.00	24.00
AREA (ac)	1.19	39.08	71.31	37.35	9.21
CURVE NUMBER	92.55	87.12	85.61	80.70	95.30
DCIA (%)	.00	.00	.00	.00	.00
TC (mins)	10.00	15.00	15.00	15.00	15.00
LAG TIME (hrs)	.00	.00	.00	.00	.00
BASIN STATUS	ONSITE	ONSITE	ONSITE	ONSITE	ONSITE

BASIN	QMX (cfs)	TMX (hrs)	VOL (in)	NOTES
POND6	1.79	8.92	6.61	RET SWALE:COMPENSATED FOR IN POND5
W1A	55.27	8.92	5.98	
W1B	98.90	8.92	5.80	
W1C	48.05	8.92	5.24	
W3A	14.02	8.92	6.94	



SECTION B-B

STRUCTURE NUMBER	TYPE BOX	GRATE ELEVATION	INVERT ELEVATION
DS4	"O"	93.69	89.6



PLAN

CONCRETE APRON DETAIL FOR DITCH BOTTOM INLET # DS4
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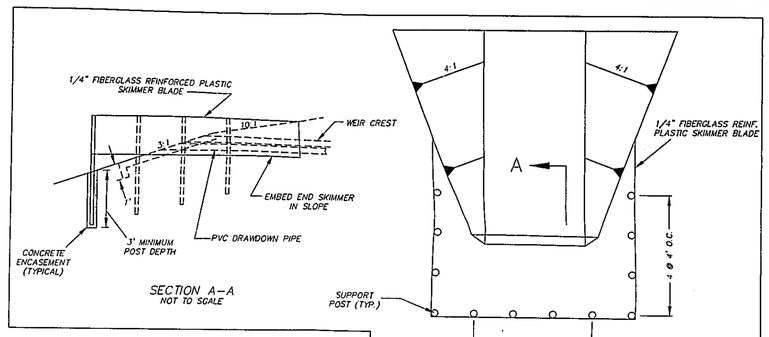
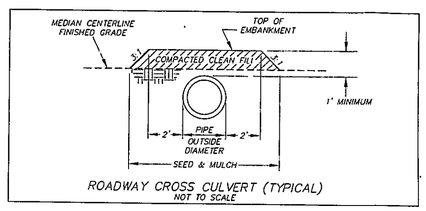


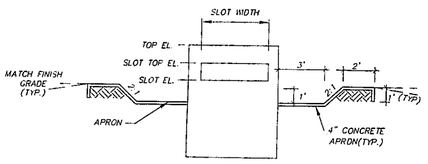
SECTION A-A
NOT TO SCALE

SKIMMER POST SPACING DETAIL POND 2,3 & 5
NOT TO SCALE

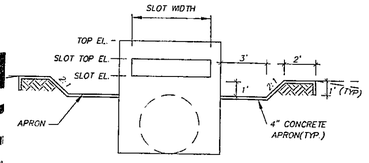


ROADWAY CROSS CULVERT (TYPICAL)
NOT TO SCALE

STRUCTURE NUMBER	SLOT ELEVATION TOP	SLOT ELEVATION BOTTOM	SLOT WIDTH FRONT	SLOT WIDTH SIDES (2)	TOTAL LENGTH	TOP ELEV.
DS3	93.00	91.00	8"	6"	20'	93.67

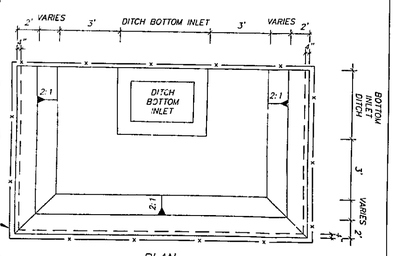


SIDE ELEVATION
(BOTH SIDES TYP.)



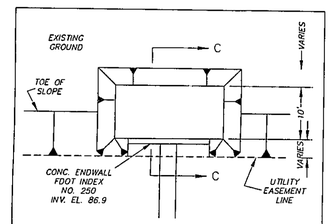
FRONT ELEVATION

SLOT DETAIL
NOT TO SCALE



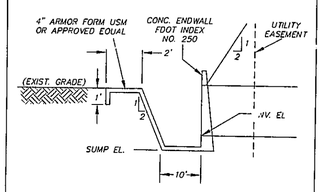
PLAN

CONCRETE APRON DETAIL FOR DITCH BOTTOM INLETS W/ SLOTS
NOT TO SCALE

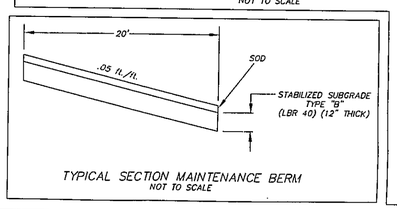


PLAN
NOT TO SCALE

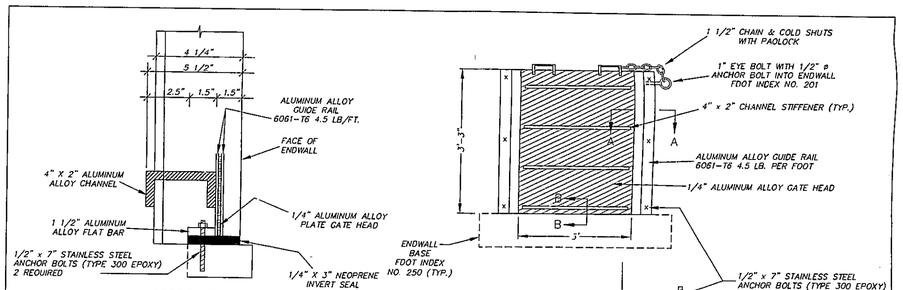
STRUCTURE NUMBER	PIPE SIZE	SUMP ELEVATION	INVERT ELEVATION
DS31	30" RCP	88.10	88.60
DS41	36" RCP	88.90	89.40



SECTION C-C
NOT TO SCALE



TYPICAL SECTION MAINTENANCE BERM
NOT TO SCALE



SECTION B-B

GOLDEN HARVEST ALUMINUM STOP GATE
MODEL #MD GH36A (MODIFIED) OR APPROVED EQUAL
NOT TO SCALE

SECTION A-A
NOT TO SCALE

Calvin Mills Florida 47035 4/15/97

EXHIBIT G

DATE	REVISIONS	REVISED BY	CHECKED BY

CADD	NAME	DATE
DESIGNED BY	WDS	3/95
DRAWN BY	RFB	3/95
CHECKED BY	ZSC	3/95
APPROVED BY	JDH	6/95
FILE NAME	RFB 04/01/97 MISCDETS.DWG	

DYER, RIDDLE, MILLS & PRECOURT, INC.
ENGINEERS • SURVEYORS • SCIENTISTS • PLANNERS
ORLANDO • 1505 EAST COLONIAL DRIVE • P.O. BOX 538505 • FLORIDA 32853-8505

RETENTION POND DETAILS
GREENE PROPERTY
PHASE II INFRASTRUCTURE PLAN
MISCELLANEOUS DETAILS
ORANGE COUNTY, FLORIDA

PROJECT NO. 88-0390.000
DATE APRIL 1997
SCALE AS NOTED
SHEET 11 OF 60

48-00826-S
9704117-P

SPECIAL CONDITIONS

1 . MINIMUM ROAD CROWN ELEVATION: BASIN: POND 1 - 94.10 FEET NGVD.
BASIN: POND 2 - 93.00 FEET NGVD.
BASIN: POND 3 - 95.10 FEET NGVD.
BASIN: POND 4 - 96.45 FEET NGVD.
BASIN: POND 5 - 96.00 FEET NGVD.
BASIN: POND 6 - 96.00 FEET NGVD.
BASIN: W1A - 96.00 FEET NGVD.
BASIN: W4A - 97.95 FEET NGVD.

2 . DISCHARGE FACILITIES:

BASIN: POND 1:

1-.25' DIA. CIRCULAR ORIFICE WITH INVERT AT ELEV. 88' NGVD.
26 LF OF 3' DIA. RCP CULVERT.
1600 LF OF 4' DIA. RCP CULVERT.
1-3' W X 4' L DROP INLET WITH CREST AT ELEV. 90.5' NGVD.

RECEIVING BODY : W8SOUTH & LAKE 2

CONTROL ELEV : 88 FEET NGVD. /88 FEET NGVD DRY SEASON.

BASIN: POND 2:

1-14' WIDE SHARP CRESTED WEIR WITH CREST AT ELEV. 89.5' NGVD.
1-.25' DIA. CIRCULAR ORIFICE WITH INVERT AT ELEV. 88.5' NGVD.

RECEIVING BODY : BASIN W9

CONTROL ELEV : 88.5 FEET NGVD. /88.5 FEET NGVD DRY SEASON.

BASIN: POND 3:

1-23' WIDE SHARP CRESTED WEIR WITH CREST AT ELEV. 93.15' NGVD.
1-.25' DIA. CIRCULAR ORIFICE WITH INVERT AT ELEV. 91' NGVD.

RECEIVING BODY : BASIN W8B

CONTROL ELEV : 91 FEET NGVD. /91 FEET NGVD DRY SEASON.

BASIN: POND 4:

1-.38' DIA. CIRCULAR ORIFICE WITH INVERT AT ELEV. 92' NGVD.
500 LF OF 4' DIA. RCP CULVERT.
1-4.5' W X 9.66' L DROP INLET WITH CREST AT ELEV. 93.6' NGVD.

RECEIVING BODY : W4B & LAKE 1

CONTROL ELEV : 92 FEET NGVD. /92 FEET NGVD DRY SEASON.

BASIN: POND 5:

1-10' WIDE SHARP CRESTED WEIR WITH CREST AT ELEV. 93' NGVD.
1-.25' DIA. CIRCULAR ORIFICE WITH INVERT AT ELEV. 91' NGVD.

RECEIVING BODY : BASIN W1B

CONTROL ELEV : 91 FEET NGVD. /91 FEET NGVD DRY SEASON.

BASIN: POND 6:

1-.25' DIA. CIRCULAR ORIFICE WITH INVERT AT ELEV. 92' NGVD.
29 LF OF 1.25' DIA. RCP CULVERT.
1-3' W X 4' L DROP INLET WITH CREST AT ELEV. 93.5' NGVD.

RECEIVING BODY : BASIN W1A

CONTROL ELEV : 92 FEET NGVD. /92 FEET NGVD DRY SEASON.

BASIN: W4B & LAKE 1:

1-100' WIDE SHARP CRESTED WEIR WITH CREST AT ELEV. 90.7' NGVD.

RECEIVING BODY : BASIN W4B

CONTROL ELEV : 90.7 FEET NGVD. /90.7 FEET NGVD DRY SEASON.

BASIN: W8SOUTH & LAKE 2:

1-100' WIDE SHARP CRESTED WEIR WITH CREST AT ELEV. 86.8' NGVD.

RECEIVING BODY : BASIN W9

CONTROL ELEV : 86.8 FEET NGVD. /86.8 FEET NGVD DRY SEASON.

BASIN: W1A:

2-6' WIDE RECTANGULAR NOTCH WEIRS WITH CREST AT ELEV. 91' NGVD.
1-8' WIDE RECTANGULAR NOTCH WEIR WITH CREST AT ELEV. 91' NGVD.
200 LF OF 2.5' DIA. RCP CULVERT.

RECEIVING BODY : BASIN W1B

CONTROL ELEV : 91 FEET NGVD. /91 FEET NGVD DRY SEASON.

BASIN: W1B, STRUCTURE NO. 1:

2-3' DIA. RCP CULVERTS EACH 210' LONG.

RECEIVING BODY : BASIN W1C

condition) and will discharge 92 cfs into the RCID drainage system via on-site wetlands (Basin W9) which will ultimately discharge into Reedy Creek.

The project construction will include encroachments into the 100 year floodplain. The applicant provided calculations and detailed analysis demonstrating that no net encoachment into the 100 year floodplain will be proposed. Drainage Basins W1B, W4B, W8B and W8South provide compensating storage for floodplain encroachment.

The water management system will provide water quality treatment for the construction phase of the roadway project (International Drive) except for Ponds 3 and 4 which serve, in addition to the roadway project, a commercial area north of and adjacent to International Drive (see Exhibit 3). Prior to the construction of the conceptually approved phases, individual water management systems will be required for the phases that are not located within Basins (Ponds 3 and 4).

BASIN INFORMATION:

Basin	Area Acres	WSWT Elev (ft, NGVD)	Normal/Dry Ctrl Elev (ft, NGVD)	Method of Determination
POND 1	6.78	88.00	88/88	WET SEASON SOIL BORINGS
POND 2	8.48	88.50	88.5/88.5	WET SEASON SOIL BORINGS
POND 3	13.78	91.00	91/91	WET SEASON SOIL BORINGS
POND 4	30.26	92.00	92/92	WET SEASON SOIL BORINGS
POND 5	5.90	91.00	91/91	WET SEASON SOIL BORINGS
POND 6	.65	92.00	92/92	WET SEASON SOIL BORINGS
W4B & LAKE 1	23.32	90.70	90.7/90.7	WET SEASON SOIL BORINGS
W8SOUTH & LAKE 2	41.51	86.80	86.8/86.8	WET SEASON SOIL BORINGS
W1A	39.08	91.00	91/91	WET SEASON SOIL BORINGS
W1B	71.31	89.00	89/89	WET SEASON SOIL BORINGS
W1C	37.35	87.00	87/87	WET SEASON SOIL BORINGS
W4A	23.90	93.67	93.67/93.67	WET SEASON SOIL BORINGS
W4B	115.29	90.70	90.7/90.7	WET SEASON SOIL BORINGS
W5A	23.32	90.70	90.7/90.7	WET SEASON SOIL BORINGS

Basin	Area Acres	WSWT Elev (ft, NGVD)	Normal/Dry Ctrl Elev (ft, NGVD)	Method of Determination
W7A & W8A	41.99	91.32	91.32/91.32	WET SEASON SOIL BORINGS
W8B	211.60	90.40	90.4/90.4	WET SEASON SOIL BORINGS
W9	54.49	86.78	86.78/86.78	WET SEASON SOIL BORINGS
W13	24.05	90.40	90.4/90.4	WET SEASON SOIL BORINGS

DISCHARGE STRUCTURE INFORMATION:

Water Quality Structures:

Basin	Str. #	Bleeder Type	Dimensions	Invert Elev. (ft, NGVD)
POND 1	1	CIRCULAR ORIFICE	.25' dia.	88.00
POND 2	1	CIRCULAR ORIFICE	.25 dia.	88.50
POND 3	1	CIRCULAR ORIFICE	.25' dia.	91.00
POND 4	1	CIRCULAR ORIFICE	.38 dia.	92.00
POND 5	1	CIRCULAR ORIFICE	.25' dia.	91.00
POND 6	1	CIRCULAR ORIFICE	.25' dia.	92.00

Major Discharge Structures:

Basin	Str. #	Description	Crest Elev. (ft, NGVD)
POND 1	1	3' wide X 4' long drop inlet	90.50
POND 2	1	14' wide SHARP CRESTED weir	89.50
POND 3	1	23' wide SHARP CRESTED weir	93.15
POND 4	1	4.5' wide X 9.66' long drop inlet	93.60
POND 5	1	10' wide SHARP CRESTED weir	93.00
POND 6	1	3' wide X 4' long drop inlet	93.50
W4B & LAKE 1	1	100' wide SHARP CRESTED weir	90.70
W8SOUTH & LAKE 2	1	100' wide SHARP CRESTED weir	86.80
W1A	1	6' wide X 2' high RECTANGULAR NOTCH weir	91.00
W1A	1	6' wide X 2' high RECTANGULAR NOTCH weir	91.00
W1A	1	8' wide X 2' high RECTANGULAR NOTCH weir	91.00
W4A	1	3' wide X 4' long drop inlet	93.67
W4B	1	18' wide SHARP CRESTED weir	90.70
W5A	1	100' wide SHARP CRESTED weir	90.70
W7A & W8A	1	19' wide SHARP CRESTED weir	91.32
W8B	1	10' wide SHARP CRESTED weir	90.40
W13	1	50' wide SHARP CRESTED weir	90.40

Discharge Culverts:

Basin	Str. #	Description
POND 1	1	26' long, 3' dia. RCP
POND 1	1	1600' long, 4' dia. RCP
POND 4	1	500' long, 4' dia. RCP
POND 6	1	29' long, 1.25' dia. RCP
W1A	1	200' long, 2.5' dia. RCP
W1B	1	210' long, 3' dia. RCP
W1B	1	210' long, 3' dia. RCP
W1B	2	214' long, 3' dia. RCP
W1B	2	214' long, 3' dia. RCP
W1B	2	214' long, 3' dia. RCP
W1B	3	216' long, 3' dia. RCP
W1B	3	216' long, 3' dia. RCP
W1B	3	216' long, 3' dia. RCP
W1B	4	220' long, 3' dia. RCP
W1B	4	220' long, 3' dia. RCP
W4A	1	103' long, 3' dia. RCP
W7A & W8A	1	204' long, 4.5' dia. RCP
W8B	1	180' long, 3' dia. RCP
W13	1	265' long, 4' dia. RCP

Receiving Body:

Basin	Str. #	Receiving Body
POND 1	1	W8SOUTH & LAKE 2
POND 2	1	BASIN W9
POND 3	1	BASIN W8B
POND 4	1	W4B & LAKE 1
POND 5	1	BASIN W1B
POND 6	1	BASIN W1A
W4B & LAKE 1	1	BASIN W4B
W8SOUTH & LAKE 2	1	BASIN W9
W1A	1	BASIN W1B
W1B	1	BASIN W1C
W1B	2	BASIN W1C
W1B	3	BASIN W1C
W1B	4	BASIN W1C
W4A	1	BASIN W4B
W4B	1	BASIN W1B
W5A	1	BASIN W4B
W7A & W8A	1	BASIN W8B
W8B	1	BASIN W9
W13	1	W8SOUTH & LAKE 2

III. PROJECT EVALUATION

Discharge Rate:

The only drainage basins discharging off-site are:

1- Basin W1C discharging into S.R. 535 drainage system
2- Basin W-8B dicharging into Floribra (Basin 100)
3- Basin W-9 discharing into the RCID drainage system

Design Storm Frequency: 25 YR/24 HR **Design Rainfall:** 8.60 inches

Basin	Allow Disch (cfs)	Method of Determination	Design Disch (cfs)	Design Stage (ft, NGVD)
POND 1	11.61	PRE VS. POST	11.61	90.9
POND 2	13.9	PRE VS. POST	13.9	89.97
POND 3	23.67	PRE VS. POST	23.67	93.64
POND 4	49.94	PRE VS. POST	49.94	94.27
POND 5	9.78	PRE VS. POST	9.78	93.47
W4B & LAKE 1	23.32	PRE VS. POST	23.32	92.35
W8SOUTH & LAKE 2	77.37	PRE VS. POST	77.37	88.36
W1A	33.92	192 CFS/SQUARE MILE	33.92	92.63
W1B	155.88	192 CFS/SQUARE MILE	155.88	89.56
W1C	169.61	192 CFS/SQUARE MILE	169.61	89.19
W4A	29.16	PRE VS. POST	29.16	94.43
W4B	115.21	PRE VS. POST	115.21	92.35
W5A	44.45	PRE VS. POST	44.45	92.35
W7A & W8A	55.89	PRE VS. POST	55.89	92.29
W8B	71.96	PRE VS. POST	71.96	91.44
W9	92.01	PRE VS. POST	92.01	88.36
W13	28.98	PRE VS. POST	28.98	90.72

WATER QUALITY:

Water quality treatment in excess of 2.5 inches times the percentage of impervious coverage is provided in five wet detention and one dry detention ponds for this phase.

Basin	Treatment Method	Vol Req'd. (ac-ft)	Vol Prov'd (ac-ft)
POND 1	.5 acres WET DETENTION	1.01	1.25
POND 2	1.2 acres WET DETENTION	1.19	1.25
POND 3	.93 acres WET DETENTION	2.23	2.23
POND 4	3.33 acres WET DETENTION	5.16	5.22
POND 5	.62 acres WET DETENTION	0.38	1.34

Basin	Treatment Method	Vol Req'd. (ac-ft)	Vol Prov'd (ac-ft)
POND 6	.14 acres DRY DETENTION	0.07	0.07

ROAD DESIGN:

As shown in the following table, minimum road center lines have been set at or above the calculated design storm flood elevation.

Design Storm Freq: 10 YR/24 HRS **Design Rainfall:** 7.00 inches

Basin	Flood Elevation (ft., NGVD)	Minimum Centerline Elevation (ft, NGVD)
POND 1	90.73	94.1
POND 2	89.92	93
POND 3	93.43	95.1
POND 4	94.09	96.45
POND 5	93.4	96
POND 6	93.5	96
W1A	92.63	96
W4A	94.43	97.95

IV. ENVIRONMENTAL ASSESSMENT

PROJECT SITE DESCRIPTION:

The Greene Property project site lies in a geological area called the Osceola Plain, a topographically low area exhibiting little relief and dominated by nearly level, poorly drained soils. Elevations across the site range from 105' NGVD in the north to less than 90'NGVD in the southern portion of the site. Drainage across the site occurs in two directions: 1) Northwest toward Bonnett Creek and 2) Southeast toward Shingle Creek. The entire site is considered to be within the Reedy Creek drainage basin which is a principal watershed of both Orange and Osceola counties.

The site has historically been used for native and improved range, pasture, sod farming and silvaculture. Agricultural management practices appear to have had limited impact upon the wetland vegetation communities within the site prior to 1980. Although, many of the cypress domes show evidence of timber harvesting, aerial photography as late as 1965 suggests that practice was selective.

Alteration of the site's drainage pattern occurred around 1983 as a result of the construction of an elevated, non-culverted haul road constructed across the westerly portion of the site which coincided with the construction of the EPCOT interchange at C.R. 535. The haul road has interrupted drainage in the

Basin Pond 5 is 0.91 acre-feet. Compensating storage is provided in Pond 5 for Basin Pond 6 and the proposed turn lanes from S.R. 535 into International Drive. Pond 5 discharges via an orifice and an overflow wier into Basin W1A.

Basin Pond 6 receives runoff from International Drive STA 205+50 to the east property line along with part of the intersection of International Drive and S.R. 535. This basin is served by the construction of a small retention pond and swale that drains into Basin W1A via a drop structure. The required retention volume of 0.38 acre-feet is compensated for in Pond 5 as stated above.

3.3 Westerly Basins - Reedy Creek Basins

Basin W8B consists of approximately 212 acres. It is located in the central portion of the Greene Project and is south of the proposed International Drive extension. It is also located north of the south property line. Typically, stormwater runoff from International Drive will be routed through a pollution abatement pond which will, in turn, overflow into the existing wetland. East of this basin is the extension of the westerly roadway leading from International Drive to S.R. 536. This basin is connected to the south with the Floribra Development and to the northwest with Basin W9 which is connected to the FDOT right-of-way. The wetland in this basin provides stormwater attenuation and conveyance. In addition to the two connections mentioned previously, this basin is connected to the north via a cross culvert leading the Wetland W8A. It is also connected to the southwest via a bypass emergency pipe and structure system.

Basin W7A is located south of S.R. 536 and west of the westerly roadway leading from the project to S.R. 536. It is bounded on the west with Wetland W8A and on the south with International Drive. This basin is approximately 19 acres. The coefficient of runoff used for this basin is 95.3. The stormwater runoff from this basin will be collected and treated prior to discharge into the Master Drainage System. The topography of this sub-basin slopes gradually from the northeast corner of the basin to the southwest corner toward Wetland W8A.

TABLE 4-2
Water Quality

Basin	Total Area (Acres)	Developable Area (Acres)	Impervious Area (Acres)	Retention Volume* (Ac-Ft)
Pond 1	6.78	6.78	4.84	1.01
Pond 2	8.48	8.48	5.71	1.19
Pond 3	13.78	13.78	10.68	2.23
Pond 4	30.26	30.26	24.77	5.16
Pond 5	5.90	5.90	4.39	0.91
Pond 6	2.32	2.32	1.82	0.38
W1A	39.08	18.18	15.45	3.22
W1B	71.31	26.15	22.23	4.63
W1C	37.35	4.90	4.21	0.88
W3A	9.21	9.21	7.83	1.63
W4A	23.90	0.00	0.00	0.00
W4B	115.29	55.89	47.51	9.90
W5A	23.32	23.32	19.82	4.13
W8B	211.60	107.95	91.76	19.12
W7A	19.42	19.42	16.51	3.44
W8A	22.57	0.00	0.00	0.00
W13	24.05	13.23	11.25	2.34
W8 South	54.49	35.14	29.87	6.22
W9	41.51	20.97	17.82	3.71

* 2.5 Inches Over Impervious Area

4.5 Soil Storage

A saturated condition is assumed in the design of the drainage system. Therefore, no soil storage is anticipated.

4.6 Allowable Discharge

On-site attenuation is provided to ensure that the post-development 25-year, 24-hour discharge is less than the pre-development 25-year, 24-hour discharge. Table 4-3 clearly shows this criteria was observed.

TABLE 4-4
100-Year, 72-Hour Maximum Stages and Discharges

Basin	Stage (Feet)	Discharge (cfs)
Pond 1	91.45	29.43
Pond 2	90.44	38.76
Pond 3	94.22	76.79
Pond 4	95.36	79.30
Pond 5	93.97	28.97
Pond 6	94.08	7.02
W1A	93.34	36.81
W1B	90.28	281.53
W1C	89.39	326.88*
W3A	90.83	4.97*
W4A	95.63	51.81
W4B	93.14	207.59
W5A	93.15	90.39
W8B	92.01	87.73**
W8A	93.16	97.97
W13	91.10	116.17
W9	89.16	116.17*
Lake 2	89.27	202.59

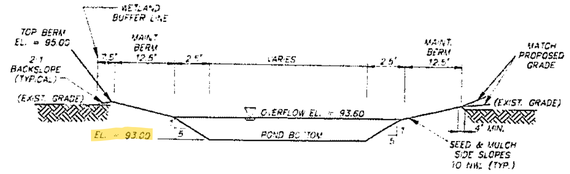
* Flowing Off-Site
** 45.23 cfs Flowing Off-Site

Exhibit 6 depicts the 100-year, 72-hour post-development computed floodplain. It should be noted that this storm event was used to establish minimum finished floor elevation for the site.

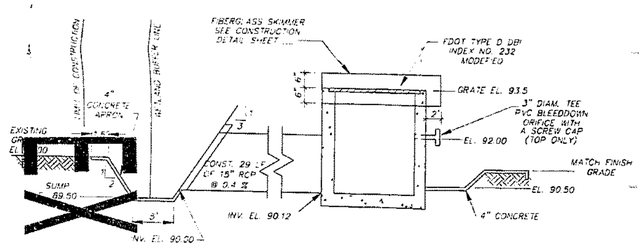
4.8 Basic Design Criteria and Methodology

4.8.1 Design Criteria

This report employs the requirements of the South Florida Water Management District, Orange County Regulation and the Florida Department of Environmental Regulation in the design. The calculations developed for this project are located in Appendix D.



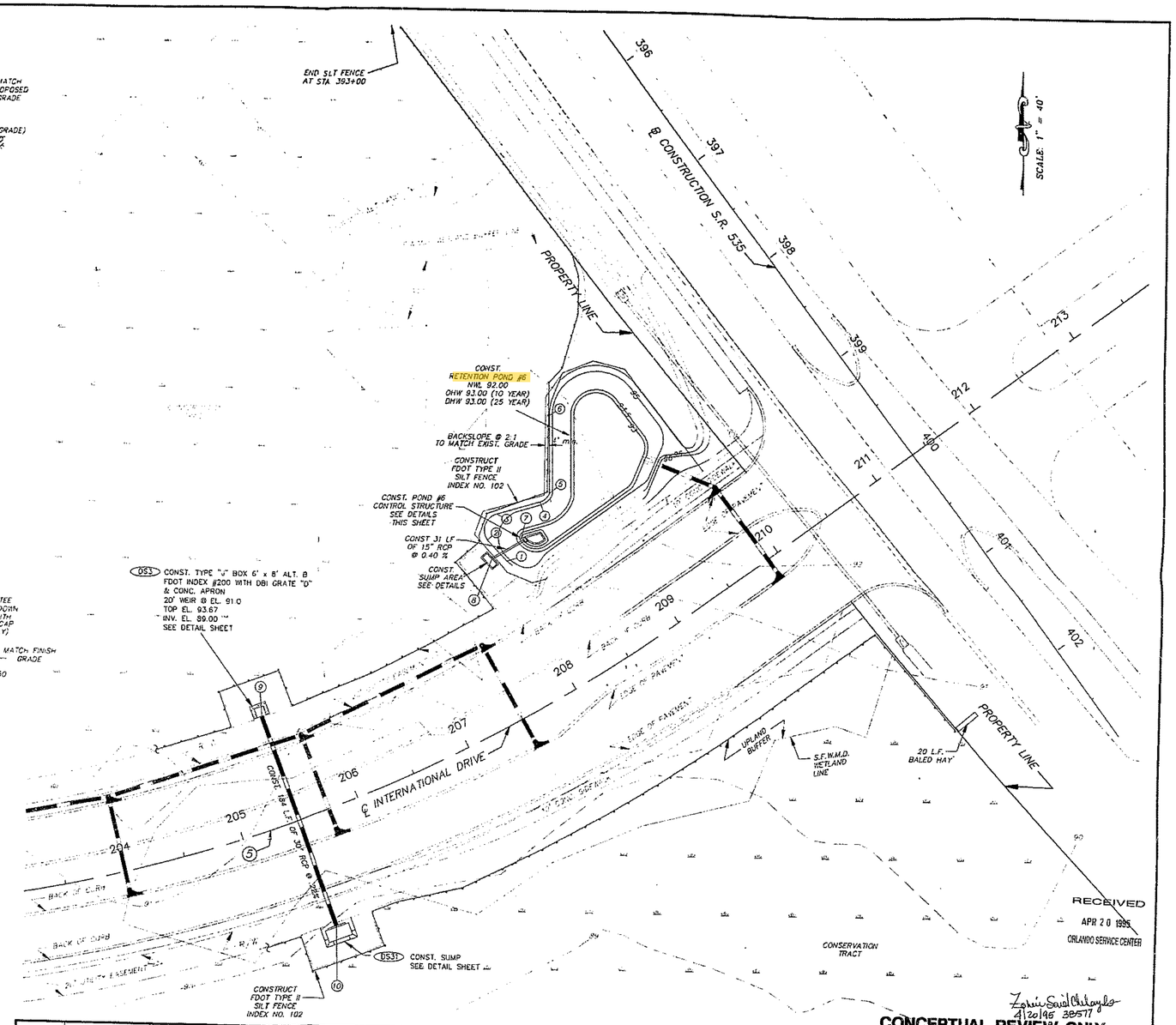
POND #6 TYPICAL SECTION
NOT TO SCALE



SECTION A-A
POND #1 CONTROL STRUCTURE
NOT TO SCALE
FOR FIBERGLASS CONNECTION DETAIL SEE DETAIL SHEET

REF. PT.	NORTHING	EASTING
1	7481.64	14368.47
2	7520.74	14358.95
3	7531.27	14353.43
4	7531.27	14395.33
5	7536.42	14403.86
6	7602.58	14402.70
7	7499.09	14379.67
8	7483.37	14356.12
9	7349.54	14169.84
10	7178.19	14234.79

EXHIBIT 12



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APR 20 1995
ORLANDO SERVICE CENTER

Zoning Section Reviewed
4/20/95 30577
CONCEPTUAL REVIEW ONLY

DATE	REVISIONS	REVISED BY	CHECKED BY

CADD	NAME	DATE
DESIGNED BY	MRM	3/95
DRAWN BY	RFB	3/95
CHECKED BY	ZSC	3/95
APPROVED BY	JDH	3/95
FILE NAME	RFB 04/18/95 POND6.DWG	

DYER, RIDDLE, MILLS & PRECOURT, INC.
ENGINEERS • SURVEYORS • SCIENTISTS • PLANNERS
ORLANDO - 1505 EAST COLONIAL DRIVE • P.O. BOX 538505 - FLORIDA 32853-8505

RETENTION POND DETAILS
GREENE PROPERTY
MASTER INFRASTRUCTURE PLAN
POND NO. 6
ORANGE COUNTY, FLORIDA

PROJECT NO. 88-0390.000
DATE MARCH 1995
SCALE HORIZ. 1" = 40'
SHEET 26 OF ___

18-00866-S
990618-15 APR 20 1995

S22 T24 R31
WPB