FINAL LOCATION HYDRAULICS REPORT

Florida Department of Transportation
District One

CR 887 (Old US 41)
Project Development and Environment Study

From US 41 To Lee County Line
From Collier County Line to Bonita Beach Road

Collier County and Lee County, Florida

FPID: 435110-1-22-01 & 435347-1-22-01
ETDM Number: 14339

July 2025

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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.

PROFESSIONAL ENGINEER CERTIFICATION

CR 887 (Old US 41) from US 41 to Lee County Line

CR 887 (Old US 41) from Collier County Line to Bonita Beach Road

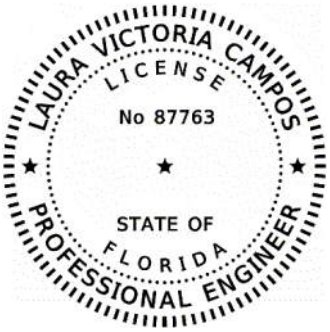
Collier and Lee Counties, Florida

Financial Project ID 435110-1-22-01 & 435347-1-22-01

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This Location Hydraulics Report includes a summary of data collection efforts and design analysis for floodplain encroachments and cross drain improvements as part of the CR 887 (Old US 41) Project Development & Environment Study from US 41 in Collier County to Bonita Beach Road in Lee County in Florida. I acknowledge that the procedures and references used to develop the results contained in this report are standard to the professional practice of civil engineering as applied through design standards and criteria set forth by the federal, state, and local regulatory agencies as well as professional judgment and experience.

I hereby certify that I am a registered professional engineer in the State of Florida practicing with HNTB Corporation, a corporation authorized to operate as an engineering business, Certificate of Authorization No. 6500, by the State of Florida, Department of Professional Regulation, and Board of Professional Engineers. I have prepared or approved the evaluation, findings, opinions, conclusions, or technical advice as documented in this report.



This item has been digitally signed and sealed by ***Laura Victoria Campos*** 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.

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Executive Summary

The Florida Department of Transportation is conducting a Project Development and Environmental Study to evaluate the costs and impacts of constructing roadway capacity improvements to County Road 887, also known as Old US 41, from US 41 (Tamiami Trail North) to a "New Quadrant Roadway" connecting Old US 41 to Bonita Beach Road, approximately 2.7 miles. A map of the study area is provided in **Figure 1-1** of this report. The primary purpose of this project is to increase the capacity of the roadway in order to improve traffic safety along the corridor.

Roadway improvements along the corridor will result in the extension of existing cross drains and the addition of fill in existing floodplains due to the construction of roadway embankment. The modifications are necessary for motorist safety and will not impact drainage conveyance to their respective outfalls. Included in these improvements is the modification of the roadway stormwater conveyance system from an open system with roadside ditches, which receive both onsite and offsite runoffs, to a closed system with inlets and culverts, which will only collect the onsite runoff. A separate stormwater conveyance system concept will need to be considered during the design phase for the purposes of intercepting the offsite runoffs inflowing into the project's right-of-way and allowing the inflows to bypass the proposed onsite conveyance system so that the existing drainage patterns to cross drains CD-01 and CD-02 may be maintained. The application of a bypass system concept involving closed pipe conveyance for offsite inflows would result in decreased times of concentrations and therefore increased capacity demands for two of the three cross drains (CD-01 and CD-02) within the project limits. Therefore, upsizing improvements are recommended to maintain hydraulic adequacy. **Table 5-1**: *Summary of Recommended Cross Drain Improvements* provides a summary of the cross drain extension and upsizing recommendations. Opportunities may exist during the design phase to prioritize maintaining open conveyance ditches within the right-of-way where feasible to sustain similar times of concentration and avoid the need for upsizing CD-01 and CD-02, but for the purposes of this preliminary analysis, the "worst-case" scenario of a completely closed pipe system is assumed as it is the only feasible option given the right-of-way constraints within the post-development typical sections.

Longitudinal encroachments upon the floodplain are anticipated due to the proposed County Road 887 widening improvements. Using the Federal Emergency Management Agency's Flood Insurance Rate Maps, these encroachments were preliminarily estimated using the cup-for-cup methodology. The project encroaches upon the floodplain throughout most of the Collier County segment. It is estimated that approximately **33.14 acre-feet** of encroachments are associated with the proposed widening improvements in this study. Please refer to **Table 5-3**: *Summary of Floodplain Encroachment Areas (FEAs)* for a summarization of the anticipated floodplain encroachments. Both Collier County and the City of Bonita Springs participate in the National Flood Insurance Program Community Ranking System (CRS) as CRS Class 5 communities. Participation in the CRS has the effect of limiting changes to the 100-year floodplain, similar to that of a floodway.

Three (3) floodplain compensation sites were identified in proximity to the project. These sites are summarized in **Table E-1** of this section, and again in Section 6 of this report. These recommended sites were selected based on the evaluation of several factors, including wetland impacts, habitat and environmental impacts, and hydraulic connectivity to the affected floodplains. During the design phase,

floodplain compensation should be provided in ditches and stormwater management facilities to the maximum extent possible, and other alternatives to compensatory storage should be considered, such as improving the conveyance of Dunruss Creek to maintain or improve flood stages; or running a regional floodplain model instead of using the cup-for-cup methodology to determine if flood stages can be maintained with less compensation. The offsite floodplain compensation sites identified in this report should supplement any additional floodplain compensation needs once more information is available during the design phase. It should also be noted that the compensatory volumetric requirements for this project were conservatively estimated due to the preliminary nature of this study and will likely be able to be reduced during the design phase.

Table E-1: Summary of Recommended FPC Sites

FPC Site Designation	FPC Volume Provided (ac-ft)	FPC Pond Area (ac)
FPC 1	10.85	7.37
FPC 2	15.89	6.62
FPC 3	7.48	3.49

The recommended cross drains will perform hydraulically in a manner equal to or greater than the existing structures, and backwater surface elevations are not expected to increase. The recommended floodplain compensation sites provide **34.22 acre-feet** of compensatory storage, creating a net improvement in floodplain storage, thus, no significant change in flood risk or the potential for interruption or termination of emergency service or emergency evacuation routes is expected. Therefore, it has been determined that this encroachment is not significant. No floodways are within the project limits; please refer to **Appendix B** for the FEMA FIRM panels.

1. Introduction

The Florida Department of Transportation, District One (FDOT) is conducting a Project Development and Environmental (PD&E) Study to evaluate the costs and impacts of constructing roadway capacity improvements to County Road (CR) 887 (Old US 41) from US 41 (Tamiami Trail North) to a New Quadrant Roadway connecting Old US 41 to Bonita Beach Road, approximately 2.7 miles. The primary purpose of this project is to increase the capacity of CR 887 from US 41 to Bonita Beach Road in order to improve traffic safety along the roadway. See the *Preliminary Engineering Report (PER)* under separate cover for the formal project purpose and need.

The purpose of this PD&E Study is to evaluate engineering and environmental data and document information that will aid FDOT, Collier County and Lee County in determining the proposed improvements. The study is being conducted to meet the requirements of the National Environmental Policy Act (NEPA) and other related federal and state laws. A map of the PD&E Study area is provided in **Figure 1-1**.

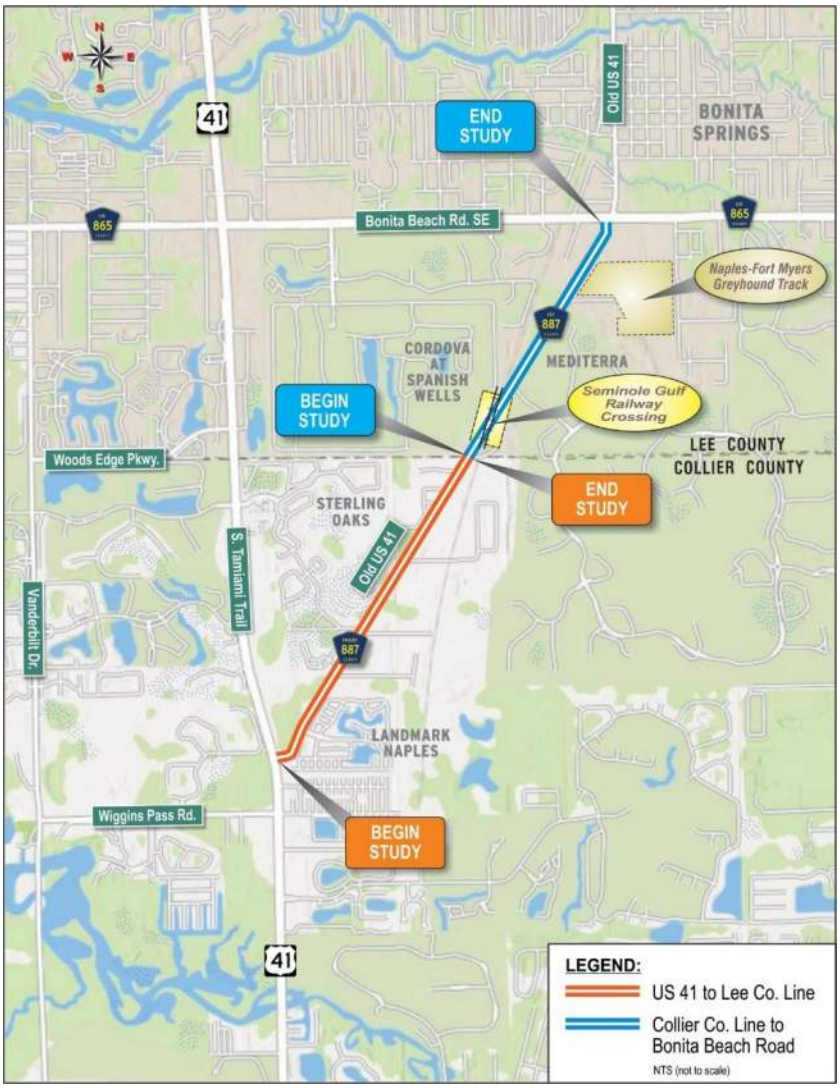


Figure 1-1: PD&E Project Study Area

2. Project Description

The intent of this Location Hydraulics Report (LHR) is to identify the potential 100-year (base) floodplain encroachments resulting from the roadway improvements assessed in this study, and to evaluate the hydraulic adequacy of existing cross drains within the project limits to determine what improvements or modifications may be needed in the post-development conditions. For information related to the proposed stormwater management design concepts, please reference the *Pond Siting Report* under separate cover.

In accordance with *Title 23 of the Code of Federal Regulations (CFR) 650 Subpart A, Section 650.111*, floodplains are to be protected. These regulations intend to avoid possible long- and short-term adverse impacts associated with the modification of floodplains as a result of development. Conclusions and recommendations for floodplain compensation and cross drain improvements were developed using the best available data and conceptual roadway alignment and typical sections. The cross drain locations, cross drain lengths, and floodplain encroachment volumes shall be confirmed during the design phase when survey information, geotechnical data, and proposed cross-sections are available. The proposed typical sections for the project are provided in **Appendix A**.

The limits of this study are CR 887 from US 41 to Bonita Springs Road. The total project length is approximately 2.7 miles. The project is located within Collier County and Lee County, Florida, within Sections 2, 3, 10, and 15 of Township 48 South, Range 25 East, and within the Bonita Springs United States Geological Survey (USGS) 7.5-minute (1:24,000) quadrangle map, which may be found in **Appendix A**. A Project Location Map is provided in **Figure 2-1**.



Figure 2-1: Project Location Map

All elevations and stages shown in this document are referenced to the North American Vertical Datum (NAVD) of 1988. When converting elevations in the project area from the National Geodetic Vertical Datum (NGVD) of 1929 to NAVD 88, the following conversion factor should be used: NAVD 88 = NGVD 29 – 1.214 feet. See **Appendix F** for more information on the datum conversion.

3. Design Criteria

The proposed Floodplain Compensation (FPC) sites and cross drain improvements were preliminarily designed in accordance with South Florida Water Management District (SFWMD) design criteria and the criteria outlined in FDOT's 2025 Drainage Manual and 2025 Drainage Design Guide.

In accordance with SFWMD's *Environmental Resource Permit Applicant's Handbook Volume II*, Section 3.6 *Flood Plain Encroachment,* the following criterion applies:

> *"No net encroachment into the floodplain, between the average wet season water table and that encompassed by the 100-year event, which will adversely affect the existing rights of others, will be allowed."*

For the design of cross drains, the following criteria in **Table 3-1** applies.

Table 3-1: Design Criteria for Cross Drains

Criteria	Reference	Requirement
Design Storm Frequencies	2025 FDOT Drainage Manual, Table 4.1	High Use or Essential Facility: 50 years
Backwater	2025 FDOT Drainage Manual, Section 4.4.3	Keep the backwater for design frequency conditions at or below the travel lanes.
Minimum Cover for Concrete Pipes	2025 FDOT Drainage Manual, Appendix C	Unpaved or Flexible Pavement: 12 inches Rigid Pavement: 9 inches

3.1 Existing Permits

There are several existing SFWMD Environmental Resource Permits (ERPs) along the project corridor. A summary of these permits is included below in **Table 3-2**.

Table 3-2: Summary of Relevant SFWMD Permits

Permit No.	Project Name
11-01042-S	Sterling Oaks
11-01367-P	Meadowbrook Preserve FKA Turtle Creek Apartments
11-01368-P	US 41 (SR 45) from CR 887 to Myrtle Road
11-01542-P	Somerset Palms Apartment Homes FKA Arbor View
11-01644-P	North Collier Industrial Center
11-01702-P	Busk Nursery
11-01761-P	Mediterra
11-01765-P	Gateway Shoppes at North Bay Plaza
11-01984-P	Old 41 Stormwater Improvements
11-02000-P	Old 41 T Corp
11-02061-P-02	Germain Storage Lot
11-02242-P	North Naples Research and Technology Park
11-02353-P	Triangle Parcel
11-02803-P	US 41 Intersection Improvements at Old US 41
11-03268-P	Old US 41 Intersection Improvements at Rail Head Blvd
11-103545-P	Landmark Naples
36-00067-S	Spanish Wells

Permit No.	Project Name
36-00067-S-02	Cordova at Spanish Wells FKA Valencia at Spanish Wells
36-02687-S	Bonita Beach Road
36-03821-P	Bonita Business Park
36-04608-P	Constitution Center
36-05633-P	Bonita Plaza
36-100490-P	Causeway Commerce Park
36-100709-P	South Depot
81-00290-S	Railhead Industrial Park
87-00020-S	Bonita Beach Road Improvements

4. Existing Conditions

The existing CR 887 roadway from US 41 to Bonita Beach Road is classified as a two-lane, undivided major collector with a posted speed limit of 45 miles per hour (mph). The roadway features two twelve-foot travel lanes with alternating left and right turn lanes throughout the length of the corridor. **Figures 4-1, -2, and -3** show the existing typical sections. The project is located within the jurisdiction of the SFWMD and traverses four waterbody IDs (WBIDs). **Table 4-1** lists the WBIDs by watershed, as well as their respective waterbody name and impairments. The Cocohatchee River is an Outstanding Florida Waters (OFW).

Table 4-1: Project WBIDs

WBID	Waterbody Name	Impairments
West Cocohatchee River Watershed		
3278C	Wiggins Bay Outlet	Low Oxygen, Metals
3278D	Cocohatchee (Inland Segment)	Bacteria and Other Microbes, Low Oxygen
Imperial River Watershed		
3258F	Oak Creek	Bacteria and Other Microbes, Low Oxygen
3258EB	Imperial River (Marine Segment)	Algae, Bacteria and Other Microbes, Low Oxygen, Mercury, Metals, Nitrogen and/or Phosphorus

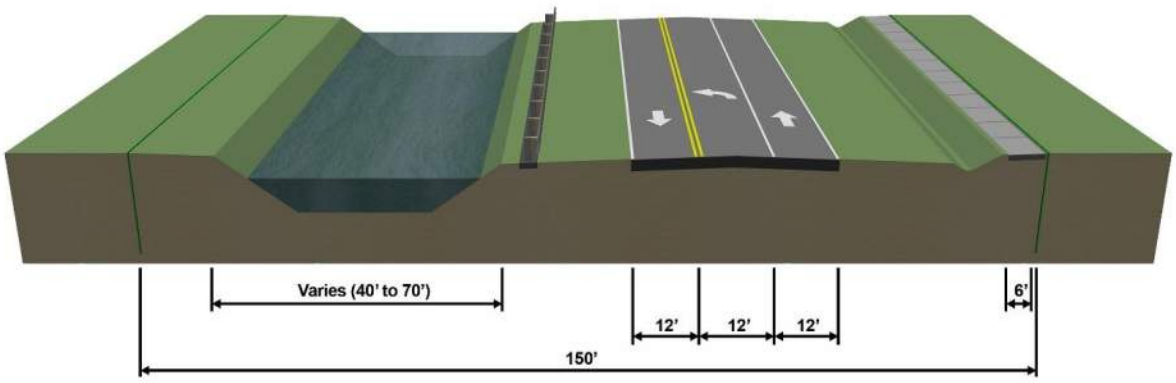


Figure 4-1: Existing Typical Section from US 41 to Florida Power & Light (FPL) Easement

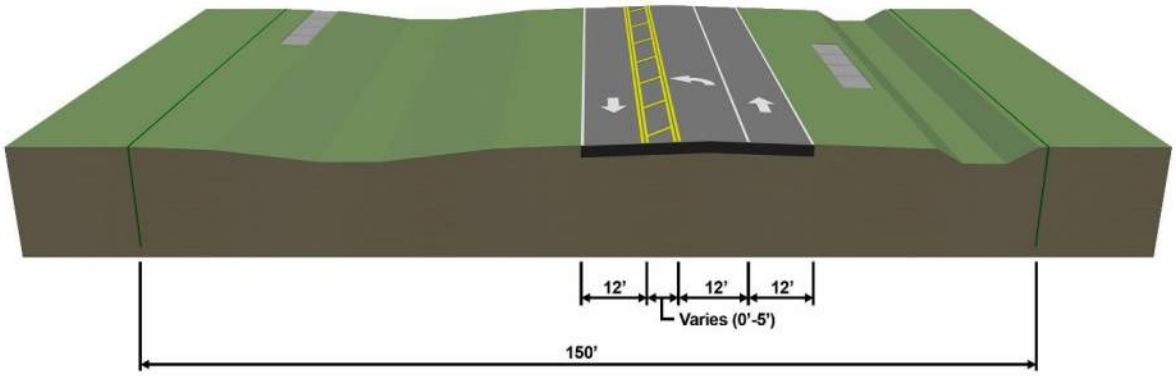


Figure 4-2: Existing Typical Section from FPL Easement to Lee County Line

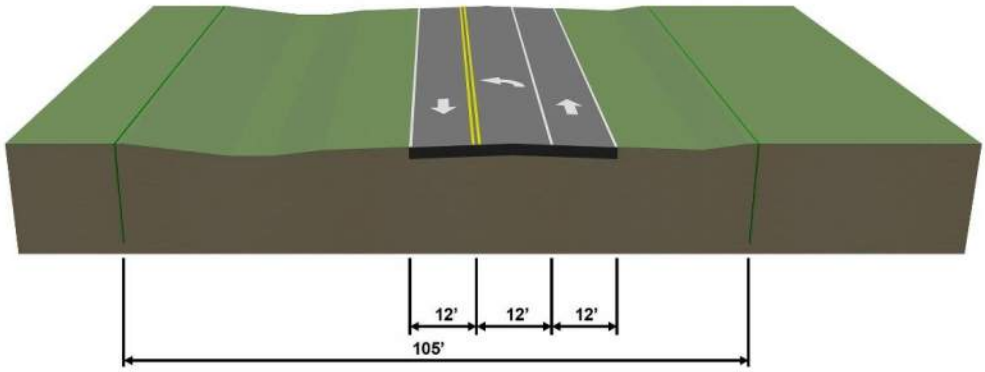


Figure 4-3: Existing Typical Section from Collier County Line to Bonita Beach Road

A large canal, referred to in this document as Dunruss Creek, but also known as Wiggins Bay or Old US 41 Canal, is located on the west side of CR 887 in the Collier County segment of the project. Within the project limits it runs parallel to CR 887 from the CR 887-US 41 intersection to approximately 300 feet south of Rail Head Boulevard, where it cuts north into a Florida Power & Light (FPL) utility easement and continues outside of the study area. Dunress Creek flows southwest within the project limits and then flows west under US 41 out of the study area. Within the study area, Dunress Creek flows under cross streets via mitered end sections. The portion of Dunruss Creek that runs alongside CR 887 was regraded in 2010 under SFWMD Permit #11-01984-P (Old 41 Stormwater Improvements).

Generally, stormwater runoff in the Collier County segment of the project sheet flows from the CR 887 into roadside ditches on the east and into the roadside portion of Dunruss Creek on the west side. The eastern roadside ditches collect runoff from the roadway and other offsite areas and convey it southwest towards two existing cross drains (EX_CD-1 & EX_CD-2) which outfall into Dunruss Creek. The creek collects runoff from CR 887 and other offsite areas, primarily from the Spanish Wells stormwater management system, which outfalls into a ditch within the FPL utility easement and conveys the water south into Dunruss Creek. The creek conveys this collection of flows southwest towards a double 4'x10' bridge culvert crossing under US 41, where it ultimately outfalls to the Cocohatchee River and the Gulf of America (*also known as the Gulf of Mexico*).

Generally, stormwater runoff in the Lee County segment of the project sheet flows from the CR 887 into roadside ditches that directly convey the runoff northeast towards a culvert crossing (EX_CD-3) near Sta. 225+00. The culvert discharges into a conveyance ditch which conveys runoff west then north running parallel to the CSX railroad. This ditch flows north under Bonita Beach Road and ultimately outfalls to Oak Creek. This culvert crossing also accepts discharge from the Mediterra stormwater management system, located east of CR 887.

Three (3) offsite basins have been identified that correlate with each of the three cross drains within the limits of the study area. Basin divides have been developed from existing permit information and supplemented with LiDAR data. Cross drain information was obtained from existing permit information. Existing basin divides are detailed on the *Pre-Development Cross Drain Basin Map* in **Appendix D.**

4.1 Soils

The predominant soils within and adjacent to the corridor are poorly drained sandy soils, with some areas of moderately well-drained sandy soils. The Natural Resource Conservation Service (NRCS) Web Soil Survey of Collier and Lee Counties was used to determine the soil types within the project limits. The Soil Survey indicates that much of the project corridor is underlain by mineral soils (sands). The presence of organics beneath the existing roadway's embankment is uncertain.

Based on a review and evaluation of subsurface information available for the project area, it is expected that soil and groundwater conditions found along the corridor are generally favorable for roadway improvements. A map summarizing the soils in the project vicinity is provided in **Appendix A**. **Table 4-2** provides the predominant soil names within the project limits, as well as their hydrologic soil group.

Table 4-2: Soil Types

Soil Name	Hydrologic Soil Group
Brynwood fine sand, wet-Urban land complex, 0 to 2 percent slopes	B/D
Copeland fine sandy loam, ponded-Urban land complex, 0 to 1 percent slopes	D
Felda fine sand, ponded-Urban land complex, 0 to 1 percent slopes	A/D
Immokalee fine sand-Urban land complex, 0 to 2 percent slopes	B/D
Immokalee-Oldsmar, limestone substratum-Urban land complex, 0 to 2 percent slopes	B/D
Satellite fine sand-Urban land complex, 0 to 2 percent slopes	A
Urban land, 0 to 2 percent slopes	-

4.2 Land Use

Existing land uses within the study area include residential, commercial, recreational, industrial, conservation, and limited vacant land. Residential subdivisions and commercial businesses access CR 887 throughout the corridor. A map summarizing the land use classifications in the project vicinity is provided in **Appendix A**.

4.3 Cross Drains

There are three (3) existing cross drains within the project limits. **Table 4-3** provides a summary of the existing culverts. At the time this report was compiled, no known drainage issues were reported related to the hydraulic adequacy of these cross drain culverts. Due to the preliminary nature of this study, the HY-8 analysis and other relevant calculations provided in **Appendix D** should be revised during design when survey information and geotechnical data are available. Tailwater elevations were obtained from information in the existing permits provided in **Appendix F** and are summarized in **Table 4-4** below.

Table 4-3: Summary of Existing Cross Drains

Cross Drain	Size	Length	Location
EX_CD-1	2 - 24" RCP	100 ft	Sta. 103+45
EX_CD-2	2 - 30" RCP	53 ft	Sta. 143+58
EX_CD-3	2 – 36" RCP	65 ft	Sta. 224+20

Table 4-4: Summary of Tailwater Elevations

Cross Drain	Location	Tailwater Elevation (NAVD)	Source
EX_CD-1	Sta. 103+45	6.88 (Water Surface)	SFWMD Permit No. 11-01984-P
EX_CD-2	Sta. 143+58	7.56 (Ex. Ground)	SFWMD Permit No. 11-01984-P
EX_CD-3	Sta. 224+20	7.48 (Ex. Ground)	SFWMD Permit No. 36-04608-P

4.4 Floodplains and Floodways

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs) for Collier County and Lee County were reviewed to determine the extents of floodplains and floodways within the project limits. The project does not encroach upon any FEMA floodways. The floodplains that extend into the project area, which are primarily zone AE with some zone AH, are limited to the Collier County portion of the project. No floodplains were shown to extend into the Lee County portion at the time this report was compiled. However, it should be noted that discrepancies exist between the FIRMs for Collier and Lee Counties. It is possible that the floodplain area and Base Flood Elevation (BFE) information provided by FEMA may be modified by future studies and analysis. **Table 4-5** provides a summary of the FEMA FIRMs, including their effective dates. These FEMA FIRMs are provided in **Appendix B**.

Table 4-5: Summary of FEMA FIRMs

County	FIRM Number	Effective Date
Collier	12021C0183J	2/8/2024
	12021C0191J	
Lee	12071C0658G	11/17/2022
	12071C0659G	

5. Proposed Conditions

The proposed improvements involve widening CR 887 from a two-lane undivided facility to a four-lane divided facility and constructing a New Quadrant Roadway connecting CR 887 to Race Track Road. The proposed typical sections include five-foot bicycle lanes in both directions, a six-foot sidewalk on the east side, and a ten-foot shared-use path on the west side throughout the Collier County portion. Within Bonita Springs (Lee County), seven-foot bicycle lanes in both directions and a 12-foot shared-use path on the west side are proposed for CR 887, and the New Quadrant Roadway includes a two-lane divided typical section with a 16-foot sod median, 11-foot travel lanes, and established 7-foot bicycle lanes. On the southeast side is an 8-foot concrete sidewalk with a 11-foot sod barrier between the roadway. On the northwest side there is 12-foot shared use path with a 7-foot barrier between the roadways. The proposed roadway typical sections are provided in **Appendix A**.

5.1 Cross Drains

The proposed roadway widening will require extensions to all three (3) existing cross drains along the corridor. In the existing conditions, stormwater runoffs from adjacent offsite areas in Collier County discharge into the conveyance ditches along the southeastern side of CR 887 and coalesce with the on-site runoff from the project area before entering cross drains CD-1 and CD-2. Due to right-of-way constraints, the typical section proposed by FDOT calls for the elimination of these ditches, and therefore a separate offsite collection system concept will need to be considered during the design phase to bypass the onsite conveyance system and maintain existing drainage patterns from the offsite areas draining to cross drains CD-01 and CD-02, assuming general post-development hydraulic connections for the offsite flows remain equivalent to pre-development conditions. This report assumes that the offsite bypass system concept will involve a closed drainage system that collects runoff from offsite areas, separate from the onsite curb inlet collection system, before discharging to CD-1 and CD-2. Due to differences in their hydraulic characteristics, closed concrete pipe systems typically convey flows at higher velocities than open grassed ditches, creating shorter times of concentration. The reduction in the times of concentration for these flows will result in impacts to the hydraulic adequacy of CD-1 and CD-2, therefore requiring upsizing improvements to meet the capacity needs of the projected closed conveyance system. Opportunities may exist during design to prioritize maintaining open conveyance ditches within the right-of-way where feasible to sustain similar times of concentration, but for the purposes of this preliminary analysis, the "worst-case" scenario of a completely closed pipe system is assumed, as it is the only feasible option with the current typical section. However, the need for upsizing should be analyzed further during the design phase, once survey information is available and the offsite conveyance design is complete.

Preliminary data shows that there is adequate cover in the upsized condition based on the difference between the lowest edge of pavement (LEOP) and the crown of the infall inverts. **Table 5-1** below summarizes the recommended improvements and modifications to each cross drain, and an exhibit demonstrating the recommended cross drain improvements is available in **Appendix D**. **Table 5-2** demonstrates the available cover at each crossing. Elevations and pipe lengths were taken from the existing permits provided in **Appendix F**.

Table 5-1: Summary of Recommended Cross Drain Improvements

Cross Drain	Size	Length	Location	Improvements
CD-1	2 - 30" RCP	130 ft	Sta. 103+45	Extension (Upsizing Recommended)
CD-2	2 - 36" RCP	90 ft	Sta. 143+58	Extension (Upsizing Recommended)
CD-3	2 – 36" RCP	115 ft	Sta. 224+20	Extension

Table 5-2: Summary of Available Cover for CD-1 and CD-2

Cross Drain	LEOP El.	Infall Invert El.	Pipe Crown El.	Available Cover (ft)
CD-1	12.07	5.17	7.96	4.11
CD-2	12.62	7.61	10.94	1.68

5.2 Floodplains & Floodways

The anticipated floodplain encroachments due to the proposed roadway widening were preliminarily estimated to determine potential impacts to the 100-year floodplains and necessary compensation volumes. It should be emphasized that the FPC calculations are preliminary, and the final calculations will need to be provided in the design phase. The floodplain encroachments can be mitigated using offsite FPC sites. Cup-for-cup floodplain compensation calculations were provided for each floodplain encroachment. Each FPC site provides compensation within the same basin/encroachment location.

The project will encroach upon the 100-year floodplain through longitudinal encroachments resulting from filling the floodplain areas associated with the proposed roadway widening within the project limits. The longitudinal encroachments cannot be avoided since the floodplains associated with the water bodies and depressional areas coincide with the footprint of the widening improvements. The floodplain encroachment areas were preliminarily quantified based on the FEMA 100-year BFEs and the average wet season water table elevations were referenced from the nearby SFWMD permits provided in **Appendix F**.

During the design phase, it is recommended that the tie-down slopes be optimized within the right-of-way to provide the minimum allowable floodplain encroachment volume to reduce the need for off-site FPC sites. Additionally, stormwater management facilities should be evaluated to provide additional floodplain compensation through attenuation, where possible. Since the roadway design is still conceptual, FPC sites were conservatively sized to compensate for the entire floodplain impact per encroachment area, therefore disregarding the existing roadway embankment volumes and other existing fill volumes for which compensation is not required. These sites will likely be able to be reduced or possibly eliminated during the design phase, once the survey, geotechnical data, and proposed cross-sections are available and the conveyance and Stormwater Management Facility designs are complete.

There are six (6) proposed floodplain encroachment areas within the project limits. It is estimated that approximately **33.14 acre-feet** of floodplain encroachments are associated with the proposed improvements in this study. Three off-site FPC areas were identified to compensate for the proposed encroachments. The bottom elevations for the proposed FPC sites were set to the estimated SHWT referenced from adjacent SFWMD permits. **Table 5-3** summarizes the project floodplain encroachment areas. Floodplain calculations are provided in **Appendix C**.

Table 5-3: Summary of Floodplain Encroachment Areas (FEAs)

FEA Designation	BFE (ft, NAVD)	Avg. SHWT (ft, NAVD)	FEA Area (ac)	FEA Volume (ac-ft)
FEA_10	10.00	8.29	1.00	**1.71**
FEA_10.5	10.50	8.29	0.92	**2.03**
FEA_11	11.00	8.29	1.82	**4.93**
FEA_11.5	11.50	8.99	0.78	**1.96**
FEA_12	12.00	9.29	6.04	**16.37**
FEA_12.5	12.50	9.49	2.04	**6.14**

FPC Site One (FPC 1) is a 7.37-acre compensation area on the east side of CR 887 near Sta. 123+00 on parcels #64040000-802, -747, -721, -705, -682, -666, -640, -624, -608, and -585. All parcels are privately owned at the time this report was compiled. No impacts to wetlands or floodplains are anticipated for this site, based on the NWI and relevant FIRM. The FPC site shall maintain a hydraulic connection to the adjacent floodplain with a BFE estimated at 11 ft (NAVD) and the pond bottom set at an average SHWT estimated at 8.99 ft (NAVD), based on the SFWMD Permit #11-01644-P (North Collier Industrial Center).

FPC Site Two (FPC 2) is a 6.62-acre compensation area on the east side of CR 887 near Sta. 153+00 on parcels #00144040007, #00145681106, and #00143920005. All parcels are privately owned at the time this report was compiled. No impacts to wetlands or floodplains are anticipated for this site, based on the NWI and relevant FIRM. The FPC site shall maintain a hydraulic connection to the adjacent floodplain with a BFE estimated at 12.5 ft (NAVD) and the pond bottom set at an average SHWT estimated at 9.29 ft (NAVD), based on the SFWMD Permit #11-01042-S (Sterling Oaks).

FPC Site Three (FPC 3) is a 3.49-acre compensation area on the east side of CR 887 near Sta. 157+00 with a majority of the site residing on parcel #00144000005. This parcel is privately owned at the time this report was compiled. The remaining portion of the FPC site footprint is within an existing Collier County right-of-way easement and does not require acquisition. No impacts to wetlands or floodplains are anticipated for this site, based on the NWI and relevant FIRM. The FPC site shall maintain a hydraulic connection to the adjacent floodplain with a BFE estimated at 12.5 ft (NAVD) and the pond bottom set at an average SHWT estimated at 9.49 ft (NAVD), based on the SFWMD Permit #11-01542-P (Somerset Palms Apartment Homes FKA Arbor View).

A map showing the location of the floodplain encroachment areas and corresponding FPC sites is available in **Appendix C**. The latest published current effective FEMA FIRMs were used to determine floodplain areas and BFEs at the time this report was compiled. It is possible that floodplain areas and BFE information may be modified by future studies and analysis. During the design phase, the latest available FEMA FIRMs or other studies shall be used.

5.3 Project Classification

The floodplain areas within the project limits are located in medium- to high-density, urbanized areas; however, the longitudinal encroachment areas are classified as minimal. Minimal encroachments on a floodplain occur when there is floodplain involvement, but the impacts on human life, transportation facilities, and natural and beneficial floodplain values are not significant and can be resolved with minimal

efforts. Normally, these minimal efforts to address the impacts will consist of applying FDOT's drainage design standards and following the Water Management District's procedures to achieve results that will not increase or significantly change the flood elevations and/or limits.

5.4 Risk Evaluation

The proposed improvements were evaluated to determine whether there would be adverse floodplain impacts. It should be emphasized that the assumed application of a closed bypass conveyance system as discussed in this report, specifically in section **5.1 Cross Drains**, may increase downstream stages in Dunruss Creek, and could therefore adversely impact the risks associated with this project if not properly mitigated during the design phase. The cross drains will be reviewed in greater detail during the design phase, once survey information is available and a more thorough hydrologic method of analysis is utilized, to determine the impact of the proposed extensions and recommended upsizings on the headwater and tailwater elevations.

The replacement drainage structures for the three (3) cross drains in this project are limited to hydraulically equivalent structures that are not expected to increase the backwater surface elevations. The limitations to the hydraulic equivalency proposed are basically due to restrictions imposed by the geometrics of design, existing development, cost feasibility, or practicability. An alternative encroachment location is not considered since it does not meet the project's purpose and need or is economically unfeasible.

Since any flooding conditions that may be present in the project area are inherent in the topography or are a result of other outside contributing sources, and there is no practical alternative to eradicate flooding problems in any significant amount, existing flooding will continue, if present, but will not increase as a result of the construction of this project.

Furthermore, the project will not affect existing floodplain elevations or extents. There will be no significant change in the potential for interruption or termination of emergency service or emergency evacuation routes as the result of construction of this project. Therefore, it has been determined that this encroachment is not significant.

5.5 Coordination with Local Agencies

A Pre-Application Meeting was held with SFWMD on January 27th, 2021. Please refer to **Appendix E** for the Pre-Application Meeting Minutes.

5.6 Documented Drainage Concerns

At the time of this report's compilation, no known drainage concerns were reported within the study limits.

6. Recommendations and Conclusions

The proposed widening of the existing CR 887 from US 41 to Bonita Beach Road from two to four lanes will result in encroachments into the adjacent FEMA-designated floodplains and require the extension of all three cross drains along the project limits. The elimination of the existing roadside ditches that accept offsite flows will need to be addressed with an offsite bypass system concept during the design phase. This report assumes that the concept will involve a closed drainage system that collects runoff from offsite areas, separate from the onsite curb inlet collection system, before discharging to CD-1 and CD-2 to maintain existing offsite drainage patterns. The reduction in the times of concentration for these flows will result in impacts to the hydraulic adequacy of CD-1 and CD-2, therefore requiring upsizing improvements to meet the capacity needs of the projected closed conveyance system. Opportunities may exist during design to prioritize maintaining open conveyance ditches within the right-of-way where feasible to sustain similar times of concentration, but for the purposes of this preliminary analysis, the "worst-case" scenario of a completely closed pipe system is assumed, as it is the only feasible option with the typical proposed by FDOT. CD-1 is projected to require upsizing from double 24" RCP culverts to double 30" RCP culverts, and CD-2 is projected to require upsizing from double 30" RCP culverts to double 36" RCP culverts. The need for these improvements should be analyzed further during the design phase, once survey information is available and the offsite conveyance design is complete. As mentioned in section **5.4, Risk Evaluations**, it should be emphasized that the assumed application of a closed bypass conveyance system may increase downstream stages in Dunruss Creek, and could therefore adversely impact the risks associated with this project if not properly mitigated during the design phase. The cross drains should be reviewed in greater detail during the design phase, once survey information is available and a more thorough hydrologic method of analysis is utilized, to mitigate potential impacts to downstream water surface elevations. The onsite runoff from the project will be collected by curb inlets and attenuated in a stormwater management facility in post-development conditions to maintain pre-development discharge rates. Therefore, the reduction in time of concentration is not caused by onsite runoff. Please refer to the *Pond Siting Report* under separate cover for more information on how onsite runoff will be managed.

The anticipated floodplain encroachments due to the proposed roadway widening were calculated, and potential FPC sites were identified. The floodplain encroachment calculations are conservative due to the preliminary nature of this study and should be revised during design. During the design phase, floodplain compensation should be provided in ditches and stormwater management facilities to the maximum extent possible; the off-site FPC sites identified in this report should supplement any additional floodplain compensation needs.

There are six (6) proposed floodplain encroachment areas within the project limits. Three (3) off-site FPC sites were identified to compensate for the proposed encroachments. The FPC sites were selected based on the evaluation of several factors, including the total costs of each alternative, wetland impacts, habitat and environmental impacts, and hydraulic connectivity to the affected floodplains. A map showing the location of the FPC sites is available in **Appendix C**. Refer to **Table E-1** in the Executive Summary of this report for a summary of the recommended FPC sites.

7. References

- FDOT Drainage Manual (2025)
- FDOT Drainage Design Guide (2025)
- FDOT Project Development and Environment Manual (July 1, 2023)
- FEMA FIRMs for Collier and Lee Counties
- FEMA Flood Map Service Center
- Flood Insurance Studies (FIS) for Collier and Lee Counties
- Florida Department of Environmental Protection (FDEP) Geospatial Open Data
- National Geodetic Survey (NGS) Coordinate Conversion and Transformation Tool (NCAT)
- Environmental Resource Permit Applicant's Handbook Volume I (June 28, 2024)
- SFWMD Environmental Resource Permit Applicant's Handbook Volume II (2016)
- SFWMD ePermitting website
- Natural Resources Conservation Service (NRCS) Web Soil Surveys
- Florida Land Use Cover and Classification System (FLUCCS)

Appendix A | Figures

USGS Quadrangle Map for Bonita Springs

Proposed Typical Sections for Collier County

Proposed Typical Sections for the City of Bonita Springs

NRCS Soils Maps for Collier County and Lee County

FLUCCS Land Use Map

USGS Quadrangle Map
for Bonita Springs

U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

The National Map US Topo

BONITA SPRINGS QUADRANGLE
FLORIDA
7.5-MINUTE SERIES



Produced by the United States Geological Survey
North American Datum of 1983 (NAD83)
World Geodetic System of 1984 (WGS84). Projection and
1 000-meter grid:Universal Transverse Mercator, Zone 17R

This map is not a legal document. Boundaries may be generalized for this map scale. Private lands within government reservations may not be shown. Obtain permission before entering private lands.

Imagery	NAIP,	November 2019
Roads	U.S. Census Bureau,	2016
Names	GNIS,	1979 - 2020
Hydrography	National Hydrography Dataset,	2002 - 2019
Contours	National Elevation Dataset,	2019
Boundaries	Multiple sources; see metadata file	2018 - 2019
Public Land Survey System	BLM,	2020
Wetlands	FWS National Wetlands Inventory	2002

MN
GN
5°51'
104 MILS
0°22'
7 MILS
UTM GRID AND 2019 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

U.S. National Grid
100,000 - m Square ID
MK
Grid Zone Designation
17R

SCALE 1:24 000

1 0.5 0 KILOMETERS 1 2
1000 500 0 METERS 1000 2000
1 0.5 0 1
MILES
1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000
FEET

CONTOUR INTERVAL 5 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988

This map was produced to conform with the National Geospatial Program US Topo Product Standard.

FLORIDA
QUADRANGLE LOCATION

1 2 3
4
5 6
ADJOINING QUADRANGLES

1 Fort Myers Beach
2 Estero
3 Corkscrew NW
4 Corkscrew SW
5 Naples North
6 Belle Meade NW

ROAD CLASSIFICATION
Expressway
Secondary Hwy
Ramp
Local Connector
Local Road
4WD
Interstate Route
US Route
State Route

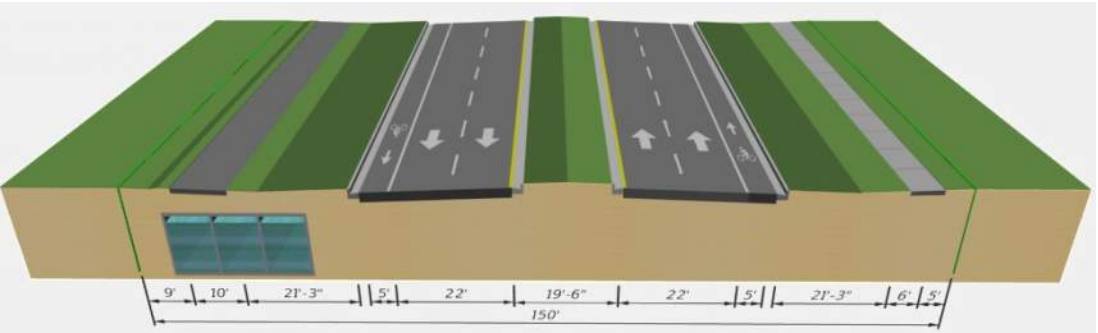
BONITA SPRINGS, FL
2021

764301636031 7
NSN 7 6430 16360317
NGA REF NO. USGSX24K4804

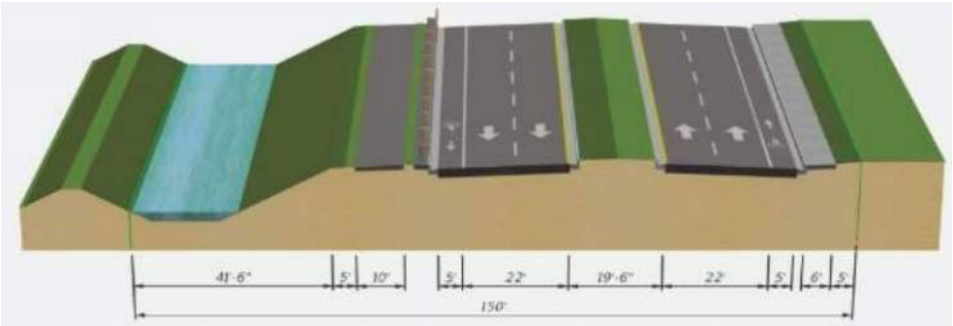
Proposed Typical Sections
for Collier County

FPID: 435110-1 Typical Sections

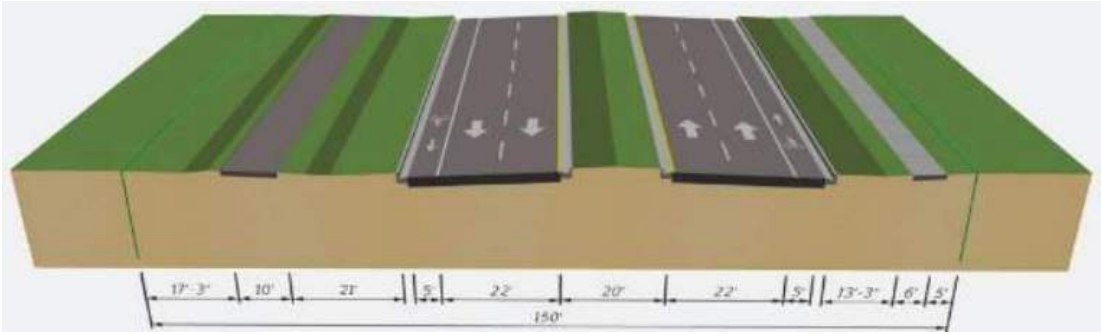
US 41 to 300’ North of Sterling Oaks Drive



300’ North of Sterling Oaks Drive to 1,000’ North of Sterling Oaks Drive



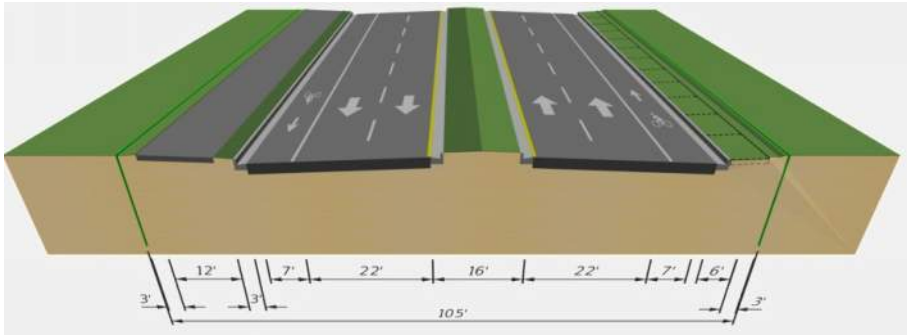
1,000’ North of Sterling Oaks Drive to Lee County Line



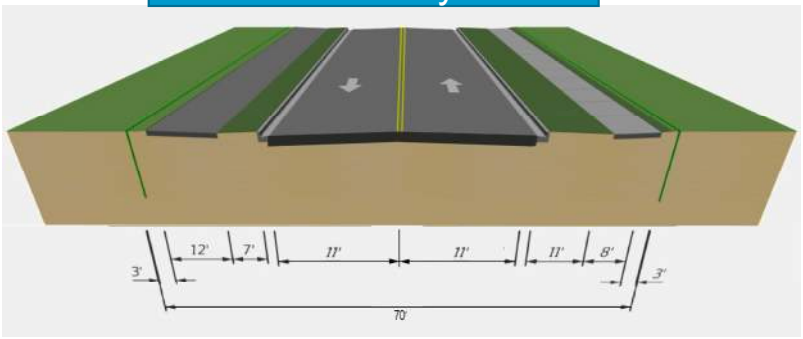
Proposed Typical Sections
for City of Bonita Springs

FPID: 435347-1 Typical Sections

Collier/Lee County Line to New Quadrant Roadway



New Quadrant Roadway



NRCS Soils Maps for
Collier County and Lee County



Legend

- Project Limits
- County Dividing Line

Collier County Soils

- 25 - Cypress Lake-Riviera-Copeland fine sands, frequently ponded, association, 0 to 1 perent slopes
- 32 - Urban land, 0 to 2 percent slopes
- 36 - Immokalee sand-Urban land complex, 0 to 2 percent slopes
- 39 - Satellite fine sand, 0 to 2 percent slopes
- 99 - Water
- 101 - Basinger fine sand-Urban land complex, 0 to 2 percent slopes
- 102 - Cypress Lake fine sand-Urban land complex, 0 to 2 percent slopes
- 103 - Cypress Lake-Riviera-Copeland fine sands, frequently ponded-Urban land association, 0 to 1 percent slopes
- 110 - Brynwood fine sand-Urban land complex, 0 to 2 percent slopes
- 111 - Brynwood-Cypress lake fine sands-Urban land association, 0 to 2 percent slopes
- 113 - Holopaw fine sand-Urban land complex, 0 to 2 percent slopes
- 115 - Holopaw-Basinger-Urban land complex, 0 to 2 perent slopes
- 116 - Holopaw-Okeelanta, ponded-Urban land assocaition, 0 to 1 percent slopes
- 117 - Immokalee fine sand-Urban land complex, 0 to 2 percent slopes
- 118 - Immokalee-Oldsmar, limestone substratum-Urban land complex, 0 to 2 percent slopes
- 120 - Malabar fine sand-Urban land complex, 0 to 2 percent slopes
- 121 - Matlacha-Cypress lake-Urban land complex, 0 to 2 percent slopes
- 122 - Myakka fine sand-Urban land complex, 0 to 2 percent slopes
- 124 - Myakka fine sand, ponded-Urban land complex, 0 to 1 percent slopes
- 128 - Pineda fine sand, limestone substratum-Urban land complex, 0 to 2 percent slopes
- 129 - Pineda-Riviera fine sands-Urban land association, 0 to 2 percent slopes
- 130 - Pomello fine sand-Urban land complex, 0 to 2 percent slopes
- 131 - Riviera fine sand, limestone substratum-Urban land complex, 0 to 2 percent slopes
- 132 - Riviera, limestone substratum-Copeland fine sand-Urban land association, 0 to 2 percent slopes
- 133 - Satellite fine sand-Urban land complex, 0 to 2 percent slopes

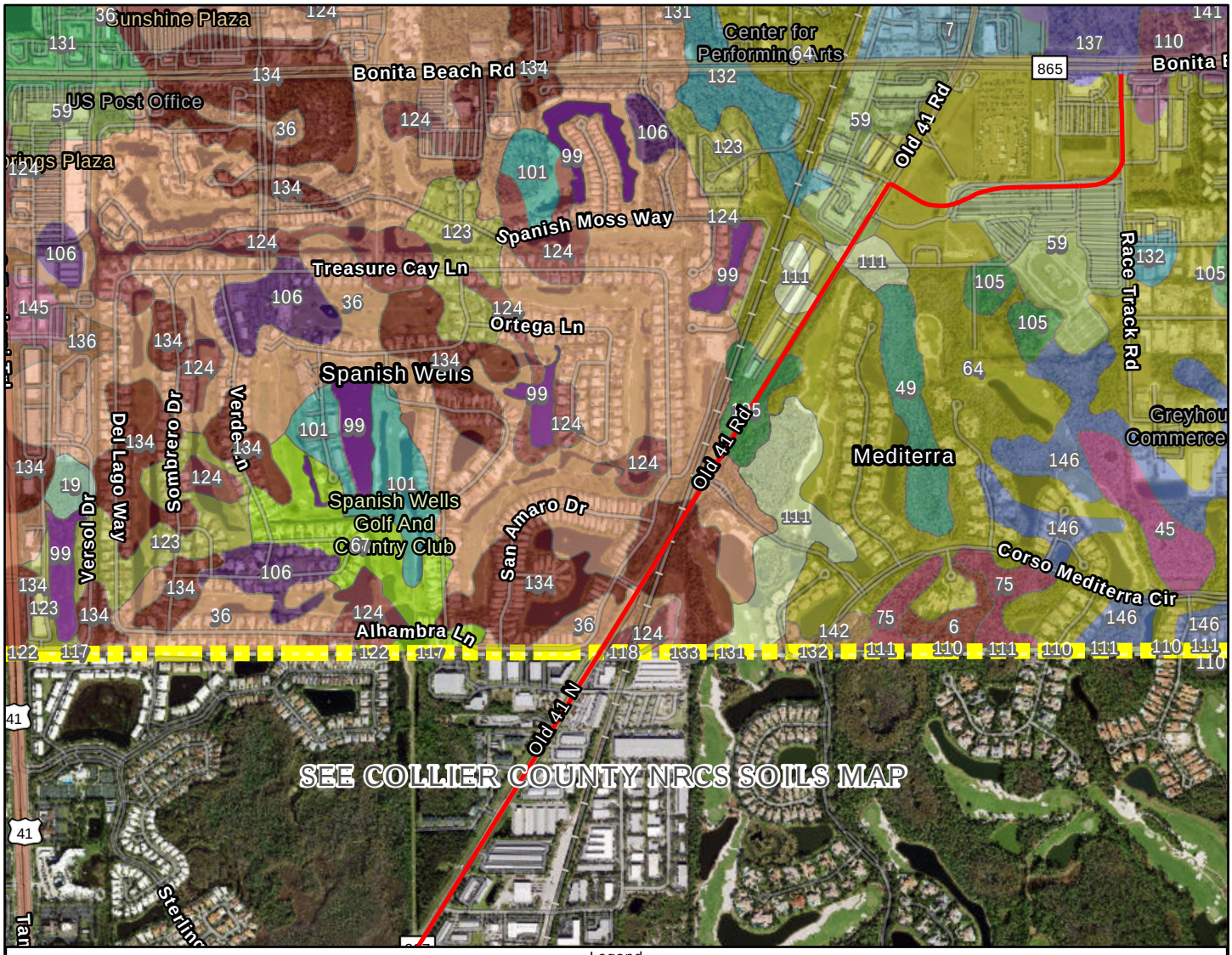
HNTB

CR 887 (Old US 41)
Project Development and Environment Study

NRCS Soils Map - Collier County

N

0 0.15 0.3 Mi



Legend

- Project Limits
- County Dividing Line

Lee County Soils

- 6 - Brynwood fine sand, wet, 0 to 2 percent slopes
- 7 - Matlacha gravelly fine sand-Urban land complex, 0 to 2 percent slopes
- 10 - Pompano fine sand, 0 to 2 percent slopes
- 19 - Gator muck, frequently ponded, 0 to 1 percent slopes
- 36 - Immokalee sand-Urban land complex, 0 to 2 percent slopes
- 45 - Copeland fine sandy loam, frequently ponded, 0 to 1 percent slopes
- 49 - Felda fine sand, frequently ponded, 0 to 1 percent slopes
- 53 - Myakka fine sand, frequently ponded, 0 to 1 percent slopes
- 59 - Urban land, 0 to 2 percent slopes
- 64 - Brynwood fine sand, wet-Urban land complex, 0 to 2 percent slopes
- 67 - Smyrna fine sand-Urban land complex, 0 to 2 percent slopes
- 75 - Brynwood fine sand, slough, 0 to 1 percent slopes
- 99 - Water
- 101 - Anclote sand, ponded-Urban land complex, 0 to 1 percent slopes
- 105 - Copeland fine sandy loam, ponded-Urban land complex, 0 to 1 percent slopes
- 106 - Daytona sand-Urban land complex, 0 to 5 percent slopes
- 110 - Felda fine sand-Urban land complex, 0 to 2 percent slopes
- 111 - Felda fine sand, ponded-Urban land complex, 0 to 1 percent slopes
- 117 - Immokalee fine sand-Urban land complex, 0 to 2 percent slopes (Collier)
- 118 - Immokalee-Oldsmar, limestone substratum-Urban land complex, 0 to 2 percent slopes (Collier)
- 122 - Myakka fine sand-Urban land complex, 0 to 2 percent slopes (Collier)
- 123 - Myakka fine sand-Urban land complex, 0 to 2 percent slopes
- 124 - Myakka fine sand, ponded-Urban land complex, 0 to 1 percent slopes
- 127 - Orsino fine sand-Urban land complex, 0 to 5 percent slopes
- 131 - Pompano fine sand-Urban land compex, 0 to 2 percent slopes
- 132 - Pompano fine sand, ponded-Urban land complex, 0 to 1 percent slopes
- 133 - Satellite fine sand-Urban land complex, 0 to 2 percent slopes (Collier)
- 134 - Satellite fine sand-Urban land complex, 0 to 2 percent slopes
- 136 - Valkaria fine sand-Urban land complex, 0 to 2 percent slopes
- 137 - Wabasso sand-Urban land complex, 0 to 2 percent slopes
- 138 - Wabasso sand, limestone substratum-Urban land complex, 0 to 2 percent slopes
- 141 - Cocoa fine sand-Urban land complex, 0 to 2 percent slopes
- 142 - Cypress Lake fine sand, slough-Urban land complex, 0 to 1 percent slopes
- 145 - Gator muck, ponded-Urban land complex, 0 to 1 percent slopes
- 146 - Brynwood fine sand, slough-Urban land complex, 0 to 1 percent slopes
- 149 - Valkaria fine sand, ponded-Urban land complex, 0 to 1 percent slopes

HNTB

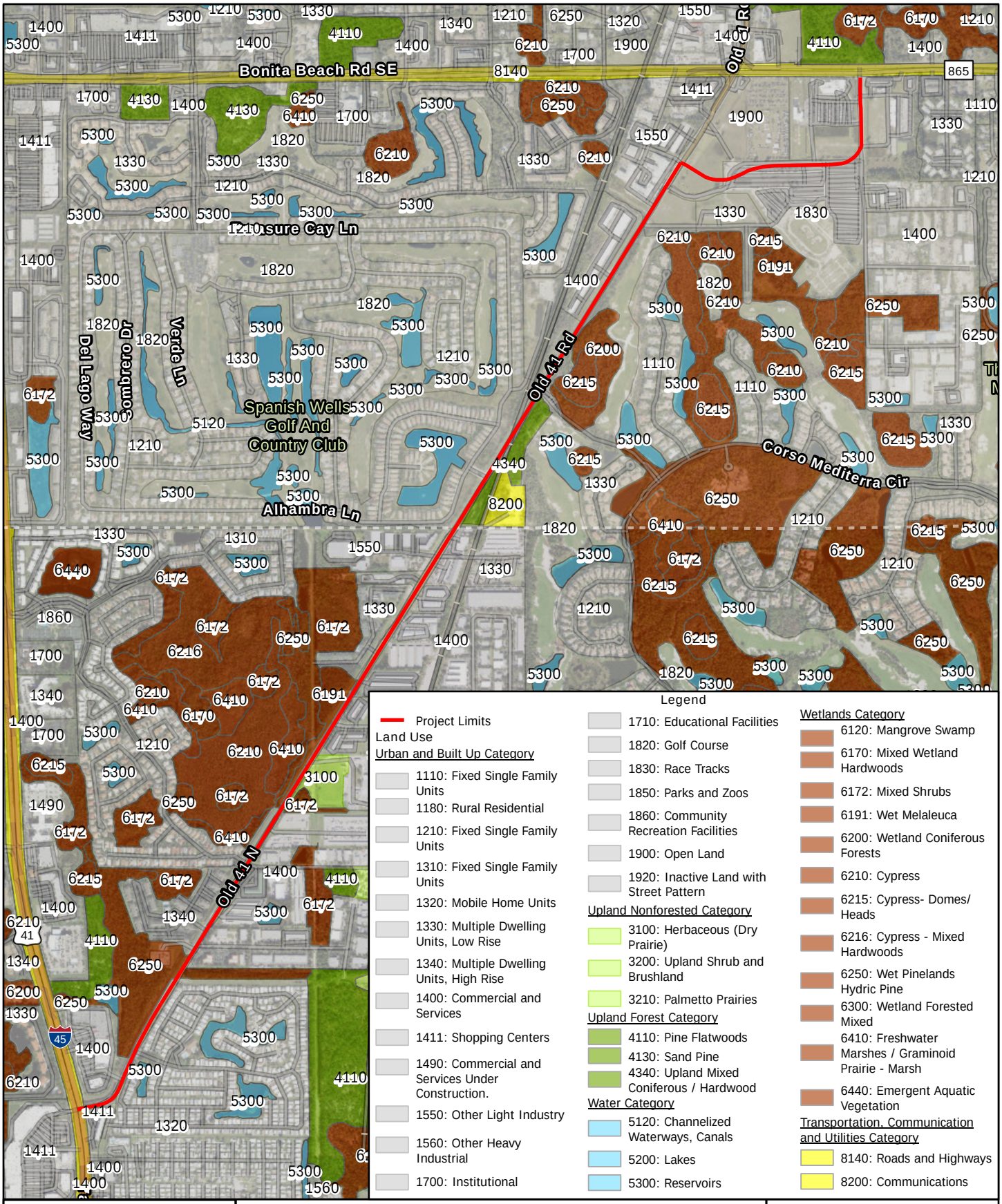
CR 887 (Old US 41)
Project Development and Environment Study

NRCS Soils Map - Lee County

N

0 0.15 0.3 Mi

FLUCCS Land Use Map



HNTB

CR 887 (Old US 41)
Project Development and Environment Study

FLUCCS Land Use Map

Appendix B | FEMA FIRMs

FIRM Panel 183

FIRM Panel 191

FIRM Panel 658

FIRM Panel 659



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT HTTPS://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) Zone A, V, A99
- With BFE or Depth Zone AE, AO, AH, VE, AR
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
- Future Conditions 1% Annual Chance Flood Hazard Zone X
- Area with Reduced Flood Risk due to Levee See Notes. Zone X
- Area with Flood Risk due to Levee Zone D

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard Zone X
- Area of Undetermined Flood Hazard Zone D

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 18.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
- Coastal Transect
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

For information and questions about this Flood Insurance Rate Map (FIRM), available products associated with this FIRM, including historic versions, the current map date for each FIRM panel, how to order products, or the National Flood Insurance Program (NFIP) in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Flood Map Service Center website at https://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.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Flood Map Service Center at the number listed above.

For community and countywide map dates refer to 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.

Base map information shown on this FIRM was provided in digital format by the Collier County GIS Services, United States Bureau of Land Management, and Federal Emergency Management Agency. Ortho imagery was produced by the National Agricultural Imagery Program in 2017 and has a 1 meter ground sample distance.

SCALE

N

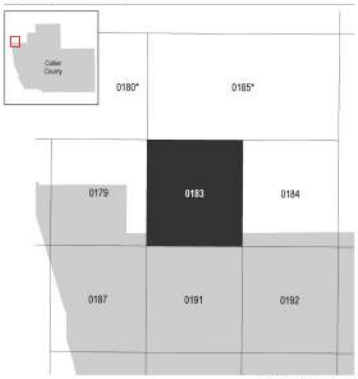
Map Projection: State Plane Transverse Mercator, Florida East Zone 0901; North American Datum 1983; Western Hemisphere; Vertical Datum: NAVD 88

1 inch = 500 feet 1:6,000

0 250 500 750 1,000 2,000 feet

0 125 250 500 meters

PANEL LOCATOR



*PANEL NOT PRINTED

FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

COLLIER COUNTY, FLORIDA

and Incorporated Areas

PANEL 183 OF 1225

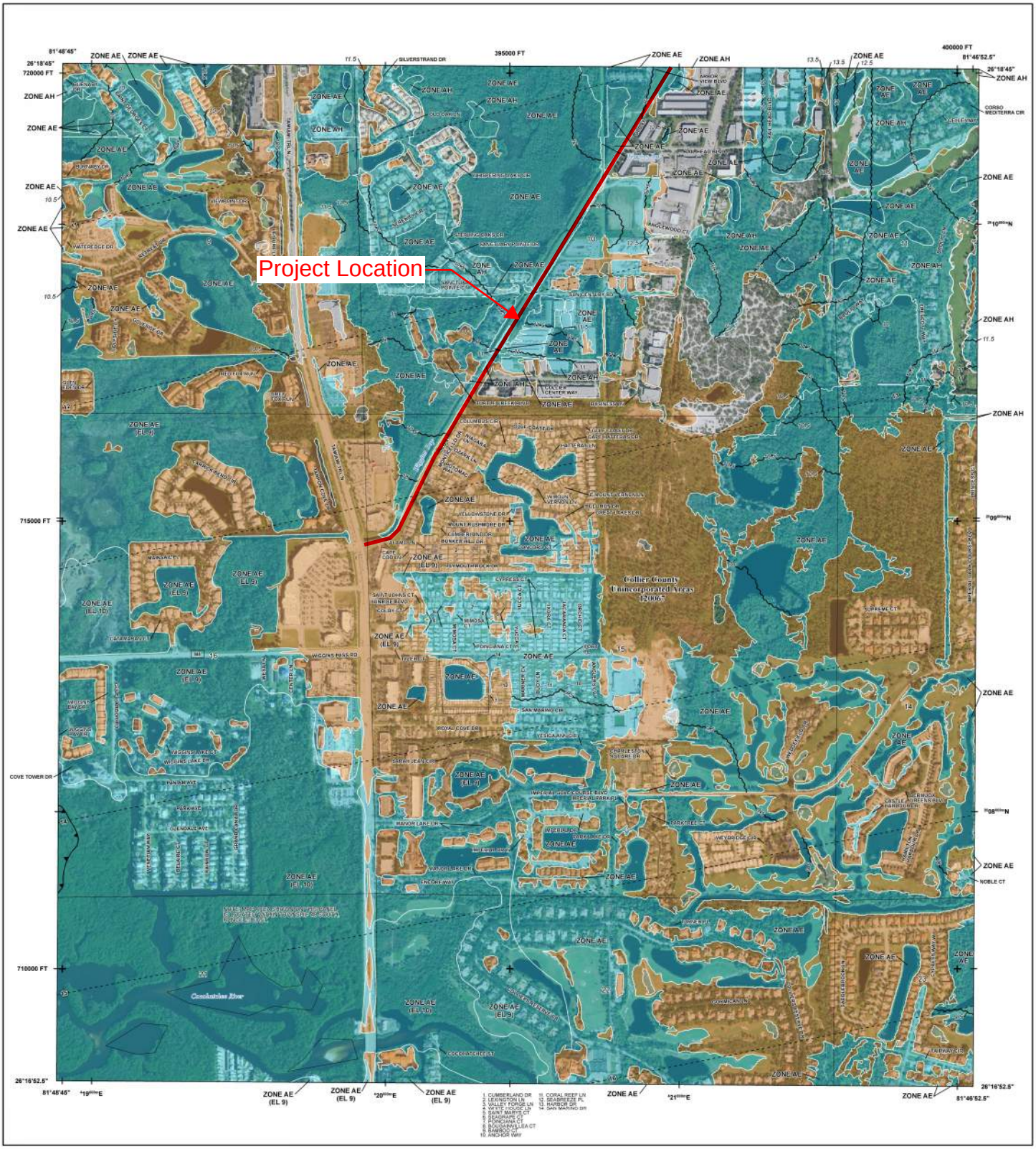
Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
COLLIER COUNTY	120067	0183	J

VERSION NUMBER 2.5.3.5

MAP NUMBER 12021C0183J

MAP REVISED FEBRUARY 8, 2024



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT

HTTPS://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS	Without Base Flood Elevation (BFE) Zone A, V, A99 With BFE or Depth Zone AE, AO, AH, VE, AR
	Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD	0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
	Future Conditions 1% Annual Chance Flood Hazard Zone X
	Area with Reduced Flood Risk due to Levee See Notes. Zone X
	Area with Flood Risk due to Levee Zone D
OTHER AREAS	NO SCREEN Area of Minimal Flood Hazard Zone X
	Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES	Channel, Culvert, or Storm Sewer
	Levee, Dike, or Floodwall
	18.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
	8 Coastal Transect
	Coastal Transect Baseline
OTHER FEATURES	Profile Baseline
	Hydrographic Feature
	513 Base Flood Elevation Line (BFE)
	Limit of Study
	Jurisdiction Boundary

NOTES TO USERS

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For community and countywide map dates refer to 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.

Base map information shown on this FIRM was provided in digital format by the Collier County GIS Services, United States Bureau of Land Management, and Federal Emergency Management Agency. Ortho imagery was produced by the National Agricultural Imagery Program in 2017 and has a 1 meter ground sample distance.

LIMIT OF MODERATE WAVE ACTION: Zone AE has been divided by a Limit of Moderate Wave Action (LiMWA). The LiMWA represents the approximate landward limit of the 1.5-foot breaking wave. The effects of wave hazards between Zone VE and the LiMWA (or between the shoreline and the LiMWA for areas where Zone VE is not identified) will be similar to, but less severe than, those in the Zone VE.

Limit of Moderate Wave Action (LiMWA)

SCALE

Map Projection: State Plane Transverse Mercator, Florida East Zone 1901; North American Datum 1983; Western Hemisphere; Vertical Datum: NAVD 88

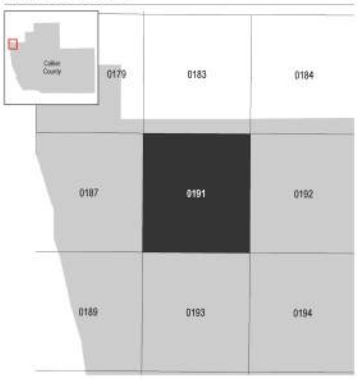
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1 inch = 500 feet 1:6,000

0 250 500 750 1,000 2,000 feet

0 125 250 500 meters

PANEL LOCATOR



FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

COLLIER COUNTY, FLORIDA

and Incorporated Areas

PANEL 191 OF 1225

Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
COLLIER COUNTY	120067	0191	J

VERSION NUMBER 2.5.3.5

MAP NUMBER 12021C0191J

MAP REVISED FEBRUARY 8, 2024



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT HTTPS://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) Zone A, V, A99
- With BFE or Depth Zone AE, AO, AH, VE, AR
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
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OTHER AREAS
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- Area of Undetermined Flood Hazard Zone D

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 18.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
- Coastal Transect
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

For information and questions about this Flood Insurance Rate Map (FIRM), available products associated with this FIRM, including historic versions, the current map date for each FIRM panel, how to order products, or the National Flood Insurance Program (NFIP) in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Flood Map Service Center website at https://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.

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For community and countywide map dates refer to 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.

Base map information shown on this FIRM was provided by Lee County, dated 2008 and 2010; the Florida Department of Transportation, dated 2017 and 2018; the U.S. Department of Agriculture, dated 2018; and the U.S. Department of Transportation, dated 2017.

SCALE

Map Projection: State Plane Transverse Mercator, Florida West Zone 0902; North American Datum 1983; Western Hemisphere; Vertical Datum: NAVD 88

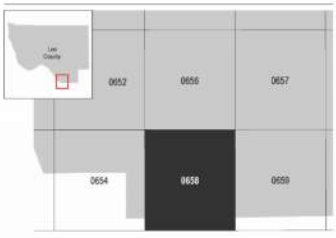
N

1 inch = 500 feet 1:6,000

0 250 500 750 1,000 2,000 feet

0 125 250 500 meters

PANEL LOCATOR



FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

LEE COUNTY, FLORIDA and Incorporated Areas

PANEL 658 OF 685

Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
BONITA SPRINGS, CITY OF	120680	0658	G

VERSION NUMBER 2.4.3.5

MAP NUMBER 12071C0658G

MAP REVISED NOVEMBER 17, 2022



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT HTTPS://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) Zone A, V, A99
- With BFE or Depth Zone AE, AO, AH, VE, AR
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
- Future Conditions 1% Annual Chance Flood Hazard Zone X
- Area with Reduced Flood Risk due to Levee See Notes. Zone X
- Area with Flood Risk due to Levee Zone D

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard Zone X
- Area of Undetermined Flood Hazard Zone D

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 18.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
- Coastal Transect
- Coastal Transect Baseline
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SCALE

Map Projection: State Plane Transverse Mercator, Florida West Zone 0902; North American Datum 1983; Vertical Datum: NAVD 88

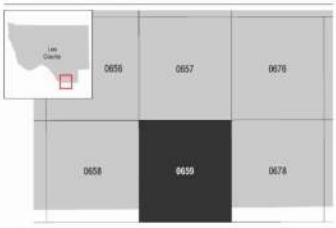
N

1 inch = 500 feet 1:6,000

0 250 500 750 1,000 2,000 feet

0 125 250 500 meters

PANEL LOCATOR



FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

LEE COUNTY, FLORIDA and Incorporated Areas

PANEL 659 OF 685

FEMA

Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
BONITA SPRINGS, CITY OF	120680	0659	G

VERSION NUMBER 2.4.3.5

MAP NUMBER 12071C0659G

MAP REVISED NOVEMBER 17, 2022

Appendix C | Floodplain Compensation (FPC) Analysis

Floodplain Encroachment Area Map

Calculations

0 100 500
Feet

FEA_10
1.00 AC.

FEA_10.5
0.92 AC.

FEA_11
1.82 AC.

FEA_11.5
0.78 AC.

FEA_12
6.04 AC.

FEA_12.5
2.04 AC.

ZONE AE
ELEV. 10

ZONE AE
ELEV. 10.5

ZONES AE & AH
ELEV. 11

ZONES AE & AH
ELEV. 11.5

ZONES AE & AH
ELEV. 12

ZONE AH
ELEV. 12.5

100-YR FLOODPLAIN

DRAINAGE EASEMENT

FPC 1
7.37 AC.

FPC 2
6.62 AC.

FPC 3
3.49 AC.

NOTES:
- SEE FEMA FIRM PANELS 12021C0191J AND 12021C0183J FOR MORE INFORMATION.
- "FEA_##" = FLOODPLAIN ENCROACHMENT AREA AT ## BASE FLOOD ELEVATION (BFE)

LEGEND
- FEA_10
- FEA_10.5
- FEA_11
- FEA_11.5
- FEA_12
- FEA_12.5
- BFE LINE

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
CR 887	COLLIER AND LEE	435110-1-22-01 435347-1-22-01

FLOODPLAIN COMPENSATION ANALYSIS EXHIBIT

SHEET NO.

Floodplain Compensation Analysis Summary

PROJECT TITLE:	Old US 41 PD&E			
PROJECT NUMBER:	85808-DS-001			**DATE**
FEA DESIGNATIONS:	FEA_10, FEA_10.5, FEA_11, FEA_11.5, FEA_12, FEA_12.5			
FPC DESIGNATIONS:	FPC 1, FPC 2, FPC 3, FPC 4	**MADE BY:**	JAG	3/15/2024
COUNTY:	Collier	**CHECKED BY:**	LVC	3/22/2024

Floodplain Encroachment Area (FEA) Summary

FEA Designation	From STA	To STA	High PGL El. (ft, NAVD)	BFE* (ft, NAVD)	Avg. SHWT (ft, NAVD)	FEA Area (ac)	FEA Depth (ft)	FEA Volume (ac-ft)
FEA_10	102+46	110+79	12.54	10.00	8.29	1.00	1.71	1.71
FEA_10.5	110+79	116+26	11.41	10.50	8.29	0.92	2.21	2.03
FEA_11	116+26	127+85	12.19	11.00	8.29	1.82	2.71	4.93
FEA_11.5	127+85	131+69	12.31	11.50	8.99	0.78	2.51	1.96
FEA_12	131+69	161+65	14.16	12.00	9.29	6.04	2.71	16.37
FEA_12.5	161+65	172+99	15.49	12.50	9.49	2.04	3.01	6.14

*Base Flood Elevation (BFE) references the 100 year floodplain elevation.

Total Floodplain Compensation (FPC) Volume Required: **33.14** **ac-ft**

FPC Designation	FPC Volume Provided	
FPC 1	10.85	ac-ft
FPC 2	15.89	ac-ft
FPC 3	7.48	ac-ft

Total FPC Volume Provided: **34.22** **ac-ft**

Notes:

- Existing embankment volumes have been excluded from the calculated FEA volumes above as an added degree of conservation due to the preliminary nature of this analysis.
- This analysis meets the criteria laid out in Section 3.6, "Flood Plain Encroachment" of the SFWMD ERP Applicant's Handbook Volume II (effective May 22, 2016).

Floodplain Compensation Calculations

PROJECT TITLE:	Old US 41 PD&E			
PROJECT NUMBER:	85808-DS-001			**DATE**
FEA DESIGNATION(S) SERVED:	FEA_10, FEA_10.5, FEA_11, FEA_11.5, FEA_12			
FPC DESIGNATION:	FPC 1	**MADE BY:**	JAG	3/15/2024
COUNTY:	Collier	**CHECKED BY:**	LVC	3/22/2024

Floodplain Compensation (FPC) Calculations

100-yr Floodplain Elevation (BFE)	11.00	ft
Average SHWT*	8.99	ft

Stage-Storage Calculations

ELEV. (ft, NAVD)		AREA (ac)	AVG AREA (ac)	Delta D (ft)	Delta storage (ac-ft)	Sum Storage (ac-ft)
13.00	Outside Berm	7.37				23.32
			6.66	1.00	6.66	
12.00	Inside Berm	5.95				16.66
			5.81	1.00	5.81	
11.00	BFE	5.67				**10.85**
			5.40	2.01	10.85	
8.99	Pond Bottom	5.12				0.00

Provided FPC Volume = 10.85 ac-ft.

* SHWT sourced from SFWMD Permit #11-01644-P (North Collier Industrial Center)

Floodplain Compensation Calculations

PROJECT TITLE:	Old US 41 PD&E			
PROJECT NUMBER:	85808-DS-001			**DATE**
FEA DESIGNATION(S) SERVED:	FEA_12, FEA_12.5			
FPC DESIGNATION:	FPC 2	**MADE BY:**	JAG	3/15/2024
COUNTY:	Collier	**CHECKED BY:**	LVC	3/22/2024

Floodplain Compensation (FPC) Calculations

100-yr Floodplain Elevation (BFE)	12.50	ft
Average SHWT*	9.29	ft

Stage-Storage Calculations

ELEV. (ft, NAVD)		AREA (ac)	AVG AREA (ac)	Delta D (ft)	Delta storage (ac-ft)	Sum Storage (ac-ft)
14.50	Outside Berm	6.62				27.34
			6.06	1.00	6.06	
13.50	Inside Berm	5.50				21.28
			5.39	1.00	5.39	
12.50	BFE	5.29				**15.89**
			4.95	3.21	15.89	
9.29	Pond Bottom	4.61				0.00

Provided FPC Volume = 15.89 ac-ft.

* SHWT sourced from SFWMD Permit #11-01042-S (Sterling Oaks)

Floodplain Compensation Calculations

PROJECT TITLE:	Old US 41 PD&E			
PROJECT NUMBER:	85808-DS-001			**DATE**
FEA DESIGNATION(S) SERVED:	FEA_12, FEA_12.5			
FPC DESIGNATION:	FPC 3	**MADE BY:**	JAG	3/15/2024
COUNTY:	Collier	**CHECKED BY:**	LVC	3/22/2024

Floodplain Compensation (FPC) Calculations

100-yr Floodplain Elevation (BFE)	12.50	ft
Average SHWT*	9.49	ft

Stage-Storage Calculations

ELEV. (ft, NAVD)		AREA (ac)	AVG AREA (ac)	Delta D (ft)	Delta storage (ac-ft)	Sum Storage (ac-ft)
14.50	Outside Berm	3.49				13.38
			3.15	1.00	3.15	
13.50	Inside Berm	2.81				10.23
			2.75	1.00	2.75	
12.50	BFE	2.68				**7.48**
			2.49	3.01	7.48	
9.49	Pond Bottom	2.29				0.00

Provided FPC Volume = 7.48 ac-ft.

* SHWT sourced from SFWMD Permit #11-01542-P (Somerset Palms Apartment Homes FKA Arbor View)

Appendix D | Cross Drain Analysis

Pre-Development Cross Drain Basin Map

Pre-Development Flood Data Table

EX_CD-1 Calculations

EX_CD-2 Calculations

EX_CD-3 Calculations

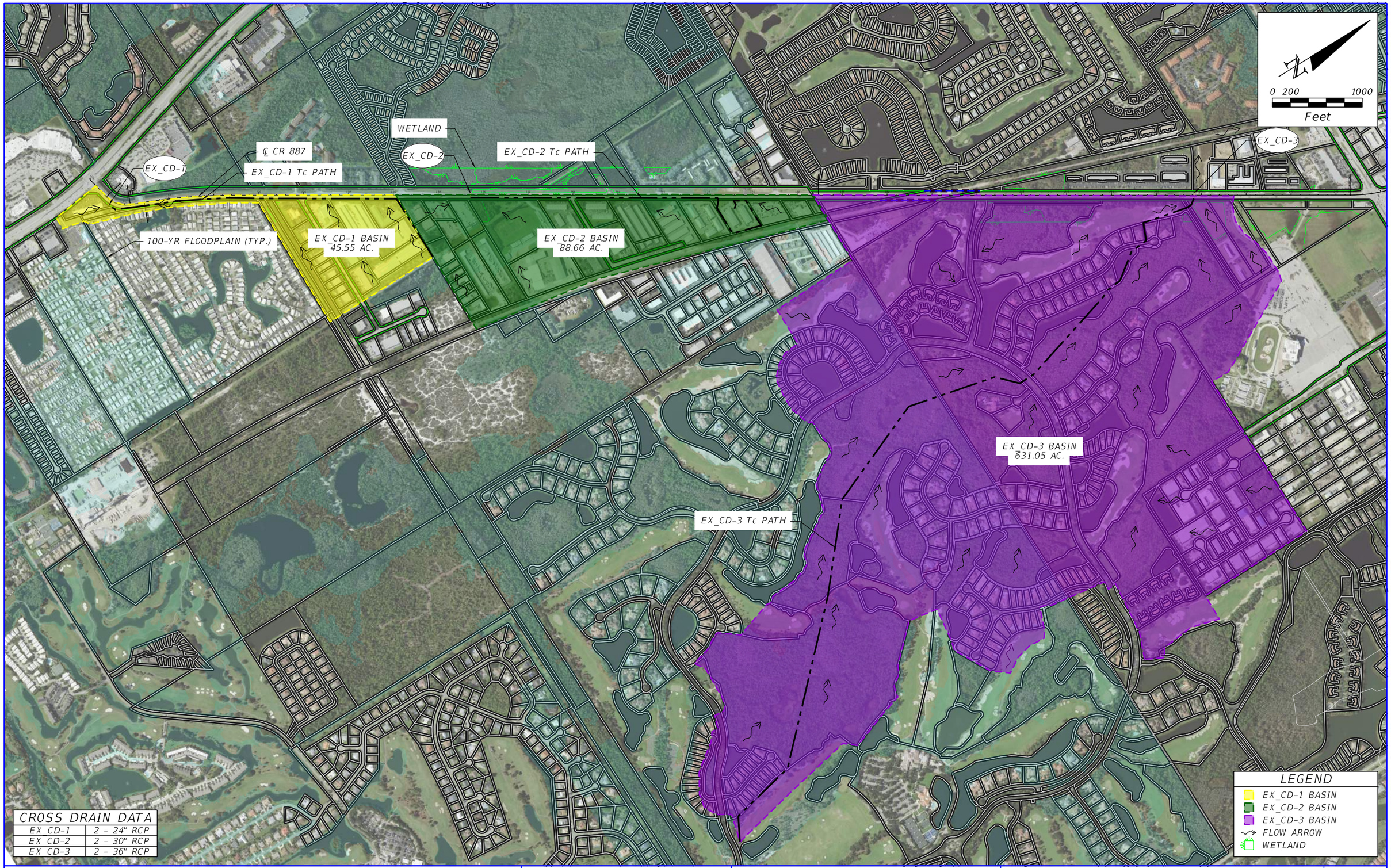
Post-Development Cross Drain Basin Map

Post-Development Flood Data Table

CD-1 Calculations

CD-2 Calculations

CD-3 Calculations



CROSS DRAIN DATA	
EX CD-1	2 - 24" RCP
EX CD-2	2 - 30" RCP
EX CD-3	2 - 36" RCP

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
CR 887	COLLIER AND LEE	435110-1-22-01 435347-1-22-01

PRE-DEVELOPMENT CROSS DRAIN BASIN MAP

SHEET NO.

jaglover 5/2/2025 1:03:24 PM Pre-Dev U:\Jobs\85808 GFDOT D1 US 41 PDE_ PSR_LHR\Exhibits\PreDev CD Basin Map.dgn

SUMMARY OF FLOOD DATA

DATE: 6/9/25

STRUCTURE NO.	STATION	DESIGN FLOOD		BASE FLOOD		OVERTOPPING FLOOD				GREATEST FLOOD	
		2% PROB	50 YR FREQ	1% PROB	100 YR FREQ					0.2% PROB	500 YR FREQ
		DISCHARGE	STAGE	DISCHARGE	STAGE	DISCHARGE	STAGE	PROB %	FREQ YR	DISCHARGE	STAGE
EX_CD-01	130+45	58.00	9.86	63.80	10.49	76.54	12.07	0.23%	441	78.50	12.07
EX_CD-02	143+58	66.50	11.31	74.90	11.78	88.70	12.62	0.26%	392	94.00	12.62
EX_CD-03	224+20	54.40	11.00	63.30	11.38	90.78	12.57	0.18%	547	86.70	12.39

NOTE: THE HYDRAULIC DATA IS SHOWN FOR INFORMATIONAL PURPOSES ONLY, TO INDICATE THE FLOOD DISCHARGES AND WATER SURFACE ELEVATIONS WHICH MAY BE ANTICIPATED IN ANY GIVEN YEAR. THIS DATA WAS GENERATED USING HIGHLY VARIABLE 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 OF 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 (CFS) AND STAGES ARE IN FEET, NAVD 88.

DEFINITIONS:

DESIGN FLOOD: UTILIZED TO ASSURE A STANDARD LEVEL OF HYDRAULIC PERFORMANCE.

BASE FLOOD: HAS A 1% CHANCE OF BEING EXCEEDED IN ANY YEAR (100 YR. FREQUENCY).

OVERTOPPING FLOOD: CAUSES FLOW OVER THE HIGHWAY, OVER A WATERSHED DIVIDE OR THRU EMERGENCY RELIEF STRUCTURES.

GREATEST FLOOD: HAS A 0.2% CHANCE OF BEING EXCEEDED IN ANY YEAR (500 YR. FREQUENCY).

PREPARED BY: HNTB Corporation

DATE: 6/9/25

REVISIONS					STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			PRE-DEVELOPMENT FLOOD DATA TABLE	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		

EX_CD-1
Calculations

CROSS DRAIN CALCULATIONS

HNTB Project No. 85808-DS-001 County: Collier Prepared by: JAG Date: 5/2/2025
Description: Old US 41 PD&E Checked by: LVC Date: 5/8/2025

EX_CD-1 STA 103+45.00 Design Flood: 50 Yr Conditions: Existing

1. Contributing Areas

See Table B-4 & -5, FDOT Drainage Design Guide

LAND USE	Area (Ac.)	"C" Value	$C_{adj.}$	$C_i A_i$
Commercial and Industrial	31.88	0.85	0.85	27.10
Pasture, Grass and farmland	13.67	0.20	0.24	3.28
Totals	45.55			30.38

2. Weighted Runoff Coefficient, C

Weighted runoff Coefficient, $C = \frac{\sum C_i A_i}{A}$ = 0.67

3. Time of Concentration

See Chapter 2, FDOT Drainage Design Guide

$t_{1(Min)} = \frac{0.93 * L^{0.6} * n^{0.6}}{i^{0.4} * s^{0.3}}$

L = 100 L = Flow length (ft); < 100 ft
n = 0.012 n = Mannings Roughness (Table B-1)
i= 11.62 i = Rainfall Intensity (in/hr)
S = 0.004 S = Average slope (ft/ft)

$t_{1(Min)}$ = 2.04

B. Shallow Channel Flow (t_2)

$V = k * S^{0.5}$

S= 0.0005 S=Slope (ft/ft)
k= 6.962 k = Constant, Figure B-3
L = 1068 L = Length of Flow path, ft

V (ft/s) = 0.16

$t_{2(Min)}$ = 114.34

C. Main Channel Flow

$V = 1.486/n * R^{0.67} * S^{0.5}$

n = 0.042 n = Mannings Roughness (Table 2.2)
R= 0.95 Hydraulic Radius (Area/Perimeter)
S = 0.00047 S = Average slope (ft/ft)
L = 2824 L = Length of Flow path, ft

V (ft/s) = 0.74

$t_{3(Min)}$ = 63.51

Total Tc = 179.89 Mins

4. 50-Year Storm Rainfall Intensity

Intensity is calculated from NOAA Atlas 14 Data

Rainfall Intensity, I_{50} = 1.90 in/hr

5A. Calculate Design Event Event (IDF Curves)

Q_{50} = C * I_{50} * Area
58.0 CFS

Q_{100} = C * I_{100} * Area
63.8 CFS

Q_{500} = C * I_{500} * Area
78.5 CFS

From NOAA Atlas 14 Data
I_{100} = 2.09 in/hr
I_{500} = 2.57 in/hr

HY-8 Culvert Analysis Report

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 58.00 cfs

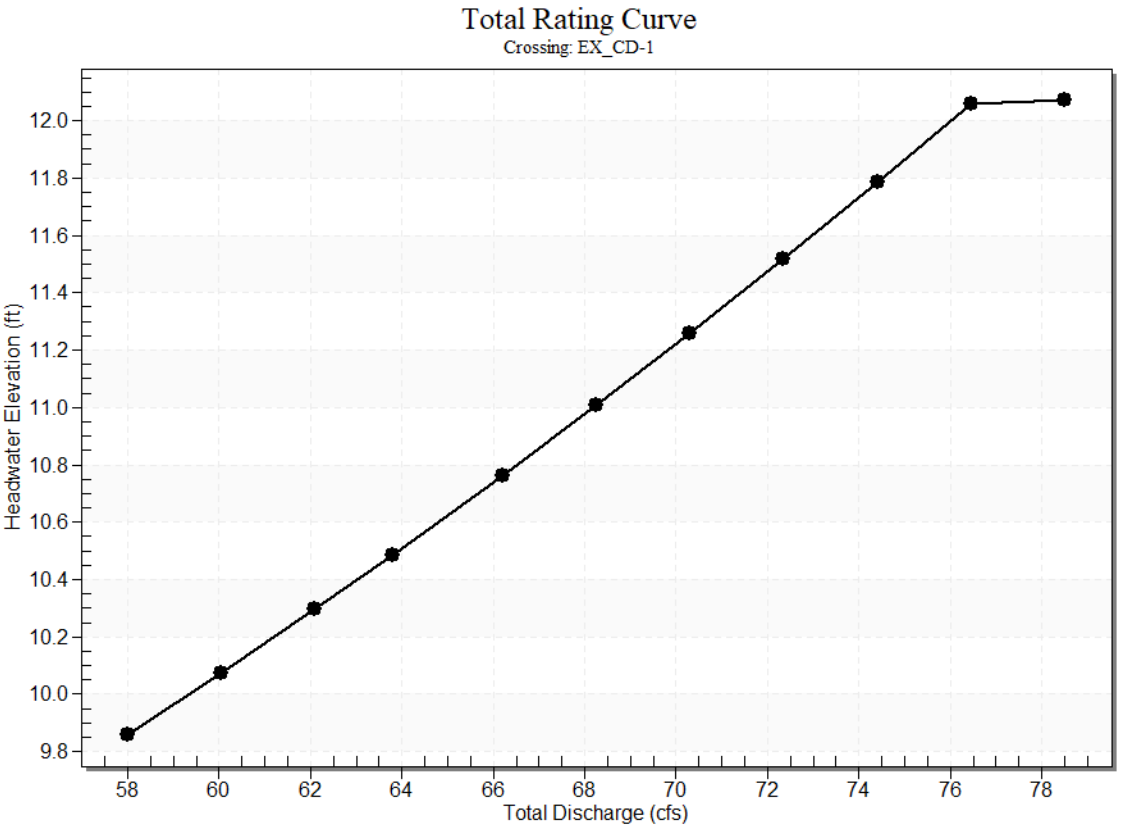
Design Flow: 63.80 cfs

Maximum Flow: 78.50 cfs

Table 1 - Summary of Culvert Flows at Crossing: EX_CD-1

Headwater Elevation (ft)	Total Discharge (cfs)	EX_CD-1 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
9.86	58.00	58.00	0.00	1
10.07	60.05	60.05	0.00	1
10.30	62.10	62.10	0.00	1
10.49	63.80	63.80	0.00	1
10.76	66.20	66.20	0.00	1
11.01	68.25	68.25	0.00	1
11.26	70.30	70.30	0.00	1
11.52	72.35	72.35	0.00	1
11.78	74.40	74.40	0.00	1
12.06	76.45	76.45	0.00	1
12.07	78.50	76.55	1.17	23
12.07	76.54	76.54	0.00	Overtopping

Rating Curve Plot for Crossing: EX_CD-1



Culvert Data: EX_CD-1

Table 1 - Culvert Summary Table: EX_CD-1

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
58.00 cfs	58.00 cfs	9.86	3.94	4.990	4-FFf	1.40	1.85	2.00	4.01	9.23	0.00
60.05 cfs	60.05 cfs	10.07	4.12	5.204	4-FFf	1.44	1.86	2.00	4.01	9.56	0.00
62.10 cfs	62.10 cfs	10.30	4.31	5.426	4-FFf	1.48	1.88	2.00	4.01	9.88	0.00
63.80 cfs	63.80 cfs	10.49	4.46	5.616	4-FFf	1.51	1.89	2.00	4.01	10.15	0.00
66.20 cfs	66.20 cfs	10.76	4.69	5.892	4-FFf	1.56	1.90	2.00	4.01	10.54	0.00
68.25 cfs	68.25 cfs	11.01	4.89	6.136	4-FFf	1.61	1.91	2.00	4.01	10.86	0.00
70.30 cfs	70.30 cfs	11.26	5.09	6.388	4-FFf	1.66	1.84	2.00	4.01	11.19	0.00
72.35 cfs	72.35 cfs	11.52	5.30	6.647	4-FFf	1.73	1.78	2.00	4.01	11.51	0.00
74.40 cfs	74.40 cfs	11.78	5.52	6.914	4-FFf	2.00	1.98	2.00	4.01	11.84	0.00
76.45 cfs	76.45 cfs	12.06	5.73	7.188	4-FFf	2.00	2.00	2.00	4.01	12.17	0.00
78.50 cfs	76.55 cfs	12.07	5.74	7.201	4-FFf	2.00	2.00	2.00	4.01	12.18	0.00

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

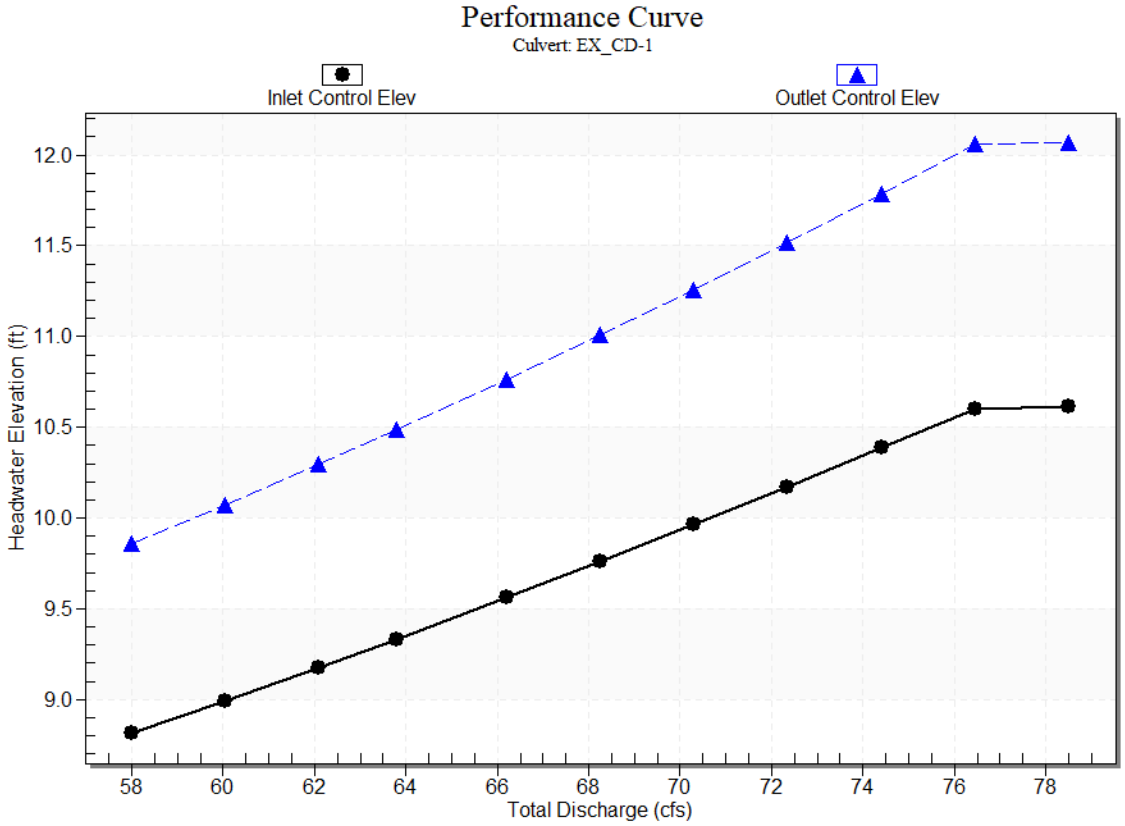
Inlet Elevation (invert): 4.87 ft,

Outlet Elevation (invert): 2.87 ft

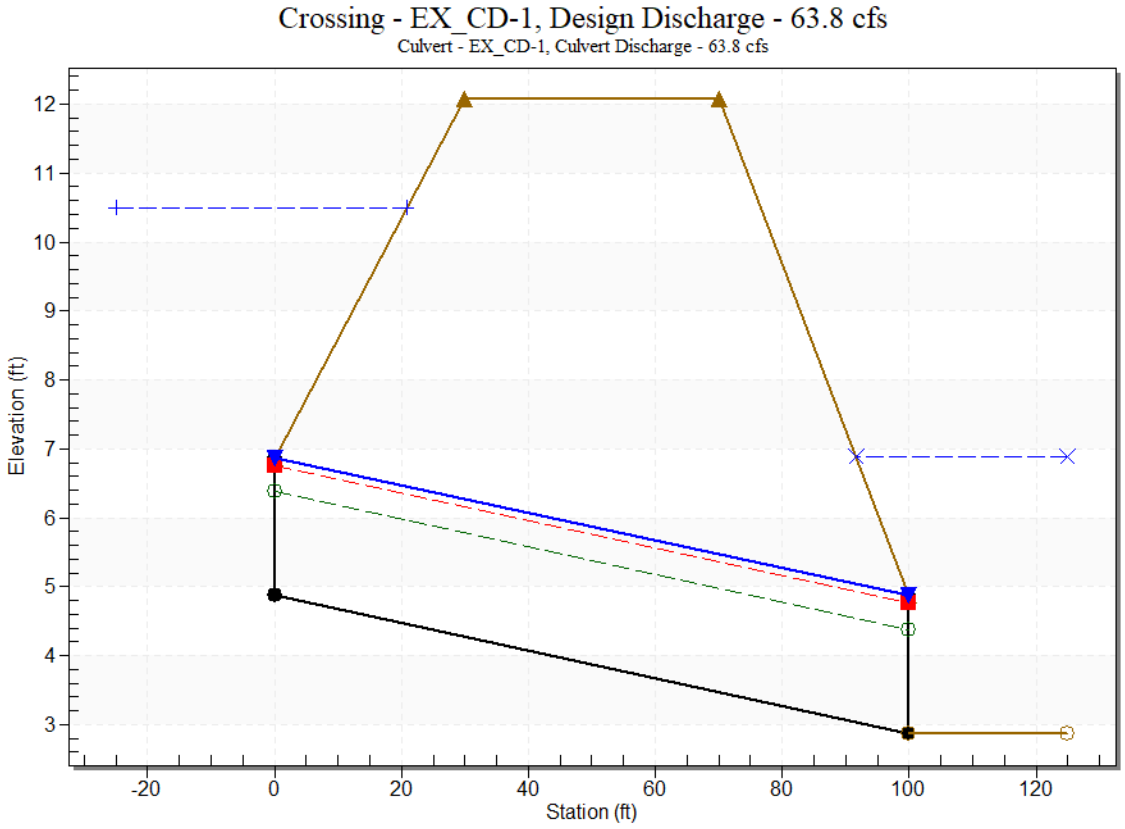
Culvert Length: 100.02 ft,

Culvert Slope: 0.0200

Culvert Performance Curve Plot: EX_CD-1



Water Surface Profile Plot for Culvert: EX_CD-1



Site Data - EX_CD-1

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 4.87 ft

Outlet Station: 100.00 ft

Outlet Elevation: 2.87 ft

Number of Barrels: 2

Culvert Data Summary - EX_CD-1

Barrel Shape: Circular

Barrel Diameter: 2.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Grooved End in Headwall (Ke=0.2)

Inlet Depression: None

Tailwater Data for Crossing: EX_CD-1

Table 2 - Downstream Channel Rating Curve (Crossing: EX_CD-1)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
58.00	6.88	4.01
60.05	6.88	4.01
62.10	6.88	4.01
63.80	6.88	4.01
66.20	6.88	4.01
68.25	6.88	4.01
70.30	6.88	4.01
72.35	6.88	4.01
74.40	6.88	4.01
76.45	6.88	4.01
78.50	6.88	4.01

Tailwater Channel Data - EX_CD-1

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 6.88 ft

Roadway Data for Crossing: EX_CD-1

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 100.00 ft

Crest Elevation: 12.07 ft

Roadway Surface: Paved

Roadway Top Width: 40.00 ft

EX_CD-2
Calculations

CROSS DRAIN CALCULATIONS

HNTB Project No. 85808-DS-001 County: Collier Prepared by: JAG Date: 5/2/2025
Description: Old US 41 PD&E Checked by: LVC Date: 5/8/2025

EX_CD-2 STA 103+45.00 Design Flood: 50 Yr Conditions: Existing

1. Contributing Areas

See Table B-4 & -5, FDOT Drainage Design Guide

LAND USE	Area (Ac.)	"C" Value	$C_{adj.}$	$C_i A_i$
Commercial and Industrial	66.50	0.75	0.75	49.88
Pasture, Grass and farmland	22.16	0.20	0.24	5.32
Totals	88.66			55.19

2. Weighted Runoff Coefficient, C

Weighted runoff Coefficient, $C = \frac{\sum C_i A_i}{A}$ = 0.62

3. Time of Concentration

See Chapter 2, FDOT Drainage Design Guide

$t_{1(Min)} = \frac{0.93 * L^{0.6} * n^{0.6}}{i^{0.4} * s^{0.3}}$

L = 100 L = Flow length (ft); < 100 ft
n = 0.012 n = Mannings Roughness (Table B-1)
i= 11.66 i = Rainfall Intensity (in/hr)
S = 0.005 S = Average slope (ft/ft)

$t_{1(Min)}$ = 1.90

B. Shallow Channel Flow (t_2)

$V = k * S^{0.5}$

S= 0.0001 S=Slope (ft/ft)
k= 6.962 k = Constant, Figure B-3
L = 1228 L = Length of Flow path, ft

V (ft/s) = 0.07

$t_{2(Min)}$ = 293.98

C. Main Channel Flow

$V = 1.486/n * R^{0.67} * S^{0.5}$

n = 0.042 n = Mannings Roughness (Table 2.2)
R= 0.95 Hydraulic Radius (Area/Perimeter)
S = 0.0005 S = Average slope (ft/ft)
L = 2483 L = Length of Flow path, ft

V (ft/s) = 0.76

$t_{3(Min)}$ = 54.14

Total Tc = 350.02 Mins

4. 50-Year Storm Rainfall Intensity

Intensity is calculated from NOAA Atlas 14 Data

Rainfall Intensity, I_{50} = 1.21 in/hr

5A. Calculate Design Event Event (IDF Curves)

Q_{50} = C * I_{50} * Area
66.5 CFS

Q_{100} = C * I_{100} * Area
74.9 CFS

Q_{500} = C * I_{500} * Area
94.0 CFS

From NOAA Atlas 14 Data
I_{100} = 1.36 in/hr
I_{500} = 1.71 in/hr

HY-8 Culvert Analysis Report

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 66.50 cfs

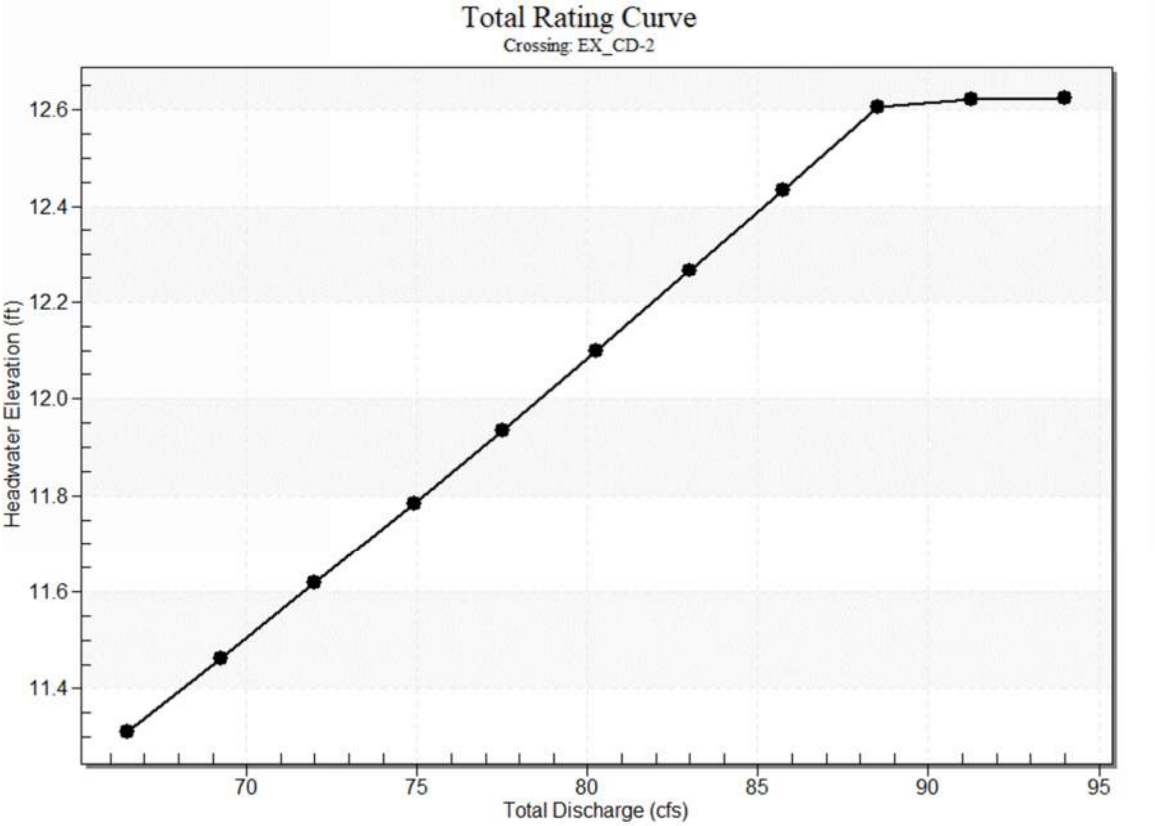
Design Flow: 74.90 cfs

Maximum Flow: 94.00 cfs

Table 1 - Summary of Culvert Flows at Crossing: EX_CD-2

Headwater Elevation (ft)	Total Discharge (cfs)	EX_CD-2 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
11.31	66.50	66.50	0.00	1
11.46	69.25	69.25	0.00	1
11.62	72.00	72.00	0.00	1
11.78	74.90	74.90	0.00	1
11.94	77.50	77.50	0.00	1
12.10	80.25	80.25	0.00	1
12.27	83.00	83.00	0.00	1
12.43	85.75	85.75	0.00	1
12.61	88.50	88.50	0.00	1
12.62	91.25	87.82	2.54	19
12.62	94.00	86.83	6.42	4
12.62	88.70	88.70	0.00	Overtopping

Rating Curve Plot for Crossing: EX_CD-2



Culvert Data: EX_CD-2

Table 1 - Culvert Summary Table: EX_CD-2

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
66.50 cfs	66.50 cfs	11.31	3.15	3.711	4-FFf	2.50	1.96	2.50	2.60	6.77	0.97
69.25 cfs	69.25 cfs	11.46	3.26	3.863	4-FFf	2.50	2.00	2.50	2.66	7.05	0.98
72.00 cfs	72.00 cfs	11.62	3.39	4.018	4-FFf	2.50	2.03	2.50	2.71	7.33	0.99
74.90 cfs	74.90 cfs	11.78	3.52	4.184	4-FFf	2.50	2.07	2.50	2.77	7.63	1.00
77.50 cfs	77.50 cfs	11.94	3.64	4.336	4-FFf	2.50	2.10	2.50	2.81	7.89	1.01
80.25 cfs	80.25 cfs	12.10	3.77	4.499	4-FFf	2.50	2.13	2.50	2.86	8.17	1.02
83.00 cfs	83.00 cfs	12.27	3.91	4.665	4-FFf	2.50	2.16	2.50	2.91	8.45	1.03
85.75 cfs	85.75 cfs	12.43	4.06	4.835	4-FFf	2.50	2.19	2.50	2.96	8.73	1.04
88.50 cfs	88.50 cfs	12.61	4.20	5.007	4-FFf	2.50	2.21	2.50	3.01	9.01	1.05
91.25 cfs	87.82 cfs	12.62	4.17	5.022	4-FFf	2.50	2.21	2.50	3.06	8.94	1.06
94.00 cfs	86.83 cfs	12.62	4.11	5.024	4-FFf	2.50	2.20	2.50	3.10	8.84	1.07

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

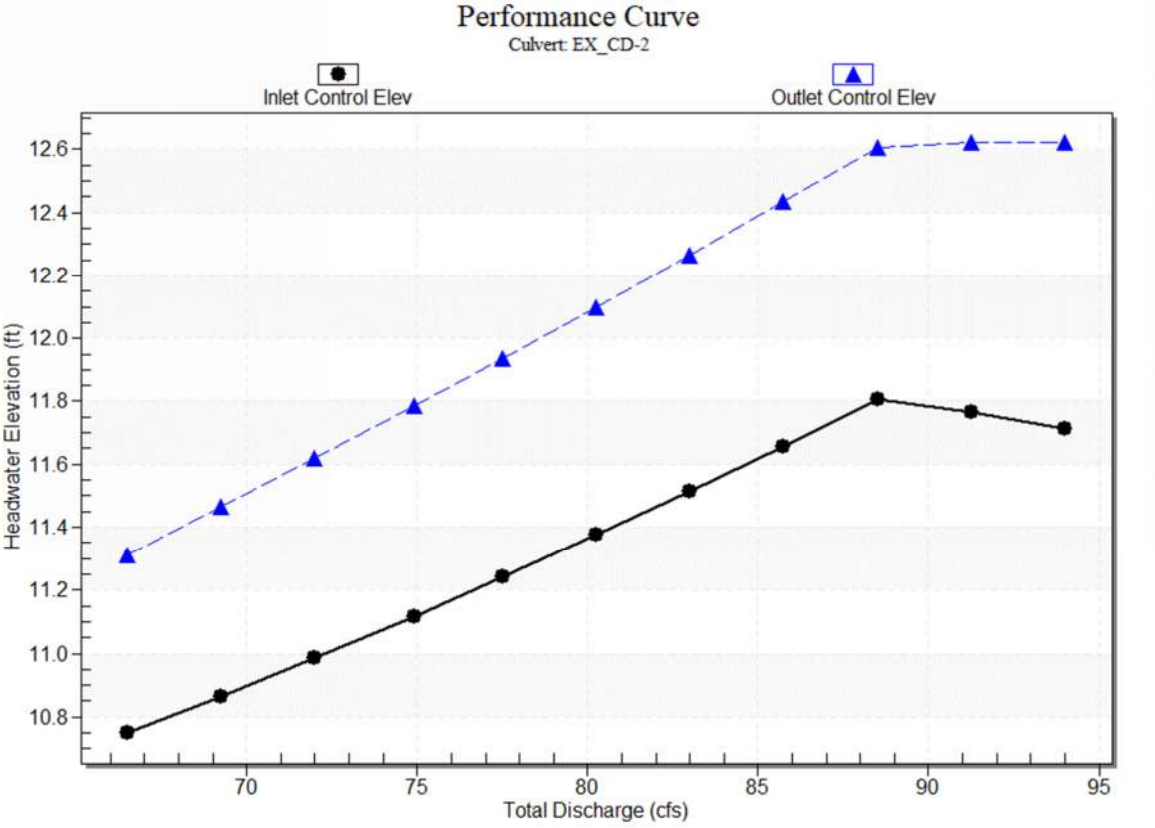
Inlet Elevation (invert): 7.60 ft,

Outlet Elevation (invert): 7.55 ft

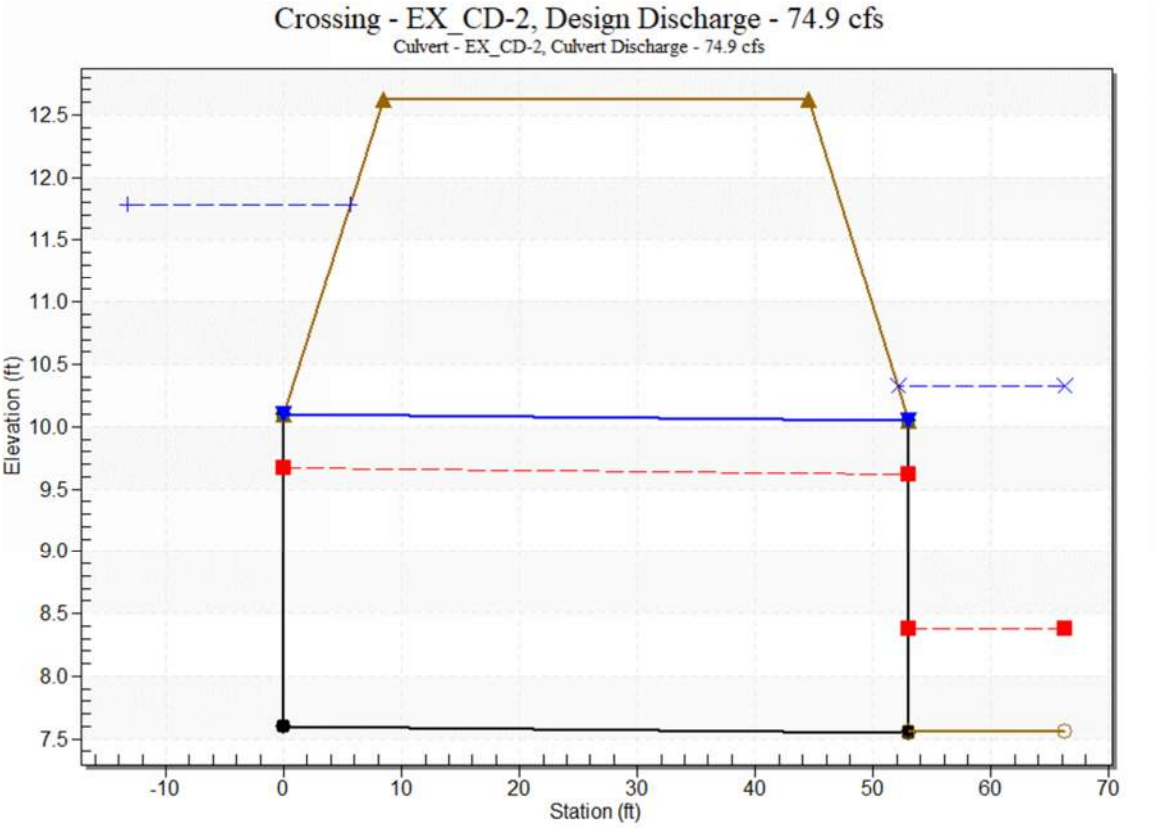
Culvert Length: 53.00 ft,

Culvert Slope: 0.0009

Culvert Performance Curve Plot: EX_CD-2



Water Surface Profile Plot for Culvert: EX_CD-2



Site Data - EX_CD-2

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 7.60 ft

Outlet Station: 53.00 ft

Outlet Elevation: 7.55 ft

Number of Barrels: 2

Culvert Data Summary - EX_CD-2

Barrel Shape: Circular

Barrel Diameter: 2.50 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Grooved End in Headwall (Ke=0.2)

Inlet Depression: None

Tailwater Data for Crossing: EX_CD-2

Table 2 - Downstream Channel Rating Curve (Crossing: EX_CD-2)

Flow (cfs)	Water Surface Elev (ft)	Velocity (ft/s)	Depth (ft)	Shear (psf)	Froude Number
66.50	10.16	2.60	0.97	0.02	0.12
69.25	10.22	2.66	0.98	0.02	0.13
72.00	10.27	2.71	0.99	0.02	0.13
74.90	10.33	2.77	1.00	0.02	0.13
77.50	10.37	2.81	1.01	0.02	0.13
80.25	10.42	2.86	1.02	0.02	0.13
83.00	10.47	2.91	1.03	0.02	0.13
85.75	10.52	2.96	1.04	0.02	0.13
88.50	10.57	3.01	1.05	0.02	0.13
91.25	10.62	3.06	1.06	0.02	0.13
94.00	10.66	3.10	1.07	0.02	0.13

Tailwater Channel Data - EX_CD-2

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 16.00 ft

Side Slope (H:V): 4.00 (_:1)

Channel Slope: 0.0001

Channel Manning's n: 0.0230

Channel Invert Elevation: 7.56 ft

Roadway Data for Crossing: EX_CD-2

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 100.00 ft

Crest Elevation: 12.62 ft

Roadway Surface: Paved

Roadway Top Width: 36.00 ft

EX_CD-3
Calculations

CROSS DRAIN CALCULATIONS

HNTB Project No. 85808-DS-001 County: Collier Prepared by: JAG Date: 3/6/2024
Description: Old US 41 PD&E Checked by: LVC Date: 3/27/2025

EX_CD-3 STA 224+20.00 Design Flood: 50 Yr Conditions: Existing

1. Contributing Areas

See Table B-4 & -5, FDOT Drainage Design Guide

LAND USE	Area (Ac.)	"C" Value	$C_{adj.}$	$C_i A_i$
SFR -0.5 ac +	**243.43**	0.35	0.42	102.24
Rooftops and pavement	**21.20**	0.95	0.95	20.14
Pasture, Grass and farmland	**150.62**	0.20	0.24	36.15
Woodlands	**215.80**	0.15	0.18	38.84
Totals	631.05			197.37

2. Weighted Runoff Coefficient, C

Weighted runoff Coefficient, $C = \frac{\sum C_i A_i}{A}$ = 0.31

3. Time of Concentration

See Chapter 2, FDOT Drainage Design Guide

$$t_{1(Min)} = \frac{0.93 * L^{0.6} * n^{0.6}}{i^{0.4} * s^{0.3}}$$

L = 100 L = Flow length (ft); < 100 ft
n = 0.15 n = Mannings Roughness (Table B-1)
i= 10.60 i = Rainfall Intensity (in/hr)
S = 0.005 S = Average slope (ft/ft)

$t_{1(Min)}$ = 9.00

B. Shallow Channel Flow (t_2)

$V = k * S^{0.5}$

S= 0.0001 S=Slope (ft/ft)
k= 6.962 k = Constant, Figure B-3
L = 953 L = Length of Flow path, ft

V (ft/s) = 0.07

$t_{2(Min)}$ = 228.14

C. Main Channel Flow

$V = 1.486/n * R^{0.67} * S^{0.5}$

n = 0.2 n = Mannings Roughness (Table 2.2)
R= 1.21 Hydraulic Radius (Area/Perimeter)
S = 0.00005 S = Average slope (ft/ft)
L = 8634 L = Length of Flow path, ft

V (ft/s) = 0.06

$t_{3(Min)}$ = 2410.58

Total Tc = 2647.72 Mins

4. 50-Year Storm Rainfall Intensity

Intensity is calculated from NOAA Atlas 14 Data

Rainfall Intensity, I_{50} = 0.28 in/hr

5A. Calculate Design Event Event (IDF Curves)

Q_{50} = C * I_{50} * Area
54.4 CFS

Calculated by IDF Equations

Q_{100} = C * I_{100} * Area
63.3 CFS

From NOAA Atlas 14 Data
I_{100} = 0.32 in/hr
I_{500} = 0.44 in/hr

Q_{500} = C * I_{500} * Area
86.7 CFS

HY-8 Culvert Analysis Report

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 54.40 cfs

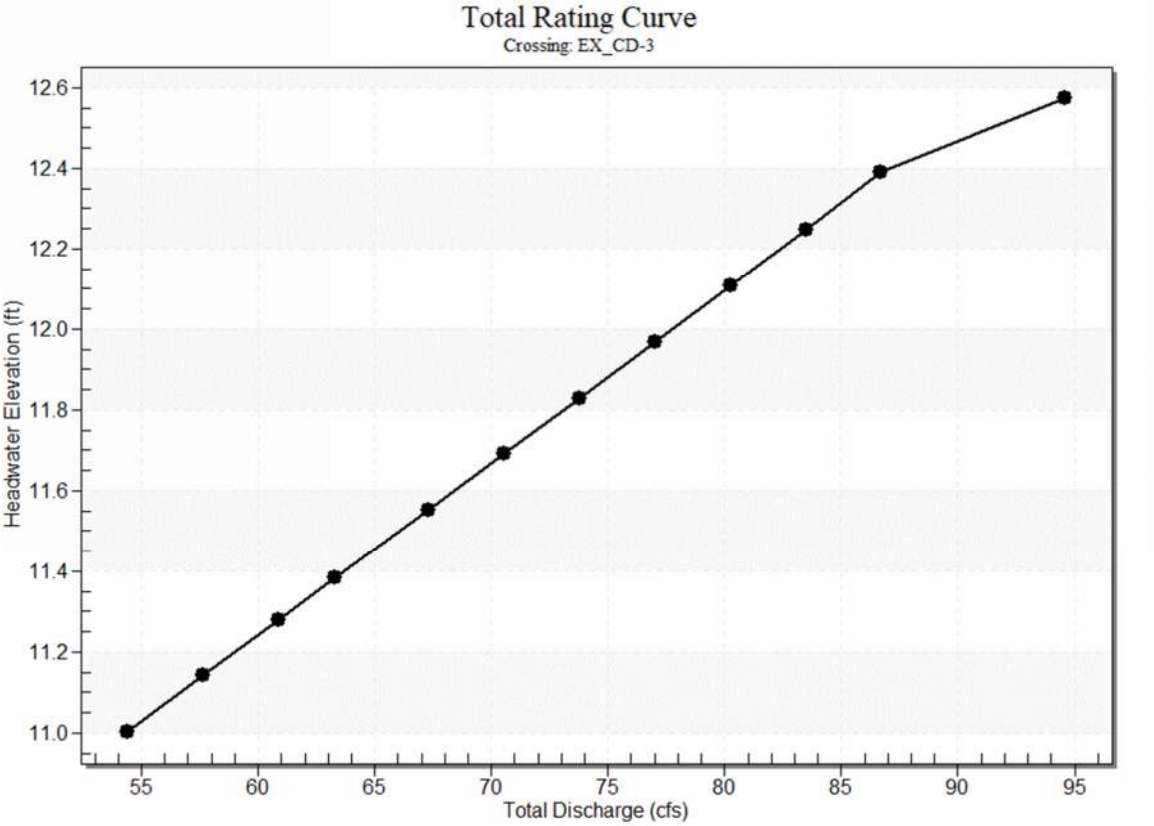
Design Flow: 63.30 cfs

Maximum Flow: 86.70 cfs

Table 1 - Summary of Culvert Flows at Crossing: EX_CD-3

Headwater Elevation (ft)	Total Discharge (cfs)	EX_CD-3 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
11.00	54.40	54.40	0.00	1
11.14	57.63	57.63	0.00	1
11.28	60.86	60.86	0.00	1
11.38	63.30	63.30	0.00	1
11.55	67.32	67.32	0.00	1
11.69	70.55	70.55	0.00	1
11.83	73.78	73.78	0.00	1
11.97	77.01	77.01	0.00	1
12.11	80.24	80.24	0.00	1
12.25	83.47	83.47	0.00	1
12.39	86.70	86.70	0.00	1
12.57	90.78	90.76	0.00	Overtopping

Rating Curve Plot for Crossing: EX_CD-3



Culvert Data: EX_CD-3

Table 1 - Culvert Summary Table: EX_CD-3

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
54.40 cfs	54.40 cfs	11.00	2.41	3.094	4-FFf	1.43	1.69	3.00	3.16	3.85	0.60
57.63 cfs	57.63 cfs	11.14	2.49	3.231	4-FFf	1.48	1.74	3.00	3.25	4.08	0.61
60.86 cfs	60.86 cfs	11.28	2.58	3.369	4-FFf	1.53	1.79	3.00	3.34	4.30	0.62
63.30 cfs	63.30 cfs	11.38	2.64	3.472	4-FFf	1.57	1.82	3.00	3.40	4.48	0.63
67.32 cfs	67.32 cfs	11.55	2.74	3.643	4-FFf	1.63	1.88	3.00	3.51	4.76	0.64
70.55 cfs	70.55 cfs	11.69	2.82	3.781	4-FFf	1.67	1.93	3.00	3.59	4.99	0.65
73.78 cfs	73.78 cfs	11.83	2.90	3.919	4-FFf	1.72	1.98	3.00	3.67	5.22	0.65
77.01 cfs	77.01 cfs	11.97	2.98	4.058	4-FFf	1.77	2.02	3.00	3.75	5.45	0.66
80.24 cfs	80.24 cfs	12.11	3.06	4.198	4-FFf	1.82	2.06	3.00	3.83	5.68	0.67
83.47 cfs	83.47 cfs	12.25	3.15	4.338	4-FFf	1.86	2.10	3.00	3.90	5.90	0.68
86.70 cfs	86.70 cfs	12.39	3.24	4.479	4-FFf	1.91	2.14	3.00	3.98	6.13	0.68

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

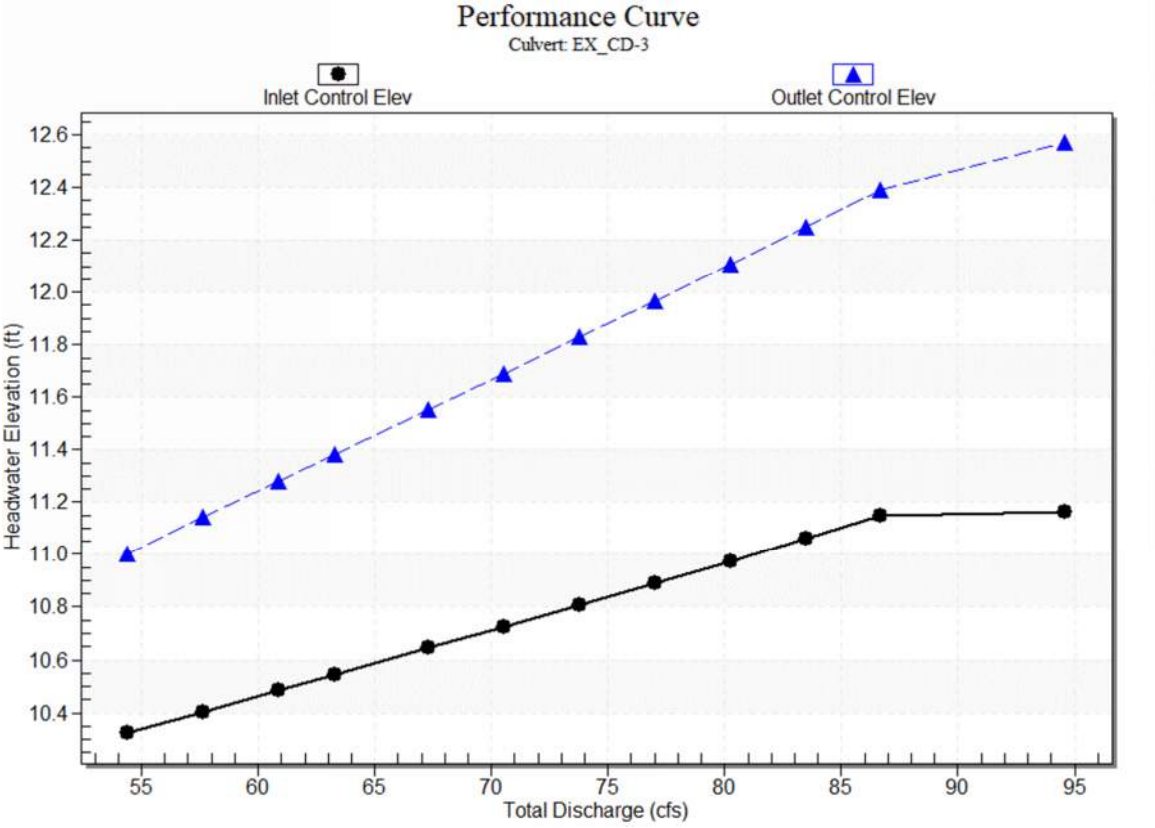
Inlet Elevation (invert): 7.91 ft,

Outlet Elevation (invert): 7.48 ft

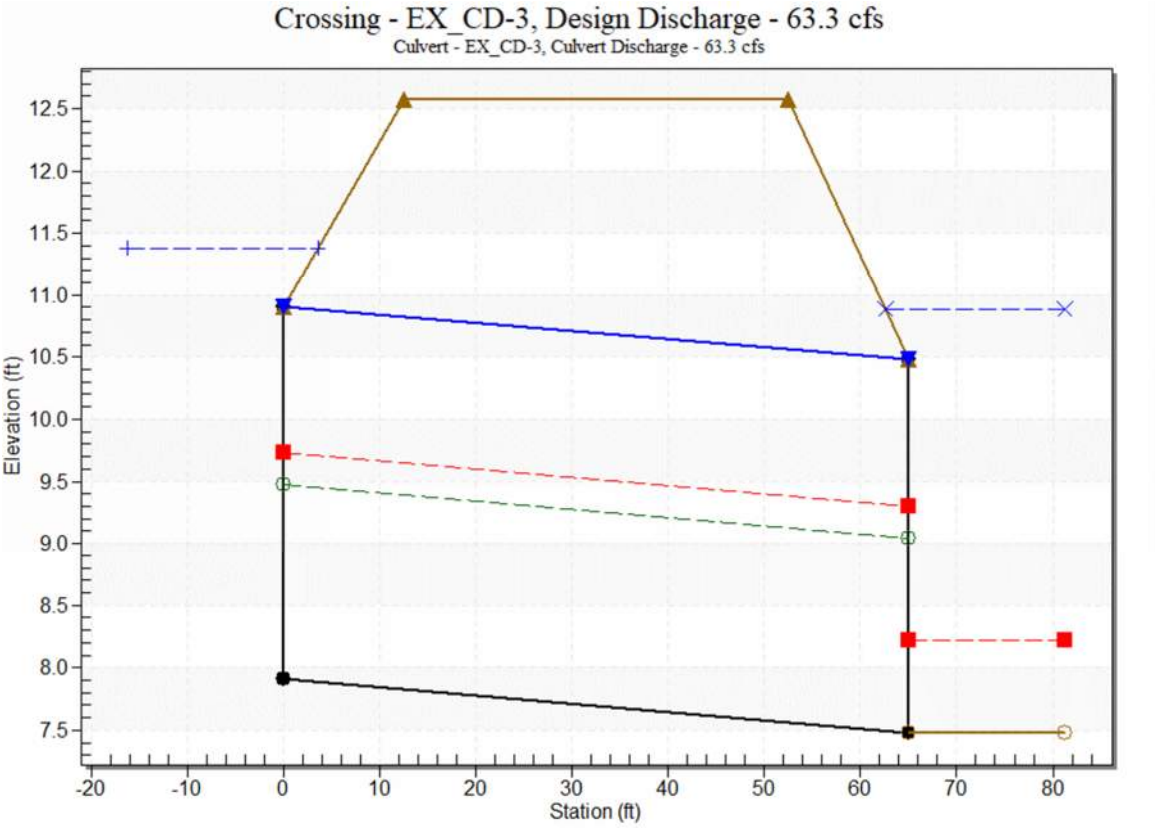
Culvert Length: 65.00 ft,

Culvert Slope: 0.0066

Culvert Performance Curve Plot: EX_CD-3



Water Surface Profile Plot for Culvert: EX_CD-3



Site Data - EX_CD-3

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 7.91 ft

Outlet Station: 65.00 ft

Outlet Elevation: 7.48 ft

Number of Barrels: 2

Culvert Data Summary - EX_CD-3

Barrel Shape: Circular

Barrel Diameter: 3.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Grooved End in Headwall

Inlet Depression: None

Tailwater Data for Crossing: EX_CD-3

Table 2 - Downstream Channel Rating Curve (Crossing: EX_CD-3)

Flow (cfs)	Water Surface Elev (ft)	Velocity (ft/s)	Depth (ft)	Shear (psf)	Froude Number
54.40	10.64	3.16	0.60	0.20	0.07
57.63	10.73	3.25	0.61	0.20	0.07
60.86	10.82	3.34	0.62	0.21	0.07
63.30	10.88	3.40	0.63	0.21	0.07
67.32	10.99	3.51	0.64	0.22	0.07
70.55	11.07	3.59	0.65	0.22	0.07
73.78	11.15	3.67	0.65	0.23	0.07
77.01	11.23	3.75	0.66	0.23	0.07
80.24	11.31	3.83	0.67	0.24	0.07
83.47	11.38	3.90	0.68	0.24	0.07
86.70	11.46	3.98	0.68	0.25	0.07

Tailwater Channel Data - EX_CD-3

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 16.00 ft

Side Slope (H:V): 4.00 (_:1)

Channel Slope: 0.0010

Channel Manning's n: 0.1300

Channel Invert Elevation: 7.48 ft

Roadway Data for Crossing: EX_CD-3

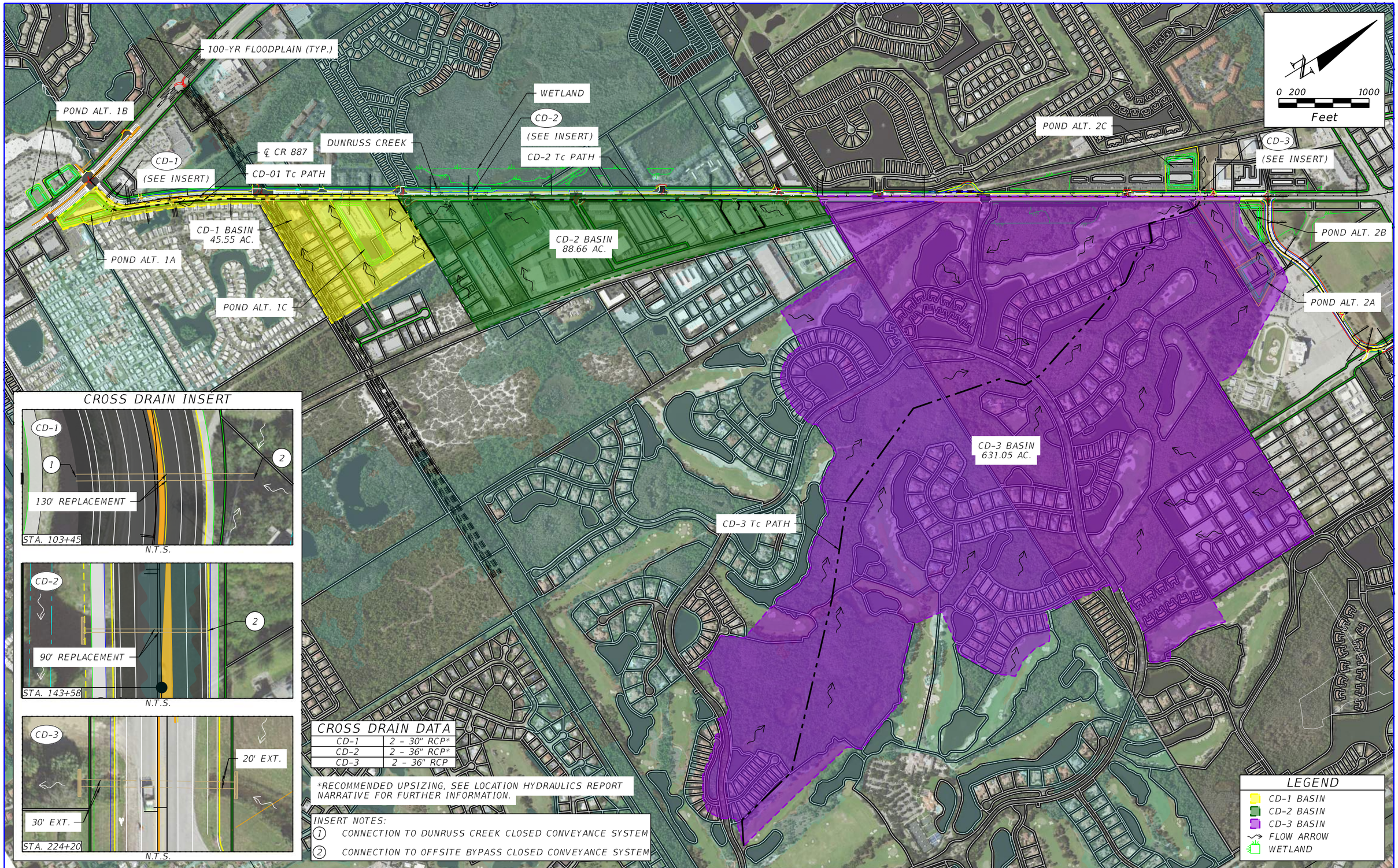
Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 100.00 ft

Crest Elevation: 12.57 ft

Roadway Surface: Paved

Roadway Top Width: 40.00 ft



CROSS DRAIN INSERT

N.T.S.

N.T.S.

N.T.S.

CROSS DRAIN DATA

CD-1	2 - 30" RCP*
CD-2	2 - 36" RCP*
CD-3	2 - 36" RCP

*RECOMMENDED UPSIZING, SEE LOCATION HYDRAULICS REPORT NARRATIVE FOR FURTHER INFORMATION.

INSERT NOTES:

1. CONNECTION TO DUNRUSS CREEK CLOSED CONVEYANCE SYSTEM
2. CONNECTION TO OFFSITE BYPASS CLOSED CONVEYANCE SYSTEM

LEGEND

- CD-1 BASIN
- CD-2 BASIN
- CD-3 BASIN
- FLOW ARROW
- WETLAND

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
CR 887	COLLIER AND LEE	435110-1-22-01 435347-1-22-01

POST-DEVELOPMENT CROSS DRAIN BASIN MAP

SHEET NO.

SUMMARY OF FLOOD DATA

DATE: 6/9/25

STRUCTURE NO.	STATION	DESIGN FLOOD		BASE FLOOD		OVERTOPPING FLOOD				GREATEST FLOOD	
		2% PROB	50 YR FREQ	1% PROB	100 YR FREQ					0.2% PROB	500 YR FREQ
		DISCHARGE	STAGE	DISCHARGE	STAGE	DISCHARGE	STAGE	PROB %	FREQ YR	DISCHARGE	STAGE
CD-01	130+45	72.90	8.78	80.30	9.18	120.57	12.07	0.11%	909	98.00	10.31
CD-02	143+58	75.00	11.09	83.80	11.44	111.23	12.62	0.17%	590	104.60	12.32
CD-03	224+20	54.40	10.87	63.30	11.28	90.85	12.57	0.18%	548	86.70	12.37

NOTE: THE HYDRAULIC DATA IS SHOWN FOR INFORMATIONAL PURPOSES ONLY, TO INDICATE THE FLOOD DISCHARGES AND WATER SURFACE ELEVATIONS WHICH MAY BE ANTICIPATED IN ANY GIVEN YEAR. THIS DATA WAS GENERATED USING HIGHLY VARIABLE 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 OF 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 (CFS) AND STAGES ARE IN FEET, NAVD 88.

DEFINITIONS:

DESIGN FLOOD: UTILIZED TO ASSURE A STANDARD LEVEL OF HYDRAULIC PERFORMANCE.

BASE FLOOD: HAS A 1% CHANCE OF BEING EXCEEDED IN ANY YEAR (100 YR. FREQUENCY).

OVERTOPPING FLOOD: CAUSES FLOW OVER THE HIGHWAY, OVER A WATERSHED DIVIDE OR THRU EMERGENCY RELIEF STRUCTURES.

GREATEST FLOOD: HAS A 0.2% CHANCE OF BEING EXCEEDED IN ANY YEAR (500 YR. FREQUENCY).

PREPARED BY: HNTB Corporation

DATE: 6/9/25

NOTE: DISCHARGES FOR CD-01 AND CD-02 INCREASED IN POST-DEVELOPMENT CONDITIONS DUE TO A REDUCTION IN TCs RESULTING FROM A DIFFERENCE IN THE HYDRAULIC CHARACTERISTICS BETWEEN THE EXISTING GRASSED DITCHES AND RECOMMENDED CLOSED PIPE SYSTEM. FURTHER EVALUATIONS ARE RECOMMENDED FOR FUTURE DESIGN PHASES TO DECREASE FLOWS IN POST-DEVELOPMENT CONDITIONS, SEE THE LOCATIONS HYDRAULICS REPORT FOR MORE INFORMATION.

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID

POST-DEVELOPMENT FLOOD DATA TABLE

SHEET NO.

CD-1
Calculations

CROSS DRAIN CALCULATIONS

HNTB Project No. 85808-DS-001 County: Collier Prepared by: JAG Date: 3/6/2024
Description: Old US 41 PD&E Checked by: LVC Date: 3/27/2025

CD-1 STA 103+45.00 Design Flood: 50 Yr Conditions: Proposed

1. Contributing Areas

See Table B-4 & -5, FDOT Drainage Design Guide

LAND USE	Area (Ac.)	"C" Value	$C_{adj.}$	$C_i A_i$
Commercial and Industrial	31.88	0.85	0.85	27.10
Pasture, Grass and farmland	13.67	0.20	0.24	3.28
Total	45.55			30.38

2. Weighted Runoff Coefficient, C

Weighted runoff Coefficient, $C = \frac{\sum C_i A_i}{A}$ = 0.67

3. Time of Concentration

See Chapter 2, FDOT Drainage Design Guide

$t_{1(Min)} = \frac{0.93 * L^{0.6} * n^{0.6}}{i^{0.4} * s^{0.3}}$

L = 100 L = Flow length (ft); < 100 ft
n = 0.012 n = Mannings Roughness (Table B-1)
i= 11.62 i = Rainfall Intensity (in/hr)
S = 0.004 S = Average slope (ft/ft)

$t_{1(Min)}$ = 2.04

B. Shallow Channel Flow (t_2)

$V = k * S^{0.5}$

S= 0.0005 S=Slope (ft/ft)
k= 6.962 k = Constant, Figure B-3
L = 1068 L = Length of Flow path, ft

V (ft/s) = 0.16

$t_{2(Min)}$ = 114.34

C. Main Pipe Flow

$V = 1.486/n * R^{0.67} * S^{0.5}$

n = 0.012 n = Mannings Roughness (Table 2.2)
R= 0.625 Hydraulic Radius (Area/Perimeter)
S = 0.0008 S = Average slope (ft/ft)
L = 2824 L = Length of Flow path, ft

V (ft/s) = 2.56

$t_{3(Min)}$ = 18.41

Total Tc = 134.79 Mins

4. 50-Year Storm Rainfall Intensity

Intensity is calculated from NOAA Atlas 14 Data

Rainfall Intensity, I_{50} = 2.39 in/hr

5A. Calculate Design Event Event (IDF Curves)

Q_{50} = C * I_{50} * Area
72.9 CFS

Q_{100} = C * I_{50} * Area
80.3 CFS

Q_{500} = C * I_{500} * Area
98.0 CFS

From NOAA Atlas 14 Data
I_{100} = 2.63 in/hr
I_{500} = 3.21 in/hr

HY-8 Culvert Analysis Report

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 72.90 cfs

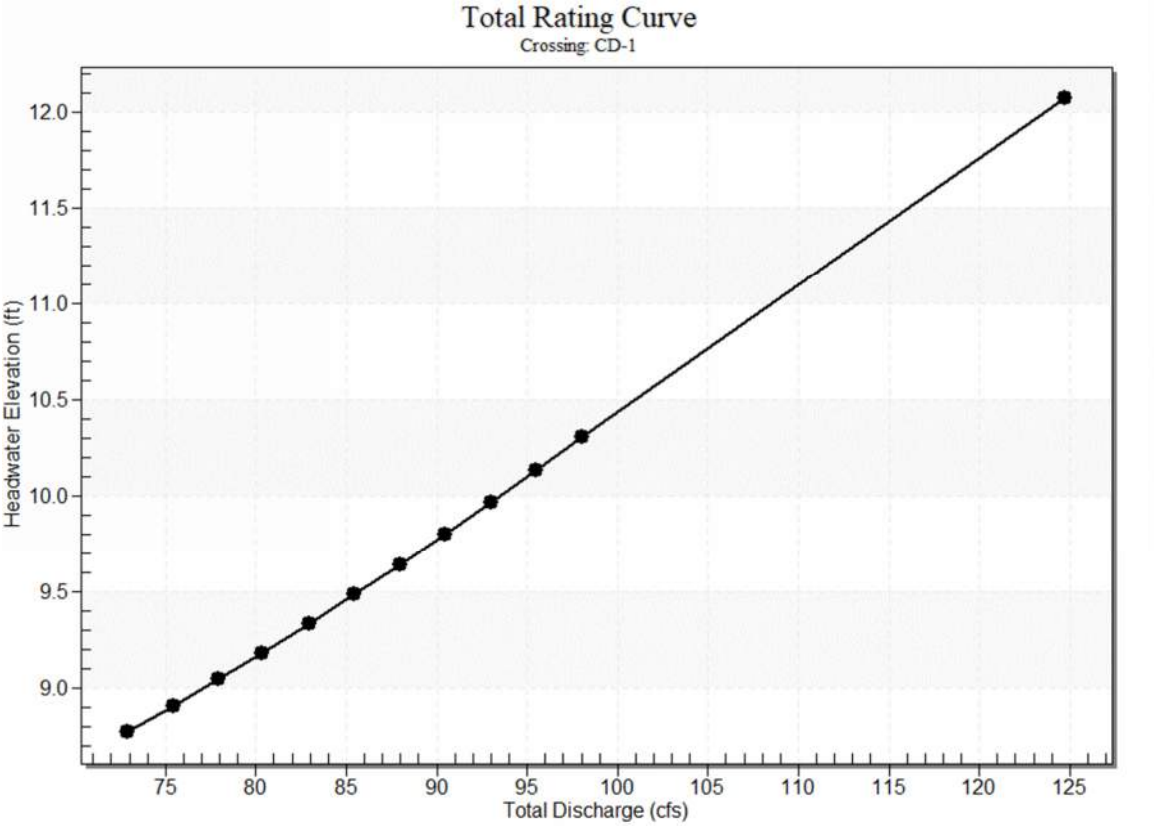
Design Flow: 80.30 cfs

Maximum Flow: 98.00 cfs

Table 1 - Summary of Culvert Flows at Crossing: CD-1

Headwater Elevation (ft)	Total Discharge (cfs)	CD-1 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
8.78	72.90	72.90	0.00	1
8.91	75.41	75.41	0.00	1
9.05	77.92	77.92	0.00	1
9.18	80.30	80.30	0.00	1
9.34	82.94	82.94	0.00	1
9.49	85.45	85.45	0.00	1
9.64	87.96	87.96	0.00	1
9.80	90.47	90.47	0.00	1
9.97	92.98	92.98	0.00	1
10.14	95.49	95.49	0.00	1
10.31	98.00	98.00	0.00	1
12.07	120.57	120.57	0.00	Overtopping

Rating Curve Plot for Crossing: CD-1



Culvert Data: CD-1

Table 1 - Culvert Summary Table: CD-1

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
72.90 cfs	72.90 cfs	8.78	3.40	3.607	4-FFf	1.37	2.05	2.50	4.31	7.43	0.00
75.41 cfs	75.41 cfs	8.91	3.52	3.740	4-FFf	1.39	2.08	2.50	4.31	7.68	0.00
77.92 cfs	77.92 cfs	9.05	3.64	3.877	4-FFf	1.42	2.11	2.50	4.31	7.94	0.00
80.30 cfs	80.30 cfs	9.18	3.75	4.012	4-FFf	1.45	2.13	2.50	4.31	8.18	0.00
82.94 cfs	82.94 cfs	9.34	3.89	4.166	4-FFf	1.48	2.16	2.50	4.31	8.45	0.00
85.45 cfs	85.45 cfs	9.49	4.02	4.316	4-FFf	1.51	2.18	2.50	4.31	8.70	0.00
87.96 cfs	87.96 cfs	9.64	4.15	4.472	4-FFf	1.54	2.21	2.50	4.31	8.96	0.00
90.47 cfs	90.47 cfs	9.80	4.29	4.632	4-FFf	1.57	2.23	2.50	4.31	9.22	0.00
92.98 cfs	92.98 cfs	9.97	4.43	4.796	4-FFf	1.60	2.25	2.50	4.31	9.47	0.00
95.49 cfs	95.49 cfs	10.14	4.58	4.965	4-FFf	1.63	2.27	2.50	4.31	9.73	0.00
98.00 cfs	98.00 cfs	10.31	4.73	5.138	4-FFf	1.66	2.29	2.50	4.31	9.98	0.00

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

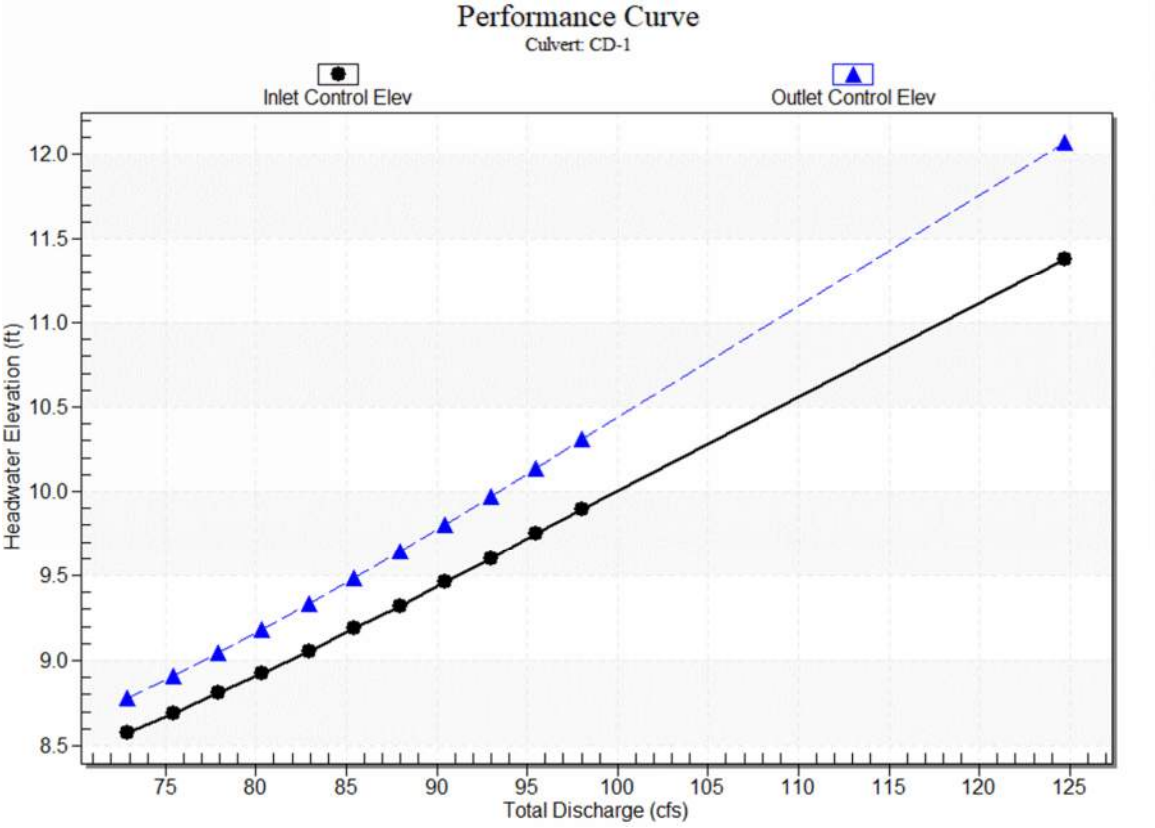
Inlet Elevation (invert): 5.17 ft,

Outlet Elevation (invert): 2.57 ft

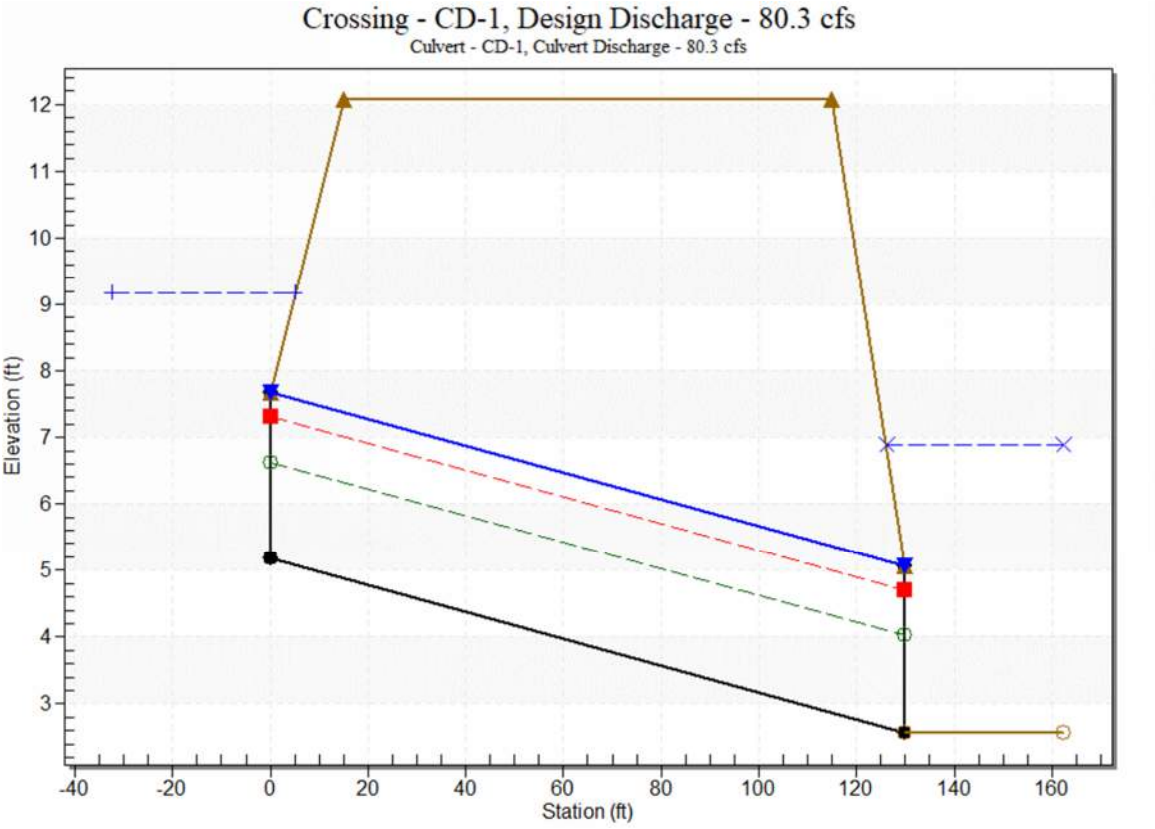
Culvert Length: 130.00 ft,

Culvert Slope: 0.0200

Culvert Performance Curve Plot: CD-1



Water Surface Profile Plot for Culvert: CD-1



Site Data - CD-1

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 5.17 ft

Outlet Station: 130.00 ft

Outlet Elevation: 2.57 ft

Number of Barrels: 2

Culvert Data Summary - CD-1

Barrel Shape: Circular

Barrel Diameter: 2.50 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Grooved End in Headwall

Inlet Depression: None

Tailwater Data for Crossing: CD-1

Table 2 - Downstream Channel Rating Curve (Crossing: CD-1)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
72.90	6.88	4.31
75.41	6.88	4.31
77.92	6.88	4.31
80.30	6.88	4.31
82.94	6.88	4.31
85.45	6.88	4.31
87.96	6.88	4.31
90.47	6.88	4.31
92.98	6.88	4.31
95.49	6.88	4.31
98.00	6.88	4.31

Tailwater Channel Data - CD-1

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 6.88 ft

Roadway Data for Crossing: CD-1

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 100.00 ft

Crest Elevation: 12.07 ft

Roadway Surface: Paved

Roadway Top Width: 100.00 ft

CD-2
Calculations

CROSS DRAIN CALCULATIONS

HNTB Project No. 85808-DS-001 County: Collier Prepared by: JAG Date: 3/6/2024
Description: Old US 41 PD&E Checked by: LVC Date: 3/27/2025

CD-2 STA 103+45.00 Design Flood: 50 Yr Conditions: Proposed

1. Contributing Areas

See Table B-4 & -5, FDOT Drainage Design Guide

LAND USE	Area (Ac.)	"C" Value	$C_{adj.}$	$C_i A_i$
Commercial and Industrial	66.50	0.75	0.75	49.87
Pasture, Grass and farmland	22.2	0.20	0.24	5.32
Total	88.66			55.19

2. Weighted Runoff Coefficient, C

Weighted runoff Coefficient, $C = \frac{\sum C_i A_i}{A}$ = 0.62

3. Time of Concentration

See Chapter 2, FDOT Drainage Design Guide

$t_{1(Min)} = \frac{0.93 * L^{0.6} * n^{0.6}}{i^{0.4} * s^{0.3}}$

L = 100 L = Flow length (ft); < 100 ft
n = 0.012 n = Mannings Roughness (Table B-1)
i= 11.66 i = Rainfall Intensity (in/hr)
S = 0.005 S = Average slope (ft/ft)

$t_{1(Min)}$ = 1.90

B. Shallow Channel Flow (t_2)

$V = k * S^{0.5}$

S= 0.0001 S=Slope (ft/ft)
k= 6.962 k = Constant, Figure B-3
L = 1228 L = Length of Flow path, ft

V (ft/s) = 0.07

$t_{2(Min)}$ = 293.98

C. Main Pipe Flow

$V = 1.486/n * R^{0.67} * S^{0.5}$

n = 0.012 n = Mannings Roughness (Table 2.2)
R= 0.750 Hydraulic Radius (Area/Perimeter)
S = 0.0006 S = Average slope (ft/ft)
L = 2483 L = Length of Flow path, ft

V (ft/s) = 2.56

$t_{3(Min)}$ = 16.19

Total Tc = 312.07 Mins

4. 50-Year Storm Rainfall Intensity

Intensity is calculated from NOAA Atlas 14 Data

Rainfall Intensity, I_{50} = 1.36 in/hr

5A. Calculate Design Event Event (IDF Curves)

Q_{50} = C * I_{50} * Area
75.0 CFS

Q_{100} = C * I_{50} * Area
83.8 CFS

Q_{500} = C * I_{500} * Area
104.6 CFS

From NOAA Atlas 14 Data

I_{100} = 1.53 in/hr
I_{500} = 1.90 in/hr

HY-8 Culvert Analysis Report

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 75.00 cfs

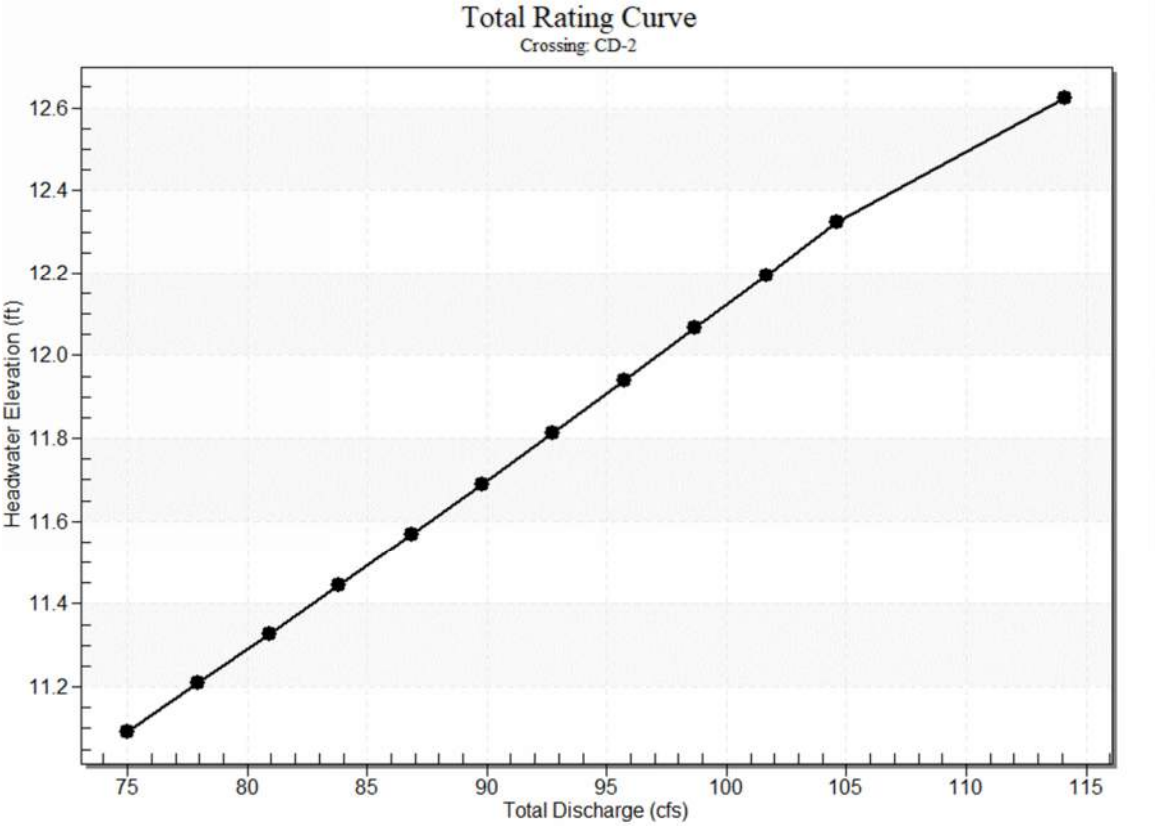
Design Flow: 83.80 cfs

Maximum Flow: 104.60 cfs

Table 1 - Summary of Culvert Flows at Crossing: CD-2

Headwater Elevation (ft)	Total Discharge (cfs)	CD-2 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
11.09	75.00	75.00	0.00	1
11.21	77.96	77.96	0.00	1
11.33	80.92	80.92	0.00	1
11.44	83.80	83.80	0.00	1
11.57	86.84	86.84	0.00	1
11.69	89.80	89.80	0.00	1
11.81	92.76	92.76	0.00	1
11.94	95.72	95.72	0.00	1
12.06	98.68	98.68	0.00	1
12.19	101.64	101.64	0.00	1
12.32	104.60	104.60	0.00	1
12.62	111.23	111.23	0.00	Overtopping

Rating Curve Plot for Crossing: CD-2



Culvert Data: CD-2

Table 1 - Culvert Summary Table: CD-2

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
75.00 cfs	75.00 cfs	11.09	2.94	3.482	6-FFt	3.00	1.99	2.80	2.77	5.46	1.00
77.96 cfs	77.96 cfs	11.21	3.01	3.598	6-FFt	3.00	2.03	2.86	2.82	5.61	1.01
80.92 cfs	80.92 cfs	11.33	3.09	3.716	6-FFt	3.00	2.07	2.91	2.88	5.77	1.02
83.80 cfs	83.80 cfs	11.44	3.17	3.833	6-FFt	3.00	2.11	3.00	2.93	5.94	1.03
86.84 cfs	86.84 cfs	11.57	3.25	3.957	4-FFf	3.00	2.15	3.00	2.98	6.14	1.04
89.80 cfs	89.80 cfs	11.69	3.33	4.079	4-FFf	3.00	2.18	3.00	3.03	6.35	1.05
92.76 cfs	92.76 cfs	11.81	3.41	4.202	4-FFf	3.00	2.22	3.00	3.08	6.56	1.06
95.72 cfs	95.72 cfs	11.94	3.50	4.327	4-FFf	3.00	2.25	3.00	3.13	6.77	1.07
98.68 cfs	98.68 cfs	12.06	3.59	4.454	4-FFf	3.00	2.29	3.00	3.18	6.98	1.08
101.64 cfs	101.64 cfs	12.19	3.68	4.582	4-FFf	3.00	2.32	3.00	3.23	7.19	1.09
104.60 cfs	104.60 cfs	12.32	3.77	4.712	4-FFf	3.00	2.35	3.00	3.27	7.40	1.10

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

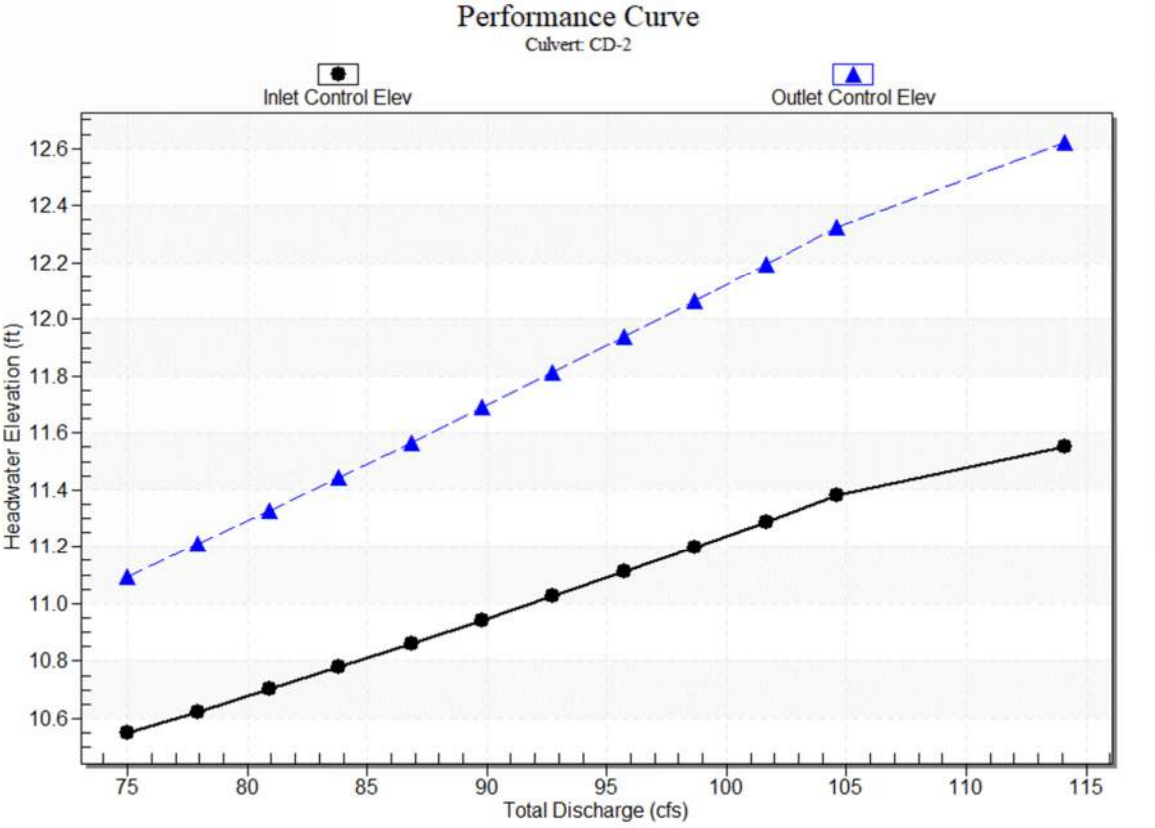
Inlet Elevation (invert): 7.61 ft,

Outlet Elevation (invert): 7.53 ft

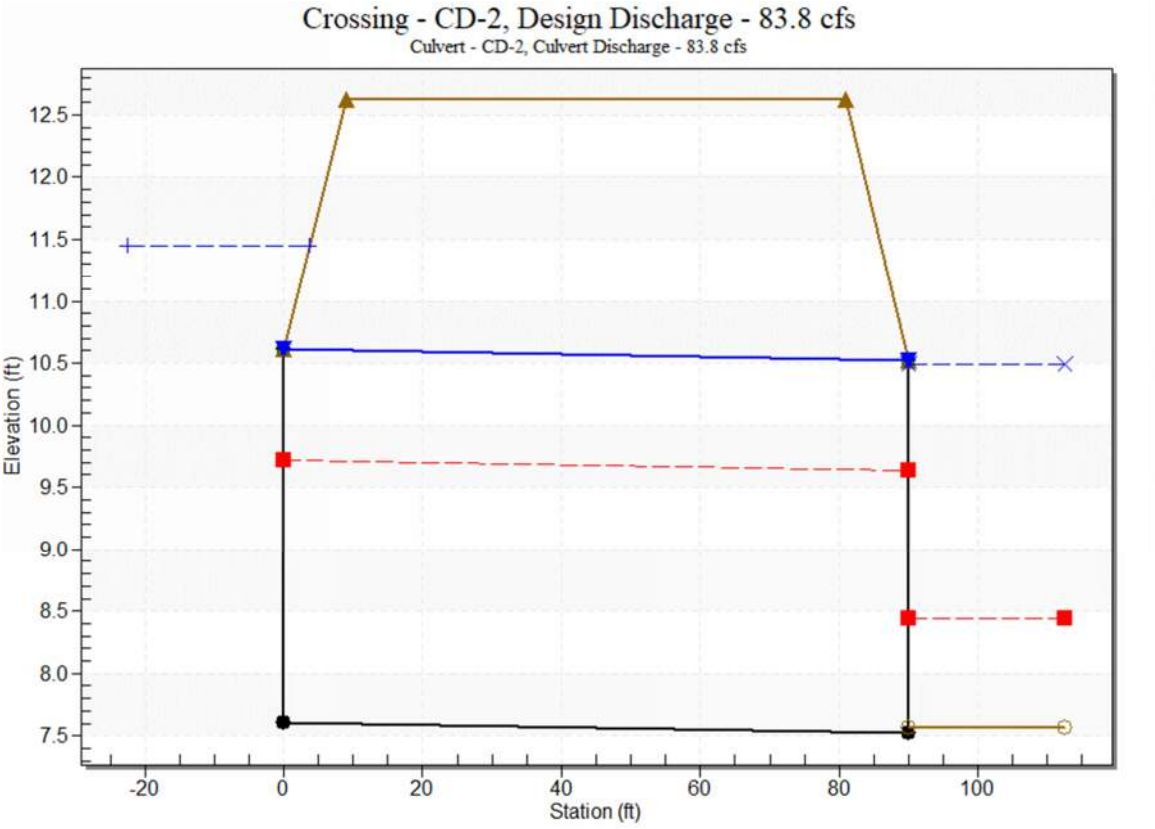
Culvert Length: 90.00 ft,

Culvert Slope: 0.0009

Culvert Performance Curve Plot: CD-2



Water Surface Profile Plot for Culvert: CD-2



Site Data - CD-2

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 7.61 ft

Outlet Station: 90.00 ft

Outlet Elevation: 7.53 ft

Number of Barrels: 2

Culvert Data Summary - CD-2

Barrel Shape: Circular

Barrel Diameter: 3.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Grooved End in Headwall

Inlet Depression: None

Tailwater Data for Crossing: CD-2

Table 2 - Downstream Channel Rating Curve (Crossing: CD-2)

Flow (cfs)	Water Surface Elev (ft)	Velocity (ft/s)	Depth (ft)	Shear (psf)	Froude Number
75.00	10.33	2.77	1.00	0.02	0.13
77.96	10.38	2.82	1.01	0.02	0.13
80.92	10.44	2.88	1.02	0.02	0.13
83.80	10.49	2.93	1.03	0.02	0.13
86.84	10.54	2.98	1.04	0.02	0.13
89.80	10.59	3.03	1.05	0.02	0.13
92.76	10.64	3.08	1.06	0.02	0.13
95.72	10.69	3.13	1.07	0.02	0.13
98.68	10.74	3.18	1.08	0.02	0.13
101.64	10.79	3.23	1.09	0.02	0.13
104.60	10.83	3.27	1.10	0.02	0.13

Tailwater Channel Data - CD-2

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 16.00 ft

Side Slope (H:V): 4.00 (_:1)

Channel Slope: 0.0001

Channel Manning's n: 0.0230

Channel Invert Elevation: 7.56 ft

Roadway Data for Crossing: CD-2

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 100.00 ft

Crest Elevation: 12.62 ft

Roadway Surface: Paved

Roadway Top Width: 72.00 ft

CD-3
Calculations

CROSS DRAIN CALCULATIONS

HNTB Project No. 85808-DS-001 County: Collier Prepared by: JAG Date: 3/6/2024
Description: Old US 41 PD&E Checked by: LVC Date: 3/27/2025

CD-3 STA 224+20.00 Design Flood: 50 Yr Conditions: Proposed

1. Contributing Areas

See Table B-4 & -5, FDOT Drainage Design Guide

LAND USE	Area (Ac.)	"C" Value	$C_{adj.}$	$C_i A_i$
SFR -0.5 ac +	**243.43**	0.35	0.42	102.24
Rooftops and pavement	**21.20**	0.95	0.95	20.14
Pasture, Grass and farmland	**150.62**	0.20	0.24	36.15
Woodlands	**215.80**	0.15	0.18	38.84
Total	631.05			197.37

2. Weighted Runoff Coefficient, C

Weighted runoff Coefficient, $C = \frac{\sum C_i A_i}{A}$ = 0.31

3. Time of Concentration

See Chapter 2, FDOT Drainage Design Guide

$t_{1(Min)} = \frac{0.93 * L^{0.6} * n^{0.6}}{i^{0.4} * s^{0.3}}$

L = 100 L = Flow length (ft); < 100 ft
n = 0.15 n = Mannings Roughness (Table B-1)
i= 10.60 i = Rainfall Intensity (in/hr)
S = 0.005 S = Average slope (ft/ft)

$t_{1(Min)}$ = 9.00

B. Shallow Channel Flow (t_2)

$V = k * S^{0.5}$

S= 0.0001 S=Slope (ft/ft)
k= 6.962 k = Constant, Figure B-3
L = 953 L = Length of Flow path, ft

V (ft/s) = 0.07

$t_{2(Min)}$ = 228.14

C. Main Channel Flow

$V = 1.486/n * R^{0.67} * S^{0.5}$

n = 0.2 n = Mannings Roughness (Table 2.2)
R= 1.21 Hydraulic Radius (Area/Perimeter)
S = 0.00005 S = Average slope (ft/ft)
L = 8634 L = Length of Flow path, ft

V (ft/s) = 0.06

$t_{3(Min)}$ = 2410.58

Total Tc = 2647.72 Mins

4. 50-Year Storm Rainfall Intensity

Intensity is calculated from NOAA Atlas 14 Data

Rainfall Intensity, I_{50} = 0.28 in/hr

5A. Calculate Design Event Event (IDF Curves)

Q_{50} = C * I_{50} * Area
54.4 CFS

Q_{100} = C * I_{50} * Area
63.3 CFS

From NOAA Atlas 14 Data
I_{100} = 0.32 in/hr
I_{500} = 0.44 in/hr

Q_{500} = C * I_{500} * Area
86.7 CFS

HY-8 Culvert Analysis Report

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 54.40 cfs

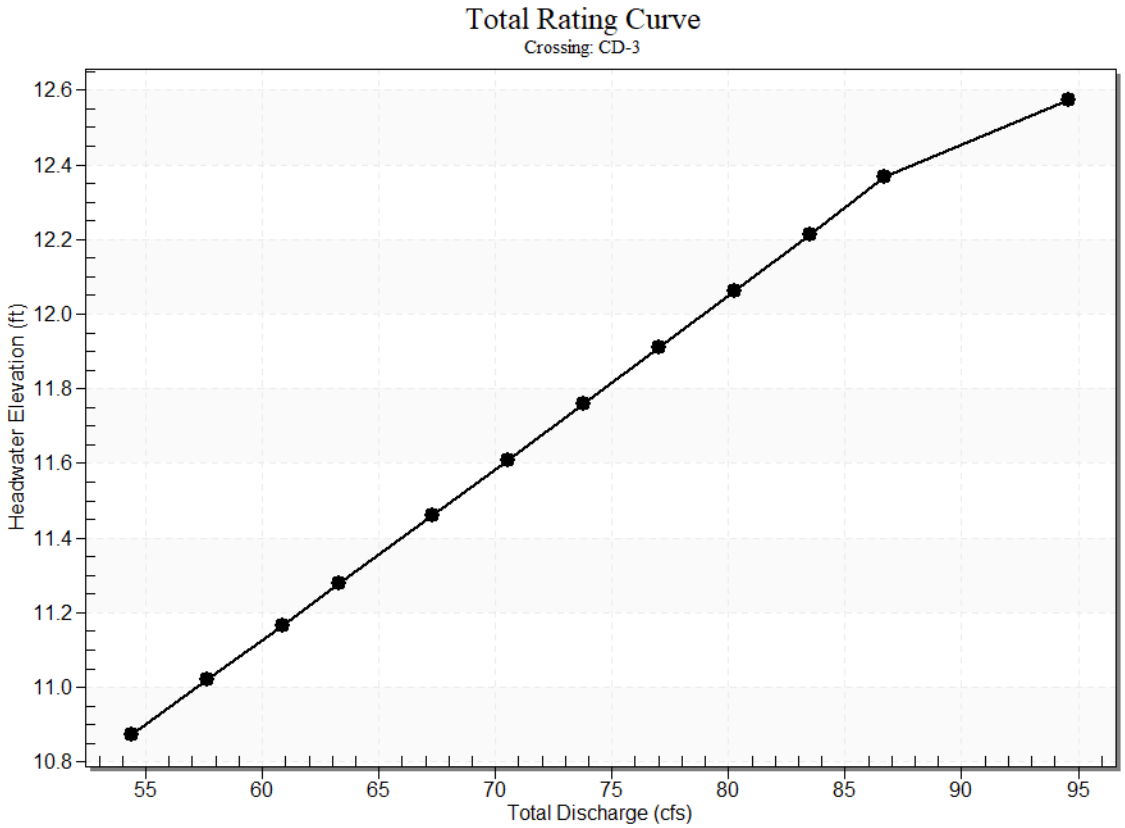
Design Flow: 63.30 cfs

Maximum Flow: 86.70 cfs

Table 1 - Summary of Culvert Flows at Crossing: CD-3

Headwater Elevation (ft)	Total Discharge (cfs)	CD-3 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
10.87	54.40	54.40	0.00	1
11.02	57.63	57.63	0.00	1
11.17	60.86	60.86	0.00	1
11.28	63.30	63.30	0.00	1
11.46	67.32	67.32	0.00	1
11.61	70.55	70.55	0.00	1
11.76	73.78	73.78	0.00	1
11.91	77.01	77.01	0.00	1
12.06	80.24	80.24	0.00	1
12.21	83.47	83.47	0.00	1
12.37	86.70	86.70	0.00	1
12.57	90.85	90.85	0.00	Overtopping

Rating Curve Plot for Crossing: CD-3



Culvert Data: CD-3

Table 1 - Culvert Summary Table: CD-3

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
54.40 cfs	54.40 cfs	10.87	2.41	2.834	4-FFf	1.43	1.69	3.00	3.16	3.85	0.60
57.63 cfs	57.63 cfs	11.02	2.49	2.981	4-FFf	1.48	1.74	3.00	3.25	4.08	0.61
60.86 cfs	60.86 cfs	11.17	2.58	3.127	4-FFf	1.53	1.79	3.00	3.34	4.30	0.62
63.30 cfs	63.30 cfs	11.28	2.64	3.238	4-FFf	1.57	1.82	3.00	3.40	4.48	0.63
67.32 cfs	67.32 cfs	11.46	2.74	3.421	4-FFf	1.63	1.88	3.00	3.51	4.76	0.64
70.55 cfs	70.55 cfs	11.61	2.82	3.570	4-FFf	1.67	1.93	3.00	3.59	4.99	0.65
73.78 cfs	73.78 cfs	11.76	2.90	3.719	4-FFf	1.72	1.98	3.00	3.67	5.22	0.65
77.01 cfs	77.01 cfs	11.91	2.98	3.869	4-FFf	1.77	2.02	3.00	3.75	5.45	0.66
80.24 cfs	80.24 cfs	12.06	3.06	4.021	4-FFf	1.82	2.06	3.00	3.83	5.68	0.67
83.47 cfs	83.47 cfs	12.21	3.15	4.174	4-FFf	1.87	2.10	3.00	3.90	5.90	0.68
86.70 cfs	86.70 cfs	12.37	3.24	4.328	4-FFf	1.91	2.14	3.00	3.98	6.13	0.68

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

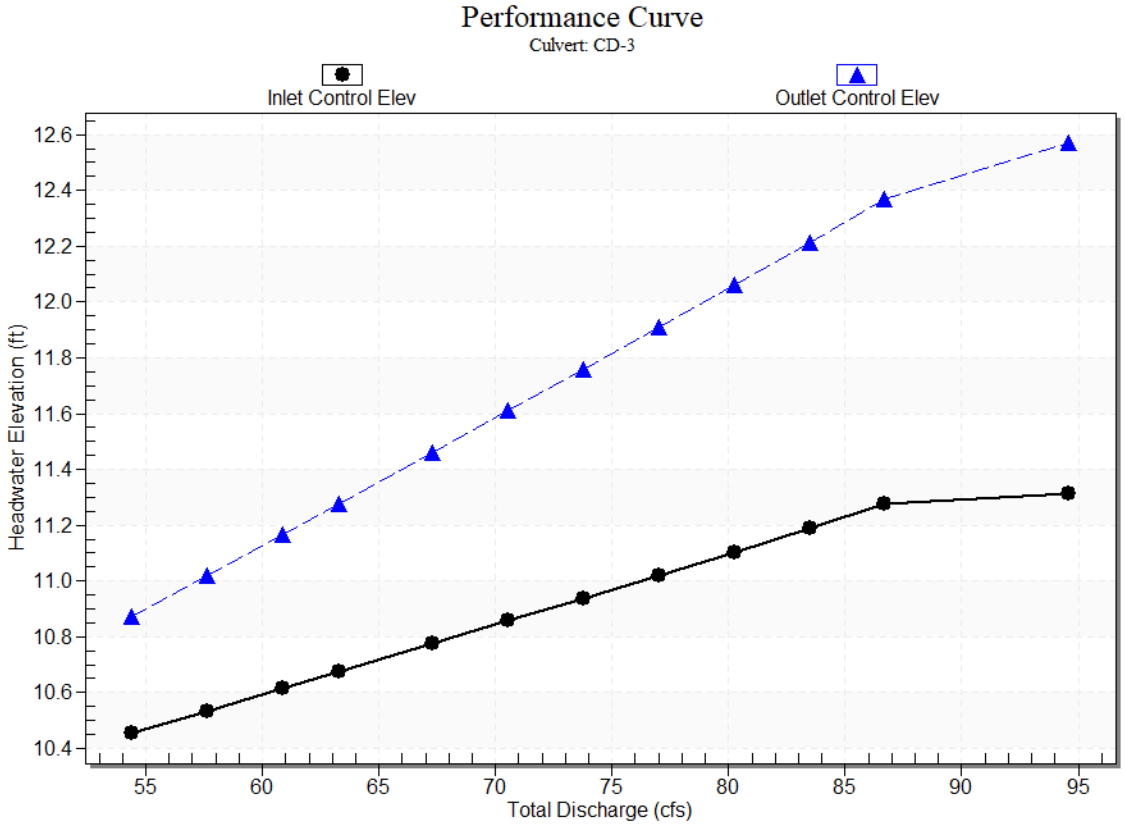
Inlet Elevation (invert): 8.04 ft,

Outlet Elevation (invert): 7.28 ft

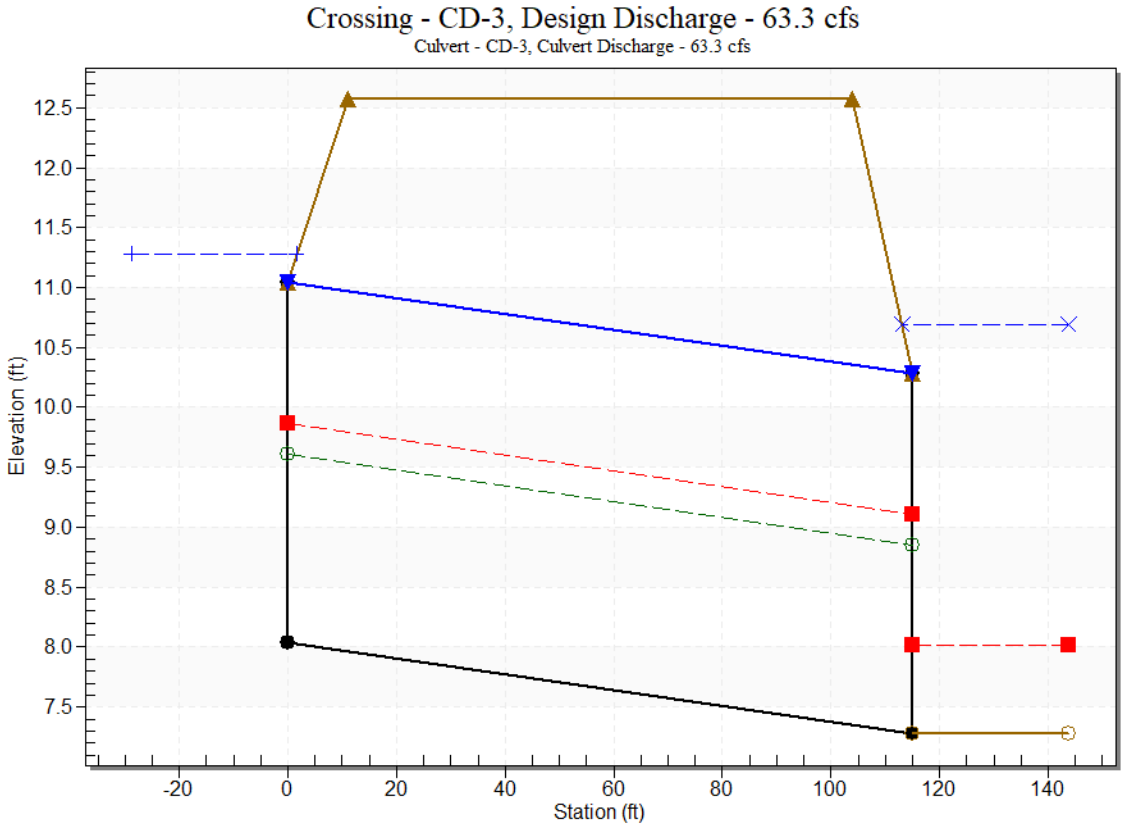
Culvert Length: 115.00 ft,

Culvert Slope: 0.0066

Culvert Performance Curve Plot: CD-3



Water Surface Profile Plot for Culvert: CD-3



Site Data - CD-3

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 8.04 ft

Outlet Station: 115.00 ft

Outlet Elevation: 7.28 ft

Number of Barrels: 2

Culvert Data Summary - CD-3

Barrel Shape: Circular

Barrel Diameter: 3.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Grooved End in Headwall

Inlet Depression: None

Tailwater Data for Crossing: CD-3

Table 2 - Downstream Channel Rating Curve (Crossing: CD-3)

Flow (cfs)	Water Surface Elev (ft)	Velocity (ft/s)	Depth (ft)	Shear (psf)	Froude Number
54.40	10.44	3.16	0.60	0.20	0.07
57.63	10.53	3.25	0.61	0.20	0.07
60.86	10.62	3.34	0.62	0.21	0.07
63.30	10.68	3.40	0.63	0.21	0.07
67.32	10.79	3.51	0.64	0.22	0.07
70.55	10.87	3.59	0.65	0.22	0.07
73.78	10.95	3.67	0.65	0.23	0.07
77.01	11.03	3.75	0.66	0.23	0.07
80.24	11.11	3.83	0.67	0.24	0.07
83.47	11.18	3.90	0.68	0.24	0.07
86.70	11.26	3.98	0.68	0.25	0.07

Tailwater Channel Data - CD-3

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 16.00 ft

Side Slope (H:V): 4.00 (_:1)

Channel Slope: 0.0010

Channel Manning's n: 0.1300

Channel Invert Elevation: 7.28 ft

Roadway Data for Crossing: CD-3

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 100.00 ft

Crest Elevation: 12.57 ft

Roadway Surface: Paved

Roadway Top Width: 93.00 ft

Appendix E | Correspondence

SFWMD Pre-Application Meeting Minutes

SFWMD Pre-Application Meeting Minutes

CR 887 (Old US 41) PD&E Study

From US 41 to Lee County Line & From Collier County Line to Bonita Beach Road
FPIDs 435110-1-22-01 & 435347-1-22-01
Lee and Collier Counties

1/27/2021
10:00 AM
Teams Meeting (Virtual)

Meeting called by: Steven Andrews, FDOT
Type of meeting: SFWMD Pre-App

Facilitator: Nicole Monies, FDOT
Note taker: Matt Dockins, RK&K

Attendees:
Melissa Roberts, SFWMD
Laura Layman, SFWMD
Jonathon Wadas, SFWMD
Jewelene Harris, SFWMD
Angelica Hoffert, SFWMD
Andy Tilton, SFWMD
Kim Fikoski, SFWMD
Richard "OJ" Oujevolk, FDOT
Brent Setchell, FDOT
Matt Feeney, Bonita Springs
Trinity Scott, Collier County
Matt Dockins, RK&K PM
Joe Baan, RK&K Drainage
Gordon Mullen, RK&K Env.

Attachments: Presentation

Minutes

Summary:

1. Existing Conditions

Joe Baan summarized the project location and scope. The Old US 41 corridor is constrained in Collier County with an existing 2-lane undivided rural typical section and a large canal on the west side of the road. The canal is for conveyance only. It does not provide any formal stormwater treatment and has no in-line weirs or control structures. Old US 41 is less constrained in Lee County because the right-of-way (ROW) has no canal.

2. Future Conditions

This PD&E analyzes potential improvements to Old US 41 including widening to a 4-lane divided typical section south of the Racetrack driveway and a quadrant roadway north of the Racetrack driveway. Multimodal improvements are included in the typical section.

3. Stormwater Management

The project is anticipated to widen Old US 41 from a 2-lane undivided roadway to a 4-lane divided roadway in the Collier County segment. Approximately 21 parcels including 23 residences and 13 businesses would be partially or completely impacted to widen the roadway and leave the existing canal in its existing location. Alternatively, replacing the canal with a closed drainage system would allow proposed improvements to be located above the existing canal and eliminate property impacts associated with the roadway itself. The closed system is the recommended alternative. The canal will remain open wherever possible, but preliminary analysis only showed one 700-ft long area where that could be possible. Brent Setchell asked how the large offsite areas would be routed into the closed system. Joe explained that most of the stormwater discharges into the canal at several well-defined points where an inlet could be proposed. SFWMD staff were supportive of the idea to close the canal because it reduces potential impacts to adjacent conservation easements. SFWMD cautioned that tailwater conditions should not be impacted for adjacent developments. Joe stated that the conceptual

model of the closed system shows that peak stage increases can be avoided, which should preserve tailwater conditions. SFWMD requested analysis of the 5-yr, 25-yr, and 100-yr storm events for the proposed closing of the canal. Jewelene Harris asked if Tampon Creek Bypass was an existing channel. Joe responded that it is an existing channel with vegetated slopes. Jewelene requested cross sections of the channel for the design phase permit submittal. SFWMD also recommended coordinating with FDEP on the potential for sovereign submerged lands.

Joe summarized the three pond alternatives for Basin 1 in Collier County. This basin discharges south to the Cocohatchee River via Dunruss Creek. All properties along this basin are either conservation easement, future roadway corridor, or developed land. He explained that SMF 1A (Extra Space Storage) is the most desirable because it only impacts one business. It will provide compensatory treatment of the new impervious area and allow areas south of Collier Center Way to discharge directly into the canal, as they do in the existing condition. Jonathon Wadas was agreeable to this concept. Jon identified that WBID 3278C may be impaired for nutrients. Basins with roadway-related impairments will be analyzed with nutrient loading calculations while basins without roadway-related impairments will use SFWMD presumptive criteria.

Joe summarized the three pond alternatives for Basin 2 in Bonita Springs. This basin discharges north via a channel beside the railroad and a channel on the racetrack property to Oak Creek. Plenty of options exist on the racetrack property to locate a pond outside of existing wetlands. The quadrant roadway will require a segment of road through the racetrack property. If this segment is located in existing impervious areas, it will be allowed to discharge where it does in the existing condition. If it is located in existing pervious area then it will need it's own stormwater management pond discharging to the existing outfall. Jon pointed out that the existing racetrack permit includes a stormwater pond discharging north.

4. Floodplain Compensation

Joe pointed out that most of the existing Old US 41 in Collier County is within 100-yr floodplain. Most of the property adjacent to the corridor is either within 100-yr floodplain or preservation lands making it difficult to site floodplain compensation (FPC) sites. Five FPC sites were identified at or above the 100-yr floodplain that could achieve conventional cup-for-cup floodplain compensation. However, these FPC sites impact 8 property owners, several businesses, and are estimated to cost $36 million in ROW alone. RK&K identified an innovative alternative to slightly improve conveyance along Dunruss Creek, which will maintain or slightly improve 100-yr peak stages along Old US 41. This alternative involves adding riprap along the FDOT canal west of US 41 to Wiggins Pass Road, a new 48-in cross drain under Wiggins Pass Road, and an overflow structure/pipe along West Lane. This alternative will increase the 100-yr peak stage south of West Lane by approximately 0.5 ft. However, the 100-yr riverine peak stage is still estimated to be below 4 ft elevation and within the banks of the downstream channel. The manmade canal west of US 41 is within an FDOT easement. SFWMD was agreeable to the second alternative as a way to avoid substantial property impacts. SFWMD requested consideration of erosion protection at the south end of West Lane. This could include a spreader swale or an excavated permanent pool. SFWMD pointed out that improvements to the canal west of US 41 could be considered wetland impacts but Brent pointed out that it is a manmade canal. After a question from SFWMD, Joe clarified that the analysis was done for riverine floodplain impacts.

5. Regional Stormwater Management

Opportunities for regional stormwater management were discussed. Brent asked about the property west of the Tarpon Cove development. This area is already permitted as a proposed Cocohatchee PUD. Brent asked about the forested area west of West Lane. RK&K will conduct a preliminary analysis of a potential regional stormwater management facility on the parcel west of West Lane and on the parcels owned by Collier County at the south end of West Lane.

6. Environmental

Gordon emphasized the preliminary nature of this project with the alignment and typical section development in process. He discussed the local SFWMD conservation easements along the project

limits. Coordination with SFWMD did not identify any Section 4(f) recreational uses. The design will avoid impacts as much as feasible but impacts near the Veterans Memorial Blvd. intersection are possible. If impacts are unavoidable, FDOT will coordinate with SFWMD to discuss legal requirements for lifting easements and replacement of prior wetland mitigative functions as part of future mitigation. Melissa emphasized SFWMD's request that conservation easements be avoided at all costs and stated that the District's governing board is generally not in favor of releasing easements. Ample lead time is needed if unavoidable impacts are expected, so begin coordination early.

Gordon provided an overview of the preliminary wetland and surface water impacts calculated to date. These are approximately 2.94 acres and 5.4 acres, respectively. These impacts do not include any discussion of Floodplain Compensation Option 2 (i.e., potential drainage conveyance and storage improvements west of the US 41/Old US 41 (CR 887) intersection at the project's southern terminus or south of Wiggins Pass Road). The UMAM functional loss for these impacts has not yet been calculated. Gordon discussed that the project is within the geographic service areas of several mitigation banks for compensatory mitigation of wetland and species habitat impacts. The project's federal Clean Water Act Section 404 permitting is expected to be completed by the FDEP (provided the project continues not to impact any federally "retained" waters).

Potential involvement with approximately 14 federal and 50 state-protected species or their habitat is being evaluated for this project. Gopher tortoise and state-listed plants are most notable due to confirmed observations. Wetland impacts and mitigation along with protected species involvement will be discussed in the PD&E-phase Natural Resource Evaluation Report to be submitted by FDOT to the applicable federal and state resource/permitting agencies.

Jewelene Harris had no questions on environmental items. She commented it appears to be pretty straightforward. Laura Layman reiterated the project should avoid impacting conservation easements. She supports closing the canal to avoid conservation easement impacts.

Action items	**Person responsible**	**Deadline**
Check if WBID 3278C is impaired for roadway-related impairments. If so, PD&E will include nutrient loading calculations.	Joe Baan	
Check with DEP on sovereign submerged land limits.	Gordon Mullen	
Regional pond options – Look into options to west of Tarpon Cove Canal (may be under development now). Look into providing treatment to the west of West Lane in County property.	Joe Baan	



CR 887 (Old 41) PD&E Study

SFWMD Pre-Application Meeting

FPID: 435110-1-22-01 & 435347-1-22-01

FAP: D119 028 B & D119 027 B

1/27/2021

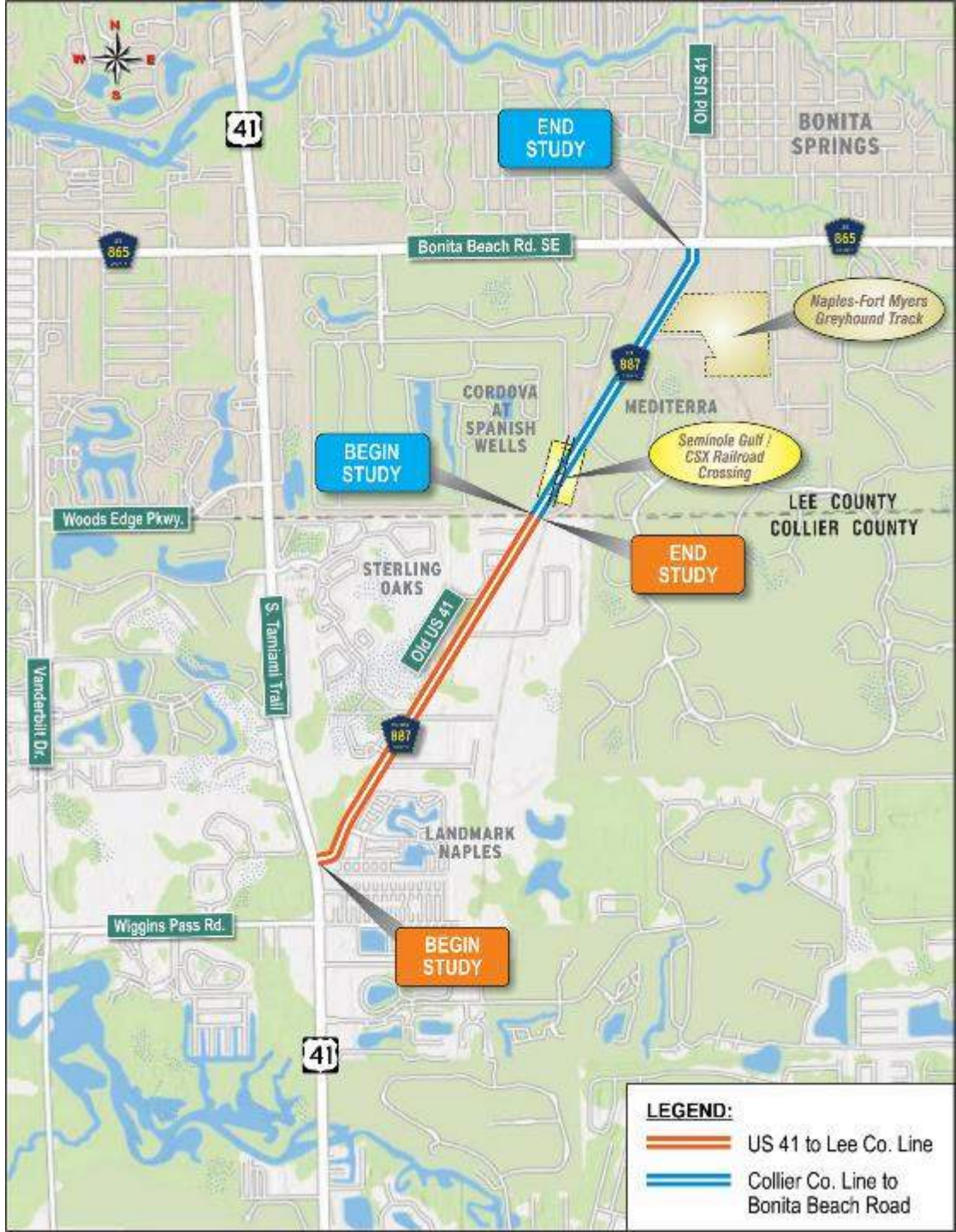
Agenda

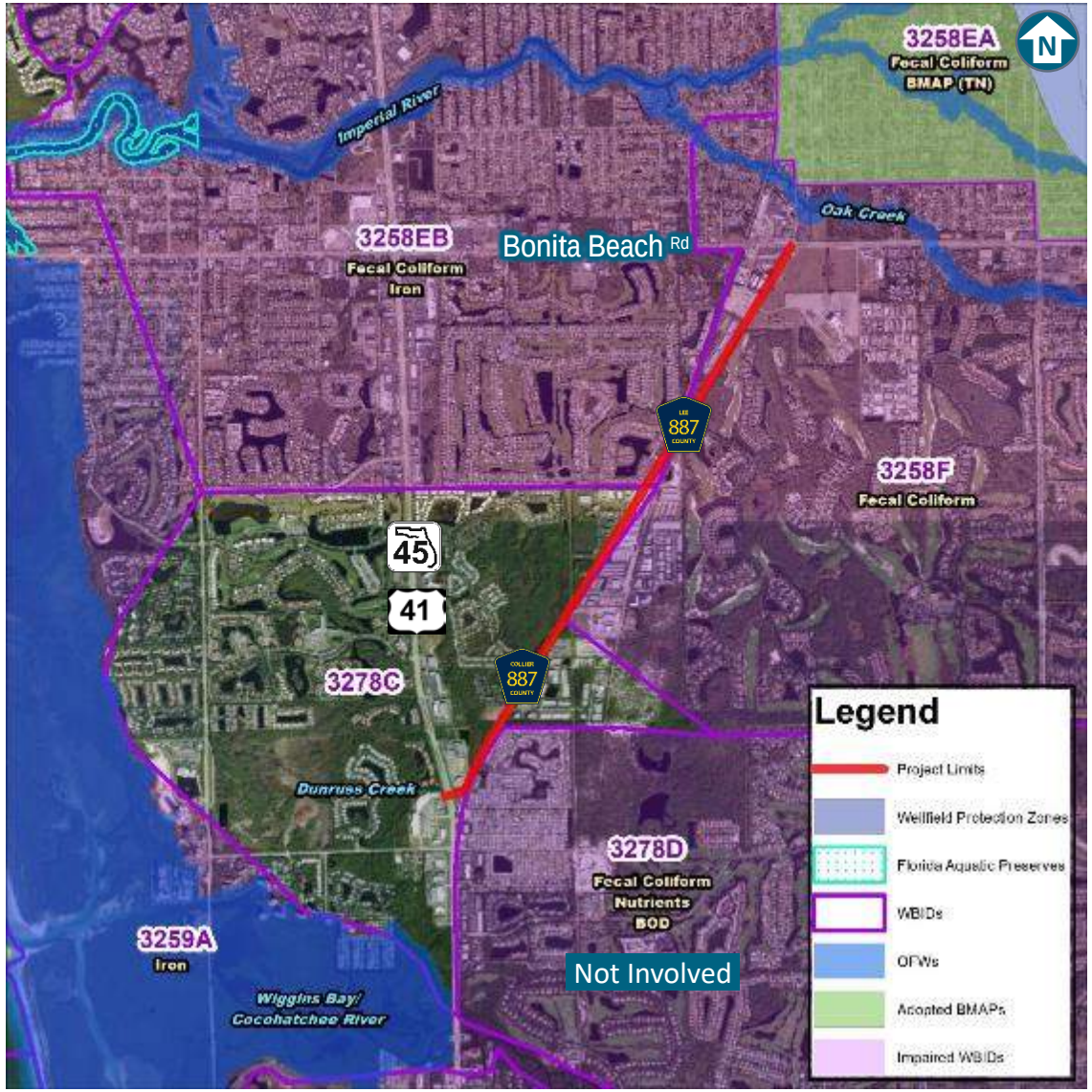
- Overview
- Stormwater
  - Dunruss Creek
  - Stormwater Ponds
  - Floodplain Compensation
- Environmental
  - Conservation Easements
  - Protected Species
  - Wetlands

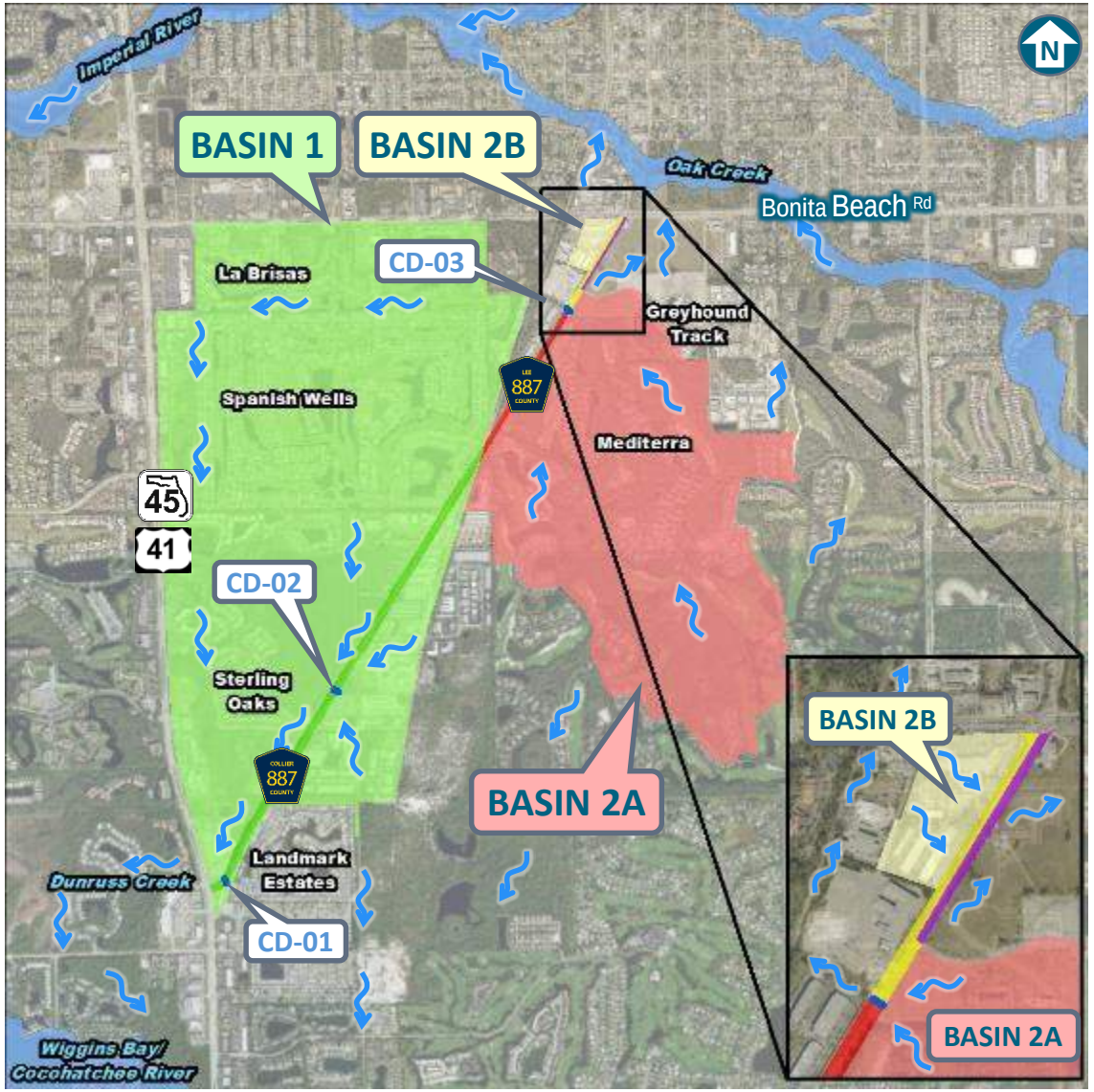


Project Overview






3258EA
Fecal Coliform
BMAP (TN)
Imperial River
Oak Creek
3258EB
Fecal Coliform
Iron
Bonita Beach Rd
887
3258F
Fecal Coliform
45
41
3278C
Dunruss Creek
3278D
Fecal Coliform
Nutrients
BOD
3259A
Iron
Wiggins Bay/
Cocohatchee River
Not Involved
Legend
Project Limits
Wellfield Protection Zones
Florida Aquatic Preserves
WBIDs
OFWs
Adopted BMAPs
Impaired WBIDs


Imperial River
BASIN 1
BASIN 2B
Oak Creek
Bonita Beach Rd
La Brisas
CD-03
Greyhound
Track
Spanish Wells
887
Mediterra
45
41
CD-02
Sterling
Oaks
BASIN 2A
Landmark
Estates
Dunruss Creek
CD-01
Wiggins Bay/
Cocohatchee River
BASIN 2B
BASIN 2A

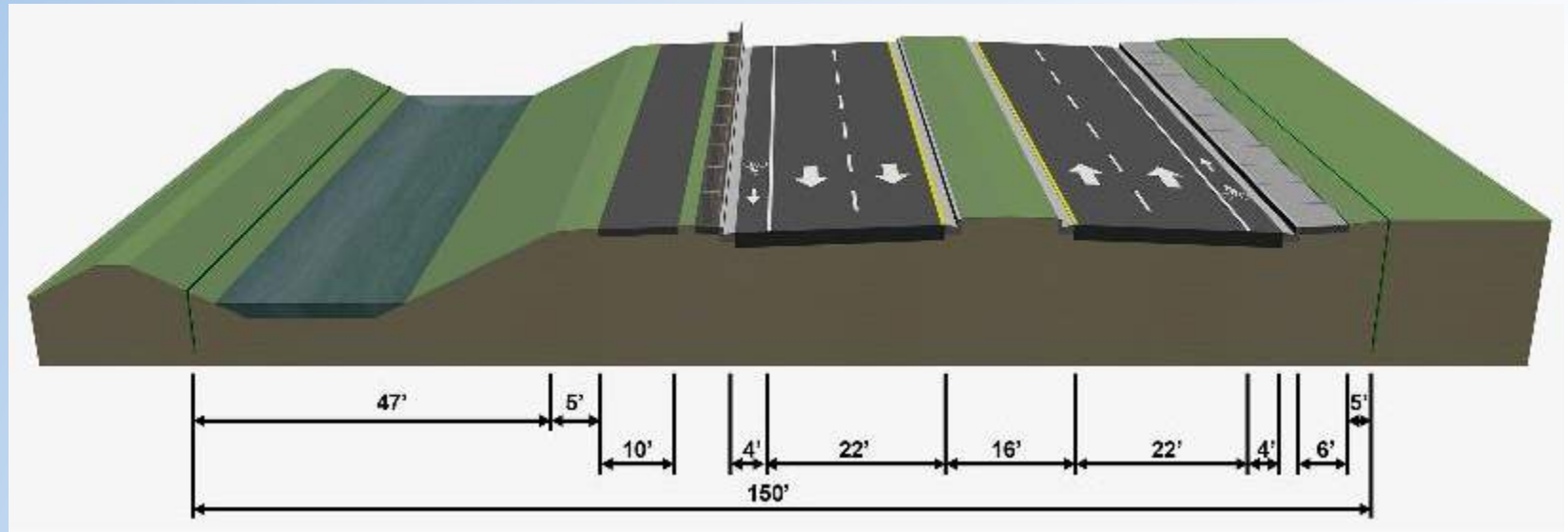
Stormwater

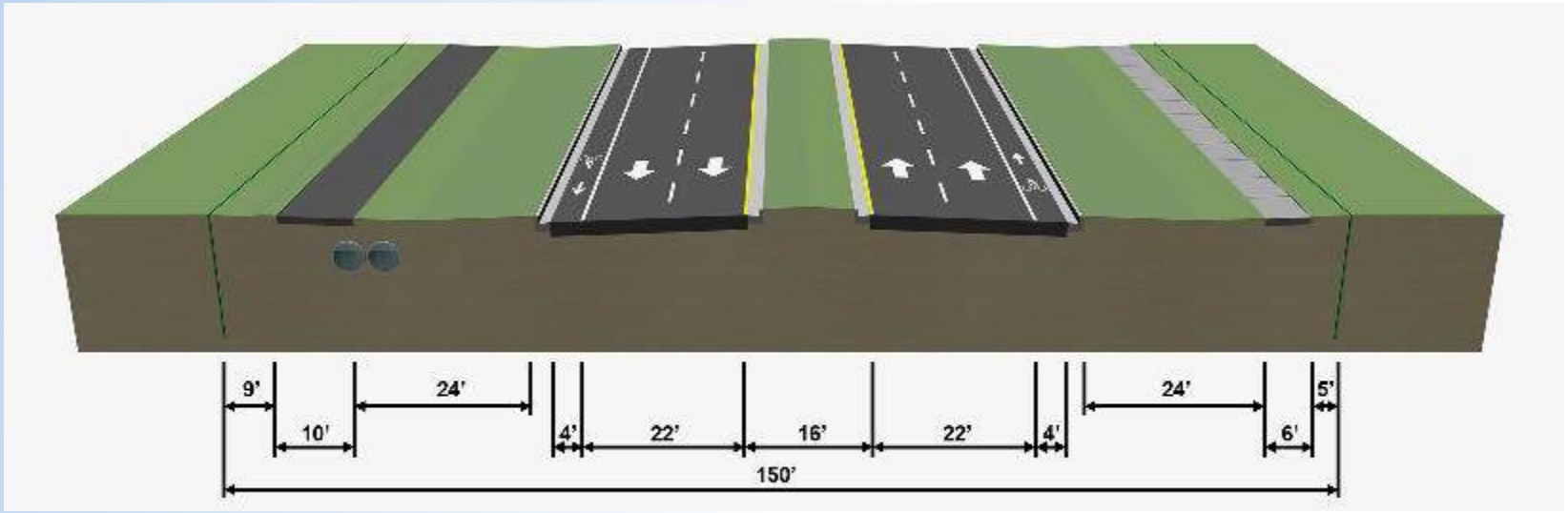
Dunruss Creek

- Existing open canal
- Alternative 1: Open Canal
  - 21 parcel impacts
    - 23 residences
    - 13 business parking/circulation
  - Moderate maintenance cost
  - Reduced safety
- Alternative 2: Closed Storm Drain
  - Double 4x10 CBC at US 41
  - Double 24” pipe at FP&L easement
  - Low maintenance
  - Maximum safety



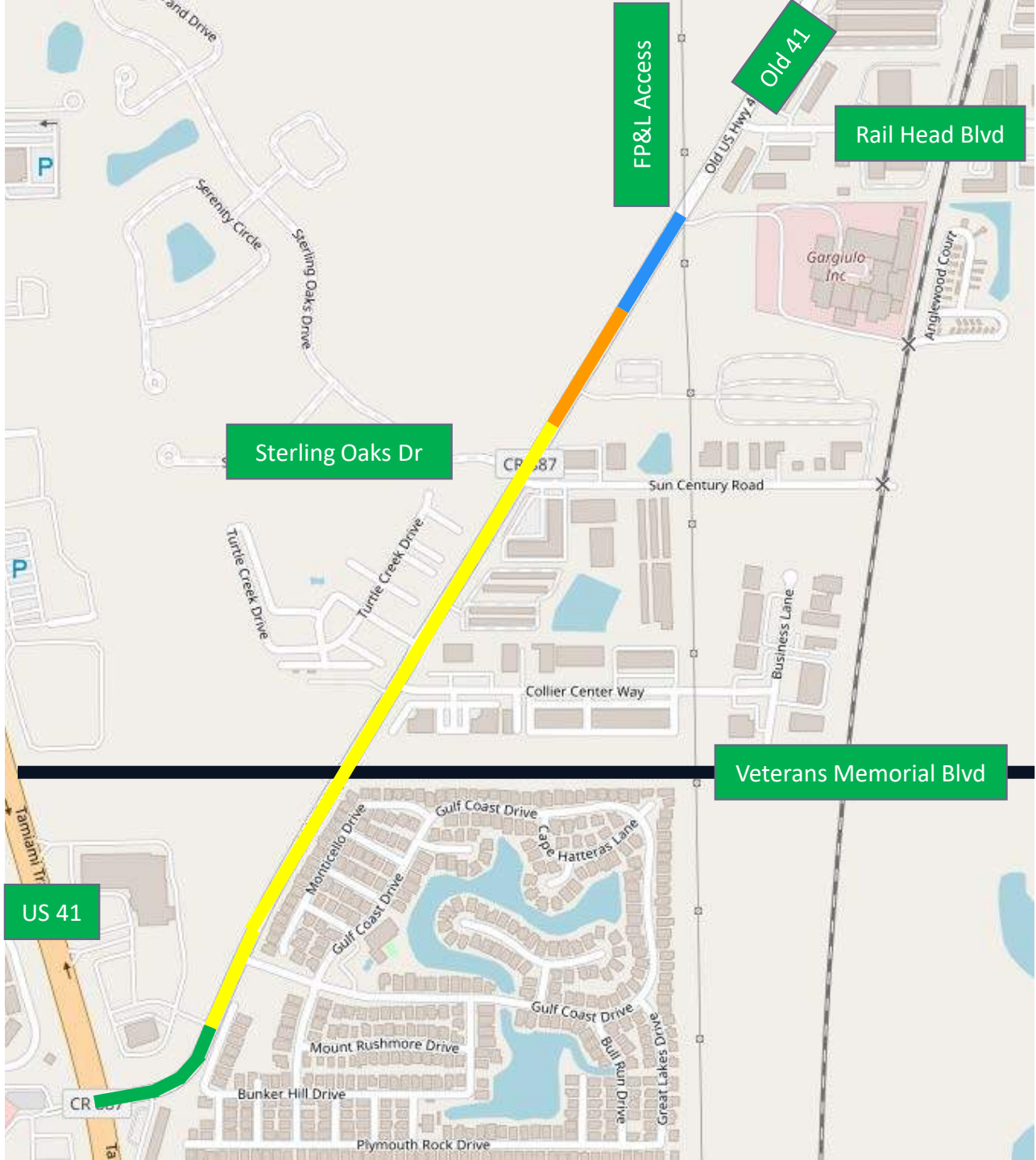
Typical Sections





Canal Segments

Canal Segment	Considerations
Segment A US 41 to CVS Driveway 500’	Numerous turn lanes at US 41 intersection. Proposed flattening of Old 41 curve approaching intersection.
Segment B CVS Driveway to N. of Sterling Oaks Dr 3,200’	Right turn lanes on east and west side of Old 41. Canal has 22’ or 16’ bottom and is typically located approx. 10’ off of ROW line.
Segment C N. of Sterling Oaks Dr to S. FP&L Access 700’	No turn lanes. Canal has 16’ bottom and is typically located at ROW line.
Segment D S. of FP&L Access to FP&L Access 600’	Includes roadway shift to accommodate right turn lane on east side at Rail Head Blvd.

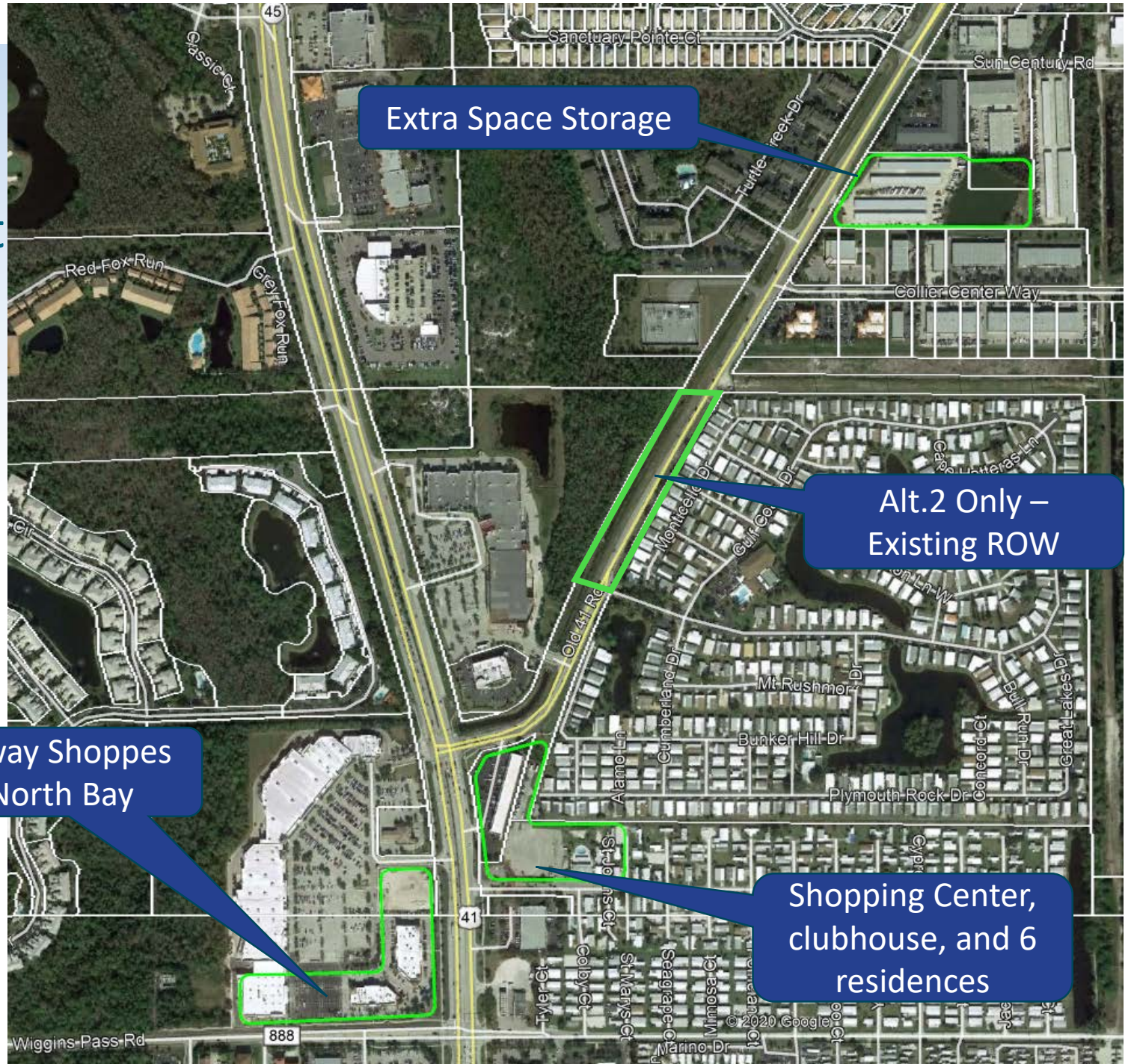


Does Open Canal plus Roadway Fit Within Existing ROW?

Canal Segment	Minimum Roadway + Path + Sidewalk Width	Required Open Canal Width	Total ROW Width Needed to Maintain Open Canal	Existing ROW	Canal Recommendation
Segment A - 500’ US 41 to CVS Driveway	125’ (SB turn lanes)	65’	190’	150’	Closed
Segment B - 3,200’ CVS Driveway to N. of Sterling Oaks Dr	125’ (NB and SB turn lanes)	45’ to 50’	170’ to 175’	150’	Closed
Segment C - 700’ N. of Sterling Oaks Dr to S. FP&L Access	103’ (no turn lanes)	32’ to 40’	135’ to 143’	150’	**Open**
Segment D - 600’ S. of FP&L Access to FP&L Access	114’ (NB turn lane)	45’	159’	150’	Closed

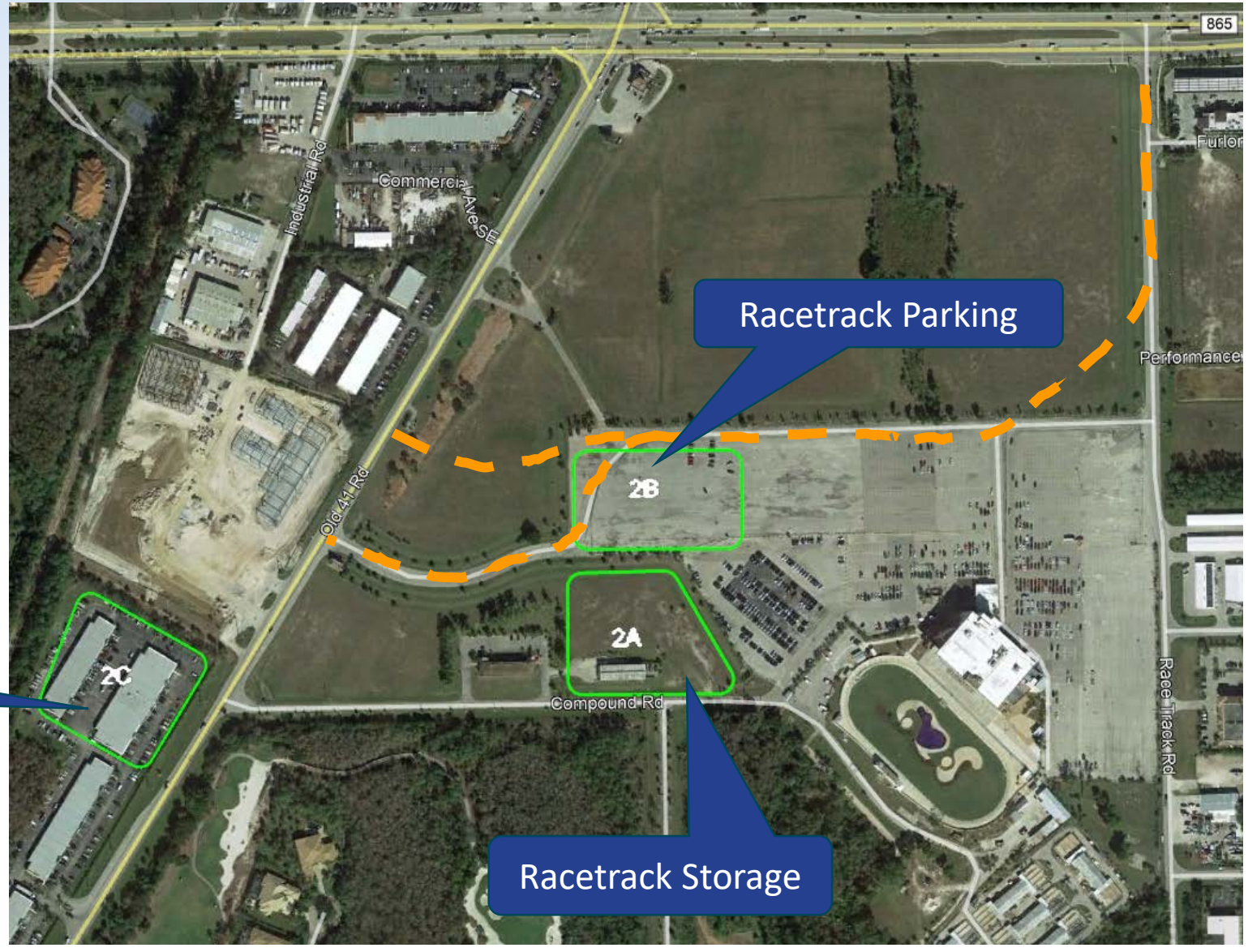
Ponds

- Compensatory Treatment
  - Collect pavement at least equivalent to new lanes
- Discharge to Dunruss Creek



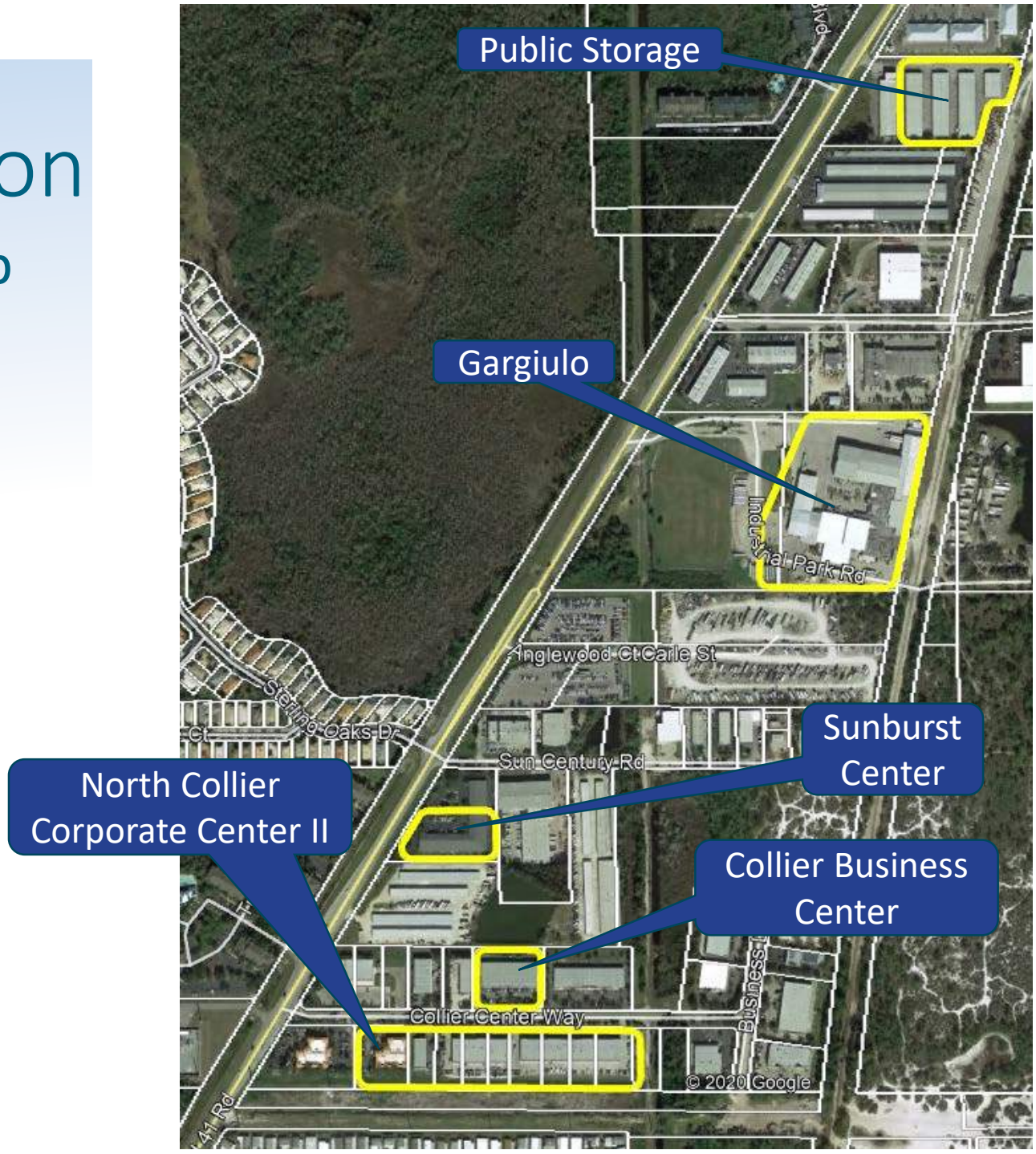
Ponds

- Preliminary evaluation
- Three options
  - Only one site needed
- Dependent on Quadrant Rd alignment and redevelopment



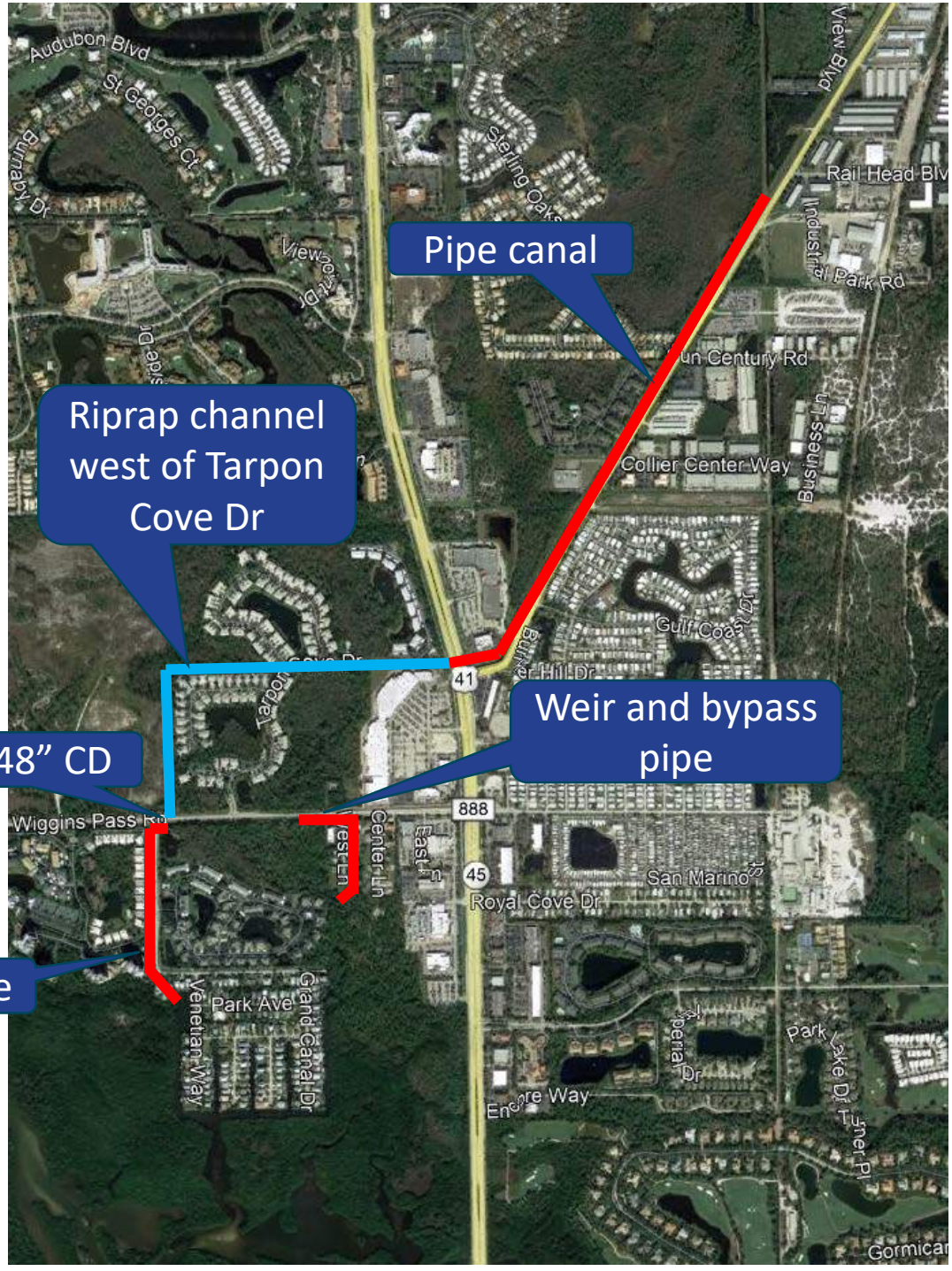
Floodplain Compensation

- Opt. 1: Conventional Cup-for-Cup
  - 17.3 acres of impacts
    - All sites shown
  - 15 Parcels
    - Eight property owners
    - Numerous businesses
  - $36 million in property acquisition



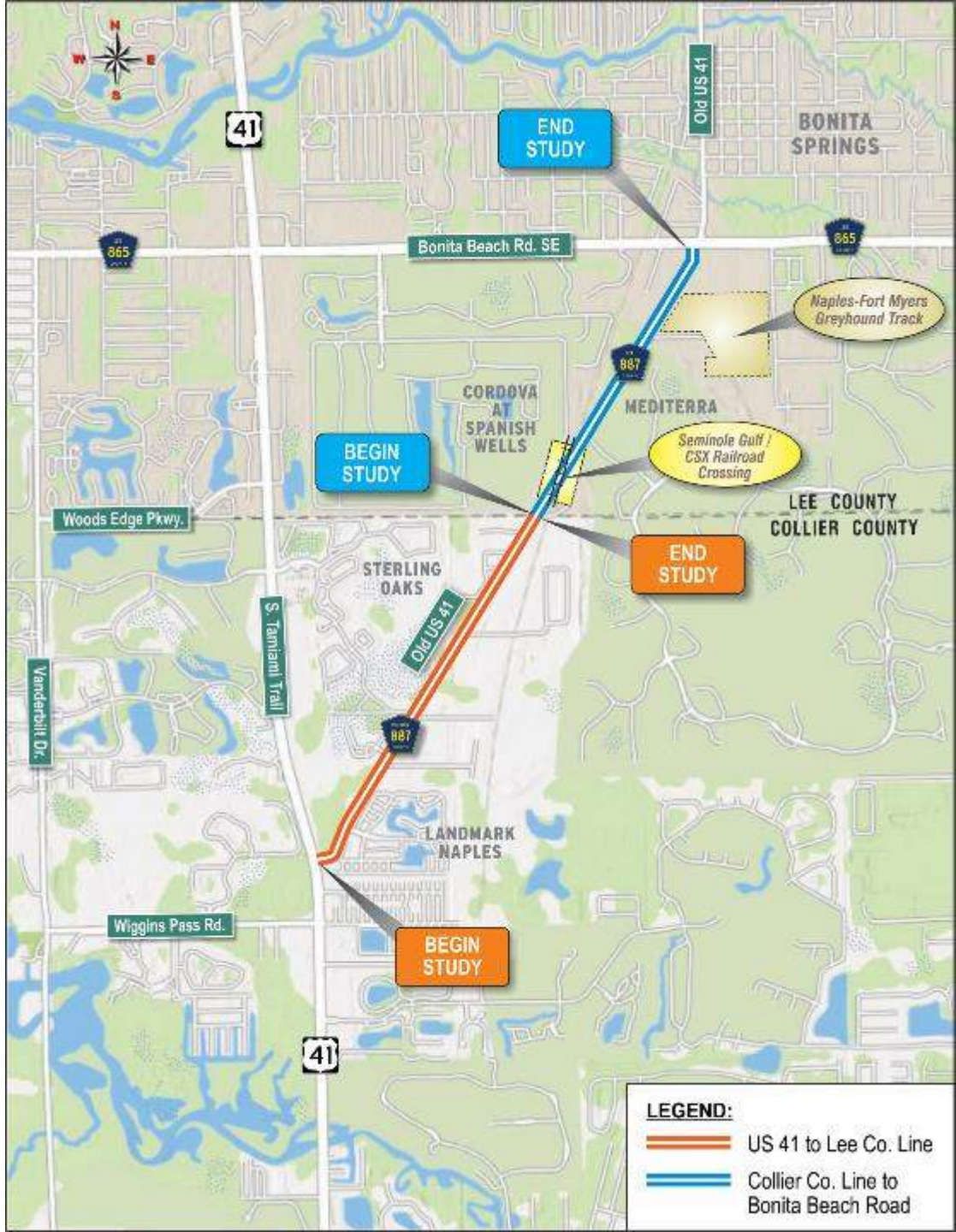
Floodplain Compensation

- Opt. 2: Improved Conveyance
  - Riprap lining from Tarpon Cove Dr. to Wiggins Pass Road
  - New 48” cross drain under Wiggins Pass Road
  - Weir and 800’ bypass pipe south of Wiggins Pass Road to West Lane
- No ROW impacts anticipated
- Approx. $1.1 million construction
- Lower flood stages along Old US 41
- Slightly higher flood stages south of West Lane



Regional Stormwater Management





Environmental

Conservation Easements

- Triangle Parcel
- Turtle Creek
- Sterling Oaks
- Constitution Center
- Mediterra Phase 2
- Avoid to the extent possible
  - If not possible, may need to lift/revise the CE legal document and replace the mitigation



Preliminary Wetland/ OSW impacts

- **Alignment/intersection development still in progress**
- Roadway
  - Wetlands – 2.94 ac.
  - OSWs – 5.26 ac.
- Stormwater Ponds (subject to change)
  - OSWs – Range from 0.13 – 1.5 ac.
- Impacts still to be developed in PD&E, with additional E&R during Design phase
- No UMAM FL calculated yet







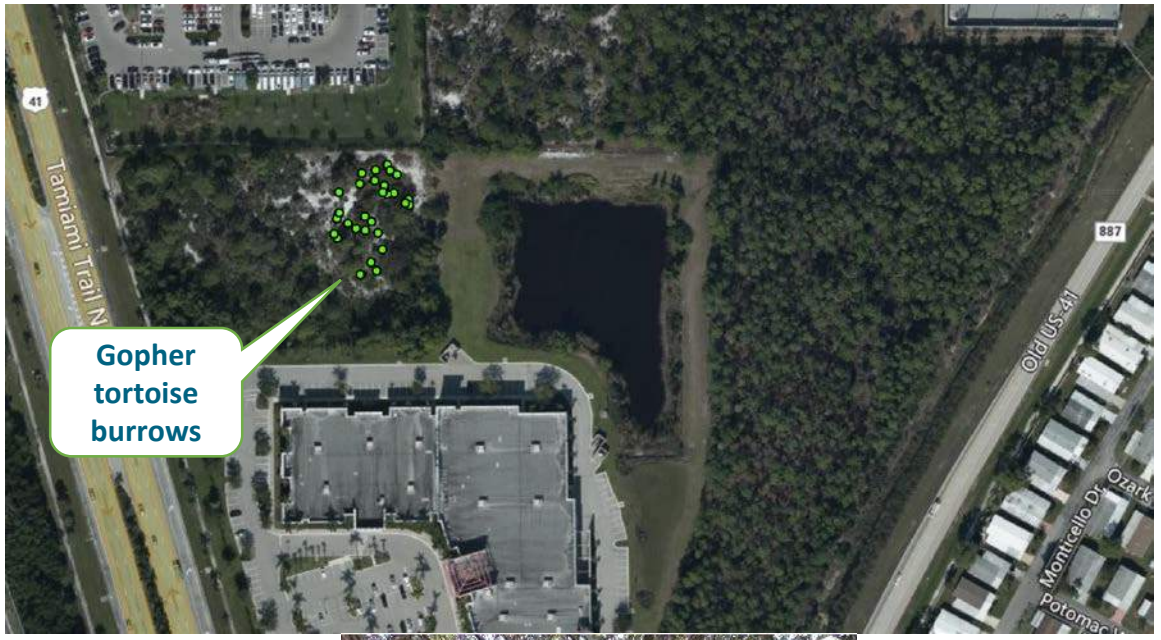
Preliminary Wetland/ OSW impacts

- Potential mitigation bank (MB) service area/options
  - Big Cypress – WRAP
  - Corkscrew Regional – WRAP
  - Panther Island/Expansion – M-WRAP
  - Little Pine Island – LPI funct. Assessment methodology
- ERP Permit through SFWMD, CWA 404 permit through FDEP
  - No involvement w/ retained waters



Protected Species

- NRE is evaluating involvement with:
  - 14 federally protected species (11 listed) – 4 plants, 10 vertebrates
  - 50 additional state protected species – 41 plants, 9 vertebrates
- Addressed in NRE Report
- Sent to USFWS, NMFS, USACE, USEPA, FWC, SFWMD, FDEP, FDACS during PD&E phase w/ follow-up as needed during Design & Construction phases





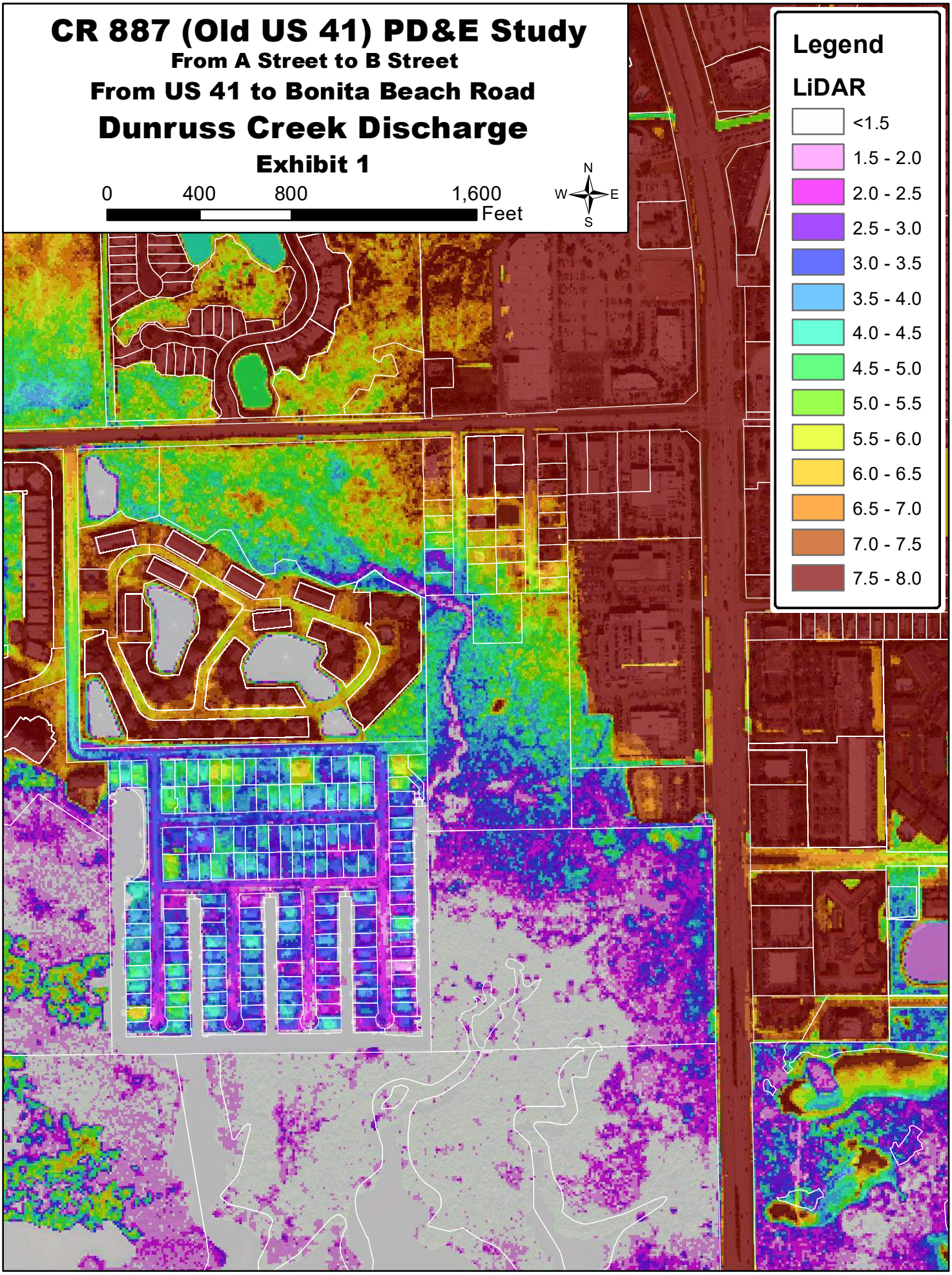
Thank You










CR 887 (Old US 41) PD&E Study
From A Street to B Street
From US 41 to Bonita Beach Road
Dunruss Creek Discharge
Exhibit 1
0
400
800
1,600
Feet
N
W
E
S
Legend
LiDAR
<1.5
1.5 - 2.0
2.0 - 2.5
2.5 - 3.0
3.0 - 3.5
3.5 - 4.0
4.0 - 4.5
4.5 - 5.0
5.0 - 5.5
5.5 - 6.0
6.0 - 6.5
6.5 - 7.0
7.0 - 7.5
7.5 - 8.0

Appendix F | Supporting Documentation

NOAA Precipitation Frequency Data Server IDF

NCAT Datum Conversion

Existing Permits

NOAA Precipitation Frequency Data Server IDF

NOAA Atlas 14, Volume 9, Version 2
Location name: Naples, Florida, USA*
Latitude: 26.3164°, Longitude: -81.7886°
Elevation: 15 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

AMS-based point precipitation frequency estimates with 90% confidence intervals (in inches/hour)[1]

Duration	Annual exceedance probability (1/years)								
	1/2	1/5	1/10	1/25	1/50	1/100	1/200	1/500	1/1000
5-min	**7.34** (6.07-9.00)	**9.06** (7.46-11.1)	**10.4** (8.50-12.9)	**12.1** (9.55-15.6)	**13.5** (10.4-17.7)	**14.9** (11.0-20.2)	**16.2** (11.4-22.9)	**18.1** (12.2-26.5)	**19.5** (12.8-29.2)
10-min	**5.38** (4.44-6.59)	**6.64** (5.46-8.17)	**7.60** (6.22-9.41)	**8.89** (7.00-11.5)	**9.88** (7.58-13.0)	**10.9** (8.03-14.8)	**11.9** (8.38-16.8)	**13.2** (8.95-19.4)	**14.3** (9.37-21.4)
15-min	**4.37** (3.61-5.36)	**5.40** (4.44-6.64)	**6.18** (5.05-7.65)	**7.23** (5.69-9.31)	**8.03** (6.17-10.6)	**8.84** (6.53-12.0)	**9.67** (6.82-13.6)	**10.8** (7.27-15.8)	**11.6** (7.62-17.4)
30-min	**3.39** (2.80-4.16)	**4.19** (3.45-5.15)	**4.80** (3.92-5.94)	**5.61** (4.42-7.23)	**6.24** (4.79-8.21)	**6.87** (5.07-9.34)	**7.51** (5.30-10.6)	**8.37** (5.65-12.3)	**9.02** (5.92-13.5)
60-min	**2.25** (1.86-2.76)	**2.77** (2.28-3.41)	**3.17** (2.59-3.92)	**3.70** (2.91-4.77)	**4.11** (3.16-5.41)	**4.53** (3.34-6.16)	**4.95** (3.49-6.99)	**5.51** (3.72-8.08)	**5.94** (3.90-8.90)
2-hr	**1.40** (1.16-1.71)	**1.72** (1.42-2.11)	**1.97** (1.62-2.42)	**2.30** (1.82-2.94)	**2.55** (1.97-3.34)	**2.81** (2.09-3.80)	**3.07** (2.18-4.31)	**3.42** (2.32-4.98)	**3.69** (2.44-5.48)
3-hr	**1.02** (0.850-1.24)	**1.26** (1.05-1.54)	**1.45** (1.19-1.78)	**1.70** (1.35-2.17)	**1.90** (1.47-2.47)	**2.09** (1.56-2.82)	**2.30** (1.64-3.21)	**2.57** (1.75-3.73)	**2.78** (1.84-4.12)
6-hr	**0.576** (0.481-0.694)	**0.737** (0.614-0.891)	**0.863** (0.715-1.05)	**1.04** (0.829-1.32)	**1.17** (0.915-1.52)	**1.32** (0.986-1.76)	**1.46** (1.05-2.03)	**1.66** (1.14-2.40)	**1.81** (1.21-2.67)
12-hr	**0.314** (0.264-0.376)	**0.423** (0.354-0.509)	**0.511** (0.425-0.618)	**0.635** (0.511-0.808)	**0.734** (0.576-0.951)	**0.837** (0.632-1.12)	**0.945** (0.683-1.31)	**1.10** (0.759-1.58)	**1.21** (0.817-1.78)
24-hr	**0.179** (0.151-0.213)	**0.242** (0.204-0.289)	**0.296** (0.247-0.355)	**0.374** (0.304-0.476)	**0.438** (0.347-0.568)	**0.508** (0.387-0.678)	**0.581** (0.424-0.806)	**0.687** (0.480-0.985)	**0.771** (0.523-1.12)
2-day	**0.107** (0.091-0.126)	**0.139** (0.117-0.164)	**0.167** (0.140-0.199)	**0.210** (0.173-0.267)	**0.247** (0.197-0.319)	**0.287** (0.221-0.383)	**0.331** (0.244-0.458)	**0.395** (0.279-0.565)	**0.448** (0.306-0.646)
3-day	**0.079** (0.067-0.093)	**0.103** (0.087-0.122)	**0.124** (0.104-0.147)	**0.155** (0.127-0.196)	**0.181** (0.145-0.232)	**0.209** (0.161-0.277)	**0.240** (0.177-0.330)	**0.284** (0.201-0.404)	**0.320** (0.219-0.460)
4-day	**0.064** (0.055-0.075)	**0.084** (0.071-0.099)	**0.100** (0.085-0.119)	**0.125** (0.102-0.157)	**0.145** (0.116-0.185)	**0.167** (0.128-0.220)	**0.190** (0.140-0.260)	**0.223** (0.158-0.316)	**0.250** (0.172-0.358)
7-day	**0.044** (0.037-0.051)	**0.055** (0.047-0.065)	**0.065** (0.055-0.077)	**0.079** (0.065-0.099)	**0.091** (0.073-0.115)	**0.103** (0.080-0.135)	**0.116** (0.086-0.158)	**0.135** (0.096-0.190)	**0.150** (0.104-0.214)
10-day	**0.035** (0.030-0.041)	**0.044** (0.037-0.051)	**0.050** (0.043-0.059)	**0.060** (0.049-0.074)	**0.068** (0.055-0.085)	**0.076** (0.059-0.099)	**0.085** (0.063-0.115)	**0.097** (0.070-0.136)	**0.107** (0.074-0.153)
20-day	**0.025** (0.021-0.029)	**0.029** (0.025-0.034)	**0.033** (0.028-0.038)	**0.038** (0.031-0.046)	**0.041** (0.033-0.051)	**0.045** (0.035-0.058)	**0.049** (0.036-0.065)	**0.054** (0.039-0.075)	**0.058** (0.040-0.082)
30-day	**0.021** (0.018-0.024)	**0.024** (0.021-0.028)	**0.027** (0.023-0.031)	**0.030** (0.025-0.036)	**0.033** (0.026-0.040)	**0.035** (0.027-0.044)	**0.037** (0.028-0.049)	**0.040** (0.029-0.055)	**0.043** (0.030-0.060)
45-day	**0.017** (0.015-0.020)	**0.020** (0.017-0.023)	**0.022** (0.019-0.026)	**0.025** (0.020-0.030)	**0.027** (0.021-0.033)	**0.028** (0.022-0.036)	**0.030** (0.022-0.039)	**0.032** (0.023-0.043)	**0.033** (0.023-0.046)
60-day	**0.015** (0.013-0.017)	**0.018** (0.015-0.020)	**0.020** (0.017-0.023)	**0.022** (0.018-0.026)	**0.023** (0.019-0.028)	**0.025** (0.019-0.031)	**0.026** (0.019-0.034)	**0.027** (0.020-0.037)	**0.028** (0.020-0.040)

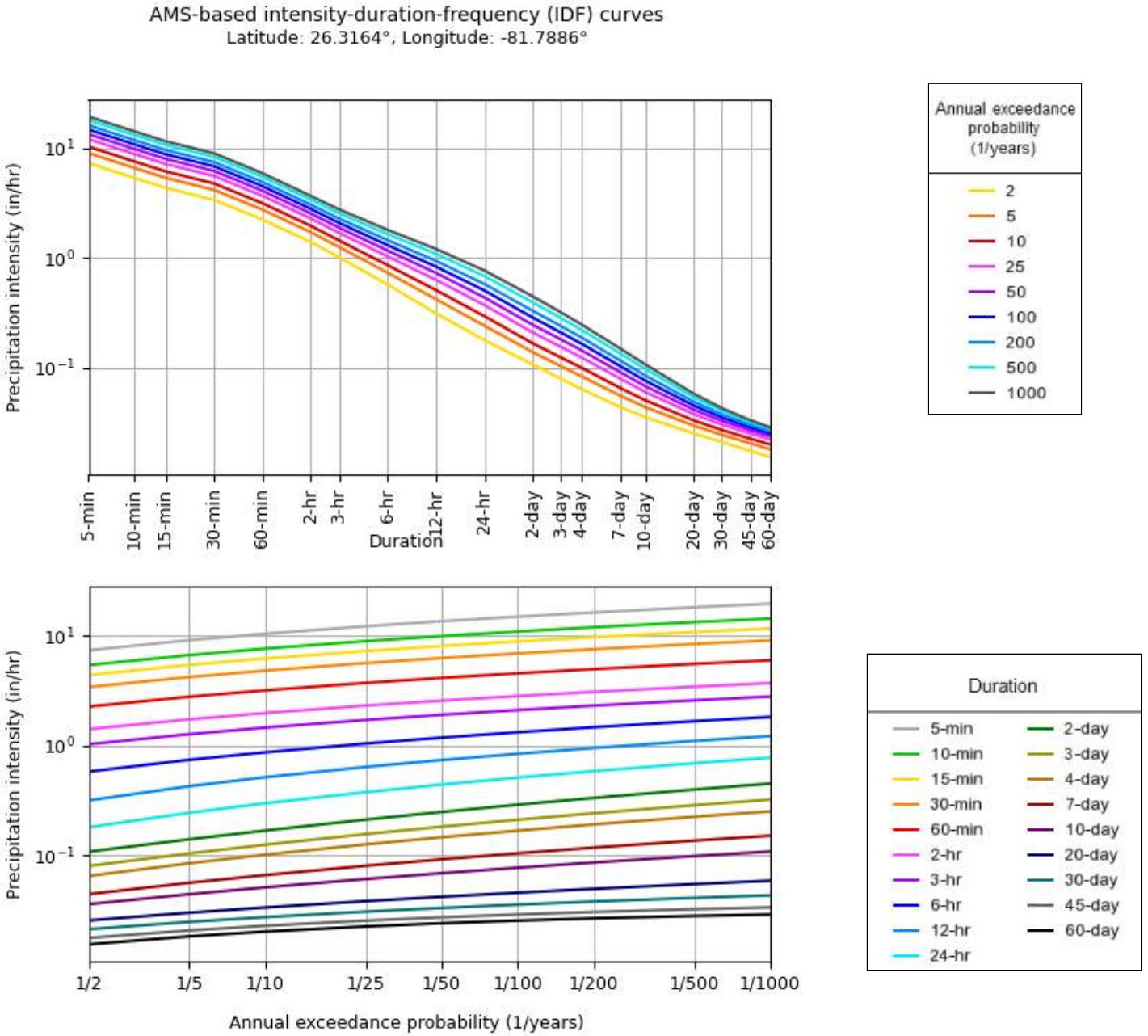
[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of annual maxima series (AMS).

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 annual exceedance probability) 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): Thu Feb 29 17:50:21 2024

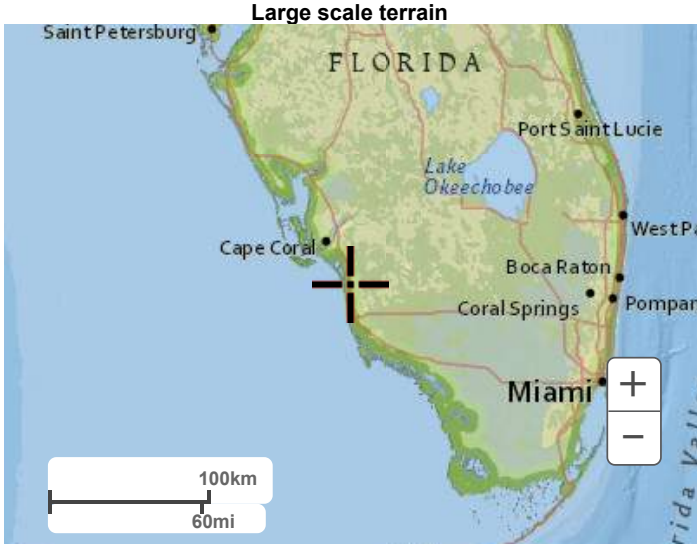
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Maps & aerials

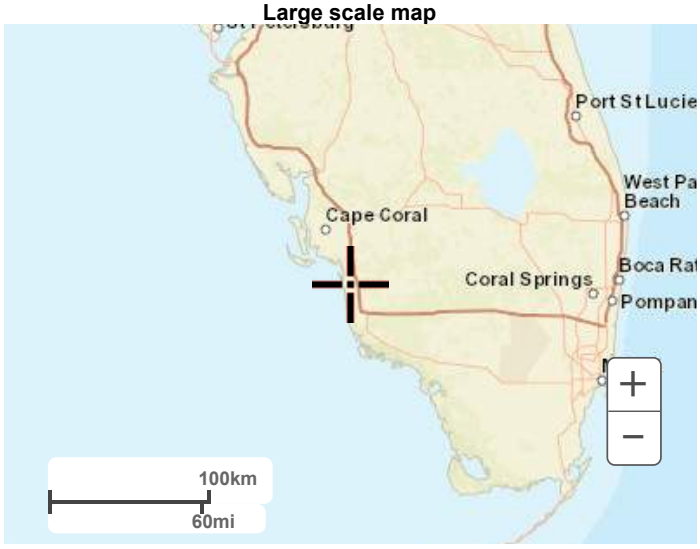
Small scale terrain



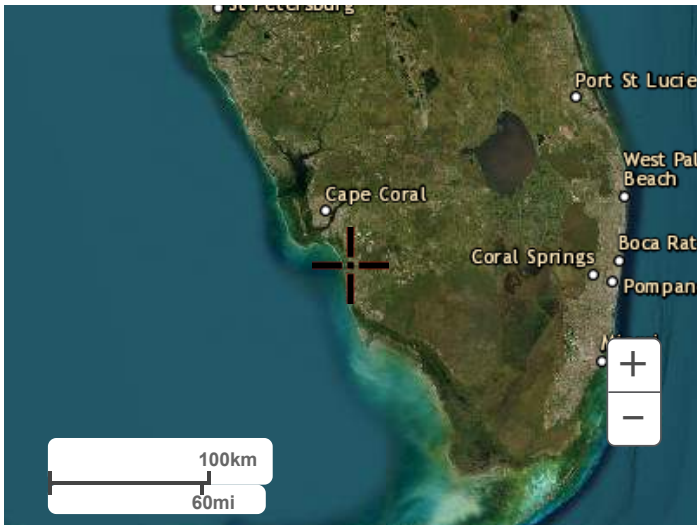
Large scale terrain



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

NCAT Datum Conversion

Transformed Coordinate

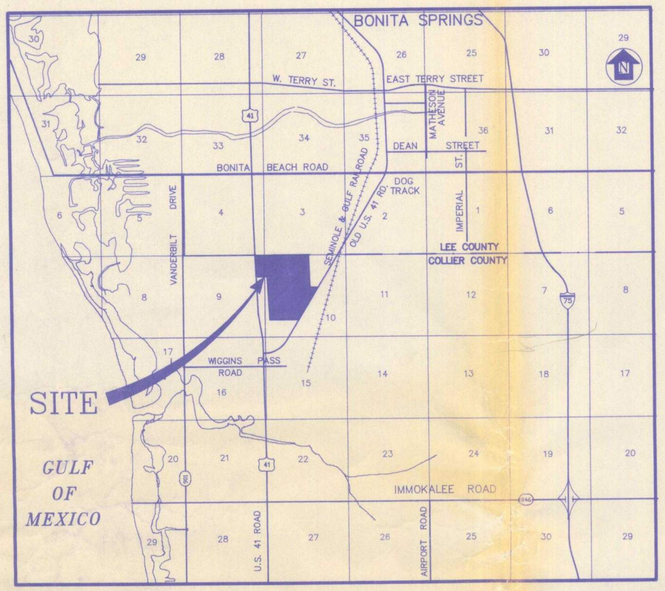
Input Coordinate		Output Coordinate		Total Change + Uncertainty	
Latitude	N26° 19′ 34.01155″ N261934.01155 26.3261143189	Latitude	N26° 19′ 34.01155″ N261934.01155 26.3261143189	Latitude	0.00000″ ±0.000000″ (0.000 m ±0.0000 m)*
Longitude	E278° 13′ 3.67538″ W0814656.32462 -81.7823123932	Longitude	E278° 13′ 3.67538″ W0814656.32462 -81.7823123932	Longitude	0.00000″ ±0.000000″ (0.000 m ±0.0000 m)*
Ellipsoid Height (usft)	Not given	Ellipsoid Height (usft)	Not given	Ellipsoid Height	Not given
Orthometric Height (usft)	1.001	Orthometric Height (usft)	-0.213	Orthometric Height	-1.214 usft ±0.023 usft
Reference Frame	NAD83(2011)	Reference Frame	NAD83(2011)		
Geopotential Datum	NGVD29	Geopotential Datum	NAVD88		

*Approximate value to aid interpretation and not an actual distance. See **TM NOS NGS 82** for more details.

Existing
Permits

Sterling Oaks ERP
SFWMD Permit No. 11-01042-2

11-01042-5



LOCATION MAP

N.T.S.

OWNER/DEVELOPER:

COMMUNITY DEVELOPMENT CORPORATION
OF SOUTHWEST FLORIDA, INC.
1100 5th AVENUE SOUTH, #401
NAPLES, FLORIDA 33940
(813) 649-1952

STERLING OAKS

PHASE ONE

LOCATED IN SECTIONS 9 & 10, TOWNSHIP 48S, RANGE 25E

COLLIER COUNTY, FLORIDA

PREPARED FOR :

COMMUNITY DEVELOPMENT CORPORATION

The tradition of quality continues.

PREPARED BY :

Q. GRADY MINOR AND ASSOCIATES, P.A.

CIVIL ENGINEERS ▪ LAND SURVEYORS ▪ PLANNERS

3800 VIA DEL REY

BONITA SPRINGS, FLORIDA 33923 (813) 947-1144

INDEX OF DRAWINGS

Ranna 229-1399

DRAWING NUMBER	DESCRIPTION
1	COVER SHEET AND INDEX OF DRAWINGS
2	KEY MAP
3	MASTER DRAINAGE PLAN
4	TRACT 'H' AND VICINITY MASTER PLAN
5	TRACT 'C' MASTER PLAN
6	TRACT 'C' PLAN AND PROFILE
7	TRACT 'C' PLAN AND PROFILE
8	TRACT 'C' PLAN AND PROFILE
9	TRACT 'E' MASTER PLAN
10	TRACT 'E' PLAN AND PROFILE
11	TARCT 'E' PLAN AND PROFILE
12	TRACT 'E' PLAN AND PROFILE
13	STERLING OAKS DRIVE - CONSTRUCTION ENTRANCE PLAN AND PROFILE STA. (-)2+00 TO STA. 10+00
14	STERLING OAKS DRIVE - CONSTRUCTION ENTRANCE PLAN AND PROFILE STA. 10+00 TO STA. 20+00
15	STERLING OAKS DRIVE PLAN AND PROFILE STA. 20+00 TO STA. 31+00
16	STERLING OAKS DRIVE PLAN AND PROFILE STA. 31+00 TO STA. 42+50
17	STERLING OAKS DRIVE PLAN AND PROFILE STA. 42+50 TO STA. 54+61.93
18	STERLING OAKS BOULEVARD PLAN AND PROFILE
19	OLD U.S. 41 DRAINAGE IMPROVEMENTS PLAN
20	GRADING, PAVING AND DRAINAGE DETAILS
21	GRADING, PAVING AND DRAINAGE DETAILS
22	GRADING, PAVING AND DRAINAGE DETAILS
23	GRADING, PAVING AND DRAINAGE DETAILS
24	WATER DISTRIBUTION SYSTEM DETAILS
25	SEWAGE COLLECTION SYSTEM DETAILS
26	LIFT STATION DETAILS
27	CLEARING PLAN
28	SIGNAGE AND STRIPING PLAN

REG COMP FILES
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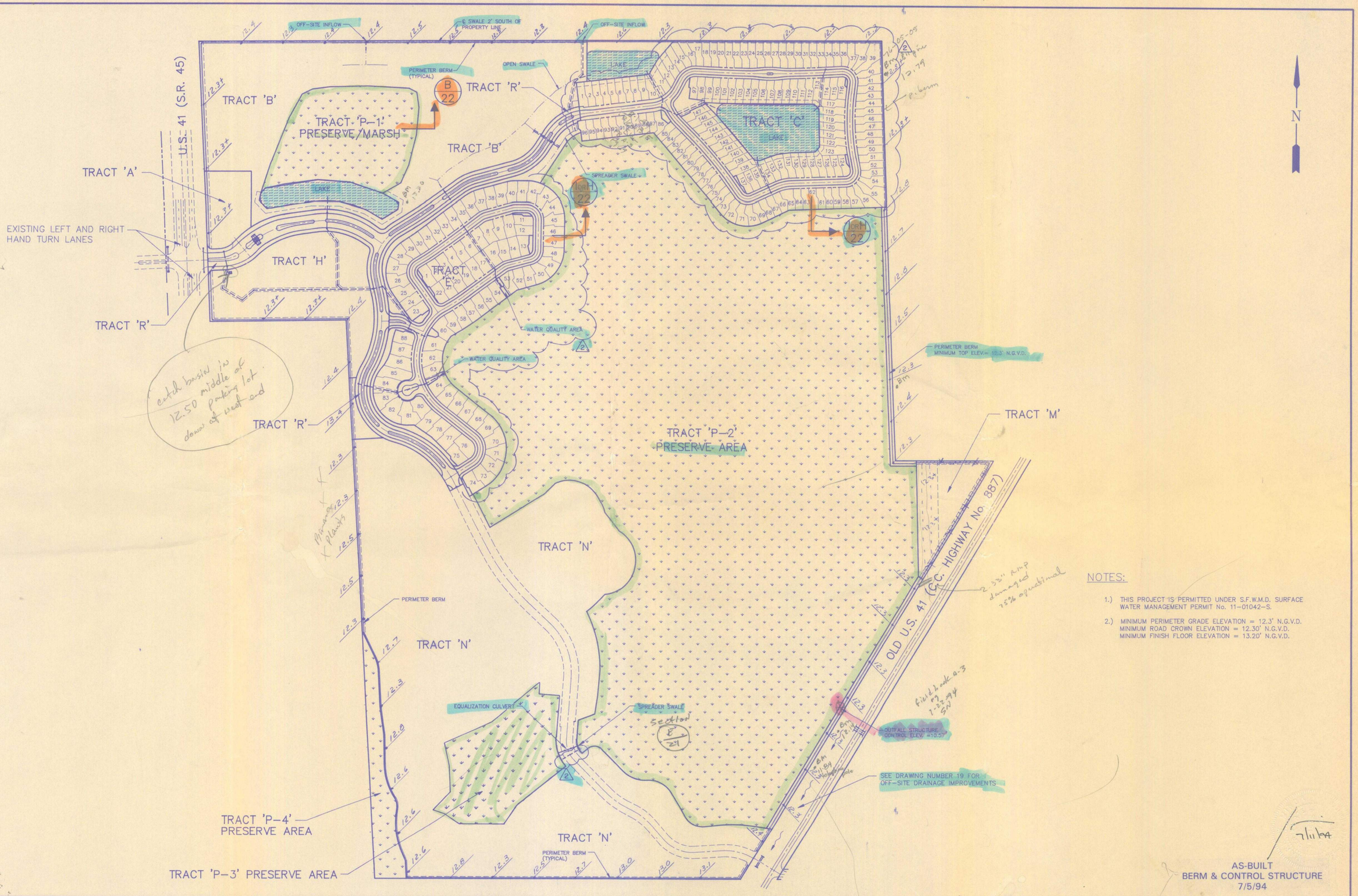
7/11/94

AS-BUILT WATER & SEWER FACILITIES, DRAINAGE STRUCTURES 6/3/94

AS-BUILT PVI GRADES 7-6-94

DATE: MARCH, 1993

DRAWING NUMBER 1 OF 28



NOTES:

1.) THIS PROJECT IS PERMITTED UNDER S.F.W.M.D. SURFACE WATER MANAGEMENT PERMIT No. 11-01042-S.

2.) MINIMUM PERIMETER GRADE ELEVATION = 12.3' N.G.V.D.
MINIMUM ROAD CROWN ELEVATION = 12.30' N.G.V.D.
MINIMUM FINISH FLOOR ELEVATION = 13.20' N.G.V.D.

AS-BUILT
BERM & CONTROL STRUCTURE
7/5/94

LEGEND

OWNER/DEVELOPER

COMMUNITY DEVELOPMENT CORPORATION OF SOUTHWEST FLORIDA, INC.
1100 5th AVENUE SOUTH, #401
NAPLES, FLORIDA 33940
(813) 649-1952

Revision	Date	Description	By
3	10/11/93	REVISE P-3	MWM
2	9/7/93	REVISED DRAINAGE IN TRACTS 'C' AND 'E' AND ADD CULVERT IN TRACT 'N' (SOUTH)	M.W.M.
1	6/14/93	ADDED SECTIONS 'B', 'H' & 'I' PER S.F.W.M.D.	M.W.M.

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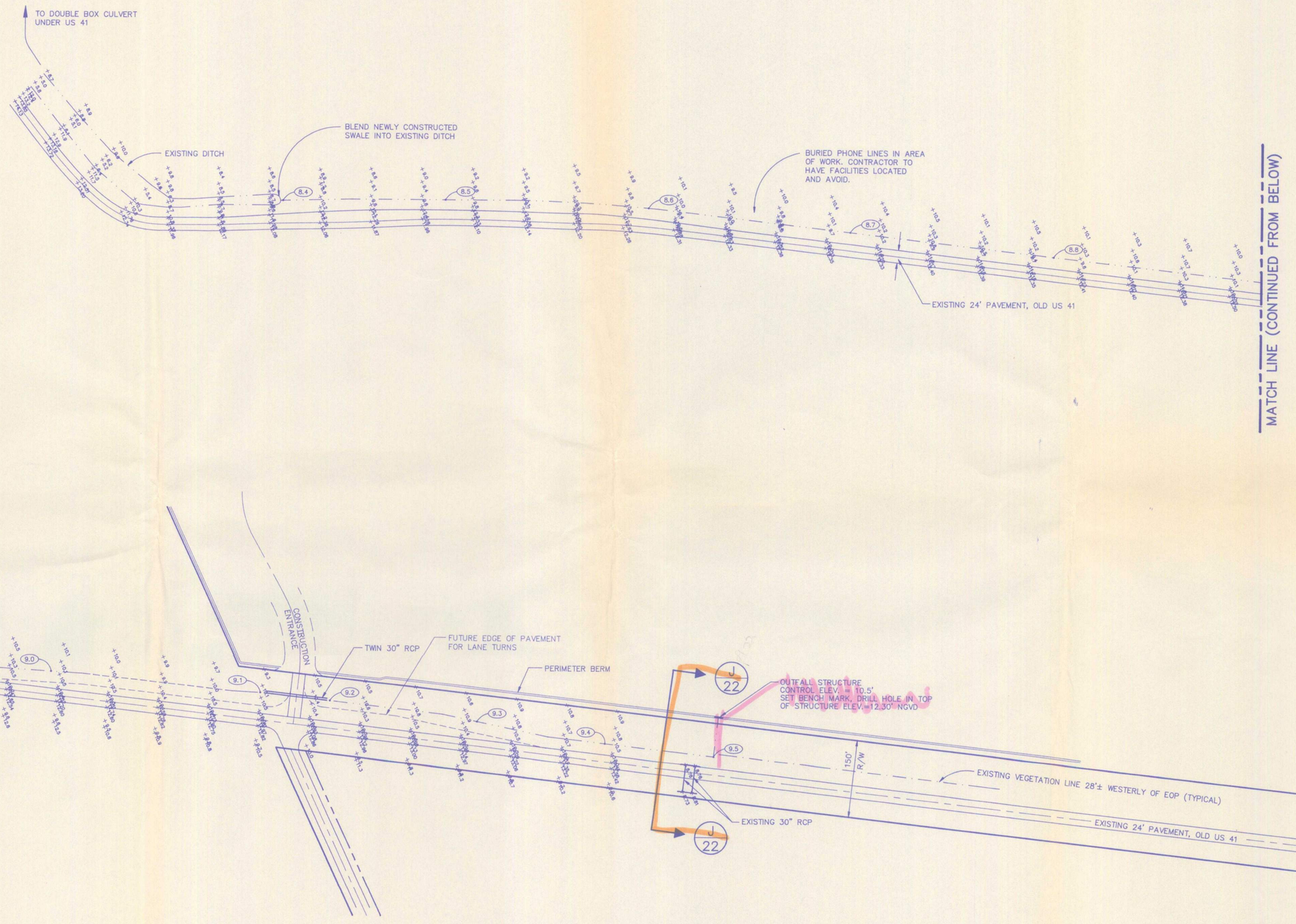
DESIGNED BY: M.W.M.
DRAWN BY: J.L.S.
APPROVED: M.W.M.
JOB CODE: SO.2
SCALE: 1"= 200'

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STERLING OAKS – PHASE ONE

MASTER DRAINAGE PLAN

DATE: MARCH, 1993
FILE NAME: SO2DMAST
DRAWING NUMBER 3 OF 28



LEGEND

- —·—·— ℄ SWALE
- (9.3) FINISH GRADE, NGVD
- +10.3 EXISTING GRADE, NGVD

OWNER/DEVELOPER

COMMUNITY DEVELOPMENT CORPORATION
OF SOUTHWEST FLORIDA, INC.
1100 5th AVENUE SOUTH, #401
NAPLES, FLORIDA 33940
(813) 649-1952

Revision	Date	Description	By

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DESIGNED BY:	M.W.M.
DRAWN BY:	J.L.S.
APPROVED:	M.W.M.
JOB CODE:	SO.2
SCALE:	1" = 100'

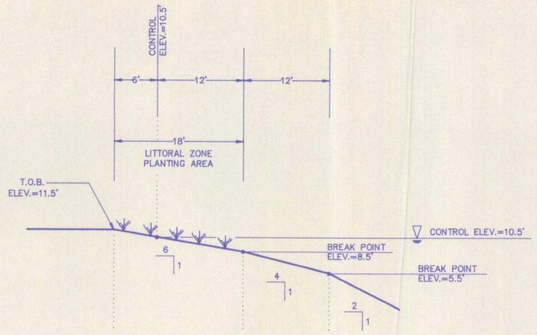
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BONITA SPRINGS, FLORIDA 33923 (813) 947-1144

7/11/94

STERLING OAKS – PHASE ONE

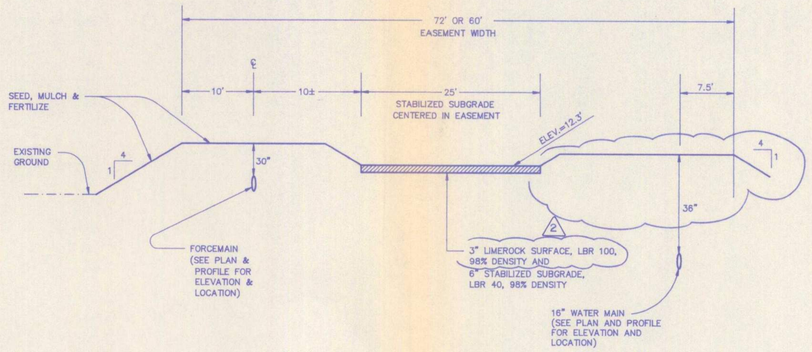
OLD U.S. 41 DRAINAGE IMPROVEMENTS PLAN

DATE:	FILE NAME:	DRAWING NUMBER
MARCH, 1993	SO2OLD41	19 OF 28

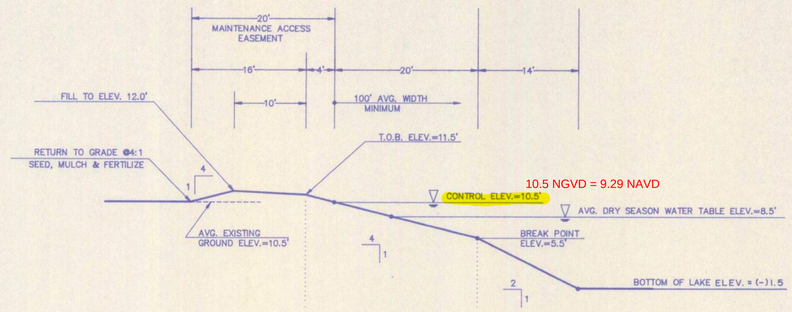


SECTION A/21

LAKE LITTORAL ZONE DETAIL

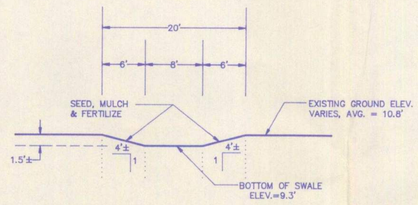


INGRESS/EGRESS, U.E. & D.E DETAIL THRU TRACT 'N'



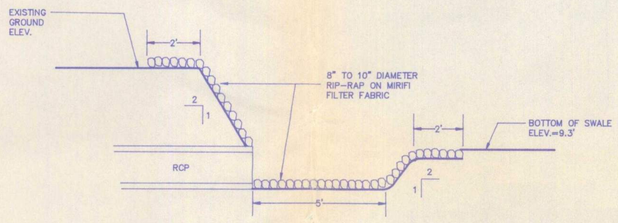
SECTION B/21

LAKE CROSS SECTION DETAIL

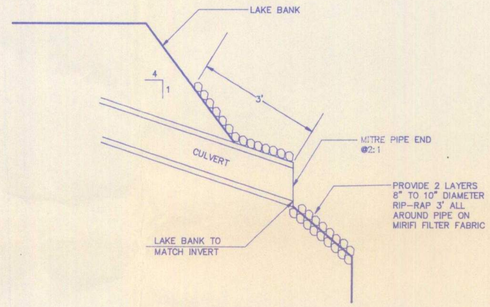


SECTION C/21

INTERIOR SWALE DETAIL

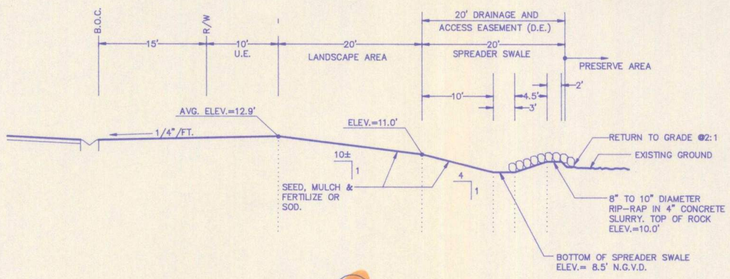


RIP-RAP SUMP DETAIL



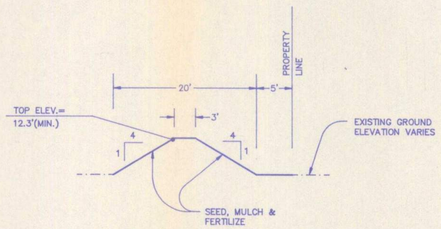
PIPE END TREATMENT AT LAKES

(N.T.S.)



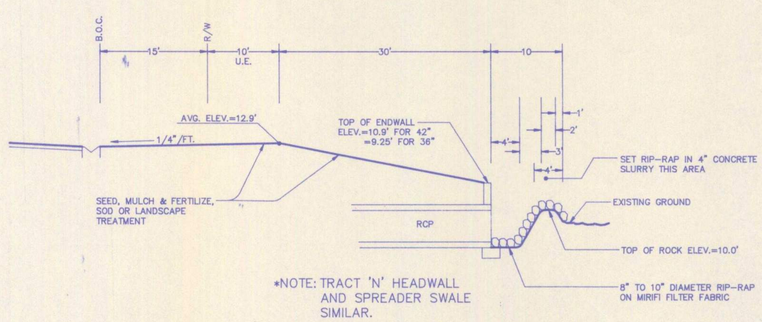
SECTION D/21

SPREADER SWALE AT LARGE PRESERVE



SECTION F/21

PERIMETER BERM DETAIL



*NOTE: TRACT 'N' HEADWALL AND SPREADER SWALE SIMILAR.

SECTION E/21

STRAIGHT ENDWALL AT SPREADER SWALE DETAIL

7/11/94

OWNER/DEVELOPER

COMMUNITY DEVELOPMENT CORPORATION OF SOUTHWEST FLORIDA, INC.
1100 5th AVENUE SOUTH, #401
NAPLES, FLORIDA 33940
(813) 649-1952

Revision	Date	Description	By
2	9/7/93	REVISE SECTION D/21 AND INGRESS/ EGRESS EASEMENT DETAIL	M.W.M.
1	6/15/93	REVISED PER COLLIER COUNTY COMMENTS	J.L.S.

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JUL 08 1994
Q. GRADY MINOR & ASSOCIATES, P.A.
CIVIL ENGINEERS • LAND SURVEYORS

DESIGNED BY:	M.W.M.
DRAWN BY:	T.C.
APPROVED:	M.W.M.
JOB CODE:	SO.2
SCALE:	NONE

Q. GRADY MINOR AND ASSOCIATES, P.A.
CIVIL ENGINEERS ■ LAND SURVEYORS ■ PLANNERS
3800 VIA DEL REY
BONITA SPRINGS, FLORIDA 33923 (813) 947-1144

STERLING OAKS – PHASE ONE

GRADING, PAVING & DRAINAGE DETAILS

DATE:	FILE NAME:	DRAWING NUMBER
MARCH, 1993	SO2GPDD2	21 OF 28

Somerset Palms Apartment Homes
FKA Arbor View ERP
SFWMD Permit No. 11-01542-P

Fort Myers Service Center
960726-4
Application Numb

ADDL/REVISED SUBMITTAL
DEC 1 1 1996
FORT MYERS SERVICE CENTER

STORMWATER MANAGEMENT CALCULATIONS (REVISED)

FOR

ARBOR VIEW

SCANNED

ADDL/REVISED SUBMITTAL
DEC 1 1 1996
FORT MYERS SERVICE CENTER

INTRODUCTION

The subject parcel is located on the west side of Old U.S. 41 and approximately 1.5 miles south of Bonita Beach Road and .25 miles south of the Lee/Collier County line. It contains a total of 22.37± acres.

The proposed water management system will consist of a 1.56 acre conservation/detention and lake area, and a storm sewer pipe system. A control structure will be sized to control the discharge to 0.04 cfs/ac, in accordance with Collier County Ordinance 90-10. The discharge will be directed into the FP&L easement ditch. This ditch directs the flow to the south and eventually into tidal water of Wiggins Bay (see attached drawing). The system as proposed, will meet the requirements of SFWMD and Collier County for water quality and water quantity.

1. WATER MANAGEMENT SYSTEM:

Total Area	=	22.37 (11.35) **
Allowable Discharge	=	0.04 cfs/acre (per Collier county Ordinance 90-10)
	=	0.04 cfs/acre (11.35 acres) = 0.45 cfs
Time of Concentration	=	$2(11.35/640)^{.5} = 0.27$ hrs.
10-Year Rainfall (1 day)	=	6.8"
25-Year Rainfall (1 day)	=	8.4"
100-Year Design Rainfall(1 day)	=	10.6"

Fort Myers Service Center
960726-4
Application Numb

A. Area Breakdown

Description	Area (AC)	% Impervious	Impervious Acres
Buildings	1.81	100	1.81
Pavement	3.26	100	3.26
Conservation/Detention and Lake	1.56	100	1.56
Conservation Area*	~~9.03~~	0	0.00
Open Space	4.72	0	0.00
Portion of Berm Draining Away From Property *	0.89	0	0.00
Eastern Half of FPL Easement*	1.10	0	0.00
Total Drainage Area **	11.35		6.63
%Impervious 6.63/11.35 = 0.58			

- Exclude from total drainage area.

SCANNED

Fort Myers Service Center
960726-4
Application Numb

B. Assumed Elevations

Maintained Water Level	=	10.70'
Minimum Road Crest and Perimeter Berm	=	12.65
Minimum Finish Floor	=	12.80
Average Open Space	=	12.65

10.7 NGVD = 9.49 NAVD

C. Soil Storage

Depth to the Developed Water Table = 12.70 - 10.70 = 2.00'

S = 2.50" (as per Vol. 4 - Chart C-III-3)

S_C = 2.50" (1 - 0.58) = 1.05"

D. Stage/Storage

	Area (Acres)				Volume
Stage (NGVD)	Conservation Detention & Lake Area	Open Space Area	Pavement	Total	(AC-FT)
10.7	1.56	0	0	1.56	0
11.0	1.56	0.47	0	2.03	0.539
11.5	1.56	1.57	0	3.13	1.829
12.0	1.56	3.54	0	5.10	3.886
12.5	1.56	3.78	0	5.34	6.496
13.0	1.56	4.72	2.93	9.21	10.134
13.5	1.56	4.72	3.26	9.54	14.821
14.0	1.56	4.72	3.26	9.54	19.591

ADDL/REVISED SUBMITTAL
DEC 1 1 1996
FORT MYERS SERVICE CENTER

E. Water Quality Calculations

This project proposed the use of a wet detention system to meet the water quality standards by detaining the larger of the two following volumes.

1. 1.0" (1ft/12in) 11.35 ac = 0.95 ac. ft.
2. 2.5" (1ft/12in) x %impervious (11.35 ac)

$$\%\text{impervious} = \frac{11.35 - (1.81 + 4.72 + 1.56)}{11.35 - (1.81 + 1.56)} = \frac{3.26}{7.98} = 40.85$$

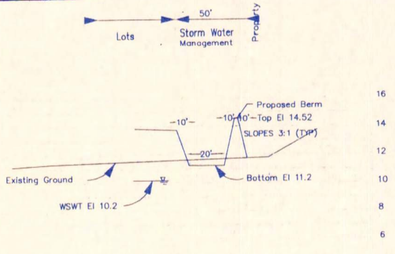
(Roof, Open, Lake)

2.5" (1ft/12in) (40.85) x 11.35 ac = 0.97 ac-ft

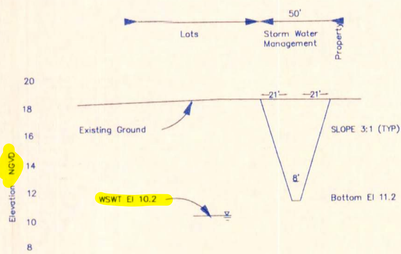
0.97 ac. ft can be detained by setting the main weir crest at elevation 11.17 feet.

SCANNED

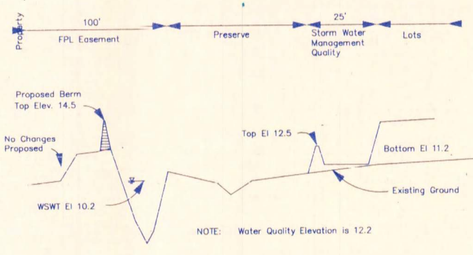
North Collier Industrial Center ERP
SFWMD Permit No. 11-01644-P



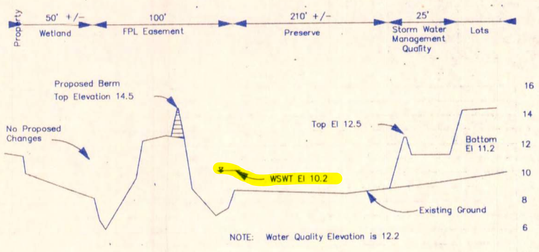
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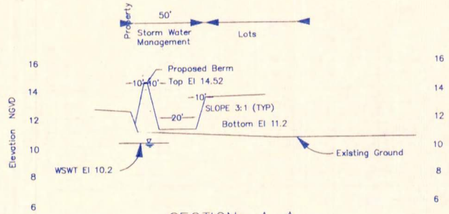
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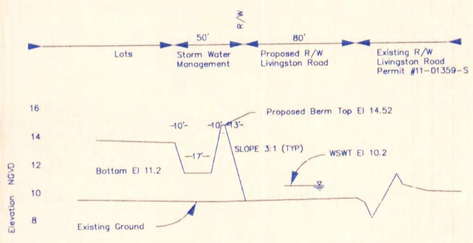
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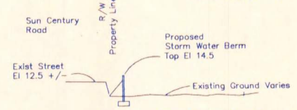
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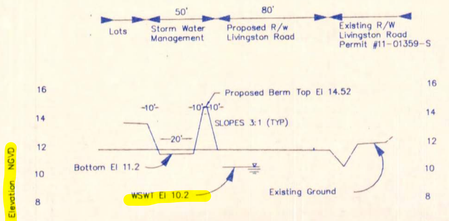
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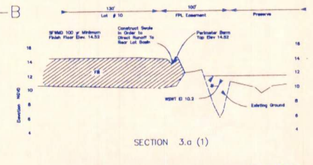
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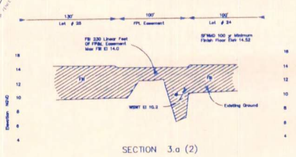
SECTION AT NORTHERN PROPERTY LINE
CUT NORTH–SOUTH
SECTION J–J
NTS



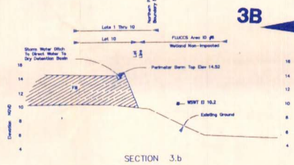
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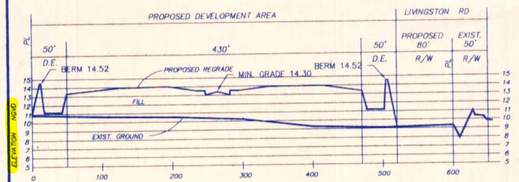
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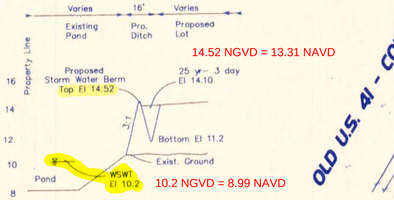
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SECTION 3.b

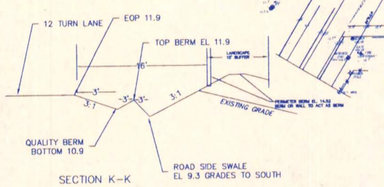


TYPICAL CROSS–SECTION
SECTION "H–H"

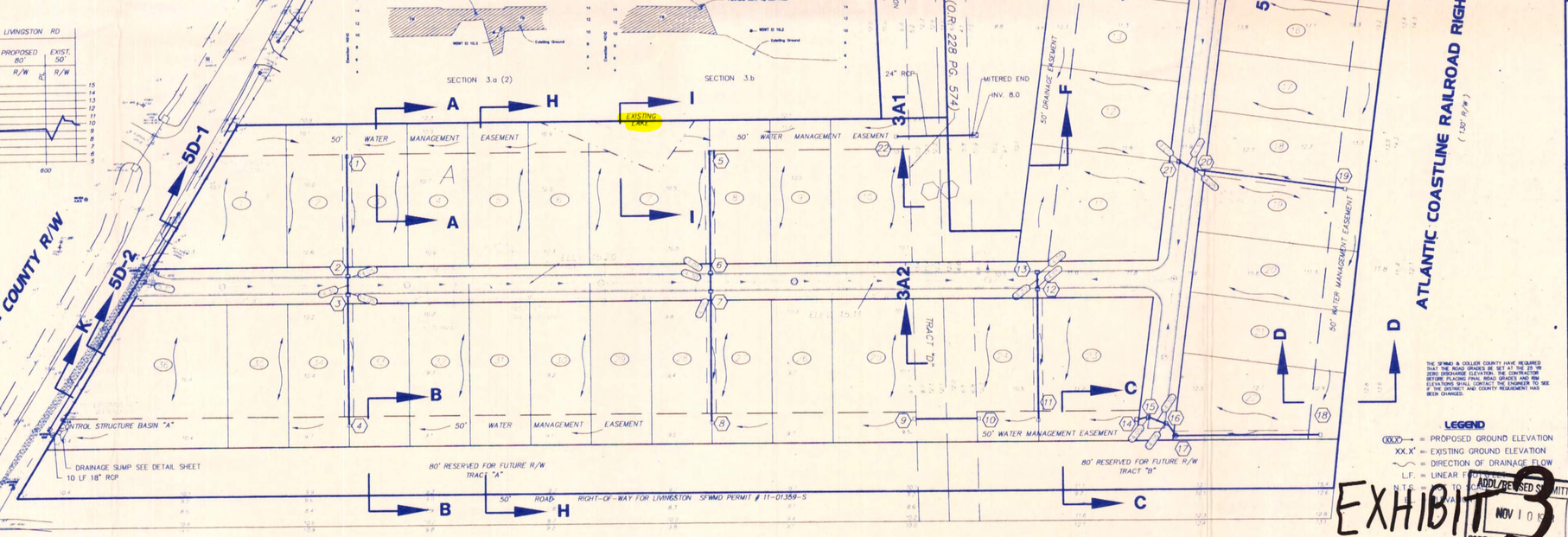


SECTION I–I

SECTION AT EXISTING POND
CUT PERPENDICTULAR TO BANK
TYPICAL EAST–WEST & NORTH–SOUTH



SECTION K–K



THE SFWMD & COLLIER COUNTY HAVE REQUIRED THAT THE ROAD GRADES BE SET AT THE 25 YR ZERO DISCHARGE ELEVATION. THE CONTRACTOR BEFORE PLACING FINAL ROAD GRADES AND RIM ELEVATIONS SHALL CONTACT THE ENGINEER TO SEE IF THE DISTRICT AND COUNTY REQUIREMENT HAS BEEN CHANGED.

LEGEND

- XX.X = PROPOSED GROUND ELEVATION
- XX.X' = EXISTING GROUND ELEVATION
- = DIRECTION OF DRAINAGE FLOW
- L.F. = LINEAR FEET
- N.T.S. = NOT TO SCALE

NUMBER	TYPE	FROM	TO	LENGTH	SIZE	INVERT	GRATE EL.
1	DITCH	1	2	200	24"	8.0'	11.20'
2	GUTTER	2	3	28	24"	5.7	13.88'
3	GUTTER	3	4	200	24"	5.7	13.88'
4	DITCH	–	–	–	–	6.5'	11.20'
5	DITCH	5	6	200	24"	8.0'	11.20'
6	GUTTER	6	7	28	24"	9.00'	13.88'
7	GUTTER	7	8	200	24"	9.00'	13.88'

NUMBER	TYPE	FROM	TO	LENGTH	SIZE	INVERT	GRATE EL.
8	DITCH	–	–	–	–	8.00'	11.20'
9	DITCH	9	10	100	30"	7.0'	11.20'
10	DITCH	–	–	–	–	7.0'	11.20'
11	DITCH	11	12	200	30"	8.00'	11.20'
12	GUTTER	12	13	50	24"	8.33'	13.88'
13	GUTTER	13	14	30	24"	8.33'	13.88'
14	DITCH	–	–	–	–	8.00'	11.20'
15	DITCH	15	16	20	30"	7.0'	13.88'

NUMBER	TYPE	FROM	TO	LENGTH	SIZE	INVERT	GRATE EL.
16	DITCH	16	17	28	30"	7.0'	13.88'
17	DITCH	17	18	240	30"	8.50	11.20'
18	DITCH	–	–	–	–	8.50'	11.20'
19	DITCH	19	20	235	24"	8.0'	11.20'
20	GUTTER	20	21	30	24"	5.10'/9.0'	13.88'
21	GUTTER	21	22	225	24"	9.0'/5.10'	13.88'
22	DITCH	–	–	130	24"	8.0	11.2

REVISIONS
REVISED FOR SFWMD 9/4/98

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CLIENT: **COMMERCIAL DEVELOPMENT COMPANY**

TITLE: **NORTH COLLIER INDUSTRIAL CENTER**
FINAL SUBDIVISION CONSTRUCTION PLANS
MASTER DRAINAGE PLAN

PURSE Associates, inc.
BONITA OAKS SQUARE - UNIT 9
4450 BONITA BEACH ROAD
BONITA SPRINGS, FLORIDA 34134
PH. (941) 948-2100 FAX (941) 948-2102

SCALE: 1" = 100' DATE: 04/1998
SHEET 4 OF 7
FILE NO.: REV.:
SHEET_4.DWG
ACAD FILE: C:\ACADDWGS\N.C.I.P.\FINAL_SUB

EXHIBIT 3
ADDL/REVISED SUBMITTAL
NOV 10 1998
FORT MYERS SERVICE CENTER

FINAL APPROVED BY GB
DEC 15 1998

APPLICATION NUMBER
980402-5
1101644P

WPB

Mediterra ERP
SFWMD Permit No. 11-01761-P

CONSTRUCT & OPERATION

TABLE A: LAND USE SUMMARY

	DRAINAGE AREAS (ACRES)						TOTAL DRAINAGE AREAS (ACRES)
	DA1	DA2	DA3	DA4	DA5	DA6	
CONSERVATION AREAS	0.0	11.4	100.8	142.7	65.0	35.5	355.4
MAINTENANCE FACILITY	5.7	0.0	0.0	0.0	0.0	0.0	5.7
GOLF COURSE / OPEN SPACE	127.5	3.2	81.8	116.5	51.6	24.5	405.1
RIGHT-OF-WAY (R.O.W.) - INTERNAL	23.4	4.2	15.0	32.4	14.3	10.1	99.4
LAKE	51.6	3.8	27.7	41.1	14.8	19.7	158.5
TOWN CENTER	4.0	0.0	8.0	8.5	0.0	0.0	20.5
RESIDENTIAL	58.7	18.1	43.7	98.7	41.3	31.4	291.9
SALES CENTER	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EXTERNAL R.O.W. (LIVINGSTON RD. N/S)	12.2	0.0	0.0	6.2	0.0	14.0	32.4
LAKE BANK	14.3	1.4	9.0	14.6	5.2	4.9	49.4
PARK	1.9	0.0	0.3	4.4	.6	2.0	9.2
Total Area	299.2	42.2	286.0	465.2	192.6	142.3	1427.5
Impervious (Roof)	20.5	5.4	16.3	33.0	12.4	9.4	97.0
Impervious (Pavement)	47.2	9.6	28.1	63.3	24.4	25.9	198.5

1. PROJECT DRAINAGE AREA = 1427.5 ACRES
   (INCLUDING CONTRIBUTING AREA FROM PORTION OF LIVINGSTON ROAD AND GREYHOUND INDUSTRIAL PARK)
2. OFF-SITE DRAINAGE AREAS:
   OFF 160 = 160 ACRES
   OFF 70 = 70 ACRES
   OFF 80 = 80 ACRES
   OFF 40 = 40 ACRES
   TOTAL OFF-SITE DRAINAGE AREAS = 350 ACRES
3. TOTAL DRAINAGE AREA = 1777.5 ACRES
4. AREA EXCLUDED FROM SURFACE WATER MANAGEMENT SYSTEM:
   A.) CONSERVATION AREA 21 = 0.9 ACRES
   ⚠⚠ B.) APPLICANT OWNED LAND CONTIGUOUS TO THE MEDITERRA PROPERTY REMAINING UNDEVELOPED:
   LINDNER PARCEL = 35.2 ACRES
   WETLAND = 4.3 ACRES
   PERVIOUS (UPLAND) = 30.9 ACRES
   (REFERENCE EXISTING CONDITIONS ON LINDNER PARCEL LETTER TO S.F.W.M.D. DATED 10-12-00)

CONSTRUCT & OPERATION

TABLE B: WATER MANAGEMENT SUMMARY

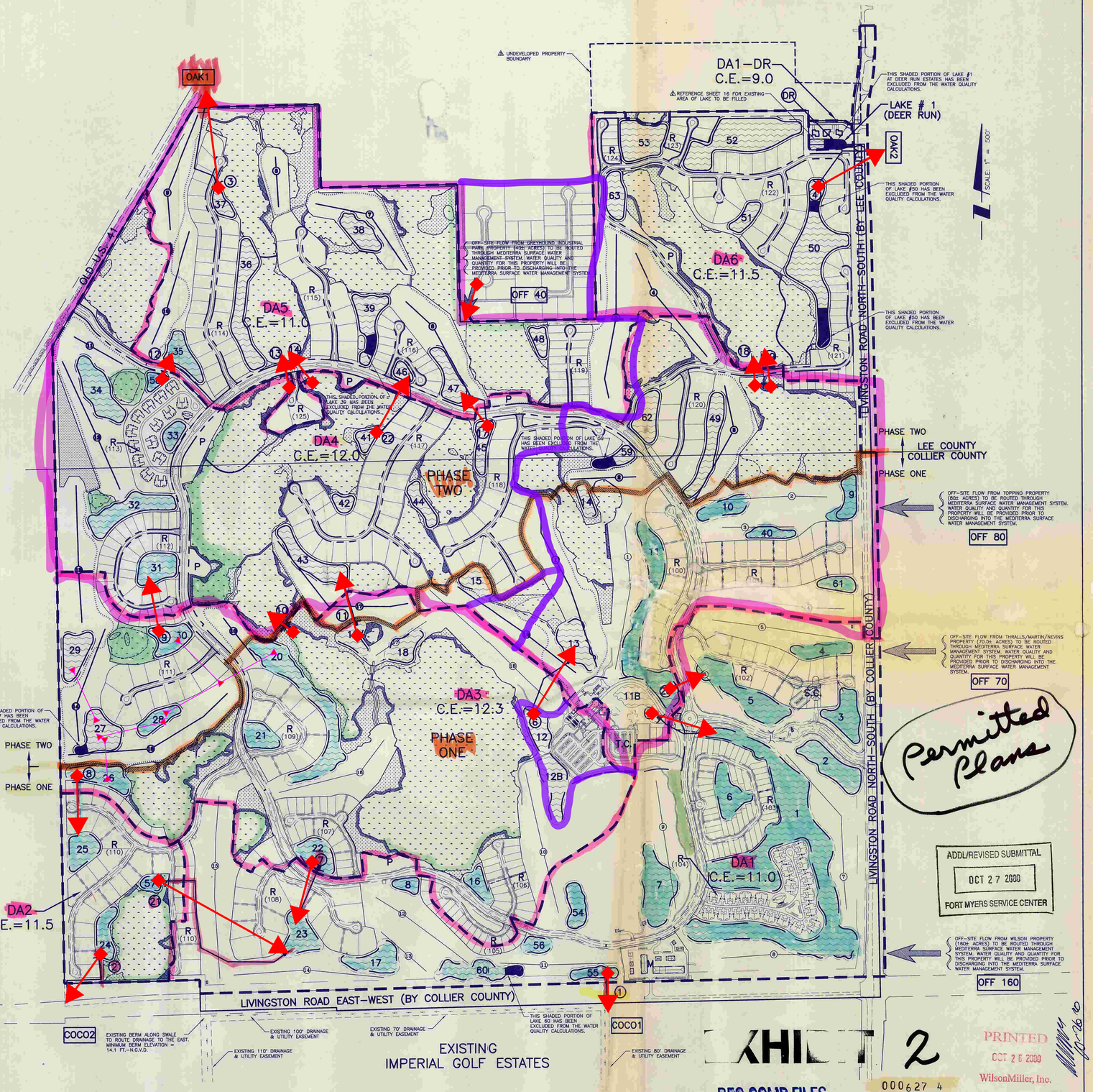
	DRAINAGE AREAS					
WATER MANAGEMENT PARAMETERS	DA1	DA2	DA3	DA4	DA5	DA6
CONTROL ELEVATION (FT-NGVD)	11.0	11.5	12.3	12.0	11.0	11.5
25-YEAR, 3-DAY RAINFALL (IN)	11.7	11.7	11.7	11.7	11.7	11.7
100-YEAR, 3-DAY RAINFALL (IN)	14.5	14.5	14.5	14.5	14.5	14.5
PEAK 25-YEAR, 3-DAY STORM STAGE (FT-NGVD)	14.0	14.0	14.1	14.1	13.3	13.6
PEAK 25-YEAR, 3-DAY STORM DISCHARGE (CFS)	51.4	22.1	N/A	N/A	23.4	24.8
PEAK 100-YEAR, 3-DAY STORM STAGE (FT-NGVD)	14.7	14.7	14.7	14.7	14.7	14.7
FEMA ELEVATION (FT-NGVD)	ZONE 'X'	ZONE 'X'	ZONE 'X'	ZONE 'X'	ZONE 'X'	ZONE 'X'
MINIMUM RECOMMENDED ROAD CROWN ELEVATION (FT-NGVD)	14.1	14.1	14.3	14.2	13.5	13.7
MINIMUM RECOMMENDED FINISHED FLOOR ELEVATION (FT-NGVD)	14.8	14.8	14.8	14.8	14.8	14.8
MINIMUM PERIMETER BERM ELEVATION (FT-NGVD)	14.1	14.1	14.3	14.2	13.5	13.7

LEGEND

- C.E. — CONTROL ELEVATION
- (6) — GOLF COURSE TRACT WITH HOLE DESIGNATION
- PROJECT BOUNDARY
- UNDEVELOPED PROPERTY BOUNDARY FOR ⚠ APPLICANT OWNED LAND CONTIGUOUS TO THE MEDITERRA PROPERTY
- PHASE BOUNDARY
- XX — LAKE WITH DESIGNATION
- WETLANDS WITHIN CONSERVATION AREAS
- UPLANDS WITHIN CONSERVATION AREAS
- UPLAND BUFFERS WITHIN CONSERVATION AREAS
- GOPHER TORTOISE PRESERVE
- BOARDWALK
- OFF X — OFF-SITE NODE FROM HYDRAULIC MODEL
- DRAINAGE BASIN BOUNDARY
- JURISDICTIONAL WETLAND LIMITS
- PROPOSED WATER LEVEL CONTROL STRUCTURE WITH CONTROL STRUCTURE NUMBER
- SWALE
- M — MAINTENANCE
- P — PARK
- R (XXX) — RESIDENTIAL (PARCEL #)
- T.C. — TOWN CENTER
- S.C. — SALES CENTER

GENERAL NOTES:

1. PERIMETER BERMS WITH A TOP OF BERM SET AT THE MINIMUM 25-YEAR, 3-DAY STORM EVENT ELEVATION WILL BE CONSTRUCTED ALONG ALL DRAINAGE AREA BOUNDARIES. IN SOME AREAS, THE PROPOSED ROADWAYS, RESIDENTIAL, OR GOLF COURSE AREAS WILL ACT AS THE PERIMETER BERM SINCE THESE USES WILL BE AT OR ABOVE THE MINIMUM 25-YEAR, 3-DAY STORM EVENT ELEVATIONS.
2. ALL INVERTS AND ELEVATIONS ARE IN FEET – NGVD.
3. ALL LAKES SHALL HAVE A 20' MAINTENANCE AND OPERATION EASEMENT. AN ACCESS EASEMENT TO EACH 20' MAINTENANCE AND OPERATION EASEMENT WILL ALSO BE GRANTED WHERE NECESSARY.
4. THE LOCATION OF LITTORAL ZONES ARE APPROXIMATE AND MAY BE RELOCATED AT THE TIME OF CONSTRUCTION.
5. PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITY APPROPRIATE EROSION CONTROL DEVICES SHALL BE INSTALLED TO CONTROL AND REDUCE SOIL EROSION AND SEDIMENT TRANSPORT TO OFF-SITE AREAS. THE CONTRACTOR SHALL MAINTAIN THESE DEVICES THROUGHOUT THE DURATION OF CONSTRUCTION. ALL DEVICES SHALL REMAIN IN PLACE UNTIL THE SURROUNDING AREAS ARE ESTABLISHED.
6. PRIOR TO CONSTRUCTION NEAR CONSERVATION AREAS, EROSION CONTROL DEVICES WILL BE INSTALLED ALONG THE CONSERVATION AREA BOUNDARY. THESE DEVICES WILL BE SILT SCREENS AND, IF NECESSARY, STAKED HAY BALES. THESE DEVICES WILL REMAIN IN PLACE UNTIL CONSTRUCTION IS COMPLETED AND THE ADJACENT CONSTRUCTION ZONES ARE STABILIZED.
7. ALL GRATE AND RIM ELEVATIONS EQUAL THE MINIMUM RECOMMENDED ROAD CROWN ELEVATION UNLESS OTHERWISE NOTED ON PLANS.



Permitted Plans

ADD/REVISED SUBMITTAL
OCT 27 2000
FORT MYERS SERVICE CENTER

EXHIBIT 2

PRINTED OCT 26 2000
WilsonMiller, Inc.

000627 4

REG COMP FILES

REV. NO.	REVISION	DATE	DRAWN BY / EMP. NO.	CHECKED BY / EMP. NO.
4	REVISED PER S.F.W.M.D. COMMENTS DATED 10/25/00 - PHONE CONVERSATION	10/26/00	H.Q.J./1135	
3	REVISED PER S.F.W.M.D. COMMENTS DATED 10/05/00 - PHONE CONVERSATION	10/20/00	H.Q.J./1135	
2	REVISED PER S.F.W.M.D. COMMENTS DATED 10/03/00	10/05/00	H.Q.J./1135	
1	REVISED PER S.F.W.M.D. COMMENTS DATED 07/27/00	08/21/00	H.Q.J./1135	

Oct 26, 2000 - 15:06:31 O:\NEW\X\ENG\02934\B2\Rev04\29348204.dwg

ACTIVITY	INITIALS/EMP. NO.	DATE
DESIGNED BY:	R.J.P./860	05/00
DRAWN BY:	H.Q.J./1135	05/00
CHECKED BY:	MK/1195	10/00
CONTRACT ADMIN. BY:		
WM APPROVED BY:		

WilsonMiller
Planners • Engineers • Ecologists • Surveyors • Landscape Architects • Transportation Consultants
WilsonMiller, Inc.
Naples • Fort Myers • Sarasota • Bradenton • Tampa
3200 Bailey Lane, Suite 200 • Naples, Florida 34105-8507 • Phone 941-649-4040 • Fax 941-643-5716 • Web-Site www.wilsonmiller.com
WilsonMiller, Inc. - FL LA #LC-C000239
WilsonMiller, Inc. - Certificate of Authorization #43

CLIENT: LONG BAY PARTNERS, L.L.C.

PROJECT: MEDITERRA – PHASE TWO

DATE: MAY 2000
HORIZONTAL SCALE: 1" = 500'
VERTICAL SCALE:
SEC: 11,12 TWP: 48S RGE: 25E
CROSS REFERENCE FILE NO.: D-2934-32
PROJECT NUMBER: 02934-008-0017-FSEAP

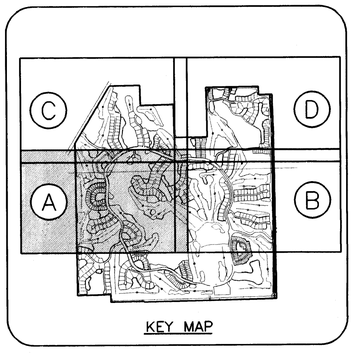
TITLE: MASTER PLAN

STEPHEN A. MEANS LICENSE # 36844
INDEX NUMBER: D-2934-112
SHEET NUMBER: 4 OF 19

LAKE LEGEND

LAKE NUMBER	CONTROL ELEVATION (FT.–N.G.V.D.)	AREA AT CONTROL (ACRES)	PERIMETER AT CONTROL (L.F.)	LITTORAL ZONE (L.F.)
27	12.3	2.7	1,493	150
28	12.3	1.3	1,090	110
29	12.3	2.2	1,297	130
30	12.3	2.0	1,254	130
31	12.0	2.2	1,171	120
32	12.0	3.4	2,120	215
33	12.0	1.0	811	85
41	12.0	0.7	713	75
42	12.0	0.6	649	65
43	12.0	2.8	1,964	200
44	12.0	1.2	1,134	120

NOTE: THE TOTAL AREA OF LITTORAL SHELVES SHOWN ON THE PLANS WILL REMAIN CONSTANT OR INCREASE. HOWEVER, THEIR LOCATIONS AND SHAPES MAY BE RELOCATED TO OTHER AREAS WITHIN THE PROJECT TO ATTAIN A DESIRED EFFECT DURING CONSTRUCTION.



KEY MAP

SCALE: 1" = 200'

LEGEND

C.E.	CONTROL ELEVATION		STRUCTURAL BUFFERS ALONG BOUNDARIES OF CONSERVATION AREAS
(X)	GOLF COURSE TRACT WITH HOLE DESIGNATION		LAKE LITTORAL ZONE
	PROJECT BOUNDARY	12	CONSERVATION AREA DESIGNATOR
	DRAINAGE BASIN BOUNDARY	18	LAKE WITH DESIGNATION
	CONSERVATION BOUNDARY		WETLANDS WITHIN CONSERVATION AREAS (INCLUDES EXISTING & CREATED WETLANDS)
	JURISDICTIONAL WETLAND LIMITS		
	CONTOUR LINE WITH ELEVATION DESIGNATION		UPLANDS WITHIN CONSERVATION AREAS
	EXISTING ELEVATION		UPLAND BUFFERS WITHIN CONSERVATION AREAS
	PROPOSED ELEVATION		
	DIRECTION OF DRAINAGE FLOW		BOARDWALKS WITHIN CONSERVATION AREAS
	SWALE		
CSXX	PROPOSED WATER LEVEL CONTROL STRUCTURE		GOPHER TORTOISE PRESERVE
	PROPOSED STORM SEWER		
	GOLF CART PATH (APPROXIMATE CENTERLINE)		

MATCH LINE – REFERENCE SHEET 7 FOR CONTINUATION

MATCH LINE – REFERENCE SHEET 6 FOR CONTINUATION

LEE COUNTY
COLLIER COUNTY

DA4
C.E.=12.0

DA3
C.E.=12.3

LAKE # 33 · LAKE # 32 · LAKE # 31 · LAKE # 30 · LAKE # 29 · LAKE # 28 · LAKE D # 27 · LAKE # 41 · LAKE # 42 · LAKE # 44 · LAKE # 43 · EXISTING LAKE # 26 · EXISTING LAKE # 21 · EXISTING LAKE # 20 · EXISTING LAKE # 19 · EXISTING LAKE # 18 · EXISTING LAKE # 15

PARK · PARK

PEDESTRIAN BOARDWALK "A" · GOLF CART BOARDWALK "A" · GOLF CART BOARDWALK "C"

20' MAINTENANCE & ACCESS EASEMENT (TYP.) · 40' MAINTENANCE & ACCESS EASEMENT (TYP.)

LITTORAL ZONE PLANTING AREA (TYP.)

JURISDICTIONAL WETLAND LIMITS (TYP.)

EXISTING DRAINAGE STRUCTURE (TYP.) · EXISTING RCP (TYP.)

STR. #1 (REF. THROAT OUTLET DETAIL)

CS #11 (DA3/4) OVERFLOW ELEV. = 12.30 INV. = 5.75

CS #22 (DA4/5) OVERFLOW ELEV. = 12.00 INV. = 4.75

EXISTING C.S. # 10

EXHIBIT 3

PRINTED AUG 31 2000

APPLICATION NUMBER 000627 4

						ACTIVITY	INITIALS/EMP. NO.	DATE	
						DESIGNED BY:	R.J.P./860	05/00	
						DRAWN BY:	H.Q.J./1135	05/00	
						CHECKED BY:	MR/1195	08/00	
1	REVISED PER S.F.W.M.D. COMMENTS DATED 07/27/00		08/21/00	H.Q.J./1135		CONTRACT ADMIN. BY:			
△REV. NO.	REVISION	Jun 20, 2000 – 15:08:23 O:\HOMES\K\ENG\02934\B2\HQJ – Do Not Delete\29348205.dwg	DATE	DRAWN BY / EMP. NO.	CHECKED BY / EMP. NO.	WM APPROVED BY:			

WilsonMiller
WilsonMiller, Inc. – FL Lic# LC-000070 · WilsonMiller, Inc. – Certificate of Authorization #4
Planners · Engineers · Ecologists · Surveyors · Landscape Architects · Transportation Consultants
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Naples · Fort Myers · Sarasota · Bradenton · Tampa
3200 Bailey Lane, Suite 200 · Naples, Florida 34105-8507 · Phone 941-649-4040 · Fax 941-643-5716 · Web-Site www.wilsonmiller.com

CLIENT: LONG BAY PARTNERS, L.L.C.

PROJECT: MEDITERRA – PHASE TWO

DATE: MAY 2000 · HORIZONTAL SCALE: 1" = 200' · VERTICAL SCALE:

TITLE: SITE PLAN (A)

SEC: 13 · TWP: 48S · RGE: 25E

CROSS REFERENCE FILE NO.: D-2934-32

PROJECT NUMBER: 02934-008-017-FSEAP

STEPHEN A. MEANS LICENSE # 36844 · INDEX NUMBER: D-2934-112

SHEET NUMBER: 5 OF 19

MATCH LINE – REFERENCE SHEET 8 FOR CONTINUATION

MATCH LINE – REFERENCE SHEET 5 FOR CONTINUATION

LEE COUNTY
COLLIER COUNTY

LAKE # 62 | LAKE # 45 | LAKE # 59 | LAKE # 49 | EXISTING LAKE # 9 | EXISTING LAKE # 10 | EXISTING LAKE # 40 | EXISTING LAKE # 61 | EXISTING LAKE # 14 | EXISTING LAKE # 15 | EXISTING LAKE # 13 | EXISTING LAKE # 11 | EXISTING LAKE # 11B | EXISTING LAKE # 12 | EXISTING LAKE # 12B | EXISTING LAKE # 5 | EXISTING LAKE # 4 | EXISTING LAKE # 3 | EXISTING LAKE # 2 | EXISTING LAKE # 1 | EXISTING LAKE # 6

DA4 C.E.=12.0 | DA4 C.E.=12.0 | DA1 C.E.=11.0 | DA3 C.E.=12.3

SCALE: 1" = 200'

LAKE LEGEND

LAKE NUMBER	CONTROL ELEVATION (FT.-N.G.V.D.)	AREA AT CONTROL (ACRES)	PERIMETER AT CONTROL (L.F.)	LITTORAL ZONE (L.F.)
45	12.0	1.3	1,235	125
59	12.0	1.0	1,010	105

NOTE: THE TOTAL AREA OF LITTORAL SHELVES SHOWN ON THE PLANS WILL REMAIN CONSTANT OR INCREASE. HOWEVER, THEIR LOCATIONS AND SHAPES MAY BE RELOCATED TO OTHER AREAS WITHIN THE PROJECT TO ATTAIN A DESIRED EFFECT DURING CONSTRUCTION.

KEY MAP

LEGEND

- C.E. CONTROL ELEVATION
- GOLF COURSE TRACT WITH HOLE DESIGNATION
- PROJECT BOUNDARY
- DRAINAGE BASIN BOUNDARY
- CONSERVATION BOUNDARY
- JURISDICTIONAL WETLAND LIMITS
- CONTOUR LINE WITH ELEVATION DESIGNATION
- EXISTING ELEVATION
- PROPOSED ELEVATION
- DIRECTION OF DRAINAGE FLOW
- SWALE
- CSXX PROPOSED WATER LEVEL CONTROL STRUCTURE
- PROPOSED STORM SEWER
- GOLF CART PATH (APPROXIMATE CENTERLINE)
- STRUCTURAL BUFFERS ALONG BOUNDARIES OF CONSERVATION AREAS
- LAKE LITTORAL ZONE
- CONSERVATION AREA DESIGNATOR
- LAKE WITH DESIGNATION
- WETLANDS WITHIN CONSERVATION AREAS (INCLUDES EXISTING & CREATED WETLANDS)
- UPLANDS WITHIN CONSERVATION AREAS
- UPLAND BUFFERS WITHIN CONSERVATION AREAS
- BOARDWALKS WITHIN CONSERVATION AREAS
- GOPHER TORTOISE PRESERVE

EXHIBIT 4

ADDITIONAL MATERIAL
SEP 0 5 2000
FORT MYERS SERVICE CENTER

PRINTED
AUG 31 2000

APPLICATION NUMBER
000627 4

WilsonMiller, Inc.

REV NO.	REVISION	DATE	DRAWN BY / EMP. NO.	CHECKED BY / EMP. NO.
1	REVISED PER S.F.W.M.D. COMMENTS DATED 07/27/00	08/21/00	H.O.J./1135	

Jun 20, 2000 - 15:10:09 Q:\ONESIX\ENG\G2934\B2\HOJ - Do Not Delete\2934B206.dwg

ACTIVITY	INITIALS/EMP. NO.	DATE
DESIGNED BY:	R.J.P./860	05/00
DRAWN BY:	C.R.H./1378	05/00
CHECKED BY:	M.E./1175	
CONTRACT ADMIN. BY:		
WM APPROVED BY:		

WilsonMiller
WilsonMiller, Inc. - FL Lic# LC-000079
WilsonMiller, Inc. - Certificate of Authorization #43
Planners • Engineers • Ecologists • Surveyors • Landscape Architects • Transportation Consultants
WilsonMiller, Inc.
Naples • Fort Myers • Sarasota • Bradenton • Tampa
3200 Bailey Lane, Suite 200 • Naples, Florida 34105-8507 • Phone 941-649-4040 • Fax 941-643-5716 • Web-Site www.wilsonmiller.com

CLIENT: LONG BAY PARTNERS, L.L.C.

PROJECT: MEDITERRA – PHASE TWO

DATE: MAY 2000
HORIZONTAL SCALE: 1" = 200'
VERTICAL SCALE:

SEC. 1,2 11,13 | TWP. 48S | RGE. 25E

CROSS REFERENCE FILE NO.: D-2934-32

TITLE: SITE PLAN (B)

PROJECT NUMBER: 02934-008-017-FSEAP

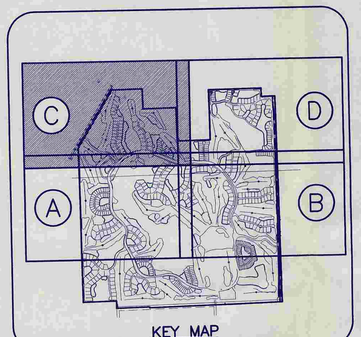
STEPHEN A. MEANS LICENSE # 36844
INDEX NUMBER: D-2934-112

SHEET NUMBER: 6 OF 19

LAKE LEGEND

LAKE NUMBER	CONTROL ELEVATION (FT.–N.G.V.D.)	AREA AT CONTROL (AC.)	PERIMETER AT CONTROL (L.F.)	LITTORAL ZONE (L.F.)
34	12.0	3.2	1733	175
35	11.0	2.0	1382	140
36	11.0	3.8	2853	290
37	11.0	0.8	798	80
38	11.0	1.8	1186	120
39	11.0	2.6	1182	120
46	11.0	0.6	600	60
47	11.0	1.9	1419	145
58	12.0	0.6	626	65

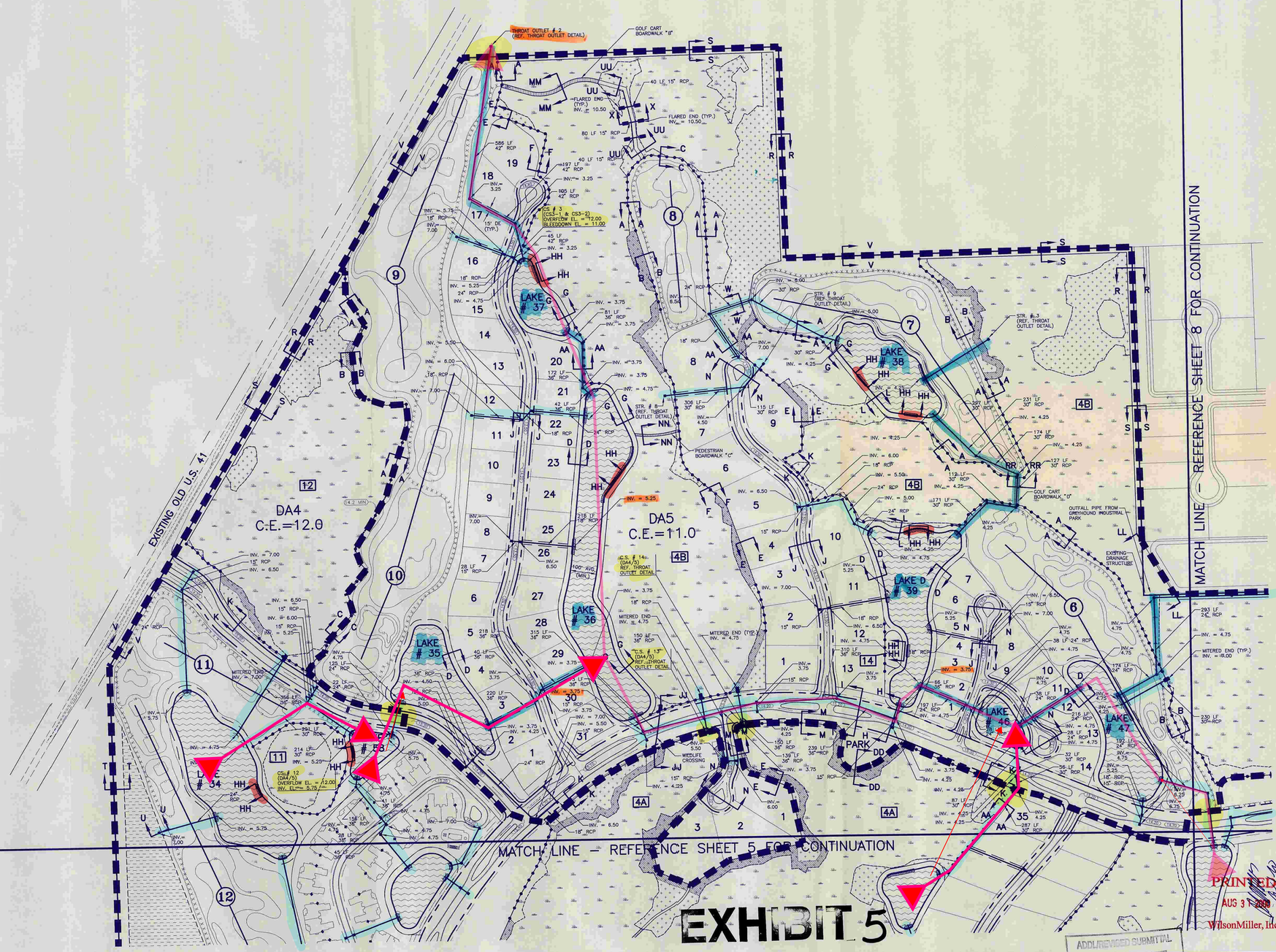
NOTE: THE TOTAL AREA OF LITTORAL SHELVES SHOWN ON THE PLANS WILL REMAIN CONSTANT OR INCREASE. HOWEVER, THEIR LOCATIONS AND SHAPES MAY BE RELOCATED TO OTHER AREAS WITHIN THE PROJECT TO ATTAIN A DESIRED EFFECT DURING CONSTRUCTION.



KEY MAP

LEGEND

- C.E. — CONTROL ELEVATION
- (X) — GOLF COURSE TRACT WITH HOLE DESIGNATION
- PROJECT BOUNDARY
- DRAINAGE BASIN BOUNDARY
- CONSERVATION BOUNDARY
- JURISDICTIONAL WETLAND LIMITS
- CONTOUR LINE WITH ELEVATION DESIGNATION
- EXISTING ELEVATION
- (XXX) — PROPOSED ELEVATION
- DIRECTION OF DRAINAGE FLOW
- SWALE
- CSXX — PROPOSED WATER LEVEL CONTROL STRUCTURE
- PROPOSED STORM SEWER
- XXXXXX — GOLF CART PATH (APPROXIMATE CENTERLINE)
- STRUCTURAL BUFFERS ALONG BOUNDARIES OF CONSERVATION AREAS
- LAKE LITTORAL ZONE
- 12 — CONSERVATION AREA DESIGNATOR
- 18 — LAKE WITH DESIGNATION
- WETLANDS WITHIN CONSERVATION AREAS (INCLUDES EXISTING & CREATED WETLANDS)
- UPLANDS WITHIN CONSERVATION AREAS
- UPLAND BUFFERS WITHIN CONSERVATION AREAS
- BOARDWALKS WITHIN CONSERVATION AREAS
- GOPHER TORTOISE PRESERVE



PRINTED AUG 31 2000 WilsonMiller, Inc.

EXHIBIT 5

1	REVISED PER S.F.W.M.D. COMMENTS DATED 07/27/00		08/21/00	H.Q.J./1135			
△REV NO.	REVISION	Jun 21, 2000 – 11:49:24 Q:\ONESIX\ENG\02934\B2\HQJ – Do Not Delete\2934B207.dwg	DATE	DRAWN BY / EMP. NO.	CHECKED BY / EMP. NO.		

ACTIVITY	INITIALS/EMP. NO.	DATE
DESIGNED BY:	R.J.P./860	05/00
DRAWN BY:	H.Q.J./1135	05/00
CHECKED BY:	[illegible]	08/00
CONTRACT ADMIN. BY:		
WM APPROVED BY:		

WilsonMiller
WilsonMiller, Inc. – FL Lic# LC-C000295 WilsonMiller, Inc. – Certificate of Authorization #42
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WilsonMiller, Inc.
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3200 Bailey Lane, Suite 200 • Naples, Florida 34105-8507 • Phone 941-649-4040 • Fax 941-643-5716 • Web-Site www.wilsonmiller.com

CLIENT: LONG BAY PARTNERS, L.L.C.

PROJECT: MEDITERRA – PHASE TWO

DATE: MAY 2000
HORIZONTAL SCALE: 1" = 200'
VERTICAL SCALE:
SEC: 1,2, 11,13 TWP: 48S RGE: 25E

TITLE: APPLICATION NUMBER: 000627-9 SITE PLAN (C)

ADD'L/REVISED SUBMITTAL SEP 05 2000 FORT MYERS SERVICE CENTER

CROSS REFERENCE FILE NO.: D-2934-32

PROJECT NUMBER: 02934-008-017-FSEAP

STEPHEN A. MEANS LICENSE # 36844

INDEX NUMBER: D-2934-112

SHEET NUMBER: 7 OF 19

LAKE LEGEND

LAKE NUMBER	CONTROL ELEVATION (FT.–N.G.V.D.)	AREA AT CONTROL (ACRES)	PERIMETER AT CONTROL (L.F.)	LITTORAL ZONE (L.F.)
48	11.0	0.8	797	80
49	12.0	2.9	2313	235
50	11.5	7.4	3959	400
51	11.5	1.1	916	95
52	11.5	6.5	2921	295
53	11.5	3.2	1503	155
62	12.0	2.2	1278	130
63	11.5	1.7	1126	115

NOTE: THE TOTAL AREA OF LITTORAL SHELVES SHOWN ON THE PLANS WILL REMAIN CONSTANT OR INCREASE, HOWEVER, THEIR LOCATIONS AND SHAPES MAY BE RELOCATED TO OTHER AREAS WITHIN THE PROJECT TO ATTAIN A DESIRED EFFECT DURING CONSTRUCTION.

SCALE: 1" = 200'

KEY MAP

LEGEND

- C.E. — CONTROL ELEVATION
- (X) — GOLF COURSE TRACT WITH HOLE DESIGNATION
- PROJECT BOUNDARY
- UNDEVELOPED PROPERTY BOUNDARY FOR APPLICANT OWNED LAND CONTIGUOUS TO THE MEDITERRA PROPERTY
- DRAINAGE BASIN BOUNDARY
- CONSERVATION BOUNDARY
- JURISDICTIONAL WETLAND LIMITS
- CONTOUR LINE WITH ELEVATION DESIGNATION
- EXISTING ELEVATION
- PROPOSED ELEVATION
- DIRECTION OF DRAINAGE FLOW
- SWALE
- CSXX — PROPOSED WATER LEVEL CONTROL STRUCTURE
- PROPOSED STORM SEWER
- XXXXXX — GOLF CART PATH (APPROXIMATE CENTERLINE)
- STRUCTURAL BUFFERS ALONG BOUNDARIES OF CONSERVATION AREAS
- LAKE LITTORAL ZONE
- 12 — CONSERVATION AREA DESIGNATOR
- 18 — LAKE WITH DESIGNATION
- WETLANDS WITHIN CONSERVATION AREAS (INCLUDES EXISTING & CREATED WETLANDS)
- UPLANDS WITHIN CONSERVATION AREAS
- UPLAND BUFFERS WITHIN CONSERVATION AREAS
- BOARDWALKS WITHIN CONSERVATION AREAS
- GOPHER TORTOISE PRESERVE

EXHIBIT 6

000627 4

ADDL/REVISED SUBMITTAL
OCT 27 2000
FORT MYERS SERVICE CENTER

PRINTED
OCT 26 2000
WilsonMiller, Inc.

△REV NO.	REVISION	Oct 26, 2000 – 15:07:34 Q:\JONES\X\ENG\02934\B2\Rev04\2934B208.dwg	DATE	DRAWN BY / EMP. NO.	CHECKED BY / EMP. NO.
4	REVISED PER S.F.W.M.D. COMMENTS DATED 10/25/00 – PHONE CONVERSATION		10/26/00	H.Q.J./1135	
1	REVISED PER S.F.W.M.D. COMMENTS DATED 07/27/00		08/21/00	H.Q.J./1135	

ACTIVITY	INITIALS/EMP. NO.	DATE
DESIGNED BY:	R.J.P./860	05/00
DRAWN BY:	H.Q.J./1135	05/00
CHECKED BY:	JME/1195	10/00
CONTRACT ADMIN. BY:		
WM APPROVED BY:		

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3200 Bailey Lane, Suite 200 • Naples, Florida 34105-8207 • Phone 941-649-4040 • Fax 941-643-5716 • Web-Site www.wilsonmiller.com

CLIENT: LONG BAY PARTNERS, L.L.C.

PROJECT: MEDITERRA – PHASE TWO

DATE: MAY 2000
HORIZONTAL SCALE: 1" = 200'
VERTICAL SCALE:

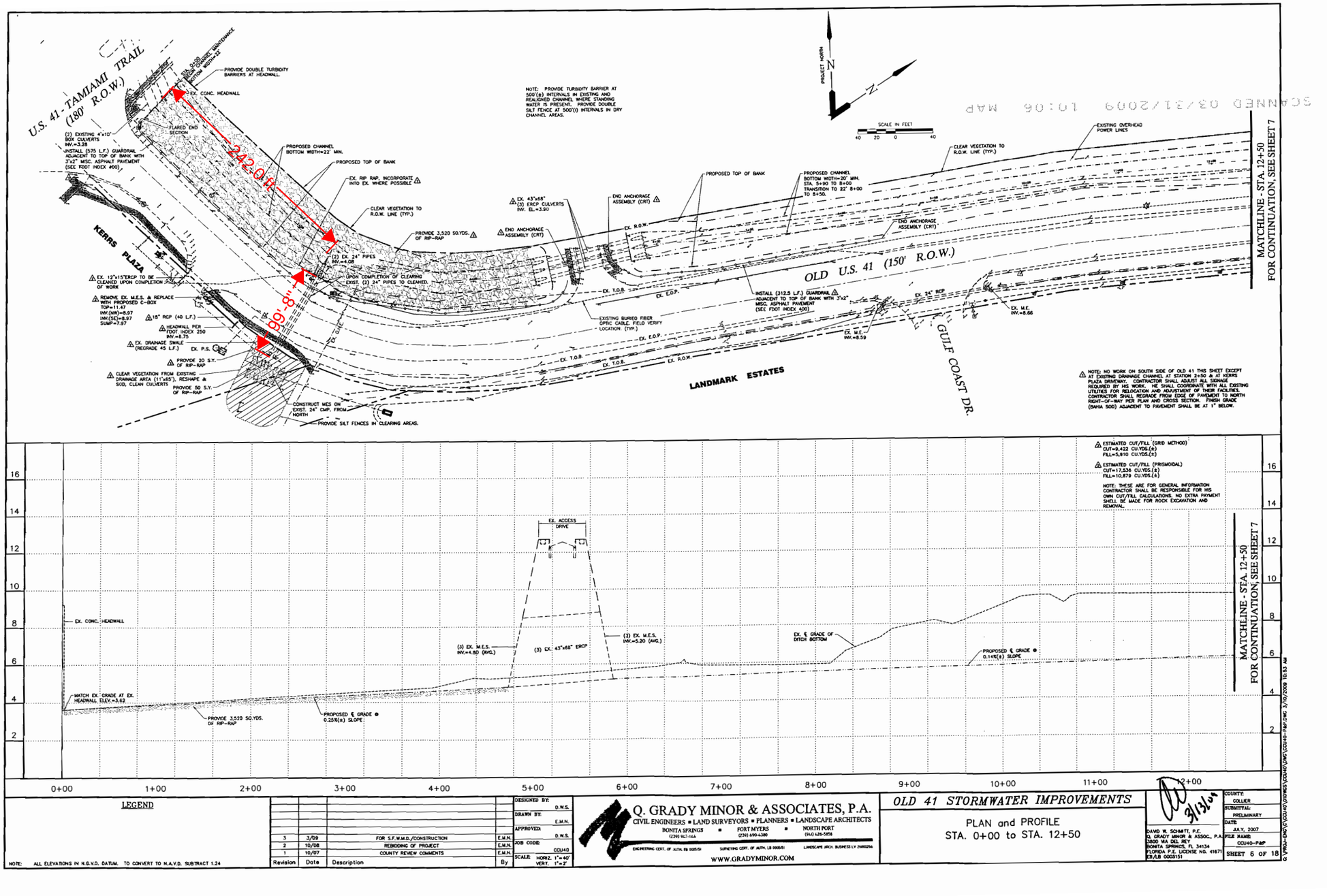
TITLE: SITE PLAN (D)

SEC: 1,2 11,12 | TWP: 48S | RGE: 25E | CROSS REFERENCE FILE NO.: D-2934-32 | PROJECT NUMBER: 02934-008-017-FSEAP

STEPHEN A. MEANS LICENSE # 56844
INDEX NUMBER: D-2934-112
SHEET NUMBER: 8 OF 19

Old 41 Stormwater Improvements ERP SFWMD Permit No. 11-01984-P

EX_CD-1



LEGEND

NOTE: ALL ELEVATIONS IN N.G.V.D. DATUM. TO CONVERT TO N.A.V.D. SUBTRACT 1.24

Revision	Date	Description	By
3	3/09	FOR S.F.W.M.D./CONSTRUCTION	E.M.N.
2	10/08	REBIDDING OF PROJECT	E.M.N.
1	10/07	COUNTY REVIEW COMMENTS	E.M.N.

DESIGNED BY: D.W.S.
DRAWN BY: E.M.N.
APPROVED: D.W.S.
JOB CODE: CCU40
SCALE: HORIZ. 1"=40' VERT. 1"=2'

Q. GRADY MINOR & ASSOCIATES, P.A.
CIVIL ENGINEERS ■ LAND SURVEYORS ■ PLANNERS ■ LANDSCAPE ARCHITECTS
BONITA SPRINGS (239) 947-1144 ■ FORT MYERS (239) 690-4380 ■ NORTH PORT (941) 426-5858
ENGINEERING CERT. OF AUTH. EB 0005151 SURVEYING CERT. OF AUTH. LB 0005151 LANDSCAPE ARCH. BUSINESS LV 26000294
WWW.GRADYMINOR.COM

OLD 41 STORMWATER IMPROVEMENTS

PLAN and PROFILE
STA. 0+00 to STA. 12+50

3/13/09

DAVID W. SCHMITT, P.E.
Q. GRADY MINOR & ASSOC., P.A.
3800 VIA DEL REY
BONITA SPRINGS, FL 34134
FLORIDA P.E. LICENSE NO. 41671
EB/LB 0005151

COUNTY: COLLIER
SUBMITTAL: PRELIMINARY
DATE: JULY, 2007
FILE NAME: CCU40-P&P
SHEET 6 OF 18

Exhibit 2.0A
Application No. 090320-7
Page 1 of 12

EX_CD-1

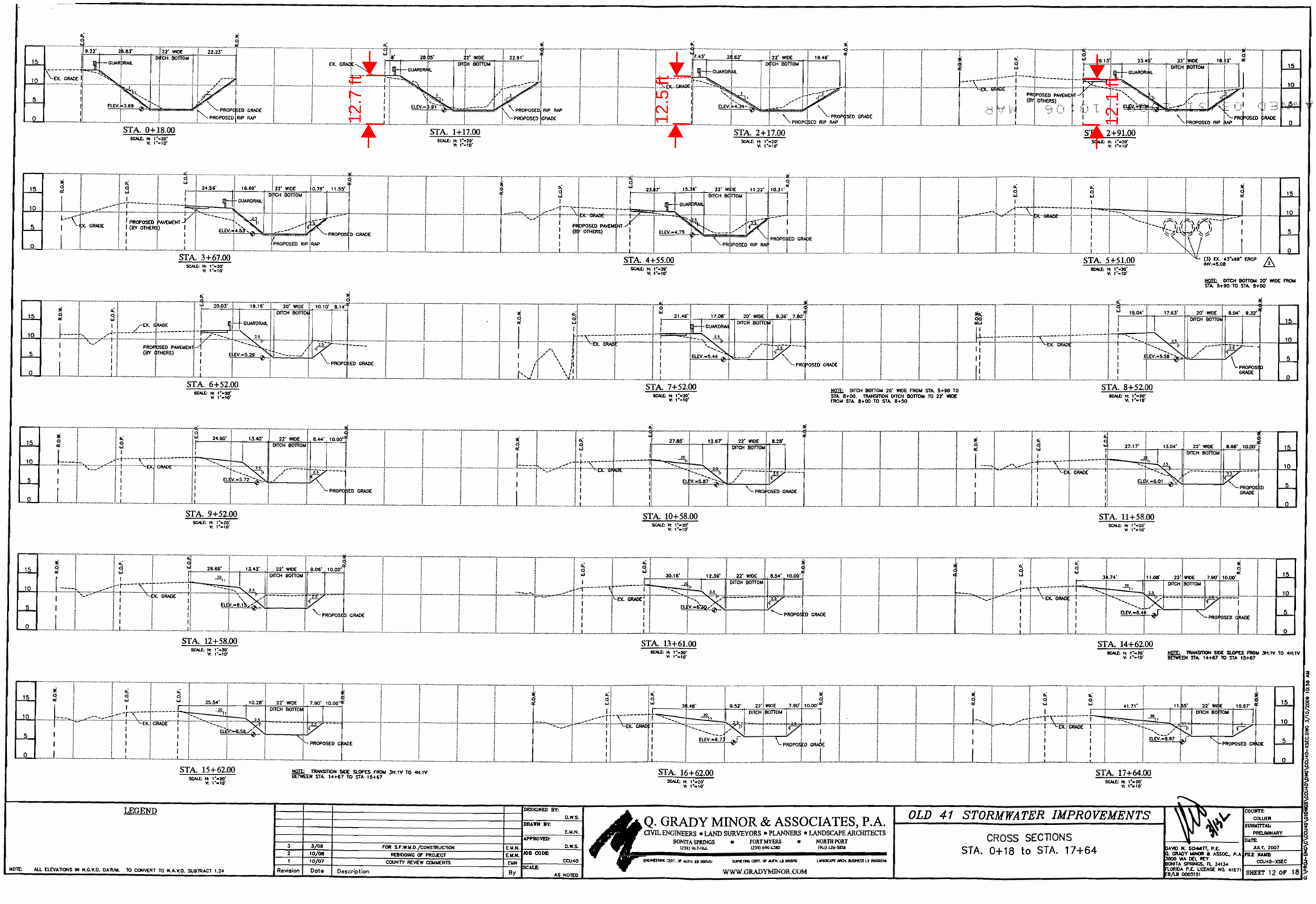


Exhibit 2.0A
Application No. 090320-7
Page 7 of 12

EX_CD-2

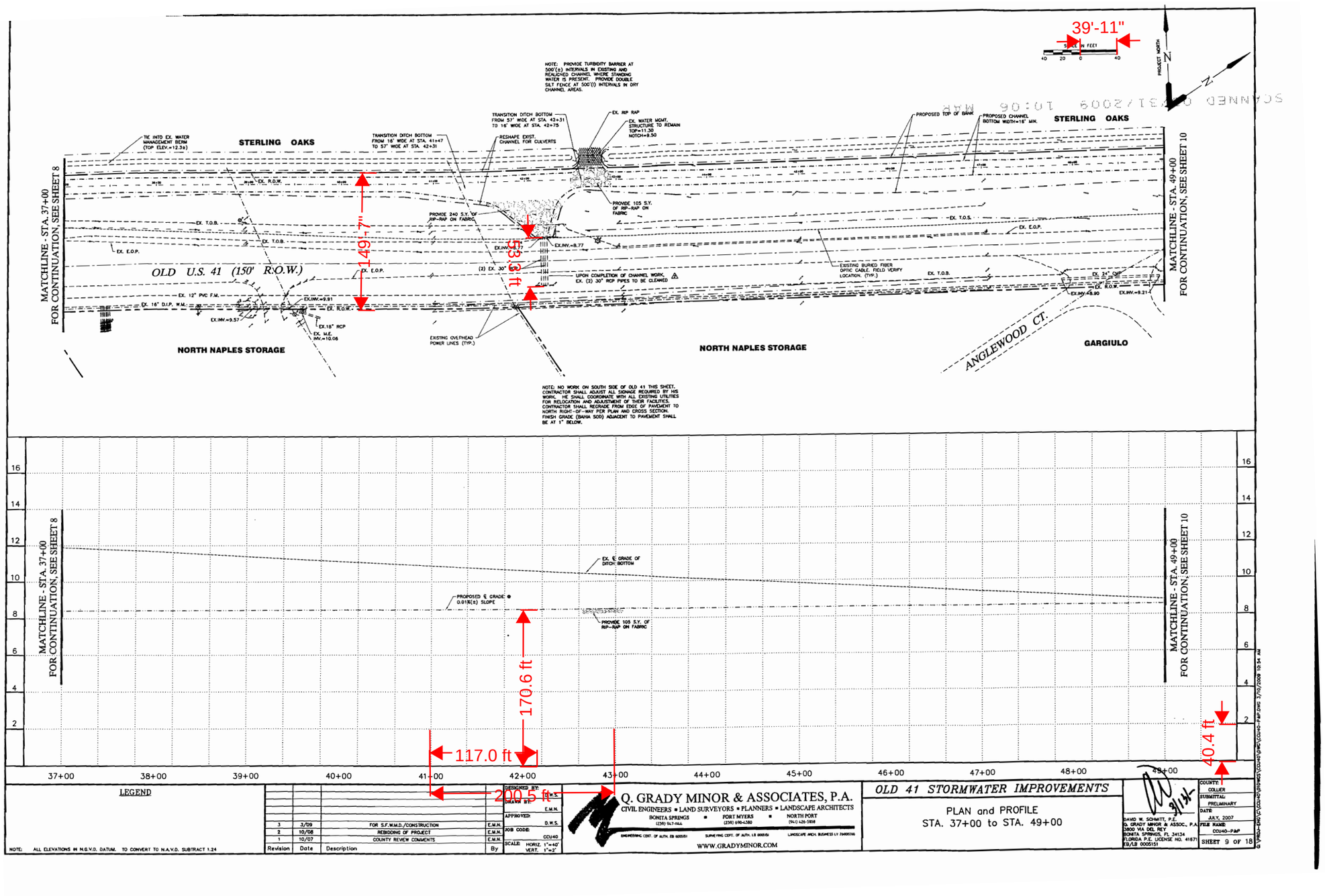


Exhibit 2.0A
Application No. 090320-7
Page 4 of 12

EX_CD-2

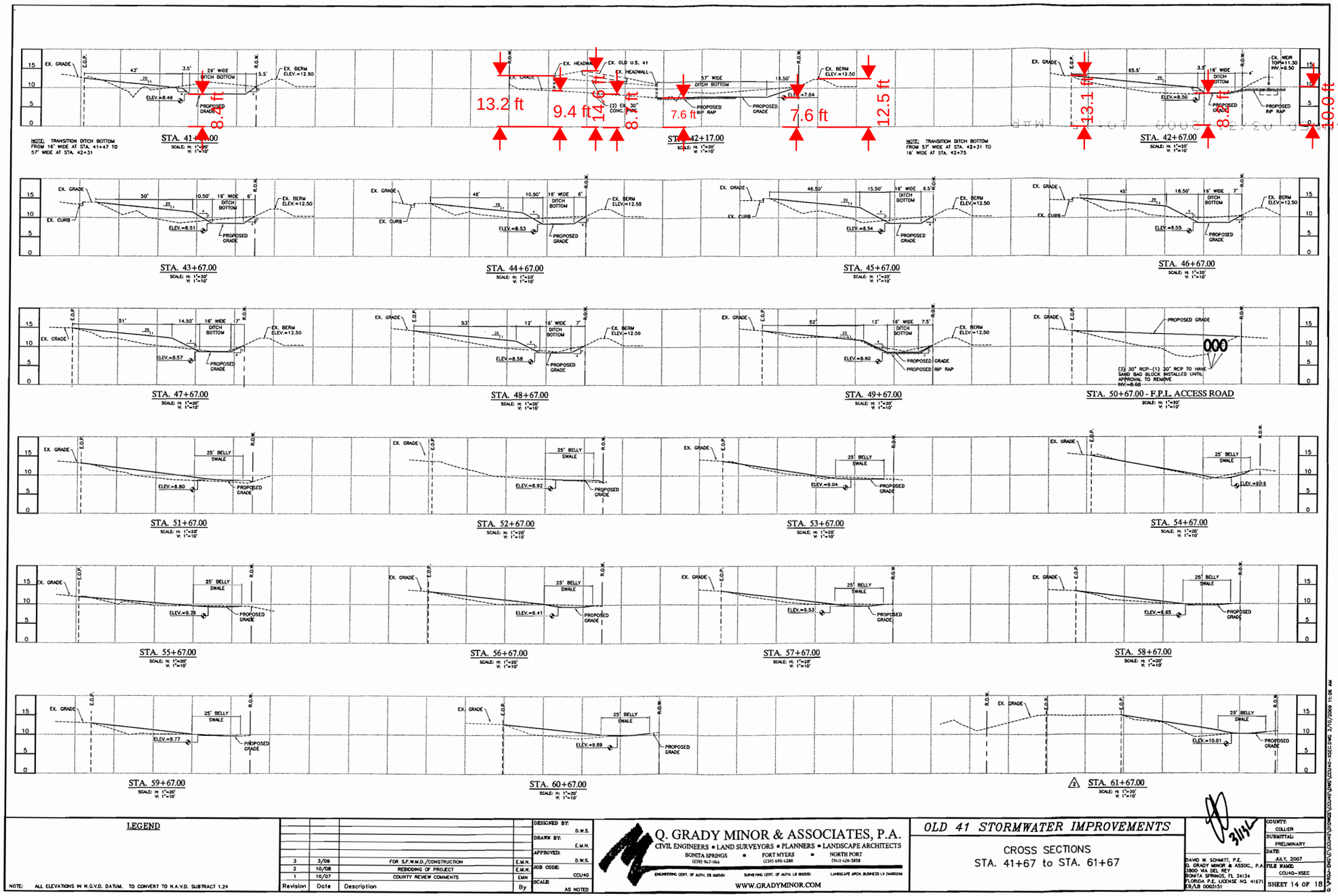
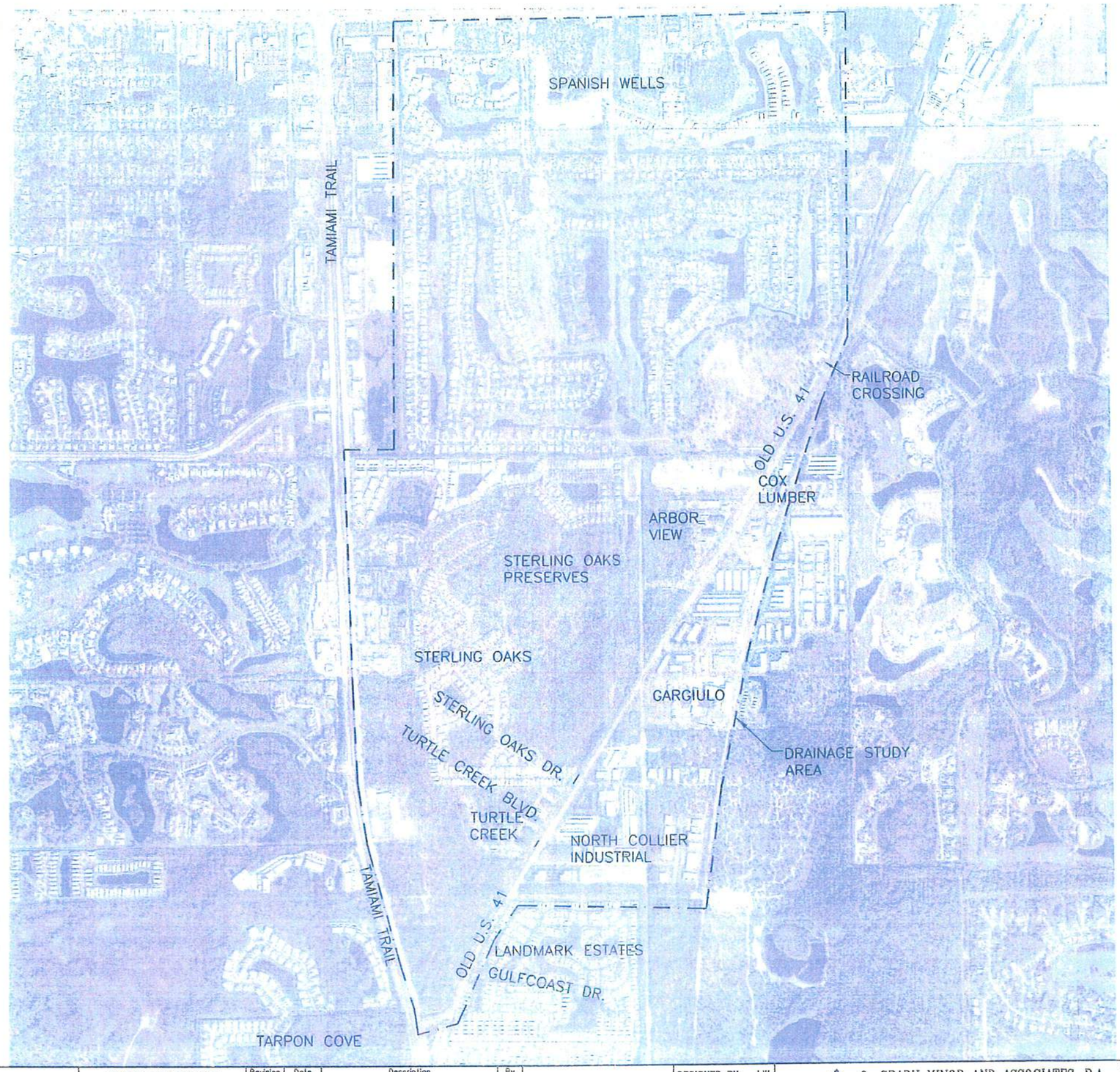


Exhibit 2.0A
Application No. 090320-7
Page 9 of 12



LEGEND

OWNER/DEVELOPER

COLLIER COUNTY
TRANSPORTATION SERVICES
2885 S. HORSESHOE DRIVE
NAPLES, FLORIDA 34104
PHONE: (239) 213-5853

Revision	Date	Description	By

DESIGNED BY:	I.W.
DRAWN BY:	S.A.B.
APPROVED:	I.W.
JOB CODE:	CCU29
SCALE:	1"=400'

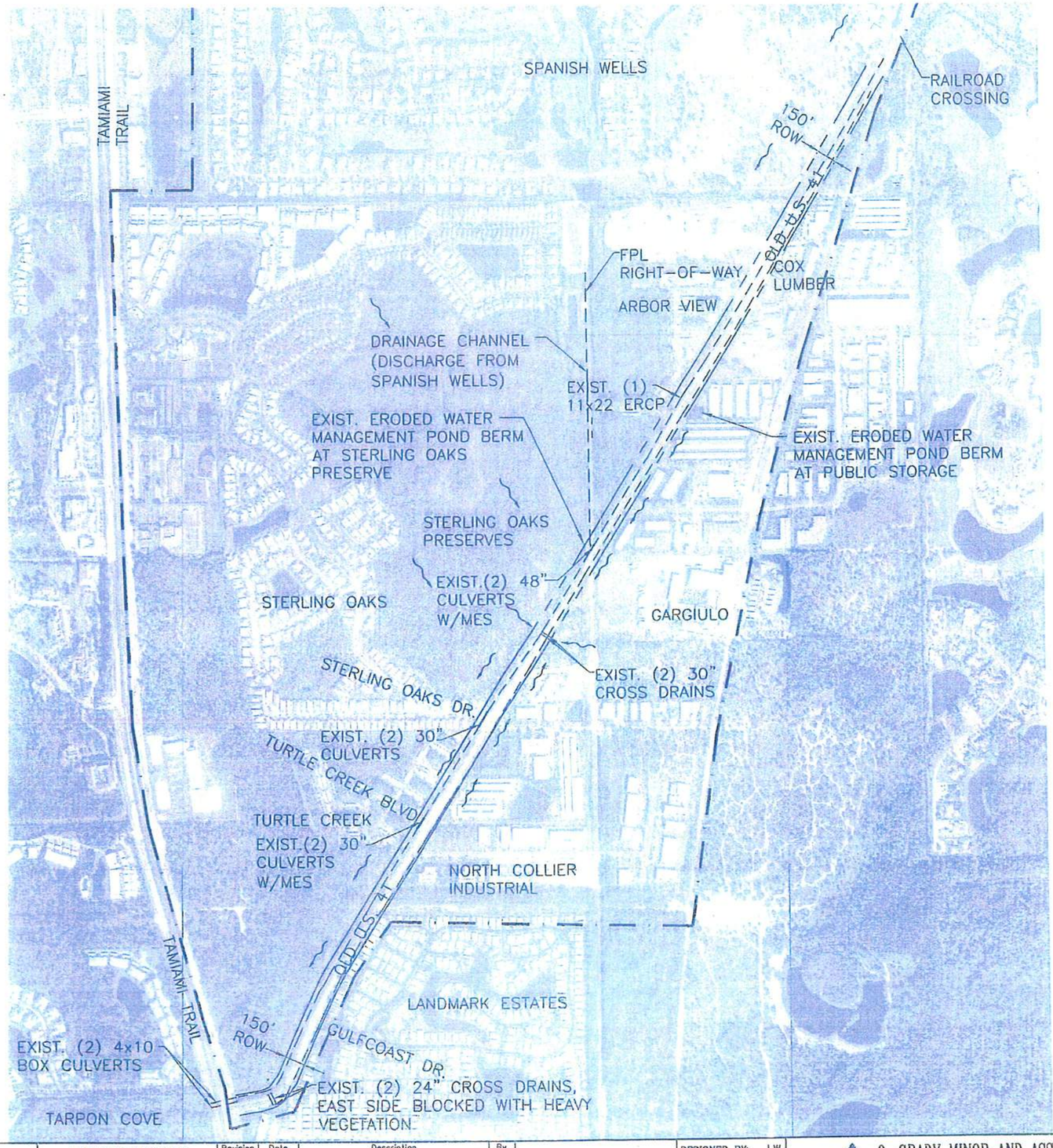
Q. GRADY MINOR AND ASSOCIATES, P.A.
CIVIL ENGINEERS ▪ LAND SURVEYORS ▪ PLANNERS
3800 VIA DEL REY
BONITA SPRINGS, FLORIDA 34134
PHONE : (239) 947-1144 FAX : (239) 947-0375
ENGINEERING CERTIFICATE OF AUTHORIZATION EB 0005151
SURVEYING CERTIFICATE OF AUTHORIZATION LB 0005161

OLD 41 DRAINAGE IMPROVEMENT STUDY

OVERALL MAP

DATE:	FILE NAME:	DRAWING NUMBER
JULY 2007	41_Base	1 of 3

G:\PROJ-ENG\Old 41 Drainage\Old 41 Drainage\dwg\41_Base(2).dwg, 7/13/2006 1:37:29 PM, \\termserver\Canon Color 5870



LEGEND

FLOW ARROWS

EXIST. HEADWALL

OWNER/DEVELOPER

COLLIER COUNTY
TRANSPORTATION SERVICES
2885 S. HORSESHOE DRIVE
NAPLES, FLORIDA 34104
PHONE: (239) 213-5853

Revision	Date	Description	By

DESIGNED BY:	I.W.
DRAWN BY:	S.A.B.
APPROVED:	I.W.
JOB CODE:	CCU29
SCALE:	N.T.S.

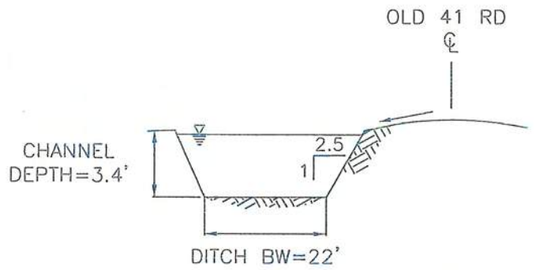
Q. GRADY MINOR AND ASSOCIATES, P.A.
CIVIL ENGINEERS ▪ LAND SURVEYORS ▪ PLANNERS
3800 VIA DEL REY
BONITA SPRINGS, FLORIDA 34134
PHONE : (239) 947-1144 FAX : (239) 947-0375
ENGINEERING CERTIFICATE OF AUTHORIZATION EB 0005151
SURVEYING CERTIFICATE OF AUTHORIZATION LB 0005151

OLD 41 DRAINAGE IMPROVEMENTS STUDY

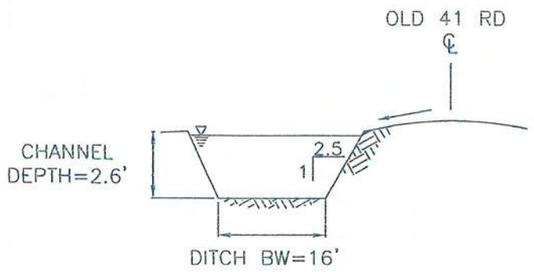
EXISTING CONDITIONS

DATE:	FILE NAME:	DRAWING NUMBER
JULY 2006	41_Base	2 OF 3

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PROPOSED DITCH EXCAVATION SECTION A–A
N.T.S.



PROPOSED DITCH EXCAVATION SECTION B–B
N.T.S.



N

LEGEND

PROPOSED WATER FLOW
PROPOSED ROADSIDE SWALE
PROPOSED CULVERTS WITH MES

OWNER/DEVELOPER

COLLIER COUNTY
TRANSPORTATION SERVICES
2885 S. HORSESHOE DRIVE
NAPLES, FLORIDA 34104
PHONE: (239) 213-5853

Revision	Date	Description	By

DESIGNED BY:	I.W.
DRAWN BY:	S.A.B.
APPROVED:	I.W.
JOB CODE:	CCU29
SCALE:	N.T.S.

Q. GRADY MINOR AND ASSOCIATES, P.A.
CIVIL ENGINEERS ▪ LAND SURVEYORS ▪ PLANNERS
3800 VIA DEL REY
BONITA SPRINGS, FLORIDA 34134
PHONE : (239) 947-1144 FAX : (239) 947-0375
ENGINEERING CERTIFICATE OF AUTHORIZATION EB 0005404
SURVEYING CERTIFICATE OF AUTHORIZATION LB 0005161

OLD 41 DRAINAGE IMPROVEMENTS STUDY

PROPOSED IMPROVEMENTS

DATE:	FILE NAME:	DRAWING NUMBER
JULY 2006	41_Base	3 OF 3

G:\PROJ-ENG\Old 41 Drainage\Old 41 Drainage\dwg\41_Base(2).dwg, 7/13/2006 2:21:24 PM, \\termserver\Canon Color 5870

SCANNED ON: 3/15/2016

PROPOSED CONDITIONS
HEC-RAS RESULTS TABLES AND GRAPHS

HEC-RAS Plan: 3RDculvnocr River: Old41 Reach: Wswale_to_US41 Profile: PF 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	Length Chnl	Min Ch El	E.G. Slope	Vel Chnl	Flow Area	Top Width	Invert Slope
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Wswale_to_US41	740	PF 1	24.00	9.50	11.88		11.88	480.00	9.50	0.000038	0.46	52.11	27.17	0.0009
Wswale_to_US41	680	PF 1	24.00	9.09	11.86		11.87	24.50	9.09	0.000022	0.39	61.68	27.82	0.0000
Wswale_to_US41	660	PF 1	44.00	9.09	11.83	9.87	11.86	130.00	9.09	0.000215	1.42	30.91	34.27	-0.0008
Wswale_to_US41	650		Culvert											
Wswale_to_US41	640	PF 1	44.00	9.20	11.51	9.98	11.55	24.50	9.20	0.000521	1.69	26.01	28.71	-0.0045
Wswale_to_US41	620	PF 1	44.00	9.31	11.52		11.53	447.00	9.31	0.000330	0.94	46.65	32.30	0.0012
Wswale_to_US41	600	PF 1	62.00	8.76	11.42		11.44	278.00	8.76	0.000162	1.04	60.48	34.28	0.0004
Wswale_to_US41	580	PF 1	62.00	8.66	11.37		11.38	16.00	8.66	0.000218	0.99	62.65	40.74	0.0000
Wswale_to_US41	560	PF 1	62.00	8.66	11.36	9.65	11.38	90.00	8.66	0.000216	0.99	62.78	40.68	-0.0007
Wswale_to_US41	550		Culvert											
Wswale_to_US41	540	PF 1	62.00	8.72	9.71	9.71	10.20	19.00	8.72	0.013184	5.63	11.01	19.94	0.1447
Wswale_to_US41	520	PF 1	62.00	5.97	8.47		8.49	200.00	5.97	0.000025	0.92	67.57	32.00	0.0004
Wswale_to_US41	450	PF 1	156.00	5.89	8.38		8.46	385.00	5.89	0.000161	2.32	67.16	31.96	0.0004
Wswale_to_US41	400	PF 1	156.00	5.73	8.33		8.40	1430.00	5.73	0.000139	2.25	69.36	30.19	0.0004
Wswale_to_US41	260	PF 1	156.00	5.14	8.16		8.18	184.00	5.14	0.000146	1.38	112.85	44.55	0.0014
Wswale_to_US41	210	PF 1	156.00	4.88	8.09		8.13	20.00	4.88	0.000610	1.76	88.63	34.53	0.0090
Wswale_to_US41	200	PF 1	156.00	4.70	8.09		8.12	44.00	4.70	0.000269	1.29	120.48	38.99	0.0320
Wswale_to_US41	180	PF 1	156.00	3.29	8.07	4.50	8.11	18.00	3.29	0.000203	1.58	98.75	53.24	0.0006
Wswale_to_US41	160	PF 1	156.00	3.28	8.07	4.49	8.10	180.00	3.28	0.000202	1.58	98.89	53.24	0.0002
Wswale_to_US41	150		Culvert											
Wswale_to_US41	140	PF 1	156.00	3.25	8.01		8.05	18.00	3.25	0.000206	1.59	98.28	53.22	0.0033
Wswale_to_US41	120	PF 1	156.00	3.19	8.00	4.51	8.04		3.19	0.000301	1.54	101.04	24.48	

Constitution Center ERP
SFWMD Permit No. 36-04608-P

CONSTITUTION CENTER

DEVELOPMENT ORDER

SECTION 2 TOWNSHIP 48 S RANGE 25 E

LEE COUNTY BONITA SPRINGS, FLORIDA

SITE PARAMETERS

LEGAL DESCRIPTION : REER TO ATTACHED SURVEY BY RHODES & RHODES LAND SURVEYING, INC.
PROPERTY I.D. # 02-48-25-B1-00012.0020

OWNER & OWNERSHIP PROVISIONS : THOMAS FCKERTY
12734 KENWOOD LANE, SUITE 89
EORT MYERS, FL 33907

ZONING :	C.P.D.
MAXIMUM BUILDING HEIGHT :	35'-0"
PROPOSED BUILDING HEIGHT :	24'-0
WET SEASON WATER TABLE :	12.0' N.G.V.D.
PROPOSFD FINISH FLOOR :	15.5' N.G.V.D.

SITE DATA : TOTAL SITE AREA = 605,484 S.E. = 13.90 ACRES = 100%
BUILDING AREA = 104,304 S.E. = 2.40 ACRES = 17%
PERVIOUS AREA = 321,099 S.F. = 7.37 ACRES = 53%
IMPERVIOUS AREA = 180,081 S.E. = 4.13 ACRES = 30%
NOTE ; 144,354 S.F. OF IMPERVIOUS AREA IN THE PRESERVF.

PARKING DATA : OFFICE = 1 SPACE PER 300 S.F.
COMMERCIAL = 1 PER 300 S.F.
COMMERCIAL NON-RETAIL = 1 PER 300 S.F.

OEEICE = 10,000 S.E. / 300 = 33.3
COMMERIAL = 30,000 S.F. / 300 = 100
COM. NON-RETAIL = 64,304 S.F. / 300 = 214.3
(348) PARKING SPACES REQUIRED
(356) REGULAR SPACES PROVIDED
(354) TOTAL PARKING SPACES PROVIDED
(5) LOADING ZONES PROVIDED
(6) TRASH ENCLOSURES PROVIDED

HANDICAP PARKING REQUIREMENTS

	REQUIRED	PROVIDED
#100	2	2
#200	4	4
#300	4	4
#400	5	5
#500	3	3
TOTAL	18	18

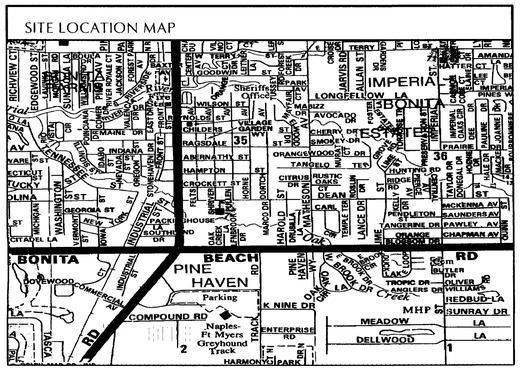
SETBACKS	REQUIRED	PROVIDED
OLD U.S. 41	25'-0"	105'-0"
COMM. AVE.	25'-0"	82'-0"
REAR	25'-0"	65'-0"

PROJECT SURVEYOR : RHODES & RHODES LAND SURVEYORS
1440 RAIL HEAD BOULEVARD, #1
NAPLES, FLORIDA 34110
PH: (941) 593-0570

GENERAL NOTES

1. EXOTIC VEGETATION AS DEFINED BY THE LEE COUNTY LAND DEVELOPMENT CODE SHALL BE REMOVED FROM THE SITE AND SUBSEQUENT ANNUAL EXOTIC REMOVAL (IN PERPETUITY) SHALL BE THE RESPONSIBILITY OF THE OWNER.
2. THE REVIEW AND APPROVAL OF IMPROVEMENT PLANS DOES NOT AUTHORIZE THE CONSTRUCTION OF REQUIRED IMPROVEMENTS, WHICH ARE INCONSISTENT WITH EXISTING EASEMENTS OF RECORD.
3. THE PROPERTY OWNER IS RESPONSIBLE EOR REPLACEMENT OF ALL DEAD LANDSCAPE MATERIAL AND FOR THE MAINTENANCE OF THE REQUIRED IRRIGATION SYSTEM.
4. THE PROPERTY OWNER IS RESPONSIBLE FOR THE PERPETUAL MAINTENANCE OF ALL EEATURES OF THE SUREACE WATER MANAGEMENT SYSTEM AS OUTLINED BY THE DESIGN ENGINEER ON THESE DRAWINGS.
5. VERIEY ALL UTILITY LOCATIONS BEEORE THE START OF CONSTRUCTION.
6. IT IS THE OWNERS RESPONSIBILITY FOR PERPETUAL MAINTENANCE OF THE PAVED AREAS, LANDSCAPING AND WATER MANAGEMENT AREAS.

SITE LOCATION MAP



INDEX OF DRAWINGS :

C-1 - COVER SHEET
SDP-1 - SITE DEVELOPMENT PLAN
SDP-2 - DIMENSIONAL PLAN
SDP-3 - WATER MANAGEMENT PLAN
SDP-4 - UTILITIES PLAN
SDP-5 - SANITARY PLAN & PROFILE
SDP-6 - SANITARY PLAN & PROFILE
SDP-7 - SITE DETAILS
SDP-8 - SITE DETAILS
L-1 - LANDSCAPE PLAN
L-2 - SITE CLEARING PLAN
OFF SITE ROAD IMPROVEMENTS
BONITA SPRINGS UTILITIES DETAILS
BOUNDARY SURVEY
AERIAL SURVEY

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Dale S. Mulder, P.E.
P.E. #60244

3 Jun 03
Kevin H. McVicker, P.E.
P.E. #51436

CONSTITUTION CENTER
OLD U.S. 41 • BONITA SPRINGS, FLORIDA 34135
LEE COUNTY

COVER SHEET

REG COMP FILES

ADD/REVISED SUBMITTAL
JUN 04 2003
LWC SERVICE CENTER

Ptt
36-04408-P

Permitted Plans

APPLICATION NUMBER
030103-8

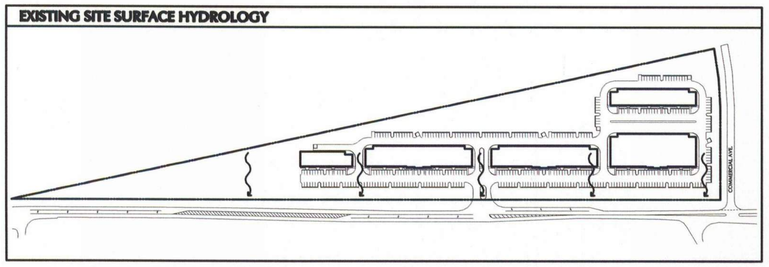
Revisions					
No:	Date:	No:	Date:	No:	Date:
1	2-3-2003	4	.	7	.
2	.	5	.	8	.
3	.	6	.	9	.

Job No: .
Drawn By: CHRIS
D.O.S. #2002-00257

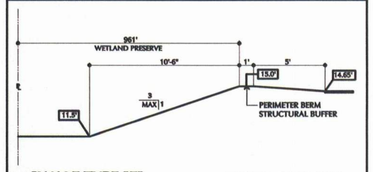
Date: 11-22-2002
Permit #: .

SHEET
C-1
1 OF 21

EXISTING SITE SURFACE HYDROLOGY



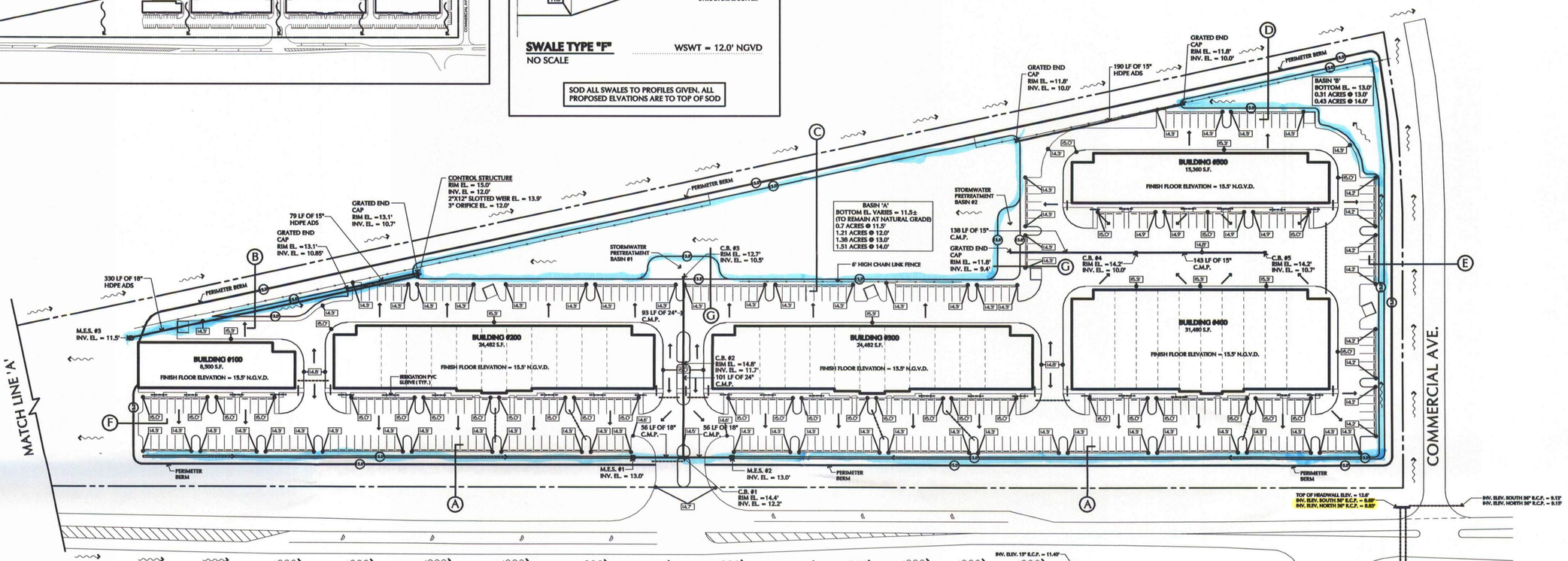
WATER MANAGEMENT SWALE SECTION



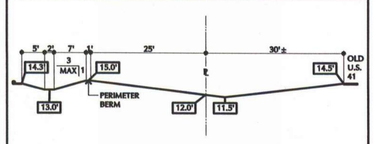
SWALE TYPE "F" ..... WSWT = 12.0' NGVD

NO SCALE

SOD ALL SWALES TO PROFILES GIVEN. ALL PROPOSED ELVATIONS ARE TO TOP OF SOD



WATER MANAGEMENT SWALE SECTION

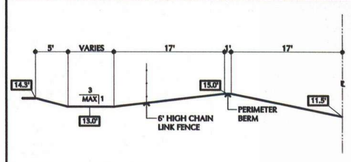


SWALE TYPE "A" ..... WSWT = 12.0' NGVD

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WATER MANAGEMENT SWALE SECTION

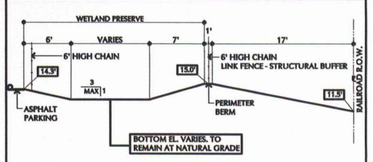


SWALE TYPE "B" ..... WSWT = 12.0' NGVD

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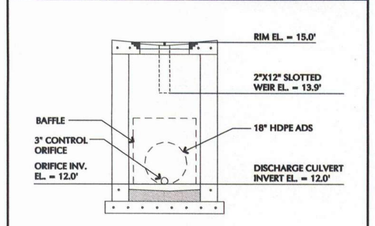


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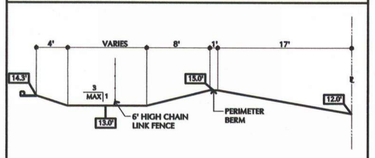
NO SCALE

SOD ALL SWALES TO PROFILES GIVEN. ALL PROPOSED ELVATIONS ARE TO TOP OF SOD

CONTROL STRUCTURE DETAIL



WATER MANAGEMENT SWALE SECTION

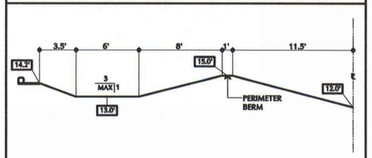


SWALE TYPE "D" ..... WSWT = 12.0' NGVD

NO SCALE

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WATER MANAGEMENT SWALE SECTION

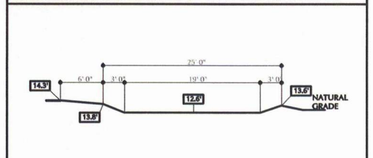


SWALE TYPE "E" ..... WSWT = 12.0' NGVD

NO SCALE

SOD ALL SWALES TO PROFILES GIVEN. ALL PROPOSED ELVATIONS ARE TO TOP OF SOD

WATER MANAGEMENT SWALE SECTION



SWALE TYPE "G" ..... WSWT = 12.0' NGVD

NO SCALE

SOD ALL SWALES TO PROFILES GIVEN. ALL PROPOSED ELVATIONS ARE TO TOP OF SOD

APPLICATION NUMBER

030103-8

ADD/REVISED SUBMITTAL

JUN 04 2003

LWC SERVICE CENTER

SCALE: 1" = 60'-0"

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Revisions

No:	Date:
1	2-3-2003
2	
3	
4	
5	

Job No: 02-0257 Date: 11-22-2002
Drawn By: CHRIS Permit #:
D.O.S. 12/02-02/27

Dale S. Mordow, P.E.
P.E. #20044

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P.E. #51456

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LEE COUNTY

WATER MANAGEMENT PLAN

Rev 4th 2

SHEET
SDP-3
4 OF 21