STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

TECHNICAL REPORT COVERSHEET

650-050-38
ENVIRONMENTAL
MANAGEMENT
08/22

POND SITING REPORT

Florida Department of Transportation

District One

Burnt Store Road PD&E Study

Limits of Project: From Van Buren Parkway to Charlotte County Line

Lee County, Florida

Financial Management Number: 436928-1-22-01

ETDM Number: 14380

Date: March 2023

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

Authorized Signature

David A. Bennett, PE
Print/Type Name

Water Resources Engineer
Title

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Address

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POND SITING REPORT

Prepared by:
CONSOR Engineers, LLC
1511 East SR 434
Winter Springs, FL 32708
Certificate of Authorization No. 6876

This Pond Siting Report is based solely upon the information made available to or gathered by CONSOR Engineers. CONSOR Engineers does not assume responsibility for conditions, which did not come to knowledge, or conditions not recognized as unacceptable at the time this report was prepared. CONSOR Engineers has performed drainage calculations and recommendations in this report in a manner consistent with sound practices and that level of care and skill normally exercised by members of the profession operating under similar circumstances.

This document and the information contained within have been prepared solely for the use of FDOT District One.
This report consists of the following parts:

Sections 1 through 7
Appendices A through C, E, H and I
Appendices D, F G are excluded from this seal

I, David A. Bennett, hereby certify that this report, as listed above, is true and correct, represents the described work and is in accordance with the requirements of this project.

David A Bennett
Date: 2023.03.22 11:38:53-04'00'

This item has been electronically signed and sealed by David A. Bennett, PE on March 1, 2023 using a Digital Signature.

Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

CONSOR Engineers, LLC
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Winter Springs, FL 32708
David A. Bennett, PE 54769

EXECUTIVE SUMMARY

The Florida Department of Transportation (FDOT), District One, is conducting a Project Development and Environment (PD&E) Study to evaluate the proposed widening of Burnt Store Road (CR 765) from Van Buren Parkway to the Charlotte County Line in Lee County. The study also extends a quarter mile north into Charlotte County to tie-in to the existing four-lane segment. The total project length is approximately 5.7 miles, and the project limits are shown in **Figure 1**. The purpose of the PD&E Study is to evaluate and document the benefits, costs, and impacts of widening Burnt Store Road from the existing two-lane undivided roadway to four lanes, while accommodating a typical section expandable to six lanes. The proposed project may also include the addition of paved shoulders/marked bicycle lanes, sidewalks, and/or a shared-use path. The purpose of the PD&E Study is to document and evaluate engineering and environmental data that will aid Lee County, Lee Metropolitan Planning Organization (MPO), FDOT District One, and the FDOT Office of Environmental Management (OEM) in reaching a decision on the type, preliminary design, and location of the proposed improvements. The study was conducted to meet the requirements of the National Environmental Policy Act (NEPA) and other related federal and state laws, rules, and regulations.

Several alternatives were evaluated to widen this segment of Burnt Store Road from a two-lane undivided roadway to a four-lane divided roadway. However, the stormwater management facilities presented in this report were designed for the ultimate 6-lane widening. The study includes the evaluation of a bridge improvement option over Gator Slough. The proposed typical section includes four 11-foot travel lanes, curb and gutter, a 24-foot grassed median, two 10-foot shared used paths, two 7-foot outside shoulders, and two 8-foot inside shoulders. The existing 200-foot right-of-way is needed to accommodate the proposed improvements.

The project is divided into 11 basins. One preferred pond site was identified for each basin, excluding basin 7, for which compensatory treatment is provided in adjacent basins 6 and 8. Ponds were sized following the requirements of South Florida Water Management District (SFWMD), Southwest Florida Water Management District (SWFWMD) and FDOT. The ultimate outfall for this project, Charlotte Harbor, is designated as an Outstanding Florida Water (OFW). However, the project does not discharge directly to an OFW. Therefore, an additional 50% of treatment is not required. A portion of the beginning of the project is located within the 100-year floodplain. Floodplain mitigation is provided in the proposed treatment ponds and in a dedicated floodplain compensation pond. There are offsite flows coming from east to west towards the east ditch of Burnt Store Road. This ditch will be replaced with a conveyance pipe directing offsite flows to Gator Slough and avoiding comingling of runoff. This approach was selected to ensure the proposed typical section can be accommodated within the 200-foot existing right-of-way. Therefore, avoiding major right-of-way acquisition for the proposed widening.

The results in this report, including pond sizes, sites and layouts are preliminary and were determined using the best available information commensurate with the PD&E study. The pond design will be finalized during the design phase when site-specific data is available. The pond site alternatives are listed in **Table 1 - Pond Alternative Evaluation Matrix.**

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Pond Alternatives Evaluation Matrix

Factors	Basin 1						Basin 2						Basin 3						Basin 4						Basin 5					
	Pond 1A	R^2	Pond 1B	R^2	Pond 1C	R^2	Pond 2A	R^2	Pond 2B	R^2	Pond 2C	R^2	Pond 3A	R^2	Pond 3B	R^2	Pond 3C	R^2	Pond 4A	R^2	Pond 4B	R^2	Pond 4C	R^2	Pond 5A	R^2	Pond 5B	R^2	Pond 5C	R^2
Pond Location (station)	1294+50	10	1295+50	8	1302+80	6	1314+00	6	1318+50	7	1328+00	10	1344+00	10	1358+00	7	1340+00	5	1372+00	7	1386+00	9	1380+00	10	1436+00	10	1428+00	8	1427+00	6
Side (LT/RT)	LT	10	RT	8	RT	6	RT	6	LT	7	RT	10	RT	10	LT	7	RT	5	RT	7	RT	10	LT	10	LT	10	RT	8	LT	6
Pond Size (ac)	3.30	8	2.31	8	2.28	8	3.55	8	3.93	8	4.34	8	1.78	8	1.73	8	1.77	8	3.69	8	3.37	8	3.73	8	9.40	8	3.40	8	7.28	8
Total Parcel Required (Yes/No)	Yes	10	No	7	No	7	No	7	No	7	Yes	10	No	7	No	7	Yes	10	No	7	No	7	No	7	No	7	No	7	Yes	10
Treatment Volume Provided (ac-ft)	0.95	-	0.95	-	0.95	-	2.20	-	2.20	-	2.20	-	1.31	-	1.31	-	1.31	-	2.70	-	2.70	-	2.70	-	3.07	-	3.07	-	3.07	-
Estimated Cost ($)[1]	3,199,863.08	6	1,103,860.15	10	1,163,502.21	8	1,956,012.94	10	2,204,855.70	7	1,970,485.64	8	995,482.80	7	938,804.87	8	885,751.08	10	1,975,542.09	7	1,228,181.54	10	1,306,366.83	8	7,026,479.35	6	2,017,659.11	10	3,461,475.19	7
New Easement Required (Yes/No)	No	7	Yes	6	No	7	Yes	6	No	8	No	8	No	8	No	8	No	8	No	8	No	8	No	8	No	8	No	8	No	8
Possibility of Utility Impacts (Yes/No)	Yes	7	No	8	No	8	No	8	Yes	7	No	8	No	8	Yes	7	No	8	No	8	No	8	Yes	7	Yes	7	No	8	No	8
FEMA Flood Zone (ac)	0.97	7	0.97	7	0.97	7	6.78	7	6.78	7	6.78	7	N/A	10	N/A	10	N/A	10	N/A	10	N/A	10	N/A	10	N/A	10	N/A	10	N/A	10
Wetland Impacts (ac)	0.00	10	0.00	10	0.00	10	0.00	10	0.00	10	0.00	10	1.43	6	0.70	7	0.00	10	0.00	10	2.98	7	0.30	8	0.00	10	0.00	10	0.00	10
Species Rating	Low	8	Medium	7	Medium	7	Medium	7	Medium	7	Low	8	Medium	7	Low	8	Low	8	Low	8	Low	8	Low	8	Low	8	Medium	7	Low	8
Contamination Risk	No	10	No	10	No	10	No	10	Low	8	Low	8	No	10	No	10	No	10	Medium	7	Medium	7	Medium	7	Medium	7	Medium	7	Medium	7
Archeological Impacts	Low	8	Low	8	Low	8	Low	8	Low	8	Low	8	Low	8	Low	8	Low	8	Low	8	Low	8	Low	8	Low	8	Low-Moderate	7	Low	8
Historic Site Impacts	Low	8	Low	8	Low	8	Low	8	Low	8	Low	8	Low	8	Low	8	Low	8	Low	8	Low	8	Low	8	Low	8	Low	8	Low	8
Current Land Use Zoning	Rural residential	8	Pine flatwoods	8	Pine flatwoods	8	Palmetto prairies	8	Pine flatwoods	8	Open land	8	Wetland scrub	8	Mixed wetland hardwood & unimproved pastures	8	Open land	8	Disturbed lands	8	Pine flatwoods & mixed rangeland	8	Exotic wetland hardwood & melaleuca	8	Rural residential	8	Pine flatwoods	8	Disturbed lands	8
Recommendations/Ranking	1 (Preferred)	117	2	113	3	108	2	109	3	107	1 (Preferred)	119	2	115	3	111	1 (Preferred)	116	3	111	1 (Preferred)	116	2	115	1 (Preferred)	115	2	114	3	112

Factors	Basin 6						Basin 8						Basin 9						Basin 10-L						Basin 10-C					
	Pond 6A	R^2	Pond 6B	R^2	Pond 6C	R^2	Pond 8A	R^2	Pond 8B	R^2	Pond 8C	R^2	Pond 9A	R^2	Pond 9B	R^2	Pond 9C	R^2	Pond 10A	R^2	-	-	-	R^2	Pond 10B	R^2	-	R^2	Pond 10C	R^2
Pond Location (station)	1468+00	10	1473+00	7	1461+00	7	1516+00	8	1512+00	10	1509+00	10	1536+00	7	1542+00	7	1548+00	10	1576+00	10	-		-		1588+00	10	-		1581+60	8
Side (LT/RT)	RT	10	LT	7	RT	7	RT	8	LT	10	LT	10	RT	7	RT	7	LT	10	RT	10	-		-		RT	10	-		RT	8
Pond Size (ac)	3.03	8	4.18	8	3.03	8	2.77	8	2.62	8	2.12	8	5.29	8	5.82	8	5.03	8	2.36	8	-		-		-		-		-	
Total Parcel Required (Yes/No)	No	7	No	7	No	7	No	7	No	7	No	7	No	7	No	7	Yes	10	No	7	-		-		N/A	10	-		N/A	10
Treatment Volume Provided (ac-ft)	2.25	-	2.25	-	2.25	-	1.81	-	1.81	-	1.81	-	2.97	-	1.81	-	2.97	-	0.74	-	-		-		-	-	-		-	-
Estimated Cost ($)[1]	2,745,198.92	8	4,667,528.79	7	2,635,972.92	10	761,576.06	8	758,155.07	8	804,890.23	10	2,387,440.19	10	3,064,365.60	7	3,908,429.64	7	780,736.23	10	-		-		1,309,734.38	7	-		20,809.25	10
New Easement Required (Yes/No)	No	8	No	8	No	8	No	8	No	8	No	8	No	8	No	8	Yes	7	No	8	-		-		No	8	-		No	8
Possibility of Utility Impacts (Yes/No)	No	8	Yes	7	No	8	No	8	Yes	7	Yes	7	No	8	No	8	Yes	7	No	8	-		-		No	8	-		No	8
FEMA Flood Zone (ac)	N/A	10	N/A	10	N/A	10	N/A	10	N/A	10	N/A	10	N/A	10	N/A	10	N/A	10	N/A	10	N/A		N/A		N/A	10	N/A		N/A	10
Wetland Impacts (ac)	1.05	7	0.00	10	0.00	10	2.37	7	0.00	10	0.10	8	0.83	8	0.00	10	5.00	7	0.00	10	-		-		0.00	10	-		0.00	10
Species Rating	Medium/High	6	No	10	Medium	7	Medium	7	Low	8	Low	8	Medium	7	Medium	7	Medium	7	Medium	7	-		-		Medium	7	-		Low	8
Contamination Risk	No	10	No	10	No	10	No	10	No	10	No	10	No	10	No	10	Low	9	No	10	-		-		Low	8	-		Low	8
Archeological Impacts	Low	8	Low-Moderate	7	Low-Moderate	7	Low	8	Low	8	Low-Moderate	7	Moderate	7	Low	8	Moderate	7	Low	8	-		-		Low	8	-		Low	8
Historic Site Impacts	Low	8	Low	8	Low	8	Low	8	Low	8	Low	8	Low	8	Low	8	Low	8	Low	8	-		-		Low	8	-		Low	8
Current Land Use Zoning	Pine flatwoods & hydric pine flatwoods	8	Recreational	8	Pine flatwoods	8	Hydric pine flatwoods	8	Improved pastures & stream & waterways	8	Improved pastures & wet prairies	8	Pine flatwoods & hydric pine flatwoods	8	Pine flatwoods	8	Hydric pine flatwoods	8	Hardwood coniferous mixed	8	-		-		Reservoirs & hardwood coniferous mixed	8	-		Reservoir	8
Recommendations/Ranking	1 (Preferred)	116	3	114	2	115	3	113	1 (Preferred)	120	2	119	2	113	3	113	1 (Preferred)	115	1 (Preferred)	122	-		-		2	112	-		1 (Preferred)	112

(1) Note: The cost evaluation for the stormwater management facility alternatives in this report includes stormwater management facility construction costs, costs associated with wetland impacts, and parcel acquisition costs. The stormwater management facility construction costs include cost of installed drainage structures, drainage pipes and outfalls, clearing and grubbing, earthwork, excavation, and sodding. The associated parcel acquisition costs for each alternative evaluated include the estimated cost of land and any impacted improvements, administrative costs, and legal fees.
(2) Note: A ranking system was developed to determine the preferred alternative. Each factor was rated with a value no higher than 10. A factor ranking of 10 or close to 10 is the most desirable. The pond with the highest total ranking was selected as preferred or alternative (1). The pond with the second highest total ranking was selected as the second most preferred alternative or alternative (2). The pond with the lowest total ranking was selected as the least desirable alternative or alternative (3)

1. INTRODUCTION

The Florida Department of Transportation (FDOT), District One, is conducting a Project Development and Environment (PD&E) Study to evaluate the proposed widening of Burnt Store Road (CR 765) from Van Buren Parkway to the Charlotte County Line in Lee County. The study also extends a quarter mile north into Charlotte County to tie-in to the existing four-lane segment. The total project length is approximately 5.7 miles, and the project limits are shown in **Figure 1**. The purpose of the PD&E Study is to evaluate and document the benefits, costs, and impacts of widening Burnt Store Road from the existing two-lane undivided roadway to four lanes, while accommodating a typical section expandable to six lanes. The proposed project may also include the addition of paved shoulders/marked bicycle lanes, sidewalks, and/or a shared-use path. The purpose of the PD&E Study is to document and evaluate engineering and environmental data that will aid Lee County, Lee Metropolitan Planning Organization (MPO), FDOT District One, and the FDOT Office of Environmental Management (OEM) in reaching a decision on the type, preliminary design, and location of the proposed improvements. The study was conducted to meet the requirements of the National Environmental Policy Act (NEPA) and other related federal and state laws, rules, and regulations.

The purpose of this PSR is to present potential pond site locations for meeting applicable stormwater management criteria and identify right-of-way needs for the ultimate 6-lane widening. An effort was made to minimize cultural and environmental impacts and right-of-way acquisition. Based on the best available information, pond alternatives were analyzed and evaluated for the following:

- Environmental impacts including wetlands, upland habitat and protected species involvement
- Cultural resources
- Hazardous materials contamination
- Economic factors including construction costs and estimated land costs
- Hydrologic factors such as soil types and seasonal high groundwater table (SHWT) elevations
- Stormwater conveyance and hydraulic parameters
- Utility impacts

2. PROJECT LOCATION

Burnt Store Road is an existing north-south two-lane undivided rural roadway arterial located in Lee County, Florida. The project begins at Van Buren Parkway and ends slightly north of the Charlotte County line, a distance of approximately 5.7 miles (refer to **Figure 1 – Project Location Map**). Burnt Store Road (CR 765) is to be widened from 2 to 4-lanes to address existing and future traffic demand and safety issues.

Ultimately it will be widened to six lanes. All elevations in this study reference the North American Vertical Datum of 1988 (NAVD'88). Elevations found in several environmental resource permits in the National Geodetic Vertical Datum of 1929 (NGVD'29) were converted to NAVD'88. The datum conversion is as follows:

Datum conversion: NGVD29 = NAVD88 + 1.175'

Figure 1 - Project Location Map

3. DATA COLLECTION

The data collection efforts consisted of the following resources:

- National Centers for Environmental Information (NOAA) – Precipitation Data
- Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs)
- Lee County's FIRMs
- Lee County Florida Parcel Data – 2010
- Lee County Property Appraiser
- Lee County Land Development Code
- Charlotte County Property Appraiser
- 2018 USGS/NRCS Lidar DEM, Southwest FL (3/24/20)
- Natural Resources Conservation Service (NRCS) Web Soil Survey
- Field Review/Site Visit (9/28/20)
- Yucca Pens Hydrologic Restoration Plan, 2010
- South Charlotte County North Lee County Surface Water Management Concept Plan
- The Lower Charlotte Harbor Flatwoods Hydrologic Modeling & Restoration-Flow Monitoring Plan, 2020
- The City of Cape Coral Northwest Filter Marsh Feasibility Study, 2014
- SFWMD ePermitting Portal
- SFWMD ERP Manual Volume 1 & 2, 2020 & 2016
- SWFWMD ePermitting Portal
- SWFWMD ERP Manual Volume 1 & 2, 2018
- FDOT Drainage Manual, 2022
- FDOT Drainage Design Guide, 2022
- PD&E Manual Part 2 Chapters 11 & 13, 2020

The SFWMD and SWFWMD ePermiting websites were used to identify existing permits adjacent to the corridor. Estimated SHWT and existing ground data from these permits were used to size the ponds. **Table 1 – Environmental Resource Permits** presents a summary of the permits that were investigated for this purpose.

Table 1 - Environmental Resource Permits

Application No.	Relevant for	Permit No.	Project Name	Issued Date	WMD
190315-33	Basin 1	36-105784-P	Burnt Store Road Widening - North Segment	10-Apr-19	SFWMD
141202-10	Basin 1	36-105784-P	Burnt Store Rd Widening (Interim 4 Lane Imp - North Segment)	10-Jul-15	SFWMD
970115-3	Basin 2	36-03217-P	Cape Coral Air Park	29-Apr-97	SFWMD
050517-11	Basin 3	36-04189-P	North Oaks	9-Aug-06	SFWMD
981030-11	Basin 4	36-02926-S	Lee County Mine	25-Mar-99	SFWMD
060301-5	Basins 4,5,6,7,8	36-06263-P	Matlacha Pass Hydrologic Restoration Project - Phase 1	15-Mar-07	SFWMD
181002-876	Basins 5,6	36-100655-P	Myriad Luxury Motorcoach Resort	19-Oct-18	SFWMD
000106-6	Basins 5,6	36-01029-W	Kodiis Pit	9-Mar-00	SFWMD
100125-16	Basins 5,6	36-07470-P	Yucca Pens Preserve	23-Dec-10	SFWMD
110517-3	Basins 5,6	36-07470-P	Yucca Pens Preserve	31-Aug-11	SFWMD
130417-10	Basin 8	36-05015-P	Burnt Store Acres	25-Nov-13	SFWMD
091007-11	Basin 9	36-03467-P	Courtside Landings	30-Jul-10	SFWMD
X000001456	Basin 9	36-00066-S	Punta Gorda Isles - Section 22	10-Apr-80	SFWMD
670741	Basin 10	43041242	Burnt Store Road III	5-Sep-12	SWFWMD

4. DESIGN CRITERIA

The design of stormwater management facilities for this project is regulated by the rules and regulations set forth by SFWMD, SWFWMD, FDOT, Lee County, and Charlotte County. The requirements of each agency are discussed in the following sections.

4.1 WMD Design Criteria

Water Quantity

SFWMD requires the post-development peak rate of discharge must not exceed the pre-development peak rate of discharge for the 25-yr/72-hr storm event.

SWFWMD requires the post-development peak rate of discharge must not exceed the pre-development peak rate of discharge for the 25-yr/24-hr storm.

Water Quality

SFWMD requires the design treatment volume is the greater of the following, for wet detention systems:

- One inch of runoff over the drainage area
- 2.5 inches times the impervious area (excluding water bodies)
- An additional 50% treatment is required for systems discharging to an OFW.

SWFWMD requires treatment of:

- One inch of runoff over the directly connected impervious area (DCIA) for wet detention systems.

- An additional 50% treatment is required for systems discharging to an OFW

From discussions with SFWMD during the pre-application meeting (see Appendix I), it was concluded that the project does not directly discharge to the OFW. However, an additional 50% was added to the treatment volume as a conservative approach.

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

4.2 FDOT Design Criteria

All designs should meet the design and performance standards of the appropriate water management district (WMD), Florida Department of Environmental Protection (FDEP), or applicable local government. Wet detention ponds shall provide a minimum permanent pool depth of six feet to minimize aquatic growth. A minimum of a 15-foot maintenance berm with a slope of 1:8 or flatter must be provided. At least one foot of freeboard is required from the maximum design stage of the pond to the inside edge of the berm. Pond side slopes shall be 1:4 or flatter to two feet below the control elevation. The proposed ponds were designed based on stage storage calculations. No modeling was done therefore tailwaters were not needed in the design. Therefore, we do not feel there is a sea level rise (SLR) component to be addressed at this time but a SLR analysis will be required during the design phase.

4.3 Lee County Criteria

Surface water management systems must be provided and designed in accordance with SFWMD requirements.

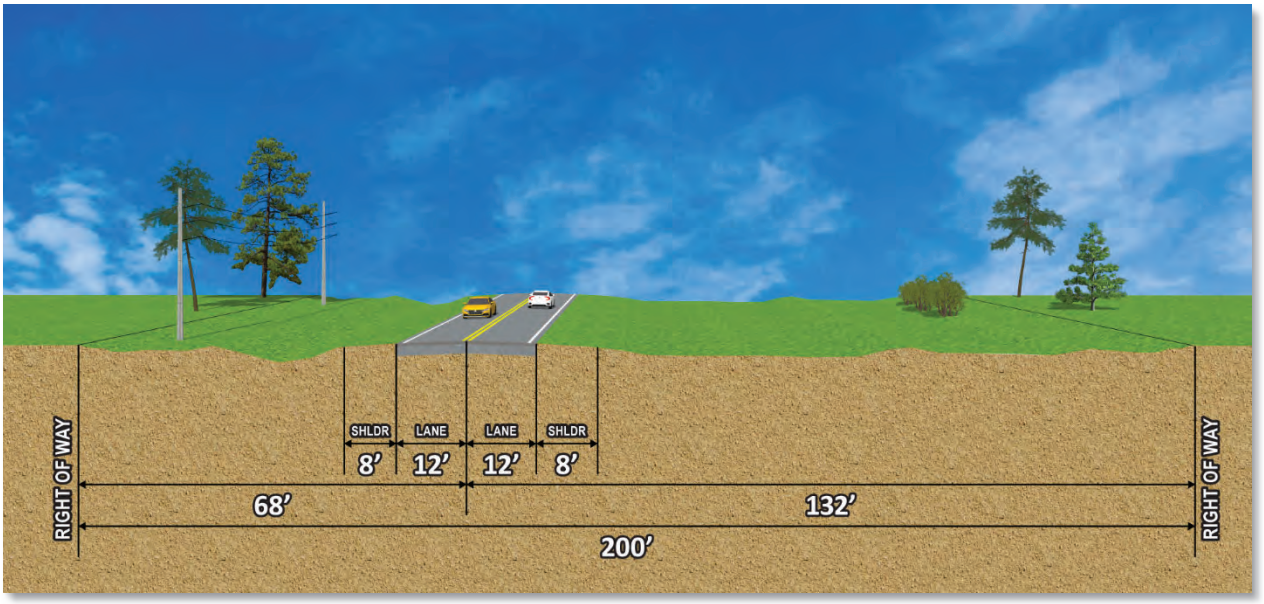
4.4 Charlotte County Criteria

The design for the stormwater management facility shall be consistent with the requirements of the SWFWMD and furthermore shall include hydrologic analysis acceptable to the county engineer.

5. EXISTING CONDITIONS

The existing typical section for Burnt Store Road consist of a two-lane, undivided arterial with 200 feet of right-of-way and roadside ditches running parallel to Burnt Store Road. Refer to **Figure 2 – Existing Roadway Typical Section**. A field visit was conducted on September 20, 2020, to verify the accuracy of the facility.

Figure 2 - Existing Roadway Typical Section



5.1 Soils

According to the Natural Resource Conservation Service (NRCS) Soil Survey most of the project traverses hydrologic soil groups A/D, B/D and C/D. Soils A/D typically exhibit good drawdown capabilities when drained and poor drawdown capabilities when saturated. Soils B/D exhibit moderate drawdown capabilities when drained and poor drawdown capabilities when saturated. Lastly, soils C/D exhibit slow drawdown capabilities when drained and poor drawdown capabilities when saturated. **Refer to Appendix E – Hydrologic Soils Group Map**, for additional information.

5.2 Floodplains & Floodways

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs) and Lee County's FIRMs were reviewed to determine the extent of the floodplain within the project limits. FEMA FIRMs with an effective date of August 28, 2008 indicate a portion of the project is within the 100-year floodplain. However, Lee County's FIRMs with an effective date of August 25, 2020 indicate the project is not within the 100-year floodplain. For the purpose of this report, it was assumed the project is located within floodplain zone AE, elevation 6 feet. This is the most conservative approach. There are no regulatory floodways within the project corridor. Floodplain maps can be found in **Appendix B**.

For additional information on the floodplain, refer to the Location Hydraulics Report (LHR) submitted concurrently with this PSR.

5.3 Impaired Waterbodies

A review of FDEP's verified list of impaired waterbodies concluded that the project is within Waterbody Identifications (WBIDs) that are not impaired. However, the project discharges to impaired WBIDs. **Table 2 – Waterbody Identification**, presents a list of the impaired and non-impaired waterbodies.

Table 2 - Waterbody Identification

Project Located in*		Discharging to		Parameter
WBIDs #	**WBID Names**	**WBIDs #**	**WBID Names**	**Impaired Water Rule**
2093A	Hog Branch*	2065B	Charlotte Harbor - Middle Segment1	Nitrogen and Chlorophyll-a
		2065D	Charlotte Harbor - Lower Segment2	Fecal Coliform
2082B	Yucca Pens Creek*	2082B2	Yucca Pens Creek - Marine Segment	Dissolved Oxygen
		2082B1	Burnt Store Marina	Dissolved Oxygen
2082C	Gator Slough Canal*	2065D	Charlotte Harbor - Lower Segment	Fecal Coliform
		2082C2	Yucca Flat Woods	Dissolved Oxygen
2082C1	Cape Coral - West Urban*	2065D	Charlotte Harbor - Lower Segment1	Fecal Coliform
		2065F	Matlacha Pass	Fecal Coliform

Note: Non-impaired waterbodies

There are no adopted TMDLs (Total Maximum Daily Loads) for the WBIDs within the project and they are not part of a Basin Management Action Plan (BMAP). Nutrient loading calculations will be required during the design phase to comply with FDEP and the WMD design criteria. New changes to the nutrient loading criteria may be implemented by the water management district in the future. It is advised that a permitting requirement meeting be held prior to design to ensure that all new criteria is met.

5.4 Existing Drainage Patterns and Offsite Basins

The existing drainage pattern for the project corridor consists of roadway runoff captured by roadside ditches on the east and west side of Burnt Store Road. Stormwater is conveyed to cross drains, which discharge to the west side ditch of Burnt Store Road flowing south and parallel to the road. The west side ditch and a small portion of the east side ditch discharge directly to Gator Slough. The entire project corridor ultimately discharges to Charlotte Harbor. The roadway runoff receives no water treatment or attenuation. It is anticipated that the existing drainage patterns will be maintained for the purposes of this PSR.

Several offsite basins, including Yucca Pen Creek, Durden Creek, Greenwell Branch, and Gator Slough West, sheet flow from east to west to the east roadside ditches of Burnt Store Road resulting in comingling of stormwater runoff from Burnt Store Road and the offsite basins in the existing condition.

There are wetlands within the project limits and impacts are anticipated. Refer to **Appendix F – Environmental Report**, for additional information.

5.5 Existing Roadway Basins

Below is a description of all roadway basins, their outfalls, flow patterns and soil characteristics. Refer to **Appendix A – Drainage Maps** for additional information.

Basin 1 is an open basin beginning at station 1291+40, approximately 1500 feet south of the Gator Slough bridge and near NW 20th Street, to station 1306+80. The basin area is 7.07 acres and consists of hydrologic soil groups B and B/D. A portion of this basin is included with the widening of Burnt Store Road (Permit # 36-105784-P) south of Gator Slough. Stormwater runoff sheet flows to roadside ditches and dry detention ponds, ultimately discharging to Gator Slough.

Basin 2 is an open basin extending from station 1306+80 to 1342+40. The total basin area is 16.35 acres and consists of mostly hydrologic soil groups B, A/D and B/D. Roadway runoff sheet flows to the east and west roadside ditches. Approximately half of this basin's northbound lanes drain directly south to Gator Slough. The other half drains to a cross drain (CD-2), which connects to the west side ditch, ultimately discharging south to Gator Slough.

Basin 3 is an open basin extending from station 1342+40 to 1363+60. The total basin area is 9.73 acres and consists of hydrologic soil group A/D. Roadway runoff sheet flows to the east and west roadside ditches. The east ditch receives offsite runoff from the Gator Slough West basin. The comingling of runoff from Burnt Store Road and the Gator Slough West basin discharges to a cross drain (CD-3) flowing west and ultimately discharging to Longview Run and Charlotte Harbor.

Basin 4 is an open basin extending from station 1363+60 to 1407+40. The total basin area is 20.11 acres and consists of hydrologic soil groups A/D and C/D. Roadway runoff sheet flows to the east and west roadside ditches. The east ditch receives offsite runoff from the Gator Slough West basin. The comingling of runoff from Burnt Store Road and the offsite Gator Slough West basin discharges to a cross drain (CD-4). Runoff flows south in the west ditch to Gator Slough.

Basin 5 is an open basin extending from station 1407+40 to 1457+20. The total basin area is 22.87 acres and consists of hydrologic soil groups A/D, B, B/D, and C/D. Roadway runoff sheet flows to the east and west roadside ditches. A portion of the east ditch receives offsite runoff from the Greenwell Branch basin where the Yucca Pens Preserve is located. The outfall for this basin is CD-5, which discharges to the Olmos Canal located approximately 300 feet west of Burnt Store Road. This canal is connected to a series of canals, which ultimately discharge to Charlotte Harbor.

Basin 6 is an open basin extending from station 1457+20 to 1483+20. The total basin area is 11.94 acres and consists of hydrologic soil groups B, A/D and C/D. Roadway runoff sheet flows to the east and west roadside ditches. CD-6 is the outfall of this basin allowing runoff to flow from the east side of Burnt Store Road to the west, then flowing south to the Olmos Canal.

Basin 7 is an open basin extending from station 1483+20 to 1504+20. The total basin area is 9.64 acres and consists of hydrologic soil groups A/D and C/D. Roadway runoff sheet flows to the east and west roadside ditches. CD-7 is the outfall of this basin. A portion of the east ditch receives offsite runoff from the Durden Creek basin. The comingling of runoff from Burnt Store Road and Durden Creek basin discharges to CD-7, located approximately station 1491+50.

Basin 8 is an open basin extending from station 1504+20 to 1523+00. The total basin area is 8.63 acres and consists of hydrologic soil groups D, A/D and C/D. Roadway runoff sheet flows to the east and west roadside ditches. The east side ditch receives offsite runoff from the Durden Creek basin discharging to CD-8. Runoff continues to flow west, ultimately discharging to Charlotte Harbor

Basin 9 is an open basin extending from station 1523+00 to 1571+20. The total basin area is 22.13 acres and consists of hydrologic soil groups A/D and C/D. Roadway runoff sheet flows to the east and west roadside ditches. The east side ditch receives offsite runoff from Yucca Pen Creek basin discharging to CD-9. Runoff continues to flow to the east through Yucca Pen Creek, ultimately discharging to Charlotte Harbor.

Basin 10-L is an open basin extending from station 1571+20 to 1583+20. The total basin area is 5.51 acres and consists of hydrologic soil groups D, A/D and C/D. Offsite runoff from Hog Creek discharges to CD-10L to the Burnt Store Marina and ultimately to Charlotte Harbor.

Basin 10-C is an open basin extending from station 1583+20 to 1598+00. The total basin area is 6.80 acres and consists of hydrologic soil groups D, A/D and C/D. This is the only basin located in Charlotte County. This basin discharges to CD-10C and ultimately to Charlotte Harbor.

Table 3 - Existing Basin Parameters

Basin	Begin Station	End Station	Area Impervious (ac)	Area Pervious (ac)	Total Area (ac)
1	1291+40	1306+80	0.85	6.22	7.07
2	1306+80	1342+40	1.96	14.38	16.35
3	1342+40	1363+60	1.17	8.57	9.73
4	1363+60	1407+40	2.41	17.70	20.11
5	1407+40	1457+20	2.74	20.12	22.87
6	1457+20	1483+20	1.43	10.51	11.94
7	1483+20	1504+20	1.16	8.48	9.64
8	1504+20	1523+00	1.04	7.60	8.63
9	1523+00	1571+20	2.66	19.47	22.13
10-L	1571+20	1583+20	0.66	4.85	5.51
10-C	1583+20	1598+00	0.82	5.98	6.80

5.6 Existing Offsite Basins and Historical Background

Several offsite basins drain to the cross drains along Burnt Store Road. These basins include Gator Slough West (GS), Greenwell Branch (GB), Durden Creek (DC) and Yucca Pen Creek (YP). Refer to **Figure 3 – Yucca Pens Project Area** and **Appendix A – Drainage Maps** for a graphical depiction of the offsite basins. The following summary of background information on the project area was extracted from the statement of work prepared by SFWMD and the statement of work prepared by BPC Group Inc. for SFWMD.

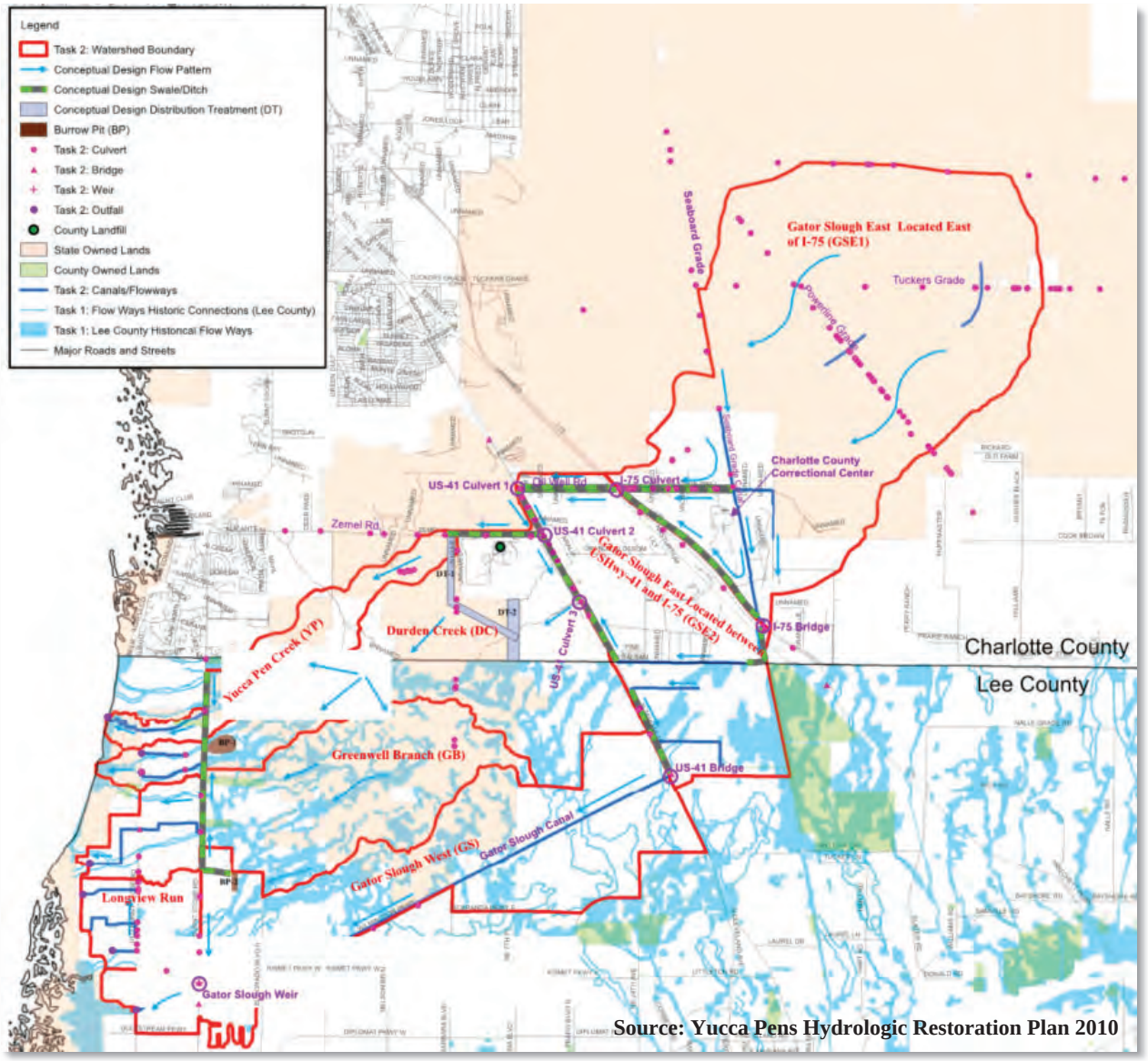
In the 1950's, almost all the watershed areas in the South Charlotte, North Lee County and Fred C. Babcock-Cecil M. Webb (Babcock-Webb) Wildlife Management Area (WMA) were drained by sheet flow in a southwesterly or southerly direction. There was no significant development to block this southwesterly and southerly sheet flow. The next 30 years, 1950 – 1980, development into these sheet flow areas caused significant flooding. Sheet flow from the Babcock-Webb area of 40 square miles remained unchanged. Topographic changes since the 1980's have further blocked, constricted, and concentrated what were formerly sheet flow areas. Expanded development in the project study area has exacerbated both constrictions and flooding in these newly developed sheet flow areas. Sheet flows prior to 1975 normally crossed over U.S. 41 near the Charlotte/Lee County line. This was blocked when the west lanes of U.S. 41 were raised in 1975. Sheet flow from the upper reaches of the Gator Slough watershed (Babcock-Webb Area) was concentrated at the 145-feet wide bridge under I-75 near the Charlotte/Lee County line when it was constructed in 1980.

The barriers that cause the original sheet flows to become concentrated point discharges through engineering structures include:

- I-75: All flows east of I-75 in the sub-basin Gator Slough East-1 discharge through the I-75 Bridge to the neighboring sub-basin Gator Slough East-2. The I-75 Bridge is shown on **Figure 3 – Yucca Pens Project Area**, which is located at the southern end of the sub-basin Gator Slough East-1.
- US Hwy 41 (N. Tamiami Road): The entire flow from the sub-basin Gator Slough East-2 between I-75 and US Hwy 41, including the flows from Gator Slough East-1 through the I-75 Bridge, is diverted to the Gator Slough Canal through the US-41 Bridge, which is located at the southwest end of the sub-basin Gator Slough East-2 as shown on **Figure 3 – Yucca Pens Project Area**.
- Burnt Store Road: Most flows generated from the drainage basins between US Hwy 41 and Burnt Store Road encompassing more than 75% of the project area are blocked off at Burnt Store Road. These flows are routed to the Gator Slough Canal through the Gator Slough Weir as shown on **Figure 3 – Yucca Pens Project Area**.

The offsite basins immediately east of Burnt Store Road (Gator Slough West, Greenwell Branch, Durden Creek, and Yucca Pen Creek) sheet flow from east to west and comingle with the roadway runoff from the east ditch of Burnt Store Road. Runoff flows under Burnt Store Road through a series of cross drains that ultimately discharge to Charlotte Harbor.

Figure 3 - Yucca Pens Project Area



5.7 Existing Drainage Studies/Projects

Several drainage studies were evaluated to assess the current drainage patterns and understand the historical flows of the project area. The purpose of some of these studies is to restore the historical flow patterns of the basins shown in **Figure 3 – Yucca Pens Project Area**. However, the purpose of this PSR is the address the stormwater management needs for the widening of Burnt Store Road for the ultimate six lane configuration.

The Matlacha Pass Hydrologic Restoration Project extends from Kismet Parkway in Cape Coral, northerly along Burnt Store Road to a point 1700 feet north of Durden Parkway. The purpose of this project is to

restore historical flow patterns in northwest Lee County drainage basin which currently drains into Matlacha Pass across Burnt Store Road and Old Burnt Store Road. This project will reduce the interbasin transfer of stormwater runoff that is occurring in the existing conditions and reduce diversion of stormwater south to Gator Slough caused by Burnt Store Road and Old Burnt Store Road.

The Yucca Pens Hydrologic Restoration Plan (2010) objective is to conduct a reconnaissance study of the water characteristics with the ultimate goal to restore historic sheet flow to the Yucca Pens Unit.

The South Charlotte County North Lee County Babcock/Webb-Surface Water Management Concept Plan objective is to prepare an integrated watershed map, define the basic problems and identify major areas of flooding and conceptually outline plans for potential solutions.

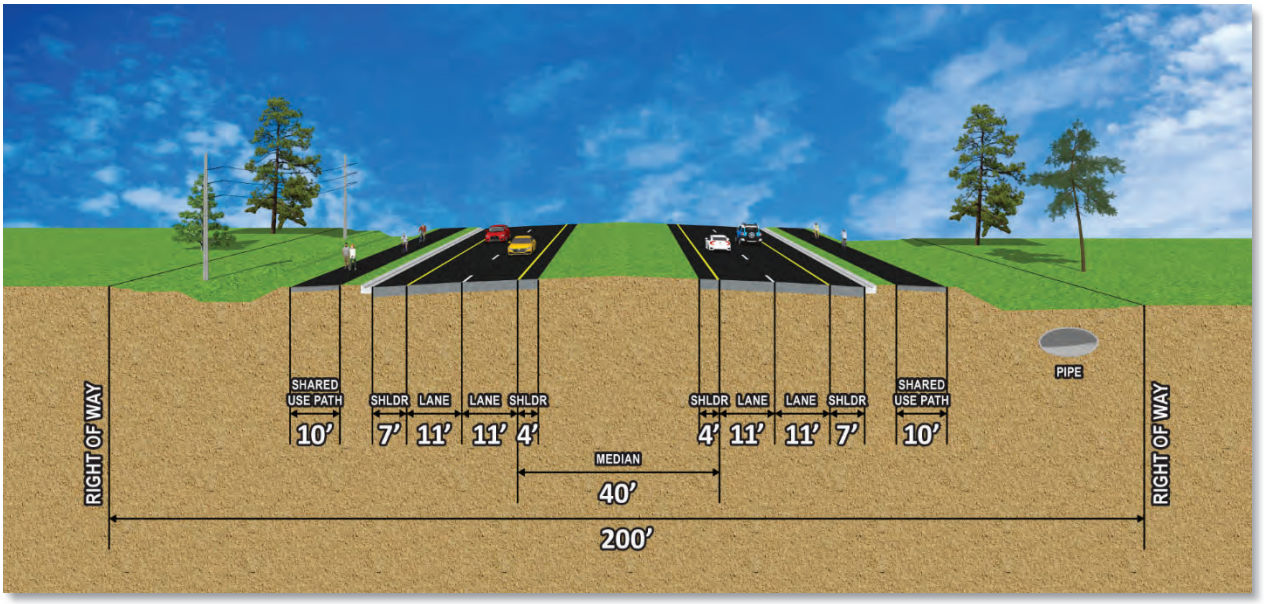
The Lower Charlotte Harbor Flatwoods Hydrologic Modeling & Restoration-Flow Monitoring Plan describes the installation and maintenance of flow monitoring stations in the Fred C. Babcock Cecil M. Webb Wildlife Management Area (WMA) and the Yucca Pens Unit WMA as well as the tidal creeks to Charlotte Harbor, located in Charlotte and Lee Counties.

The City of Cape Coral Northwest Filter Marsh Feasibility Study objective is to evaluate the feasibility of storing and treating additional surface water runoff in a 337.7-acre city owned parcel located between Burnt Store Road and Old Burnt Store Road in Northwest Cape Coral.

6. PROPOSED CONDITIONS

Impacts to right-of-way and the existing drainage conditions were heavily considered when selecting the preferred roadway alternative typical section. It consists of an urban typical section with four 11-foot lanes, two 7-foot outside shoulders, two 8-foot inside shoulders, two 10-foot shared used paths, a ditch on the west side of the road up to 10 feet in width, a conveyance pipe up to 72” in diameter to replace the east roadside ditch, and a 24-foot median. An additional two 11-foot travel lanes will be added in the ultimate condition in the median. The stormwater management ponds were sized to accommodate the ultimate condition.

Figure 4 - Proposed Roadway Typical Section



6.1 Pond Site Alternatives

Three pond alternatives (A, B and C) are provided in each basin for treatment and attenuation except for basins 7, 10-L and 10-C. Compensatory treatment for basin 7 will be provided in basins 6 and 8. Attenuation will be provided in this basin by using ditch blocks. This will avoid impacts to state conservation lands located near basin 7. Basin 10-L evaluates one pond alternative avoiding impacts to state conservation lands and existing housing developments. Basin 10-C evaluates two existing pond alternatives, Ponds 10B and 10C. Both have enough capacity for the roadway widening. All basin parameters are listed in **Table 4.**

The ponds were sized using a volumetric approach where the water quality and water quantity volume were added. An additional 50% of the treatment volume was added to the required treatment volume as a conservative approach. However, it was concluded at the pre-application meeting with SFWMD that the project does not discharge to the OFW. Pond site locations are depicted in the drainage maps in **Appendix A**. The pond sites were evaluated based on:

- Aerial photographs
- Existing ground elevation based on LiDAR data
- Field visits
- Right-of-way information from Lee County and Charlotte Property Appraiser
- Existing SFWMD and SWFWMD permits

- Construction / Maintenance / Accessibility
- SHWT estimates found in SFWMD and SWFWMD permits
- Wetlands
- Endangered species
- Cultural effects
- Utility impacts
- Contamination

The proposed conveyance will include a closed storm drain system that will direct roadway runoff to the proposed ponds. This will be evaluated during the design phase.

The east side ditch of Burnt Store Road will be replaced with a conveyance pipe to ensure the existing drainage patterns are maintained. To capture offsite flows, a series of inlets will be strategically placed along the east side of Burnt Store Road to direct runoff to Gator Slough and prevent comingling of offsite runoff with roadway runoff. The pipe is anticipated to be sized, during the design phase, based solely on the existing conveyance of the east side ditch. The west ditch of Burnt Store Road will remain to ensure the existing drainage patterns are maintained.

Table 4 - Proposed Basin Parameters

Basin	Begin Station	End Station	Area Impervious (ac)	Area Pervious (ac)	Total Area (ac)
1	1291+40	1306+80	3.04	3.18	7.07
2	1306+80	1342+40	7.03	7.36	16.35
3	1342+40	1363+60	4.19	4.38	9.73
4	1363+60	1407+40	8.65	9.05	20.11
5	1407+40	1457+20	9.83	10.29	22.87
6	1457+20	1483+20	5.13	5.37	11.94
7	1483+20	1504+20	4.15	4.34	9.64
8	1504+20	1523+00	3.71	3.88	8.63
9	1523+00	1571+20	9.52	9.96	22.13
10-L	1571+20	1583+20	2.37	2.48	5.51
10-C	1583+20	1598+00	2.92	3.06	6.80

Several coordination meetings were held with steakholders to discuss alternative treatment and attenuation methods or out-of-the-box solutions. These alternatives included upstream compensatory treatment, using an existing wetland area for attenuation near Burnt Store Marina and/or attenuating and treating water on the eastern conservation lands. However, these alternatives were not feasible for several reasons. There were no untreated impervious surface areas upstream of the project or in the

eastern conservation lands to provide compensatory treatment. In addition, given that there is no control of agreements that may occur on offsite lands, it was most reasonable to provide a standard pond as the preferred option per basin.

6.2 Proposed Roadway Basins

Basin 1. Three pond site alternatives were evaluated for this basin. Pond 1A is located to the west side of the road at 210 Burnt Store Road and is recommended as the preferred alternative. The outfall of Pond 1A will be immediately north of the pond outfalling to Redfish Canal. Ponds 1B and 1C are located to the east side and adjacent to Burnt Store Road between Gator Slough Canal and Burden Parkway. Ponds 1B and 1C are located in the same parcel. There are future plans to develop this parcel on both sides of Gator Slough. The approved Burnt Store Road Access Management Resolution depicts driveway access into this property on both the south and north sides of Gator Slough Canal. However, this future development called Burnt Store Market Place has not been permitted with SFWMD as of the writing of this report. All ponds are within the 100-year floodplain. The proposed roadway widening will eliminate the existing ponds located between the travel lanes. The outfall system of the existing ponds will be converted to a cross drain and serve as the outfall for ponds 1B and 1C discharging to Redfish Canal.

Basin 2. Three pond site alternatives were evaluated for this basin. Pond 2A is in a parcel to the east of Burnt Store Road and approximately 500 feet north of the Gator Slough Canal near station 1314+00. The pond is within the same potential development parcel as 1B and 1C. Pond 2B is located within two parcels to the west of the road, between Kismet Parkway and Delilah Drive near station 1318+50. Both ponds provide water treatment, attenuation, and floodplain compensation. Pond 2C is located to the east of the road at 2517 Burnt Store Road between NW 31st Place and Burnt Store Road on City of Cape Coral-owned property near station 1328+00 and is recommended as the preferred alternative. Its outfall discharges to CD-2. Due to roadway impacts to the strip of parcels west of the road from station 1308+00 to 1314+00, the remaining space will be utilized for floodplain compensation only. This area is referred to in the drainage maps as Pond 2 and Floodplain Compensation Area. In addition, Ponds 2A and 2B will be utilized for additional floodplain compensation.

Basin 3. Three pond site alternatives were evaluated for this basin. Pond 3A is in a parcel to east of Burnt Store Road at 2901 Burnt Store Road near station 1344+00. This pond outfalls to CD-3. Pond 3B is located west of Burnt Store Road near station 1358+00 and will discharge to the west side ditch. Pond 3C is located at 2627 Burnt Store Road on City of Cape Coral-owned property, near station 1340+00 to east of the road

and is recommended as the preferred alternative. It will outfall to CD-3. The other adjacent parcels in this basin were considered for pond sites but later discarded to avoid impacts to conservation lands.

Basin 4. Three pond site alternatives were evaluated for this basin. Pond 4A is located 3501 Burnt Store Road to the east of the road near station 1372+00. The majority of Pond 4B extends from station 1363+50 to approximately 1407+40 east of Burnt Store Road and is recommended as the preferred alternative. This parcel is owned by Lee County. The pond extends beyond the Lee County parcel to the adjacent lot towards the east located 4101 Burnt Store Road. Two parcels are necessary to comply with SFWMD pond geometry requirements. Ponds 4A and 4B will discharge immediately upstream of CD-4. Pond 4C is located near station 1380+00 and will discharge to the west ditch of Burnt Store Road.

Basin 5. Three pond site alternatives were evaluated for this basin. Pond 5A consists of two (possibly interconnected) ponds Located west of Burnt Store Road from stations 1424+00 to 1446+00. This pond alternative requires the acquisition of a series of parcels with multiple private owners. This pond will outfall to Olmos Canal. Due to the number of driveway connections required to develop these individual parcels and safety issues associated with access management, it is recommended to use them as the preferred alternative for a pond. Pond 5B is located 16930 Sanctuary Estates Drive to east of Burnt Store Road near station 1428+00. This pond will outfall to CD-5. Pond 5C encompasses two parcels located 3719 NW 32nd Place and 3807 NW 32nd Place near station 1427+00. This pond will outfall to Olmos Canal. Both parcels belong to the City of Cape Coral. The City has conceptual plans to use the sites of Pond 5C for their own stormwater management for the Caloosa Parkway roadway improvements.

Basin 6. Three pond site alternatives were evaluated for this basin. Pond 6A is located approximately station 1468+00 to east of Burnt Store Road and is recommended as the preferred alternative. This pond will outfall to CD-6. Pond 6B is in the northeast corner of the parcel located at 4316 Boathouse Lane near station 1473+00. There is currently a business development in this parcel, referred to as Myriad Luxury Motorcoach Resort. This pond will outfall to the west side ditch of Burnt Store Road. Pond 6C is located near station 1461+00 to east of Burnt Store Road. It will outfall to CD-6. All pond alternatives in this basin provide compensatory treatment for half of the treatment volume requirement of basin 7. The other half is provided in basin 8.

Basin 7. Pond site alternatives were not considered for this basin to avoid impacts to state conservation lands. Treatment will be provided in the adjacent basins 6 and 8. Attenuation in basin 7 will be provided with ditch blocks.

Basin 8. Three pond site alternatives were considered for this basin. Pond 8A is located near station 1516+00 to east of the road at 4751 Burnt Store Road. This pond will outfall to CD-8. Pond 8B is located near station 1512+00 to west of Burnt Store Road and is recommended as the preferred alternative. Pond 8C is located near station 1509+00, west of the road at 4750 Burnt Store Road. Ponds 8B and 8C will outfall to the west ditch of Burnt Store Road. All pond alternatives in this basin provide compensatory treatment for half of the treatment volume requirement of basin 7.

Basin 9. Three pond site alternatives were evaluated for this basin. Pond 9A is located near station 1536+00 to the east of Burnt Store Road. Pond 9B is located near station 1542+00 to east of Burnt Store Road. Both ponds will discharge to Yucca Pen Creek through CD-9. Pond 9C is located in two parcels near station 1548+00 approximately 800 feet west of Burnt Store Road. This pond will outfall to the west ditch of Burnt Store Road. A drainage easement will be required for the inflow and outfall Pond 9C. Currently there are plans to develop the parcels where ponds 9A and 9B are located (Mixed Use Planned Development for SVR INV, LLC). This future development is in advanced stage of approvals by Lee County. Therefore, Pond 9C is recommended as the preferred alternative.

Basin 10. This basin was subdivided in two, basins 10-L (Lee County) and 10-C (Charlotte County). One pond alternative was considered for basin 10-L, pond 10A. This pond is located near station 1576+00 to east of Burnt Store Road. It will discharge to CD-10L. Two pond alternatives were considered for basin 10-L, ponds 10B and 10C. They are both existing stormwater ponds located to east of Burnt Store Road in Charlotte County near the border with Lee County. Pond 10B is located near station 1588+00 and serves a business by the name of Charlotte County Utilities Burnt Store Road owned by Charlotte County. This pond has enough capacity to accommodate the 6-lane widening. However, the outfall structure of this pond may need to be modify during the design phase to satisfy SFWMD design criteria and discharge requirements. Pond 10C serves Burnt Store Road to north of Charlotte County. It is located near station 1581+60. This pond was previously designed and permitted (SWFWMD Permit No.: 43041242.000) to include the six-lane widening. Therefore, it is recommended as the preferred alternative.

Refer to **Tables 5 – 7** for all proposed basin parameters for each pond alternative.

Table 5 - Proposed Pond Parameters of Alternative A

Alternative 1 A					
Basin	**Pond**	**Total Volume Required (ac-ft)**	**Total Volume Provided (ac-ft)**	**Treatment Volume Required +50% (ac-ft)**	**Treatment Volume Provided (ac-ft)**
1	1A	1.65	2.23	0.95	1.28
2	2A	3.62	5.12	2.20	2.99
3	3A	1.92	2.38	1.31	1.37
4	4A	3.97	5.38	2.70	3.14
5	5A	4.52	10.9	3.07	6.24
6	6A	3.01	4.11	2.25	2.39
7	7A	1.90	-	1.30	-
8	8A	2.35	3.14	1.81	1.82
9	9A	4.37	8.12	2.97	4.76
10-L	10A	1.09	3.01	0.74	1.74

Table 6 - Proposed Pond Parameters of Alternative B

Alternative B					
Basin	**Pond**	**Total Volume Required (ac-ft)**	**Total Volume Provided (ac-ft)**	**Treatment Volume Required +50% (ac-ft)**	**Treatment Volume Provided (ac-ft)**
1	1B	1.65	2.75	0.95	1.59
2	2B	3.62	5.14	2.20	3.00
3	3B	1.92	2.31	1.31	1.33
4	4B	3.97	4.75	2.70	2.74
5	5B	4.52	5.28	3.07	3.08
6	6B	3.01	6.25	2.25	3.65
7	7B	1.90	-	1.30	-
8	8B	2.35	3.27	1.81	1.89
9	9B	4.37	9.76	1.81	5.75
10-C	10B	0.84	13.12	0.42	11.53

Table 7 - Proposed Pond Parameters of Alternative C

Alternative C					
Basin	**Pond**	**Total Volume Required (ac-ft)**	**Total Volume Provided (ac-ft)**	**Treatment Volume Required +50% (ac-ft)**	**Treatment Volume Provided (ac-ft)**
1	1C	1.65	2.75	0.95	1.59
2	2C	3.62	5.59	2.20	3.23
3	3C	1.92	2.22	1.31	1.31
4	4C	3.97	5.56	2.70	3.25
5	5C	4.52	8.40	3.07	4.93
6	6C	3.01	4.11	2.25	2.39
7	7C	1.90	-	1.30	-
8	8C	2.35	3.11	1.81	1.81
9	9C	4.37	8.20	2.97	4.82
10-C	10C	1.32	-	0.91	-

7. SUMMARY OF RESULTS

Potential ponds have been sized and located along the project limits for this PD&E study. The analysis estimates right-of-way needs using a volumetric approach, which accounts for water quality treatment and attenuation. The estimated right-of-way areas for the ponds were based on pond sizes determined from preliminary data and calculations, utilizing reasonable engineering judgement and assumptions. Pond sizes and configurations may change during final design as more detailed information on seasonal high ground water elevations, property boundaries, right-of-way, wetlands etc. becomes available. The pond sites evaluation matrix is listed in **Table 1** in the Executive Summary.

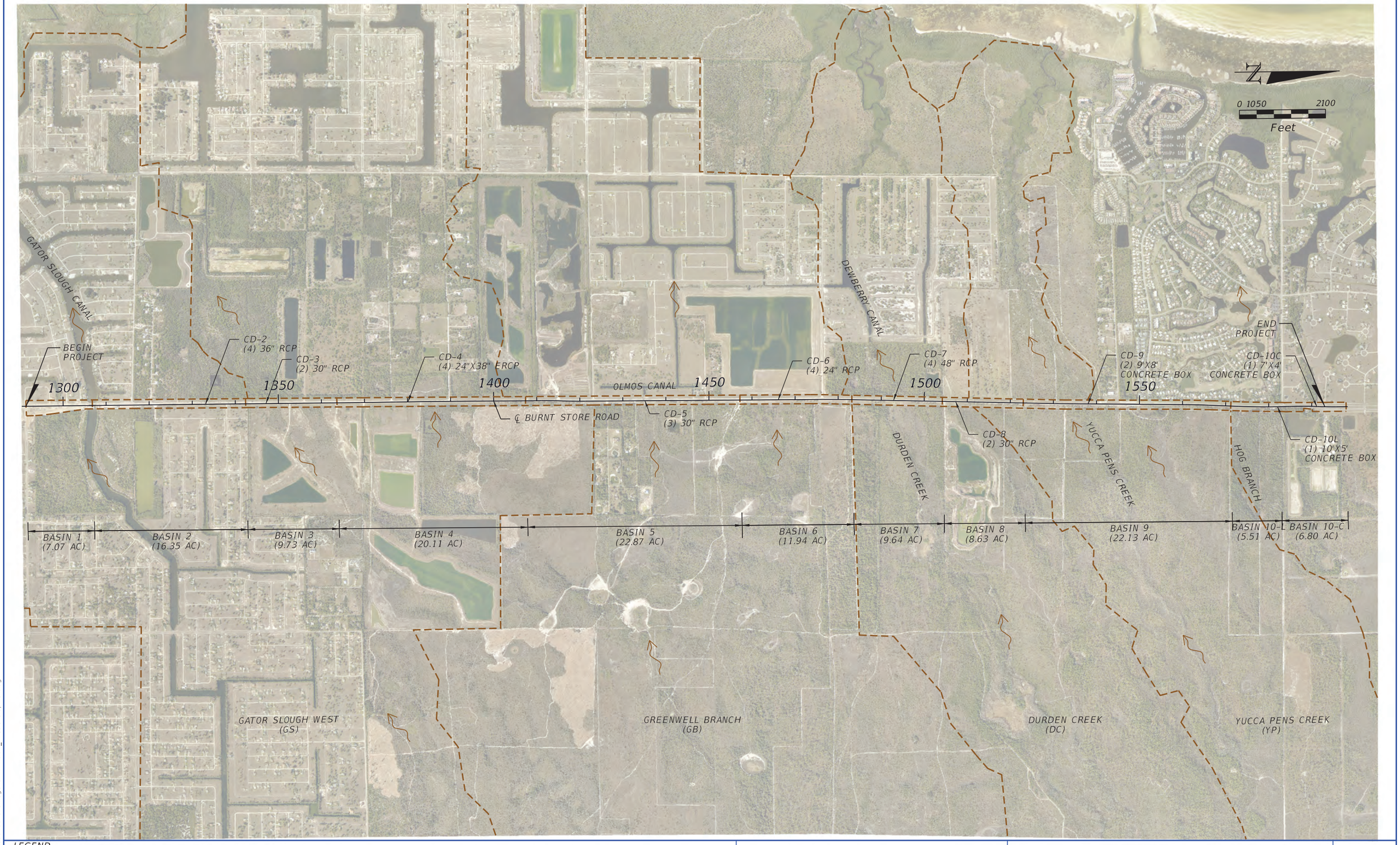
Table 8 summarizes the list of preferred ponds in each basin.

Table 8 - Summary of Preferred Pond Sites

Basin	Preferred Pond
1	1A
2	2C
3	3C
4	4B
5	5A
6	6A
7	-
8	8B
9	9C
10-L	10A
10-C	10C

APPENDIX A

Drainage Maps



LEGEND

- BASIN DIVIDE
- FLOW PATTERN

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
CR 765	LEE	436928-1-22-01

PRE-DEVELOPMENT DRAINAGE MAP

SHEET NO. 1

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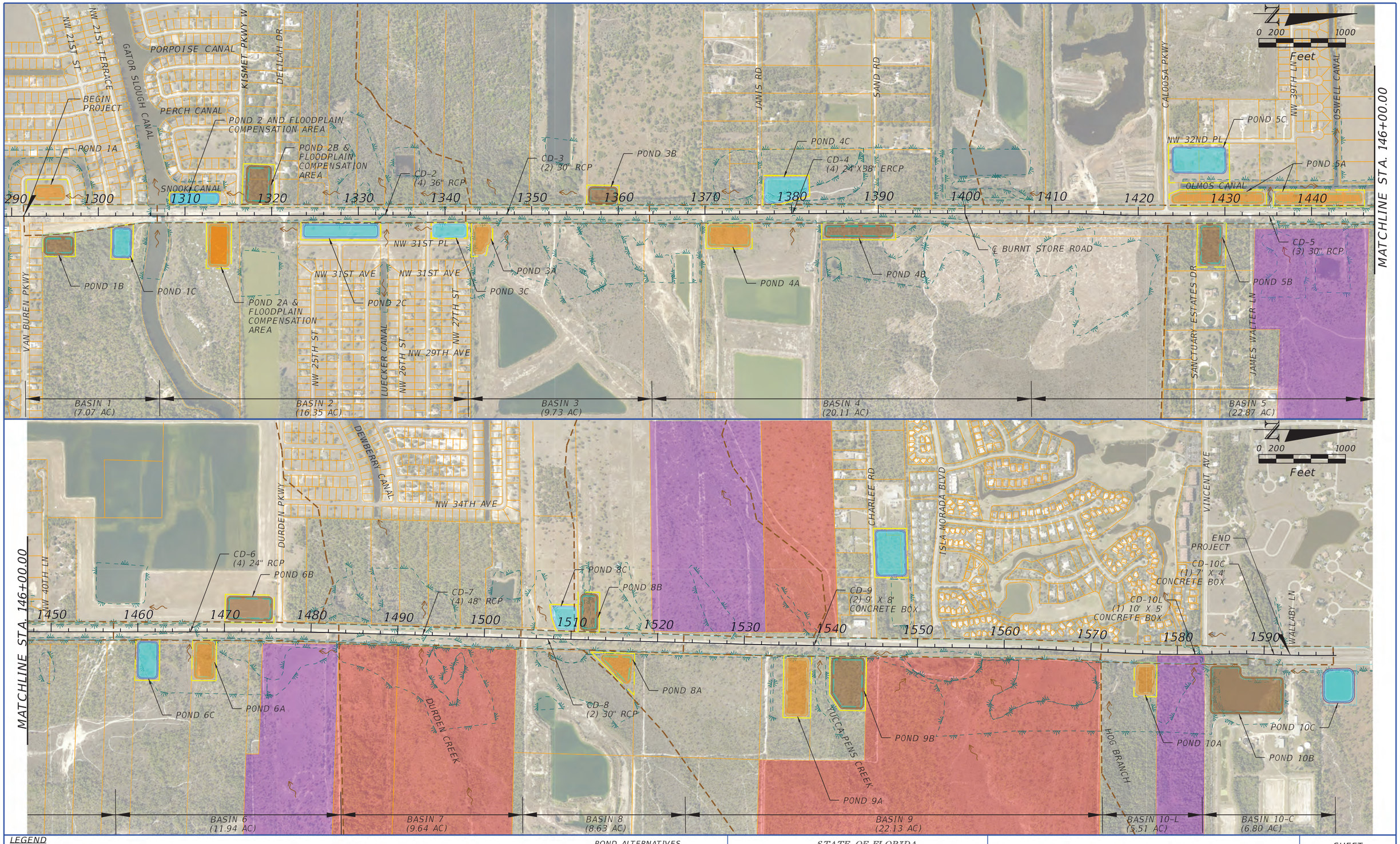

LEGEND

- R/W
- POND R/W
- WETLAND LIMITS
- PARCEL LINES
- BASIN DIVIDE
- FLOW PATTERN
- STATE CONSERVATION LANDS
- COUNTY CONSERVATION LANDS

POND ALTERNATIVES

- ALT A
- ALT B
- ALT C

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
CR 765	LEE	436928-1-22-01

POST-DEVELOPMENT DRAINAGE MAP

SHEET NO. 2

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APPENDIX B

FEMA

and

Lee County’s Flood Insurance Rate Maps

PORPOISE CANAL
NW 21ST ST
NW 21ST TERRACE
GATOR SLOUGH CANAL
KISMET PKWY W
DELILAH DR
PERCH CANAL
JANIS RD
SAND RD
CALOOSA PKWY
NW 39TH LN
OSWELL CANAL
OLMOS CANAL
NW 32ND PL
SNOOK CANAL
BEGIN PROJECT
POND 1A
POND 2 AND FLOODPLAIN COMPENSATION AREA
POND 2B & FLOODPLAIN COMPENSATION AREA
CD-2 (4) 36" RCP
CD-3 (2) 30" RCP
POND 3B
POND 4C
CD-4 (4) 24"X38" ERCP
POND 5C
POND 5A
290 1300 1310 1320 1330 1340 1350 1360 1370 1380 1390 1400 1410 1420 1430 1440
MATCHLINE STA. 146+00.00
0 200 1000 Feet
VAN BUREN PKWY
POND 1B
POND 1C
POND 2A & FLOODPLAIN COMPENSATION AREA
NW 31ST PL
NW 31ST AVE
NW 31ST AVE
POND 2C
POND 3A
POND 3C
NW 25TH ST
LUECKER CANAL
NW 26TH ST
NW 27TH ST
NW 29TH AVE
POND 4A
POND 4B
℄ BURNT STORE ROAD
CD-5 (3) 30" RCP
POND 5B
SANCTUARY ESTATES DR
JAMES WALTER LN
DEWBERRY CANAL
DURDEN PKWY
NW 34TH AVE
CHARLEE RD
ISLA MORADA BLVD
VINCENT AVE
END PROJECT
CD-10C (1) 7' X 4' CONCRETE BOX
CD-10L (1) 10' X 5' CONCRETE BOX
WALLABY LN
NW 40TH LN
CD-6 (4) 24" RCP
POND 6B
CD-7 (4) 48" RCP
POND 8C
POND 8B
CD-9 (2) 9' X 8' CONCRETE BOX
1450 1460 1470 1480 1490 1500 1510 1520 1530 1540 1550 1560 1570 1580 1590
MATCHLINE STA. 146+00.00
POND 6C
POND 6A
CD-8 (2) 30" RCP
POND 8A
DURDEN CREEK
YUCCA PENS CREEK
POND 9B
POND 9A
HOG BRANCH
POND 10A
POND 10B
POND 10C

LEGEND

- FLOOD ZONE AE - EL. 6 FT
- FLOOD ZONE X
- POND R/W

POND ALTERNATIVES

- ALT A
- ALT B
- ALT C

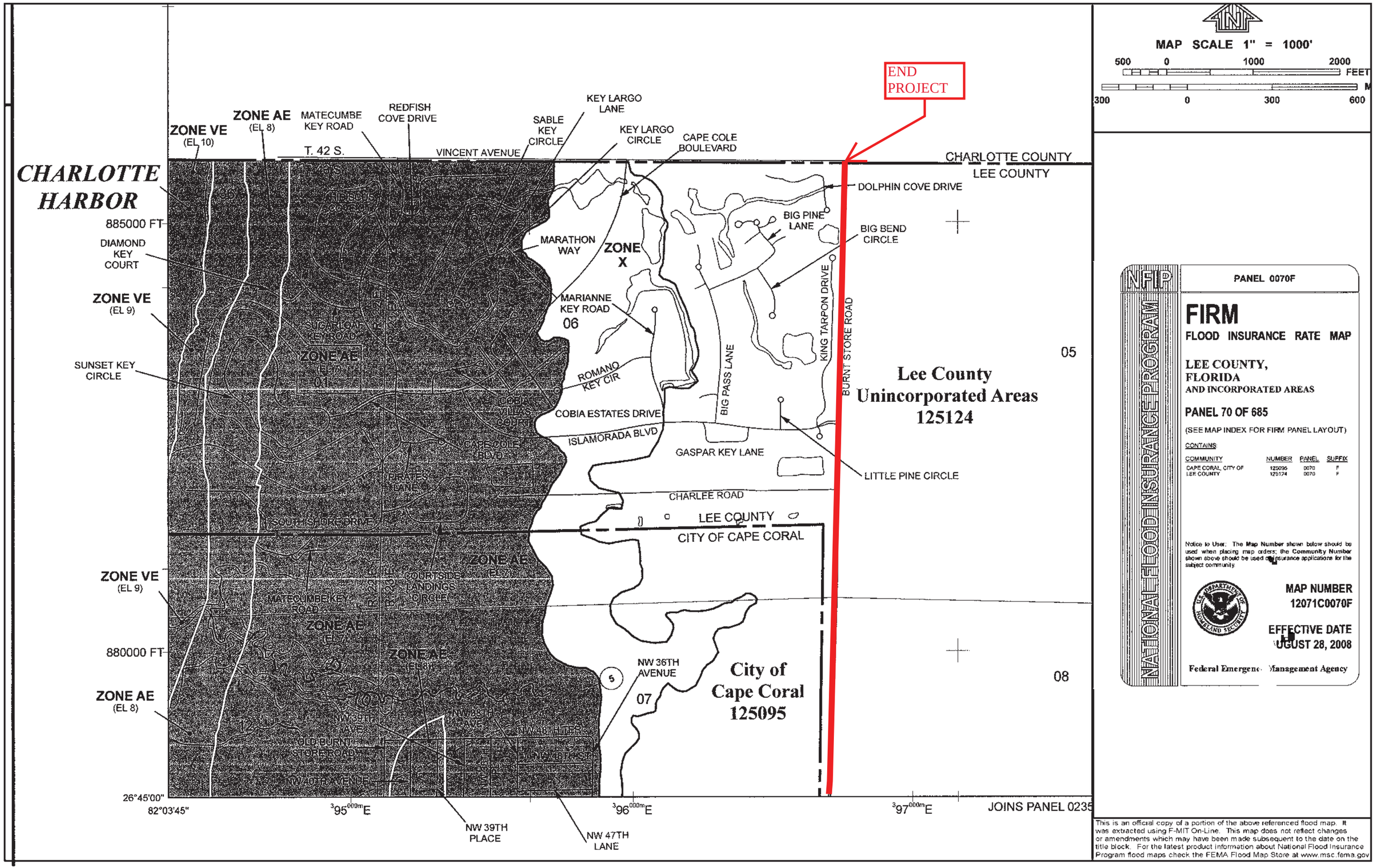
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
CR 765	LEE	436928-1-22-01

FEMA FLOODPLAIN MAP

SHEET NO. 1

3/9/2023 11:44:21 AM yukiyo.johnson
C:\Users\Ccardoza\OneDrive - CONSOR Engineers, LLC\BSR\Burnt Store Rd\drainage\DRMPRD_Stacked_01.dgn



MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

300 0 300 600 M

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0070F

FIRM

FLOOD INSURANCE RATE MAP

LEE COUNTY, FLORIDA
AND INCORPORATED AREAS

PANEL 70 OF 685

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CAPE CORAL, CITY OF	125095	0070	F
LEE COUNTY	125124	0070	F

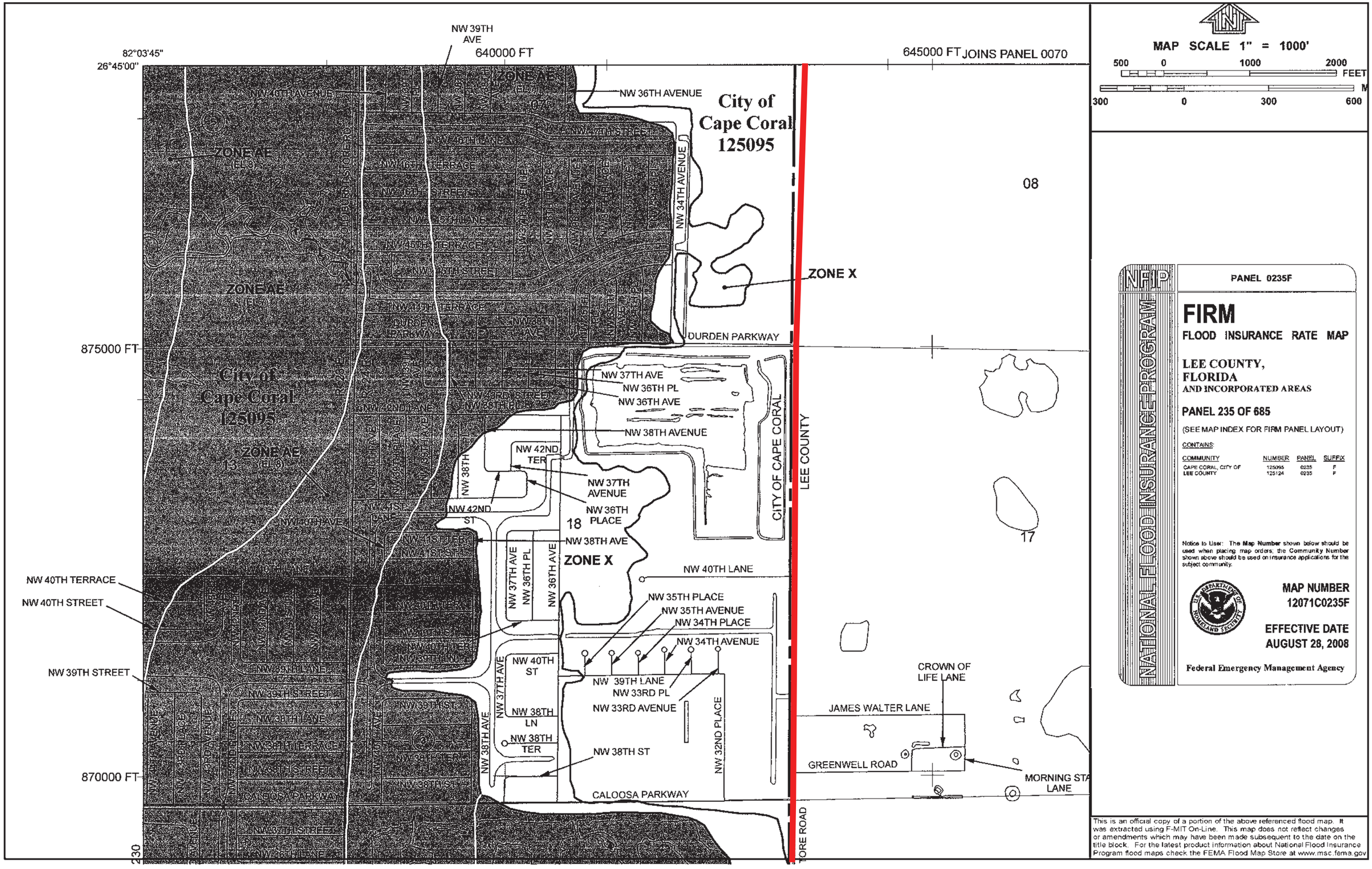
Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
12071C0070F

EFFECTIVE DATE
AUGUST 28, 2008

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov



MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

300 0 300 600 M

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0235F

FIRM

FLOOD INSURANCE RATE MAP

LEE COUNTY, FLORIDA
AND INCORPORATED AREAS

PANEL 235 OF 685

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CAPE CORAL, CITY OF	125095	0235	F
LEE COUNTY	125124	0235	F

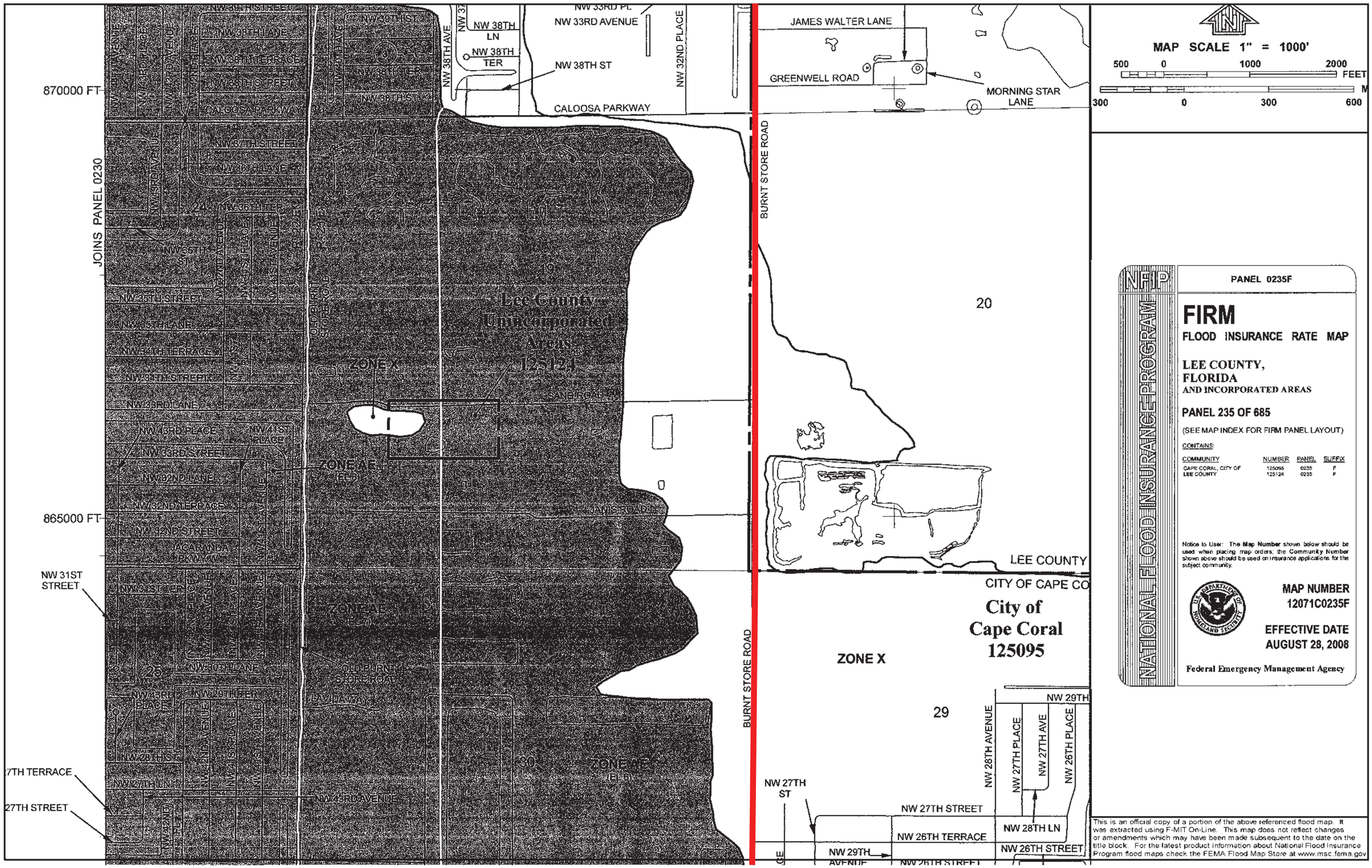
Notice to User: The **Map Number** shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
12071C0235F

EFFECTIVE DATE
AUGUST 28, 2008

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov


MAP SCALE 1" = 1000'
500 0 1000 2000 FEET
300 0 300 600 M
NFIP
PANEL 0235F
FIRM
FLOOD INSURANCE RATE MAP
LEE COUNTY, FLORIDA
AND INCORPORATED AREAS
PANEL 235 OF 685
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
CONTAINS:
COMMUNITY NUMBER PANEL SUFFIX
CAPE CORAL, CITY OF 125095 0235 F
LEE COUNTY 125124 0235 F
Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.
MAP NUMBER
12071C0235F
EFFECTIVE DATE
AUGUST 28, 2008
Federal Emergency Management Agency
NATIONAL FLOOD INSURANCE PROGRAM
This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov
870000 FT
865000 FT
JOINS PANEL 0230
Lee County Unincorporated Areas 125124
ZONE X
ZONE AE (EL 9)
ZONE AE (EL 8)
ZONE X
City of Cape Coral 125095
BURNT STORE ROAD
OLD BURNT STORE ROAD
CALOOSA PARKWAY
NW 38TH AVE
NW 38TH LN
NW 38TH TER
NW 38TH ST
NW 33RD PL
NW 33RD AVENUE
NW 32ND PLACE
JAMES WALTER LANE
GREENWELL ROAD
MORNING STAR LANE
LEE COUNTY
CITY OF CAPE CO
NW 31ST STREET
NW 27TH ST
NW 27TH STREET
NW 26TH TERRACE
NW 26TH STREET
NW 28TH LN
NW 28TH AVENUE
NW 27TH PLACE
NW 27TH AVE
NW 26TH PLACE
NW 29TH
NW 29TH AVENUE
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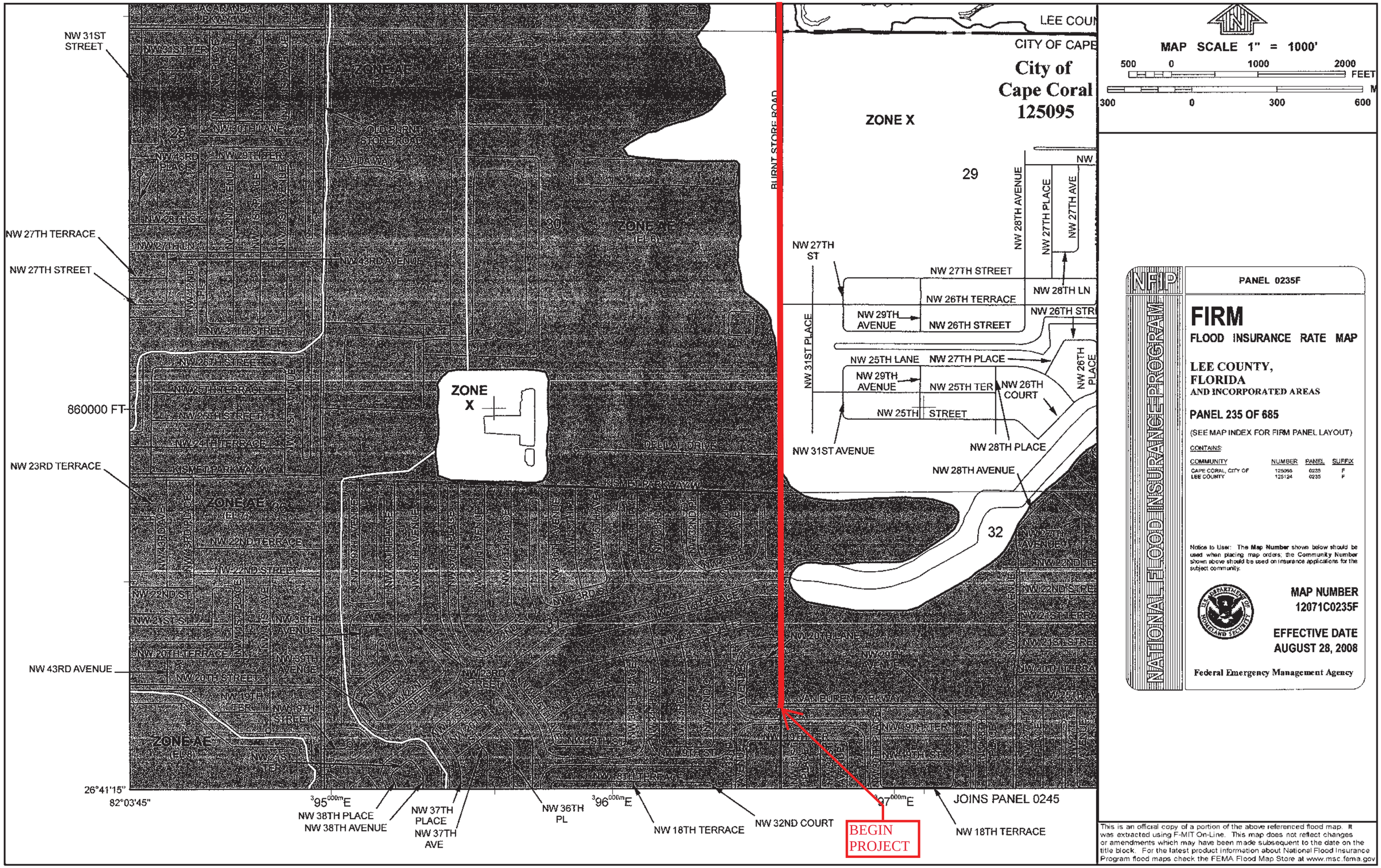
25
29
30



NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0235F

FIRM

FLOOD INSURANCE RATE MAP

LEE COUNTY, FLORIDA
AND INCORPORATED AREAS

PANEL 235 OF 685

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CAPE CORAL, CITY OF	125095	0235	F
LEE COUNTY	125124	0235	F

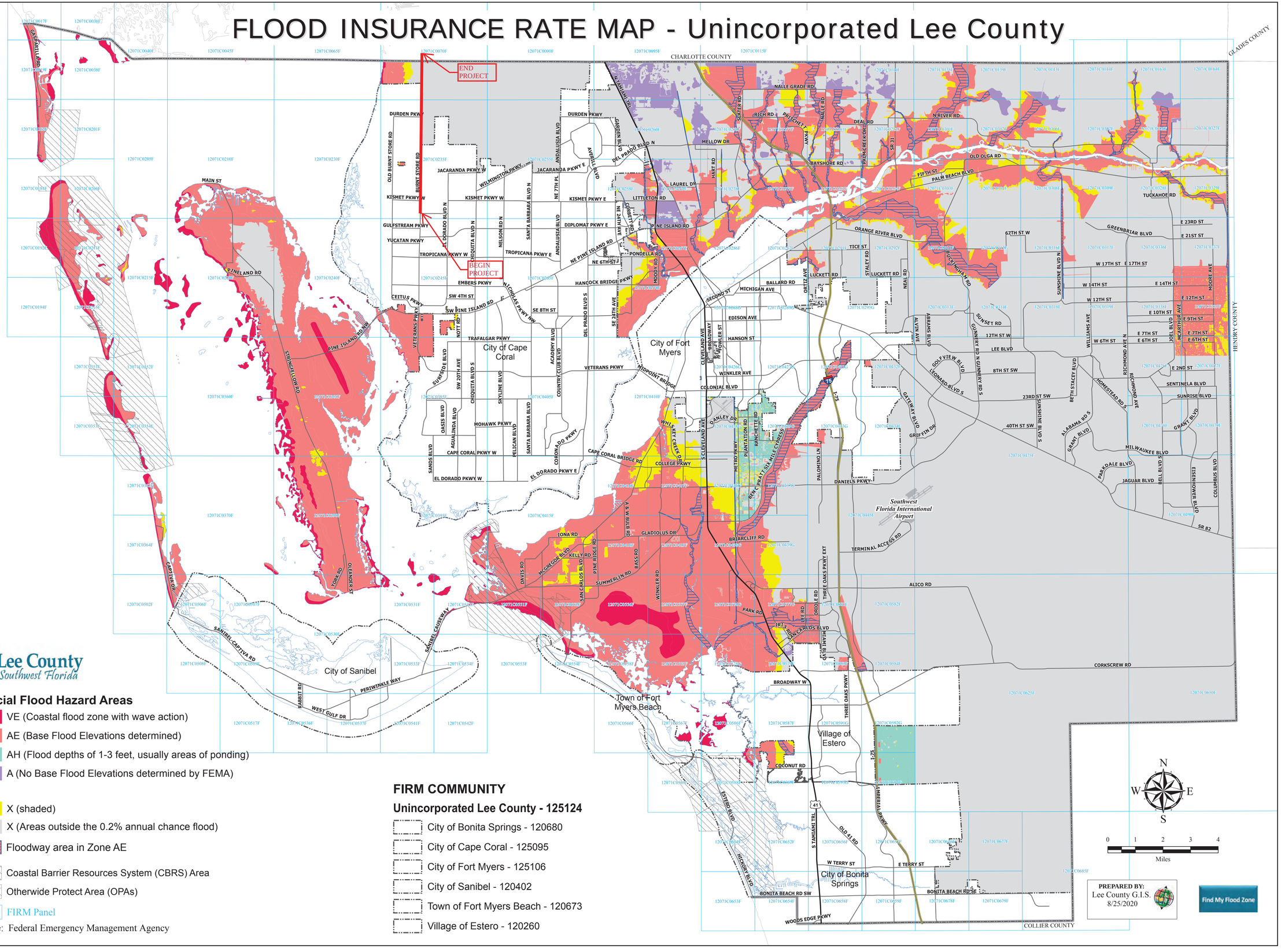
Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
12071C0235F

EFFECTIVE DATE
AUGUST 28, 2008

Federal Emergency Management Agency

FLOOD INSURANCE RATE MAP - Unincorporated Lee County



APPENDIX C

Calculations

CONSOR Engineers, LLC				
PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			DATE
BASIN DESIGNATION:	1	MADE BY:	YSJ	06/27/22
BASIN ANALYSIS (PRE/POST):	PRE	CHECKED BY:	FLG	06/01/22

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL NAME	SOIL GROUP	CN	AREA (ac)	PRODUCT
Existing Impervious	Urban Land	-	98	0.85	83.15
Pervious	Mix	B	76.5	6.22	476.00
			TOTALS	7.07	559.15

COMPOSITE CN	79.08

ESTIMATE OF RUNOFF VOLUME

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

1) DETERMINE SOIL STORAGE - S ----------> S = (1000 / CN) - 10 (inches)

2) DETERMINE RUNOFF - R ----------> R = (P - 0.2*S)^2 / (P + 0.8*S) (inches)

P = rainfall in inches

3) DETERMINE RUNOFF VOLUME - V(R) ----------> V(R) = (R / 12)*BASIN AREA (acre-feet)

CALCULATION TABLE

Agency	Design Storm Frequency	P (in)	S (in)	R (in)	V(R) (ac-ft)
SFWMD Basin Criteria	25 yr / 72 hr	10.60	2.65	7.98	4.70

CONSOR Engineers, LLC				
PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			DATE
BASIN DESIGNATION:	1	MADE BY:	YSJ	06/27/22
BASIN ANALYSIS (PRE/POST):	POST	CHECKED BY:	FLG	06/01/22

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL NAME	SOIL GROUP	CN	AREA (ac)	PRODUCT
Proposed Impervious	Urban Land	-	98	2.97	291.03
Existing Impervious	Urban Land	-	98	0.85	83.15
Pervious	Mix	B	76.5	3.25	248.82
			TOTALS	7.07	623.00

COMPOSITE CN	88.11

ESTIMATE OF RUNOFF VOLUME

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

1) DETERMINE SOIL STORAGE - S ----------> S = (1000 / CN) - 10 (inches)

2) DETERMINE RUNOFF - R ----------> R = (P - 0.2*S)^2 / (P + 0.8*S) (inches)

P = rainfall in inches

3) DETERMINE RUNOFF VOLUME - V(R) ----------> V(R) = (R / 12)*BASIN AREA (acre-feet)

CALCULATION TABLE

Agency	Design Storm Frequency	P (in)	S (in)	R (in)	V(R) (ac-ft)
SFWMD Basin Criteria	25 yr / 72 hr	10.60	1.35	9.14	**5.38**

CONSOR Engineers, LLC

PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			**DATE**
BASIN DESIGNATION:	1	**MADE BY:**	YSJ	06/27/22
POND:	1A	**CHECKED BY:**	FLG	06/01/22

Water Quality

Total Basin Area = 7.07 ac
Proposed Paved Area = 2.97 ac
Pond Area at NWL = ac

A.	1.00	" Over Total Basin Area =	0.59	Ac-Ft
B.	2.50	" Over Proposed Paved Area =	0.62	Ac-Ft
		Treatment Volume	0.62	Ac-Ft
		Treatment Volume + 50%	0.93	Ac-Ft
		Attenuation Volume	0.68	Ac-Ft
		Total Volume	**1.61**	Ac-Ft

Stage Storage Calculations

ELEV. (ft)		AREA (ac)	AVG AREA (ac)	Delta D (ft)	Delta storage (ac-ft)	Sum Storage (ac-ft)
6.63	Out. Berm	1.38				4.48
			1.30	0.50	0.65	
6.13		1.22				3.83
			1.14	0.50	0.57	
5.63	In. Berm	1.06				3.26
			1.03	1.00	1.03	
4.63	DHW (Estimated)	0.99				**2.23**
			0.95	1.00	0.95	
3.63	(PAV)	0.91				1.28
			0.86	1.50	1.28	
2.13	NWL	0.80				
-5.87	Bottom					

Freeboard = **1.00** ft

Source of NWL
SFWMD Application No.: 190315-33, SFWMD Permt No.: 36-02841-S
WSWT = 2.13 ft NAVD'88

CONSOR Engineers, LLC

PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			**DATE**
BASIN DESIGNATION:	1	**MADE BY:**	YSJ	06/27/22
POND:	1A	**CHECKED BY:**	FLG	06/27/22

Hydraulic Grade Line Clearance Calculations

1) Estimated tailwater elevation in the pond (for preliminary storm sewer design) = 4.63

2) Calculation of post-development area for HGL check

Baseline	From Station	To Station	Length (ft)	Roadway width (ft)	Area (ac)
CL BSR	1291+40	1306+80	1540.00	43.00	1.52
				Total	1.52

3) Lowest gutter elevation in Basin for HGL check

Station	1342+40
Baseline	CL BSR
Offset (ft)	RT
Elevation (ft)	9.90

4) Allowable Head Loss = lowest gutter el - est. tailwater el = 5.27 ft

5) Pipe length from Pond to lowest gutter point = 687.00 ft

6) Rational Method for contributing runoff - Q=CiA

C =	0.95	
int. =	7.50	in/hr
A =	1.52	ac
Q =	10.83	cfs
Manning's n =	0.012	
Sum K =	2.41	
V =	3.45	fps

7) Estimation of Pipe Size

HL = [4.61*(n^2)*L*(Q^2)]/(D^5.33) + K(V^2)/2g

HL = Allowable Head Loss (ft) 1.77 <actual HL - OK

n = Manning's n

L = Length (ft)

Q = Runoff (cfs)

D = Pipe diameter (ft)

K = coefficient for minor losses

V = pipe velocity (fps)

g = gravitational constant (32.2 ft/sec^2)

8) Estimated Pipe Diameter to satisfy the conditions = 2.00 ft / 24.00 in

CONSOR Engineers, LLC				
PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			DATE
BASIN DESIGNATION:	2	MADE BY:	YSJ	06/27/22
BASIN ANALYSIS (PRE/POST):	PRE	CHECKED BY:	FLG	07/1/22

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL NAME	SOIL GROUP	CN	AREA (ac)	PRODUCT
Existing Impervious	Urban Land	-	98	1.96	192.22
Pervious	5 ix	A/D	79	14.38	1136.32
			TOTALS	16.35	1328.54

COMPOSITE CN	81.28

ESTIMATE OF RUNOFF VOLUME

PRMOEDURE CMDECER5 ITE RUTMFF NMLU5 E IS BASED MT CVE SOS EHUACIMT ATD IS AS FMLLMQ SW

1: DECER5 ITE SMIL SCMRAGE - S ----------) S > =1000 / OT : - 10 =in(ces:

2: DECER5 ITE RUTMFF - R ----------) R > =P - 0.2hS:*2 / =P ^ 0.8hS : =in(ces:

P > rain+all in in(ces

3: DECER5 ITE RUTMFF NMLU5 E - N=R: ----------) N=R: > =R / 12:hBASIT AREA =a(re-+eet:

OALOULACIMT CABLE

Agency	Design Storm Frequency	P (in)	S (in)	R (in)	V(R) (ac-ft)
SFQ 5 D Basin Oriteria	2f yr / 72 cr	10.60	2.30	8.26	11.2f

CONSOR Engineers, LLC				
PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			DATE
BASIN DESIGNATION:	2	MADE BY:	YSJ	06/27/22
BASIN ANALYSIS (PRE/POST):	PMSC	CHECKED BY:	FLG	07/1/22

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL NAME	SOIL GROUP	CN	AREA (ac)	PRODUCT
Proposed Impervious	Urban Land	-	98	6.87	672.77
Existing Impervious	Urban Land	-	98	1.96	192.22
Pervious	5 ix	A/D	79	7.f2	f93.99
			TOTALS	16.35	1458.98

COMPOSITE CN	89.26

ESTIMATE OF RUNOFF VOLUME

PRMOEDURE CMDECER5 ITE RUTMFF NMLU5 E IS BASED MT CVE SOS EHUACIMT ATD IS AS FMLLMQ SW

1: DECER5 ITE SMIL SCMRAGE - S ----------) S > =1000 / OT : - 10 =in(ces:

2: DECER5 ITE RUTMFF - R ----------) R > =P - 0.2hS:*2 / =P ^ 0.8hS : =in(ces:

P > rain+all in in(ces

3: DECER5 ITE RUTMFF NMLU5 E - N=R: ----------) N=R: > =R / 12:hBASIT AREA =a(re-+eet:

OALOULACIMT CABLE

Agency	Design Storm Frequency	P (in)	S (in)	R (in)	V(R) (ac-ft)
SFQ 5 D Basin Oriteria	2f yr / 72 cr	10.60	1.20	9.28	**12.64**

CONSOR Engineers, LLC				
PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			**DATE**
BASIN DESIGNATION:	2	**MADE BY:**	YSJ	06/27/22
POND:	2A	**CHECKED BY:**	FLG	07/1/22

Water Quality

Cotal Basin Area > 16.3f a(
Proposed Paved Area > 6.87 a(
Pond Area at TQ L > a(

A.	1.00	" Mver Cotal Basin Area >	1.36	A(-Ft
B.	2.f0	" Mver Proposed Paved Area >	1.43	A(-Ft
		Creatment Nolume	1.43	A(-Ft
		Creatment Nolume ^ f0% =due to MFQ :	2.1f	A(-Ft
		Attenuation Nolume	1.39	A(-Ft
		Total Volume	**3.53**	A(-Ft

Stage Storage Calculations

ELEV. (ft)		AREA (ac)	AVG AREA (ac)	Delta D (ft)	Delta storage (ac-ft)	Sum Storage (ac-ft)
7.33	Mut. Berm	2.78				9.91
			2.66	0.f0	1.33	
6.83		2.f4				8.f8
			2.43	0.f0	1.21	
6.33	In. Berm	2.31				7.37
			2.2f	1.00	2.2f	
f.33	DVQ	2.19				**5.12**
			2.14	1.00	2.14	
4.33	=PAN:	2.08				2.99
			1.99	1.f0	2.99	
2.83	=TQ L:	1.90				
-f.17	Bottom					

Freeboard > **1.00** =t

Source of NWL
SFQ 5 D Appli(ation To.W97011f-3kSFQ 5 D Permt To.W36-03217-P
Q SQ C > 2.83 =t TAND,88

CONSOR Engineers, LLC

PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			**DATE**
BASIN DESIGNATION:	2	**MADE BY:**	YSJ	06/27/22
POND:	2A	**CHECKED BY:**	FLG	07/1/22

Hydraulic Grade Line Clearance Calculations

1: Estimated tail' ater elevation in tce pond =⊦or preliminary storm se' er design: > f.33

2: Oal(ulation o+post-development area ⊦or VGL (ce(w

Baseline	From Station	Co Station	Lengtc =⊦t:	Road' ay ' idtc =⊦t:	Area =a(:
OL BSR	1306^80	1342^40	3f60.00	43.00	3.f1
				1.00	
				Cotal	3.f1

3: Lo' est gutter elevation in Basin ⊦or VGL (ce(w

Station	1336^f0
Baseline	OL BSR
M⊦⊦set =⊦t:	RC
Elevation =⊦t:	10.27

4: Allo' able Vead Loss > lo' est gutter el - est. tail' ater el > 4.94 ⊦t

f: Pipe lengtc ⊦rom Pond to lo' est gutter point > 22f0.00 ⊦t

6: Rational 5 etcod ⊦or (ontributing runo⊦⊦- H>OiA

O >	0.9f	
int. >	7.40	in/cr
A >	3.f1	a(
H >	24.71	(⊦s
5 anning,s n >	0.012	
Sum K >	2.f1	
N >	3.f0	⊦ps

7: Estimation o+Pipe Size

VL > [4.61h=n*2:hLh=H*2:]/=D*f.33: ^ K=N*2:/2g

VL > Allo' able Vead Loss =⊦t: 3.09

n > 5 anning,s n <a(tual VL - MK

L > Lengtc =⊦t:

H > Runo⊦⊦=(⊦s:

D > Pipe diameter =⊦t:

K > (oe⊦⊦i(ient ⊦or minor losses

N > pipe velo(ity =⊦ps:

g > gravitational (onstant =32.2 ⊦t/se(*2:

8: Estimated Pipe Diameter to satis⊦y tce (onditions > 3.00 ⊦t / 36.00 in

CONSOR Engineers, LLC				
PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			DATE
BASIN DESIGNATION:	3	MADE BY:	YSJ	06/27/22
BASIN ANALYSIS (PRE/POST):	PRE	CHECKED BY:	FLG	07/1/22

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL NAME	SOIL GROUP	CN	AREA (ac)	PRODUCT
Existing Impervious	Urban Land	-	98	1.17	114.47
Pervious	5 ix	A/D	84	8.M	719.M2
			TOTALS	7.05	955.79

COMPOSITE CN	91.89

ESTIMATE OF RUNOFF VOLUME

PROCEDURE TO DETER5 INE RUNOFF VOLU5 E IS BASED ON THE SCS EQUATION AND IS AS FOLLOWS:

1) DETER5 INE SOIL STORAGE - S ----------> S = (1000 / CN) - 10 (inches)

2) DETER5 INE RUNOFF - R ----------> R = (P - 0.2*S)^2 / (P + 0.8*S) (inches)

P = rainfall in inches

3) DETER5 INE RUNOFF VOLU5 E - V(R) ----------> V(R) = (R / 12)*BASIN AREA (acre-feet)

CALCULATION TABLE

Agency	Design Storm Frequency	P (in)	S (in)	R (in)	V(R) (ac-ft)
SFW5 D Basin Criteria	2Myr / 72 hr	10.60	1.67	8.83	7.16

CONSOR Engineers, LLC				
PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			DATE
BASIN DESIGNATION:	3	MADE BY:	YSJ	06/27/22
BASIN ANALYSIS (PRE/POST):	POST	CHECKED BY:	FLG	07/1/22

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL NAME	SOIL GROUP	CN	AREA (ac)	PRODUCT
Proposed Impervious	Urban Land	-	98	4.09	400.64
Existing Impervious	Urban Land	-	98	1.17	114.47
Pervious	5 ix	A/D	84	4.48	376.11
			TOTALS	7.05	976.22

COMPOSITE CN	76.18

ESTIMATE OF RUNOFF VOLUME

PROCEDURE TO DETER5 INE RUNOFF VOLU5 E IS BASED ON THE SCS EQUATION AND IS AS FOLLOWS:

1) DETER5 INE SOIL STORAGE - S ----------> S = (1000 / CN) - 10 (inches)

2) DETER5 INE RUNOFF - R ----------> R = (P - 0.2*S)^2 / (P + 0.8*S) (inches)

P = rainfall in inches

3) DETER5 INE RUNOFF VOLU5 E - V(R) ----------> V(R) = (R / 12)*BASIN AREA (acre-feet)

CALCULATION TABLE

Agency	Design Storm Frequency	P (in)	S (in)	R (in)	V(R) (ac-ft)
SFW5 D Basin Criteria	2Myr / 72 hr	10.60	0.92	9.M	**0.08**

CONSOR Engineers, LLC

PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			**DATE**
BASIN DESIGNATION:	3	**MADE BY:**	YSJ	06/27/22
POND:	3A	**CHECKED BY:**	FLG	07/1/22

Water 3 uaQty

Total Basin Area = 9.73 ac
Proposed Paved Area = 4.09 ac
Pond Area at NWL = ac

A.	1.00	" Over Total Basin Area =	0.81	Ac-Ft
B.	2.M0	" Over Proposed Paved Area =	0.8M	Ac-Ft
		Treatment Volume	0.8M	Ac-Ft
		Treatment Volume + M0% (due to OFW)	1.28	Ac-Ft
		Attenuation Volume	0.60	Ac-Ft
		TotaQVoQme	**6.99**	Ac-Ft

Stage Storage CaQuQtions

ELEV. (ft)		AREA (ac)	AVG AREA (ac)	DeQa D (ft)	DeQa storage (ac-ft)	Sum Storage (ac-ft)
10.63	Out. Berm	1.46				4.77
			1.38	0.M0	0.69	
10.13		1.29				4.08
			1.21	0.M0	0.61	
9.63	In. Berm	1.13				3.47
			1.09	1.00	1.09	
8.63	DHW	1.0M				**2.59**
			1.01	1.00	1.01	
7.63	(PAV)	0.97				1.37
			0.92	1.M0	1.37	
6.13	(NWL)	0.86				
-1.88	Bottom					

Freeboard = **6.11** ft

Source of NWL
SFW5 D Application No.: 0M0M7-11kSFW5 D Permt No.: 36-04189-P
WSWT = 6.13 ft NAVD,88

CONSOR Engineers, LLC

PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			**DATE**
BASIN DESIGNATION:	3	**MADE BY:**	YSJ	06/27/22
POND:	3A	**CHECKED BY:**	FLG	07/1/22

Hydraulic Grade Line Clearance Calculations

1) Estimated tail' ater elevation in the pond (for preliminary storm se' er design) = 8.63

2) Calculation of post-development area for HGL checw

Baseline	From Station	To Station	Length (ft)	Road' ay ' idth (ft)	Area (ac)
CL BSR	1342+40	1363+60	2120.00	43.00	2.09
				Total	2.09

3) Lo' est gutter elevation in Basin for HGL checw

Station	1361+80
Baseline	CL BSR
Offset (ft)	RT
Elevation (ft)	10.48

4) Allo' able Head Loss = lo' est gutter el - est. tail' ater el = 1.86 ft

M Pipe length from Pond to lo' est gutter point = 1763.00 ft

6) Rational 5 ethod for contributing runoff - Q=CiA

C =	0.9M	
int. =	7.40	in/hr
A =	2.09	ac
Q =	14.71	cfs
5 anning,s n =	0.012	
Sum K =	2.48	
V =	2.08	fps

7) Estimation of Pipe Size

HL = [4.61*(n^2)*L*(Q^2)]/(D^M3) + K(V^2)/2g

HL = Allo' able Head Loss (ft) 0.89

n = 5 anning,s n <actual HL - OK

L = Length (ft)

Q = Runoff (cfs)

D = Pipe diameter (ft)

K = coefficient for minor losses

V = pipe velocity (fps)

g = gravitational constant (32.2 ft/sec^2)

8) Estimated Pipe Diameter to satisfy the conditions = 3.00 ft / 36.00 in

CONSOR Engineers, LLC				
PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			DATE
BASIN DESIGNATION:	4	MADE BY:	YSJ	06/28/22
BASIN ANALYSIS (PRE/POST):	PRE	CHECKED BY:	7FL	0G/1/22

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL NAME	SOIL GROUP	CN	AREA (ac)	PRODUCT
Existing Impervious	Urban Fand	-	98	2.41	236.50
Pervious	Mix	A/D	84	1GC0	1486.55
			TOTALS	20.11	1723.04

COMPOSITE CN	85.68

ESTIMATE OF RUNOFF VOLUME

PROCEDURE TO DETERMINE RUNO77 VOFUME IS BASED ON THE SCS EQUATION AND IS AS 7OFFOWS:

1) DETERMINE SOIF STORALE - S ----------> S = (1000 / CN) - 10 (inches)

2) DETERMINE RUNO77 - R ----------> R = (P - 0.2*S)^2 / (P + 0.8*S) (inches)

P = rainfall in inches

3) DETERMINE RUNO77 VOFUME - V(R) ----------> V(R) = (R / 12)*BASIN AREA (acre-feet)

CAFCUFATION TABFE

Agency	Design Storm Frequency	P (in)	S (in)	R (in)	V(R) (ac-ft)
S7WMD Basin Criteria	25 yr / G2 hr	10.60	1.6G	8.83	14.80

CONSOR Engineers, LLC				
PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			DATE
BASIN DESIGNATION:	4	MADE BY:	YSJ	06/28/22
BASIN ANALYSIS (PRE/POST):	POST	CHECKED BY:	7FL	0G/1/22

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL NAME	SOIL GROUP	CN	AREA (ac)	PRODUCT
Proposed Impervious	Urban Fand	-	98	8.45	82GG4
Existing Impervious	Urban Fand	-	98	2.41	236.50
Pervious	Mix	A/D	84	9.25	GCG06
			TOTALS	20.11	1841.29

COMPOSITE CN	91.56

ESTIMATE OF RUNOFF VOLUME

PROCEDURE TO DETERMINE RUNO77 VOFUME IS BASED ON THE SCS EQUATION AND IS AS 7OFFOWS:

1) DETERMINE SOIF STORALE - S ----------> S = (1000 / CN) - 10 (inches)

2) DETERMINE RUNO77 - R ----------> R = (P - 0.2*S)^2 / (P + 0.8*S) (inches)

P = rainfall in inches

3) DETERMINE RUNO77 VOFUME - V(R) ----------> V(R) = (R / 12)*BASIN AREA (acre-feet)

CAFCUFATION TABFE

Agency	Design Storm Frequency	P (in)	S (in)	R (in)	V(R) (ac-ft)
S7WMD Basin Criteria	25 yr / G2 hr	10.60	0.92	9.5G	**16.04**

CONSOR Engineers, LLC

PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			**DATE**
BASIN DESIGNATION:	4	**MADE BY:**	YSJ	06/28/22
POND:	4A	**CHECKED BY:**	7FL	0G/1/22

Water Quality

Total Basin Area = 20.11 ac
Proposed Paved Area = 8.45 ac
Pond Area at NWF = ac

A.	1.00	" Over Total Basin Area =	1.68	Ac-7t
B.	2.50	" Over Proposed Paved Area =	1.G6	Ac-7t
		Treatment Volume	1.G6	Ac-7t
		Treatment Volume + 50% (due to O7W)	2.64	Ac-7t
		Attenuation Volume	1.24	Ac-7t
		Total Volume	**3.88**	Ac-7t

Stage Storage Calculations

ELEV. (ft)		AREA (ac)	AVG AREA (ac)	Delta D (ft)	Delta storage (ac-ft)	Sum Storage (ac-ft)
11.83	Out. Berm	2.90				10.4
			2.G8	0.50	1.39	
11.33		2.66				9.01
			2.54	0.50	1.2G	
10.83	In. Berm	2.42				GG4
			2.36	1.00	2.36	
9.83	DHW	2.30				**5.38**
			2.24	1.00	2.24	
8.83	(PAV)	2.18				3.14
			2.10	1.50	3.14	
G33	(NWF)	2.01				
-0.6G	Bottom					

7reeboard = **1.00** ft

Source of NWL
S7WMD Application No.: 981030-11kS7WMD Permt No.: 36-02926-S
WSWT = G33 ft NAVD,88

CONSOR Engineers, LLC

PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			**DATE**
BASIN DESIGNATION:	4	**MADE BY:**	YSJ	06/28/22
POND:	4A	**CHECKED BY:**	7FL	0G/1/22

Hydraulic Grade Line Clearance Calculations

1) Estimated tail' ater elevation in the pond (for preliminary storm se' er design) = 9.83

2) Calculation of post-development area for HLF checw

Baseline	7rom Station	To Station	Fength (ft)	Road' ay ' idth (ft)	Area (ac)
CF BSR	1363+60	140G+40	4380.00	43.00	4.32
				Total	4.32

3) Fo' est gutter elevation in Basin for HLF checw

Station	1406+10
Baseline	CFBSR
Offset (ft)	RT
Elevation (ft)	10.C0

4) Allo' able Head Foss = lo' est gutter el - est. tail' ater el = 0.8G ft

5) Pipe length from Pond to lo' est gutter point = 3330.00 ft

6) Rational Method for contributing runoff - Q=CiA

C =	0.95	
int. =	G40	in/hr
A =	4.32	ac
Q =	30.40	cfs
Manning,s n =	0.012	
Sum K =	2.58	
V =	1.91	fps

G) Estimation of Pipe Size

HF = [4.61*(n^2)*F*(Q^2)]/(D^5.33) + K(V^2)/2g

HF = Allo' able Head Foss (ft) 0.82

n = Manning,s n <actual HF - OK

F = Fength (ft)

Q = Runoff (cfs)

D = Pipe diameter (ft)

K = coefficient for minor losses

V = pipe velocity (fps)

g = gravitational constant (32.2 ft/sec^2)

8) Estimated Pipe Diameter to satisfy the conditions = 4.50 ft / 54.00 in

CONSOR Engineers, LLC				
PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			DATE
BASIN DESIGNATION:	Y	MADE BY:	J S/	067287/22
BASIN ANALYSIS (PRE/POST):	PRE	CHECKED BY:	FLG	0x71/22

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL NAME	SOIL GROUP	CN	AREA (ac)	PRODUCT
EsigtinI mp Uervioug	b r. an Land	-	98	25x4	268589
Pervioug	Mis	O7D	84	205l2	1690518
			TOTALS	220 1	7343081

COMPOSITE CN	. 40l5.

ESTIMATE OF RUNOFF VOLUME

PRCOEDb RE TC DETERMmNE Rb NCFF VCLb ME mS BASED CN THE SOS EQb ATm6CN AND mS AS FCLLCWS:

1) DETERMmNE SCmL STCRAGE - S ----------> S = (1000 7ON) - 10 (incheg)

2) DETERMmNE Rb NCFF - R ----------> R = (P - 052*S)^2 7(P + 058*S) (incheg)

P = rainfall in incheg

3) DETERMmNE Rb NCFF VCLb ME - V(R) ----------> V(R) = (R 712)*BASmN AREA (acre-feet)

OALOb LATm6CN TABLE

Agenc6	Design Syt ro Fremqenc6	P (in)	S (in)	R (in)	V(R) (ac-uy)
SFWMD Bagin Oriteria	2Yyr 7x2 hr	10560	15x	8583	16582

CONSOR Engineers, LLC				
PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			DATE
BASIN DESIGNATION:	Y	MADE BY:	J S/	06728722
BASIN ANALYSIS (PRE/POST):	PCST	CHECKED BY:	FLG	0x71722

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL NAME	SOIL GROUP	CN	AREA (ac)	PRODUCT
ProUoged mp Uervioug	b r. an Land	-	98	9560	941512
EsigtinI mp Uervioug	b r. an land	-	98	25x4	26858 9
Pervioug	Mis	O7D	84	105Y2	88356Y0
			TOTALS	2201 1	283f042

COMPOSITE CN	37045

ESTIMATE OF RUNOFF VOLUME

PRCOEDb RE TC DETERMnNE Rb NCFF VCLb ME nS BASED CN THE SOS EQb ATn6CN AND nS AS FCLLCWS:

1) DETERMnNE SCnL STCRAGE - S ----------> S = (1000 7ON) - 10 (incheg)

2) DETERMnNE Rb NCFF - R ----------> R = (P - 052*S)^2 7(P + 058*S) (incheg)

P = rainfall in incheg

3) DETERMnNE Rb NCFF VCLb ME - V(R) ----------> V(R) = (R 712)*BASnN AREA (acre-feet)

OALOb LATn6CN TABLE

Agenc6	Design Syt ro Fremqenc6	P (in)	S (in)	R (in)	V(R) (ac-uy)
SFWMD Bagin Oriteria	2Yyr 7x2 hr	10560	0592	95Yx	7. 02f

CONSOR Engineers, LLC				
PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			DATE
BASIN DESIGNATION:	Y	MADE BY:	J S/	06/28/22
POND:	YA	CHECKED BY:	FLG	0x7/22

Wayer 9 qaQ)6

Total Bagin Area = 225 8x ac
ProUoged Paved Area = 95 60 ac
Pond Area at NWL = ac

A5	15 00	" Cver Total Bagin Area =	15 91	Ac-Ft
B5	25 Y0	" Cver ProUoged Paved Area =	25 00	Ac-Ft
		Treatp ent Volup e	25 00	Ac-Ft
		Treatp ent Volup e + Y0% (due to CFW)	35 00	Ac-Ft
		Attenuation Volup e	15 41	Ac-Ft
		Tt yaQVt Qo e	**1 0 7**	Ac-Ft

Syage Syt rage CaQqQ)yit ns

ELEV0 (uy)		AREA (ac)	AVG AREA (ac)	DeQya D (uy)	DeQya syt rage (ac-uy)	Sqo Syt rage (ac-uy)
6 30	Cut5Berp	x 46				225 1
			65 x4	05 Y0	35 3x	
6 30		6 01				185 8
			Y5 63	05 Y0	25 82	
Y 80	m5Berp	Y 2Y				1Y 59
			Y 0Y	1 00	Y 0Y	
4 80	DHW	4 8Y				**78 0 8**
			4 6Y	1 00	4 6Y	
3 80	(PAV)	45 4Y				65 24
			45 16	1 Y0	65 24	
2 30	(NWL)	3 8x				
-Y 0	Bottop					

Free. oard = **7 0 88** ft

St qrce t uNWL
SFWMD AUUication No5 181002-8x6kSFWMD Perp t No5 36-1006YY-P
Oontrol Elevation = 2 30 ft NAVD,88

CONSOR Engineers, LLC

PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			**DATE**
BASIN DESIGNATION:	Y	**MADE BY:**	J S/	067287/22
POND:	YA	**CHECKED BY:**	FLG	0x7/7/22

Hydraulic Grade Line Clearance Calculations

1) Egtip ated tail' ater elevation in the Uond (for preliminary gtorp ge' er degI n) = 4580

2) Oalculation of Uogt-develoUp ent area for HGL checw

Bageline	Frop Station	To Station	LenI th (ft)	Road' ay ' idth (ft)	Area (ac)
OL BSR	140x+40	14Yx+20	4980500	43500	4592
				Total	4592

3) Lo' egt I utter elevation in Bagin for HGL checw

Station	1412+40
Bageline	OL BSR
Cffget (ft)	RT
Elevation (ft)	11500

4) Allo' a. le Head Logg = lo' egt I utter el - egt5tail' ater el = 6520 ft

Y) PiUe lenI th frop Pond to lo' egt I utter Uoint = 2281500 ft

6) Rational Method for contri. utinI runoff - Q=OiA

O =	059Y	
int5=	x540	in/hr
A =	4592	ac
Q =	3459Y6	cfg
ManninI ,g n =	05012	
Sup K =	25Y1	
V =	4589	fUg

x) Egtip ation of PiUe Size

HL = [4561*(n^2)*L*(Q^2)]/(D^Y533) + K(V^2)/2I

HL = Allo' a. le Head Logg (ft) 6511

n = ManninI ,g n <actual HL - CK

L = LenI th (ft)

Q = Runoff (cfg)

D = PiUe diap eter (ft)

K = coefficient for p inor loggeg

V = UiUe velocity (fUg)

I = I ravitational congtant (3252 ft/gec^2)

8) Egtip ated PiUe Diap eter to gatigfy the conditiong = 3500 ft

36500 in

CONSOR Engineers, LLC				
PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			DATE
BASIN DESIGNATION:	6	MADE BY:	YSJ	06/28/22
BASIN ANALYSIS (PRE/POST):	PRE	CHECKED BY:	7FL	0G/1/22

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL NAME	SOIL GROUP	CN	AREA (ac)	PRODUCT
Existing Impervious	Urban Fand	-	98	1.43	140.39
Pervious	5 ix	M/D	84	10.Ol	882.42
			TOTALS	116 3	1522681

COMPOSITE CN	846y8

ESTIMATE OF RUNOFF VOLUME

PRCMEDURE TC DETER5 INE RUNC77 VCFU5 E IS BASED CN THE SMS EQUATICN AND IS AS 7CFFCWS:

1) DETER5 INE SCIF STCRALE - S ----------> S = (1000 / MN) - 10 (inches)

2) DETER5 INE RUNC77 - R ----------> R = (P - 0.2*S)^2 / (P + 0.8*S) (inches)

P = rainfall in inches

3) DETER5 INE RUNC77 VCFU5 E - V(R) ----------> V(R) = (R / 12)*BASIN AREA (acre-feet)

MAFMUFATICN TABFE

Agenct	Design Somrq Freuf enct	P (in)	S (in)	R (in)	V(R) (ac-9o)
S7W5 D Basin Mriteria	2Oyr / G2 hr	10.60	1.6G	8.83	8.G8

CONSOR Engineers, LLC				
PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			DATE
BASIN DESIGNATION:	6	MADE BY:	YSJ	06/28/22
BASIN ANALYSIS (PRE/POST):	PCST	CHECKED BY:	7FL	0G/1/22

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL NAME	SOIL GROUP	CN	AREA (ac)	PRODUCT
Proposed Impervious	Urban Fand	-	98	Q01	491.3O
Existing Impervious	Urban Fand	-	98	1.43	140.39
Pervious	5 ix	M/D	84	Q49	461.2G
			TOTALS	116 3	15. Q55

COMPOSITE CN	. 16 4y

ESTIMATE OF RUNOFF VOLUME

PRCMEDURE TC DETER5 INE RUNC77 VCFU5 E IS BASED CN THE SMS EQUATICN AND IS AS 7CFFCWS:

1) DETER5 INE SCIF STCRAL E - S ----------> S = (1000 / MN) - 10 (inches)

2) DETER5 INE RUNC77 - R ----------> R = (P - 0.2*S)^2 / (P + 0.8*S) (inches)

P = rainfall in inches

3) DETER5 INE RUNC77 VCFU5 E - V(R) ----------> V(R) = (R / 12)*BASIN AREA (acre-feet)

MAFMUFATICN TABFE

Agenct	Design Sonrq Freuf enct	P (in)	S (in)	R (in)	V(R) (ac-9o)
S7W5 D Basin Miteria	2Oyr / G2 hr	10.60	0.92	9.OG	. 6 4 2

CONSOR Engineers, LLC

PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			**DATE**
BASIN DESIGNATION:	6	**MADE BY:**	YSJ	06/28/22
POND:	6A	**CHECKED BY:**	7FL	0G/1/22

Wacer l faclot

Total Basin Area = 11.94 ac
Proposed Paved Area = Q01 ac
Pond Area at NWF = ac

A.	1.00	" Cver Total Basin Area =	0.99	Ac-7t
B.	2.C0	" Cver Proposed + Existing Paved Area =	1.04	Ac-7t
		Treatment Volume (Basin 6)	1.04	Ac-7t
		Half of Treatment Volume (Basin G)	0.42	Ac-7t
		Treatment Volume + C0% (Basins 6 and G)	2.20	Ac-7t
		Attenuation Volume (Basin 6)	0.G4	Ac-7t
		Tmaa0Vnaf q e	**26 3**	Ac-7t

Soage Somrage Ca0cf0hcimns

ELEV6 (90)		AREA (ac)	AVG AREA (ac)	De0ba D (90)	De0ba somrage (ac-90)	Sf q Somrage (ac-90)
G10	Cut. Berm	2.30				8.02
			2.19	0.C0	1.10	
6.60		2.08				6.93
			1.98	0.C0	0.99	
6.10	In. Berm	1.88				Q94
			1.83	1.00	1.83	
Q10	DHW	1.GG				**36l1**
			1.G2	1.00	1.G2	
4.10	(PAV)	1.6G				2.39
			1.60	1.C0	2.39	
2.60	(NWF)	1.C2				
-Q40	Bottom					

7reeboard = **16l5** ft

Snf rce n9 NWL

Preliminary Roadk ay Soil Survery Report, August 3, 2022
Estimated SHL WT = 2.6 ft NAVD'88

CONSOR Engineers, LLC

PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			**DATE**
BASIN DESIGNATION:	6	**MADE BY:**	YSJ	06/28/22
POND:	6A	**CHECKED BY:**	7FL	0G/1/22

Hydraulic Grade Line Clearance Calculations

1) Estimated tailk ater elevation in the pond (for preliminary storm sek er design) = Q10

2) Malculation of post-development area for HLF checw

Baseline	7rom Station	To Station	Fength (ft)	Roadk ay k idth (ft)	Area (ac)
MF BSR	14OG+20	1483+20	2600.00	43.00	2.OG
				Total	2.OG

3) Fok est gutter elevation in Basin for HLF checw

Station	1460+80
Baseline	MF BSR
Cffset (ft)	RT
Elevation (ft)	12.80

4) Allok able Head Foss = lok est gutter el - est. tailk ater el = GC0 ft

O) Pipe length from Pond to lok est gutter point = 693.00 ft

6) Rational 5 ethod for contributing runoff - Q=MiA

M=	0.9O	
int. =	G40	in/hr
A =	2.OG	ac
Q =	18.04	cfs
5 anning's n =	0.012	
Sum K =	2.41	
V =	OG4	fps

G) Estimation of Pipe Size

HF = [4.61*(n^2)*F*(Q^2)]/(D^Q33) + K(V^2)/2g

HF = Allok able Head Foss (ft) 4.96
n = 5 anning's n <actual HF - CK
F = Fength (ft)
Q = Runoff (cfs)
D = Pipe diameter (ft)
K = coefficient for minor losses
V = pipe velocity (fps)
g = gravitational constant (32.2 ft/sec^2)

8) Estimated Pipe Diameter to satisfy the conditions = 2.00 ft
24.00 in

CONSOR Engineers, LLC				
PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			DATE
BASIN DESIGNATION:	7	MADE BY:	YSJ	06/28/22
BASIN ANALYSIS (PRE/POST):	PRE	CHECKED BY:	FLG	07/1/22

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL NAME	SOIL GROUP	CN	AREA (ac)	PRODUCT
Existing Impervious	Urban Land	-	98	1.16	113.39
Pervious	Mix	C/D	84	8.48	712.73
			TOTALS	9.64	826.12

COMPOSITE CN	85.68

ESTIMATE OF RUNOFF VOLUME

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

1) DETERMINE SOIL STORAGE - S ----------> S = (1000 / CN) - 10 (inches)

2) DETERMINE RUNOFF - R ----------> R = (P - 0.2*S)^2 / (P + 0.8*S) (inches)

P = rainfall in inches

3) DETERMINE RUNOFF VOLUME - V(R) ----------> V(R) = (R / 12)*BASIN AREA (acre-feet)

CALCULATION TABLE

Agency	Design Storm Frequency	P (in)	S (in)	R (in)	V(R) (ac-ft)
SFWMD Basin Criteria	25 yr / 72 hr	10.60	1.67	8.83	7.09

CONSOR Engineers, LLC				
PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			DATE
BASIN DESIGNATION:	7	MADE BY:	YSJ	06/28/22
BASIN ANALYSIS (PRE/POST):	POST	CHECKED BY:	FLG	07/1/22

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL NAME	SOIL GROUP	CN	AREA (ac)	PRODUCT
Proposed Impervious	Urban Land	-	98	4.05	396.86
Existing Impervious	Urban Land	-	98	1.16	113.39
Pervious	Mix	C/D	84	4.44	372.56
			TOTALS	9.64	882.81

COMPOSITE CN	91.56

ESTIMATE OF RUNOFF VOLUME

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

1) DETERMINE SOIL STORAGE - S ----------> S = (1000 / CN) - 10 (inches)

2) DETERMINE RUNOFF - R ----------> R = (P - 0.2*S)^2 / (P + 0.8*S) (inches)

P = rainfall in inches

3) DETERMINE RUNOFF VOLUME - V(R) ----------> V(R) = (R / 12)*BASIN AREA (acre-feet)

CALCULATION TABLE

Agency	Design Storm Frequency	P (in)	S (in)	R (in)	V(R) (ac-ft)
SFWMD Basin Criteria	25 yr / 72 hr	10.60	0.92	9.57	**7.69**

CONSOR Engineers, LLC

PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			**DATE**
BASIN DESIGNATION:	7	**MADE BY:**	YSJ	06/28/22
POND:	N/A - Refer to Basin 6 for compensatory treatment	**CHECKED BY:**	FLG	07/1/22

Water Quality

Total Basin Area = 9.64 ac
Proposed Paved Area = 4.05 ac
Pond Area at NWL = ac

A.	1.00	" Over Total Basin Area =	0.80	Ac-Ft
B.	2.50	" Over Proposed Paved Area =	0.84	Ac-Ft
		Treatment Volume	0.84	Ac-Ft
		Treatment Volume + 50%	1.27	Ac-Ft
		Attenuation Volume	0.59	Ac-Ft
		Total Volume	**1.86**	Ac-Ft

Note
Treatment volume not provided in this basin, refer to basins 6 and 8.

CONSOR Engineers, LLC

PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			**DATE**
BASIN DESIGNATION:	7	**MADE BY:**	YSJ	06/28/22
POND:	N/A	**CHECKED BY:**	FLG	07/1/22

Hydraulic Grade Line Clearance Calculations

1) Estimated tailwater elevation in the pond (for preliminary storm sewer design) = 0.00

2) Calculation of post-development area for HGL check

Baseline	From Station	To Station	Length (ft)	Roadway width (ft)	Area (ac)
CL BSR	1483+20	1504+20	2100.00	43.00	2.07
				Total	2.07

3) Lowest gutter elevation in Basin for HGL check

Station	1484+60
Baseline	CL BSR
Offset (ft)	RT
Elevation (ft)	13.30

4) Allowable Head Loss = lowest gutter el - est. tailwater el = 13.30 ft

5) Pipe length from Pond to lowest gutter point = ft

6) Rational Method for contributing runoff - Q=CiA

C =	0.95	
int. =	7.40	in/hr
A =	2.07	ac
Q =	14.57	cfs
Manning's n =	0.012	
Sum K =		
V =	#DIV/0!	fps

7) Estimation of Pipe Size

HL = [4.61*(n^2)*L*(Q^2)]/(D^5.33) + K(V^2)/2g

HL = Allowable Head Loss (ft) #DIV/0!
n = Manning's n #DIV/0!
L = Length (ft)
Q = Runoff (cfs)
D = Pipe diameter (ft)
K = coefficient for minor losses
V = pipe velocity (fps)
g = gravitational constant (32.2 ft/sec^2)

8) Estimated Pipe Diameter to satisfy the conditions = 0.00 ft
0.00 in

CONSOR Engineers, LLC				
PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			DATE
BASIN DESIGNATION:	8	MADE BY:	YSJ	06/28/22
POND:	PRE	CHECKED BY:	7FL	0G/1/22

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL NAME	SOIL GROUP	CN	AREA (ac)	PRODUCT
Existing Impervious	Urban Fand	-	98	1.04	101.51
Pervious	Mix	O/D	84	G60	638.06
			TOTALS	8.63	739.57

COMPOSITE CN	85.68

ESTIMATE OF RUNOFF VOLUME

PRCOEDURE TC DETERMINE RUNC77 VCFUME IS BASED CN THE SOS EQUATICN AND IS AS 7CFFCWS:

1) DETERMINE SCIF STCRALE - S ----------> S = (1000 / ON) - 10 (inches)

2) DETERMINE RUNC77 - R ----------> R = (P - 0.2*S)^2 / (P + 0.8*S) (inches)

P = rainfall in inches

3) DETERMINE RUNC77 VCFUME - V(R) ----------> V(R) = (R / 12)*BASIN AREA (acre-feet)

OAFOUFATICN TABFE

Agency	Design Storm Frequency	P (in)	S (in)	R (in)	V(R) (ac-ft)
S7WMD Basin Oriteria	25 yr / G2 hr	10.60	1.6G	8.83	6.35

CONSOR Engineers, LLC				
PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			DATE
BASIN DESIGNATION:	8	MADE BY:	YSJ	06/28/22
POND:	PCST	CHECKED BY:	7FL	0G/1/22

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL NAME	SOIL GROUP	CN	AREA (ac)	PRODUCT
Proposed Impervious	Urban Fand	-	98	3.63	355.28
Existing Impervious	Urban Fand	-	98	1.04	101.51
Pervious	Mix	O/D	84	3.9G	333.53
			TOTALS	8.63	790.33

COMPOSITE CN	91.56

ESTIMATE OF RUNOFF VOLUME

PRCOEDURE TC DETERMINE RUNC77 VCFUME IS BASED CN THE SOS EQUATICN AND IS AS 7CFFCWS:

1) DETERMINE SCIF STCRALE - S ----------> S = (1000 / ON) - 10 (inches)

2) DETERMINE RUNC77 - R ----------> R = (P - 0.2*S)^2 / (P + 0.8*S) (inches)

P = rainfall in inches

3) DETERMINE RUNC77 VCFUME - V(R) ----------> V(R) = (R / 12)*BASIN AREA (acre-feet)

OAFOUFATICN TABFE

Agency	Design Storm Frequency	P (in)	S (in)	R (in)	V(R) (ac-ft)
S7WMD Basin Oriteria	25 yr / G2 hr	10.60	0.92	9.5G	**6.88**

CONSOR Engineers, LLC

PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			**DATE**
BASIN DESIGNATION:	8	**MADE BY:**	YSJ	06/28/22
POND:	8A	**CHECKED BY:**	7FL	0G/1/22

Water Quality

Total Basin Area = 8.63 ac
Proposed Paved Area = 3.63 ac
Pond Area at NWF = ac

A.	1.00	" Cver Total Basin Area =	0.G2	Ac-7t
B.	2.50	" Cver Proposed Paved Area =	0.G6	Ac-7t
		Treatment Volume (Basin 8)	0.G6	Ac-7t
		Half of Treatment Volume (Basin G)	0.42	Ac-7t
		Treatment Volume + 50% (Basin Gand 8)	1.GG	Ac-7t
		Attenuation Volume (Basin 8)	0.53	Ac-7t
		Total Volume	**2.30**	Ac-7t

Stage Storage Calculations

ELEV. (ft)		AREA (ac)	AVG AREA (ac)	Delta D (ft)	Delta storage (ac-ft)	Sum Storage (ac-ft)
14.33	Cut. Berm	1.80				6.05
			1.Gl	0.50	0.85	
13.83		1.61				5.20
			1.52	0.50	0.G6	
13.33	In. Berm	1.42				4.44
			1.38	1.00	1.38	
12.33	DHW	1.33				**3.07**
			1.30	1.00	1.30	
11.33	(PAV)	1.26				1.GG
			1.18	1.50	1.GG	
9.83	(NWF)	1.10				
1.83	Bottom					

7reeboard = **1.00** ft

Source of NWL
S7WMD Application No.: 13041G-10kS7WMD Permt No.: 36-050515-P
WSWT = 9.83 ft NAVD,88

CONSOR Engineers, LLC

PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			**DATE**
BASIN DESIGNATION:	8	**MADE BY:**	YSJ	06/28/22
POND:	8A	**CHECKED BY:**	7FL	0G/1/22

Hydraulic Grade Line Clearance Calculations

1) Estimated tail' ater elevation in the pond (for preliminary storm se' er design) = 12.33

2) Oalculation of post-development area for HLF checw

Baseline	7rom Station	To Station	Fength (ft)	Road' ay ' idth (ft)	Area (ac)
OF BSR	1504+20	1523+00	1880.00	43.00	1.86
				Total	1.86

3) Fo' est gutter elevation in Basin for HLF checw

Station	1508+60
Baseline	OF BSR
Cffset (ft)	RT
Elevation (ft)	14.30

4) Allo' able Head Foss = lo' est gutter el - est. tail' ater el = 1.9G ft

5) Pipe length from Pond to lo' est gutter point = 6G4.00 ft

6) Rational Method for contributing runoff - Q=OiA

O =	0.95	
int. =	G40	in/hr
A =	1.86	ac
Q =	13.05	cfs
Manning,s n =	0.012	
Sum K =	2.40	
V =	2.66	fps

G) Estimation of Pipe Size

HF = [4.61*(n^2)*F*(Q^2)]/(D^5.33) + K(V^2)/2g

HF = Allo' able Head Foss (ft) 0.84
n = Manning,s n <actual HF - CK
F = Fength (ft)
Q = Runoff (cfs)
D = Pipe diameter (ft)
K = coefficient for minor losses
V = pipe velocity (fps)
g = gravitational constant (32.2 ft/sec^2)

8) Estimated Pipe Diameter to satisfy the conditions = 2.50 ft / 30.00 in

CONSOR Engineers, LLC				
PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			DATE
BASIN DESIGNATION:	9	MADE BY:	YSJ	06/28/22
POND:	PRE	CHECKED BY:	7FL	0G/1/22

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL NAME	SOIL GROUP	CN	AREA (ac)	PRODUCT
Existing Impervious	Urban Fand	-	98	2.66	260.25
Pervious	Mix	O/D	84	19.4G	1635.88
			TOTALS	22.13	1896.13

COMPOSITE CN	85.68

ESTIMATE OF RUNOFF VOLUME

PRCOEDURE TC DETERMINE RUNC77 VCFUME IS BASED CN THE SOS EQUATICN AND IS AS 7CFFCWS:

1) DETERMINE SCIF STCRALE - S ----------> S = (1000 / ON) - 10 (inches)

2) DETERMINE RUNC77 - R ----------> R = (P - 0.2*S)^2 / (P + 0.8*S) (inches)

P = rainfall in inches

3) DETERMINE RUNC77 VCFUME - V(R) ----------> V(R) = (R / 12)*BASIN AREA (acre-feet)

OAFOUFATICN TABFE

Agency	Design Storm Frequency	P (in)	S (in)	R (in)	V(R) (ac-ft)
S7WMD Basin Oriteria	25 yr / G2 hr	10.60	1.6G	8.83	16.28

CONSOR Engineers, LLC				
PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			DATE
BASIN DESIGNATION:	9	MADE BY:	YSJ	06/28/22
POND:	PCST	CHECKED BY:	7FL	0G/1/22

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL NAME	SOIL GROUP	CN	AREA (ac)	PRODUCT
Proposed Impervious	Urban Fand	-	98	9.29	910.89
Existing Impervious	Urban Fand	-	98	2.66	260.25
Pervious	Mix	O/D	84	10.18	855.12
			TOTALS	22.13	2026.26

COMPOSITE CN	91.56

ESTIMATE OF RUNOFF VOLUME

PRCOEDURE TC DETERMINE RUNC77 VCFUME IS BASED CN THE SOS EQUATICN AND IS AS 7CFFCWS:

1) DETERMINE SCIF STCRALE - S ----------> S = (1000 / ON) - 10 (inches)

2) DETERMINE RUNC77 - R ----------> R = (P - 0.2*S)^2 / (P + 0.8*S) (inches)

P = rainfall in inches

3) DETERMINE RUNC77 VCFUME - V(R) ----------> V(R) = (R / 12)*BASIN AREA (acre-feet)

OAFOUFATICN TABFE

Agency	Design Storm Frequency	P (in)	S (in)	R (in)	V(R) (ac-ft)
S7WMD Basin Oriteria	25 yr / G2 hr	10.60	0.92	9.5G	**17.65**

CONSOR Engineers, LLC

PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			**DATE**
BASIN DESIGNATION:	9	**MADE BY:**	YSJ	06/28/22
POND:	9A	**CHECKED BY:**	7FL	0G/1/22

Water Quality

Total Basin Area = 22.13 ac
Proposed Paved Area = 9.29 ac
Pond Area at NWF = ac

A.	1.00	" Cver Total Basin Area =	1.84	Ac-7t
B.	2.50	" Cver Paved Area =	1.94	Ac-7t
		Treatment Volume	1.94	Ac-7t
		Treatment Volume + 50% (due to C7W)	2.90	Ac-7t
		Attenuation Volume	1.3G	Ac-7t
		Total Volume	**4.27**	Ac-7t

Stage Storage Calculations

ELEV. (ft)		AREA (ac)	AVG AREA (ac)	Delta D (ft)	Delta storage (ac-ft)	Sum Storage (ac-ft)
G33	Cut. Berm	4.21				15.54
			4.06	0.50	2.03	
6.83		3.90				13.51
			3.G5	0.50	1.88	
6.33	In. Berm	3.60				11.64
			3.52	1.00	3.52	
5.33	DHW (Estimated)	3.44				**8.12**
			3.36	1.00	3.36	
4.33	(PAV)	3.28				4.G6
			3.1G	1.50	4.G6	
2.83	NWF	3.06				
-5.1G	Bottom					

7reeboard = **1.00** ft

Source of NWL
S7WMD Application No.: 09100G-11kS7WMD Permt No.: 36-0346G-P
WSWT = 2.83 ft NAVD,88

CONSOR Engineers, LLC

PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			**DATE**
BASIN DESIGNATION:	9	**MADE BY:**	YSJ	06/28/22
POND:	9A	**CHECKED BY:**	7FL	0G/1/22

Hydraulic Grade Line Clearance Calculations

1) Estimated tail' ater elevation in the pond (for preliminary storm se' er design) = 5.33

2) Oalculation of post-development area for HLF checw

Baseline	7rom Station	To Station	Fength (ft)	Road' ay ' idth (ft)	Area (ac)
OF BSR	1523+00	15GI+20	4820.00	43.00	4.G6
				Total	4.G6

3) Fo' est gutter elevation in Basin for HLF checw

Station	1569+80
Baseline	OF BSR
Cffset (ft)	RT
Elevation (ft)	14.60

4) Allo' able Head Foss = lo' est gutter el - est. tail' ater el = 9.2G ft

5) Pipe length from Pond to lo' est gutter point = 3362.00 ft

6) Rational Method for contributing runoff - Q=OiA

O =	0.95	
int. =	G40	in/hr
A =	4.G6	ac
Q =	33.45	cfs
Manning,s n =	0.012	
Sum K =	2.58	
V =	4.G3	fps

G) Estimation of Pipe Size

HF = [4.61*(n^2)*F*(Q^2)]/(D^5.33) + K(V^2)/2g

HF = Allo' able Head Foss (ft) 8.05
n = Manning,s n <actual HF - CK
F = Fength (ft)
Q = Runoff (cfs)
D = Pipe diameter (ft)
K = coefficient for minor losses
V = pipe velocity (fps)
g = gravitational constant (32.2 ft/sec^2)

8) Estimated Pipe Diameter to satisfy the conditions = 3.00 ft / 36.00 in

CONSOR Engineers, LLC				
PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			DATE
BASIN DESIGNATION:	10-Y	MADE BY:	J S/	06728722
BASIN ANALYSIS (PRE/POST):	PRE	CHECKED BY:	FYL	0G71722

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL NAME	SOIL GROUP	CN	AREA (ac)	PRODUCT
Existing Impervious	Urban Yand	-	98	0.66	64.C9
Pervious	5 ix	A7D	84	4.8M	40G2G
			TOTALS	2Q2.	173047

COMPOSITE CN	82(58

ESTIMATE OF RUNOFF VOLUME

PROCEDURE TO DETER5 INE RUNOFF VOYU5 E IS BASED ON THE SCS EQUATION AND IS AS FOYYOWS:

1) DETER5 INE SOIY STORAL E - S ----------> S = (1000 7CN) - 10 (inches)

2) DETER5 INE RUNOFF - R ----------> R = (P - 0.2*S)^2 7(P + 0.8*S) (inches)

P = rainfall in inches

3) DETER5 INE RUNOFF VOYU5 E - V(R) ----------> V(R) = (R 712)*BASIN AREA (acre-feet)

CAYCUYATION TABYE

Agenc6	Design Syt ro Fremqenc6	P (in)	S (in)	R (in)	V(R) (ac-uy)
SFW5 D Basin Criteria	2Myr 7G2 hr	10.60	1.6G	8.83	4.0M

CONSOR Engineers, LLC				
PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			DATE
BASIN DESIGNATION:	10-Y	MADE BY:	J S/	06728722
BASIN ANALYSIS (PRE/POST):	POST	CHECKED BY:	FYL	0G71722

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL NAME	SOIL GROUP	CN	AREA (ac)	PRODUCT
Proposed Impervious	Urban Yand	-	98	2.31	226.G8
Existing Impervious	Urban Yand	-	98	0.66	64.G9
Pervious	5 ix	A7D	84	2.M3	212.89
		TOTALS		202.	2410115

COMPOSITE CN	f. 025

ESTIMATE OF RUNOFF VOLUME

PROCEDURE TO DETER5 INE RUNOFF VOYU5 E IS BASED ON THE SCS EQUATION AND IS AS FOYYOWS:

1) DETER5 INE SOIY STORAL E - S ----------> S = (1000 7CN) - 10 (inches)

2) DETER5 INE RUNOFF - R ----------> R = (P - 0.2*S)^2 7(P + 0.8*S) (inches)

P = rainfall in inches

3) DETER5 INE RUNOFF VOYU5 E - V(R) ----------> V(R) = (R 712)*BASIN AREA (acre-feet)

CAYCUYATION TABYE

Agenc6	Design Syt ro Fremqenc6	P (in)	S (in)	R (in)	V(R) (ac-uy)
SFW5 D Basin Criteria	2Myr 7G2 hr	10.60	0.92	9.MG	10Of

CONSOR Engineers, LLC

PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			**DATE**
BASIN DESIGNATION:	10-Y	**MADE BY:**	J S/	06728722
POND:	10A	**CHECKED BY:**	FYL	0G71722

Wayer Qqaliy6

Total Basin Area = MM ac
Proposed Paved Area = 2.31 ac
Pond Area at NWY = ac

A.	1.00	" Over Total Basin Area =	0.46	Ac-Ft
B.	2.M0	" Over Paved Area =	0.48	Ac-Ft
		Treatment Volume	0.48	Ac-Ft
		Treatment Volume + M0% (due to OFW)	0.G2	Ac-Ft
		Attenuation Volume	0.34	Ac-Ft
		Tt yal Vt lqo e	**. 045**	Ac-Ft

Syage Syt rage Calcqlayit ns

ELEV0 (uy)		AREA (ac)	AVG AREA (ac)	Delya D (uy)	Delya syt rage (ac-uy)	Sqo Syt rage (ac-uy)
1M20	Out. Berm	1.GM				M93
			1.66	0.M0	0.83	
14.G0		1.MG				M10
			1.49	0.M0	0.G4	
14.20	In. Berm	1.40				4.36
			1.36	1.00	1.36	
13.20	DHW (Estimated)	1.31				**904.**
			1.2G	1.00	1.2G	
12.20	(PAV)	1.22				1.G4
			1.16	1.M0	1.G4	
10.G0	(NWY)	1.10				
2.G0	Bottom					

Freeboard = **. 044** ft

St qrce t uNWL
SWFW5 D Application No.: 6G0G41kSWFW5 D Permt No.: 41242
NWY = 10.G0 ft NAVD,88

CONSOR Engineers, LLC

PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			**DATE**
BASIN DESIGNATION:	10-Y	**MADE BY:**	J S/	06/28/22
POND:	10A	**CHECKED BY:**	FYL	06/17/22

Hydraulic Grade Line Clearance Calculations

1) Estimated tail' ater elevation in the pond (for preliminary storm se' er design) = 13.20

2) Calculation of post-development area for HL Y checw

Baseline	From Station	To Station	Yength (ft)	Road' ay ' idth (ft)	Area (ac)
CY BSR	1M61+20	1M83+20	1200.00	43.00	1.18
				Total	1.18

3) Yo' est gutter elevation in Basin for HL Y checw

Station	1M81+80
Baseline	CY BSR
Offset (ft)	RT
Elevation (ft)	14.90

4) Allo' able Head Yoss = lo' est gutter el - est. tail' ater el = 1.G0 ft

M) Pipe length from Pond to lo' est gutter point = M43.00 ft

6) Rational 5 ethod for contributing runoff - Q=CiA

C =	0.9M	
int. =	G40	in7hr
A =	1.18	ac
Q =	8.33	cfs
5 anning,s n =	0.012	
Sum K =	2.40	
V =	2.6M	fps

G) Estimation of Pipe Size

HY = [4.61*(n^2)*Y*(Q^2)]7(D^M3.3) + K(V^2)72g

HY = Allo' able Head Yoss (ft) 0.88

n = 5 anning,s n <actual HY - OK

Y = Yength (ft)

Q = Runoff (cfs)

D = Pipe diameter (ft)

K = coefficient for minor losses

V = pipe velocity (fps)

g = gravitational constant (32.2 ft7sec^2)

8) Estimated Pipe Diameter to satisfy the conditions = 2.00 ft / 24.00 in

CONSOR Engineers, LLC				
PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			DATE
BASIN DESIGNATION:	1	MADE BY:	YSJ	06/28/22
BASIN ANALYSIS (PRE/POST):	PRE	CHECKED BY:	7FL	0G/01/22

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL NAME	SOIL GROUP	CN	AREA (ac)	PRODUCT
Existing Impervious	Urban Fand	-	98	0.85	83.15
Pervious	Mix	B	G6.5	6.22	4G6.00
			TOTALS	7.07	559.15

COMPOSITE CN	79.08

ESTIMATE OF RUNOFF VOLUME

PROCEDURE TO DETERMINE RUNO77 VOFUME IS BASED ON THE SCS EQUATION AND IS AS 7OFFOWS:

1) DETERMINE SOIF STORALE - S ----------> S = (1000 / CN) - 10 (inches)

2) DETERMINE RUNO77 - R ----------> R = (P - 0.2*S)^2 / (P + 0.8*S) (inches)

P = rainfall in inches

3) DETERMINE RUNO77 VOFUME - V(R) ----------> V(R) = (R / 12)*BASIN AREA (acre-feet)

CAFCUFATION TABFE

Agency	Design Storm Frequency	P (in)	S (in)	R (in)	V(R) (ac-ft)
S7WMD Basin Criteria	25 yr / G2 hr	10.60	2.65	G98	4.G0

CONSOR Engineers, LLC				
PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			DATE
BASIN DESIGNATION:	1	MADE BY:	YSJ	06/28/22
BASIN ANALYSIS (PRE/POST):	POST	CHECKED BY:	7FL	0G/01/22

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL NAME	SOIL GROUP	CN	AREA (ac)	PRODUCT
Proposed Impervious	Urban Fand	-	98	2.9G	291.03
Existing Impervious	Urban Fand	-	98	0.85	83.15
Pervious	Mix	B	G6.5	3.25	248.82
			TOTALS	7.07	623.00

COMPOSITE CN	88.11

ESTIMATE OF RUNOFF VOLUME

PROCEDURE TO DETERMINE RUNO77 VOFUME IS BASED ON THE SCS EQUATION AND IS AS 7OFFOWS:

1) DETERMINE SOIF STORALE - S ----------> S = (1000 / CN) - 10 (inches)

2) DETERMINE RUNO77 - R ----------> R = (P - 0.2*S)^2 / (P + 0.8*S) (inches)

P = rainfall in inches

3) DETERMINE RUNO77 VOFUME - V(R) ----------> V(R) = (R / 12)*BASIN AREA (acre-feet)

CAFCUFATION TABFE

Agency	Design Storm Frequency	P (in)	S (in)	R (in)	V(R) (ac-ft)
S7WMD Basin Criteria	25 yr / G2 hr	10.60	1.35	9.14	**5.38**

CONSOR Engineers, LLC

PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			**DATE**
BASIN DESIGNATION:	1	**MADE BY:**	YSJ	06/28/22
POND:	1B	**CHECKED BY:**	7FL	0G01/22

Water Quality

Total Basin Area = G0G ac
Proposed Paved Area = 2.9G ac
Pond Area at NWF = ac

A.	1.00	" Over Total Basin Area =	0.59	Ac-7t
B.	2.50	" Over Proposed Paved Area =	0.62	Ac-7t
		Treatment Volume	0.62	Ac-7t
		Treatment Volume + 50% (due to O7W)	0.93	Ac-7t
		Attenuation Volume	0.68	Ac-7t
		Total Volume	**1.61**	Ac-7t

Stage Storage Calculations

ELEV. (ft)		AREA (ac)	AVG AREA (ac)	Delta D (ft)	Delta storage (ac-ft)	Sum Storage (ac-ft)
6.63	Out. Berm	1.63				5.45
			1.54	0.50	0.GG	
6.13		1.45				4.68
			1.3G	0.50	0.69	
5.63	In. Berm	1.29				4.00
			1.25	1.00	1.25	
4.63	DHW (Estimated)	1.20				**2.75**
			1.16	1.00	1.16	
3.63	(PAV)	1.12				1.59
			1.06	1.50	1.59	
2.13	NWF	1.00				
-5.8G	Bottom					

7reeboard = **1.00** ft

Source of NWL
S7WMD Application No.: 190315-33, S7WMD Permt No.: 36-02841-S
WSWT = 2.13 ft NAVD'88

CONSOR Engineers, LLC

PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			**DATE**
BASIN DESIGNATION:	1	**MADE BY:**	YSJ	06/28/22
POND:	1B	**CHECKED BY:**	7FL	0G/01/22

Hydraulic Grade Line Clearance Calculations

1) Estimated tailwater elevation in the pond (for preliminary storm sewer design) = 4.63

2) Calculation of post-development area for HLF check

Baseline	7rom Station	To Station	Fength (ft)	Roadway width (ft)	Area (ac)
CF BSR	1291+40	1306+80	1540.00	43.00	1.52
				Total	1.52

3) Fowest gutter elevation in Basin for HLF check

Station	1342+40
Baseline	CF BSR
Offset (ft)	RT
Elevation (ft)	9.90

4) Allowable Head Foss = lowest gutter el - est. tailwater el = 5.2G ft

5) Pipe length from Pond to lowest gutter point = 583.00 ft

6) Rational Method for contributing runoff - Q=CiA

C =	0.95	
int. =	G40	in/hr
A =	1.52	ac
Q =	10.69	cfs
Manning's n =	0.012	
Sum K =	2.40	
V =	3.40	fps

G) Estimation of Pipe Size

HF = [4.61*(n^2)*F*(Q^2)]/(D^5.33) + K(V^2)/2g

HF = Allowable Head Foss (ft) 1.53
n = Manning's n <actual HF - OK
F = Fength (ft)
Q = Runoff (cfs)
D = Pipe diameter (ft)
K = coefficient for minor losses
V = pipe velocity (fps)
g = gravitational constant (32.2 ft/sec^2)

8) Estimated Pipe Diameter to satisfy the conditions = 2.00 ft / 24.00 in

CONSOR Engineers, LLC				
PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			DATE
BASIN DESIGNATION:	2	MADE BY:	YSJ	06/27/22
BASIN ANALYSIS (PRE/POST):	PRE	CHECKED BY:	FLG	07/01/22

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL NAME	SOIL GROUP	CN	AREA (ac)	PRODUCT
Existing Impervious	Urban Land	-	98	1.96	192.22
Pervious	5 ix	A/D	79	14.38	1136.3
			TOTALS	16.35	1328.54

COMPOSITE CN	81.28

ESTIMATE OF RUNOFF VOLUME

PRMOEDURE CMDECER5 ITE RUTMFF NMLU5 E IS BASED MT CVE SOS EHUACIMT ATD IS AS FMLLMQ SW

1: DECER5 ITE SMIL SCMRAGE - S ----------) S > =1000 / OT : - 10 =in(ces:

2: DECER5 ITE RUTMFF - R ----------) R > =P - 0.2hS:*2 / =P ^ 0.8hS : =in(ces:

P > rain+all in in(ces

3: DECER5 ITE RUTMFF NMLU5 E - N=R: ----------) N=R: > =R / 12:hBASIT AREA =a(re-+eet:

OALOULACIMT CABLE

Agency	Design Storm Frequency	P (in)	S (in)	R (in)	V(R) (ac-ft)
SFQ 5 D Basin Oriteria	2f yr / 72 cr	10.60	2.30	8.26	11.2f

CONSOR Engineers, LLC				
PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			DATE
BASIN DESIGNATION:	2	MADE BY:	YSJ	06/27/22
BASIN ANALYSIS (PRE/POST):	PMSC	CHECKED BY:	FLG	07/01/22

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL NAME	SOIL GROUP	CN	AREA (ac)	PRODUCT
Proposed Impervious	Urban Land	-	98	6.87	672.77
Existing Impervious	Urban Land	-	98	1.96	192.22
Pervious	5 ix	A/D	79	7.f2	f93.99
			TOTALS	16.35	1458.98

COMPOSITE CN	89.26

ESTIMATE OF RUNOFF VOLUME

PRMOEDURE CMDECER5 ITE RUTMFF NMLU5 E IS BASED MT CVE SOS EHUACIMT ATD IS AS FMLLMQ SW

1: DECER5 ITE SMIL SCMRAGE - S ----------) S > =1000 / OT : - 10 =in(ces:

2: DECER5 ITE RUTMFF - R ----------) R > =P - 0.2hS:*2 / =P ^ 0.8hS : =in(ces:

P > rain+all in in(ces

3: DECER5 ITE RUTMFF NMLU5 E - N=R: ----------) N=R: > =R / 12:hBASIT AREA =a(re-+eet:

OALOULACIMT CABLE

Agency	Design Storm Frequency	P (in)	S (in)	R (in)	V(R) (ac-ft)
SFQ 5 D Basin Oriteria	2f yr / 72 cr	10.60	1.20	9.28	**12.64**

CONSOR Engineers, LLC				
PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			**DATE**
BASIN DESIGNATION:	2	**MADE BY:**	YSJ	06/27/22
POND:	2B	**CHECKED BY:**	FLG	07/01/22

Water Quality

Cotal Basin Area > 16.3f a(
Proposed Paved Area > 6.87 a(
Pond Area at TQ L > a(

A.	1.00	" Mver Cotal Basin Area >	1.36	A(-Ft
B.	2.f0	" Mver Paved Area >	1.43	A(-Ft
		Creatment Nolume	1.43	A(-Ft
		Creatment Nolume ^ f0% =due to MFQ :	2.1f	A(-Ft
		Attenuation Nolume	1.39	A(-Ft
		Total Volume	**3.53**	A(-Ft

Stage Storage Calculations

ELEV. (ft)		AREA (ac)	AVG AREA (ac)	Delta D (ft)	Delta storage (ac-ft)	Sum Storage (ac-ft)
7.33	Mut. Berm	2.7f				9.92
			2.64	0.f0	1.32	
6.83	100yr/24cr	2.f3				8.60
			2.42	0.f0	1.21	
6.33	In. Berm	2.31				7.39
			2.2f	1.00	2.2f	
f.33	DVQ	2.19				**5.14**
			2.14	1.00	2.14	
4.33	=PAN:	2.08				3.00
			2.00	1.f0	3.00	
2.83	=TQ L:	1.92				
-f.17	Bottom					

Freeboard > **1.00** =t

Source of NWL
SFQ 5 D Appli(ation To.W97011f-3kSFQ 5 D Permt To.W36-03217-P
Q SQ C > 2.83 =t TAND,88

CONSOR Engineers, LLC

PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			**DATE**
BASIN DESIGNATION:	2	**MADE BY:**	YSJ	06/27/22
POND:	2B	**CHECKED BY:**	FLG	07/01/22

Hydraulic Grade Line Clearance Calculations

1: Estimated tail' ater elevation in tce pond =tor preliminary storm se' er design: > f.33

2: Oal(ulation o+post-development area +or VGL (ce(w

Baseline	From Station	Co Station	Lengtc =t:	Road' ay ' idtc =t:	Area =a(:
OL BSR	1306^80	1342^40	3f60.00	43.00	3.f1
				Cotal	3.f1

3: Lo' est gutter elevation in Basin +or VGL (ce(w

Station	1336^f0
Baseline	OL BSR
M+set =t:	RC
Elevation =t:	10.30

4: Allo' able Vead Loss > lo' est gutter el - est. tail' ater el > 4.97 +t

f: Pipe lengtc +rom Pond to lo' est gutter point > 1806.00 +t

6: Rational 5 etcod +or (ontributing runo++- H>OiA

O >	0.9f	
int. >	7.40	in/cr
A >	3.f1	a(
H >	24.71	(+s
5 anning,s n >	0.012	
Sum K >	2.48	
N >	3.f0	+ps

7: Estimation o+Pipe Size

VL > [4.61h=n*2:hLh=H*2:]/=D*f.33: ^ K=N*2:/2g

VL > Allo' able Vead Loss =t: 2.f7
n > 5 anning,s n <a(tual VL - MK
L > Lengtc =t:
H > Runo++=(+s:
D > Pipe diameter =t:
K > (oe++i(ient +or minor losses
N > pipe velo(ity =+ps:
g > gravitational (onstant =32.2 +t/se(*2:

8: Estimated Pipe Diameter to satis+y tce (onditions > 3.00 +t / 36.00 in

CONSOR Engineers, LLC				
PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			DATE
BASIN DESIGNATION:	3	MADE BY:	YSJ	0/ 7lF722
BASIN ANALYSIS (PRE/POST):	PRE	CHECKED BY:	LGx	0/ 7lF722

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL NAME	SOIL GROUP	CN	AREA (ac)	PRODUCT
EsigtinI mp Uervioug	b r. an Gand	-	98	15l /	11454/
Pervioug	Mis	A7D	84	85F/	/ 195F2
			TOTALS	7.05	955.79

COMPOSITE CN	91.89

ESTIMATE OF RUNOFF VOLUME

PROCEDb RE TO DETERMmNE Rb NOLL VOGb ME mS BASED ON THE SCS EQb ATmON AND mS AS LOGGOWS:

1) DETERMmNE SOmG STORAx E - S ----------> S = (1000 7CN) - 10 (incheg)

2) DETERMmNE Rb NOLL - R ----------> R = (P - 052*S)^2 7(P + 058*S) (incheg)

P = rainfall in incheg

3) DETERMmNE Rb NOLL VOGb ME - V(R) ----------> V(R) = (R 712)*BASmN AREA (acre-feet)

CAGCb GATmON TABGE

Agency	Design Storm Frequency	P (in)	S (in)	R (in)	V(R) (ac-ft)
SLWMD Bagin Criteria	2F yr 7/ 2 hr	10560	156/	8583	/ 516

CONSOR Engineers, LLC				
PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			**DATE**
BASIN DESIGNATION:	3	**MADE BY:**	YSJ	0/ 71F722
BASIN ANALYSIS (PRE/POST):	POST	**CHECKED BY:**	LGx	0/ 71F722

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL NAME	SOIL GROUP	CN	AREA (ac)	PRODUCT
ProUoged mp Uervioug	b r. an Gand	-	98	4509	400564
EsigtinI mp Uervioug	b r. an Gand	-	98	151/	11454/
Pervioug	Mis	A7D	84	4548	3/ 6511
			TOTALS	**7.05**	**976.22**

COMPOSITE CN	**76.18**

ESTIMATE OF RUNOFF VOLUME

PROCEDb RE TO DETERMnNE Rb NOLL VOGb ME nS BASED ON THE SCS EQb ATnON AND nS AS LOGGOWS:

1) DETERMnNE SOnG STORAx E - S ----------> S = (1000 7CN) - 10 (incheg)

2) DETERMnNE Rb NOLL - R ----------> R = (P - 052*S)^2 7(P + 058*S) (incheg)

P = rainfall in incheg

3) DETERMnNE Rb NOLL VOGb ME - V(R) ----------> V(R) = (R 712)*BASnN AREA (acre-feet)

CAGCb GATnON TABGE

Agency	Design Storm Frequency	P (in)	S (in)	R (in)	V(R) (ac-ft)
SLWMD Bagin Criteria	2F yr 7/ 2 hr	10560	0592	95F/	**0.08**
		5			

CONSOR Engineers, LLC				
PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			**DATE**
BASIN DESIGNATION:	3	**MADE BY:**	YSJ	0/ 7/F722
POND:	3B	**CHECKED BY:**	LGx	0/ 7/F722

Water 3 uaQty

Total Bagin Area =	95 3	ac
ProUoged Paved Area =	4509	ac
Pond Area at NWG =		ac

A5	1500	" Over Total Bagin Area =	0581	Ac-Lt
B5	25F0	" Over Paved Area =	058F	Ac-Lt
		Treatp ent Volup e	058F	Ac-Lt
		Treatp ent Volup e + F0% (due to OLW)	1528	Ac-Lt
		Attenuation Volup e	0560	Ac-Lt
		TotaQVoQme	**6.99**	Ac-Lt

Stage Storage CaQuQtions

ELEV. (ft)		AREA (ac)	AVG AREA (ac)	DeQa D (ft)	DeQa storage (ac-ft)	Sum Storage (ac-ft)
1053	Out5Berp	1541				4562
			1533	05F0	056/	
1051	100yr724hr	152F				3596
			1518	05F0	05F9	
953	m5Berp	1510				353/
			1506	1500	1506	
853	DHW	1502				**2.56**
			0598	1500	0598	
/53	(PAV)	0594				1533
			0589	15F0	1533	
651	(NWG)	0583				
-158	Bottop					

Lree. oard = **6.11** ft

Source of NWL

SLWMD AUUication No5 0F0F1/ -11kSLWMD Perp t No5 36-04189-P

WSWT = 651 3 ft NAVD,88

CONSOR Engineers, LLC

PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			**DATE**
BASIN DESIGNATION:	3	**MADE BY:**	YSJ	0/ 7IF722
POND:	3B	**CHECKED BY:**	LGx	0/ 7IF722

Hydraulic Grade Line Clearance Calculations

1) Egtip ated tail' ater elevation in the Uond (for preliminary gtorp ge' er degI n) = 8563

2) Calculation of Uogt-develoUp ent area for Hx G checw

Bageline	Lrop Station	To Station	GenI th (ft)	Road' ay ' idth (ft)	Area (ac)
CG BSR	1342+40	1363+60	2120500	43500	2509
				Total	2509

3) Go' egt I utter elevation in Bagin for Hx G checw

Station	1361+80
Bageline	CG BSR
Offget (ft)	RT
Elevation (ft)	10560

4) Allo' a. le Head Gogg = lo' egt I utter el - egt5tail' ater el = 1598 ft

F) PiUe lenI th frop Pond to lo' egt I utter Uoint = 336500 ft

6) Rational Method for contri. utinI runoff - Q=CiA

C =	059F	
int5=	/ 540	in7hr
A =	2509	ac
Q =	145 1	cfg
ManninI ,g n =	05012	
Sup K =	2538	
V =	3500	fUg

/) Egtip ation of PiUe Size

HG = [4561*(n^2)*G*(Q^2)]7(D^F533) + K(V^2)72I

HG = Allo' a. le Head Gogg (ft) 05 0

n = ManninI ,g n <actual HG - OK

G = GenI th (ft)

Q = Runoff (cfg)

D = PiUe diap eter (ft)

K = coefficient for p inor loggeg

V = UiUe velocity (fUg)

I = I ravitational congtant (3252 ft7gec^2)

8) Egtip ated PiUe Diap eter to gatigfy the conditiong = 25F0 ft

30500 in

CONSOR Engineers, LLC				
PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			DATE
BASIN DESIGNATION:	4	MADE BY:	YSJ	0/ 7lF722
BASIN ANALYSIS (PRE/POST):	PRE	CHECKED BY:	LGx	0/ 7lF722

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL NAME	SOIL GROUP	CN	AREA (ac)	PRODUCT
EsigtinI mp Uervioug	b r. an Gand	-	98	2541	2365F0
Pervioug	Mis	A7D	84	1/ 5' 0	14865FF
			TOTALS	20.11	1723.04

COMPOSITE CN	85.68

ESTIMATE OF RUNOFF VOLUME

PROCEDb RE TO DETERMnNE Rb NOLL VOGb ME nS BASED ON THE SCS EQb ATnON AND nS AS LOGGOWS:

1) DETERMnNE SOnG STORAx E - S ----------> S = (1000 7CN) - 10 (incheg)

2) DETERMnNE Rb NOLL - R ----------> R = (P - 052*S)^2 7(P + 058*S) (incheg)

P = rainfall in incheg

3) DETERMnNE Rb NOLL VOGb ME - V(R) ----------> V(R) = (R 712)*BASnN AREA (acre-feet)

CAGCb GATnON TABGE

Agency	Design Storm Frequency	P (in)	S (in)	R (in)	V(R) (ac-ft)
SLWMD Bagin Criteria	2F yr 7/ 2 hr	10560	156/	8583	14580

CONSOR Engineers, LLC				
PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			**DATE**
BASIN DESIGNATION:	4	**MADE BY:**	YSJ	0/ 71F722
BASIN ANALYSIS (PRE/POST):	POST	**CHECKED BY:**	LGx	0/ 71F722

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL NAME	SOIL GROUP	CN	AREA (ac)	PRODUCT
ProUoged mp Uervioug	b r. an Gand	-	98	854F	82/ 5/ 4
EsigtinI mp Uervioug	b r. an Gand	-	98	2541	2365F0
Pervioug	Mis	A7D	84	952F	/ / / 506
			TOTALS	**20.11**	**1841.29**

COMPOSITE CN	91.56

ESTIMATE OF RUNOFF VOLUME

PROCEDb RE TO DETERMnNE Rb NOLL VOGb ME nS BASED ON THE SCS EQb ATn6N AND nS AS LOGGOWS:

1) DETERMnNE SOn6 STORAx E - S ----------> S = (1000 7CN) - 10 (incheg)

2) DETERMnNE Rb NOLL - R ----------> R = (P - 052*S)^2 7(P + 058*S) (incheg)

P = rainfall in incheg

3) DETERMnNE Rb NOLL VOGb ME - V(R) ----------> V(R) = (R 712)*BASnN AREA (acre-feet)

CAGCb GATn6N TABGE

Agency	Design Storm Frequency	P (in)	S (in)	R (in)	V(R) (ac-ft)
SLWMD Bagin Criteria	2F yr 7/ 2 hr	10560	0592	95F/	**16.04**

CONSOR Engineers, LLC				
PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			**DATE**
BASIN DESIGNATION:	4	**MADE BY:**	YSJ	0/ 7/F722
POND:	4B	**CHECKED BY:**	LGx	0/ 7/F722

Water Quality

Total Bagin Area = 2051 1 ac
ProUoged Paved Area = 854F ac
Pond Area at NWG = ac

A5	1500	" Over Total Bagin Area =	1568	Ac-Lt
B5	25F0	" Over ProUoged Paved Area =	157 6	Ac-Lt
		Treatp ent Volup e	157 6	Ac-Lt
		Treatp ent Volup e + F0% (due to OLW)	2564	Ac-Lt
		Attenuation Volup e	1524	Ac-Lt
		Total Volume	**3.88**	Ac-Lt

Stage Storage Calculations

ELEV. (ft)		AREA (ac)	AVG AREA (ac)	Delta D (ft)	Delta storage (ac-ft)	Sum Storage (ac-ft)
1153 3	Out5Berp	258/				9548
			257 2	05F0	1536	
1153 3		25F6				8513
			2541	05F0	1520	
1053 3	m5Berp	252F				6592
			251/	1500	251/	
953 3	DHW	2509				**4.75**
			2502	1500	2502	
853 3	(PAV)	1594				257 4
			1583	15F0	257 4	
/ 53 3	(NWG)	157 1				
-053/	Bottop					

Lree. oard = **1.00** ft

Source of NWL
SLWMD AUUication No5 981030-11kSLWMD Perp t No5 36-02926-S
WSWT = / 53 3 ft NAVD,88

CONSOR Engineers, LLC

PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			**DATE**
BASIN DESIGNATION:	4	**MADE BY:**	YSJ	0/ 7IF722
POND:	4B	**CHECKED BY:**	LGx	0/ 7IF722

Hydraulic Grade Line Clearance Calculations

1) Egtip ated tail' ater elevation in the Uond (for preliminary gtorp ge' er degI n) = 9583

2) Calculation of Uogt-develoUp ent area for Hx G checw

Bageline	Lrop Station	To Station	GenI th (ft)	Road' ay ' idth (ft)	Area (ac)
CG BSR	1363+60	140/ +40	4380500	43500	4532
				Total	4532

3) Go' egt I utter elevation in Bagin for Hx G checw

Station	1406+10
Bageline	CG BSR
Offget (ft)	RT
Elevation (ft)	105' 0

4) Allo' a. le Head Gogg = lo' egt I utter el - egt5tail' ater el = 058/ ft

F) PiUe lenI th frop Pond to lo' egt I utter Uoint = 188/ 500 ft

6) Rational Method for contri. utinI runoff - Q=CiA

C =	059F	
int5=	/ 540	in7hr
A =	4532	ac
Q =	30540	cfg
ManninI ,g n =	05012	
Sup K =	2549	
V =	1591	fUg

/) Egtip ation of PiUe Size

HG = [4561*(n^2)*G*(Q^2)]7(D^F533) + K(V^2)72I

HG = Allo' a. le Head Gogg (ft) 05F2
n = ManninI ,g n <actual HG - OK
G = GenI th (ft)
Q = Runoff (cfg)
D = PiUe diap eter (ft)
K = coefficient for p inor loggeg
V = UiUe velocity (fUg)
I = I ravitational congtant (3252 ft7gec^2)

8) Egtip ated PiUe Diap eter to gatigfy the conditiong = 45F0 ft
F4500 in

CONSOR Engineers, LLC				
PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			DATE
BASIN DESIGNATION:	Y	MADE BY:	J S/	07FHYE22
BASIN ANALYSIS (PRE/POST):	PRE	CHECKED BY:	LGx	07FHYE22

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL NAME	SOIL GROUP	CN	AREA (ac)	PRODUCT
EsigtinI mp Uervioug	b r. an Gand	-	98	2574	268589
Pervioug	Mis	OHD	84	20512	1690518
			TOTALS	220 1	7343081

COMPOSITE CN	. 405.

ESTIMATE OF RUNOFF VOLUME

PRCOEDb RE TC DETERMmNE Rb NCLL VCGb ME mS BASED CN THE SOS EQb ATmCN AND mS AS LCGGCWS:

1) DETERMmNE SCmG STCRAx E - S ----------> S = (1000 FON) - 10 (incheg)

2) DETERMmNE Rb NCLL - R ----------> R = (P - 052*S)^2 F(P + 058*S) (incheg)

P = rainfall in incheg

3) DETERMmNE Rb NCLL VCGb ME - V(R) ----------> V(R) = (R F12)*BASmN AREA (acre-feet)

OAGOb GATmCN TABGE

Agenc6	Design Syt ro Fremqenc6	P (in)	S (in)	R (in)	V(R) (ac-uy)
SLWMD Bagin Oriteria	2Yyr F72 hr	10560	1567	8583	16582

CONSOR Engineers, LLC				
PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			**DATE**
BASIN DESIGNATION:	Y	**MADE BY:**	J S/	07H YE22
BASIN ANALYSIS (PRE/POST):	PCST	**CHECKED BY:**	LGx	07H YE22

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL NAME	SOIL GROUP	CN	AREA (ac)	PRODUCT
ProUoged mp Uervioug	b r. an Gand	-	98	9560	941512
EsigtinI mp Uervioug	b r. an land	-	98	2574	268589
Pervioug	Mis	OHD	84	105Y2	883Y0
			TOTALS	**220 1**	**283f042**

COMPOSITE CN	37045

ESTIMATE OF RUNOFF VOLUME

PRCOEDb RE TC DETERMnNE Rb NCLL VCGb ME nS BASED CN THE SOS EQb ATn6CN AND nS AS LCGGCWS:

1) DETERMnNE SCn6STCRAx E - S ----------> S = (1000 FON) - 10 (incheg)

2) DETERMnNE Rb NCLL - R ----------> R = (P - 052*S)^2 F(P + 058*S) (incheg)

P = rainfall in incheg

3) DETERMnNE Rb NCLL VCGb ME - V(R) ----------> V(R) = (R F12)*BASnN AREA (acre-feet)

OAGOb GATn6CN TABGE

Agenc6	Design Syt ro Fremqenc6	P (in)	S (in)	R (in)	V(R) (ac-uy)
SLWMD Bagin Oriteria	2Yyr F72 hr	10560	0592	95Y7	7. 02f

CONSOR Engineers, LLC				
PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			DATE
BASIN DESIGNATION:	Y	MADE BY:	J S/	07H Y22
POND:	YB	CHECKED BY:	LGx	07H Y22

Wayer 9 qaQ6

Total Bagin Area = 22587 ac
ProUoged Paved Area = 9560 ac
Pond Area at NWG = ac

A5	1500	" Cver Total Bagin Area =	1591	Ac-Lt
B5	25Y0	" Cver ProUoged Paved Area =	2500	Ac-Lt
		Treatp ent Volup e	2500	Ac-Lt
		Treatp ent Volup e + Y0% (due to CLW)	3500	Ac-Lt
		Attenuation Volup e	1541	Ac-Lt
		Tt yaCVt Qo e	**1017**	Ac-Lt

Syage Syt rage CaQqQyit ns

ELEV0 (uy)		AREA (ac)	AVG AREA (ac)	DeQya D (uy)	DeQya syt rage (ac-uy)	Sqo Syt rage (ac-uy)
6580	Cut5Berp	3526				10531
			2593	05Y0	1547	
6530		2560				858Y
			2549	05Y0	152Y	
Y580	m5Berp	2538				7560
			2532	1500	2532	
4580	DHW	2526				**402.**
			2520	1500	2520	
3580	(PAV)	2514				3508
			2506	15Y0	3508	
2530	(NWG)	1597				
-Y570	Bottop					

Lree. oard = **7088** ft

St qrce t uNWL

SLWMD AUUication No5 181002-876kSLWMD Perp t No5 36-1006YY-P
Oontrol Elevation = 2530 ft NAVD,88

CONSOR Engineers, LLC

PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			**DATE**
BASIN DESIGNATION:	Y	**MADE BY:**	J S/	07FHYF22
POND:	YB	**CHECKED BY:**	LGx	07FHYF22

Hydraulic Grade Line Clearance Calculations

1) Egtip ated tail' ater elevation in the Uond (for preliminary gtorp ge' er degI n) = 4580

2) Oalculation of Uogt-develoUp ent area for Hx G checw

Bageline	Lrop Station	To Station	GenI th (ft)	Road' ay ' idth (ft)	Area (ac)
OG BSR	1407+40	14Y7+20	4980500	43500	4592
				Total	4592

3) Go' egt I utter elevation in Bagin for Hx G checw

Station	1412+40
Bageline	OG BSR
Cffget (ft)	RT
Elevation (ft)	11500

4) Allo' a. le Head Gogg = lo' egt I utter el - egt5tail' ater el = 6520 ft

Y) PiUe lenI th frop Pond to lo' egt I utter Uoint = 1601500 ft

6) Rational Method for contri. utinI runoff - Q=OiA

O =	059Y	
int5=	7540	inFhr
A =	4592	ac
Q =	345Y6	cfg
ManninI ,g n =	05012	
Sup K =	2547	
V =	4589	fUg

7) Egtip ation of PiUe Size

HG = [4561*(n^2)*G*(Q^2)]F(D^Y533) + K(V^2)F2I

HG = Allo' a. le Head Gogg (ft) 45YY

n = ManninI ,g n <actual HG - CK

G = GenI th (ft)

Q = Runoff (cfg)

D = PiUe diap eter (ft)

K = coefficient for p inor loggeg

V = UiUe velocity (fUg)

I = I ravitational congtant (3252 ftFgec^2)

8) Egtip ated PiUe Diap eter to gatigfy the conditiong = 3500 ft

36500 in

CONSOR Engineers, LLC				
PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			DATE
BASIN DESIGNATION:	6	MADE BY:	YSJ	06/28/22
BASIN ANALYSIS (PRE/POST):	PRE	CHECKED BY:	7FL	0G/1x/22

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL NAME	SOIL GROUP	CN	AREA (ac)	PRODUCT
EsigtinI mp Uervioug	b r. an Fand	-	98	1543	140539
Pervioug	Mis	O/D	84	105x1	882542
			TOTALS	116 3	1522681

COMPOSITE CN	846y8

ESTIMATE OF RUNOFF VOLUME

PRCOEDb RE TC DETERMnNE Rb NC77 VCFb ME nS BASED CN THE SOS EQb ATn6CN AND nS AS 7CFFCWS:

1) DETERMnNE SCnF STCRALE - S ----------> S = (1000 / ON) - 10 (incheg)

2) DETERMnNE Rb NC77 - R ----------> R = (P - 052*S)^2 / (P + 058*S) (incheg)

P = rainfall in incheg

3) DETERMnNE Rb NC77 VCFb ME - V(R) ----------> V(R) = (R / 12)*BASn AREA (acre-feet)

OAFOb FATn6CN TABFE

Agenct	Design Sonrq Freuf enct	P (in)	S (in)	R (in)	V(R) (ac-9o)
S7WMD Bagin Oriteria	2x yr / G2 hr	10560	156G	8583	8538

CONSOR Engineers, LLC				
PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			DATE
BASIN DESIGNATION:	6	MADE BY:	YSJ	06/28/22
BASIN ANALYSIS (PRE/POST):	PCST	CHECKED BY:	7FL	0G/1x/22

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL NAME	SOIL GROUP	CN	AREA (ac)	PRODUCT
ProUoged mp Uervioug	b r. an Fand	-	98	x501	4915 3x
EsigtinI mp Uervioug	b r. an Fand	-	98	1543	140539
Pervioug	Mis	O/D	84	x549	46152G
			TOTALS	116 3	15. Q65

COMPOSITE CN	. 16 4y

ESTIMATE OF RUNOFF VOLUME

PRCOEDb RE TC DETERMnNE Rb NC77 VCFb ME nS BASED CN THE SOS EQb ATn6CN AND nS AS 7CFFCWS:

1) DETERMnNE SCnF STCRALE - S ----------> S = (1000 / ON) - 10 (incheg)

2) DETERMnNE Rb NC77 - R ----------> R = (P - 052*S)^2 / (P + 058*S) (incheg)

P = rainfall in incheg

3) DETERMnNE Rb NC77 VCFb ME - V(R) ----------> V(R) = (R / 12)*BASnN AREA (acre-feet)

OAFOb FATn6CN TABFE

Agenct	Design Sonrq Freuf enct	P (in)	S (in)	R (in)	V(R) (ac-9o)
S7WMD Bagin Oriteria	2x yr / G2 hr	10560	0592	95xG	. 6412

CONSOR Engineers, LLC

PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			**DATE**
BASIN DESIGNATION:	6	**MADE BY:**	YSJ	06/28/22
POND:	6B	**CHECKED BY:**	7FL	0G1x/22

Waoer l f aGlot

Total Bagin Area = 11594 ac
ProUoged Paved Area = x501 ac
Pond Area at NWF = ac

A5	1500	" Cver Total Bagin Area =	0599	Ac-7t
B5	25x0	" Cver ProUoged + EsigtinI Paved Area =	1504	Ac-7t
		Treatp ent Volup e (Bagin 6)	1504	Ac-7t
		Half of Treatp ent Volup e (Bagin G)	0. 42	Ac-7t
		Treatp ent Volup e + x0% (Bagin 6 and G)	2520	Ac-7t
		Attenuation Volup e (Bagin 6)	0563	Ac-7t
		Tnoa0Vnff q e	**26 3**	Ac-7t

Soage Sonrage Ca0tf 0acimns

ELEV6 (90)		AREA (ac)	AVG AREA (ac)	De0ba D (90)	De0ba sonrage (ac-90)	Sf q Sonrage (ac-90)
G510	Cut5Berp	3530				12502
			351G	05x0	15x9	
6560	100yr/24hr	3504				10543
			2592	05x0	1546	
6510	m5Berp	2509				859G
			25G3	1500	25G3	
x510	DHW	2566				**y624**
			2560	1500	2560	
4510	(PAV)	25x3				356x
			2544	15x0	356x	
2560	(NWF)	2534				
-x540	Bottop					

7ree. oard = **1665** ft

Snf rce n9 NWL

Prelip inary Roadk ay Soil Survery ReUort, AuI ugt 3, 2022
Egtip ated SHL WT = 256 ft NAVD'88

CONSOR Engineers, LLC

PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			**DATE**
BASIN DESIGNATION:	6	**MADE BY:**	YSJ	06/28/22
POND:	6B	**CHECKED BY:**	7FL	0G/1x/22

Hydraulic Grade Line Clearance Calculations

1) Egtip ated tailk ater elevation in the Uond (for preliminary gtorp gek er degiI n) = x510

2) Oalculation of Uogt-develoUp ent area for HLF checw

Bageline	7rop Station	To Station	FenI th (ft)	Roadk ay k idth (ft)	Area (ac)
OF BSR	14xG+20	1483+20	2600500	43500	25xG
				Total	25xG

3) Fok egt I utter elevation in Bagin for HLF checw

Station	1460+80
Bageline	OF BSR
Cffget (ft)	RT
Elevation (ft)	12580

4) Allok a. le Head Fogg = lok egt I utter el - egt5tailk ater el = G500 ft

x) PiUe lenI th frop Pond to lok egt I utter Uoint = 1208500 ft

6) Rational Method for contri. utinI runoff - Q=OiA

O =	059x	
int5=	G540	in/hr
A =	25xG	ac
Q =	18504	cfg
ManninI 'g n =	05012	
Sup K =	2544	
V =	3568	fUg

G) Egtip ation of PiUe Size

HF = [4561*(n^2)*F*(Q^2)]/(D^x533) + K(V^2)/2I

HF = Allok a. le Head Fogg (ft) 2549

n = ManninI 'g n <actual HF - CK

F = FenI th (ft)

Q = Runoff (cfg)

D = PiUe diap eter (ft)

K = coefficient for p inor loggeg

V = UiUe velocity (fUg)

I = I ravitational congtant (3252 ft/gec^2)

8) Egtip ated PiUe Diap eter to gatigfy the conditiong = 25x0 ft

30500 in

CONSOR Engineers, LLC				
PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			DATE
BASIN DESIGNATION:	8	MADE BY:	YSJ	06/28/22
POND:	PRE	CHECKED BY:	7FL	0G/1x/22

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL NAME	SOIL GROUP	CN	AREA (ac)	PRODUCT
EsigtinI mp Uervioug	b r. an Fand	-	98	1504	1015x1
Pervioug	Mis	O/D	84	G660	638506
			TOTALS	8.63	739.57

COMPOSITE CN	85.68

ESTIMATE OF RUNOFF VOLUME

PRCOEDb RE TC DETERMnNE Rb NC77 VCFb ME nS BASED CN THE SOS EQb ATn6CN AND nS AS 7CFFCWS:

1) DETERMnNE SCnF STCRALE - S ----------> S = (1000 / ON) - 10 (incheg)

2) DETERMnNE Rb NC77 - R ----------> R = (P - 052*S)^2 / (P + 058*S) (incheg)

P = rainfall in incheg

3) DETERMnNE Rb NC77 VCFb ME - V(R) ----------> V(R) = (R / 12)*BASnN AREA (acre-feet)

OAFOb FATn6CN TABFE

Agency	Design Storm Frequency	P (in)	S (in)	R (in)	V(R) (ac-ft)
S7WMD Bagin Oriteria	2x yr / G2 hr	10560	156G	8583	653x

CONSOR Engineers, LLC				
PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			DATE
BASIN DESIGNATION:	8	MADE BY:	YSJ	06/28/22
POND:	PCST	CHECKED BY:	7FL	0G/1x/22

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL NAME	SOIL GROUP	CN	AREA (ac)	PRODUCT
ProUbged mp Uervioug	b r. an Fand	-	98	3563	3xx528
EsigtinI mp Uervioug	b r. an Fand	-	98	1504	1015x1
Pervioug	Mis	O/D	84	359G	3335x3
			TOTALS	8.63	790.33

COMPOSITE CN	91.56

ESTIMATE OF RUNOFF VOLUME

PRCOEDb RE TC DETERMnNE Rb NC77 VCFb ME nS BASED CN THE SOS EQb ATnCN AND nS AS 7CFFCWS:

1) DETERMnNE SCnF STCRALE - S ----------> S = (1000 / ON) - 10 (incheg)

2) DETERMnNE Rb NC77 - R ----------> R = (P - 052*S)^2 / (P + 058*S) (incheg)

P = rainfall in incheg

3) DETERMnNE Rb NC77 VCFb ME - V(R) ----------> V(R) = (R / 12)*BASnN AREA (acre-feet)

OAFOb FATnCN TABFE

Agency	Design Storm Frequency	P (in)	S (in)	R (in)	V(R) (ac-ft)
S7WMD Bagin Oriteria	2x yr / G2 hr	10560	0592	95xG	**6.88**

CONSOR Engineers, LLC				
PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			DATE
BASIN DESIGNATION:	8	MADE BY:	YSJ	06/28/22
POND:	8B	CHECKED BY:	7FL	0G/1x/22

Water Quality

Total Bagin Area = 8563 ac
ProUoged Paved Area = 3563 ac
Pond Area at NWF = ac

A5	1500	" Cver Total Bagin Area =	0532	Ac-7t
B5	25x0	" Cver Paved Area =	0536	Ac-7t
		Treatp ent Volup e (Bagin 8)	0536	Ac-7t
		Half of Treatp ent Volup e (Bagin G)	0542	Ac-7t
		Treatp ent Volup e + x0% (Bagin Gand 8)	153G	Ac-7t
		Attenuation Volup e	05x3	Ac-7t
		Total Volume	**2.30**	Ac-7t

Stage Storage Calculations

ELEV. (ft)		AREA (ac)	AVG AREA (ac)	Delta D (ft)	Delta storage (ac-ft)	Sum Storage (ac-ft)
1453 3	Cut5Berp	1591				654x
			1581	05x0	0591	
1353 3	100yr/24hr	15G1				x5x4
			1562	05x0	0581	
1353 3	m5Berp	15x2				453G4
			154G	1500	154G	
1253 3	DHW	1542				**3.27**
			1538	1500	1538	
1153 3	(PAV)	1533				1589
			1526	15x0	1589	
953 3	(NWF)	1519				
153 3	Bottop					

7ree. oard = **1.00** ft

Source of NWL
S7WMD AUUication No5 13041G-10kS7WMD Perp t No5 36-0x0x1x-P
WSWT = 953 3 ft NAVD,88

CONSOR Engineers, LLC

PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			**DATE**
BASIN DESIGNATION:	8	**MADE BY:**	YSJ	06/28/22
POND:	8B	**CHECKED BY:**	7FL	0G/1x/22

Hydraulic Grade Line Clearance Calculations

1) Egtip ated tail' ater elevation in the Uond (for preliminary gtorp ge' er degI n) = 12533

2) Oalculation of Uogt-develoUp ent area for HL F checw

Bageline	7rop Station	To Station	FenI th (ft)	Road' ay ' idth (ft)	Area (ac)
OF BSR	1x04+20	1x23+00	188050	43500	1586
				Total	1586

3) Fo' egt I utter elevation in Bagin for HL F checw

Station	1x08+60
Bageline	OF BSR
Cffget (ft)	RT
Elevation (ft)	14530

4) Allo' a. le Head Fogg = lo' egt I utter el - egt5tail' ater el = 159G ft

x) PiUe lenI th frop Pond to lo' egt I utter Uoint = 346500 ft

6) Rational Method for contri. utinI runoff - Q=OiA

O =	059x	
int5=	G540	in/hr
A =	1586	ac
Q =	1350x	cfg
ManninI ,g n =	05012	
Sup K =	2538	
V =	451x	fUg

G) Egtip ation of PiUe Size

HF = [4561*(n^2)*F*(Q^2)]/(D^x533) + K(V^2)/2I

HF = Allo' a. le Head Fogg (ft) 1561
n = ManninI ,g n <actual HF - CK
F = FenI th (ft)
Q = Runoff (cfg)
D = PiUe diap eter (ft)
K = coefficient for p inor loggeg
V = UiUe velocity (fUg)
I = I ravitational congtant (3252 ft/gec^2)

8) Egtip ated PiUe Diap eter to gatigfy the conditiong = 2500 ft
24500 in

CONSOR Engineers, LLC				
PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			DATE
BASIN DESIGNATION:	9	MADE BY:	YSJ	06/28/22
POND:	PRE	CHECKED BY:	7FL	0G/1x/22

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL NAME	SOIL GROUP	CN	AREA (ac)	PRODUCT
EsigtinI mp Uervioug	b r. an Fand	-	98	25.66	2605.2x
Pervioug	Mis	O/D	84	1954G	163x.88
			TOTALS	22.13	1896.13

COMPOSITE CN	85.68

ESTIMATE OF RUNOFF VOLUME

PRCOEDb RE TC DETERMnNE Rb NC77 VCFb ME nS BASED CN THE SOS EQb ATn6CN AND nS AS 7CFFCWS:

1) DETERMnNE SCnF STCRALE - S ----------> S = (1000 / ON) - 10 (incheg)

2) DETERMnNE Rb NC77 - R ----------> R = (P - 052*S)^2 / (P + 058*S) (incheg)

P = rainfall in incheg

3) DETERMnNE Rb NC77 VCFb ME - V(R) ----------> V(R) = (R / 12)*BASn AREA (acre-feet)

OAFOb FATn6CN TABFE

Agency	Design Storm Frequency	P (in)	S (in)	R (in)	V(R) (ac-ft)
S7WMD Bagin Oriteria	2x yr / G2 hr	10.50	15.6G	8.53	16.28

CONSOR Engineers, LLC				
PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			DATE
BASIN DESIGNATION:	9	MADE BY:	YSJ	06/28/22
POND:	PCST	CHECKED BY:	7FL	0G/1x/22

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL NAME	SOIL GROUP	CN	AREA (ac)	PRODUCT
ProUoged mp Uervioug	b r. an Fand	-	98	9529	910589
EsigtinI mp Uervioug	b r. an Fand	-	98	2566	2605 2x
Pervioug	Mis	O/D	84	10518	8xx512
			TOTALS	22.13	2026.26

COMPOSITE CN	91.56

ESTIMATE OF RUNOFF VOLUME

PRCOEDb RE TC DETERMnNE Rb NC77 VCFb ME nS BASED CN THE SOS EQb ATnCN AND nS AS 7CFFCWS:

1) DETERMnNE SCnF STCRALE - S ----------> S = (1000 / ON) - 10 (incheg)

2) DETERMnNE Rb NC77 - R ----------> R = (P - 052*S)^2 / (P + 058*S) (incheg)

P = rainfall in incheg

3) DETERMnNE Rb NC77 VCFb ME - V(R) ----------> V(R) = (R / 12)*BASnN AREA (acre-feet)

OAFOb FATnCN TABFE

Agency	Design Storm Frequency	P (in)	S (in)	R (in)	V(R) (ac-ft)
S7WMD Bagin Oriteria	2x yr / G2 hr	10560	0592	95xG	**17.65**

CONSOR Engineers, LLC				
PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			**DATE**
BASIN DESIGNATION:	9	**MADE BY:**	YSJ	06/28/22
POND:	9B	**CHECKED BY:**	7FL	0G1x/22

Water Quality

Total Bagin Area = 22513 ac
ProUoged Paved Area = 9529 ac
Pond Area at NWF = ac

A5	1500	" Cver Total Bagin Area =	1584	Ac-7t
B5	25x0	" Cver Paved Area =	1594	Ac-7t
		Treatp ent Volup e	1594	Ac-7t
		Treatp ent Volup e + x0% (due to C7W)	2590	Ac-7t
		Attenuation Volup e	153G	Ac-7t
		Total Volume	**4.27**	Ac-7t

Stage Storage Calculations

ELEV. (ft)		AREA (ac)	AVG AREA (ac)	Delta D (ft)	Delta storage (ac-ft)	Sum Storage (ac-ft)
G533	Cut5Berp	458x				18548
			4500	05x0	253x	
6583	100yr/24hr	45xx				16513
			4540	05x0	2520	
6533	m5Berp	452x				13593
			451G	1500	451G	
x533	DHW	4509				**9.76**
			4502	1500	4502	
4533	(PAV)	3594				x5Gx
			3583	15x0	x5Gx	
2583	(NWF)	3502				
-x51G	Bottop					

7ree. oard = **1.00** ft

Source of NWL
S7WMD AUUication No5 09100G-11kS7WMD Perp t No5 36-0346G-P
WSWT = 2583 ft NAVD,88

CONSOR Engineers, LLC

PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			**DATE**
BASIN DESIGNATION:	9	**MADE BY:**	YSJ	06/28/22
POND:	9B	**CHECKED BY:**	7FL	0G/1x/22

Hydraulic Grade Line Clearance Calculations

1) Egtip ated tail' ater elevation in the Uond (for preliminary gtorp ge' er degI n) = xS3

2) Oalculation of Uogt-develoUp ent area for HL F checw

Bageline	7rop Station	To Station	FenI th (ft)	Road' ay ' idth (ft)	Area (ac)
OF BSR	1x23+00	1xGI+20	4820500	43500	4506
				Total	4506

3) Fo' egt I utter elevation in Bagin for HL F checw

Station	1x69+80
Bageline	OF BSR
Cffget (ft)	RT
Elevation (ft)	14560

4) Allo' a. le Head Fogg = lo' egt I utter el - egt5tail' ater el = 952G ft

x) PiUe lenI th frop Pond to lo' egt I utter Uoint = 2G63500 ft

6) Rational Method for contri. utinI runoff - Q=OiA

O =	059x	
int5=	G540	in/hr
A =	4506	ac
Q =	3354x	cfg
ManninI ,g n =	05012	
Sup K =	25x4	
V =	4563	fUg

G) Egtip ation of PiUe Size

HF = [4561*(n^2)*F*(Q^2)]/(D^xS3) + K(V^2)/2I

HF = Allo' a. le Head Fogg (ft) 6506

n = ManninI ,g n <actual HF - CK

F = FenI th (ft)

Q = Runoff (cfg)

D = PiUe diap eter (ft)

K = coefficient for p inor loggeg

V = UiUe velocity (fUg)

I = I ravitational congtant (3252 ft/gec^2)

8) Egtip ated PiUe Diap eter to gatigfy the conditiong = 3500 ft

36500 in

CONSOR Engineers, LLC				
PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			DATE
BASIN DESIGNATION:	10-Y	MADE BY:	J S/	067287 22
BASIN ANALYSIS (PRE/POST):	PRE	CHECKED BY:	FYL	0G71x722

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL NAME	SOIL GROUP	CN	AREA (ac)	PRODUCT
Esigtin I mp Uervioug	b r. an Yand	-	98	0582	G9591
Pervioug	Mis	A7D	84	x598	x02530
			TOTALS	20 1	7. 3034

COMPOSITE CN	. 702.

ESTIMATE OF RUNOFF VOLUME

PROCEDb RE TO DETERMnNE Rb NOFF VOYb ME nS BASED ON THE SCS EQb ATnON AND nS AS FOYYOWS:

1) DETERMnNE SOnY STORAL E - S ----------> S = (1000 7CN) - 10 (incheg)

2) DETERMnNE Rb NOFF - R ----------> R = (P - 052*S)^2 7(P + 058*S) (incheg)

P = rainfall in incheg

3) DETERMnNE Rb NOFF VOYb ME - V(R) ----------> V(R) = (R 712)*BASnN AREA (acre-feet)

CAYCb YATnON TABYE

Agenc8	Design S56ry Fret oenc8	P (in)	S (in)	R (in)	V(R) (ac-n5)
SWFWMD Bagin Criteria	2x yr 724 hr	85x4	156G	6582	3586

CONSOR Engineers, LLC				
PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			DATE
BASIN DESIGNATION:	10-Y	MADE BY:	J S/	06/28/22
BASIN ANALYSIS (PRE/POST):	POST	CHECKED BY:	FYL	06/30/22

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL NAME	SOIL GROUP	CN	AREA (ac)	PRODUCT
ProUoged mp Uervioug	b r. an Yand	-	98	25.8x	2C9.56
EsigtinI mp Uervioug	b r. an Yand	-	98	05.82	C9.51
Pervioug	Mis	A7D	84	35.13	2625.xG
			TOTALS	20.1	2330.4q

COMPOSITE CN	u40/72

ESTIMATE OF RUNOFF VOLUME

PROCEDb RE TO DETERMnNE Rb NOFF VOYb ME nS BASED ON THE SCS EQb ATnON AND nS AS FOYYOWS:

1) DETERMnNE SOnY STORAL E - S ----------> S = (1000 7CN) - 10 (incheg)

2) DETERMnNE Rb NOFF - R ----------> R = (P - 05.2*S)^2 7(P + 05.8*S) (incheg)

P = rainfall in incheg

3) DETERMnNE Rb NOFF VOYb ME - V(R) ----------> V(R) = (R 712)*BASnN AREA (acre-feet)

CAYCb YATnON TABYE

Agenc8	Design S5.6ry Fret oenc8	P (in)	S (in)	R (in)	V(R) (ac-n5)
SWFWMD Bagin Criteria	2x yr 724 hr	85.4	05.92	G5.3	f0.82

CONSOR Engineers, LLC				
PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			DATE
BASIN DESIGNATION:	10-Y	MADE BY:	J S/	06/28/22
POND:	10B	CHECKED BY:	FYL	06/30/22

Wa5er 9 oaQ88

Total Bagin Area =	6580	ac
ProUoged Paved Area =	258x	ac
Pond Area at NWY =		ac

A5	05x0	" Over Total Bagin Area =	0528	Ac-Ft
B5	1500	" Over Paved Area =	0524	Ac-Ft
		Treatp ent Volup e	0528	Ac-Ft
		Treatp ent Volup e + x0% (due to OFW)	0542	Ac-Ft
		Attenuation Volup e	0540	Ac-Ft
		T65aQV6Qy e	**101**	Ac-Ft

S5age S56rage CaQoQ56ns

ELEV0 (n5)		AREA (ac)	AVG AREA (ac)	De@5a D (n5)	De@5a s56rage (ac-n5)	Soy S56rage (ac-n5)
1454.0	Out5Berp	952.3				3051.0
			950.0	05x0	45x0	
1359.0		853.G				2x56.0
			85xx	05x0	452.G	
1354.0	m5Berp	853.2				215.3
			852.1	150.0	852.1	
1254.0	DHW	850.9				**41 0.3**
			G89.8	052.0	156.0	
1252.0	(PAV)	G88.6				115x3
			G86.9	15x0	115x3	
1053.0	(NWY)	G5x.1				
25.0	Bottop					

Free. oard = **40.1 1** ft

S6orce 6mNWL

SWFWMD AUUication No5 6G0G41kSWFWMD Perp t No5 41242

NWY = 1053.0 ft NAVD,88

CONSOR Engineers, LLC

PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			**DATE**
BASIN DESIGNATION:	10-Y	**MADE BY:**	J S/	06/28/22
POND:	10B	**CHECKED BY:**	FYL	06/1x/22

Hydraulic Grade Line Clearance Calculations

1) Egtip ated tail' ater elevation in the Uond (for preliminary gtorp ge' er degI n) = 12540

2) Calculation of Uogt-develoUp ent area for HL Y checw

Bageline	Frop Station	To Station	YenI th (ft)	Road' ay ' idth (ft)	Area (ac)
CY BSR	1x83+20	1x98+00	1480500	43500	1546
				Total	1546

3) Yo' egt I utter elevation in Bagin for HL Y checw

Station	1x94+10
Bageline	CY BSR
Offget (ft)	RT
Elevation (ft)	1x500

4) Allo' a. le Head Yogg = lo' egt I utter el - egt5tail' ater el = 2560 ft

x) PiUe lenI th frop Pond to lo' egt I utter Uoint = 618500 ft

6) Rational Method for contri. utinI runoff - Q=CiA

C =	059x	
int5=	G540	in7hr
A =	1546	ac
Q =	1052G	cfg
ManninI ,g n =	05012	
Sup K =	2540	
V =	352G	fUg

G) Egtip ation of PiUe Size

HY = [4561*(n^2)*Y*(Q^2)]7(D^x533) + K(V^2)/2I

HY = Allo' a. le Head Yogg (ft) 154G

n = ManninI ,g n <actual HY - OK

Y = YenI th (ft)

Q = Runoff (cfg)

D = PiUe diap eter (ft)

K = coefficient for p inor loggeg

V = UiUe velocity (fUg)

I = I ravitational congtant (3252 ft7gec^2)

8) Egtip ated PiUe Diap eter to gatigfy the conditiong = 2500 ft

24500 in

CONSOR Engineers, LLC				
PROJECT TITLE:	u Srnt otRre d RaP D&E 4			
PROJECT NUMBER:	36928- l0l88lY0			DATE
BASIN DESIGNATION:	0	MADE BY:	J o/	Y978- 788
BASIN ANALYSIS (PRE/POST):	Dd 4	CHECKED BY:	FLG	Yx70s 788

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL NAME	SOIL GROUP	CN	AREA (ac)	PRODUCT
4 giItinmpUberviRSI	. r5an LanP	1	2-	YMs	- 6Ms
DerviRSI	O ig	u	x9Ms	9M8	3x9MY
			TOTALS	7.07	559.15

COMPOSITE CN	79.08

ESTIMATE OF RUNOFF VOLUME

DdCB4&. d4 TC &4T4dOpN4 d. NCFF VCL. O4 po uAo4& CN TH4 oBo 4Q. ATpCN AN& po Ao FCLLCWo:

0) &4T4dOpN4 oCpL oTCdAG4 1o	1111111111111111111111111111111111>	o = (0YYY7BN) 10Y	(incheI)
8) &4T4dOpN4 d. NCFF 1d	1111111111111111111111111111111111>	d = (D1YM*o)^8 7(D+ YM*o)	(incheI)
		D= rainfall in incheI	
6) &4T4dOpN4 d. NCFF VCL. O4 1V(d)	1111111111111111111111111111111111>	V(d) = (d 708)*uAopN Ad4A	(acre1feet)

BALB. LATpCN TAuL4

Agency	Design Storm Frequency	P (in)	S (in)	R (in)	V(R) (ac-ft)
oFWO & u aIin Briteria	8s yr 7x8 hr	0YM	8Ms	xM-	3MY

CONSOR Engineers, LLC				
PROJECT TITLE:	u Srnt otRre d RaP D&E 4			
PROJECT NUMBER:	36928- 10188 1Y0			**DATE**
BASIN DESIGNATION:	0	**MADE BY:**	J o/	Y978- 788
BASIN ANALYSIS (PRE/POST):	DCoT	**CHECKED BY:**	FLG	Yx70s 788

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL NAME	SOIL GROUP	CN	AREA (ac)	PRODUCT
DrRbRIeP pUberviRSI	. r5an LanP	1	2-	8M2x	820M6
4 giItinmpUberviRSI	. r5an LanP	1	2-	YMs	- 6M8s
DerviRSI	O ig	u	x9M	6M8s	83- M8
			TOTALS	**7.07**	**623.00**

COMPOSITE CN	**88.11**

ESTIMATE OF RUNOFF VOLUME

DdCB4&. d4 TC &4T4dOpN4 d. NCFF VCL. O4 po uAo4& CN TH4 oBo 4Q. ATpCN AN& po Ao FCLLCWo:

0) &4T4dOpN4 oCpL oTCdAG4 1o	1111111111111111111111111111111111>	o = (0YYY7BN) 10Y	(incheI)
8) &4T4dOpN4 d. NCFF 1d	1111111111111111111111111111111111>	d = (D1YM*o)^8 7(D+ YM*o)	(incheI)
		D= rainfall in incheI	
6) &4T4dOpN4 d. NCFF VCL. O4 1V(d)	1111111111111111111111111111111111>	V(d) = (d 708)*uAopN Ad4A	(acrelfeet)

BALB. LATpCN TAuL4

Agency	Design Storm Frequency	P (in)	S (in)	R (in)	V(R) (ac-ft)
oFWO & uaIin Briteria	8s yr 7x8 hr	0YM	0Ms	2M3	**5.38**

CONSOR Engineers, LLC				
PROJECT TITLE:	u Srnt otRre d RaP D&E 4			
PROJECT NUMBER:	36928- l0188 IY0			**DATE**
BASIN DESIGNATION:	0	**MADE BY:**	J o/	Y978- 788
POND:	0B	**CHECKED BY:**	FLG	Yx70s 788

Water Quality

TRtal u aIin Area = xMx ac
DrRbRIeP DaveP Area = 8M2x ac
DRnP Area at NWL = ac

AM	0NMY	" Cver TRtal u aIin Area =	YM2	AcIFt
u M	8MsY	" Cver DrRbRIeP DaveP Area =	YM8	AcIFt
		TreatUent VRlSUe	YM8	AcIFt
		TreatUent VRlSUe + sY% (PSe tRCFW)	YM6	AcIFt
		AttenSatiRn VRlSUe	YM-	AcIFt
		Total Volume	**1.61**	AcIFt

Stage Storage Calculations

ELEV. (ft)		AREA (ac)	AVG AREA (ac)	Delta D (ft)	Delta storage (ac-ft)	Sum Storage (ac-ft)
9M6	CStMuerU	0M6				sMs
			0Ms3	YsMY	YsMx	
9M6		0Ms				3M-
			0M4x	YsMY	YM2	
sM6	pnMuerU	0M2				3MMY
			0M8s	0NMY	0M8s	
3M6	&HW	0MMY				**2.75**
	(4ItiUateP)		0MM9	0NMY	0MM9	
6M6	(DAV)	0MM8				0Ms2
			0NM9	0NsY	0Ms2	
8M6	NWL	0MMY				
lsMx	u RttRU					

Free5RarP = **1.00** ft

Source of NWL
oFWO & AbblicatiRn NRM02Y60s l66, oFWO & DerUt NRM69 IY8- 30 lo
WoWT = 8M6 ft NAV&'- -

CONSOR Engineers, LLC

PROJECT TITLE:	u Srnt otRre d RaP D&E 4			
PROJECT NUMBER:	36928- 10188 1Y0			**DATE**
BASIN DESIGNATION:	0	**MADE BY:**	J o/	Y978- 788
POND:	0B	**CHECKED BY:**	FLG	Yx70s 788

Hydraulic Grade Line Clearance Calculations

0) 4 ItiUateP tailwater elevatiRn in the bRnP (fRr preliminary ItRrU Iewer PeIimn) = 3M46

8) BalcSlatiRn Rf bRIt lPevelRbUent area fRr HGL check

u aIeline	FrRU otatiRn	TROtatiRn	Lenmth (ft)	d RaPway wiPth (ft)	Area (ac)
BL u od	0820+3Y	06Y9+- Y	0s3YMY	36MY	0M8
				TRtal	0M8

6) LRweIt nStter elevatiRn in u aIin fRr HGL check

otatiRn	0638+3Y
u aIeline	BL u od
CffIet (ft)	d T
4 levatiRn (ft)	2MY

3) AllRwa5le HeaP LRII = lRweIt nStter el 1 eItMailwater el = sM8x ft

s) Dibe lenmth frRU DRnP tR lRweIt nStter bRint = 09YMY ft

9) d atiRnal O ethRP fRr cRntri5StinmrSnRff 1Q=BiA

B =	YM5s	
intM=	xMY	in7hr
A =	0M8	ac
Q =	0YM2	cfI
O anninmI n =	YM08	
oSU K =	8M6x	
V =	9M5s	fbI

x) 4 ItiUatiRn Rf Dibe oize

HL = [3M0*(n^8)*L*(Q^8)]7(&^sM6) + K(V^8)78m

HL = AllRwa5le HeaP LRII (ft) 8M3

n = O anninmI n <actSal HL 1CK

L = Lenmth (ft)

Q = d SnRff (cfI)

& = Dibe PiaUeter (ft)

K = cRefficient fRr UinRr lRIIeI

V = bibe velRcity (fbI)

m= mravitatiRnal cRnItant (68M ft7ec^8)

-) 4 ItiUateP Dibe &iaUeter tRIatiIfy the cRnPitiRnI = 0MY ft

0-MY in

CONSOR Engineers, LLC				
PROJECT TITLE:	u Srnt otRre d RaP D&E 4			
PROJECT NUMBER:	36928- l0l88lY0			DATE
BASIN DESIGNATION:	8	MADE BY:	J o/	Y978F780
BASIN ANALYSIS (PRE/POST):	Dd 4	CHECKED BY:	LGx	YF70s7888

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL NAME	SOIL GROUP	CN	AREA (ac)	PRODUCT
4giItinmpUberviRSI	. r5an GanP	1	2-	0M29	028M8
DerviRSI	O ig	A7&	F2	03M4-	0069M8
			TOTALS	16.35	1328.54

COMPOSITE CN	81.28

ESTIMATE OF RUNOFF VOLUME

DdCB4&. d4 TC &4T4dOpN4 d. NCLL VCG. O4 po uAo4& CN TH4 oBo 4Q. ATpCN AN& po Ao LCGGCWo:

0) &4T4dOpN4 oCpGoTCdAx 4 1o	1111111111111111111111111111111111>	o = (0YYY7BN) 10Y	(incheI)
8) &4T4dOpN4 d. NCLL 1d	1111111111111111111111111111111111>	d = (D1YM*o)^8 7(D+ YM*o)	(incheI)
		D= rainfall in incheI	
6) &4T4dOpN4 d. NCLL VCG. O4 1V(d)	1111111111111111111111111111111111>	V(d) = (d 708)*uAopN Ad4A	(acre1feet)

BAGB. GATpCN TAuG4

Agency	Design Storm Frequency	P (in)	S (in)	R (in)	V(R) (ac-ft)
oLWO & uaIin Briteria	8s yr 7F8 hr	0YM1Y	8M4Y	-M9	00M8s

CONSOR Engineers, LLC				
PROJECT TITLE:	u Srnt otRre d RaP D&E 4			
PROJECT NUMBER:	36928- 10188 1Y0			DATE
BASIN DESIGNATION:	8	MADE BY:	J o/	Y978F780
BASIN ANALYSIS (PRE/POST):	DCoT	CHECKED BY:	LGx	YF70s7888

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL NAME	SOIL GROUP	CN	AREA (ac)	PRODUCT
DrRbRIeP pUberviRSI	. r5an GanP	1	2-	9MF	9F8MF
4 giItinmpUberviRSI	. r5an GanP	1	2-	0M29	028M8
DerviRSI	O ig	A7&	F2	FM8	s26M2
			TOTALS	16.35	1458.98

COMPOSITE CN	89.26

ESTIMATE OF RUNOFF VOLUME

DdCB4&. d4 TC &4T4dOpN4 d. NCLL VCG. O4 po u Ao4& CN TH4 oBo 4Q. ATpCN AN& po Ao LCGGCWo:

0) &4T4dOpN4 oCpGoTCdAx 4 1o	1111111111111111111111111111111111>	o = (0YYY7BN) 10Y	(incheI)
8) &4T4dOpN4 d. NCLL 1d	1111111111111111111111111111111111>	d = (D1YM*o)^8 7(D+ YM*o)	(incheI)
		D= rainfall in incheI	
6) &4T4dOpN4 d. NCLL VCG. O4 1V(d)	1111111111111111111111111111111111>	V(d) = (d 708)*u AopN Ad4A	(acrelfeet)

BAGB. GATpCN TAuG4

Agency	Design Storm Frequency	P (in)	S (in)	R (in)	V(R) (ac-ft)
oLWO & uaIin Briteria	8s yr 7F8 hr	0YM1Y	0M1Y	2M4-	**12.64**

CONSOR Engineers, LLC

PROJECT TITLE:	u Srnt otRre d RaP D&E 4			
PROJECT NUMBER:	36928- l0188 IY0			**DATE**
BASIN DESIGNATION:	8	**MADE BY:**	J o/	Y978F780
POND:	8B	**CHECKED BY:**	LGx	YF70s7888

Water Quality

TRtal u aIin Area = 09M6s ac
DrRbRIeP DaveP Area = 9MF ac
DRnP Area at NWG = ac

AM	0NMY	" Cver TRtal u aIin Area =	0M69	AcILt
u M	8MY	" Cver DaveP Area =	0M36	AcILt
		TreatUent VRlSUe	0M36	AcILt
		TreatUent VRlSUe + sY% (PSe tRCLW)	8M6s	AcILt
		AttenSatiRn VRlSUe	0M62	AcILt
		Total Volume	**3.53**	AcILt

Stage Storage Calculations

ELEV. (ft)		AREA (ac)	AVG AREA (ac)	Delta D (ft)	Delta storage (ac-ft)	Sum Storage (ac-ft)
FM6	CStMuerU	6MMY				00MM
			6M6	YsMY	0MMF	
9M6		8M29				2Ms6
			8MMY	YsMY	0MMY	
9M6	pnMuerU	8M96				-M6
			8Ms3	0MMY	8Ms3	
sM6	&HW	8MMs				**5.59**
			8M6F	0MMY	8M6F	
3M6	(DAV)	8MM-				6M86
			8MMs	0MsY	6M86	
8M6	(NWG)	8MM8				
lsMMF	u RttRU					

Lree5RarP = **1.00** ft

Source of NWL
oLWO & AbblicatiRn NRM2FY00s l6koLWO & DerUt NRM691Y680FlD
WoWT = 8M6 ft NAV&,--

CONSOR Engineers, LLC

PROJECT TITLE:	u Srnt otRre d RaP D&E 4			
PROJECT NUMBER:	36928- 10188 1Y0			**DATE**
BASIN DESIGNATION:	8	**MADE BY:**	J o/	Y978F780
POND:	8B	**CHECKED BY:**	LGx	YF70s7888

Hydraulic Grade Line Clearance Calculations

0) 4ItiUateP tail' ater elevatiRn in the bRnP (fRr preliminary ItRrU Ie' er PeIimn) = sM6

8) BalcSlatiRn Rf bRIt lPevelRbUent area fRr Hx G checw

u aIeline	LrRU otatiRn	TRotatiRn	Genmth (ft)	d RaP' ay ' iPth (ft)	Area (ac)
BGu od	06Y9+- Y	0638+3Y	6s9YMY	36MY	6M0
				TRtal	6M0

6) GR' eIt nStter elevatiRn in u aIin fRr Hx G checw

otatiRn	0669+s Y
u aIeline	BGu od
CffIet (ft)	d T
4levatiRn (ft)	0YM4Y

3) AllR' a5le HeaP GRII = lR' eIt nStter el 1eItMail' ater el = 3M2F ft

s) Dibe lenmth frRU DRnP tR lR' eIt nStter bRint = -s8MY ft

9) d atiRnal O ethRP fRr cRntri5StinmrSnRff 1Q=BiA

B =	YM5s	
intM=	FMY	in7hr
A =	6M0	ac
Q =	83M0	cfI
O anninmI n =	YM08	
oSU K =	8M8	
V =	sM6	fbI

F) 4ItiUatiRn Rf Dibe oize

HG = [3M0*(n^8)*G*(Q^8)]7(&^sM6) + K(V^8)78m

HG = AllR' a5le HeaP GRII (ft) 6M9

n = O anninmI n <actSal HG 1CK

G = Genmth (ft)

Q = d SnRff (cfI)

& = Dibe PiaUeter (ft)

K = cRefficient fRr UinRr lRIIeI

V = bibe velRcity (fbI)

m= mravitatiRnal cRnItant (68M ft7ec^8)

-) 4ItiUateP Dibe &iaUeter tRIatiIfy the cRnPitiRnI = 8MY ft

6YMY in

CONSOR Engineers, LLC				
PROJECT TITLE:	u Srnt otRre d RaP D&E 4			
PROJECT NUMBER:	36928- l0l88lY0			DATE
BASIN DESIGNATION:	6	MADE BY:	J o/	Y978F788
BASIN ANALYSIS (PRE/POST):	Dd 4	CHECKED BY:	LGx	YF70s788

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL NAME	SOIL GROUP	CN	AREA (ac)	PRODUCT
4giItinmpUberviRSI	. r5an GanP	1	2-	0MF	003MF
DerviRSI	O ig	A7&	- 3	- MF	F02M8
			TOTALS	7.05	955.79

COMPOSITE CN	91.89

ESTIMATE OF RUNOFF VOLUME

DdCB4&. d4 TC &4T4dOpN4 d. NCLL VCG. O4 po uAo4& CN TH4 oBo 4Q. ATpCN AN& po Ao LCGGCWo:

0) &4T4dOpN4 oCpGoTCdAx 4 1o	1111111111111111111111111111111111>	o = (0YYY7BN) 10Y	(incheI)
8) &4T4dOpN4 d. NCLL 1d	1111111111111111111111111111111111>	d = (D1YM*o)^8 7(D+ YM*o)	(incheI)
		D= rainfall in incheI	
6) &4T4dOpN4 d. NCLL VCG. O4 1V(d)	1111111111111111111111111111111111>	V(d) = (d 708)*uAopN Ad4A	(acre1feet)

BAGB. GATpCN TAuG4

Agency	Design Storm Frequency	P (in)	S (in)	R (in)	V(R) (ac-ft)
oLWO & u aIin Briteria	8s yr 7F8 hr	0YMY	0MF	- M6	FM9

CONSOR Engineers, LLC				
PROJECT TITLE:	u Srnt otRre d RaP D&E 4			
PROJECT NUMBER:	36928- 101881Y0			DATE
BASIN DESIGNATION:	6	MADE BY:	J o/	Y978F788
BASIN ANALYSIS (PRE/POST):	DCoT	CHECKED BY:	LGx	YF70s788

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL NAME	SOIL GROUP	CN	AREA (ac)	PRODUCT
DrRbRIeP pUberviRSI	. r5an GanP	1	2-	3M2	3YYM3
4 giItinmpUberviRSI	. r5an GanP	1	2-	0MF	003MF
DerviRSI	O ig	A7&	-3	3M-	6F9M0
			TOTALS	7.05	976.22

COMPOSITE CN	76.18

ESTIMATE OF RUNOFF VOLUME

DdCB4&. d4 TC &4T4dOpN4 d. NCLL VCG. O4 po uAo4& CN TH4 oBo 4Q. ATpCN AN& po Ao LCGGCWo:

0) &4T4dOpN4 oCpGoTCdAx 4 1o	1111111111111111111111111111111111>	o = (0YYY7BN) 10Y	(incheI)
8) &4T4dOpN4 d. NCLL 1d	1111111111111111111111111111111111>	d = (D1YM*o)^8 7(D+ YM*o)	(incheI)
		D= rainfall in incheI	
6) &4T4dOpN4 d. NCLL VCG. O4 1V(d)	1111111111111111111111111111111111>	V(d) = (d 708)*uAopN Ad4A	(acrelfeet)

BAGB. GATpCN TAuG4

Agency	Design Storm Frequency	P (in)	S (in)	R (in)	V(R) (ac-ft)
oLWO & uaIin Briteria	8s yr 7F8 hr	0YMY	YM8	2MF	**0.08**

CONSOR Engineers, LLC

PROJECT TITLE:	u Srnt otRre d RaP D&E 4			
PROJECT NUMBER:	36928- l0188 lY0			**DATE**
BASIN DESIGNATION:	6	**MADE BY:**	LGx	Y978F788
POND:	6B	**CHECKED BY:**	LGx	YF70s788

Water 3 uaQty

TRtal u aIin Area = 2M6 ac
DrRbRIeP DaveP Area = 3M2 ac
DRnP Area at NWG = ac

AM 0MY " Cver TRtal u aIin Area = YM0 AcILt
u M 8MY " Cver DaveP Area = YMs AcILt
TreatUent VRlSUe YMs AcILt

TreatUent VRlSUe + sY% (PSe tRCLW) 0M4- AcILt

AttenSatiRn VRlSUe YMY AcILt

TotaQVoQme **6.99** AcILt

Stage Storage CaQuQtions

ELEV. (ft)		AREA (ac)	AVG AREA (ac)	DeQa D (ft)	DeQa storage (ac-ft)	Sum Storage (ac-ft)
0YM6	CStMuerU	0M3				3M2
			0M4s	YsMY	YM4-	
0YM6		0M89				6M0
			0M4-	YsMY	YsM2	
2M6	pnMuerU	0MY				6M8
			0MY	0MY	0MY	
-M6	&HW	YMY				**2.22**
			YM8	0MY	YM8	
FM6	(DAV)	YM6				0M0
			YMF	0MY	0M0	
9M6	(NWG)	YM0				
l0M-	(uRttRU)					

Lree5RarP = **6.11** ft

Source of NWL
oLWO & AbblicatiRn NRMYsYs 0F100koLWO & DerUt NRM691Y30-21D
WoWT = 9M6 ft NAV&,--

CONSOR Engineers, LLC

PROJECT TITLE:	u Srnt otRre d RaP D&E 4			
PROJECT NUMBER:	36928- 10188 1Y0			**DATE**
BASIN DESIGNATION:	6	**MADE BY:**	J o/	Y978F788
POND:	6B	**CHECKED BY:**	LGx	YF70s788

Hydraulic Grade Line Clearance Calculations

0) 4 ItiUateP tail' ater elevatiRn in the bRnP (fRr preliminary ItRrU Ie' er PeIimn) = -M6

8) BalcSlatiRn Rf bRIt lPevelRbUent area fRr Hx G checw

u aIeline	LrRU otatiRn	TRotatiRn	Genmth (ft)	d RaP' ay ' iPth (ft)	Area (ac)
BGu od	0638+3Y	0696+9Y	808YMY	36MY	8M2
				TRtal	8M2

6) GR' eIt nStter elevatiRn in u aIin fRr Hx G checw

otatiRn	0690+- Y
u aIeline	BGu od
CffIet (ft)	d T
4 levatiRn (ft)	0YMY

3) AllR' a5le HeaP GRII = lR' eIt nStter el 1 eIt tMail' ater el = 0M4- ft

s) Dibe lenmth frRU DRnP tR lR' eIt nStter bRint = 8082MY ft

9) d atiRnal O ethRP fRr cRntri5StinmrSnRff 1 Q=BiA

B =	YM5	
intM=	FMY	in7hr
A =	8M2	ac
Q =	03M0	cfI
O anninmI n =	YM08	
oSU K =	8MY	
V =	8M-	fbI

F) 4 ItiUatiRn Rf Dibe oize

HG = [3M0*(n^8)*G*(Q^8)]7(&^sM6) + K(V^8)78m

HG = AllR' a5le HeaP GRII (ft) 0M3

n = O anninmI n <actSal HG 1 CK

G = Genmth (ft)

Q = d SnRff (cfI)

& = Dibe PiaUeter (ft)

K = cRefficient fRr UinRr lRIIeI

V = bibe velRcity (fbI)

m= mravitatiRnal cRnItant (68M ft7ec^8)

-) 4 ItiUateP Dibe &iaUeter tRIatiIfy the cRnPitiRnI = 6MY ft

69MY in

CONSOR Engineers, LLC				
PROJECT TITLE:	u Srnt otRre d RaP D&E 4			
PROJECT NUMBER:	36928- l0l88lY0			DATE
BASIN DESIGNATION:	3	MADE BY:	J o/	Y978- 788
BASIN ANALYSIS (PRE/POST):	Dd 4	CHECKED BY:	FLG	Yx70s 788

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL NAME	SOIL GROUP	CN	AREA (ac)	PRODUCT
4 giItinmpUberviRSI	. r5an LanP	1	2-	8M0	869MY
DerviRSI	O ig	A7&	- 3	0xMY	03- 9Ms
			TOTALS	20.11	1723.04

COMPOSITE CN	85.68

ESTIMATE OF RUNOFF VOLUME

DdCB4&. d4 TC &4T4dOpN4 d. NCFF VCL. O4 po uAo4& CN TH4 oBo 4Q. ATpCN AN& po Ao FCLLCWo:

0) &4T4dOpN4 oCpL oTCdAG4 1o	1111111111111111111111111111111111>	o = (0YYY7BN) 10Y	(incheI)
8) &4T4dOpN4 d. NCFF 1d	1111111111111111111111111111111111>	d = (D1YM*o)^8 7(D+ YM*o)	(incheI)
		D= rainfall in incheI	
6) &4T4dOpN4 d. NCFF VCL. O4 1V(d)	1111111111111111111111111111111111>	V(d) = (d 708)*uAopN Ad4A	(acre1feet)

BALB. LATpCN TAuL4

Agency	Design Storm Frequency	P (in)	S (in)	R (in)	V(R) (ac-ft)
oFWO & uaIin Briteria	8s yr 7x8 hr	0YM	0Mx	- M6	03MY

CONSOR Engineers, LLC				
PROJECT TITLE:	u Srnt otRre d RaP D&E 4			
PROJECT NUMBER:	36928- 10188 1Y0			DATE
BASIN DESIGNATION:	3	MADE BY:	J o/	Y978- 788
BASIN ANALYSIS (PRE/POST):	DCoT	CHECKED BY:	FLG	Yx70s 788

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL NAME	SOIL GROUP	CN	AREA (ac)	PRODUCT
DrRbRIeP pUberviRSI	. r5an LanP	1	2-	- Ms	- 8xM3
4 giItinmpUberviRSI	. r5an LanP	1	2-	8M0	869MY
DerviRSI	O ig	A7&	- 3	2Ms	xxxM9
			TOTALS	20.11	1841.29

COMPOSITE CN	91.56

ESTIMATE OF RUNOFF VOLUME

DdCB4&. d4 TC &4T4dOpN4 d. NCFF VCL. O4 po u Ao4& CN TH4 oBo 4Q. ATpCN AN& po Ao FCLLCWo:

0) &4T4dOpN4 oCpL oTCd AG4 1o	1111111111111111111111111111111111>	o = (0YYY7BN) 10Y	(incheI)
8) &4T4dOpN4 d. NCFF 1d	1111111111111111111111111111111111>	d = (D1YM*o)^8 7(D+ YM*o)	(incheI)
		D= rainfall in incheI	
6) &4T4dOpN4 d. NCFF VCL. O4 1V(d)	1111111111111111111111111111111111>	V(d) = (d 708)*u AopN Ad4A	(acrelfeet)

BALB. LATpCN TAuL4

Agency	Design Storm Frequency	P (in)	S (in)	R (in)	V(R) (ac-ft)
oFWO & uaIin Briteria	8s yr 7x8 hr	0YM	YM8	2Mx	**16.04**

CONSOR Engineers, LLC

PROJECT TITLE:	u Srnt otRre d RaP D&E 4			
PROJECT NUMBER:	36928- l0188 IY0			**DATE**
BASIN DESIGNATION:	3	**MADE BY:**	J o/	Y978- 788
POND:	3B	**CHECKED BY:**	FLG	Yx70s 788

Water Quality

TRtal u aIin Area = 8YM0 ac
DrRbRIeP DaveP Area = - Ms ac
DRnP Area at NWL = ac

AN	0NMY	" Cver TRtal u aIin Area =	0M4-	AcIFt
u N	8MsY	" Cver DaveP Area =	0M49	AcIFt
		TreatUent VRlSUe	0M49	AcIFt
		TreatUent VRlSUe + s Y% (PSe tRCFW)	8M43	AcIFt
		AttenSatiRn VRlSUe	0M83	AcIFt
		Total Volume	**3.88**	AcIFt

Stage Storage Calculations

ELEV. (ft)		AREA (ac)	AVG AREA (ac)	Delta D (ft)	Delta storage (ac-ft)	Sum Storage (ac-ft)
00M6	CStMuerU	8M2x				0YMl
			8Ms	YsMY	0M36	
00M46		8M46				2M42
			8M40	YsMY	0M40	
0YM6	pnMuerU	8M42				xM42
			8M36	0NMY	8M36	
2M6	&HW	8M4x				**5.56**
			8M40	0NMY	8M40	
- M6	(DAV)	8M4s				6M4s
			8MMx	0MsY	6M4s	
xM46	(NWL)	8MM-				
lYM4x	u RttRU					

Free5RarP = **1.00** ft

Source of NWL
oFWO & AbblicatiRn NRM2- 0Y6Y100koFWO & DerUt NRM691Y8289lo
WoWT = xM46 ft NAV&,- -

CONSOR Engineers, LLC

PROJECT TITLE:	u Srnt otRre d RaP D&E 4			
PROJECT NUMBER:	36928- 10188 1Y0			**DATE**
BASIN DESIGNATION:	3	**MADE BY:**	J o/	Y978- 788
POND:	3B	**CHECKED BY:**	FLG	Yx70s 788

Hydraulic Grade Line Clearance Calculations

0) 4 ItiUateP tail' ater elevatiRn in the bRnP (fRr preliminary ItRrU Ie' er PeIimn) = 2M6

8) BalcSlatiRn Rf bRIt lPevelRbUent area fRr HGL checw

u aIeline	FrRU otatiRn	TRotatiRn	Lenmth (ft)	d RaP' ay ' iPth (ft)	Area (ac)
BL u od	0696+9Y	03Yx+3Y	36- YMY	36MY	3M8
				TRtal	3M8

6) LR' eIt nStter elevatiRn in u aIin fRr HGL checw

otatiRn	03Y9+0Y
u aIeline	BL u od
CffIet (ft)	d T
4 levatiRn (ft)	0YMY

3) AllR' a5le HeaP LRII = lR' eIt nStter el 1 eItMail' ater el = YMx ft

s) Dibe lenmth frRU DRnP tR lR' eIt nStter bRint = 8s23MY ft

9) d atiRnal O ethRP fRr cRntri5StinmrSnRff 1Q=BiA

B =	YM5	
intM=	xMY	in7hr
A =	3M8	ac
Q =	6YMY	cfI
O anninmI n =	YM08	
oSU K =	8M6	
V =	0M0	fbI

x) 4 ItiUatiRn Rf Dibe oize

HL = [3M0*(n^8)*L*(Q^8)]7(&^sM6) + K(V^8)78m

HL = AllR' a5le HeaP LRII (ft) YMx

n = O anninmI n <actSal HL 1CK

L = Lenmth (ft)

Q = d SnRff (cfI)

& = Dibe PiaUeter (ft)

K = cRefficient fRr UinRr lRIIeI

V = bibe velRcity (fbI)

m= mravitatiRnal cRnItant (68M ft7ec^8)

-) 4 ItiUateP Dibe &iaUeter tRIatiIfy the cRnPitiRnI = 3MY ft

s3MY in

CONSOR Engineers, LLC				
PROJECT TITLE:	u Srnt otRre d RaP D&E 4			
PROJECT NUMBER:	36928- l0l88lY0			DATE
BASIN DESIGNATION:	J	MADE BY:	/ o7	Y9I8- I88
BASIN ANALYSIS (PRE/POST):	Dd 4	CHECKED BY:	LGx	YsI0JI88

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL NAME	SOIL GROUP	CN	AREA (ac)	PRODUCT
4 giItinmpUberviRSI	. r5an GanP	1	2-	8M3	89- M2
DerviRSI	O ig	BR&	- 3	8YM8	092YM4-
			TOTALS	220 1	7343081

COMPOSITE CN	. 405.

ESTIMATE OF RUNOFF VOLUME

DdCB4&. d4 TC &4T4dOpN4 d. NCLL VCG. O4 po uAo4& CN TH4 oBo 4Q. ATpCN AN& po Ao LCGGCWo:

0) &4T4dOpN4 oCpGoTCdAx 4 1o	1111111111111111111111111111111111>	o = (0YYYFBN) 10Y	(incheI)
8) &4T4dOpN4 d. NCLL 1d	1111111111111111111111111111111111>	d = (D1YM*o)^8 F(D+ YM*o)	(incheI)
		D= rainfall in incheI	
6) &4T4dOpN4 d. NCLL VCG. O4 1V(d)	1111111111111111111111111111111111>	V(d) = (d F08)*uAopN Ad4A	(acrelfeet)

BAGB. GATpCN TAuG4

Agenc6	Design Syt ro Fremqenc6	P (in)	S (in)	R (in)	V(R) (ac-uy)
oLWO & u aIin Briteria	8J yr Fs 8 hr	0YM1Y	0M4s	- M6	09M8

CONSOR Engineers, LLC				
PROJECT TITLE:	u Srnt otRre d RaP D&E 4			
PROJECT NUMBER:	36928- 10188 1Y0			DATE
BASIN DESIGNATION:	J	MADE BY:	/ o7	Y9I8- I88
BASIN ANALYSIS (PRE/POST):	DCoT	CHECKED BY:	LGx	YsI0JI88

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL NAME	SOIL GROUP	CN	AREA (ac)	PRODUCT
DrRbRIeP pUberviRSI	. r5an GanP	1	2-	2MY	230M8
4 giItinmpUberviRSI	. r5an lanP	1	2-	8M3	89- M2
DerviRSI	O ig	BF&	- 3	0YM8	- - 6MY
			TOTALS	220 1	283f042

COMPOSITE CN	37045

ESTIMATE OF RUNOFF VOLUME

DdCB4&. d4 TC &4T4dOpN4 d. NCLL VCG. O4 po uAo4& CN TH4 oBo 4Q. ATpCN AN& po Ao LCGGCWo:

0) &4T4dOpN4 oCpGoTCdAx 4 1o	1111111111111111111111111111111111>	o = (0YYYFBN) 10Y	(incheI)
8) &4T4dOpN4 d. NCLL 1d	1111111111111111111111111111111111>	d = (D1YM*o)^8 F(D+ YM*o)	(incheI)
		D= rainfall in incheI	
6) &4T4dOpN4 d. NCLL VCG. O4 1V(d)	1111111111111111111111111111111111>	V(d) = (d F08)*uAopN Ad4A	(acrelfeet)

BAGB. GATpCN TAuG4

Agenc6	Design Syt ro Fremqenc6	P (in)	S (in)	R (in)	V(R) (ac-uy)
oLWO & uaIin Briteria	8J yr Fs8 hr	0YMY	YM8	2Ms	7. 02f

CONSOR Engineers, LLC				
PROJECT TITLE:	u Srnt otRre d RaP D&E 4			
PROJECT NUMBER:	36928- l0188 IY0			DATE
BASIN DESIGNATION:	J	MADE BY:	/ o7	Y9I8- I88
POND:	J B	CHECKED BY:	LGx	YsI0J I88

Wayer 9 qaQ06

TRtal u aIin Area = 88Ms ac
DrRbRIeP DaveP Area = 2IMY ac
DRnP Area at NWG = ac

AM	0NMY	" Cver TRtal u aIin Area =	0M20	AcILt
u M	8NMY	" Cver DrRbRIeP DaveP Area =	8NMY	AcILt
		TreatUent VRlSUe	8NMY	AcILt
		TreatUent VRlSUe + JY% (PSe tRCLW)	6NMY	AcILt
		AttenSatiRn VRlSUe	0M10	AcILt
		TtyaQVtQqo e	**l0l7**	AcILt

Syage Syt rage CaQqQqyit ns

ELEV0 (uy)	AREA (ac)	AVG AREA (ac)	DeQya D (uy)	DeQya syt rage (ac-uy)	Sqo Syt rage (ac-uy)
9MY CStMuerU	3M12				09NM
		3M03	YMIY	8NMs	
9MIY	6M22				03NM
		6MJJ	YMIY	0M28	
JMY pnMuerU	6MIY				08NM
		6M96	0NMY	6M96	
3MY &HW	6MJJ				**.0l8**
		6M4-	0NMY	6M4-	
6MY (DAV)	6MIY				3M26
		6M82	0NMY	3M26	
8MIY (NWG)	6MIs				
lJMY (uRttRU)					

Lree5RarP = **7088** ft

St qrce t uNWL
oLWO & AbblicatiRn NRM0- 0YY8l- s 9koLWO & DerUt NRM69 l0YY9J J lD
BRntrRl 4 levatiRn = 8M4Y ft NAV&,- -

CONSOR Engineers, LLC

PROJECT TITLE:	u Srnt otRre d RaP D&E 4			
PROJECT NUMBER:	36928- 10188 1Y0			**DATE**
BASIN DESIGNATION:	J	**MADE BY:**	/ o7	Y9I8- I88
POND:	JB	**CHECKED BY:**	LGx	YsI0J I88

Hydraulic Grade Line Clearance Calculations

0) 4 ItiUateP tail' ater elevatiRn in the bRnP (fRr preliminary ItRrU Ie' er PeIimn) = 3MY

8) BalcSlatiRn Rf bRIt lPevelRbUent area fRr Hx G checw

u aIeline	LrRU otatiRn	TRotatiRn	Genmth (ft)	d RaP' ay ' iPth (ft)	Area (ac)
BGu od	03Ys+3Y	03Js+8Y	32- YMY	36MY	3M8
				TRtal	3M8

6) GR' eIt nStter elevatiRn in u aIin fRr Hx G checw

otatiRn	0308+3Y
u aIeline	BGu od
CffIet (ft)	d T
4 levatiRn (ft)	00MY

3) AllR' a5le HeaP GRII = lR' eIt nStter el 1 eItMail' ater el = 9M8Y ft

J) Dibe lenmth frRU DRnP tR lR' eIt nStter bRint = 0396MY ft

9) d atiRnal O ethRP fRr cRntri5StinmrSnRff 1 Q=BiA

B =	YM	
intM=	sMY	inHhr
A =	3M8	ac
Q =	63M9	cfI
O anninmI n =	YM08	
oSU K =	8M9	
V =	3M2	fbI

s) 4 ItiUatiRn Rf Dibe oize

HG = [3M0*(n^8)*G*(Q^8)]I(&^J M6) + K(V^8)I8m

HG = AllR' a5le HeaP GRII (ft) 3M6
n = O anninmI n <actSal HG 1 CK
G = Genmth (ft)
Q = d SnRff (cfI)
& = Dibe PiaUeter (ft)
K = cRefficient fRr UinRr lRIIeI
V = bibe velRcity (fbI)
m= mravitatiRnal cRnItant (68M ftHec^8)

-) 4 ItiUateP Dibe &iaUeter tRIatiIfy the cRnPitiRnI = 6MY ft
69MY in

CONSOR Engineers, LLC				
PROJECT TITLE:	u Srnt otRre d RaP D&E 4			
PROJECT NUMBER:	36928- l0l88lY0			DATE
BASIN DESIGNATION:	9	MADE BY:	J o/	Y978- 788
BASIN ANALYSIS (PRE/POST):	Dd 4	CHECKED BY:	FLG	Yx70s 788

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL NAME	SOIL GROUP	CN	AREA (ac)	PRODUCT
4 giItinmpUberviRSI	. r5an LanP	1	2-	0M6	03 YM2
DerviRSI	O ig	B7&	- 3	0Ym0	- - 8M8
			TOTALS	116 3	152261

COMPOSITE CN	846y8

ESTIMATE OF RUNOFF VOLUME

DdCB4&. d4 TC &4T4dOpN4 d. NCFF VCL. O4 po uAo4& CN TH4 oBo 4Q. ATpCN AN& po Ao FCLLCWo:

0) &4T4dOpN4 oCpL oTCdAG4 1o 1111111111111111111111111111111111> o = (0YYY7BN) 10Y (incheI)

8) &4T4dOpN4 d. NCFF 1d 1111111111111111111111111111111111> d = (D1YM*o)^8 7(D+ YM*o) (incheI)

D= rainfall in incheI

6) &4T4dOpN4 d. NCFF VCL. O4 1V(d) 1111111111111111111111111111111111> V(d) = (d 708)*uAopN Ad4A (acre1feet)

BALB. LATpCN TAuL4

Agenct	Design Somrq Freuf enct	P (in)	S (in)	R (in)	V(R) (ac-9o)
oFWO & u aIin Briteria	8s yr 7x8 hr	0YM1Y	0M9x	- M6	- M-

CONSOR Engineers, LLC				
PROJECT TITLE:	u Srnt otRre d RaP D&E 4			
PROJECT NUMBER:	36928- 10188 1Y0			DATE
BASIN DESIGNATION:	9	MADE BY:	J o/	Y978- 788
BASIN ANALYSIS (PRE/POST):	DCoT	CHECKED BY:	FLG	Yx70s 788

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL NAME	SOIL GROUP	CN	AREA (ac)	PRODUCT
DrRbRIeP pUberviRSI	. r5an LanP	1	2-	sM0	320Ms
4 giItinmpUberviRSI	. r5an LanP	1	2-	0M6	03YM2
DerviRSI	O ig	B7&	- 3	sM2	390Mx
			TOTALS	116 3	15. Q55

COMPOSITE CN	. 16 4y

ESTIMATE OF RUNOFF VOLUME

DdCB4&. d4 TC &4T4dOpN4 d. NCFF VCL. O4 po u Ao4& CN TH4 oBo 4Q. ATpCN AN& po Ao FCLLCWo:

0) &4T4dOpN4 oCpL oTCdAG4 1o	1111111111111111111111111111111111>	o = (0YYY7BN) 10Y	(incheI)
8) &4T4dOpN4 d. NCFF 1d	1111111111111111111111111111111111>	d = (D1YM*o)^8 7(D+ YM*o)	(incheI)
		D= rainfall in incheI	
6) &4T4dOpN4 d. NCFF VCL. O4 1V(d)	1111111111111111111111111111111111>	V(d) = (d 708)*u AopN Ad4A	(acrelfeet)

BALB. LATpCN TAuL4

Agenct	Design Sonrq Freuf enct	P (in)	S (in)	R (in)	V(R) (ac-9o)
oFWO & uaIin Briteria	8s yr 7x8 hr	0YM	YM8	2Mx	. 642

CONSOR Engineers, LLC

PROJECT TITLE:	u Srnt otRre d RaP D&E 4			
PROJECT NUMBER:	36928- l0188 IY0			**DATE**
BASIN DESIGNATION:	9	**MADE BY:**	J o/	Y978- 788
POND:	9B	**CHECKED BY:**	FLG	Yx70s 788

Waoer l faOlot

TRtal u aIin Area = 00M23 ac
DrRbRIeP DaveP Area = sMM0 ac
DRnP Area at NWL = ac

AM	0MMY	" Cver TRtal u aIin Area =	YM22	AcIFt
u M	8MMY	" Cver DaveP Area =	0MM3	AcIFt
		TreatUent VRlSUe (u aIin 9)	0MM3	AcIFt
		Half Rf TreatUent VRlSUe (u aIin x)	YM38	AcIFt
		TreatUent VRlSUe + sY% (u aIin 9 anP x)	8M8Y	AcIFt
		AttenSatiRn VRlSUe (u aIin 9)	YMM3	AcIFt
		Tmoa0VnOf q e	**26 3**	AcIFt

Soage Somrage Ca0cf 0hcimns

ELEV6 (90)	AREA (ac)	AVG AREA (ac)	De0ba D (90)	De0ba somrage (ac-90)	Sf q Somrage (ac-90)
xMMY CStMuerU	8MMY				-M38
		8M02	YMMY	0MMY	
9MMY	8MM-				9M26
		0M2-	YMMY	YM22	
9MMY pnMuerU	0M-				sM23
		0M36	0MMY	0M36	
sMMY &HW	0Mdx				**3611**
		0Md8	0MMY	0Md8	
3MMY (DAV)	0M9x				8M62
		0M9Y	0MMY	8M62	
8MMY (NWL)	0Md8				
lsMMY u RttRU					

Free5RarP = **1655** ft

Snf rce n9 NWL
DreliUinary d RaPk ay oRil o Srvery d ebRrt, ASnSIt 6, 8Y88
4 ItiUateP oHGWT = 8M9 ft NAV&'- -

CONSOR Engineers, LLC

PROJECT TITLE:	u Srnt otRre d RaP D&E 4			
PROJECT NUMBER:	36928- 10188 1Y0			**DATE**
BASIN DESIGNATION:	9	**MADE BY:**	J o/	Y978- 788
POND:	9B	**CHECKED BY:**	FLG	Yx70s 788

Hydraulic Grade Line Clearance Calculations

0) 4 ItiUateP tailk ater elevatiRn in the bRnP (fRr preliminary ItRrU Iek er PeIimn) = sMY

8) BalcSlatiRn Rf bRIt lPevelRbUent area fRr HGL checw

u aIeline	FrRU otatiRn	TRotatiRn	Lenmth (ft)	d RaPk ay k iPth (ft)	Area (ac)
BL u od	03s x+8Y	03- 6+8Y	89YYMY	36MY	8Mdx
				TRtal	8Mdx

6) LRk eIt nStter elevatiRn in u aIin fRr HGL checw

otatiRn	039Y+- Y
u aIeline	BL u od
CffIet (ft)	d T
4 levatiRn (ft)	08MY

3) AllRk a5le HeaP LRII = lRk eIt nStter el 1 eItMailk ater el = xMY ft

s) Dibe lenmth frRU DRnP tR lRk eIt nStter bRint = 6- MY ft

9) d atiRnal O ethRP fRr cRntri5StinmrSnRff 1 Q=BiA

B =	YMs	
intM=	xMY	in7hr
A =	8Mdx	ac
Q =	0- M3	cfI
O anninmI n =	YM08	
oSU K =	8M9	
V =	0YM0	fbI

x) 4 ItiUatiRn Rf Dibe oize

HL = [3M0*(n^8)*L*(Q^8)]7(&^s M6) + K(V^8)78m

HL = AllRk a5le HeaP LRII (ft) 3Mdx

n = O anninmI n <actSal HL 1CK

L = Lenmth (ft)

Q = d SnRff (cfI)

& = Dibe PiaUeter (ft)

K = cRefficient fRr UinRr lRIIeI

V = bibe velRcity (fbI)

m= mravitatiRnal cRnItant (68M ft7ec^8)

-) 4 ItiUateP Dibe &iaUeter tRIatiIfy the cRnPitiRnI = 0MY ft

0- MY in

CONSOR Engineers, LLC				
PROJECT TITLE:	u Srnt otRre d RaP D&E 4			
PROJECT NUMBER:	36928- l0l88lY0			DATE
BASIN DESIGNATION:	-	MADE BY:	J o/	Y978- 788
POND:	Dd 4	CHECKED BY:	FLG	Yx70s 788

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL NAME	SOIL GROUP	CN	AREA (ac)	PRODUCT
4 giItinmpUberviRSI	. r5an LanP	1	2-	0M3	0Y0M0
DerviRSI	O ig	B7&	- 3	xM4Y	96- M9
			TOTALS	8.63	739.57

COMPOSITE CN	85.68

ESTIMATE OF RUNOFF VOLUME

DdCB4&. d4 TC &4T4dOpN4 d. NCFF VCL. O4 po uAo4& CN TH4 oBo 4Q. ATpCN AN& po Ao FCLLCWo:

0) &4T4dOpN4 oCpL oTCdAG4 1o	1111111111111111111111111111111111>	o = (0YYY7BN) 10Y	(incheI)
8) &4T4dOpN4 d. NCFF 1d	1111111111111111111111111111111111>	d = (D1YM*o)^8 7(D+ YM*o)	(incheI)
		D= rainfall in incheI	
6) &4T4dOpN4 d. NCFF VCL. O4 1V(d)	1111111111111111111111111111111111>	V(d) = (d 708)*uAopN Ad4A	(acre1feet)

BALB. LATpCN TAuL4

Agency	Design Storm Frequency	P (in)	S (in)	R (in)	V(R) (ac-ft)
oFWO & uaIin Briteria	8s yr 7x8 hr	0YM4Y	0M4x	- M6	9M4s

CONSOR Engineers, LLC				
PROJECT TITLE:	u Srnt otRre d RaP D&E 4			
PROJECT NUMBER:	36928- 10188 1Y0			DATE
BASIN DESIGNATION:	-	MADE BY:	J o/	Y978- 788
POND:	DCoT	CHECKED BY:	FLG	Yx70s 788

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL NAME	SOIL GROUP	CN	AREA (ac)	PRODUCT
DrRbRIeP pUberviRSI	. r5an LanP	1	2-	6M6	6ss M4-
4 giItinmpUberviRSI	. r5an LanP	1	2-	0M3	0Y0M0
DerviRSI	O ig	B7&	- 3	6M2x	666M6
			TOTALS	8.63	790.33

COMPOSITE CN	91.56

ESTIMATE OF RUNOFF VOLUME

DdCB4&. d4 TC &4T4dOpN4 d. NCFF VCL. O4 po u Ao4& CN TH4 oBo 4Q. ATpCN AN& po Ao FCLLCWo:

0) &4T4dOpN4 oCpL oTCd AG4 1o	1111111111111111111111111111111111>	o = (0YYY7BN) 10Y	(incheI)
8) &4T4dOpN4 d. NCFF 1d	1111111111111111111111111111111111>	d = (D1YM*o)^8 7(D+ YM*o)	(incheI)
		D= rainfall in incheI	
6) &4T4dOpN4 d. NCFF VCL. O4 1V(d)	1111111111111111111111111111111111>	V(d) = (d 708)*u AopN Ad4A	(acrelfeet)

BALB. LATpCN TAuL4

Agency	Design Storm Frequency	P (in)	S (in)	R (in)	V(R) (ac-ft)
oFWO & uaIin Briteria	8s yr 7x8 hr	0YM1Y	YM28	2Mx	**6.88**

CONSOR Engineers, LLC

PROJECT TITLE:	u Srnt otRre d RaP D&E 4			
PROJECT NUMBER:	36928- l0188 IY0			**DATE**
BASIN DESIGNATION:	-	**MADE BY:**	J o/	Y978- 788
POND:	- B	**CHECKED BY:**	FLG	Yx70s 788

Water Quality

TRtal u aIin Area = -NM6 ac
DrRbRIeP DaveP Area = 6NM6 ac
DRnP Area at NWL = ac

AN	0NMY	" Cver TRtal u aIin Area =	YMl8	AclFt
u N	8MsY	" Cver DaveP Area =	YMl9	AclFt
		TreatUent VRlSUe (u aIin -)	YMl9	AclFt
		Half Rf TreatUent VRlSUe (u aIin x)	YMl8	AclFt
		TreatUent VRlSUe + s Y% (u aIin x anP -)	0Mdx	AclFt
		AttenSatiRn VRlSUe (u aIin -)	YMl6	AclFt
		Total Volume	**2.30**	AclFt

Stage Storage Calculations

ELEV. (ft)		AREA (ac)	AVG AREA (ac)	Delta D (ft)	Delta storage (ac-ft)	Sum Storage (ac-ft)
03M6	CStMuerU	0M2				9NMs
			0MlY	YMlY	YMls	
06M6	0YYyr783hr	0M0				sMlY
			0Ml8	YMlY	YMl9	
06M6	pnMuerU	0M6				3M3
			0Ml-	0MlY	0Ml-	
08M6	&HW	0M6				**3.06**
			0M2	0MlY	0M2	
00M6	(DAV)	0M3				0Mdx
			0Ml-	0MlY	0Mdx	
2M6	(NWL)	0M8				
0M6	u RttRU					

Free5RarP = **1.00** ft

Source of NWL
oFWO & AbblicatiRn NRM06Y30x10YkoFWO & DerUt NRM691Ys Ys 0s lD
WoWT = 2M6 ft NAV&,- -

CONSOR Engineers, LLC

PROJECT TITLE:	u Srnt otRre d RaP D&E 4			
PROJECT NUMBER:	36928- 10188 1Y0			**DATE**
BASIN DESIGNATION:	-	**MADE BY:**	J o/	Y978- 788
POND:	- B	**CHECKED BY:**	FLG	Yx70s 788

Hydraulic Grade Line Clearance Calculations

0) 4 ItiUateP tail' ater elevatiRn in the bRnP (fRr preliminary ItRrU Ie' er PeIimn) = 08M46

8) BalcSlatiRn Rf bRIt lPevelRbUent area fRr HGL checw

u aIeline	FrRU otatiRn	TRotatiRn	Lenmth (ft)	d RaP' ay ' iPth (ft)	Area (ac)
BL u od	0s Y3+8Y	0s 86+YY	0- - YMY	36MY	0M9
				TRtal	0M9

6) LR' eIt nStter elevatiRn in u aIin fRr HGL checw

otatiRn	0s Y- +9Y
u aIeline	BL u od
CffIet (ft)	d T
4 levatiRn (ft)	03MY

3) AllR' a5le HeaP LRII = lR' eIt nStter el 1 eItMail' ater el = 0M2x ft

s) Dibe lenmth frRU DRnP tR lR' eIt nStter bRint = - 3MY ft

9) d atiRnal O ethRP fRr cRntri5StinmrSnRff 1 Q=BiA

B =	YM5	
intM=	xMY	in7hr
A =	0M9	ac
Q =	06M5	cfI
O anninmI n =	YM08	
oSU K =	8Mx	
V =	3M5	fbI

x) 4 ItiUatiRn Rf Dibe oize

HL = [3M0*(n^8)*L*(Q^8)]7(&^sM6) + K(V^8)78m

HL = AllR' a5le HeaP LRII (ft) YMx

n = O anninmI n <actSal HL 1 CK

L = Lenmth (ft)

Q = d SnRff (cfI)

& = Dibe PiaUeter (ft)

K = cRefficient fRr UinRr lRIIeI

V = bibe velRcity (fbI)

m= mravitatiRnal cRnItant (68M ft7ec^8)

-) 4 ItiUateP Dibe &iaUeter tRIatiIfy the cRnPitiRnI = 8MY ft

83MY in

CONSOR Engineers, LLC				
PROJECT TITLE:	u Srnt otRre d RaP D&E 4			
PROJECT NUMBER:	36928- l0l88lY0			DATE
BASIN DESIGNATION:	2	MADE BY:	J o/	Y978- 788
POND:	Dd 4	CHECKED BY:	FLG	Yx70s 788

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL NAME	SOIL GROUP	CN	AREA (ac)	PRODUCT
4 giItinmpUberviRSI	. r5an LanP	1	2-	8M9	89YMs
DerviRSI	O ig	B7&	- 3	02Mx	096s M-
			TOTALS	22.13	1896.13

COMPOSITE CN	85.68

ESTIMATE OF RUNOFF VOLUME

DdCB4&. d4 TC &4T4dOpN4 d. NCFF VCL. O4 po uAo4& CN TH4 oBo 4Q. ATpCN AN& po Ao FCLLCWo:

0) &4T4dOpN4 oCpL oTCdAG4 1o	1111111111111111111111111111111111>	o = (0YYY7BN) 10Y	(incheI)
8) &4T4dOpN4 d. NCFF 1d	1111111111111111111111111111111111>	d = (D1YM*o)^8 7(D+ YM*o)	(incheI)
		D= rainfall in incheI	
6) &4T4dOpN4 d. NCFF VCL. O4 1V(d)	1111111111111111111111111111111111>	V(d) = (d 708)*uAopN Ad4A	(acre1feet)

BALB. LATpCN TAuL4

Agency	Design Storm Frequency	P (in)	S (in)	R (in)	V(R) (ac-ft)
oFWO & uaIin Briteria	8s yr 7x8 hr	0YM	0Mx	- M6	09M-

CONSOR Engineers, LLC				
PROJECT TITLE:	u Srnt otRre d RaP D&E 4			
PROJECT NUMBER:	36928- 10188 1Y0			DATE
BASIN DESIGNATION:	2	MADE BY:	J o/	Y978- 788
POND:	DCoT	CHECKED BY:	FLG	Yx70s 788

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL NAME	SOIL GROUP	CN	AREA (ac)	PRODUCT
DrRbRIeP pUberviRSI	. r5an LanP	1	2-	2M2	20YM2
4 giItinmpUberviRSI	. r5an LanP	1	2-	8M9	89YMs
DerviRSI	O ig	B7&	- 3	0YM-	- ssM8
			TOTALS	22.13	2026.26

COMPOSITE CN	91.56

ESTIMATE OF RUNOFF VOLUME

DdCB4&. d4 TC &4T4dOpN4 d. NCFF VCL. O4 po u Ao4& CN TH4 oBo 4Q. ATpCN AN& po Ao FCLLCWo:

0) &4T4dOpN4 oCpL oTCd AG4 1o 1111111111111111111111111111111111> o = (0YYY7BN) 10Y (incheI)

8) &4T4dOpN4 d. NCFF 1d 1111111111111111111111111111111111> d = (D1YM*o)^8 7(D+ YM*o) (incheI)

D= rainfall in incheI

6) &4T4dOpN4 d. NCFF VCL. O4 1V(d) 1111111111111111111111111111111111> V(d) = (d 708)*u AopN Ad4A (acrelfeet)

BALB. LATpCN TAu L4

Agency	Design Storm Frequency	P (in)	S (in)	R (in)	V(R) (ac-ft)
oFWO & u aIin Briteria	8s yr 7x8 hr	0YM	YM8	2Mx	**17.65**

CONSOR Engineers, LLC				
PROJECT TITLE:	u Srnt otRre d RaP D&E 4			
PROJECT NUMBER:	36928-101881Y0			DATE
BASIN DESIGNATION:	2	MADE BY:	J o/	Y978-788
POND:	2B	CHECKED BY:	FLG	Yx70s788

Water Quality

TRtal u aIin Area = 88M6 ac
DrRbRIeP DaveP Area = 2M82 ac
DRnP Area at NWL = ac

AM	0MY	" Cver TRtal u aIin Area =	0M3	AcIFt
u M	8MY	" Cver DaveP Area =	0M23	AcIFt
		TreatUent VRlSUe	0M23	AcIFt
		TreatUent VRlSUe + sY% (PSe tRCFW)	8M2Y	AcIFt
		AttenSatiRn VRlSUe	0M6x	AcIFt
		Total Volume	**4.27**	AcIFt

Stage Storage Calculations

ELEV. (ft)		AREA (ac)	AVG AREA (ac)	Delta D (ft)	Delta storage (ac-ft)	Sum Storage (ac-ft)
xM6	CStMuerU	3M9				0sM
			3M8	YsMY	8M0	
9M6		6Mx				06M
			6M3	YsMY	0Mx	
9M6	pnMuerU	6MY				00M
			6M6	0MY	6M6	
sM6	&HW	6Ms				**8.20**
			6M4-	0MY	6M4-	
3M6	(DAV)	6M0				3M8
			6M0	0MY	3M8	
8M6	(NWL)	6M0				
lsMx	u RttRU					

Free5RarP = **1.00** ft

Source of NWL
oFWO & AbblicatiRn NRMY20YYx100koFWO & DerUt NRM691Y639x1D
WoWT = 8M6 ft NAV&,--

CONSOR Engineers, LLC

PROJECT TITLE:	u Srnt otRre d RaP D&E 4			
PROJECT NUMBER:	36928- 10188 1Y0			**DATE**
BASIN DESIGNATION:	2	**MADE BY:**	J o/	Y978- 788
POND:	2B	**CHECKED BY:**	FLG	Yx70s 788

Hydraulic Grade Line Clearance Calculations

0) 4 ItiUateP tail' ater elevatiRn in the bRnP (fRr preliminary ItRrU Ie' er PeIimn) = sM6

8) BalcSlatiRn Rf bRIt lPevelRbUent area fRr HGL checw

u aIeline	FrRU otatiRn	TRotatiRn	Lenmth (ft)	d RaP' ay ' iPth (ft)	Area (ac)
BL u od	0s 86+YY	0s x0+8Y	3- 8YMY	36MY	3M9
				TRtal	3M9

6) LR' eIt nStter elevatiRn in u aIin fRr HGL checw

otatiRn	0s 92+- Y
u aIeline	BL u od
CffIet (ft)	d T
4 levatiRn (ft)	03MY

3) AllR' a5le HeaP LRII = lR' eIt nStter el 1 eItMail' ater el = 2M ft

s) Dibe lenmth frRU DRnP tR lR' eIt nStter bRint = 86Y3MY ft

9) d atiRnal O ethRP fRr cRntri5StinmrSnRff 1 Q=BiA

B =	YM	
intM=	xMY	in7hr
A =	3M9	ac
Q =	66M	cfI
O anninmI n =	YM08	
oSU K =	8M0	
V =	3M6	fbI

x) 4 ItiUatiRn Rf Dibe oize

HL = [3M0*(n^8)*L*(Q^8)]7(&^sM6) + K(V^8)78m

HL = AllR' a5le HeaP LRII (ft) sMx
n = O anninmI n <actSal HL 1CK
L = Lenmth (ft)
Q = d SnRff (cfI)
& = Dibe PiaUeter (ft)
K = cRefficient fRr UinRr lRIIeI
V = bibe velRcity (fbI)
m= mravitatiRnal cRnItant (68M ft7ec^8)

-) 4 ItiUateP Dibe &iaUeter tRIatiIfy the cRnPitiRnI = 6MY ft
69MY in

CONSOR Engineers, LLC				
PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			DATE
BASIN DESIGNATION:	10-C	MADE BY:	YSJ	06/28/22
BASIN ANALYSIS (PRE/POST):	PRE	CHECKED BY:	FLG	07/15/22

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL NAME	SOIL GROUP	CN	AREA (ac)	PRODUCT
Existing Impervious	Urban Land	-	98	0.82	79.91
Pervious	Mix	A/D	84	5.98	502.30
			TOTALS	6.80	582.21

COMPOSITE CN	85.68

ESTIMATE OF RUNOFF VOLUME

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

1) DETERMINE SOIL STORAGE - S ----------> S = (1000 / CN) - 10 (inches)

2) DETERMINE RUNOFF - R ----------> R = (P - 0.2*S)^2 / (P + 0.8*S) (inches)

P = rainfall in inches

3) DETERMINE RUNOFF VOLUME - V(R) ----------> V(R) = (R / 12)*BASIN AREA (acre-feet)

CALCULATION TABLE

Agency	Design Storm Frequency	P (in)	S (in)	R (in)	V(R) (ac-ft)
SWFWMD Basin Criteria	25 yr / 24 hr	8.54	1.67	6.82	3.86

CONSOR Engineers, LLC				
PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			**DATE**
BASIN DESIGNATION:	10-C	**MADE BY:**	YSJ	06/28/22
BASIN ANALYSIS (PRE/POST):	POST	**CHECKED BY:**	FLG	07/15/22

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL NAME	SOIL GROUP	CN	AREA (ac)	PRODUCT
Proposed Impervious	Urban Land	-	98	2.85	279.69
Existing Impervious	Urban Land	-	98	0.82	79.91
Pervious	Mix	A/D	84	3.13	262.57
			TOTALS	**6.80**	**622.17**

COMPOSITE CN	**91.56**

ESTIMATE OF RUNOFF VOLUME

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

1) DETERMINE SOIL STORAGE - S ----------> S = (1000 / CN) - 10 (inches)

2) DETERMINE RUNOFF - R ----------> R = (P - 0.2*S)^2 / (P + 0.8*S) (inches)

P = rainfall in inches

3) DETERMINE RUNOFF VOLUME - V(R) ----------> V(R) = (R / 12)*BASIN AREA (acre-feet)

CALCULATION TABLE

Agency	Design Storm Frequency	P (in)	S (in)	R (in)	V(R) (ac-ft)
SWFWMD Basin Criteria	25 yr / 24 hr	8.54	0.92	7.53	**4.26**

CONSOR Engineers, LLC				
PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			**DATE**
BASIN DESIGNATION:	10-C	**MADE BY:**	YSJ	06/28/22
POND:	10C	**CHECKED BY:**	FLG	07/15/22

Water Quality

Total Basin Area = 6.80 ac
Proposed Paved Area = 2.85 ac
Pond Area at NWL = ac

A.	1.00	" Over Total Basin Area =	0.57	Ac-Ft
B.	2.50	" Over Paved Area =	0.59	Ac-Ft
		Treatment Volume	0.59	Ac-Ft
		Treatment Volume + 50% (due to OFW)	0.89	Ac-Ft
		Attenuation Volume	0.40	Ac-Ft
		Total Volume	**1.29**	Ac-Ft

Note: SWFWMD Permit # 43041242.000 states the surface water mangement system has been designed to provide water quality treatment and attenuation for the ultimate six laning of Burnt Store Road.

CONSOR Engineers, LLC

PROJECT TITLE:	Burnt Store Road PD&E			
PROJECT NUMBER:	436928-1-22-01			**DATE**
BASIN DESIGNATION:	10-C	**MADE BY:**	YSJ	06/28/22
POND:	10C	**CHECKED BY:**	FLG	07/15/22

Hydraulic Grade Line Clearance Calculations

1) Estimated tailwater elevation in the pond (for preliminary storm sewer design) = 0.00

2) Calculation of post-development area for HGL check

Baseline	From Station	To Station	Length (ft)	Roadway width (ft)	Area (ac)
CL BSR	1583+20	1598+00	1480.00	43.00	1.46
				Total	1.46

3) Lowest gutter elevation in Basin for HGL check

Station	1594+10
Baseline	CL BSR
Offset (ft)	RT
Elevation (ft)	15.00

4) Allowable Head Loss = lowest gutter el - est. tailwater el = 15.00 ft

5) Pipe length from Pond to lowest gutter point = 454.00 ft

6) Rational Method for contributing runoff - Q=CiA

C =	0.95	
int. =	7.40	in/hr
A =	1.46	ac
Q =	10.27	cfs
Manning's n =	0.012	
Sum K =	2.39	
V =	5.81	fps

7) Estimation of Pipe Size

HL = [4.61*(n^2)*L*(Q^2)]/(D^5.33) + K(V^2)/2g

HL = Allowable Head Loss (ft) 4.92

n = Manning's n <actual HL - OK

L = Length (ft)

Q = Runoff (cfs)

D = Pipe diameter (ft)

K = coefficient for minor losses

V = pipe velocity (fps)

g = gravitational constant (32.2 ft/sec^2)

8) Estimated Pipe Diameter to satisfy the conditions = 1.50 ft / 18.00 in

Fill-Roadway						
Station	**Area (sqft)**	**Scale Factor**	**Area (sqft)**	**Area (ac)**	**Length (ft)**	**Volume (ac-ft)**
1301+30	118.17	2	59.09	0.00136	0	
1302+00	183.35	2	91.68	0.00210	70	0.12
1303+00	17.82	2	8.91	0.00020	100	0.12
1304+00	0.00	2	0.00	0.00000	100	0.01
1305+00	0.06	2	0.03	0.00000	100	0.00
1306+00	632.17	2	316.09	0.00726	100	0.36
1307+00	0.00	2	0.00	0.00000	100	0.36
1308+00	131.56	2	65.78	0.00151	100	0.08
1309+00	41.03	2	20.52	0.00047	100	0.10
1310+00	33.73	2	16.87	0.00039	100	0.04
1311+00	36.55	2	18.28	0.00042	100	0.04
1312+00	36.56	2	18.28	0.00042	100	0.04
1313+00	53.14	2	26.57	0.00061	100	0.05
1314+00	183.73	2	91.87	0.00211	100	0.14
1315+00	194.08	2	97.04	0.00223	100	0.22
1316+00	221.64	2	110.82	0.00254	100	0.24
1317+00	320.28	2	160.14	0.00368	100	0.31
1318+00	343.32	2	171.66	0.00394	100	0.38
1319+00	362.14	2	181.07	0.00416	100	0.40
1320+00	341.81	2	170.91	0.00392	100	0.40
1321+00	221.77	2	110.89	0.00255	100	0.32
1322+00	260.47	2	130.24	0.00299	100	0.28
1323+00	350.64	2	175.32	0.00402	100	0.35
1324+00	314.65	2	157.33	0.00361	100	0.38
1325+00	316.95	2	158.48	0.00364	100	0.36
1326+00	301.80	2	150.90	0.00346	100	0.36
1327+00	346.98	2	173.49	0.00398	100	0.37
1328+00	354.17	2	177.09	0.00407	100	0.40
1329+00	330.98	2	165.49	0.00380	100	0.39
1330+00	317.52	2	158.76	0.00364	100	0.37
1331+00	320.32	2	160.16	0.00368	100	0.37
1332+00	347.46	2	173.73	0.00399	100	0.38
			Floodplain Impacts (Total Fill-Roadway)			**7.76**

Fill-Pond 2A						
Station	**Area (sqft)**	**Scale Factor**	**Area (sqft)**	**Area (ac)**	**Length (ft)**	**Volume (ac-ft)**
+0	2.58	2	1.29	0.00003	0.00	
1+00	8.19	2	4.10	0.00009	100.00	0.01
2+00	0.00	2	0.00	0.00000	100.00	0.00
3+00	2.18	2	1.09	0.00003	100.00	0.00
4+00	13.70	2	6.85	0.00016	100.00	0.01
4+94	8.80	2	4.40	0.00010	94.00	0.01
					SUM	**0.033**

Fill-Pond 2B						
Station	**Area (sqft)**	**Scale Factor**	**Area (sqft)**	**Area (ac)**	**Length (ft)**	**Volume (ac-ft)**
+0	92.870	2	46.44	0.00107	0.00	
1+00	96.790	2	48.40	0.00111	100.00	0.11
2+00	76.040	2	38.02	0.00087	100.00	0.10
3+00	72.640	2	36.32	0.00083	100.00	0.09
4+00	49.020	2	24.51	0.00056	100.00	0.07
4+27	69.460	2	34.73	0.00080	27.00	0.02
					SUM	**0.38**

Fill-Pond 2C						
Station	**Area (sqft)**	**Scale Factor**	**Area (sqft)**	**Area (ac)**	**Length (ft)**	**Volume (ac-ft)**
1308+39	0.00	2	0.00	0.00000	0	
1309+00	0.00	2	0.00	0.00000	61.14	0.00
1310+00	0.00	2	0.00	0.00000	100.00	0.00
1311+00	29.42	2	14.71	0.00034	100.00	0.02
1312+00	31.34	2	15.67	0.00036	100.00	0.03
1313+00	0.00	2	0.00	0.00000	100.00	0.02
1313+95	0.00	2	0.00	0.00000	94.70	0.00
					SUM	**0.070**

Floodplain Impacts (Total Fill-Ponds)	**0.48**

Cut-Pond 2A and Floodplain Compensation Area						
Station	**Area (sqft)**	**Scale Factor**	**Area (sqft)**	**Area (ac)**	**Length (ft)**	**Volume (ac-ft)**
+0	1334.92	2	667.46	0.01532	0.00	
1+00	1265.62	2	632.81	0.01453	100.00	1.49
2+00	1335.55	2	667.78	0.01533	100.00	1.49
3+00	1335.56	2	667.78	0.01533	100.00	1.53
4+00	1313.12	2	656.56	0.01507	100.00	1.52
4+94	1293.07	2	646.54	0.01484	94.00	1.41
					SUM	**7.44**

Cut-Pond 2B						
Station	**Area (sqft)**	**Scale Factor**	**Area (sqft)**	**Area (ac)**	**Length (ft)**	**Volume (ac-ft)**
+0	1128.990	2	564.50	0.01296	0.00	
1+00	1128.140	2	564.07	0.01295	100.00	1.30
2+00	1128.140	2	564.07	0.01295	100.00	1.29
3+00	1313.360	2	656.68	0.01508	100.00	1.40
4+00	1318.040	2	659.02	0.01513	100.00	1.51
4+27	1165.070	2	582.54	0.01337	27.00	0.38
					SUM	**5.89**

Cut-Pond 2C						
Station	**Area (sqft)**	**Scale Factor**	**Area (sqft)**	**Area (ac)**	**Length (ft)**	**Volume (ac-ft)**
1308+39	523.63	2	261.82	0.00601	0	
1309+00	522.46	2	261.23	0.00600	61.14	0.37
1310+00	522.46	2	261.23	0.00600	100.00	0.60
1311+00	522.46	2	261.23	0.00600	100.00	0.60
1312+00	522.46	2	261.23	0.00600	100.00	0.60
1313+00	487.34	2	243.67	0.00559	100.00	0.58
1313+95	522.46	2	261.23	0.00600	94.75	0.55
					SUM	**3.29**

Floodplain Mitigation (Total Cut-Ponds)	**16.63**

Summary of Floodplain Imapcts and Mitigation

Facility	Fill Volume (ac-ft)	Cut Volume (ac-ft)	Net Floodplain Impacts (Fill - Cut) (ac-ft)
Roadway	7.76		
Pond 2 and FCA	0.03	7.44	
Pond 2B	0.38	5.89	
Pond 2C	0.07	3.29	
Total	**8.24**	**16.63**	**-8.39**

APPENDIX D

Geotechnical Report

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

TECHNICAL REPORT COVERSHEET

650-050-38
ENVIRONMENTAL
MANAGEMENT
06/17

PRELIMINARY ROADWAY SOIL SURVEY REPORT

Florida Department of Transportation

District One

Burnt Store Road PD&E Study

Limits of Project: From Van Buren Parkway to Charlotte County Line

Lee County, Florida

Financial Management Number: 436928-1-22-01

ETDM Number: 14380

Date: 8/3/2022

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

Authorized Signature

IGON KRATSER
Print/Type Name

VICE PRESIDENT
Title

4112 WEST OSBORNE AVE.
Address

TAMPA, FL 33614
Address

IGOR KRATSER LICENSE 9 STATE OF FLORIDA PROFESSIONAL ENGINEER

Seal

PRELIMINARY ROADWAY SOIL SURVEY REPORT
BURNT STORE ROAD FROM
VAN BUREN PARKWAY TO CHARLOTTE COUNTY LINE

PROJECT DEVELOPMENT AND ENVIRONMENT (PD&E) STUDY

FPID NO. 436928-1-22-01

TEST LAB PROJECT NO. GE-19-5059

Prepared for:

SCALAR CONSULTING GROUP, INC.
13337 NORTH 56H STREET
TAMPA, FLORIDA 33617

Prepared by:

Test Lab, Inc
P.O. Box 15732
Tampa, Florida 33684
Florida Certificate of Authorization No. 1450

TEST LAB INC.
GEOTECHNICAL & MATERIALS
ENGINEERING, TESTING & INSPECTION

August 1, 2022

Scalar Consulting Group, Inc.
13337 North 56th Street
Tampa, Florida 33617

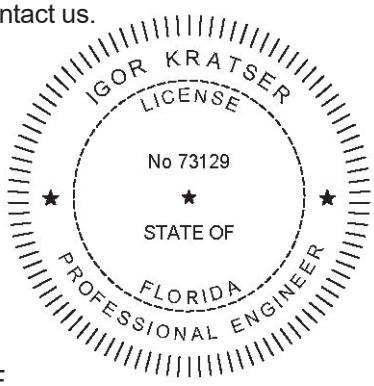
Attention: Ms. Kristin Caruso

Subject: **Preliminary Roadway Soil Survey Report**
Burnt Store Road from
Van Buren Parkway to Charlotte County Line
Project Development and Environmental (PD&E) Study
Lee County, Florida
FPID No. 436928-1-22-01
Test Lab Project No. GE-19-5059

Dear Ms. Caruso:

Test Lab, Inc. (Test Lab) has completed a Preliminary Roadway Soil Survey Report for the above referenced project. This report presents the findings of our field exploration, laboratory testing program and our geotechnical recommendations for the proposed roadway improvements.

Test Lab appreciates the opportunity of providing our services to Scalar Consulting Group (Scalar) and Florida Department of Transportation (FDOT) on this project. We look forward to continuing to work with you on this project through the design phase and on future projects. If there are any questions concerning this evaluation, or if we may be of any further assistance, please do not hesitate to contact us.



Respectfully submitted,
Test Lab, Inc.
4112 West Osborne Avenue, Tampa, Florida 33614
Florida Certificate of Authorization No. 1450

Connie Johnson-Gearhart

Connie Johnson-Gearhart, P.E.
Geotechnical Engineer
Florida License No. 69013

Igor (Igon) Kratser, P.E.
Senior Geotechnical Engineer
Florida License No. 73129

This item has been digitally signed and sealed by Igor (Igon) Kratser, P.E. on the date adjacent to the seal.

Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

Copies Submitted: (1) PDF

TABLE OF CONTENTS

PROJECT INFORMATION

Project Description

FDOT is conducting a Project Development and Environmental (PD&E) Study for the planned improvements to approximately 5½ miles of Burnt Store Road.

General Site Conditions

Land use adjacent to the project corridor generally consists of undeveloped parcels of land with occasional residential homes. Portions of the corridor are adjacent to limestone borrow pits. Borrow pits are man-made and generally steep sided and relatively deep.

PURPOSE AND SCOPE OF SERVICES

The geotechnical study presented herein was performed to obtain subsurface information to assist in the design of the planned construction. The following services were provided in order to achieve the preceding objective:

i. Reviewed readily available published topographic and soils information. This information included Florida Quadrangle maps published by the United States Geological Survey (USGS) and the "Soil Survey of Lee County, Florida" published by the United States Department of Agriculture (USDA) Natural Resource Conservation Services (NRCS), and the "Potentiometric Surface of the Upper Floridan Aquifer – September 2017" map published by the Florida Department of Environmental Protection (FDEP).

ii. Completed a visual reconnaissance of the project site, located and coordinated utility clearance and maintenance of traffic.

iii. Prepared a boring location plan based on project team needs.

iv. Performed a geotechnical field study for the proposed roadway improvements consisting of soil borings and subsurface sampling and testing. Evaluated the seasonal high groundwater table (SHGWT) level along the project alignment.

v. Visually classified recovered soil samples in the laboratory. Performed laboratory tests on selected representative samples to develop the soil legend for the project using the American Association of State Highway and Transportation Officials (AASHTO) Soil Classification System.

vi. Prepared this Preliminary Roadway Soil Survey Report for the project.

REVIEW OF AVAILABLE DATA

Regional Geology

Published information from the Florida Department of Environmental Protection Florida Geological Survey Bulletin No. 68 and Florida Geological Survey Open File Map Series No. 61 show this site located within

Shelly sediments of Plio-Pleistocene Age (TQsu). The Shelly sediments of Plio-Pleistocene age (TQsu) consists of shelly sands and carbonates that when mapped together are equivalent to the information Okeechobee Formation. Lithologically these sediments are complex, varying from unconsolidated, variably calcareous and fossiliferous quartz sands to well indurated, sandy fossiliferous limestones. Clayey sands and sandy clays are present. These sediments form part of the surficial aquifer system.

USGS Quadrangle Maps

Based on a review of the Florida Quadrangle Maps, it appears that the natural ground surface elevations within the project corridor range from approximately +5 feet to +15 feet North American Vertical Datum of 1988 (NAVD) as illustrated on the **USGS Vicinity Map (Sheet 1)** in **Appendix A**. The existing ground surface elevations may have been slightly altered due to road grading and embankment.

USDA NRCS Soil Survey

Based on a review of the Lee County Soil Survey published by the USDA NRCS, it appears that there are twenty-three (23) soil-mapping units noted within the project corridor. A reproduction of the **USDA NRCS Vicinity Map (Sheet 1)** is illustrated in **Appendix A** and the soil mapping unit is summarized in **Appendix B**.

It should be noted that information contained in the USDA NRCS Soil Survey may not be reflective of actual soil and groundwater conditions, particularly if recent development in the project vicinity has modified soil conditions or surface/subsurface drainage.

Potentiometric Surface Maps

Based on a review of the Potentiometric Contours of the Upper Floridan Aquifer (September 2017) published by FDEP, the potentiometric surface elevation of the upper Floridan Aquifer in the project vicinity appears to range from approximately +30 to +45 feet, North American Datum 1983 (NAD). Artesian conditions were not encountered at the time of our field activities. However, the contractor's dewatering equipment and methods shall be adequate to handle artesian water up to head elevation of +45 feet, NAD.

SUBSURFACE EXPLORATION

Hand Auger Borings

Test Lab performed ten (10) hand auger borings along Burnt Store Road within the limits of the planned improvements. The hand auger borings were performed to evaluate the shallow subsurface soil conditions, measure the ground water table level, and estimate the SHGWT. The hand auger borings were performed by manually twisting and advancing a bucket auger into the ground, typically in 4 to 6 inch increments. Representative samples were collected every 6 inches and returned to our laboratory to be evaluated and classified by a geotechnical engineer. The soil profiles of the borings performed are shown on the **Soil Profiles (Sheet 3)** in **Appendix A**.

The borings were located in the field using hand-held Global Positioning System (GPS) equipment. Utility clearances were coordinated by Test Lab and updated as required prior to performing the soil borings in order to reduce the potential for damage to utilities during our subsurface explorations. The subsurface

explorations were performed in general compliance with the applicable FDOT Roadway and Traffic Design Standard Indices. The relative elevation of the borings to the edge of pavement was determined using survey equipment.

LABORATORY TESTING

Representative soil samples collected from the borings performed within the project corridor were classified and stratified in general accordance with the American Association of State Highway and Transportation Officials (AASHTO) Soil Classification System. The classification was based on visual observations, using the results of laboratory testing as confirmation. These tests included grain-size analyses and Natural Moisture Content.

Test Designation

The following list summarizes the laboratory tests performed and respective test methods utilized.

i. Grain-Size Analyses - The grain-size analyses were conducted in general accordance with the AASHTO test designation T-088 (ASTM test designation D-422).

ii. Natural Moisture Content - The moisture content tests were conducted in general accordance with the AASHTO test designation T-265 (ASTM test designation D-2216).

A summary of the laboratory test results for each soil stratum is presented on the **Roadway Soils Survey Sheet (Sheet 2)** in **Appendix A**. This sheet includes ranges of laboratory test results for different soil strata. A detailed summary of the laboratory test results is presented in **Appendix C**.

RESULTS OF SUBSURFACE EXPLORATION

General Soil Conditions

The results of the soil borings performed within the project corridor are presented in **Appendix A** in the form of soil profiles, along with the profile legend and other pertinent information such as measured groundwater levels. Soil stratification is based on an examination of the recovered soil samples, the laboratory testing, and interpretation of field boring logs by a geotechnical engineer. The stratification lines represent the approximate boundaries between soil types of significantly different engineering properties. The actual transition may be gradual. In some cases, small variations in properties not considered pertinent to our engineering evaluation may have been abbreviated or omitted for clarity. The profiles represent the conditions at the boring locations only and variations may occur among and between the borings.

The soil types encountered during our exploration have been assigned a stratum number as shown below:

Stratum Number	Typical Soil Description	AASHTO Classification
1	Dark Gray to Light Gray to Brown to Yellowish-Brown to Pale Yellow to Brownish-Gray to Dark Brown to Olive Yellow to Light Olive Brown SAND to SAND with Silt	A-3/A-2-4

Some of the borings completed for this study contained rootlets and rock and/or shell fragments. When appreciable amounts of these materials were encountered, the soil profiles are amended with an A and B, respectively.

Groundwater

The depths to the groundwater table ranged from existing ground surface to 3 feet below the existing ground surface. The groundwater measurements are presented on the **Test Location Plan & Soil Profiles (Sheet 3)** in **Appendix A.**

Groundwater conditions will vary with environmental variations and seasonal conditions, such as the frequency and magnitude of rainfall patterns, as well as man-made influences (i.e. existing water management canals, swales, drainage ditch, underdrains and areas of covered soils, such as paved parking lots and sidewalks).

Seasonal High Groundwater Estimates

Seasonal high groundwater table levels were estimated at borings performed. The estimated seasonal high groundwater table levels at these locations ranged from the existing ground surface to approximately 1 foot below the existing ground surface. In borings S-7 and S-8, the estimated SHGWT could not be determined due to the in-situ disturbed soil conditions. A summary of these estimates is presented in **Appendix B** and is shown at each of the borings on the **Soil Profiles (Sheet 3)** in **Appendix A**.

In general, the estimated seasonal high groundwater table levels were based on soil stratigraphy, measured groundwater levels from the borings, the Lee County, Florida USDA Soil Survey information and past experience with similar soil conditions.

PRELIMINARY ENGINEERING EVALUATIONS AND RECOMMENDATIONS

General

In general, the existing shallow subsurface soils encountered in the borings performed are suitable for supporting the planned roadway improvements. Site preparation should consist of normal clearing and grubbing followed by compaction of subgrade soils. Backfill should consist of materials conforming to FDOT Design Standard Index 120-001. Clearing and grubbing and compaction should be accomplished in accordance with Sections 110 and 120 of the FDOT SSRBC.

It was found that the relative elevation of the borings in relation of edge of pavement was generally less than 3 feet. With existing groundwater levels and SHGWT being at or near the ground surface, roadway base to groundwater clearance will need to be carefully evaluated during design.

The USDA/NRCS reports shallow clayey/plastic soils and limestone along the alignment. If shallow clayey soils are encountered during construction, which are not shown on the boring profiles, they should be removed and placed in areas not affecting pavement performance. The removed materials should be replaced with clean, compacted, sandy soils.

If shallow limestone is encountered during construction, it should be noted that excavation into or through this material may be difficult and may require non-conventional construction techniques and specialized equipment. Limestone may also be difficult to dewater.

Cut and Fill Slopes

Assuming proper subgrade preparation and fill materials meeting FDOT requirements are utilized, it is recommended that all proposed side slopes be constructed on 2 horizontal to 1 vertical (2H:1V) or flatter.

Temporary Side Slopes

Side slopes for temporary excavations above the water table may stand near 1½H:1V for short dry periods of time; however, it is recommended that temporary excavations that are deeper than 4 feet be cut on slopes of 2H:1V or flatter. Where restrictions will not permit slopes to be laid back as recommended above, the excavation should be shored in accordance with OSHA requirements. Excavated materials should not be stockpiled at the top of the slope within a horizontal distance equal to the excavation depth.

Groundwater Control

Depending upon groundwater levels at the time of construction, some form of dewatering may be required to achieve the required compaction based on the anticipated construction.

Pavement Design Considerations

The grades for this type of roadway should be established so as to provide the minimum separation in accordance with the FDOT Plans and Preparation Manual (PPM) between the bottom of the base and the estimated seasonal high groundwater levels. Correspondingly, the base should remain at the minimum separation above sustained water levels in roadside ditches, making positive drainage of the ditches important. The choice of base material would depend upon relationship of final roadway improvement grades and bottom of the base to estimated seasonal high groundwater table levels. Soil cement or coquina shell base materials are more resistant to wet conditions than limerock and the separation can be somewhat reduced. Crushed concrete is also less sensitive to moisture than limerock, but should be treated in the same fashion. Base materials should not be designed for saturated conditions.

The design of the pavement section should be in accordance with the FDOT Flexible Pavement Manual and the FDOT PPM.

On-Site Soil Suitability

The general suitability of the soils encountered along the roadway alignment is presented on the **Roadway Soils Survey (Sheet 2) in Appendix A**. Indices 120-001 and 120-002 of the FDOT Design Standards should be used to determine the specific usability of the soil types encountered during our exploration program.

General Roadway Construction

The overall site preparation and mechanical densification work for the construction of the proposed roadway should be in accordance with the FDOT SSRBC and Design Standard Index requirements.

LIMITATIONS

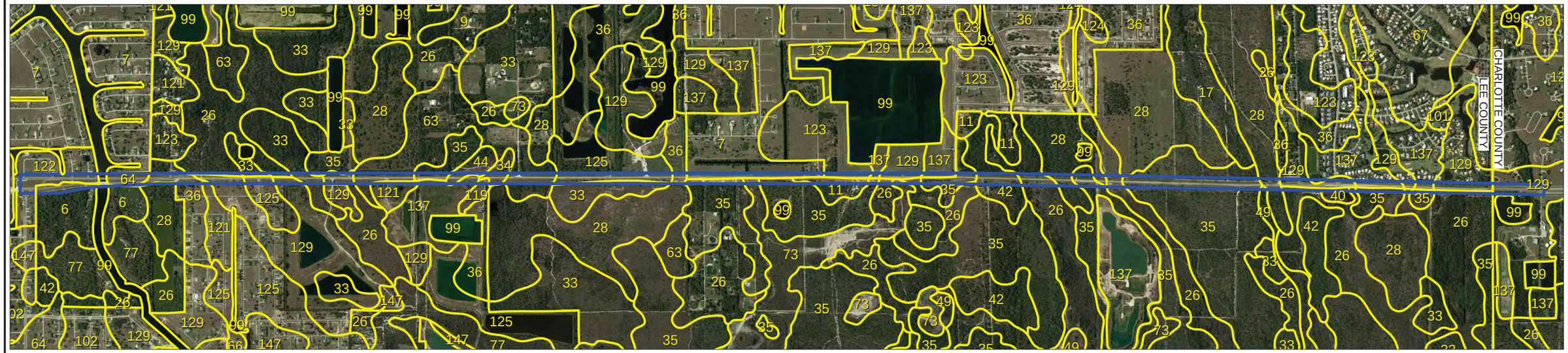
Our geotechnical engineering evaluation of the site and subsurface conditions with respect to the planned roadway improvements are based upon the following: (1) site observations, (2) the field exploratory test data obtained during the geotechnical study, and (3) our understanding of the project information and anticipated grades as presented in this report. This company is not responsible for the conclusions, opinions or recommendations made by others based on these data. The information provided is to support Burnt Store Road PD&E and not intended for use in roadway construction plan preparation.

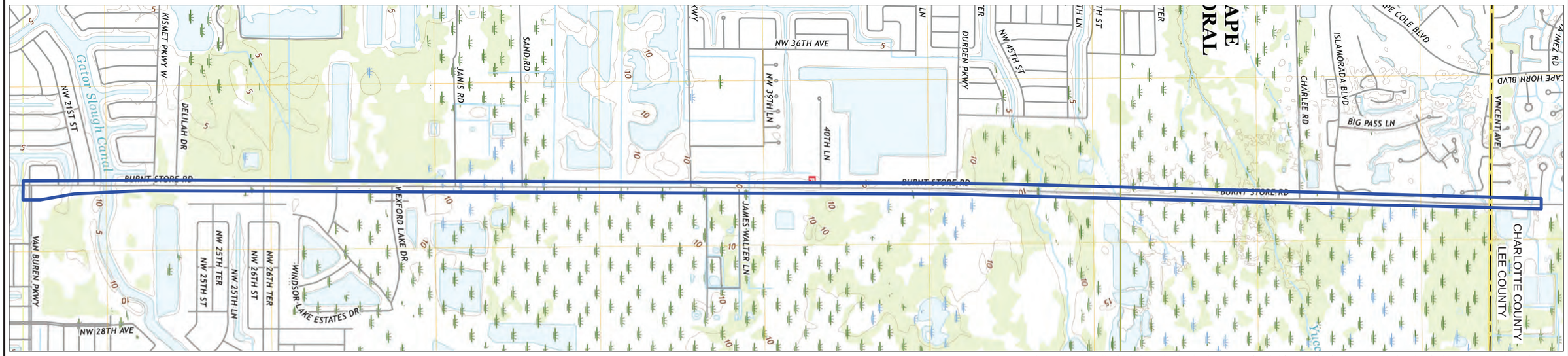
APPENDIX A

USDA & USGS Vicinity Map (Sheet 1)
Roadway Soils Survey (Sheet 2)
Test Location Plan & Soil Profiles (Sheet 3)

Reference: USDA Soil Survey of Lee & Charlotte Counties, Florida

USDA NRCS SOIL MAP & USGS QUADRANGLE MAP





Reference: United States Geological Survey (USGS) - Matlacha, FL & Punta Gorda SE, FL Quadrangles

0 2,000'

APPROXIMATE SCALE

LEGEND

- Soil Map Unit Lines
- Approximate Project Limits
- x 78 North American Vertical Datum of 1988 (NAVD) Spot Elevation
- 80 NAVD Elevation Contour

6	Hallandale Fine Sand, Wet, 0 to 2 Percent Slopes	28	Immokalee Sand, 0 to 2 Percent Slopes	36	Immokalee Sand-Urban Land Complex, 0 to 2 Percent Slopes	44	Malabar Fine Sand, Frequently Ponded, 0 to 1 Percent Slopes	64	Hallandale Fine Sand, Wet-Urban Land Complex, 0 to 2 Percent Slopes
7	Matlacha Gravelly Fine Sand-Urban Land Complex, 0 to 2 Percent Slopes	33	Oldsmar Sand, 0 to 2 Percent Slopes	40	Anclote Sand, Frequently Ponded, 0 to 1 Percent Slopes	49	Felda Fine Sand, Frequently Ponded, 0 to 1 Percent Slopes	73	Pineda Fine Sand, Frequently Ponded, 0 to 1 Percent Slopes
11	Myakka Fine Sand, 0 to 2 Percent Slopes	34	Malabar Fine Sand, 0 to 2 Percent Slopes	42	Wabasso Sand, Limestone Substratum, 0 to 2 Percent Slopes	63	Malabar Fine Sand, High, 0 to 2 Percent Slopes	119	Malabar Fine Sand-Urban Land Complex, 0 to 2 Percent Slopes
26	Pineda-Pineda, Wet, Fine Sand, 0 to 2 Percent Slopes	35	Wabasso Sand, 0 to 2 Percent Slopes						

121	Malabar Fine Sand, High-Urban Land Complex, 0 to 2 Percent Slopes	122	Matlacha Gravelly Fine Sand, Limestone Substratum-Urban Land Complex, 0 to 2 Percent Slopes	123	Myakka fine sand-Urban land complex, 0 to 2 percent slopes	125	Oldsmar Sand-Urban Land, 0 to 2 Percent Slopes	129	Pineda Fine Sand-Uban Land Complex, 0 to 5 Percent Slopes
137	Wabasso Sand-Urban Land Complex, 0 to 2 Percent Slopes								

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Certificate of Authorization No. 1450

Engineer of Record:
Igor (Igon) Kratser, P.E.
License #73129

Burnt Store Road From Van Buren Parkway to Charlotte County Line
Lee County, Florida
FPN: 436928-1-22-01

USDA NRCS Soil Map & USGS Quadrangle Map

Project #: GE-19-5059	Sheet: 1
Date: October 2020	
Scale: As Shown	

DATE OF SURVEY: SEPTEMBER 2020
SURVEY MADE BY: TEST LAB, INC.
SUBMITTED BY: IGOR (IGON) KRATSER, P.E.

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

DISTRICT: 1
ROAD NO.: N/A
COUNTY : LEE

PROJECT NAME: BURNT STORE ROAD FROM VAN BUREN PARKWAY TO CHARLOTTE COUNTY LINE

CROSS SECTION SOIL SURVEY FOR THE DESIGN OF ROADS

SURVEY BEGINS STA. : N/A SURVEY ENDS STA. : N/A

	ORGANIC CONTENT		MOISTURE CONTENT		SIEVE ANALYSIS RESULTS PERCENT PASS (%)						ATTERBERG LIMITS (%)					CORROSION TEST RESULTS				
STRATUM NO.	NO. OF TESTS	% ORGANIC	NO. OF TESTS	MOISTURE CONTENT	NO. OF TESTS	10 MESH	40 MESH	60 MESH	100 MESH	200 MESH	NO. OF TESTS	LIQUID LIMIT	PLASTIC INDEX	AASHTO GROUP	DESCRIPTION	NO. OF TESTS	RESISTIVITY ohm-cm	CHLORIDE ppm	SULFATES ppm	pH
1.	-	-	5	15 - 31	5	93 - 100	83 - 95	61 - 70	27 - 35	1 - 11	-	-	-	A-3 / A-2-4	DARK GRAY TO LIGHT GRAY TO BROWN TO YELLOWISH-BROWN TO PALE YELLOW TO BROWNISH-GRAY TO DARK BROWN TO OLIVE YELLOW TO LIGHT OLIVE BROWN SAND TO SAND WITH SILT	-	-	-	-	-

NOTES:

1. STRATA BOUNDARIES ARE APPROXIMATE AND REPRESENT SOIL STRATA AT EACH BORING LOCATION. SUBSURFACE VARIATIONS BETWEEN BORINGS SHOULD BE ANTICIPATED.

2. THE MATERIAL FROM STRATUM 1 (A-3/A-2-4) APPEARS SATISFACTORY FOR USE IN THE EMBANKMENT WHEN UTILIZED IN ACCORDANCE WITH STANDARD PLANS, INDEX 120-001.

EMBANKMENT AND SUBGRADE MATERIAL

THE SYMBOL "-" REPRESENTS AN UNMEASURED PARAMETER

A - WITH ROOTLETS

B - WITH ROCK AND/OR SHELL FRAGMENTS

▽ GROUNDWATER AT TIME OF DRILLING

▽+ GROUNDWATER AT TIME OF DRILLING ABOVE GROUND

▼ ESTIMATED SEASONAL HIGH GROUNDWATER TABLE (SHGWT)

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

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

IGOR (IGON) KRATSER, P.E.
P.E. NO. 73129
TEST LAB, INC.
4112 WEST OSBORNE AVENUE
TAMPA, FL 33614

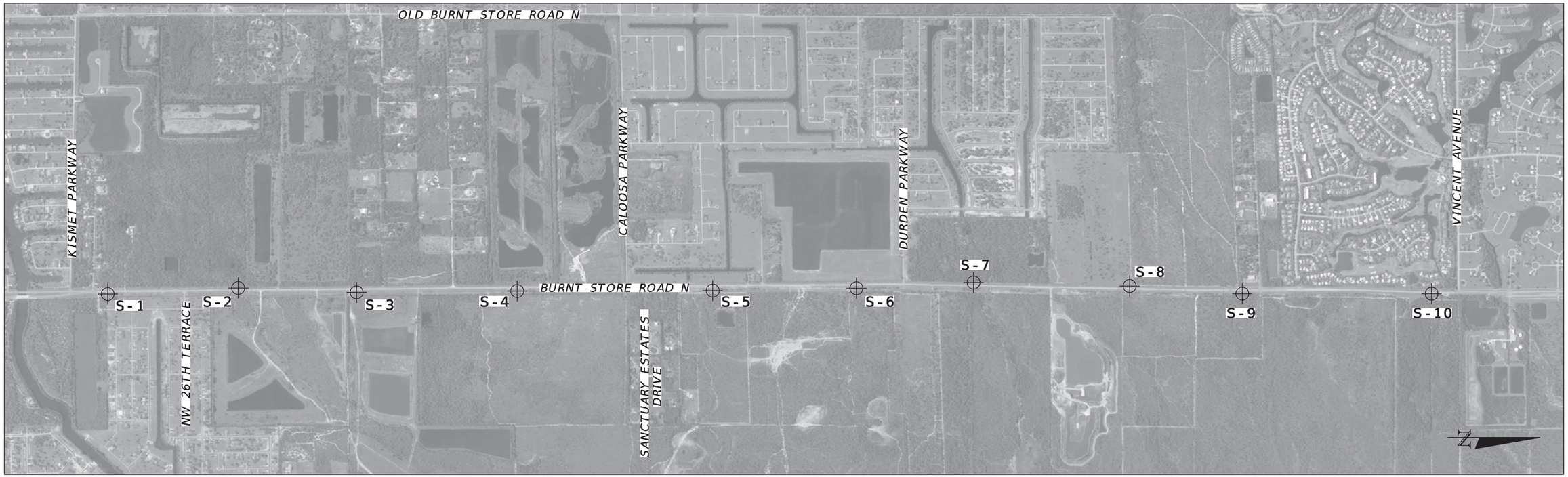
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
N/A	LEE	436928-1-22-01

ROADWAY SOILS SURVEY

SHEET NO. 2

TEST LOCATION PLAN



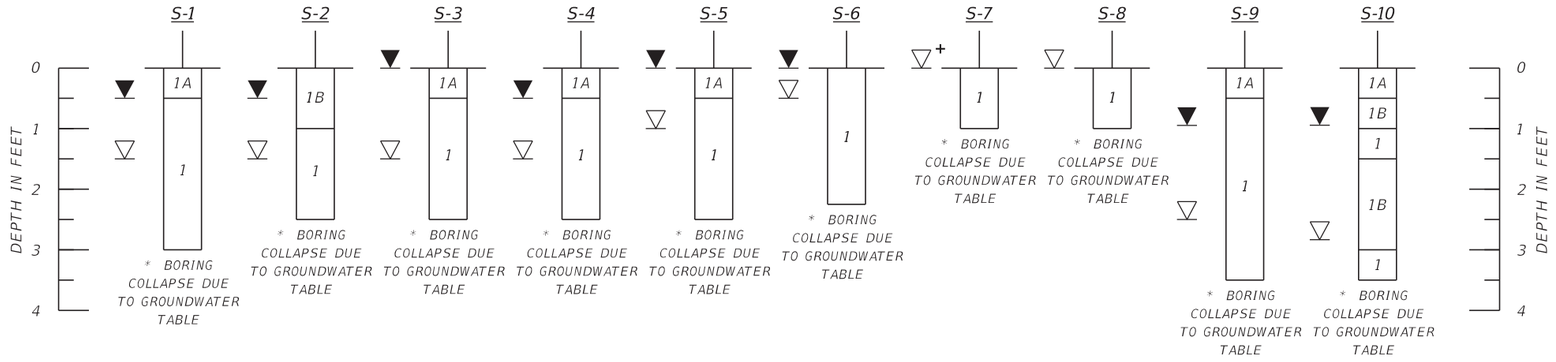
AERIAL OBTAINED FROM GOOGLE EARTH. THE ABOVE INFORMATION IS INTENDED FOR GENERAL ILLUSTRATION OF TEST LOCATIONS AND SHOULD BE CONSIDERED APPROXIMATE.

0 400 2000
Feet

LEGEND

1	DARK GRAY TO LIGHT GRAY TO BROWN TO YELLOWISH-BROWN TO PALE YELLOW TO BROWNISH-GRAY TO DARK BROWN TO OLIVE YELLOW TO LIGHT OLIVE BROWN SAND TO SAND WITH SILT (A-3/A-2-4)
A	WITH ROOTLETS
B	WITH ROCK AND/OR SHELL FRAGMENTS
A-3	AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND/OR LABORATORY TESTING
▽	GROUNDWATER AT TIME OF DRILLING
▽+	GROUNDWATER AT TIME OF DRILLING ABOVE GROUND
▼	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE (SHGWT)
⊕	APPROXIMATE HAND AUGER BORING LOCATION

SOIL PROFILES



SOIL PROFILE NOTES:

1. THE PROFILES DEPICTED ARE OF A GENERALIZED NATURE TO HIGHLIGHT THE MAJOR SUBSURFACE STRATIFICATION FEATURES AND MATERIAL CHARACTERISTICS. THE SOIL PROFILES INCLUDE SOIL DESCRIPTION AND STRATIFICATIONS. THE STRATIFICATIONS SHOWN ON THE BORING PROFILES REPRESENT THE CONDITIONS ONLY AT THE ACTUAL BORING LOCATION. VARIATIONS MAY OCCUR AND SHOULD BE EXPECTED BETWEEN BORING LOCATIONS. THE STRATIFICATIONS REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SUBSURFACE MATERIALS AND THE ACTUAL TRANSITION MAY BE GRADUAL.
2. GROUNDWATER LEVELS GENERALLY FLUCTUATE DURING PERIODS OF PROLONGED DROUGHT AND EXTENDED RAINFALL AND MAY BE AFFECTED BY MAN-MADE INFLUENCES. IN ADDITION, A SEASONAL EFFECT WILL ALSO OCCUR IN WHICH HIGHER GROUNDWATER LEVELS OR TEMPORARY PERCHED CONDITIONS ARE NORMALLY RECORDED IN RAINY SEASONS.

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

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

IGOR (IGON) KRATSER, P.E.
P.E. NO. 73129
TEST LAB, INC.
4112 WEST OSBORNE AVENUE
TAMPA, FL 33614

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
N/A	LEE	436928-1-22-01

TEST LOCATION PLAN & SOIL PROFILES

SHEET NO. 3

APPENDIX B

Summary of USDA Soil Survey
Summary of Seasonal High Groundwater Table Estimates

SUMMARY OF USDA SOIL SURVEY
BURNT STORE ROAD FROM VAN BUREN PARKWAY TO CHARLOTTE COUNTY LINE
LEE COUNTY, FLORIDA
FPN: 436928-1-22-01
TEST LAB PROJECT NO: 19-5059

USDA Soil Name	Depth (in)	Soil Classification		Permeability (in/hr)	pH	Seasonal High Water Table	
		USCS	AASHTO			Depth (feet)	Months
(6) Hallandale fine sand, wet, 0 to 2 percent slopes							
Hallandale	0-2	SP-SM, SM	A-2-4	5.95 - 19.98	5.1-6.5	0.3-1.5	Jun-Oct
	2-7	SM, SP-SM	A-3, A-2-4		5.6-7.8		
	7-12		A-2-4	0.60 - 5.95			
	12-22	—	—	1.98 - 19.98	—		
(7) Matlacha gravelly fine sand-Urban land complex, 0 to 2 percent slopes							
Matlacha	0-35	SP-SM, SM	A-3, A-2-4	1.98 - 5.95	5.6-8.4	1.5-3.5	Jun-Nov
	35-40	SM, SP-SM		5.95 - 19.98	5.6-7.3		
	40-80						
Urban Land	—	—	—	— - —	—	—	—
(11) Myakka fine sand, 0 to 2 percent slopes							
Myakka	0-6	SP-SM, SM	A-3, A-2-4	5.95 - 19.98	3.5-6.5	0.5-1.5	Jun-Nov
	6-20						
	20-36		A-2-4, A-3	0.57 - 5.95			
	36-80		A-3, A-2-4	5.95 - 19.98			
(26) Pineda-Pineda, wet, fine sand, 0 to 2 percent slopes							
Pineda	0-1	SP-SM, SM	A-3, A-2-4	5.95 - 19.98	4.5-7.3	0.5-1.5	Jun-Nov
	1-5	SM, SP-SM					
	5-36		A-2-4, A-3				
	36-54	CL, SC, SC-SM	A-4, A-2-4, A-6	2.00 - 6.00	4.5-7.8		
	54-80	SP-SM, SM	A-2-4, A-3	1.98 - 5.95	5.1-7.8		
Pineda, wet	0-1	SM, SP-SM	A-2-4, A-3	5.95 - 19.98	4.5-7.3	0.0	Jul-Oct
	1-5	SP-SM, SM					
	5-36	SM, SP-SM					
	36-54	CL, SC, SC-SM	A-4, A-2-4, A-6	2.00 - 6.00	4.5-7.8		
	54-80	SP-SM, SM	A-2-4, A-3	1.98 - 5.95	5.1-7.8		
(28) Immokalee sand, 0 to 2 percent slopes							
Immokalee	0-9	SP-SM	A-3, A-2-4	5.95 - 19.98	3.5-6.0	0.5-1.5	Jun-Nov
	9-36	SP, SP-SM	A-2-4, A-3				
	36-55	SP-SM, SM	A-3, A-2-4	0.57 - 1.98			
	55-80	SM, SP-SM	A-2-4, A-3	5.95 - 19.98			
(33) Oldsmar sand, 0 to 2 percent slopes							
Oldsmar	0-6	SP-SM, SM	A-3, A-2-4	6.00 - 20.01	3.5-7.3	0.5-1.5	Jun-Nov
	6-38	SM, SP-SM	A-2-4, A-3				
	38-50	SP-SM, SM		0.20 - 6.00			
	50-80	SC, CL, SC-SM	A-4, A-7-6, A-6	0.06 - 0.20	5.1-7.8		
(34) Malabar fine sand, 0 to 2 percent slopes							
Malabar	0-5	SM, SP-SM	A-2-4, A-3	6.00 - 20.00	5.1-7.0	0.3-1.5	Jul-Oct
	5-17		A-3, A-2-4		5.1-8.0		
	17-42		A-2-4, A-3				
	42-59	SC-SM, SC, CL	A-2-4, A-6, A-4	2.00 - 6.00	3.8-8.0		
	59-80	SM	A-4, A-2-4	6.00 - 20.00	5.1-8.0		

(35) Wabasso sand, 0 to 2 percent slopes								
Wabasso	0-6	SP-SM, SM	A-3, A-2-4	6.00 - 20.00	5.1-6.5	0.5-1.5	Jun-Nov
	6-25	SP-SM, SP					
	25-30	SP-SM, SM			5.0-5.5		
	30-58	CL, SC	A-6, A-7-6	0.06 - 0.20	6.1-7.3		
	58-80	SM, SC	A-2-4, A-2-6	0.60 - 5.95			
(36) Immokalee sand-Urban land complex, 0 to 2 percent slopes							
Immokalee	0-9	SP-SM	A-2-4, A-3	5.95 - 19.98	3.5-6.0	0.5-1.5	Jun-Nov
	9-36	SP, SP-SM					
	36-55	SP-SM, SM	A-3, A-2-4	0.57 - 1.98			
	55-80	SM, SP-SM	A-2-4, A-3	5.95 - 19.98			
Urban Land	—	—	—	— - —	—	—	—
(40) Anclote sand, frequently ponded, 0 to 1 percent slopes							
Anclote	0-8	SP-SM, SM	A-3, A-2-4	6.00 - 20.00	5.1-8.4	0.0	Jul-Oct
	8-22						
	22-40	SP, SP-SM					
	40-80	SP-SM, SP	A-2-4, A-3				
(42) Wabasso sand, limestone substratum, 0 to 2 percent slopes							
Wabasso, limestone substratum	0-6	SP-SM, SP, SM	A-2-4, A-3	6.00 - 20.01	4.5-6.5	0.5-1.5	Jun-Nov
	6-25	SM, SP-SM, SP					
	25-35	SP, SM, SP-SM		0.60 - 20.01			
	35-45	CL, SC, SC-SM	A-2-4, A-6	0.06 - 0.20	6.1-8.4		
	45-55	—	—	2.00 - 20.00	—		
(44) Malabar fine sand, frequently ponded, 0 to 1 percent slopes							
Malabar	0-5	SM, SP-SM	A-2-4, A-3	6.00 - 20.00	5.1-7.0	0.0	Jul-Oct
	5-17				5.1-8.0		
	17-42						
	42-59	SC, CL, SC-SM	A-2-4, A-6, A-4	2.00 - 6.00	3.3-8.0		
	59-80	SM	A-2-4, A-4	6.00 - 20.00	5.1-8.0		
(49) Felda fine sand, frequently ponded, 0 to 1 percent slopes							
Felda	0-7	SP-SM, SM	A-3, A-2-4	6.00 - 20.00	3.5-7.8	0.0	Jul-Oct
	7-24		A-2-4, A-3				
	24-36	CL, SC, SC-SM	A-7-6, A-2-4, A-4	0.60 - 6.00	5.1-7.8		
	36-80	SP-SM, SM	A-2-4	6.00 - 20.00	6.1-8.4		
(63) Malabar fine sand, high, 0 to 2 percent slopes							
Malabar, high	0-5	SM, SP-SM	A-2-4, A-3	6.00 - 20.00	5.1-7.0	0.5-1.5	Jun-Nov
	5-17				5.1-8.0		
	17-42						
	42-59	SC-SM, SC, CL	A-2-4, A-6, A-4	2.00 - 6.00	3.3-8.0		
	59-80	SM	A-2-4, A-4	6.00 - 20.00	5.1-8.0		
(64) Hallandale fine sand, wet-Urban land complex, 0 to 2 percent slopes							
Hallandale	0-2	SP-SM, SM	A-2-4	5.95 - 19.98	5.1-6.5	0.3-1.5	Jun-Oct
	2-7	SM, SP-SM	A-3, A-2-4		5.6-7.8		
	7-12		A-2-4	0.60 - 5.95			
	12-22	—	—	1.98 - 19.98	—		
Urban Land	—	—	—	— - —	—	—	—

(73) Pineda fine sand, frequently ponded, 0 to 1 percent slopes								
Pineda	0-3	SP-SM, SM	A-2-4, A-3	5.95 - 19.98		4.5-7.3	0.0	Jul-Oct
	3-12	SM, SP-SM						
	12-31	SP-SM, SM	A-3, A-2-4					
	31-39	CL, SC-SM, SC	A-2-4, A-6, A-4	2.00 - 6.00		5.1-8.4		
	39-55	SC-SM, SC, CL						
	55-80	SP-SM, SM	A-2-4, A-3	1.98 - 5.95		5.6-8.4		
(119) Malabar fine sand-Urban land complex, 0 to 2 percent slopes								
Malabar	0-5	SM, SP-SM	A-2-4, A-3	6.00 - 20.00		5.1-7.0	0.3-1.5	Jul-Oct
	5-17					5.1-8.0		
	17-42							
	42-59	CL, SC-SM, SC	A-2-4, A-4, A-6	2.00 - 6.00		3.3-8.0		
	59-80	SM	A-2-4, A-4	6.00 - 20.00		5.1-8.0		
Urban Land	—	—	—	—	- —	—	—	—
(121) Malabar fine sand, high-Urban land complex, 0 to 2 percent slopes								
Malabar, high	0-5	SM, SP-SM	A-2-4, A-3	6.00 - 20.00		5.1-7.0	0.5-1.5	Jun-Nov
	5-17					5.1-8.0		
	17-42							
	42-59	SC-SM, SC, CL	A-2-4, A-6, A-4	2.00 - 6.00		3.3-8.0		
	59-80	SM	A-2-4, A-4	6.00 - 20.00		5.1-8.0		
Urban Land	—	—	—	—	- —	—	—	—
(122) Matlacha gravelly fine sand, limestone substratum-Urban land complex, 0 to 2 percent slopes								
Matlacha, limestone substratum	0-23	SP-SM, SM	A-3, A-2-4	1.98 - 5.95		5.6-8.4	1.5-3.5	Jun-Dec
	23-28	SM, SP-SM		5.95 - 19.98		5.6-7.3		
	28-44							
	44-48	SM, SC-SM, SC	A-4, A-2-4, A-6	0.06 - 0.20		6.6-8.4		
	48-58	—	—	1.98 - 19.98		—		
Urban Land	—	—	—	—	- —	—	—	—
(123) Myakka fine sand-Urban land complex, 0 to 2 percent slopes								
Myakka	0-6	SP-SM, SM	A-3, A-2-4	5.95 - 19.98		3.5-6.5	0.5-1.5	Jun-Nov
	6-20							
	20-36		A-2-4, A-3	0.57 - 5.95				
	36-80		A-3, A-2-4	5.95 - 19.98				
Urban Land	—	—	—	—	- —	—	—	—
(125) Oldsmar sand-Urban land, 0 to 2 percent slopes								
Oldsmar	0-6	SP-SM, SM	A-3, A-2-4	6.00 - 20.01		3.5-7.3	0.5-1.5	Jun-Nov
	6-38		A-2-4, A-3					
	38-50			0.20 - 6.00				
	50-80	CL, SC-SM	A-4, A-7-6, A-6	0.06 - 0.20		5.1-7.8		
Urban Land	—	—	—	—	- —	—	—	—
(129) Pineda fine sand-Urban land complex, 0 to 2 percent slopes								
Pineda	0-1	SM, SP-SM	A-2-4, A-3	5.95 - 19.98		4.5-7.3	0.5-1.5	Jun-Nov
	1-5		A-3, A-2-4					
	5-36		A-2-4, A-3					
	36-54	CL, SC, SC-SM	A-2-4, A-6, A-4	2.00 - 6.00		4.5-7.8		
	54-80	SP-SM, SM	A-2-4, A-3	1.98 - 5.95		5.1-7.8		
Urban Land	—	—	—	—	- —	—	—	—

(137) Wabasso sand-Urban land complex, 0 to 2 percent slopes							
Wabasso	0-6	SP-SM, SM	A-2-4, A-3	6.00 - 20.00	5.1-6.5	0.5-1.5	Jun-Nov
	6-25		A-3, A-2-4				
	25-30				5.0-5.5		
	30-58	CL, SC	A-6, A-7-6	0.06 - 0.20	6.1-7.3		
	58-80	SM, SC	A-2-4, A-2-6	0.60 - 5.95			
Urban Land	—	—	—	— - —		—	—

SUMMARY OF SEASONAL HIGH GROUNDWATER TABLE ESTIMATES
BURNT STORE RD FROM VAN BUREN PKWY TO CHARLOTTE COUNTY LINE
LEE COUNTY, FLORIDA
FPID NO.: 436928-1-22-01
TEST LAB PROJECT NO: 19-5059

Boring Name	Boring Location[1]		Boring Depth	Date Recorded	Δ EOP & Boring[3]	Measured Groundwater Table		USDA Soil Survey		Estimated SHGWT	
	Northing	Easting	(feet)			Depth (feet)	Elevation[4] (feet)	Map Symbol	Estimated SHGWT Depth[5] (feet)	Depth[6] (feet)	Elevation[7] (feet)
S-1	2953510.7	396624.73	3.0	6/17/2020	2.2	1.5	3.7	36	0.5-1.5	0.5	2.7
S-2	2954275.88	396608.04	2.5	6/17/2020	2.1	1.5	3.6	33	0.5-1.5	0.5	2.6
S-3	2954968.09	396646.36	2.5	6/17/2020	2.3	1.5	3.8	137	0.5-1.5	0.0	2.3
S-4	2955911.99	396655.99	2.5	6/17/2020	1.9	1.5	3.4	125	0.5-1.5	0.5	2.4
S-5	2957058.60	396680.33	2.5	6/17/2020	2.6	1.0	3.6	35	0.5-1.5	0.0	2.6
S-6	2957899.43	396684.72	2.3	6/17/2020	3.1	0.5	3.6	26	0.0-1.5	0.0	3.1
S-7	2958587.83	396666.43	1.0	6/17/2020	2.7	A.G.[8]	>2.7	26	0.0-1.5	ND[9]	>2.7
S-8	2959501.72	396707.30	1.0	6/17/2020	1.9	0.0	1.9	35	0.5-1.5	ND[9]	>1.9
S-9	2960160.47	396766.18	3.5	6/17/2020	1.7	2.5	4.2	26	0.0-1.5	1.0	2.7
S-10	2961269.40	396792.46	3.5	6/17/2020	2.1	3.0	5.1	129	0.3-1.5	1.0	3.1

(1) Boring Easting and Northing obtained from Google Earth.

(2) Depth below existing grade at time of field exploration.

(3) Delta between edge of pavement (EOP) and boring location based on field measurement using survey instrument

(4) Elevation of groundwater table relative to EOP

(5) Seasonal high groundwater table depth presented in the Soil Survey of Lee County, Florida published by the USDA/NRCS.

(6) Seasonal high groundwater table depth estimated based on soil stratigraphy, measured groundwater levels from the borings, the Soil Survey of Lee County published information and past experience with similar soil conditions.

(7) Elevation of seasonal high groundwater table relative to EOP

(8) A.G. = Above Grade at the time the boring was performed.

(9) ND = Estimated SHGWT is above grade. The estimated SHGWT elevation should be evaluated based on biological indicators at this location.

APPENDIX C

Summary of Laboratory Test Results

SUMMARY OF LABORATORY TEST RESULTS
BURNT STORE ROAD FROM VAN BUREN PARKWAY TO CHARLOTTE COUNTY LINE
LEE COUNTY, FLORIDA
FPN: 436928-1-22-01
TEST LAB PROJECT NO: 19-5059

Boring Number	Sample Depth (ft)*	Stratum Number	AASHTO Symbol	Seive Analysis					Atterberg Limits			Organic Content (%)	Natural Moisture Content (%)
				#10	#40	#60	#100	#200	Liquid Limit	Plastic Limit	Plasticity Index		
S-9	2.5 - 3.0	1	A-3	100.0	93.4	63.0	29.7	1.9	-	-	-	-	21.2
S-3	1.0 - 1.5	1	A-3	100.0	94.0	69.6	35.2	4.2	-	-	-	-	15.3
S-5	0.5 - 1.0	1	A-3	100.0	95.0	64.6	27.2	1.3	-	-	-	-	19.6
S-10	2.0 - 2.5	1	A-2-4	92.5	82.9	61.0	34.3	10.5	-	-	-	-	30.7
S-10	2.5 - 3.0	1	A-3	94.3	86.6	62.8	32.6	4.1	-	-	-	-	22.1

APPENDIX E

Hydrologic Soils Group Map

LEGEND HYDROLOGIC SOIL RATING

- WATER
- A
- A/D
- B
- B/D
- C/D

POND ALTERNATIVES

- = ALT A
- = ALT B
- = ALT C

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
CR 765	LEE	436928-1-22-01

SOIL MAP

SHEET NO. 1

8/24/2022 3:08:10 PM yukyo_johnson
C:\Users\CCardoza\OneDrive - CONSOR Engineers, LLC\BSR\Burnt Store Rd\drainage\DRMPRD_Stacked_01.dgn

GENERAL SOILS MAP

Lee Plan Map 10

Lee County Southwest Florida

Map Generated: September 2016

Adopted By: ORD 90-43 & 90-44

PROJECT LIMITS

CHARLOTTE COUNTY

GLADES COUNTY

HENDRY COUNTY

COLLIER COUNTY

GULF OF MEXICO

Gasparilla Island

Boca Grande

Charlotte Harbor

Cayo Costa

Pine Island

Matlacha Pass

Matlacha

Little Pine Island

Pine Island Sound

North Captiva Island

Captiva Island

Captiva

St. James City

Truckland

San Carlos Bay

Sanibel Island

Sanibel

Estero Island

Cape Coral

FORT MYERS

Alva

Lehigh Acres

Halfway Pond

Estero

Bonita Springs

Corkscrew Swamp

Hickey Creek Swamp

Yellow Fever Cr.

Daughtery Cr.

Popash Creek

Trout Creek

Telegraph Cr.

Cypress Cr.

Spanish Cr.

Orange River

Caloosahatchee River

Estero River

Spring Creek

Imperial River

Mullock Creek

Mainsail Dr.

Yucca Pen Cr.

GATOR SLOUGH CANAL

DEL PRADO PARKWAY

INTERCOASTAL WATERWAY

BOX CANAL

GEORGE CANAL

ABLE CANAL

26°40′

26°30′

26°20′

82°10′

82°00′

81°50′

81°40′

N

T 43 S

T 44 S

T 45 S

T 46 S

T 47 S

T 48 S

LEGEND

SOILS OF THE FLATWOODS AND SLOUGHS

1 — Immokalee-Pompano: Nearly level, poorly drained, deep soils that are sandy throughout; some have an organic-stained subsoil

2 — Hallandale-Boca: Nearly level, poorly drained, shallow to moderately deep, sandy soils; some are sandy throughout and some have a loamy subsoil

3 — Immokalee-Myakka: Nearly level, poorly drained, deep, sandy soils that have a sandy, organic-stained subsoil

4 — Oldsmar-Malabar-Immokalee: Nearly level, poorly drained, deep, sandy soils; some have a sandy, organic-stained subsoil underlain by a loamy subsoil, some have just a loamy subsoil, and some have just a sandy, organic-stained subsoil

5 — Pineda-Boca-Wabasso: Nearly level, poorly drained, deep and moderately deep, sandy soils; some have a sandy subsoil, some have a loamy subsoil, and some have a sandy, organic-stained subsoil underlain by a loamy subsoil

SOILS OF THE SWAMPS AND SLOUGHS

6 — Isles-Boca-Pompano: Nearly level, poorly drained, deep and moderately deep, sandy soils; some have a loamy subsoil and some are sandy throughout

SOILS OF THE TIDAL AREAS AND BARRIER ISLANDS

7 — Wulfert-Kesson-Captiva: Nearly level, very poorly drained and poorly drained soils; some are organic and some are sandy throughout with varying proportions of shell fragments

8 — Peckish-Estero-Isles: Nearly level, very poorly drained, mucky soils; some have a sandy, organic-stained subsoil and some have a loamy subsoil

9 — Canaveral-Captiva-Kesson: Nearly level, somewhat poorly drained to very poorly drained soils that are sandy throughout with a varying mixture of shell fragments

SOILS OF THE MANMADE AREAS

10 — Matlacha: Nearly level, somewhat poorly drained soils that are mostly mixed sands, shell fragments, and limestone fragments throughout

Compiled 1983

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
UNIVERSITY OF FLORIDA INSTITUTE OF FOOD AND AGRICULTURAL SCIENCES
AGRICULTURAL EXPERIMENT STATIONS
SOIL SCIENCE DEPARTMENT
FLORIDA DEPARTMENT OF AGRICULTURE AND CONSUMER SERVICES

GENERAL SOIL MAP
LEE COUNTY, FLORIDA

Scale 1:253,440

1 0 1 2 3 4 Miles

1 0 4 8 Km


82° 4' 21" W
82° 0' 17" W
26° 46' 47" N
26° 40' 50" N
394000
395000
396000
397000
398000
399000
400000
2962000
2961000
2960000
2959000
2958000
2957000
2956000
2955000
2954000
2953000
2952000
Yucca Pen Creek
Gator Slough
123 129
123
129
26
137 35
129
35 26
137
40
42
129 26
36 28
49
17
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Map Scale: 1:30,800 if printed on B portrait (11" x 17") sheet.
Meters
0 450 900 1800 2700
Feet
0 1000 2000 4000 6000
N
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

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

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

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

Soil Survey Area: Charlotte County, Florida
Survey Area Data: Version 16, Sep 17, 2018

Soil Survey Area: Lee County, Florida
Survey Area Data: Version 15, Sep 19, 2018

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jan 10, 2019—Jan 18, 2019

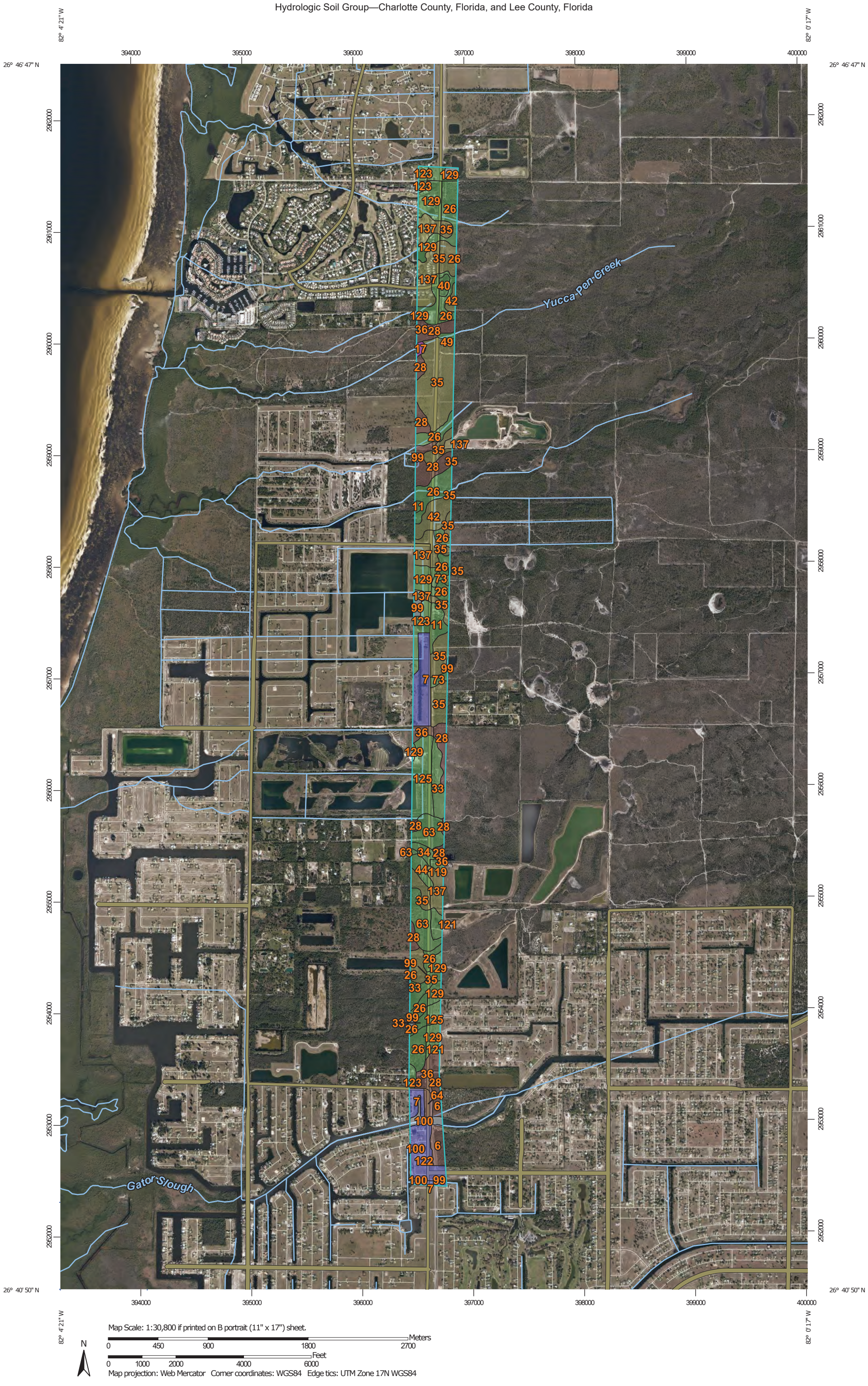
The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
99	Water	2.8	0.4%
123	Myakka fine sand-Urban land complex, 0 to 2 percent slopes	2.7	0.4%
129	Pineda fine sand-Urban land complex, 0 to 2 percent slopes	5.5	0.8%
Subtotals for Soil Survey Area		**11.0**	**1.6%**
Totals for Area of Interest		**707.1**	**100.0%**

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
6	Hallandale fine sand, wet, 0 to 2 percent slopes	14.4	2.0%
7	Matlacha gravelly fine sand-Urban land complex, 0 to 2 percent slopes	38.5	5.4%
11	Myakka fine sand, 0 to 2 percent slopes	11.7	1.7%
17	Daytona sand, 0 to 5 percent slopes	2.1	0.3%
26	Pineda-Pineda, wet, fine sand, 0 to 2 percent slopes	90.6	12.8%
28	Immokalee sand, 0 to 2 percent slopes	57.2	8.1%
33	Oldsmar sand, 0 to 2 percent slopes	30.2	4.3%
34	Malabar fine sand, 0 to 2 percent slopes	5.2	0.7%
35	Wabasso sand, 0 to 2 percent slopes	137.5	19.5%
36	Immokalee sand-Urban land complex, 0 to 2 percent slopes	17.0	2.4%
40	Anclote sand, frequently ponded, 0 to 1 percent slopes	3.9	0.6%
42	Wabasso sand, limestone substratum, 0 to 2 percent slopes	20.7	2.9%
44	Malabar fine sand, frequently ponded, 0 to 1 percent slopes	7.6	1.1%
49	Felda fine sand, frequently ponded, 0 to 1 percent slopes	1.9	0.3%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
63	Malabar fine sand, high, 0 to 2 percent slopes	36.4	5.1%
64	Hallandale fine sand, wet-Urban land complex, 0 to 2 percent slopes	4.5	0.6%
73	Pineda fine sand, frequently ponded, 0 to 1 percent slopes	6.1	0.9%
99	Water	5.0	0.7%
100	Waters of the Gulf of Mexico	7.4	1.0%
119	Malabar fine sand-Urban land complex, 0 to 2 percent slopes	2.8	0.4%
121	Malabar fine sand, high-Urban land complex, 0 to 2 percent slopes	7.3	1.0%
122	Matlacha gravelly fine sand, limestone substratum-Urban land complex, 0 to 2 percent slopes	26.3	3.7%
123	Myakka fine sand-Urban land complex, 0 to 2 percent slopes	17.3	2.5%
125	Oldsmar sand-Urban land, 0 to 2 percent slopes	36.3	5.1%
129	Pineda fine sand-Urban land complex, 0 to 2 percent slopes	56.8	8.0%
137	Wabasso sand-Urban land complex, 0 to 2 percent slopes	51.1	7.2%
Subtotals for Soil Survey Area		**696.0**	**98.4%**
Totals for Area of Interest		**707.1**	**100.0%**


82° 4' 21" W
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Yucca Pen Creek
Gator Slough
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137
26 35
129 73
26
137
99 35
123 11
35
99
7 73
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36 28
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125
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28 63 28
63 34 28
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44 119
137
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63 121
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Map Scale: 1:30,800 if printed on B portrait (11" x 17") sheet.
N
Meters
0 450 900 1800 2700
Feet
0 1000 2000 4000 6000
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A
A/D
B
B/D
C
C/D
D
Not rated or not available

Soil Rating Lines

A
A/D
B
B/D
C
C/D
D
Not rated or not available

Soil Rating Points

A
A/D
B
B/D
C
C/D
D
Not rated or not available

Water Features

Streams and Canals

Transportation

Rails
Interstate Highways
US Routes
Major Roads
Local Roads

Background

Aerial Photography

MAP INFORMATION

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

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Source of Map: Natural Resources Conservation Service
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Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
99	Water		2.8	0.4%
123	Myakka fine sand-Urban land complex, 0 to 2 percent slopes	A/D	2.7	0.4%
129	Pineda fine sand-Urban land complex, 0 to 2 percent slopes	A/D	5.5	0.8%
Subtotals for Soil Survey Area			**11.0**	**1.6%**
Totals for Area of Interest			**707.1**	**100.0%**

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
6	Hallandale fine sand, wet, 0 to 2 percent slopes	B/D	14.4	2.0%
7	Matlacha gravelly fine sand-Urban land complex, 0 to 2 percent slopes	B	38.5	5.4%
11	Myakka fine sand, 0 to 2 percent slopes	A/D	11.7	1.7%
17	Daytona sand, 0 to 5 percent slopes	A	2.1	0.3%
26	Pineda-Pineda, wet, fine sand, 0 to 2 percent slopes	A/D	90.6	12.8%
28	Immokalee sand, 0 to 2 percent slopes	B/D	57.2	8.1%
33	Oldsmar sand, 0 to 2 percent slopes	A/D	30.2	4.3%
34	Malabar fine sand, 0 to 2 percent slopes	A/D	5.2	0.7%
35	Wabasso sand, 0 to 2 percent slopes	C/D	137.5	19.5%
36	Immokalee sand-Urban land complex, 0 to 2 percent slopes	B/D	17.0	2.4%
40	Anclote sand, frequently ponded, 0 to 1 percent slopes	A/D	3.9	0.6%
42	Wabasso sand, limestone substratum, 0 to 2 percent slopes	C/D	20.7	2.9%

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
44	Malabar fine sand, frequently ponded, 0 to 1 percent slopes	A/D	7.6	1.1%
49	Felda fine sand, frequently ponded, 0 to 1 percent slopes	A/D	1.9	0.3%
63	Malabar fine sand, high, 0 to 2 percent slopes	A/D	36.4	5.1%
64	Hallandale fine sand, wet-Urban land complex, 0 to 2 percent slopes	B/D	4.5	0.6%
73	Pineda fine sand, frequently ponded, 0 to 1 percent slopes	A/D	6.1	0.9%
99	Water		5.0	0.7%
100	Waters of the Gulf of Mexico		7.4	1.0%
119	Malabar fine sand-Urban land complex, 0 to 2 percent slopes	A/D	2.8	0.4%
121	Malabar fine sand, high-Urban land complex, 0 to 2 percent slopes	A/D	7.3	1.0%
122	Matlacha gravelly fine sand, limestone substratum-Urban land complex, 0 to 2 percent slopes	B	26.3	3.7%
123	Myakka fine sand-Urban land complex, 0 to 2 percent slopes	A/D	17.3	2.5%
125	Oldsmar sand-Urban land, 0 to 2 percent slopes	A/D	36.3	5.1%
129	Pineda fine sand-Urban land complex, 0 to 2 percent slopes	A/D	56.8	8.0%
137	Wabasso sand-Urban land complex, 0 to 2 percent slopes	C/D	51.1	7.2%
Subtotals for Soil Survey Area			**696.0**	**98.4%**
Totals for Area of Interest			**707.1**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

APPENDIX F

Environmental Report

Scalar Consulting Group Inc.

13337 North 56th Street
Tampa, FL 33617
Ph: (813) 988-1199

Memorandum

Date:	July 28, 2022
To:	Francina Gil, CONSOR
From:	Dara Jarvis, Scalar Consulting Group Inc.
CC:	Kristin Caruso, Scalar Consulting Group Inc.
Subject:	Threatened and Endangered Species (T&E) and Wetlands Assessment for Pond Siting Burnt Store Road from Van Buren Parkway to Charlotte County Line FPID No. 436928-1-22-01 Lee County, Florida **The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being, or have been, carried out by FDOT pursuant to 23 U.S.C. § 327 and a Memorandum of Understanding dated May 26, 2022, and executed by FHWA and FDOT.**

INTRODUCTION

The Florida Department of Transportation (FDOT), District One, is conducting a Project Development and Environment (PD&E) Study to evaluate the proposed widening of Burnt Store Road (CR 765) from Van Buren Parkway to the Charlotte County Line in Lee County. The study also extends a quarter mile north into Charlotte County to address a four-lane segment gap. The total project length is approximately 5.7 miles (see **Figure 1**). Alternatives to be evaluated include the widening of the existing two-lane undivided roadway to four lanes, and to four lanes expandable to six lanes. The proposed project may also include the addition of paved shoulders/marked bicycle lanes, sidewalks, and/or a shared-use path. The project is located in both the City of Cape Coral and unincorporated Lee County and falls within Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31 and 32, Township 43 South, Range 23 East, and Sections 31 and 32, Township 42 South, Range 23 East (See **Figure 1**). The proposed roadwork consists of widening and drainage improvements, in addition to stormwater ponds.

This memorandum (memo) supports the Pond Siting Report (PSR) by addressing presence or potential presence of federal and state threatened and endangered (T&E) species and jurisdictional wetlands or surface waters within the 28 pond alternatives. We evaluated nine basins within the project area with three alternatives per basin, with the exception of Basin 2 (4 sites). Staff scientists completed a review of existing environmental conditions within the proposed pond sites and outfall pipe right-of-way (ROW) to assess potential environmental impacts. Field surveys, in addition to desktop research and GIS analysis were used to assess the environmental conditions present within the proposed pond footprints.

Figure 1. Project Location Map

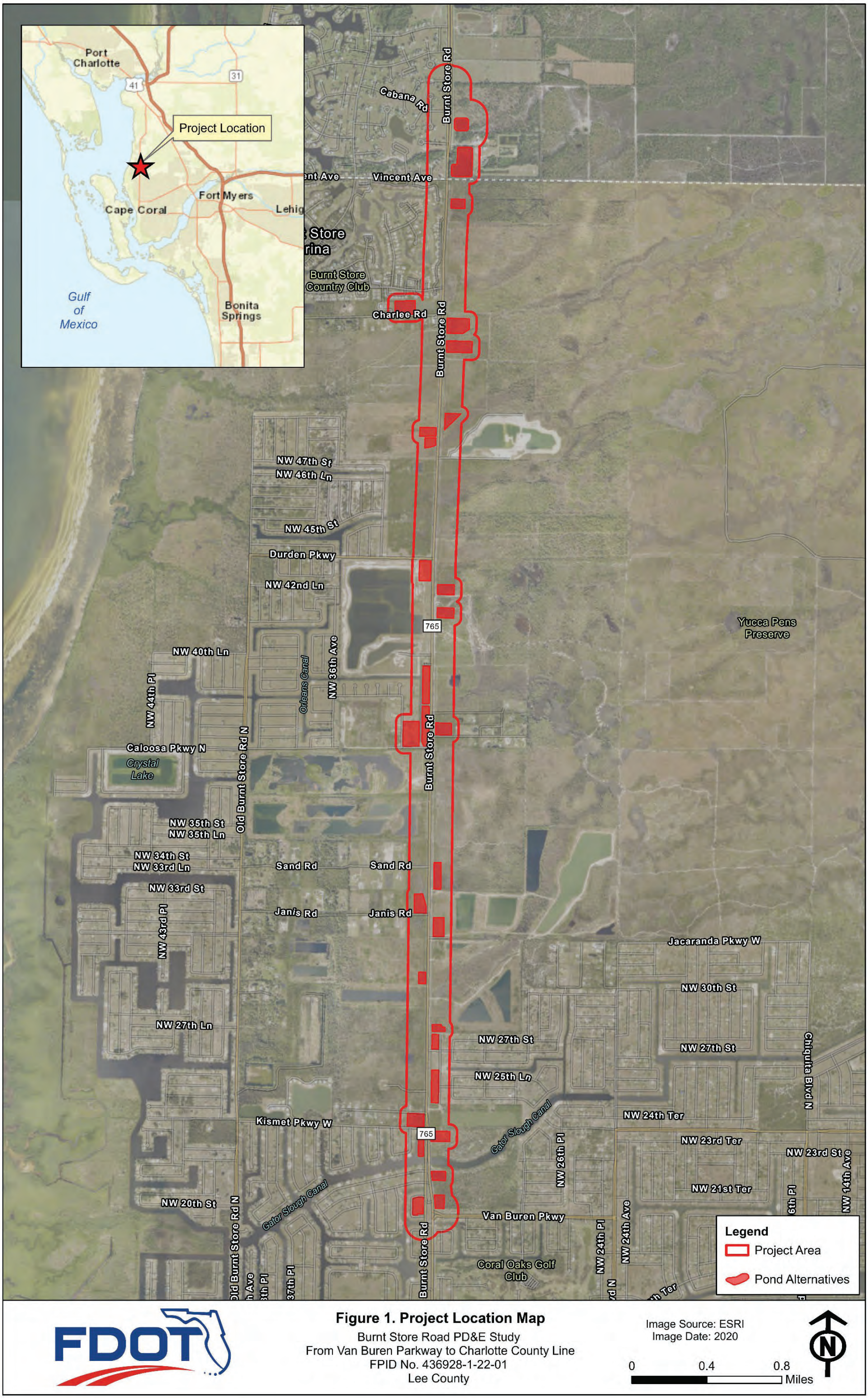


Figure 1. Project Location Map
Burnt Store Road PD&E Study
From Van Buren Parkway to Charlotte County Line
FPID No. 436928-1-22-01
Lee County

Image Source: ESRI
Image Date: 2020

0 0.4 0.8 Miles

METHODOLOGY

An extensive desktop analysis was conducted to determine if any T&E, jurisdictional wetlands, or surface waters occur within or adjacent to the proposed stormwater pond locations. **Table 1** includes potential listed species that could occur within the project area and **Figures 2, 3, and 4** depict existing land use, wetlands, and soils, respectively. The primary GIS sources that were utilized included:

- 2021 ESRI Aerial;
- 2020, 2014, 2005, 1996 FDOT Aerials;
- 2016 South Florida Water Management District (SFWMD) Land Use categorized according to Florida Land Use, Cover and Forms Classification System (FLUCCS);
- 2020 United States Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS), soils data;
- 2013 Florida Natural Areas Inventory (FNAI) Protected Species Elemental Occurrence GIS data;
- 2021 United States Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) data
- Audubon Florida EagleWatch Public Nest App (2022 nesting data);
- FWC : Wading bird rookeries locator,1999 (FWC 2020); Wood stork Active Colonies, 2010 – 2019 (USFWS, 2020); Florida scrub-jay Habitat and Observations,1992 – 1993;
- USFWS : Consultation Area and Critical Habitat for threatened and endangered species; and South Florida wood stork (*Mycteria americana*) core foraging areas (CFA).

Land use classifications as identified in GIS were field verified in accordance to FLUCCS. Site review findings were recorded to characterize vegetative communities present, document the presence of wetland and surface waters within the sites, and evaluate the potential of each site to support T&E species.

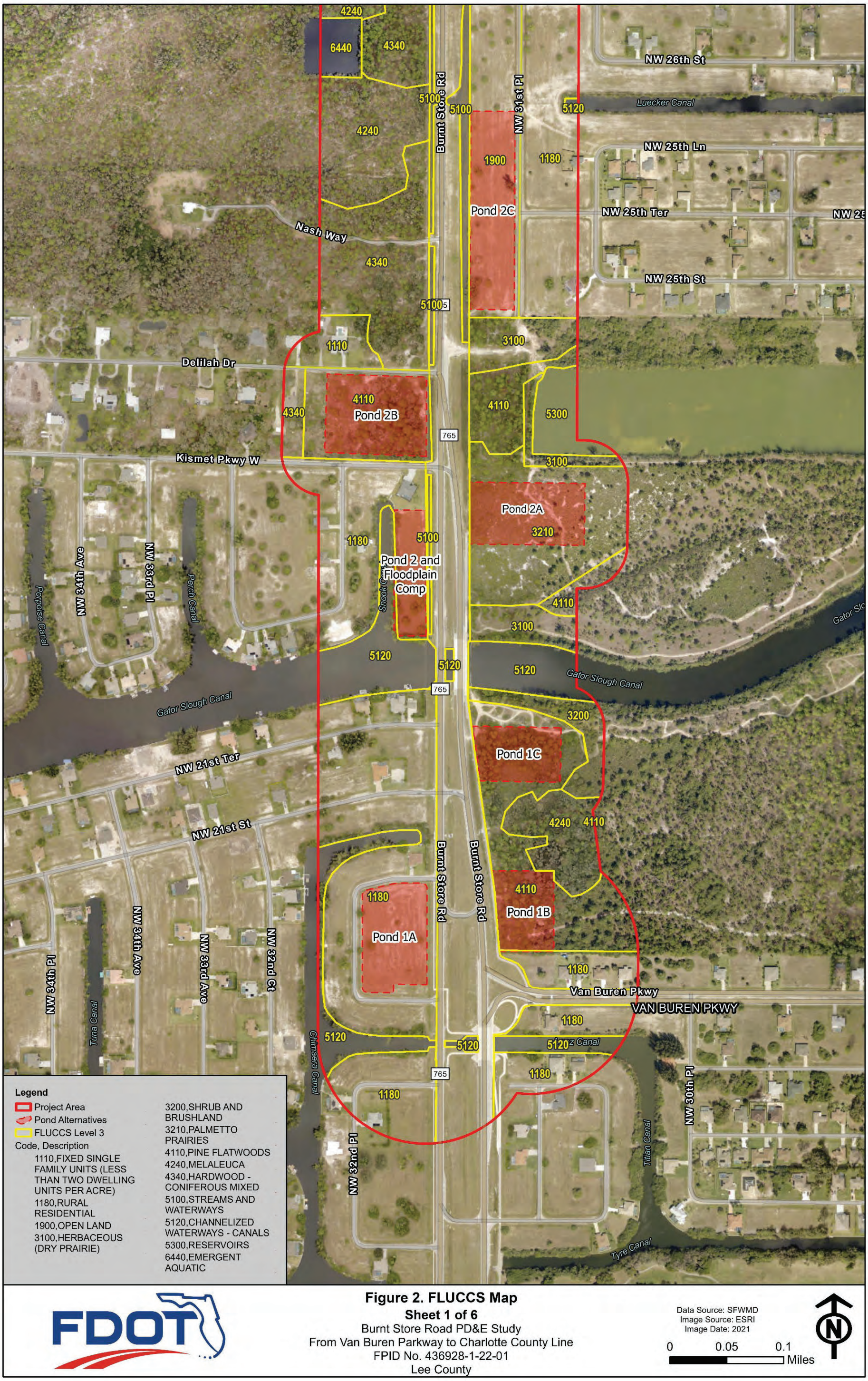
A rating system was formulated for the purpose of comparing each pond site that was reviewed. A rating of “No”, “Low”, “Medium” or “High” is provided to identify the potential for protected species involvement associated with the stormwater pond sites. The rating system was dependent on (1) the current existing habitat; (2) its general condition for supporting protected wildlife; (3) if any T&E species were observed in the area; and (4) whether species mitigation is possible and reasonable to offset any impacts should that pond site be selected. Sites with no available habitat such as fully developed properties, were designated a rating of “No”. Sites with marginal habitat and no observed protected species were designated a rating of “Low”.

Table 1. Potential Federal and State Listed Species within/near Pond Alternative Footprints

Species	Common Name	FWC	USFWS	Habitat
REPTILES				
Drymarchon corais couperi	Eastern indigo snake	-	T	Hydric hammock, sandhill scrub, upland pine forest, mangrove swamp
Gopherus polyphemus	Gopher tortoise	T	-	Sandhill, scrub, xeric hammock, ruderal areas, dry prairie, pine flatwoods
Pituophis melanoleucus mugitus	Florida pine snake	T	-	Well-drained sandy soils with a moderate to open canopy
BIRDS				
Antigone canadensis pratensis	Florida sandhill crane	T	-	Basin marsh, depression marsh, dry prairies, marl prairie, pastures
Aphelocoma coerulescens	Florida scrub-jay	-	T	Relict dune ecosystems or scrub on well drained sandy soils; scrubby oaks
Athene cunicularia floridana	Florida burrowing owl	T	-	Native prairies and cleared areas with short groundcover
Polyborus plancus audubonii	Crested caracara	-	T	Prairies with cabbage palms, wooded areas with saw palmetto, scrub oaks, pastures
Laterallus jamaicensis	Eastern black rail	-	T	Brackish, salt, and freshwater wetlands
Egretta caerulea	Little blue heron	T	-	Shallow edges of any surface waters
Egretta rufescens	Reddish egret	T	-	Shallow edges of any surface waters
Egretta tricolor	Tricolored heron	T	-	Shallow edges of any surface waters
Falco sparverius paulus	Southeastern American kestrel	T	-	Sandhill, mesic flatwoods, ruderal, dry prairie
Mycteria americana	Wood stork	-	T	Shallow edges of surface waters
Picoides borealis	Red-cockaded woodpecker	-	E	Mature pine forests containing living longleaf pine trees
Platalea ajaja	Roseate spoonbill	T	-	Shallow edges of any surface waters
Rostrhamus sociabilis plumbeus	Snail kite	-	E	Lowland freshwater marshes and littoral shelves of lakes
Haliaeetus leucocephalus	Bald Eagle*	-	-	Estuarine, lacustrine, riverine, tidal marsh, tall trees or structures for nesting
Pandion haliaetus	Osprey*	-	-	Open water; areas of cypress, mangrove, pine and swamp hardwoods for nesting
MAMMALS				
Blarina carolinensis shermani	Sherman's short-tailed shrew	T	-	Drainage ditches with dense grass; forested areas with thick tree debris and detritus
Eumops floridanus	Florida bonneted bat	-	E	Cavities in natural and manmade structures

Species	Common Name	FWC	USFWS	Habitat
PLANTS				
Calopogon multiflorus	Many-flowered grass-pink	T	-	Dry to moist flatwoods
Euphorbia cumulicola	Sand-dune spurge	E	-	Dunes and scrub
Clitoria arenicola	Sand butterfly pea	E	-	Sandhill, scrubby flatwoods, dry upland woods
Deeringothamnus pulchellus	Beautiful pawpaw	-	E	Flatwoods
Lechea cernua	Nodding pinweed	T	-	Scrub
Linum carteri var. *smallii*	Small's flax	E	-	Pine rocklands/flatwoods/savannahs, wet prairies
Nemastylis floridana	Celestial lily	E	-	Wet flatwoods, prairies, marshes
Nolina atopocarpa	Florida beargrass	T	-	Wet flatwoods
Platanthera integra	Yellow fringeless orchid	E	-	Wet pine flatwoods, wet prairies
Schizachyrium niveum	Scrub bluestem	E	-	Scrub
Status: T = Threatened; E = Endangered; T (SA) = Threatened Due to Similarity of Appearance *The bald eagle and osprey are afforded federal protection through the Migratory Bird Treaty Act (MBTA) and/or the Bald and Golden Eagle Protection Act (BGEPA).				

Figure 2. FLUCCS Map



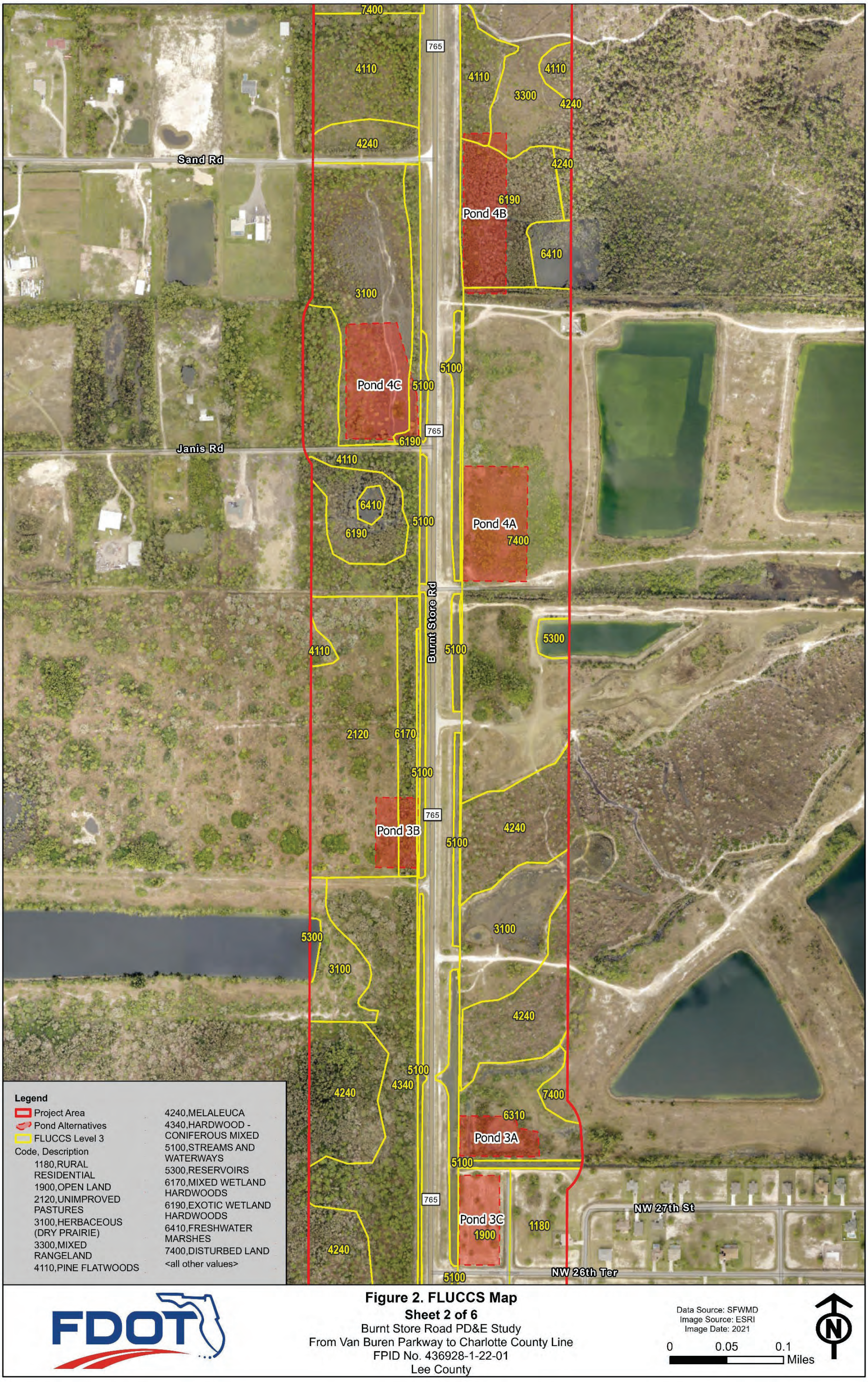


Figure 2. FLUCCS Map
Sheet 2 of 6
Burnt Store Road PD&E Study
From Van Buren Parkway to Charlotte County Line
FPID No. 436928-1-22-01
Lee County

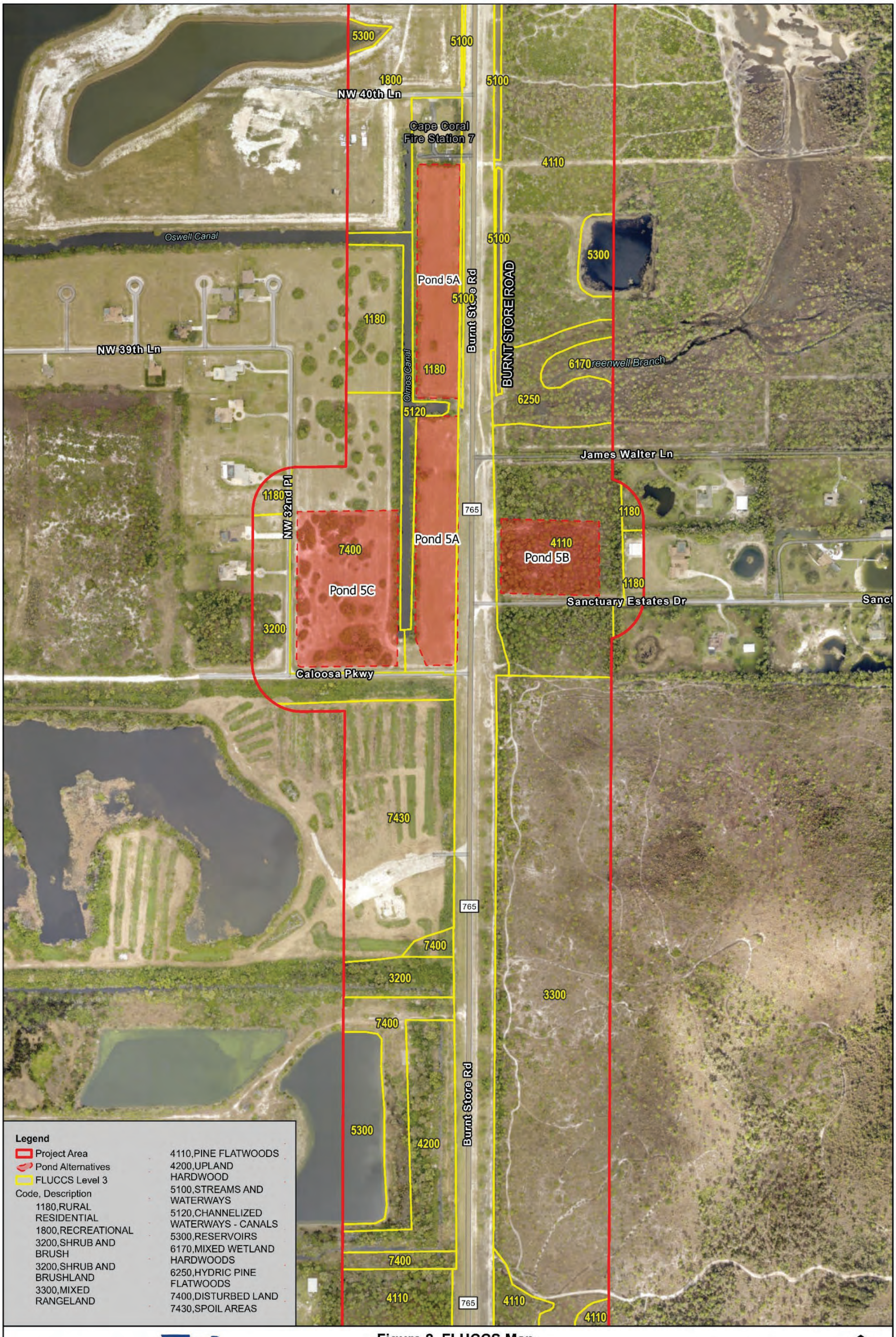


Figure 2. FLUCCS Map
Sheet 3 of 6
Burnt Store Road PD&E Study
From Van Buren Parkway to Charlotte County Line
FPID No. 436928-1-22-01
Lee County

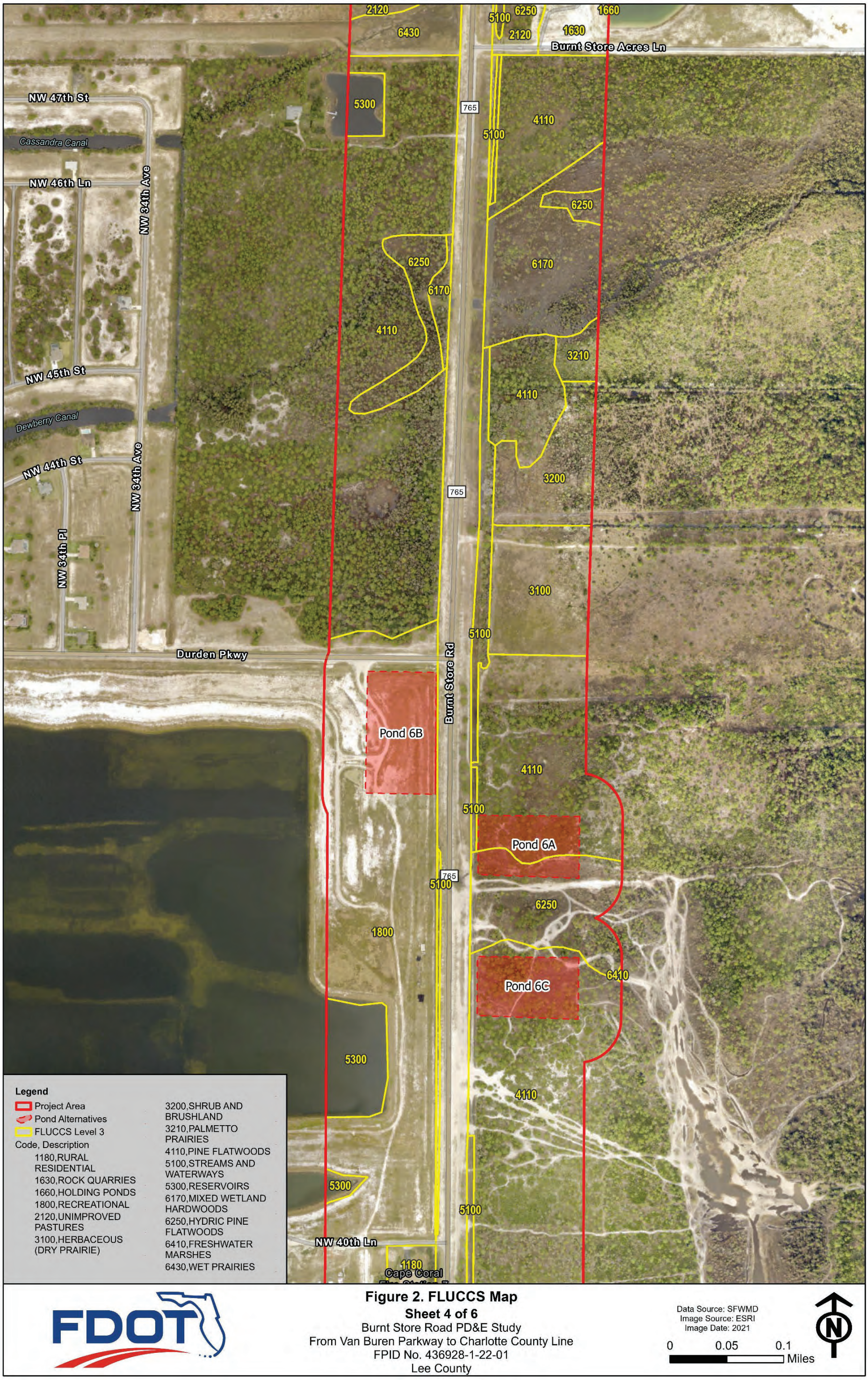


Figure 2. FLUCCS Map
Sheet 4 of 6
Burnt Store Road PD&E Study
From Van Buren Parkway to Charlotte County Line
FPID No. 436928-1-22-01
Lee County

Figure 2. FLUCCS Map
Sheet 5 of 6
Burnt Store Road PD&E Study
From Van Buren Parkway to Charlotte County Line
FPID No. 436928-1-22-01
Lee County

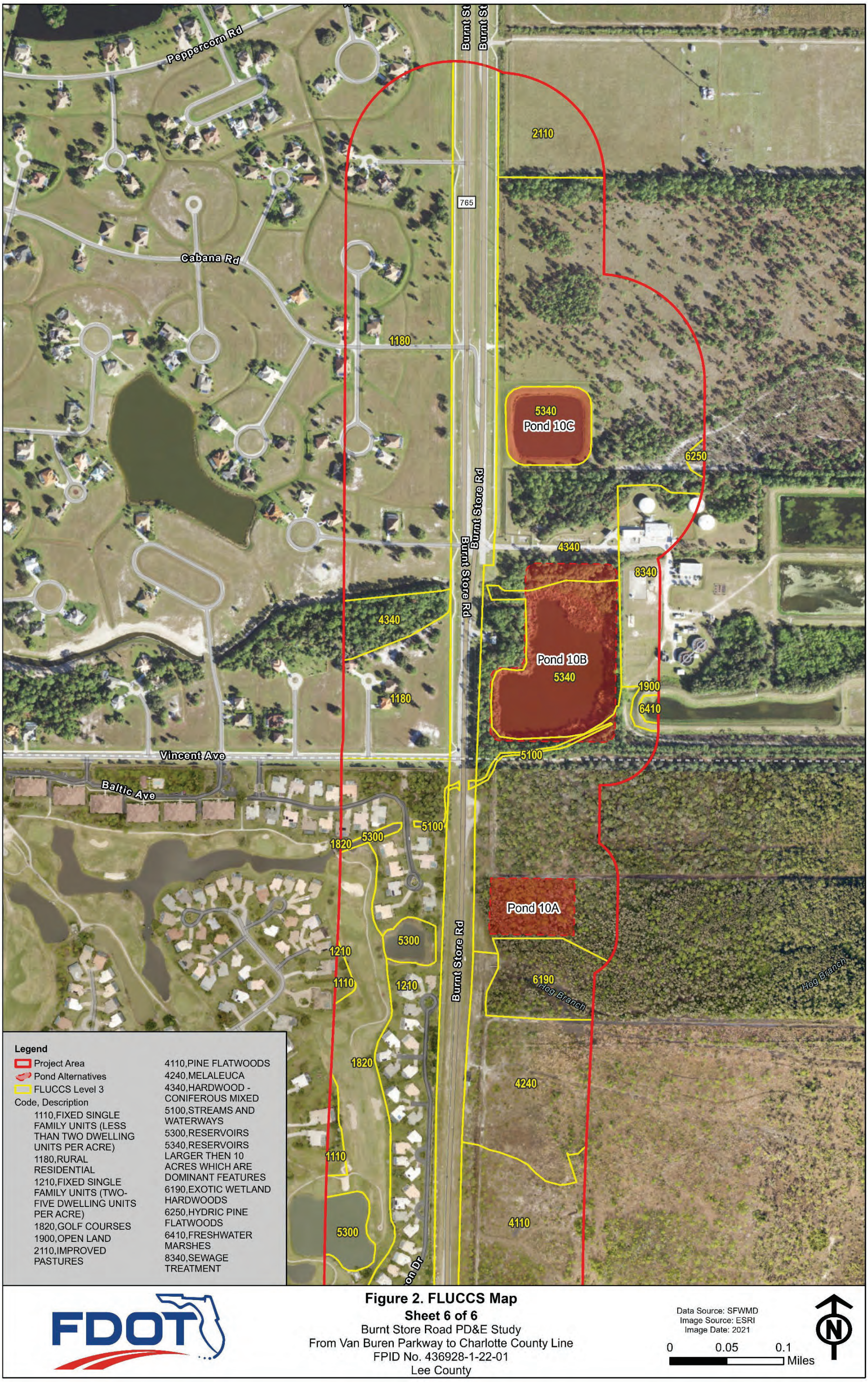

Peppercorn Rd
Burnt St
Burnt St
765
2110
Cabana Rd
1180
5340
Pond 10C
6250
Burnt Store Rd
Burnt Store Rd
4340
8340
Pond 10B
5340
1900
6410
4340
1180
5100
Vincent Ave
Baltic Ave
5100
1820
5300
Pond 10A
5300
1210
1110
1210
Burnt Store Rd
6190
Hog Branch
Hog Branch
1820
4240
1110
5300
4110
on Dr
Legend
Project Area
Pond Alternatives
FLUCCS Level 3
Code, Description
1110,FIXED SINGLE FAMILY UNITS (LESS THAN TWO DWELLING UNITS PER ACRE)
1180,RURAL RESIDENTIAL
1210,FIXED SINGLE FAMILY UNITS (TWO-FIVE DWELLING UNITS PER ACRE)
1820,GOLF COURSES
1900,OPEN LAND
2110,IMPROVED PASTURES
4110,PINE FLATWOODS
4240,MELALEUCA
4340,HARDWOOD - CONIFEROUS MIXED
5100,STREAMS AND WATERWAYS
5300,RESERVOIRS
5340,RESERVOIRS LARGER THEN 10 ACRES WHICH ARE DOMINANT FEATURES
6190,EXOTIC WETLAND HARDWOODS
6250,HYDRIC PINE FLATWOODS
6410,FRESHWATER MARSHES
8340,SEWAGE TREATMENT
FDOT
Figure 2. FLUCCS Map
Sheet 6 of 6
Burnt Store Road PD&E Study
From Van Buren Parkway to Charlotte County Line
FPID No. 436928-1-22-01
Lee County
Data Source: SFWMD
Image Source: ESRI
Image Date: 2021
0
0.05
0.1
Miles
N

Figure 3. National Wetland Inventory (NWI) with Field Verified Wetlands and Surface Waters Map

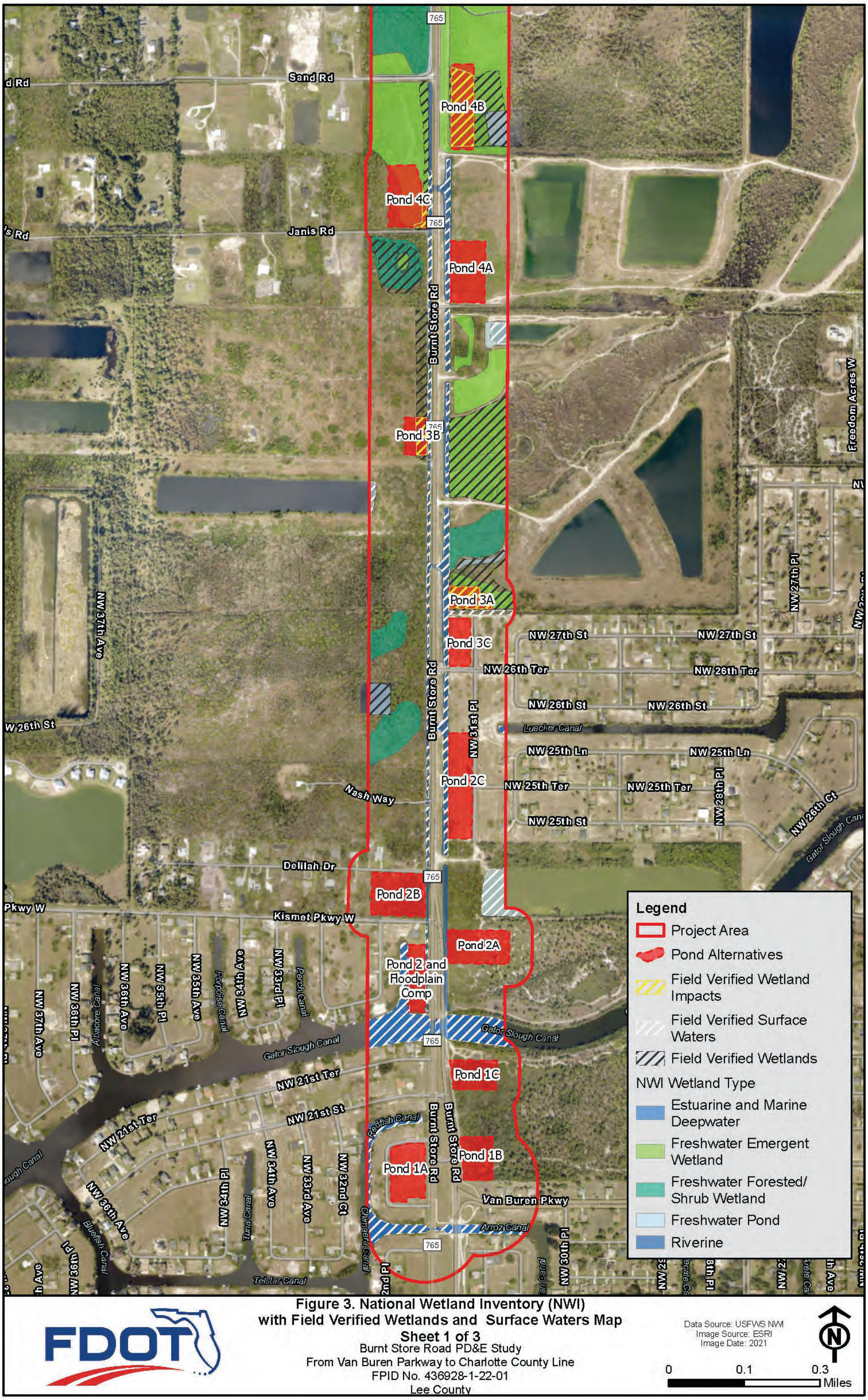


Figure 3. National Wetland Inventory (NWI) with Field Verified Wetlands and Surface Waters Map
Sheet 1 of 3
Burnt Store Road PD&E Study
From Van Buren Parkway to Charlotte County Line
FPID No. 436928-1-22-01
Lee County

Data Source: USFWS NWI
Image Source: ESRI
Image Date: 2021

0 0.1 0.3 Miles

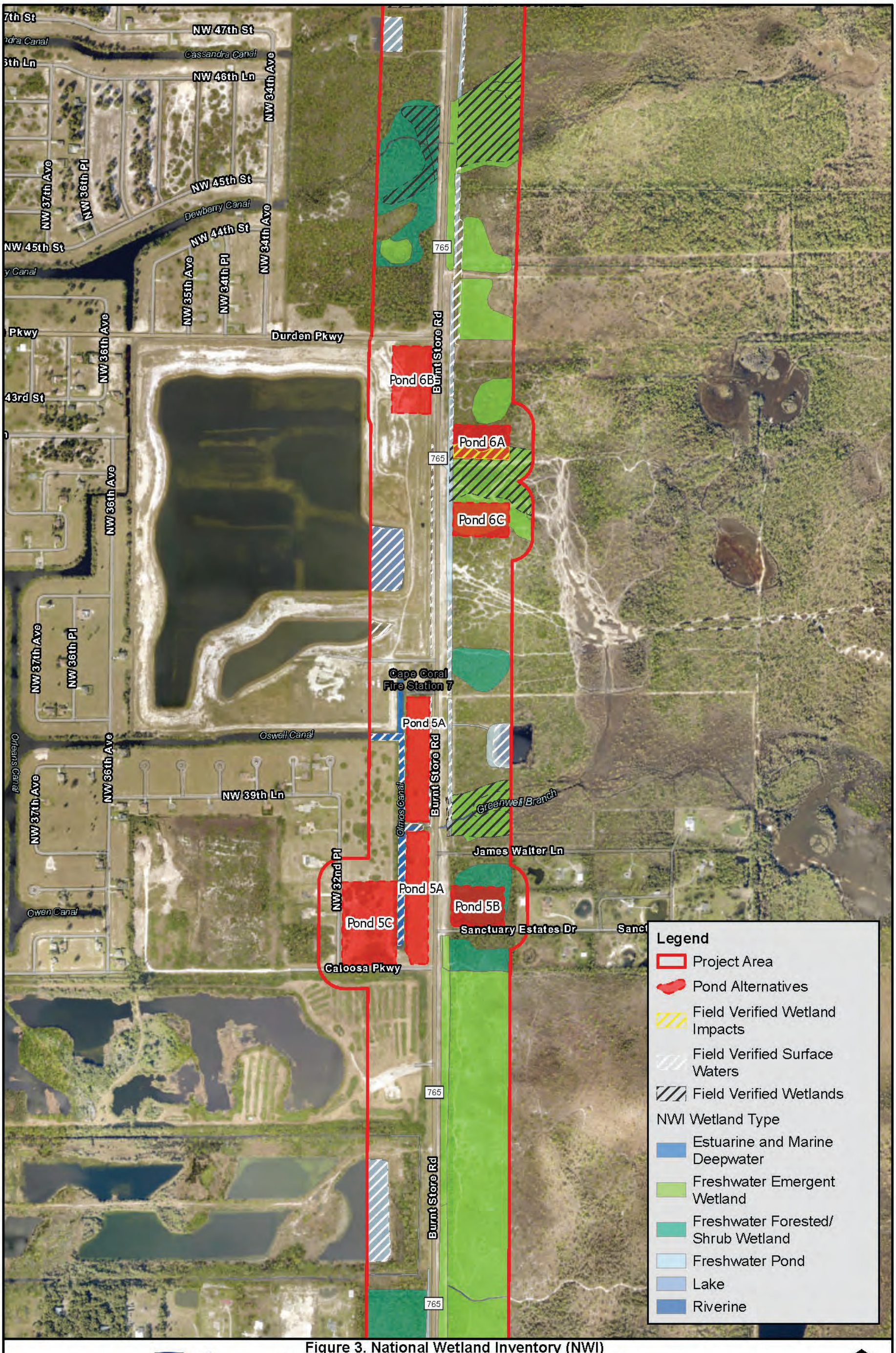


Figure 3. National Wetland Inventory (NWI) with Field Verified Wetlands and Surface Waters Map
Sheet 2 of 3
Burnt Store Road PD&E Study
From Van Buren Parkway to Charlotte County Line
FPID No. 436928-1-22-01
Lee County

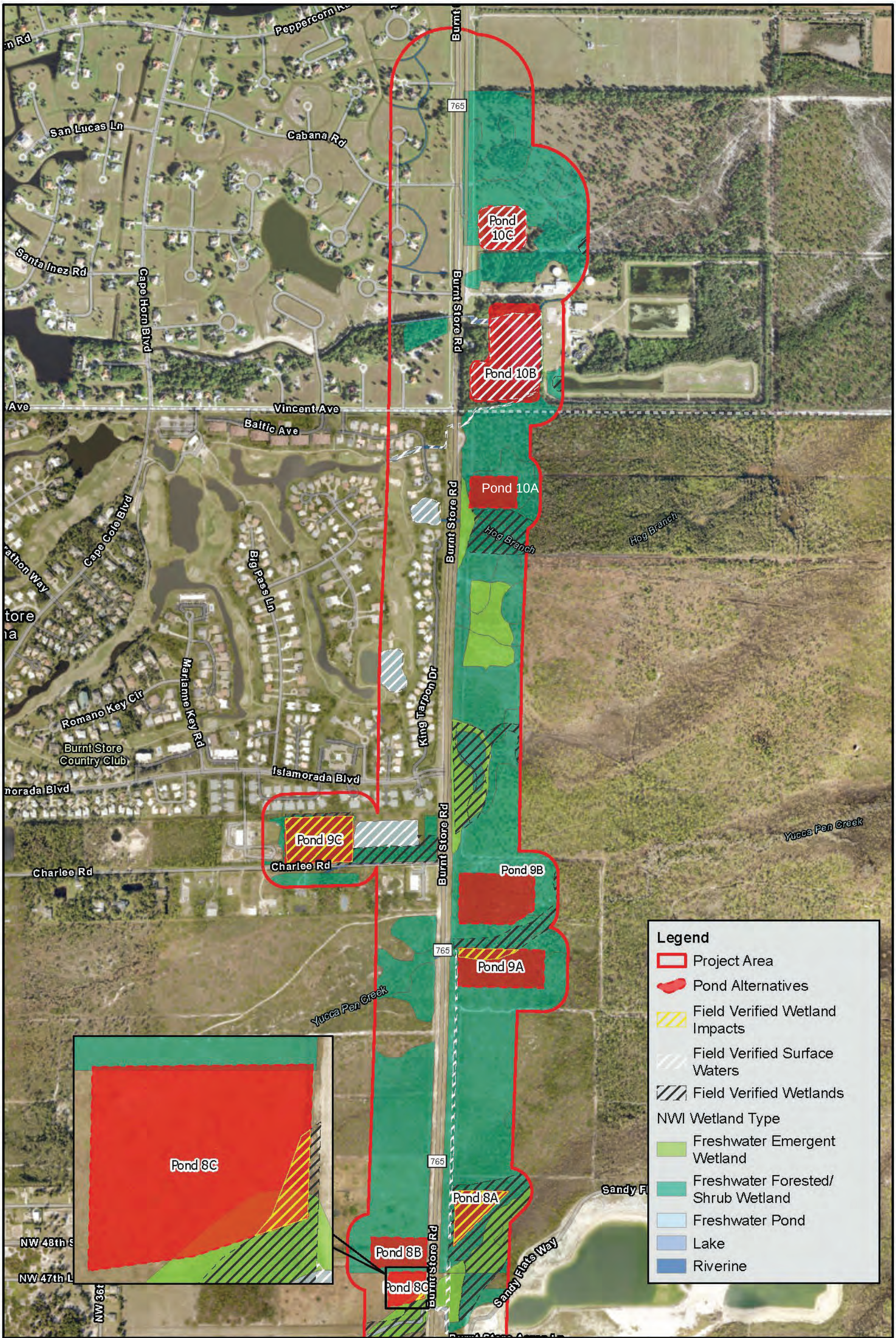
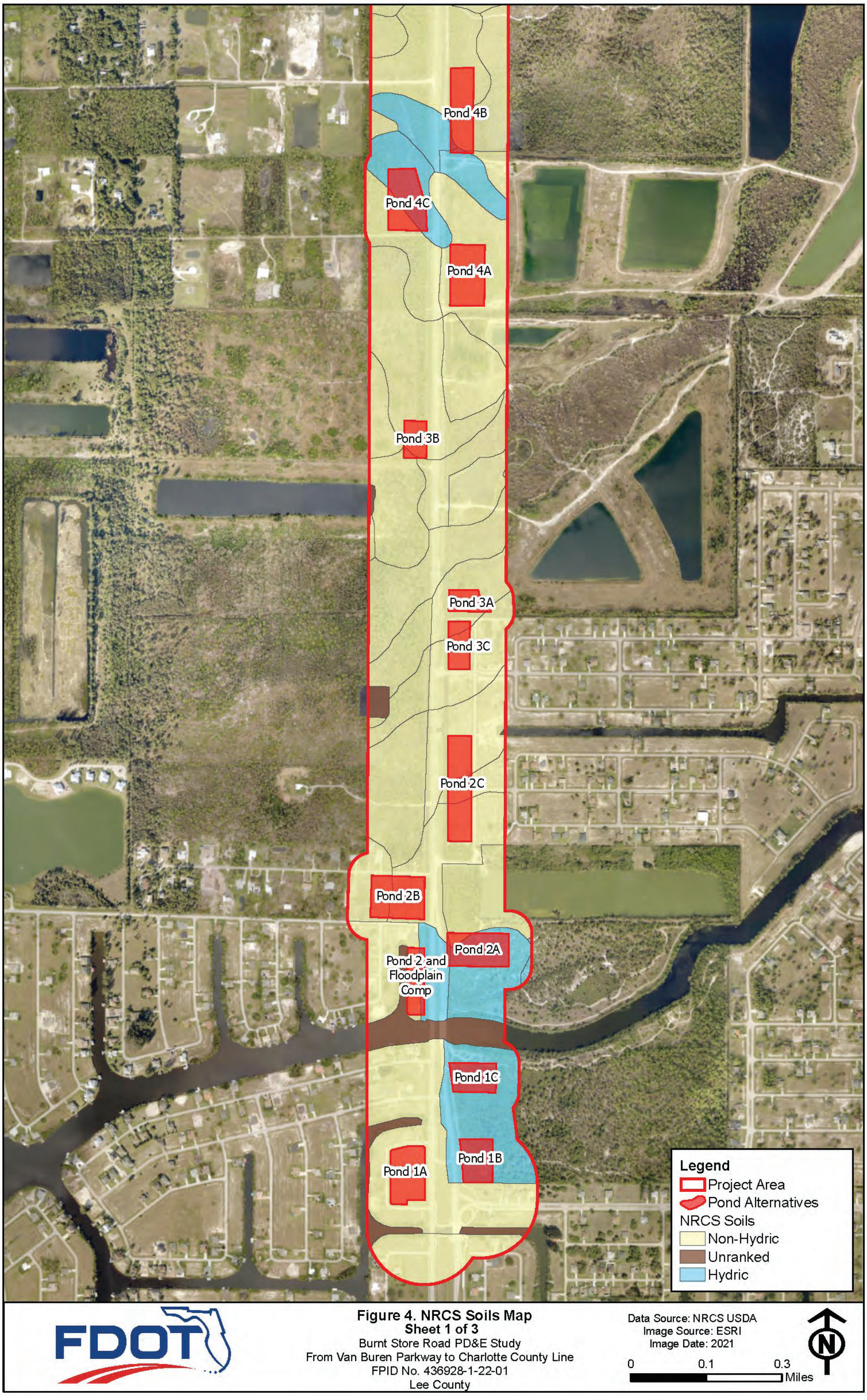


Figure 3. National Wetland Inventory (NWI) with Field Verified Wetlands and Surface Waters Map
Sheet 3 of 3
Burnt Store Road PD&E Study
From Van Buren Parkway to Charlotte County Line
FPID No. 436928-1-22-01
Lee County

Figure 4. NRCS Soils Map



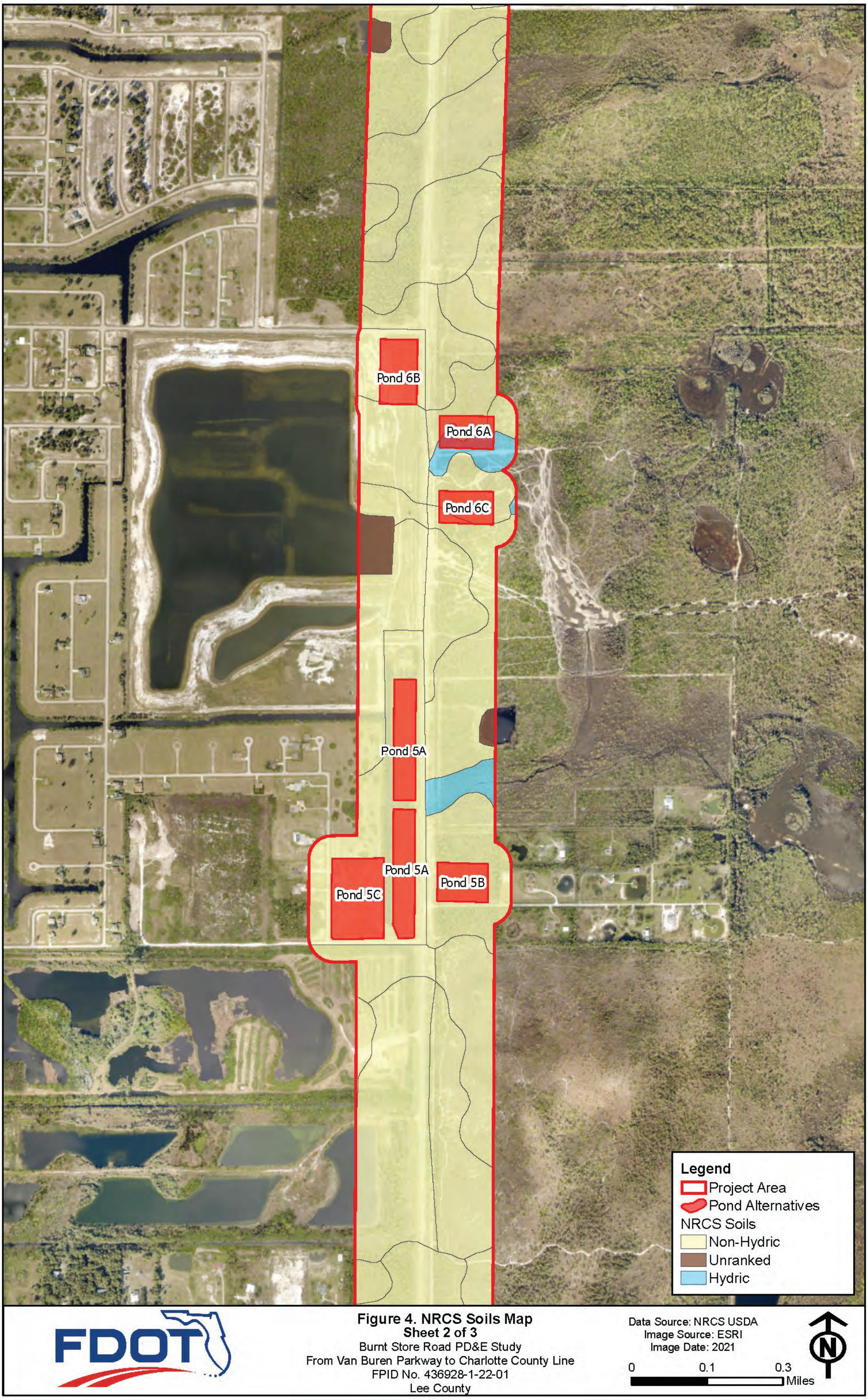

Pond 6B
Pond 6A
Pond 6C
Pond 5A
Pond 5A
Pond 5C
Pond 5B
Legend
Project Area
Pond Alternatives
NRCS Soils
Non-Hydric
Unranked
Hydric
FDOT
Figure 4. NRCS Soils Map
Sheet 2 of 3
Burnt Store Road PD&E Study
From Van Buren Parkway to Charlotte County Line
FPID No. 436928-1-22-01
Lee County
Data Source: NRCS USDA
Image Source: ESRI
Image Date: 2021
0
0.1
0.3
Miles
N

Figure 4. NRCS Soils Map
Sheet 3 of 3
Burnt Store Road PD&E Study
From Van Buren Parkway to Charlotte County Line
FPID No. 436928-1-22-01
Lee County

Sites with moderate habitat and in which protected species could reasonably occur were designated with a rating of "Medium". Sites with high quality habitat and in which protected species were observed or would be reasonably expected to occur were designated a rating of "High".

Considering wetlands, rating was based on the proportion of the pond's footprint that was comprised of wetlands: a rating of "No" means 0 percent (%); a rating of "Low" is assigned for percentages between 1 and 24%; a "Medium" rating is for wetland composition between 25 and 49%; and a "High" rating is for assigned to any pond with wetland composition equal to or greater than 50%. To assist with an overall assessment of pond site cost, a wetland mitigation cost was estimated for each pond site. A Uniform Mitigation Assessment Methodology (UMAM) assessment was completed for each wetland habitat type, and the delta scores from the UMAM scoring were used to assign to each pond site wetland impact. This scoring is comparable to the Little Pine Island assessment method. For an approximate wetland mitigation bank cost per credit, we assumed $182,500 which is the average of forested and herbaceous freshwater credits at Little Pine Island Mitigation Bank. A summary of costs and ratings can be seen in **Table 2**, Pond Siting T&E and Wetlands Table.

RESULTS

Wildlife

Habitat exists for some of the T&E species as most of the pond site locations are in undeveloped areas or in undeveloped portions of low-density development (see **Figure 2**). Proposed pond sites that contain wetlands and surface waters would support the wood stork, the Florida sandhill crane (*Antigone canadensis pratensis*), the Eastern black rail (*Laterallus jamaicensis*), the snail kite (*Rostrhamus sociabilis plumbeus*), the Sherman's short-tailed shrew (*Blarina shermani*), the little blue heron (*Egretta caerulea*), the reddish egret (*Egretta rufescens*), the tricolored heron (*Egretta tricolor*), the roseate spoonbill (*Platalea ajaja*), and wetland dependent plants. Proposed ponds that are located in pastures and prairies would support the Florida burrowing owl (*Athene cunicularia floridana*) and the crested caracara (*Polyborus plancus audubonii*). None of the pond sites features well-drained soils of which gopher tortoise (*Gopherus polyphemus*), and Florida pine snake (*Pituophis melanoleucus mugitus*) would prefer, but the prairies and pastures within the pond footprints could potentially support these species. There are little to no mature longleaf pine (*Pinus palustris*) that would potentially support the red-cockaded woodpecker (*Picoides borealis*). There are little open habitat featuring snags for the southeastern American kestrel (*Falco sparverius paulus*). The Florida bonneted bat (*Eumops floridanus*) (FBB) could potentially roost and forage within the proposed pond sites within mature trees containing cavities, as well as artificial structures that are located in relatively open areas

There are no scrub oak habitats within pond sites that would support the Florida scrub-jay (*Aphelocoma coerulescens*). The Eastern indigo snake (*Drymarchon corais couperi*) utilizes a wide variety of habitat including wetlands and uplands which occurs throughout the pond sites. The proposed pond sites within uplands could also support upland dependent plants that prefer scrub and flatwoods.

Additional Species

Additionally, while not a state or federally listed species under the ESA, the bald eagle (*Haliaeetus leucocephalus*), osprey (*Pandion haliaetus*), black bear (*Ursus americanus floridanus),* and bat species including the Mexican free-tail (*Tadarida brasiliensis*), tri-colored (*Perimyotis subflavus*), evening (*Nycticeius humeralis*), big brown (*Eptesicus fuscus*), northern yellow (*Dasypterus intermedius*), and Rafinesque's big-eared (*Corynorhinus rafinesquii*) bat were included in the protected species analysis due to the presence of suitable habitat and regulatory protections associated with these species. There is a possibility that bald eagles may establish new nests within appropriate habitat within 660 feet of the proposed pond footprints, but no new nest were observed during field review.

Pond Descriptions

BASIN 1

Pond 1A (3.30 acres; 0% wetland) is located west of Burnt Store Road, and centered within NW 20th Lane. This site is mapped and field verified as Rural Residential (FLUCCS 1180). The site is surrounded by development on three sides and there are no wetlands or surface waters present within the footprint area. The site has minimal wildlife habitat value but has the potential to be utilized by gopher tortoise and other commensal species, therefore it was given the species rating of "Low". No listed species or burrows were observed during field surveys. No jurisdictional wetlands or surface waters are present; therefore, the site was given a wetland rating of "No".

Pond 1B (2.31 acres; 0% wetland) is located on the northeast corner of Van Buren Parkway and Burnt Store Road. The site is mapped as Pine Flatwoods (FLUCCS 4110) and Melaleuca (*Melaleuca quinquenervia*) (FLUCCS 4240); however, during the field visit it wase reclassified as only Pine Flatwoods (FLUCCS 4110). The site consist of slash pine (*Pinus elliottii*) with a sparse understory of primarily saw palmetto (*Serenoa repens*) and brush. The site has adequate wildlife habitat for the gopher tortoise and other commensal species; therefore, it was given the species rating of "Medium". No listed species or burrows were observed during the field survey. No jurisdictional wetlands or surface waters are present; therefore, the site was given a wetland rating of "No".

Pond 1C (2.28 acres; 0% wetland) is located east of Burnt Store Road and south of Gator Slough Canal. It is mapped as Pine Flatwoods (FLUCCS 4110) and Shrub and Brushland (FLUCCS 3200); however, during the field visit it was reclassified as only Pine Flatwoods (FLUCCS 4110). This parcel is similar to Pond 1B; however, the boundaries of this pond has been disturbed. The site consist of slash pine with an understory of saw palmetto and Brazilian pepper (*Schinus terebinthifolia*). The site has adequate wildlife habitat for the gopher tortoise and other commensal species; therefore, it was given the species rating of "Medium". No listed species or burrows were observed during the field survey. No jurisdictional wetlands or surface waters are present; therefore, the site was given a wetland rating of "No".

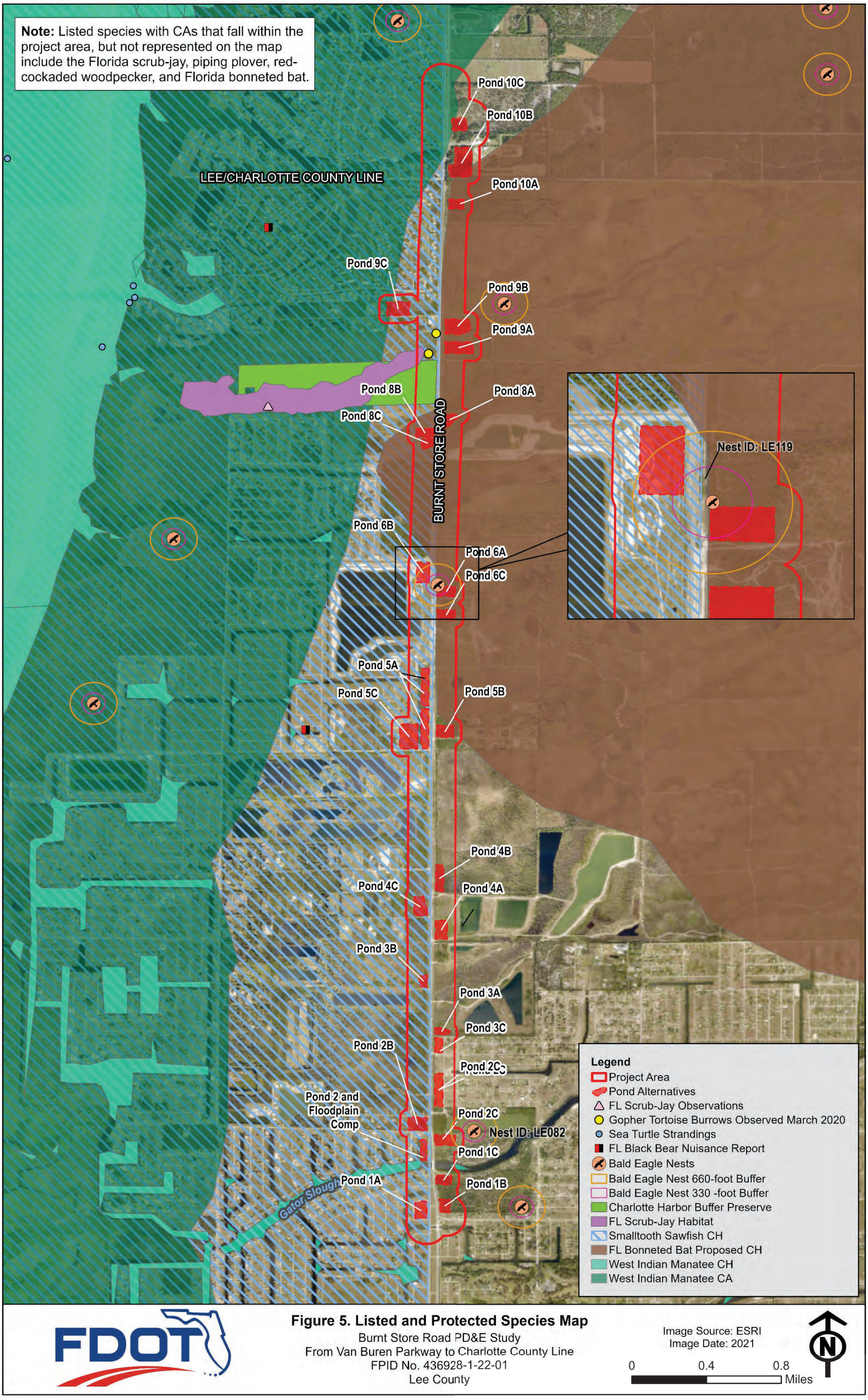
BASIN 2

Pond 2 and Floodplain Compensation Area (1.99 acres; 0% wetland) is located north of Gator Slough Canal and west of Burnt Store. It is mapped and field verified as Rural Residential (FLUCCS 118). However, it was undeveloped undeveloped during the field reviews in April 2022. The site consists of a 10% or less canopy of longleaf pine and slash pine with various grasses covering the extent of the parcel and sparse, low-lying brushes and shrubs bordering the perimeter of the parcel. The site has adequate wildlife habitat for the gopher tortoise and other commensal species; therefore, it was given the species rating of "Medium". No listed species or burrows were observed during the field survey. No jurisdictional wetlands or surface waters are present; therefore, the site was given a wetland rating of "No".

Pond 2A (3.55 acres; 0% wetland) is located east of Burnt Store Road and just south of Kismet Parkway West. The site is mapped and field verified as Palmetto Prairies (FLUCCS 3210). Bald eagle nest LE082 is located approximately 480-feet northwest of the pond site (see **Figure 5**). According to EagleWatch, the nest was inactive from 2018 to 2021; the nest was last active in 2017. No listed species or burrows were observed during field surveys. The site has adequate wildlife habitat for the gopher tortoise and other commensal species; therefore, it was given the species rating of "Medium". No jurisdictional wetlands or surface waters are present; therefore, the site was given a wetland rating of "No".

Pond 2B (3.93 acres; 0% wetland) is located west of Burnt Store Road and just north of Kismet Parkway West. It is mapped as Hardwood – Coniferous Mixed (FLUCCS 4340); however, during the field visit it was reclassified as Pine Flatwoods (FLUCCS 4110). The site has adequate wildlife habitat for the gopher tortoise and other commensal species; therefore, it was given the species rating of "Medium". No listed species or burrows were observed during the field survey. No jurisdictional wetlands or surface waters are present; therefore, the site was given a wetland rating of "No".

Figure 5. Listed and Protected Species Map



Pond 2C (4.34 acres; 0% wetland) is located between Burnt Store Road located and NW 31st Place. The site is mapped as Rural Residential (FLUCCS 1180). The parcel is owned by the City of Cape Coral therefore, it does not fit the residential classification and was reclassified as Open Lands (FLUCCS 1900). The site has minimal wildlife habitat value but has the potential to be utilized by gopher tortoise and other commensal species, therefore it was given the species rating of "Low". No listed species or burrows were observed during field surveys. No jurisdictional wetlands or surface waters are present; therefore, the site was given a wetland rating of "No".

BASIN 3

Pond 3A (1.43 acres; 100% wetland) is located east of Burnt Store Road and just north of Pond 3C. It is mapped as Herbaceous (Dry Prairie) (FLUCCS 3100); however, during the field visit it was reclassified as Wetland Scrub (FLUCCS 6310). The site has moderate wildlife habitat value including foraging areas for the wood stork and other wading birds. A gopher tortoise burrow was observed in the berm that wraps around the southern and eastern boundaries of this wetland system. Therefore, it was given a species rating of "Medium". No other species were observed during the field surveys. The majority of the pond site was identified as wetland; therefore, the site was given a wetland rating of "High".

Pond 3B (1.45 acres; 48% wetland) is located west of Burnt Store Road and it is the most northern pond in Basin 3. It is mapped as Upland Hardwood Forests (FLUCCS 4240); however, during the field visit it was reclassified as Mixed Wetland Hardwoods (FLUCCS 6170) and Unimproved Pastures (FLUCCS 2120). The site has minimal wildlife habitat that could support wetland including the wood stork and other wading birds as well as upland dependent species therefore it was given the species rating of "Low". No listed species were observed during field surveys. The majority of the pond site was identified as wetland; therefore, the site was given a wetland rating of "High".

Pond 3C (1.77 acres; 0% wetland) is located east of Burnt Store Road, north of NW 26th Terrace, and west of NW 31st Place. It is mapped as Rural Residential (FLUCCS 1180). The parcel is owned by the City of Cape Coral therefore, it does not fit the residential classification and was reclassified as Open Lands (FLUCCS 1900). The site has minimal wildlife habitat value but has the potential to be utilized by gopher tortoise and other commensal species, therefore it was given the species rating of "Low". No listed species or burrows were observed during field surveys. No jurisdictional wetlands or surface waters are present; therefore, the site was given a wetland rating of "No".

BASIN 4

Pond 4A (3.69 acres; 0% wetland) is located south of Janis Road and east of Burnt Store Road. It is mapped and field verified as Disturbed Lands (FLUCCS 7400). No listed species or burrows were observed during field surveys. The site has minimal wildlife habitat value for any listed or protected species therefore it was given the species rating of "Low". No jurisdictional wetlands or surface waters are present; therefore, the site was given a wetland rating of "No".

Pond 4B (3.37 acres; 88% wetland) is located east of Burnt Store Road and just north of borrow pits. The majority of this pond site is mapped as Melaleuca (FLUCCS 4240), with a small percentage of Pine Flatwoods (FLUCCS 4110) and Mixed Rangeland (FLUCCS 3300). However, during the field visit the area that was classified as FLUCCS 4240 was reclassified as Exotic Wetland Hardwoods (FLUCCS 6190). The site has minimal wildlife habitat value but has the potential to be utilized by gopher tortoise and other commensal species as well as the wood stork ad other wading birds, therefore it was given the species rating of "Low". No listed species or burrows were observed during field surveys. The majority of the pond site was identified as wetland; therefore, the site was given a wetland rating of "High".

Pond 4C (3.73 acres; 8% wetland) is located west of Burnt Store Road and north of Janis Road. It is mapped as Pine Flatwoods and Mixed Wetland Hardwoods (FLUCCS 4110 and 6190). However, during the field visit it was reclassified as Herbaceous (Dry Prairie) (FLUCCS 3100) in the placement of FLUCCS 4110 with a sliver of FLUCCS 6190 along the eastern boundary running the entire extent of the pond site. The site has minimal wildlife habitat that could support wetland including the wood stork and other wading birds as well as upland dependent species therefore it was given the species rating of "Low". No listed species were observed during field surveys. Minimal wetlands or surface waters are present; therefore, the site was given a wetland rating of "Low".

BASIN 5

Pond 5A (9.40 acres; 0% wetland) is located west of Burnt Store Road and north of Caloosa Parkway. It is mapped and field verified as Rural Residential (FLUCCS 1180). The site has minimal wildlife habitat value but has the potential to be utilized by gopher tortoise and other commensal species, therefore it was given the species rating of "Low". No listed species or burrows were observed during field surveys. No jurisdictional wetlands or surface waters are present; therefore, the site was given a wetland rating of "No".

Pond 5B (3.40 acres; 0% wetland) is located east of Burnt Store Road, north of Sanctuary Estates Drive and south of James Walter Lane. It is mapped and field verified as Pine Flatwoods (FLUCCS 4110). The site has adequate wildlife habitat for the gopher tortoise and other commensal species; therefore, it was given the species rating of "Medium". No listed species or burrows were observed during the field survey. No jurisdictional wetlands or surface waters are present; therefore, the site was given a wetland rating of "No".

Pond 5C (7.28 acres; 0% wetland) is located west of Burnt Store Road, north of Caloosa Parkway, and just west of Pond 5A. It is mapped as Rural Residential (FLUCCS 1180). The parcel is owned by the City of Cape Coral therefore, it does not fit the residential classification and was reclassified as Disturbed Lands (7400). No listed species or burrows were observed during field surveys. The site has minimal wildlife habitat value for any listed or protected species therefore it was given the species rating of "Low". No jurisdictional wetlands or surface waters are present; therefore, the site was given a wetland rating of "No".

BASIN 6

Pond 6A (3.03 acres; 35% wetland) is located east of Burnt Store Road, and it is mapped and field verified as Pine Flatwoods and Hydric Pine Flatwoods (FLUCCS 4110 and 6250). The site has ample wildlife habitat that could support wetland like the wood stork and other wading birds as well as upland dependent species therefore it was given the species rating of "Medium/High". A bald eagle nest, LE119, is located within 330-feet of the pond site. It was first recorded in September 2020 and last known active in November 2020. It was recorded as unsuccessful in the 2020-2021 nesting season and inactive during the 2021-2022 nesting season. After five years, the nest is no longer deemed active so the species ranking may downgrade. The nest was not observed during project surveys. No other listed species were observed during field surveys. There were wetlands present; therefore, the site was given a wetland rating of "Medium".

Pond 6B (4.18 acres; 0% wetland) is located south of Durden Parkway and west of Burnt Store Road. It is mapped as Herbaceous (Dry Prairie) (FLUCCS 310); however, development of this parcel was underway during the field review and is reclassified as Recreational (FLUCCS 1800). According to the SFWMD e-permitting website, this parcel is permitted (Permit No. 36-100655-P) for a stormwater facility that will serve approximately 188 acres of recreational and commercial development known as Myriad Luxury Motor Coach Resort. There is little to no habitat for listed species due to development, therefore a species rating of "No" was given. No wetlands were present; therefore, the site was given a wetland rating of "No".

Pond 6C (3.03 acres; 0% wetland) is located east of Burnt Store Road and south of Pond 6A. It is mapped and field verified as Pine Flatwoods and Hydric Pine Flatwoods (FLUCCS 4110 and 6250); however, during the field visit it was reclassified as only Pine Flatwoods (FLUCCS 4110). The site has adequate wildlife habitat for the gopher tortoise and other commensal species; therefore, it was given the species rating of "Medium". No listed species or burrows were observed during the field survey. No jurisdictional wetlands or surface waters are present; therefore, the site was given a wetland rating of "No".

BASIN 7

No ponds are proposed for this basin.

BASIN 8

Pond 8A (2.37 acres; 100% wetland) is located east of Burnt Store Road and north of Burnt Store Acres Lane. The site is mapped as Pine Plantation (FLUCCS 4410); however, during the field visit it was reclassified as Hydric Pine Flatwoods (FLUCCS 6250) due to hydric indicators. The site has ample wildlife habitat for protected and listed species, specifically the Sherman's short-tailed shrew due to dense groundcover and wood stork and other wading birds; therefore, it was given the species rating of "Medium". No listed species were observed during field surveys; however, a bald eagle was observed soaring above heading northwest. The majority of the pond site was identified as wetland; therefore, the site was given a wetland rating of "High".

Pond 8B (2.62 acres; 0% wetland) is located west of Burnt Store Road and is mapped as Unimproved Pastures (FLUCCS 2120). However, during the field visit it was reclassified as Improved Pastures (FLUCCS 2110) and Stream and Waterways (FLUCCS 5100). There is habitat for wood stork and other wading birds available and habitat for the gopher tortoise and other commensal species therefore a species rating of "Low" was given. No listed species were observed during field surveys. Other surface waters are present however, no wetlands are present within the pond footprint; therefore, the site was given a wetland rating of "No".

Pond 8C (1.81 acres; 6% wetland) is located west of Burnt Store Road and is mapped as Unimproved Pastures (FLUCCS 2120). However, during the field visit it was reclassified as Improved Pastures (FLUCCS 2110) and Wet Prairies (FLUCCS 6430). There is habitat for wood stork and other wading birds, and habitat for the gopher tortoise and other commensal species therefore a species rating of "Low" was given. No listed species were observed during field surveys. Minimal wetlands or surface waters are present; therefore, the site was given a wetland rating of "Low".

BASIN 9

Pond 9A (5.29 acres; 16% wetland) is located east of Burnt Store Road and south of Charlee Road. This site is mapped as Pine Flatwoods (FLUCCS 4110). However, during the field visit it was classified as Hydric Pine Flatwoods (FLUCCS 6250) due to some hydric soils in the northern section of the parcel. There is ample habitat for wood stork and other wading birds, and habitat for the gopher tortoise and other commensal species therefore a species rating of "Medium" was given. Minimal wetlands or surface waters are present; therefore, the site was given a wetland rating of "Low".

Pond 9B (5.82 acres; 0% wetland) is located east of Burnt Store Road, south of Charlee Road, and just north of Pond 9A. This site is mapped as Shrub and Brushland (FLUCCS 3210) and Pine Flatwoods (FLUCCS 4110). However, during the field visit the entire parcel was reclassified as FLUCCS 4110. The site has adequate wildlife habitat for the gopher tortoise and other commensal species; therefore, it was given the species rating of "Medium". No listed species or burrows were observed during the field survey. No jurisdictional wetlands or surface waters are present; therefore, the site was given a wetland rating of "No".

Pond 9C (5.03 acres; 99% wetland) is located west of Burnt Store Road and north of Charlee Road and it is mapped as Pine Flatwoods (FLUCCS 4110). However, during the field visit it was reclassified as Hydric Pine Flatwoods (FLUCCS 6250) due to hydric indicators. The site has ample wildlife habitat for listed and protected species including the wood stork and other wading birds. This site has dense groundcover for the Sherman's short-tailed shrew; therefore, it was given the species rating of "Medium". No listed species were observed during field surveys. The majority of the pond site was identified as wetland; therefore, the site was given a wetland rating of "High".

BASIN 10

Pond 10A (2.36 acres; 0% wetland) is located east of Burnt Store Road. The site is mapped and field verified as Hardwood-Coniferous Mixed (FLUCCS 4340) and features all uplands with sparse Melaleuca. The site has habitat for the gopher tortoise and other commensal species with little to no disturbed areas as well as foraging areas for the wood stork and other wading birds; therefore, it was given the species rating of "Medium". No listed species or burrows were observed during field surveys. No jurisdictional wetlands and surface waters are present; therefore, the site was given a wetland rating of "No".

Pond 10B (9.22 acres; 0% wetland) is located north of Vincent Avenue/Charlotte County Line and east of Burnt Store Road. Pond 10B is an existing stormwater facility. It is mapped as Reservoir (FLUCCS 5300). However, it was field verified as Reservoir less than 10 acres (FLUCCS 5340) and Hardwood Coniferous Mixed (FLUCCS 4340). The site has habitat value and has the potential to provide food for the wood stork and wading birds, therefore it was given the species rating of "Medium". Since this pond is already an existing pond which is considered a surface water and not a wetland, the sites were given a wetland rating of "No".

Pond 10C (3.17 acres; 0% wetland) is located north of Vincent Avenue/Charlotte County Line and east of Burnt Store Road. This site is an existing stormwater facility, mapped as a Reservoir (FLUCCS 5300) and further classified as a Reservoir less than 10 acres (FLUCCS 5340). The site has minimal wildlife habitat value for listed species in the area but has the potential to provide foraging for the wood stork and wading birds, therefore it was given the species rating of "Low". Since this pond is already an existing pond which is considered a surface water and not a wetland, the sites were given a wetland rating of "No".

CONCLUSIONS AND RECOMMENDATIONS

Listed Species

Pond site 6B was documented as having a rating of "No", pond sites 1A, 2C, 3B, 3C, 4A, 4B, 4C, 5A, 5C, 8B, 8C, and 10C were documented as protected species involvement as "Low", and pond sites 1B, 1C, 2 and FPC Site, 2A, 2B, 3A, 5B, 6C, 8A, 9A, 9B, 9C, 10A, and 10B had a rating of "Medium". Pond site 6A was ranked "Medium/High" due to presence of an eagle nest that is currently absent but retains protection for several more years. A 100% burrow survey is recommended for "Low" and higher-ranked selected pond sites during final design. A gopher tortoise relocation permit may be required. Wood stork compensation will be required if the overall project impacts more than 0.5-acre of suitable foraging habitat, which is expected to occur. The placement of stormwater ponds are not anticipated to adversely affect the conservation of fish and wildlife, including endangered or threatened species, or their habitats, since the project footprint does not include any known nesting or roosting sites, and minimal habitat known to be specifically utilized by protected species. The results of the analysis are summarized in **Table 2**, Pond Siting T&E and Wetlands Table.

Wetlands

The pond site alternatives that were documented as having a rating of "No" include Ponds 1A, 1B, 1C, 2 and FPC Site, 2A, 2B, 2C, 3C, 4A, 5A, 5B, 5C, 6B, 6C, 8B, 9B, 10A, 10B, and 10C. Pond sites with ratings of "Low" include Ponds 4C, 8C, and 9A. Pond sites 3B and 6A have a rating of "Medium" and sites with

a “High” rating are Sites 3A, 4B, 8A, and 9C. All measures will be taken to avoid or minimize wetland and water quality impacts during the final pond site design, resulting in minimal net loss of wetland habitat that may be used for species foraging, breeding, nesting, or other biological processes. The results of the analysis are summarized in **Table 2**, Pond Siting T&E and Wetlands Table.

Table 2: Pond Siting T&E Wetlands Table

Pond Alternatives	Mapped Land Use / FLUCFCS Code		Wetlands			*Potential Protected Species that would Utilize Habitat	Species Rating	Wetland Rating
	Type	Code	Wetlands Impacts (acres)	% Coverage of Site	Wetland Mitigation Cost ^			
Pond 1A 3.30 ac	Rural Residential	1180	none	0	$0	gopher tortoise, Florida pine snake, Florida burrowing owl, crested caracara, southeastern American kestrel, and Florida bonneted bat	Low	No
Pond 1B 2.31 ac	Pine Flatwoods	4110	none	0	$0	gopher tortoise, Florida pine snake, Florida bonneted bat, southeastern American kestrel, and upland dependent plants	Medium	No
Pond 1C 2.28 ac	Pine Flatwoods	4110	none	0	$0	gopher tortoise, Florida pine snake, Florida bonneted bat, southeastern American kestrel, and upland dependent plants	Medium	No
Pond 2 and FPC 1.99 ac	Rural Residential	1180	none	0	$0	gopher tortoise, Florida pine snake, Florida burrowing owl, crested caracara, southeastern American kestrel, and Florida bonneted bat	Medium	No
Pond 2A 3.55 ac	Palmetto Prairies	3210	none	0	$0	gopher tortoise, Florida pine snake, Florida burrowing owl, crested caracara, southeastern American kestrel, and upland dependent plants	Medium	No
Pond 2B 3.93 ac	Pine Flatwoods	4110	none	0	$0	gopher tortoise, Florida pine snake, Florida bonneted bat, southeastern American kestrel, and upland dependent plants	Medium	No
Pond 2C 4.34 ac	Open Land	1900	none	0	$0	gopher tortoise, Florida pine snake, Florida burrowing owl, crested caracara, southeastern American kestrel, and upland dependent plants	Low	No
Pond 3A 1.43 ac	Wetland Scrub	6310	1.43	100	$112,219	osprey, bald eagle, Florida sandhill crane, Eastern black rail, Sherman's short-tailed shrew, little blue heron, reddish egret, tricolored heron, roseate spoonbill, and wetland dependent plants	Medium	High
Pond 3B 1.45 ac	Mixed Wetland Hardwoods & Unimproved Pastures	6170 & 2120	0.70	48	$72,818	osprey, bald eagle, Florida burrowing owl, crested caracara, southeastern American kestrel, gopher tortoise, Florida pine snake, and protected plants	Low	Medium
Pond 3C 1.77 ac	Open Land	1900	none	0	$0	gopher tortoise, Florida pine snake, Florida burrowing owl, crested caracara, southeastern American kestrel, and upland dependent plants	Low	No
Pond 4A 3.69 ac	Disturbed Lands	7400	none	0	$0	gopher tortoise, Florida pine snake, Florida burrowing owl, crested caracara, southeastern American kestrel, and upland dependent plants	Low	No
Pond 4B 3.37 ac	Pine Flatwoods & Mixed Rangeland	4110 & 3300	2.98	88	$201,225	gopher tortoise, Florida pine snake, Florida burrowing owl, crested caracara, southeastern American kestrel, and upland dependent plants	Low	High

Pond Alternatives	Mapped Land Use / FLUCFCS Code		Wetlands			*Potential Protected Species that would Utilize Habitat	Species Rating	Wetland Rating
	Type	Code	Wetlands Impacts (acres)	% Coverage of Site	Wetland Mitigation Cost ^			
Pond 4C 3.73 ac	Exotic Wetland Hardwoods & Melaleuca	6190 & 4240	0.30	8	$20,258	osprey, bald eagle, Florida bonneted bat, and protected plants	Low	Low
Pond 5A 9.40 ac	Rural Residential	1180	none	0	$0	gopher tortoise, Florida pine snake, Florida burrowing owl, crested caracara, southeastern American kestrel, and Florida bonneted bat	Low	No
Pond 5B 3.40 ac	Pine Flatwoods	4110	none	0	$0	gopher tortoise, Florida pine snake, Florida bonneted bat, southeastern American kestrel, and upland dependent plants	Medium	No
Pond 5C 7.28 ac	Disturbed Lands	7400	none	0	$0	gopher tortoise, Florida pine snake, Florida burrowing owl, crested caracara, and southeastern American kestrel	Low	No
Pond 6A 3.03 ac	Pine Flatwoods & Hydric Pine Flatwoods	4110 & 6250	1.05	35	$109,226	osprey, bald eagle, gopher tortoise, Florida pine snake, Florida bonneted bat, southeastern American kestrel, Eastern black rail, Sherman's short-tailed shrew, and protected plants	Medium/ High	Medium
Pond 6B 4.18 ac	Recreational	1800	none	0	$0	gopher tortoise, Florida burrowing owl, and Florida pine snake	No	No
Pond 6C 3.03 ac	Pine Flatwoods	4110	none	0	$0	gopher tortoise, Florida pine snake, Florida bonneted bat, southeastern American kestrel, and upland dependent plants	Medium	No
Pond 8A 2.37 ac	Hydric Pine Flatwoods	6250	2.37	100	$135,095	osprey, bald eagle, Eastern black rail, Sherman's short-tailed shrew, and wetland dependent plants	Medium	High
Pond 8B 2.62 ac	Impoved Pastures & Stream and Waterways	2110 & 5100	none	0	$0	gopher tortoise, Florida pine snake, Florida bonneted bat, southeastern American kestrel, wood stork, little blue heron, reddish egret, tricolored heron, and roseate spoonbill	Low	No
Pond 8C 1.81 ac	Improved Pastures & Wet Prairies	2110 & 6430	0.10	6	$7,848	Florida bonneted bat, wood stork, Florida sandhill crane, snail kite, little blue heron, reddish egret, tricolored heron, and roseate spoonbill	Low	Low
Pond 9A 5.29 ac	Pine Flatwoods & Hydric Pine Flatwoods	4110 & 6250	0.83	16	$86,341	osprey, bald eagle, gopher tortoise, Florida pine snake, Florida bonneted bat, southeastern American kestrel, Eastern black rail, and Sherman's short-tailed shrew	Medium	Low
Pond 9B 5.82 ac	Pine Flatwoods	4110	none	0	$0	gopher tortoise, Florida pine snake, Florida bonneted bat, southeastern American kestrel, and upland protected plants	Medium	No
Pond 9C 5.03 ac	Hydric Pine Flatwoods	6250	5.00	99	$520,125	osprey, bald eagle, Eastern black rail, Sherman's short-tailed shrew, and wetland dependent plants	Medium	High
Pond 10A 2.36 ac	Hardwood-Coniferous Mixed	4340	none	0	$0	osprey, bald eagle Florida scrub-jay, Florida panthers, gopher tortoise, Florida pine snake, and upland dependent plants	Medium	No

Pond Alternatives	Mapped Land Use / FLUCFCS Code		Wetlands			*Potential Protected Species that would Utilize Habitat	Species Rating	Wetland Rating
	Type	Code	Wetlands Impacts (acres)	% Coverage of Site	Wetland Mitigation Cost ^			
Pond 10B 9.22 ac	Reservoir & Hardwood-Coniferous Mixed	5340 & 4340	none	0	$0	osprey, bald eagle, wood stork, Florida sandhill crane, snail kite, little blue heron, reddish egret, tricolored heron, roseate spoonbill, Florida scrub-jay, Florida panthers, gopher tortoise, Florida pine snake, and protected plants	Medium	No
Pond 10C 3.17 ac	Reservoir	5340	none	0	$0	wood stork, Florida sandhill crane, snail kite, little blue heron, reddish egret, tricolored heron, and roseate spoonbill	Low	No
* Eastern indigo snake has the potential to occur in any of the pond alternatives								
^ = $182,500 was used to calculate estimated mitigation cost based on average dual (state/federal) credit cost in January 2022								

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APPENDIX G

Preliminary Cultural Resources Assessment

PRELIMINARY CULTURAL RESOURCE ASSESSMENT

PROBABILITY ANALYSIS

TECHNICAL MEMORANDUM

PROPOSED POND SITES

Florida Department of Transportation

District One

Burnt Store Road PD&E Study

Limits of Project: From Van Buren Parkway to Charlotte County Line

Lee County, Florida

Financial Management Number: 436928-1-22-01

ETDM Number: 14380

Date: July 2022

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

PRELIMINARY CULTURAL RESOURCE ASSESSMENT
PROBABILITY ANALYSIS
TECHNICAL MEMORANDUM

PROPOSED POND SITES

BURNT STORE ROAD PD&E STUDY
FROM VAN BUREN PARKWAY TO CHARLOTTE COUNTY LINE

LEE COUNTY, FLORIDA

FPID No.: 436928-1-22-01

Prepared for:

Florida Department of Transportation
District One
801 North Broadway Avenue
Bartow, Florida 33830

Prepared by:

Archaeological Consultants, Inc.
8110 Blaikie Court, Suite A
Sarasota, Florida 34240

In association with:

Scalar Consulting, Inc.
13337 North 56th Street
Tampa, Florida 33617

July 2022

1.0 INTRODUCTION

The purpose of this study was to determine, preliminarily, if any significant or potentially significant cultural resources, including archaeological sites and historic resources, will be impacted by the construction of a total 28 proposed pond sites associated with improvements to Burnt Store Road, Lee County (**Figure 1**) (Note: Pond 5A has two parts; Pond 2 is also considered a Floodplain Compensation [FPC] site). Known or potentially significant cultural resources are defined as those sites that are listed, determined eligible, or considered potentially eligible for listing in the National Register of Historic Places (NRHP). All work was conducted in compliance with the provisions of the *National Historic Preservation Act of 1966* (Public Law 89-665), as amended, and the implementing regulations 36 CFR 800, as well as with the provisions contained in the revised Chapter 267, *Florida Statutes* (*FS*).

The study methodology included a review of Florida Master Site File (FMSF) records, NRHP listings, relevant Cultural Resource Assessment Survey (CRAS) reports, the U.S. Department of Agriculture's (USDA) *Soil Survey of Charlotte and Lee Counties, Florida* (USDA 1984a, 1984b), as well as the United States Geological Survey (USGS) Punta Gorda SE and Matlacha quadrangle maps (USGS 1956, 1958, 2013a, 2013b).

As a result of the preliminary study, there are no previously recorded prehistoric or historic archaeological sites recorded within any of the pond sites, although there is one historic and one prehistoric site within one mile. This, combined with the additional background research, resulted in most of the pond sites having a low archaeological potential while only four had a low to moderate potential, and two had a moderate archaeological potential.

For historic resources 46 years of age or older (constructed in 1977 or earlier), there are no resources located within any of the pond sites. However, there is one previously recorded linear resource, a portion of Burnt Store Road (8CH01589), located adjacent to two of the pond sites. It has been determined not eligible for listing in the NRHP by the State Historic Preservation Officer (SHPO). The portion of Burnt Store Road in Lee County has not been recorded.

In conclusion, no proposed pond site should be avoided due to cultural resource issues. Following the selection of preferred pond sites, systematic archaeological field survey is recommended; historical/architectural field survey is also recommended.

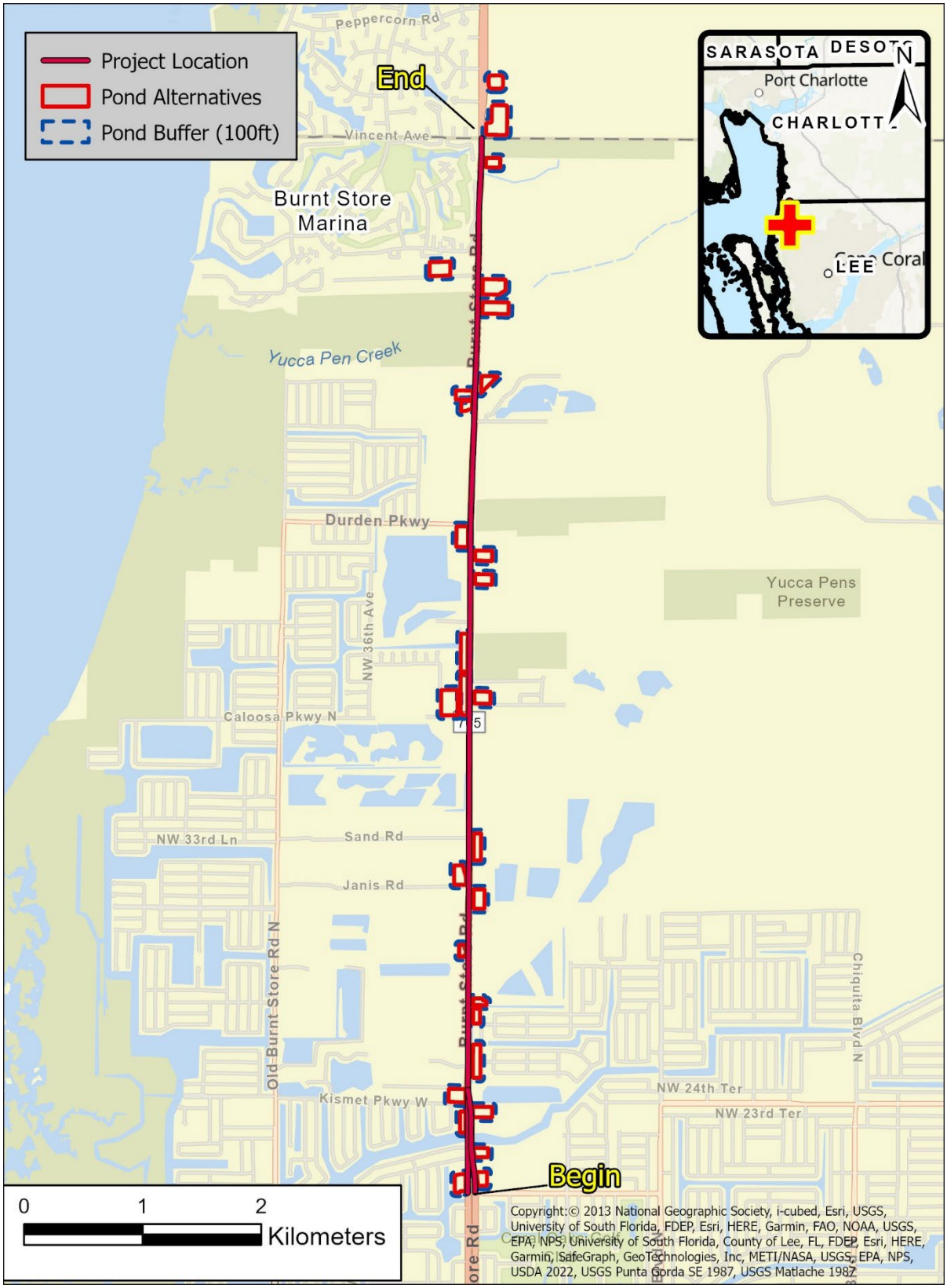

Figure 1. Location of the proposed pond sites.

2.0 DESCRIPTION OF KNOWN ARCHAEOLOGICAL SITES AND HISTORIC RESOURCES POTENTIAL

Archaeological Sites: A check of the FMSF digital database (June 2022) indicated that there are no previously recorded prehistoric or historic archaeological sites located within any of the preliminary pond sites (**Figures 2, 3, 4**). However, one prehistoric and one historic archaeological site is recorded within one mile (**Figure 4**); both were recorded during a survey of the Burnt Store Road Preserve Parcel (Beriault 2007). The prehistoric archaeological site, 8LL02416, Yucca Pen Creek Site, consisted of a sparse scatter of shell, predominately oyster, located on high ground extending into Yucca Pen Creek. The second site, 8LL02417, the Yucca Pen Cabin, is a deteriorated historic homestead that is now destroyed (FMSF 2022); the SHPO determined both sites not eligible for listing in the NRHP.

In addition to the CRAS conducted by Beriault (2007), which found 8LL02416, three other surveys were conducted proximate to the Area of Potential Effects (APE). These include a survey of Burnt Store Acres (ACI 2003), a survey of Section 1, 6, 12, and 13 of T43S-R22E (McCloskey 1980), and a survey of the Myriad Luxury Motorcoach Resort (ACI 2018). No archaeological sites were found during these surveys.

As archaeologists have long realized, aboriginal populations did not select their habitation sites and special activity areas in a random fashion. Rather, many environmental factors had a direct influence upon site location selection. Among these variables are soil types and drainage (**Figures 5-12**), distance to freshwater, relative topography, and proximity to food and other resources including stone and clay. Within the general area, it has been repeatedly demonstrated that archaeological sites are most often located near a permanent or semi-permanent source of potable water. In general, prehistoric sites are found on better drained soils and at the better drained upland margins of wetland features such as swamps, sinkholes, lakes, and ponds. Also, site locations often occur where a diversity of natural habitats could be exploited expeditiously. Based on this preliminary research, most of the pond sites have a low archaeological potential while only four had a low to moderate and two had a moderate archaeological potential (**Table 1**).

Historic Resources: Background research indicated that one previously recorded historic resource is located adjacent to two of the pond sites (**Figure 4**). This site, 8CH01589, is a portion of Burnt Store Road recorded by ACI in 2017. It has been determined not eligible for listing in the NRHP by the SHPO; the portion in Lee County has not been recorded.

The potential for newly identified historic resources was determined by examining the appropriate USGS quadrangle maps, historic aerial imagery, and property appraiser records (Caldwell 2022; Polk 2022). Based on this preliminary research, there are no historic resources, 45 years of age or older (constructed in 1977 or earlier), identified within or adjacent to the proposed pond sites (**Table 1**).

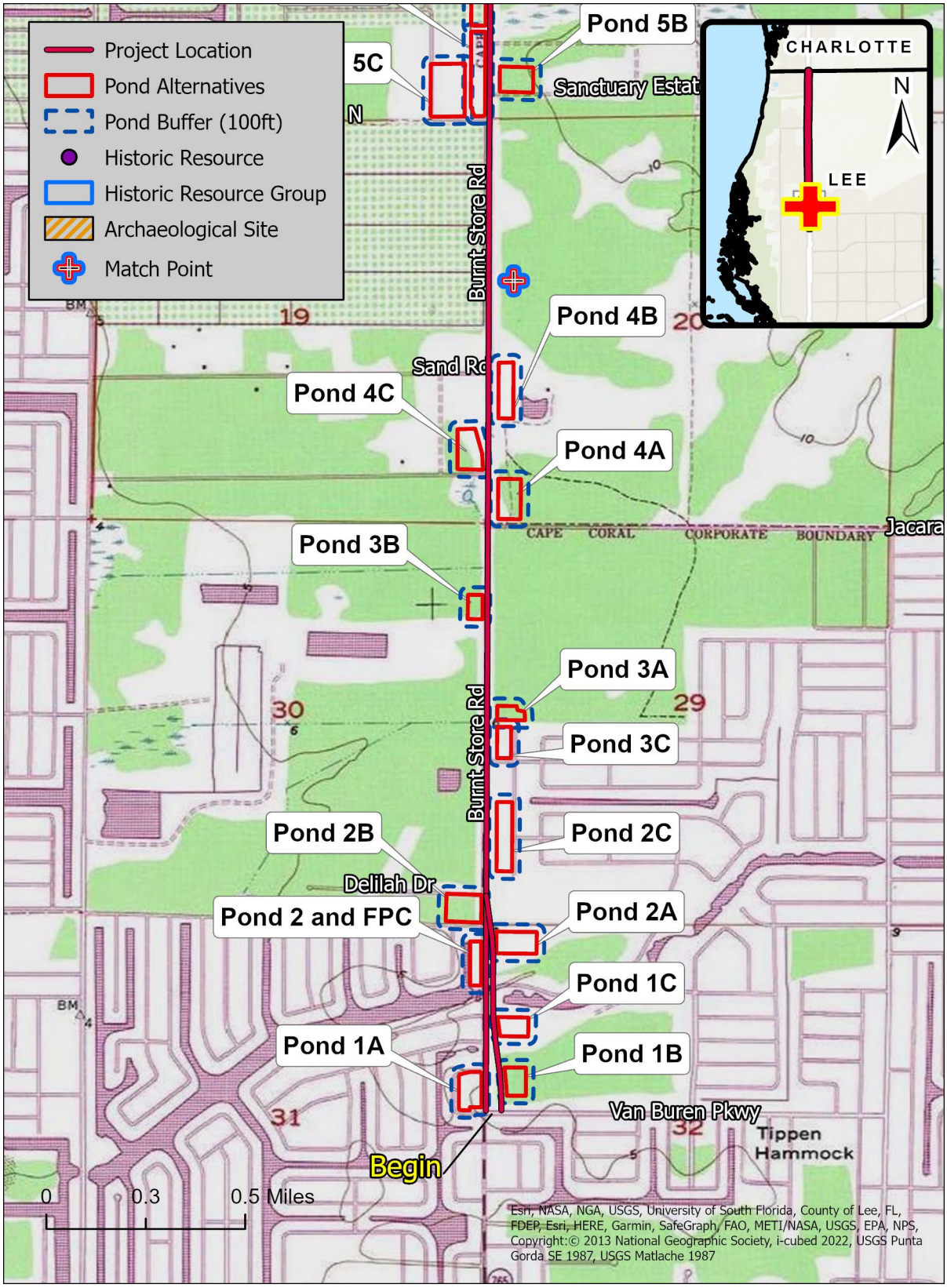

Figure 2. Environmental Setting and previously recorded cultural resources within one mile.

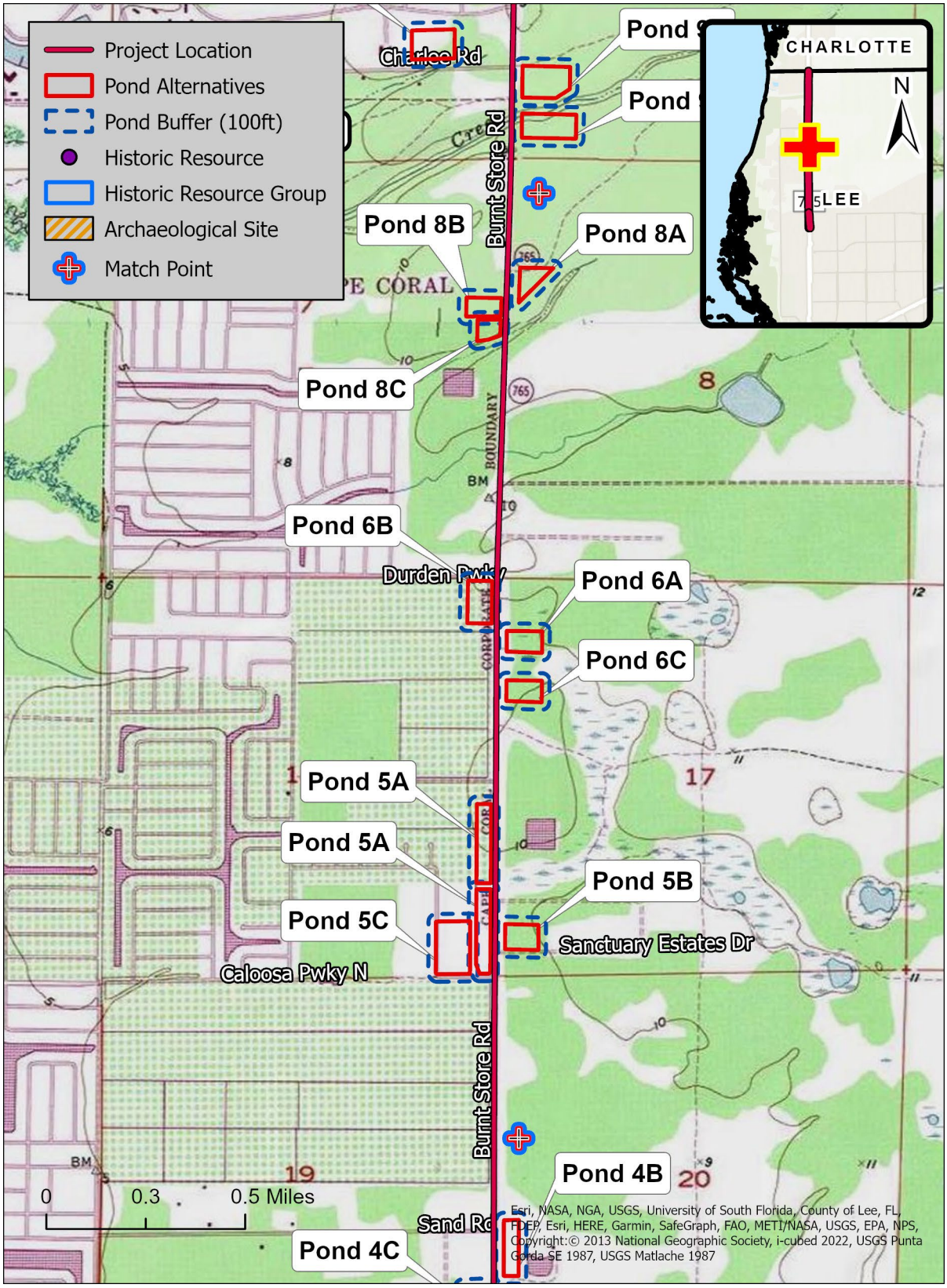

Figure 3. Environmental Setting and previously recorded cultural resources within one mile.

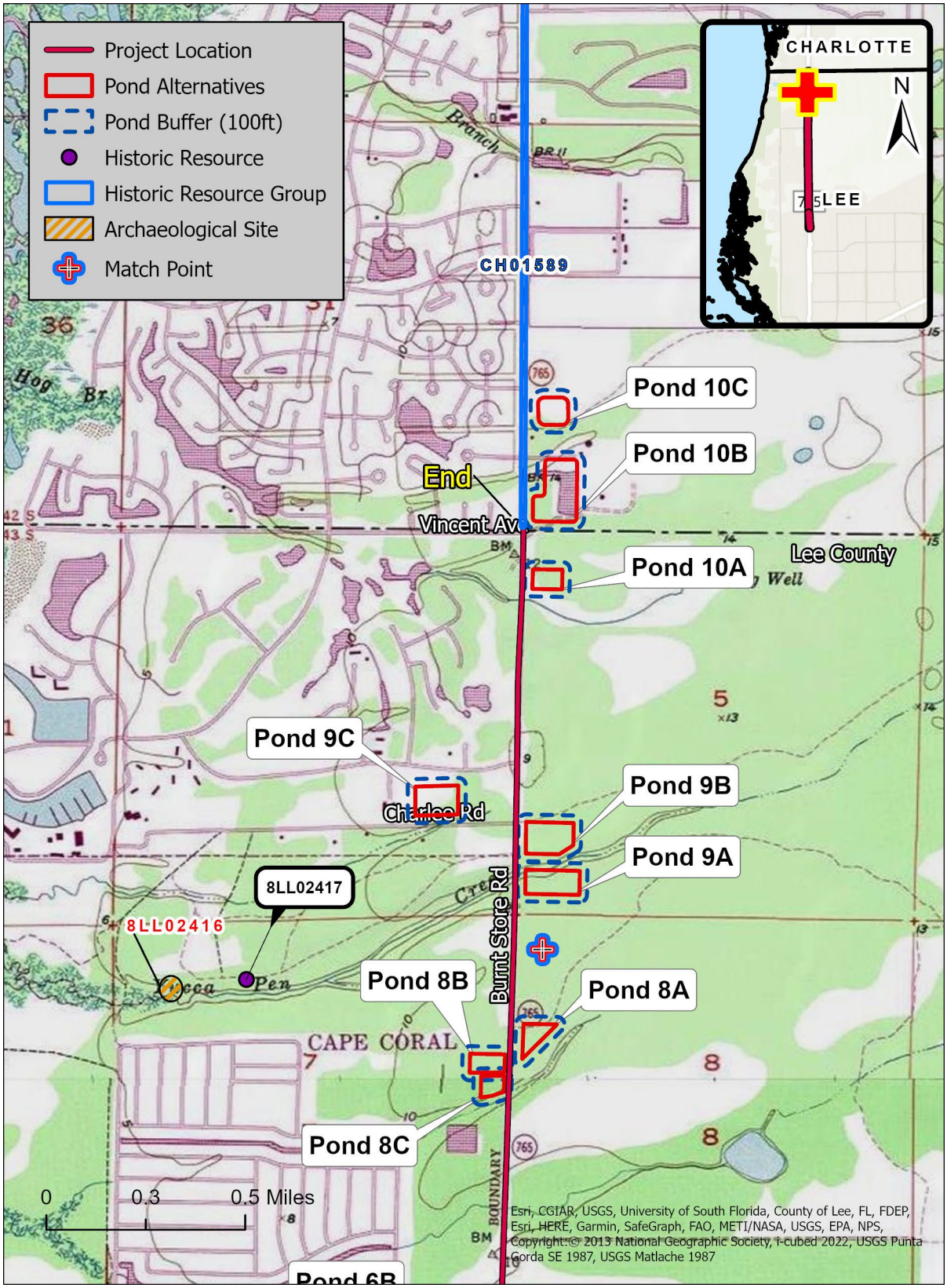

Figure 4. Environmental Setting and previously recorded cultural resources within one mile.

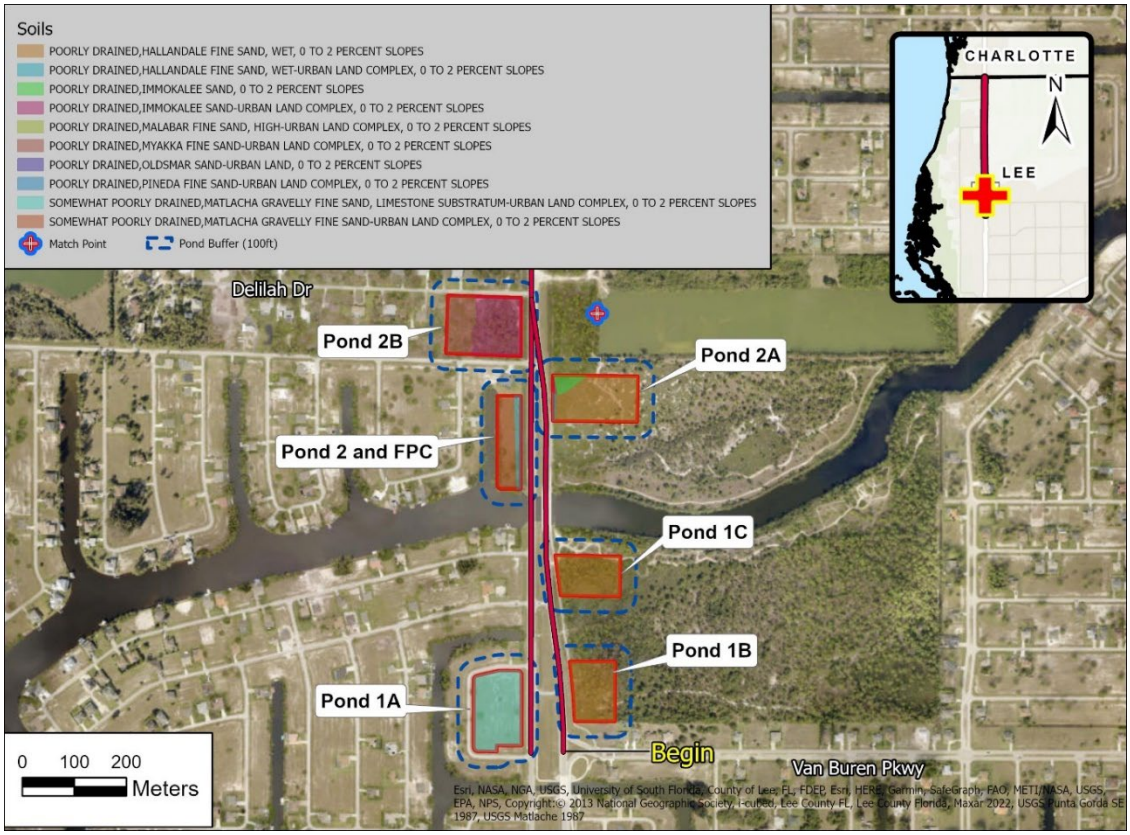

Figure 5. Soils within the pond sites.

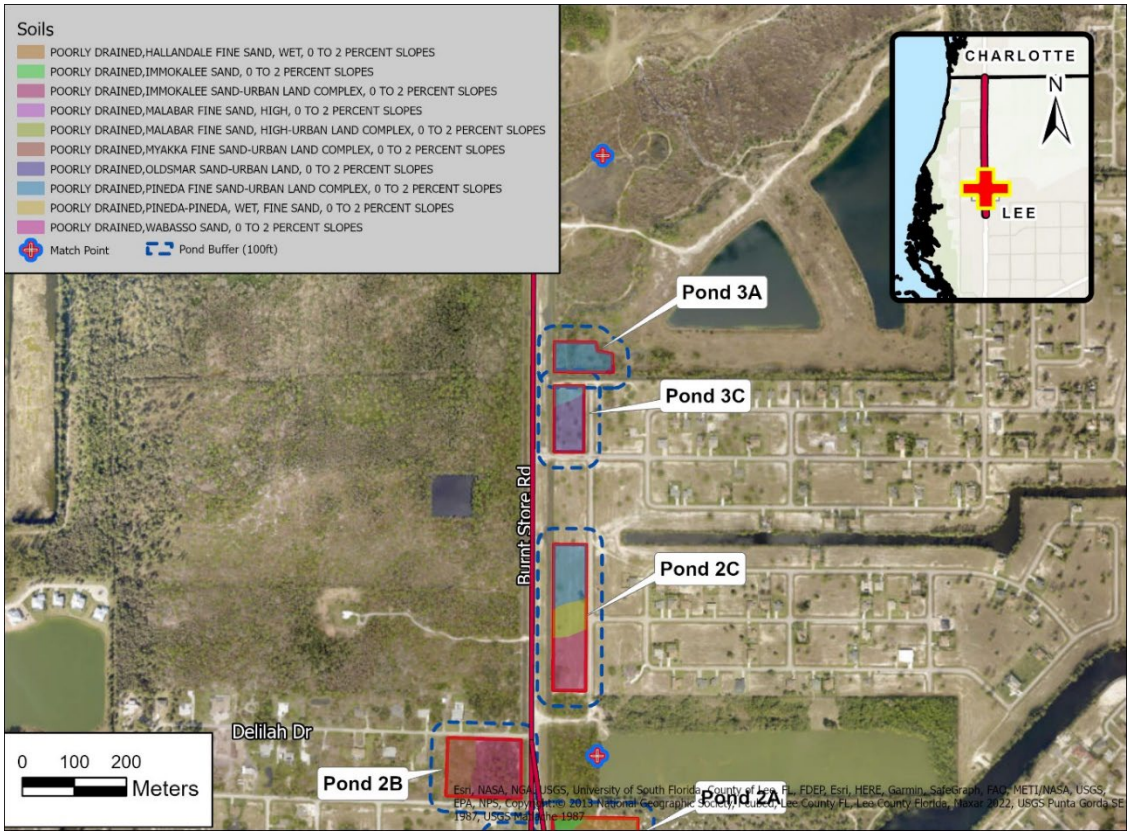

Figure 6. Soils within the pond sites.

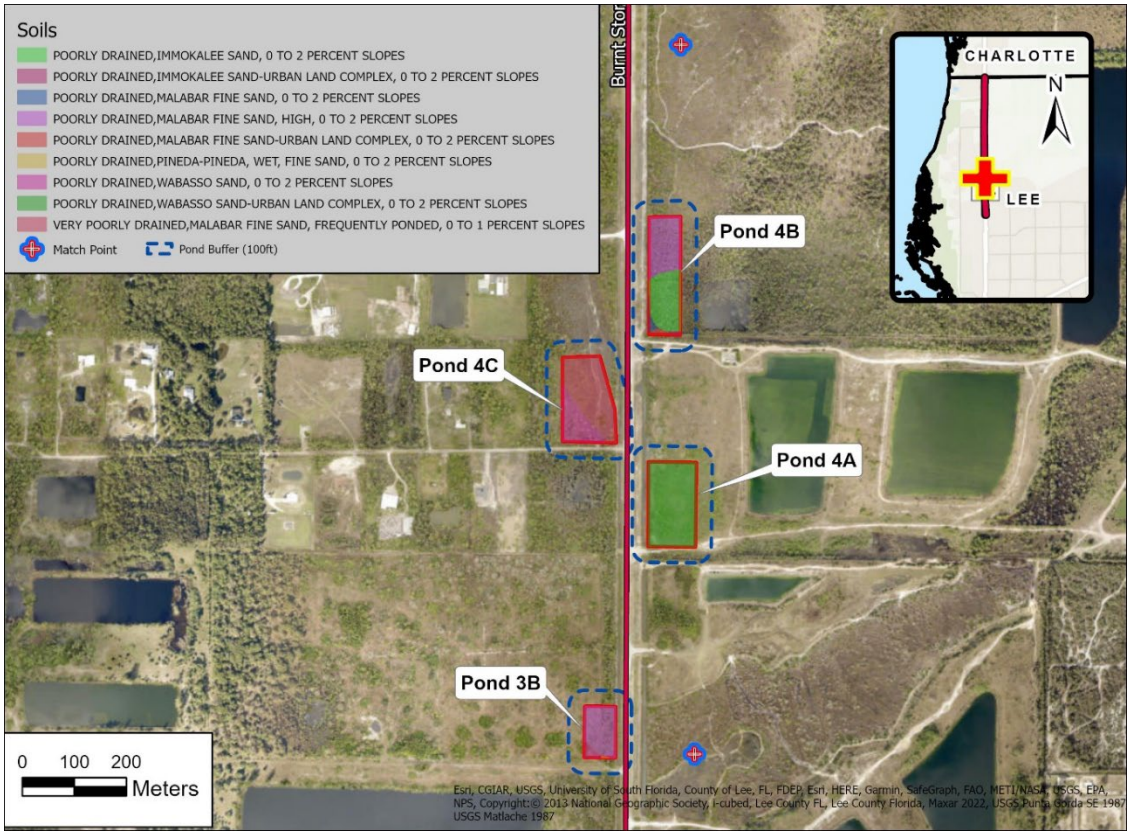

Figure 7. Soils within the pond sites.

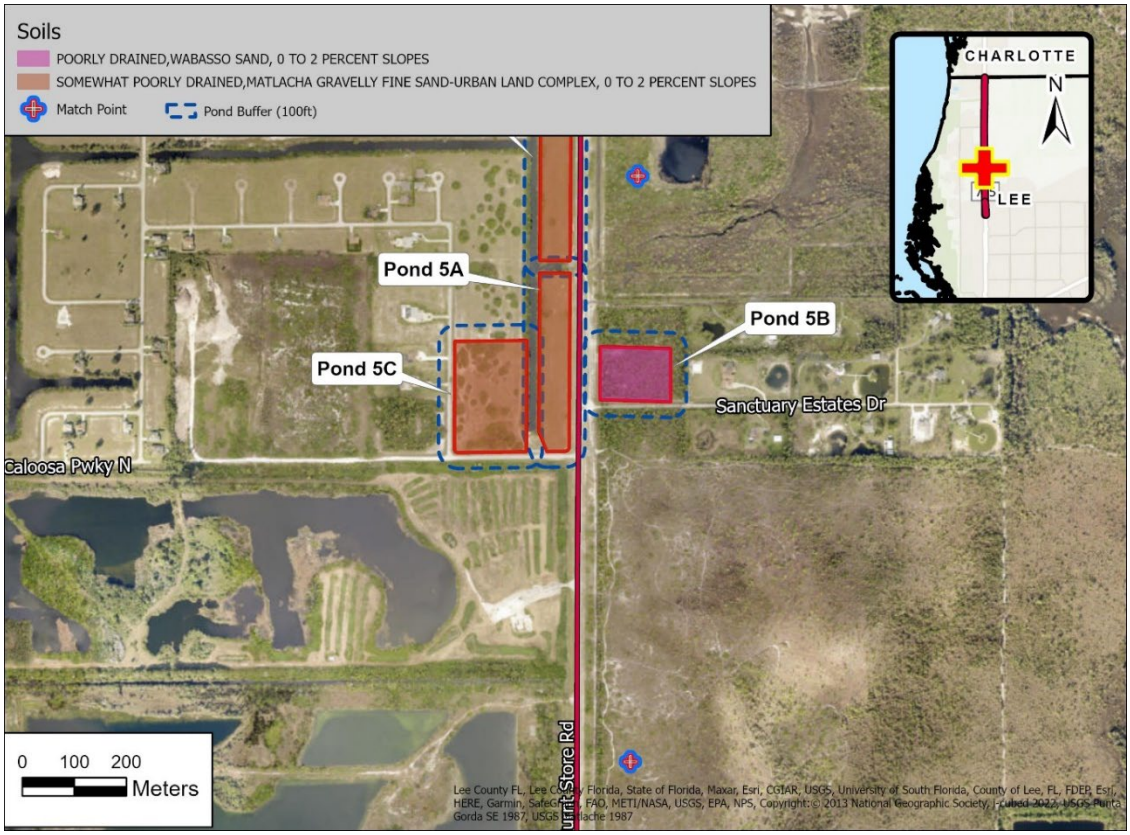

Figure 8. Soils within the pond sites.

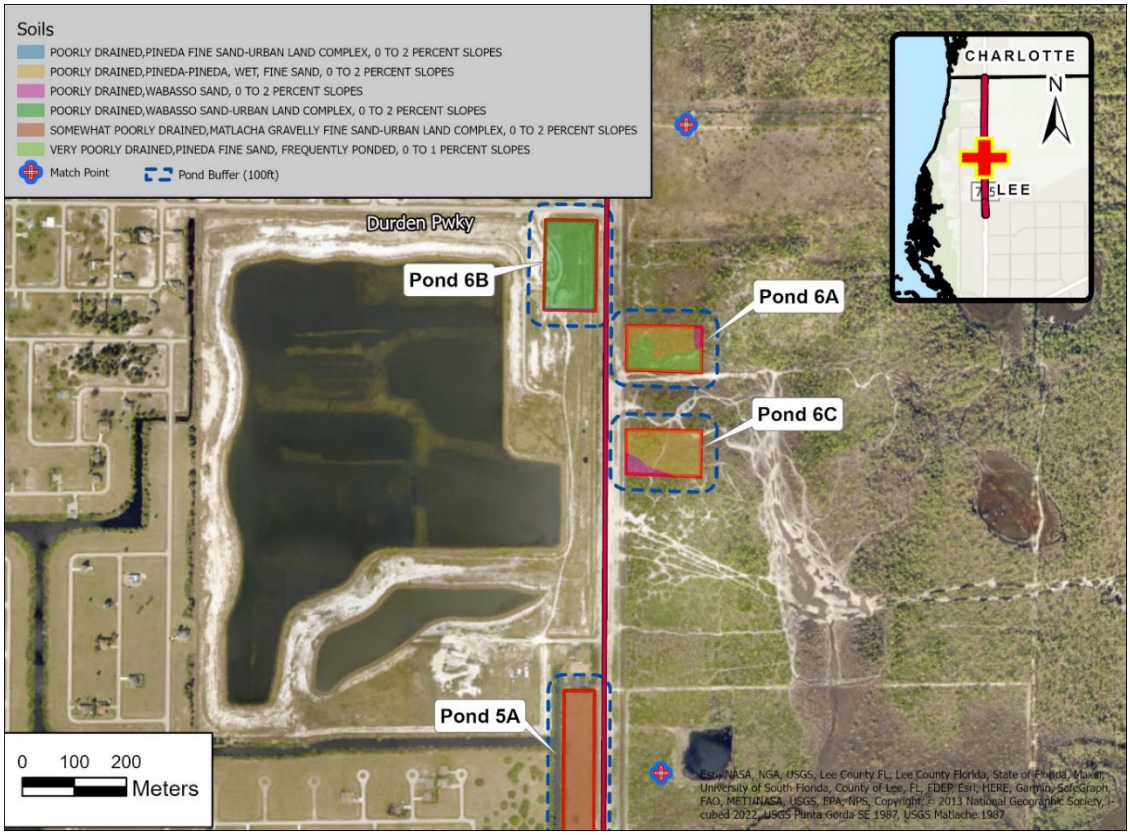

Figure 9. Soils within the pond sites.

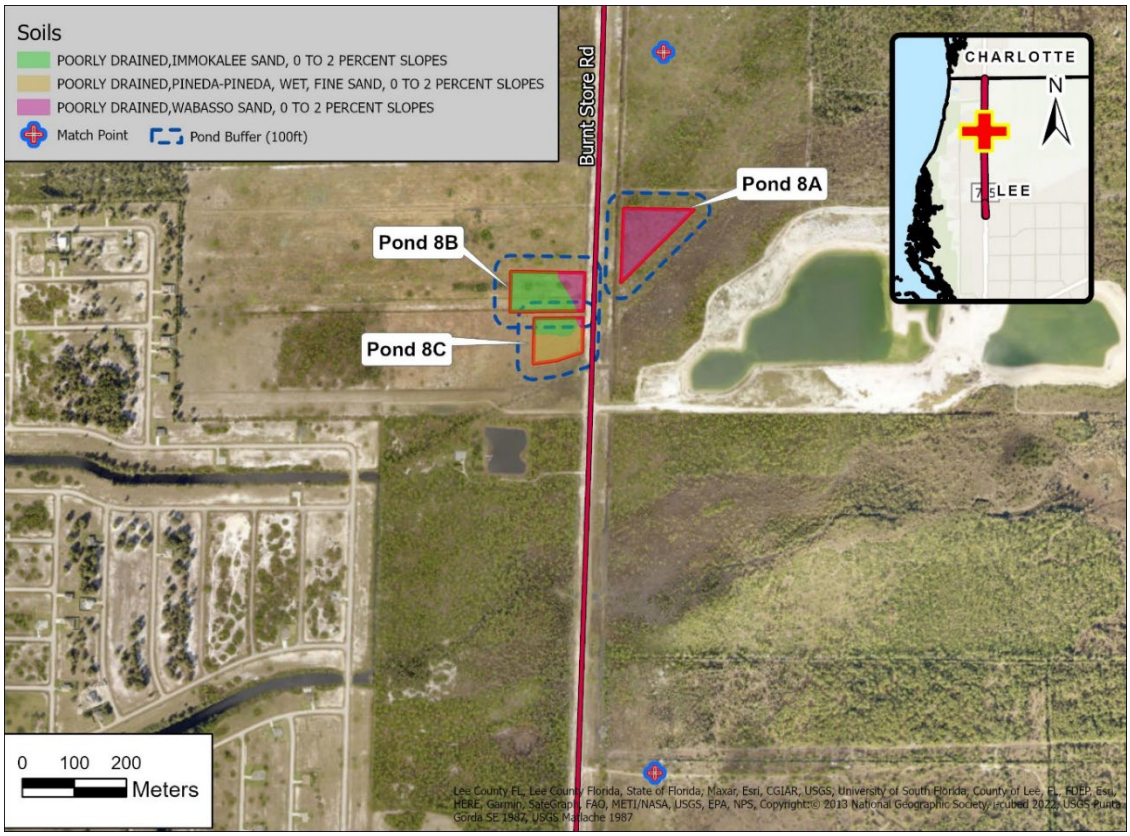

Figure 10. Soils within the pond sites.

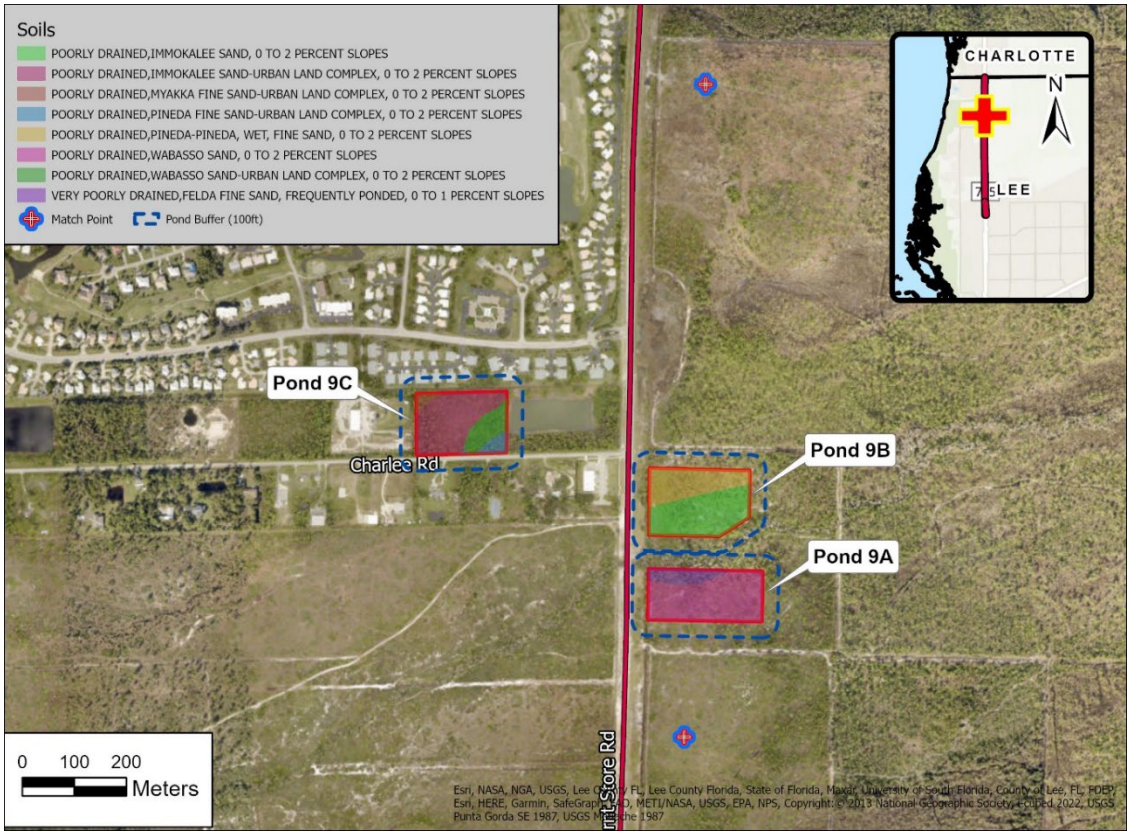

Figure 11. Soils within the pond sites.

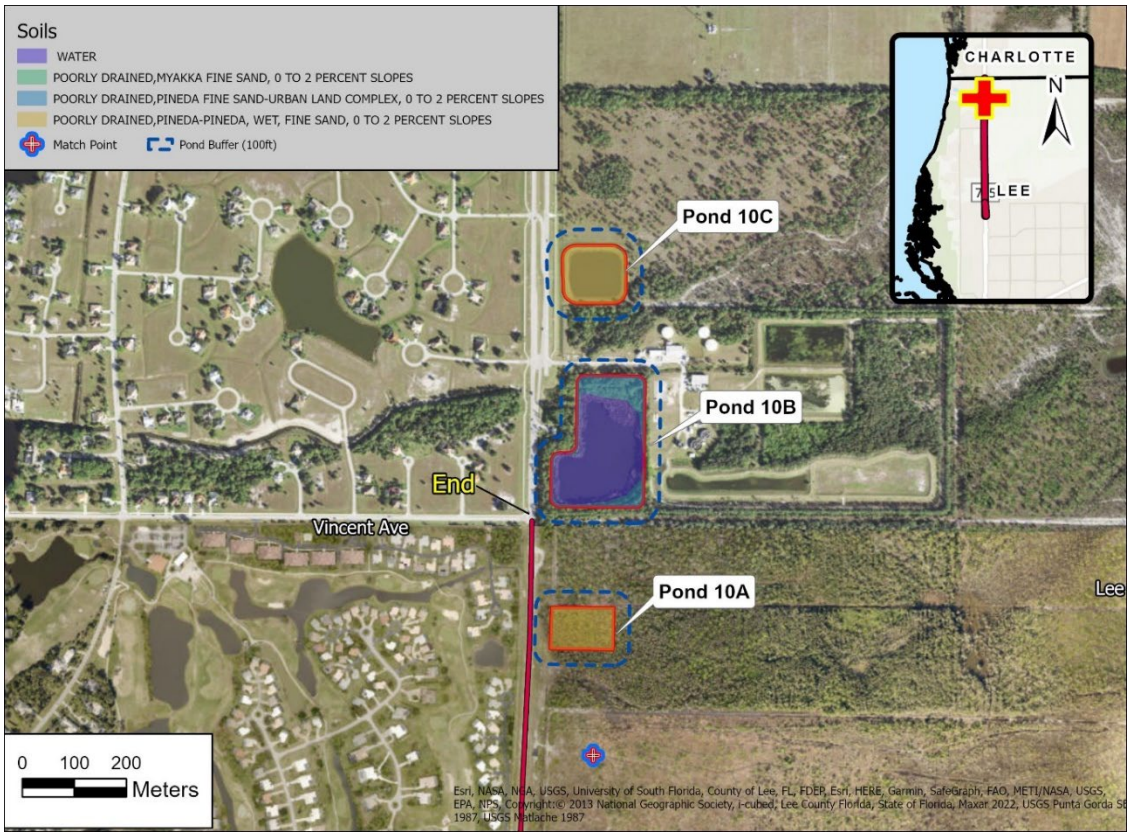

Figure 12. Soils within the pond sites.

Table 1. Archaeological data.

Ponds/ FPC	ZAP*	Comments
POND 1A	Low	Prehistoric Archaeological: no previously recorded sites within or adjacent to proposed pond site
	Low	Historic Archaeological: no previously recorded sites within or adjacent to proposed pond site
POND 1B	Low	Prehistoric Archaeological: no previously recorded sites within or adjacent to proposed pond site
	Low	Historic Archaeological: no previously recorded sites within or adjacent to proposed pond site
POND 1C	Low	Prehistoric Archaeological: no previously recorded sites within or adjacent to proposed pond site
	Low	Historic Archaeological: no previously recorded sites within or adjacent to proposed pond site
POND 2A	Low	Prehistoric Archaeological: no previously recorded sites within or adjacent to proposed pond site
	Low	Historic Archaeological: no previously recorded sites within or adjacent to proposed pond site
POND 2B	Low	Prehistoric Archaeological: no previously recorded sites within or adjacent to proposed pond site
	Low	Historic Archaeological: no previously recorded sites within or adjacent to proposed pond site
POND 2C	Low	Prehistoric Archaeological: no previously recorded sites within or adjacent to proposed pond site
	Low	Historic Archaeological: no previously recorded sites within or adjacent to proposed pond site
POND 2/FPC	Low	Prehistoric Archaeological: no previously recorded sites within or adjacent to proposed pond site
	Low	Historic Archaeological: no previously recorded sites within or adjacent to proposed pond site
POND 3A	Low	Prehistoric Archaeological: no previously recorded sites within or adjacent to proposed pond site
	Low	Historic Archaeological: no previously recorded sites within or adjacent to proposed pond site
POND 3B	Low	Prehistoric Archaeological: no previously recorded sites within or adjacent to proposed pond site
	Low	Historic Archaeological: no previously recorded sites within or adjacent to proposed pond site
POND 3C	Low	Prehistoric Archaeological: no previously recorded sites within or adjacent to proposed pond site
	Low	Historic Archaeological: no previously recorded sites within or adjacent to proposed pond site
POND 4A	Low	Prehistoric Archaeological: no previously recorded sites within or adjacent to proposed pond site
	Low	Historic Archaeological: no previously recorded sites within or adjacent to proposed pond site
POND 4B	Low	Prehistoric Archaeological: no previously recorded sites within or adjacent to proposed pond site
	Low	Historic Archaeological: no previously recorded sites within or adjacent to proposed pond site
POND 4C	Low	Prehistoric Archaeological: no previously recorded sites within or adjacent to proposed pond site
	Low	Historic Archaeological: no previously recorded sites within or adjacent to proposed pond site

Ponds/ FPC	ZAP*	Comments
POND 5A	Low	Prehistoric Archaeological: no previously recorded sites within or adjacent to proposed pond site; on slightly elevated land adjacent to a wetland
	Low	Historic Archaeological: no previously recorded sites within or adjacent to proposed pond site
POND 5B	Low-Moderate	Prehistoric Archaeological: no previously recorded sites within or adjacent to proposed pond site; a portion of the pond is elevated and adjacent to a wetland
	Low	Historic Archaeological: no previously recorded sites within or adjacent to proposed pond site
POND 5C	Low	Prehistoric Archaeological: no previously recorded sites within or adjacent to proposed pond site
	Low	Historic Archaeological: no previously recorded sites within or adjacent to proposed pond site
POND 6A	Low	Prehistoric Archaeological: no previously recorded sites within or adjacent to proposed pond site
	Low	Historic Archaeological: no previously recorded sites within or adjacent to proposed pond site
POND 6B	Low-Moderate	Prehistoric Archaeological: no previously recorded sites within or adjacent to proposed pond site; a portion of the pond is elevated and adjacent to a wetland
	Low	Historic Archaeological: no previously recorded sites within or adjacent to proposed pond site
POND 6C	Low-Moderate	Prehistoric Archaeological: no previously recorded sites within or adjacent to proposed pond site; a portion of the pond is elevated and adjacent to a wetland
	Low	Historic Archaeological: no previously recorded sites within or adjacent to proposed pond site
POND 8A	Low	Prehistoric Archaeological: no previously recorded sites within or adjacent to proposed pond site
	Low	Historic Archaeological: no previously recorded sites within or adjacent to proposed pond site
POND 8B	Low	Prehistoric Archaeological: no previously recorded sites within or adjacent to proposed pond site
	Low	Historic Archaeological: no previously recorded sites within or adjacent to proposed pond site
POND 8C	Low-Moderate	Prehistoric Archaeological: no previously recorded sites within or adjacent to proposed pond site; a portion of the pond is elevated and descends down to a stream
	Low	Historic Archaeological: no previously recorded sites within or adjacent to proposed pond site
POND 9A	Moderate	Prehistoric Archaeological: no previously recorded sites within or adjacent to proposed pond site; a portion of the pond is elevated and descends down to a creek
	Low	Historic Archaeological: no previously recorded sites within or adjacent to proposed pond site
POND 9B	Low	Prehistoric Archaeological: no previously recorded sites within or adjacent to proposed pond site
	Low	Historic Archaeological: no previously recorded sites within or adjacent to proposed pond site
POND 9C	Moderate	Prehistoric Archaeological: no previously recorded sites within or adjacent to proposed FPC site; a portion of the pond is elevated and descends down to a stream
	Low	Historic Archaeological: no previously recorded sites within or adjacent to proposed pond site
POND 10A	Low	Prehistoric Archaeological: no previously recorded sites within or adjacent to proposed pond site
	Low	Historic Archaeological: no previously recorded sites within or adjacent to proposed pond site

Ponds/ FPC	ZAP*	Comments
POND 10B	Low	Prehistoric Archaeological: no previously recorded sites within or adjacent to proposed pond site
	Low	Historic Archaeological: no previously recorded sites within or adjacent to proposed pond site
POND 10C	Low	Prehistoric Archaeological: no previously recorded sites within or adjacent to proposed pond site
	Low	Historic Archaeological: no previously recorded sites within or adjacent to proposed pond site

* Zone of Archaeological Potential

3.0 CONCLUSIONS AND RECOMMENDATIONS

In conclusion, no proposed pond site should be avoided due to cultural resource issues. Following the selection of preferred pond sites, systematic archaeological field survey is recommended in accordance with the guidelines and standards promulgated by the Florida Department of Transportation (FDOT) and Florida Division of Historical Resources (FDHR). The selected pond sites considered to have a low potential also should be surveyed and judgmentally tested. Historical/architectural field survey is also recommended.

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2013a Punta Gorda SE, FL.
2013b Matlacha, FL.

APPENDIX H

Cost Estimate

COST ESTIMATE SUMMARY

Factors	Basin 1			Basin 2			Basin 3			Basin 4			Basin 5		
	Pond 1A	Pond 1B	Pond 1C	Pond 2A	Pond 2B	Pond 2C	Pond 3A	Pond 3B	Pond 3C	Pond 4A	Pond 4B	Pond 4C	Pond 5A	Pond 5B	Pond 5C
Wetland Mitigation	-	-	-	-	-	-	112,219.00	72,818.00	-	-	201,225.00	20,258.00	-	-	-
Parcel Acquisition	2,610,000.00	663,000.00	655,000.00	1,222,000.00	1,410,000.00	1,217,000.00	488,000.00	494,000.00	532,000.00	1,171,000.00	499,000.00	546,000.00	5,407,000.00	1,054,000.00	1,936,000.00
Total Construction Cost	589,863.08	440,860.15	508,502.21	734,012.94	794,855.70	753,485.64	395,263.80	371,986.87	353,751.08	804,542.09	527,956.54	740,108.83	1,619,479.35	963,659.11	1,525,475.19
Total	3,199,863.08	1,103,860.15	1,163,502.21	1,956,012.94	2,204,855.70	1,970,485.64	995,482.80	938,804.87	885,751.08	1,975,542.09	1,228,181.54	1,306,366.83	7,026,479.35	2,017,659.11	3,461,475.19

Factors	Basin 6			Basin 8			Basin 9			Basin 10-L			Basin 10-C		
	Pond 6A	Pond 6B	Pond 6C	Pond 8A	Pond 8B	Pond 8C	Pond 9A	Pond 9B	Pond 9C	Pond 10A			Pond 10B		Pond 10C
Wetland Mitigation	109,226.00	-	-	135,095.00	-	7,848.00	86,341.00	-	520,125.00	-			-		-
Parcel Acquisition	1,847,000.00	3,604,000.00	1,847,000.00	367,000.00	417,000.00	571,000.00	1,098,000.00	1,203,000.00	1,374,000.00	366,000.00			1,267,000.00		
Total Construction Cost	788,972.92	1,063,528.79	788,972.92	259,481.06	341,155.07	226,042.23	1,203,099.19	1,861,365.60	2,014,304.64	414,736.23			42,734.38		20,809.25
Total	2,745,198.92	4,667,528.79	2,635,972.92	761,576.06	758,155.07	804,890.23	2,387,440.19	3,064,365.60	3,908,429.64	780,736.23	-	-	1,309,734.38	-	20,809.25

Note: The cost evaluation for the stormwater management facility alternatives in this report includes stormwater management facility construction costs, costs associated with wetland impacts, and parcel acquisition costs. The stormwater management facility construction costs include cost of installed drainage structures, drainage pipes and outfalls, clearing and grubbing, earthwork, excavation, and sodding. The associated parcel acquisition costs for each alternative evaluated include the estimated cost of land and any impacted improvements, administrative costs, and legal fees.

CONSTRUCTION COST

Pond 1A				
Description	Unit	Quantity	Unit Price	Total Cost
Clearing and grubbing	AC	3.30	$31,576.50	$ 104,202.45
Outfall structure, DBI type C, <10	EA	1	$5,359.30	$ 5,359.30
Manhole, P-7, <10'	EA	2	$8,218.45	$ 16,436.90
Outfall pipe (24")	LF	540	$177.79	$ 96,006.60
Inflow pipe (30")	LF	150	$151.34	$ 22,701.00
Excavation	CY	13,023	$13.68	$ 178,149.69
Performance turf	SY	13891	$3.53	$ 49,034.52
Contingency	LS	1	25%	$ 117,972.62
			TOTAL	**589,863.08**

Pond 1B				
Description	Unit	Quantity	Unit Price	Total Cost
Clearing and grubbing	AC	2.31	$31,576.50	$ 72,941.72
Outfall structure, DBI type C, <10	EA	1	$5,359.30	$ 5,359.30
Manhole, P-7, <10'	EA	0	$8,218.45	$ -
Outfall pipe (24")	LF	70	$177.79	$ 12,445.30
Inflow pipe (30")	LF	110	$151.34	$ 16,647.40
Excavation	CY	14,584	$13.68	$ 199,506.07
Performance turf	SY	12971	$3.53	$ 45,788.34
Contingency	LS	1	25%	$ 88,172.03
			TOTAL	**440,860.15**

Pond 1C				
Description	Unit	Quantity	Unit Price	Total Cost
Clearing and grubbing	AC	2.28	$31,576.50	$ 71,994.42
Outfall structure, DBI type C, <10	EA	1	$5,359.30	$ 5,359.30
Manhole, P-7, <10'	EA	0	$8,218.45	$ -
Outfall pipe (24")	LF	45	$177.79	$ 8,000.55
Inflow pipe (30")	LF	90	$151.34	$ 13,620.60
Excavation	CY	19,155	$13.68	$ 262,038.56
Performance turf	SY	12971	$3.53	$ 45,788.34
Contingency	LS	1	25%	$ 101,700.44
			TOTAL	**508,502.21**

Pond 2A				
Description	Unit	Quantity	Unit Price	Total Cost
Clearing and grubbing	AC	3.55	$31,576.50	$ 112,096.58
Outfall structure, DBI type C, <10	EA	1	$5,359.30	$ 5,359.30
Manhole, P-7, <10'	EA	0	$8,218.45	$ -
Outfall pipe (24")	LF	70	$177.79	$ 12,445.30
Inflow pipe (30")	LF	110	$151.34	$ 16,647.40
Excavation	CY	29,902	$13.68	$ 409,054.16
Performance turf	SY	8954	$3.53	$ 31,607.62
Contingency	LS	1	25%	$ 146,802.59
			TOTAL	**734,012.94**

CONSTRUCTION COST

Pond 2B				
Description	Unit	Quantity	Unit Price	Total Cost
Clearing and grubbing	AC	3.93	$31,576.50	$ 124,095.65
Outfall structure, DBI type C, <10	EA	1	$5,359.30	$ 5,359.30
Manhole, P-7, <10'	EA	1	$8,218.45	$ 8,218.45
Outfall pipe (24")	LF	440	$177.79	$ 78,227.60
Inflow pipe (30")	LF	70	$151.34	$ 10,593.80
Excavation	CY	27,653	$13.68	$ 378,294.70
Performance turf	SY	8809	$3.53	$ 31,095.06
Contingency	LS	1	25%	$ 158,971.14
			TOTAL	**794,855.70**

Pond 2C				
Description	Unit	Quantity	Unit Price	Total Cost
Clearing and grubbing	AC	4.34	$31,576.50	$ 137,042.01
Outfall structure, DBI type C, <10	EA	1	$5,359.30	$ 5,359.30
Manhole, P-7, <10'	EA	0	$8,218.45	$ -
Outfall pipe (24")	LF	70	$177.79	$ 12,445.30
Inflow pipe (30")	LF	70	$151.34	$ 10,593.80
Excavation	CY	29,672	$13.68	$ 405,911.34
Performance turf	SY	8906	$3.53	$ 31,436.77
Contingency	LS	1	25%	$ 150,697.13
			TOTAL	**753,485.64**

Pond 3A				
Description	Unit	Quantity	Unit Price	Total Cost
Clearing and grubbing	AC	1.78	$31,576.50	$ 56,206.17
Outfall structure, DBI type C, <10	EA	1	$5,359.30	$ 5,359.30
Manhole, P-7, <10'	EA	0	$8,218.45	$ -
Outfall pipe (24")	LF	375	$177.79	$ 66,671.25
Inflow pipe (30")	LF	90	$151.34	$ 13,620.60
Excavation	CY	9,223	$13.68	$ 126,173.46
Performance turf	SY	13649	$3.53	$ 48,180.26
Contingency	LS	1	25%	$ 79,052.76
			TOTAL	**395,263.80**

Pond 3B				
Description	Unit	Quantity	Unit Price	Total Cost
Clearing and grubbing	AC	1.73	$31,576.50	$ 54,627.35
Outfall structure, DBI type C, <10	EA	1	$5,359.30	$ 5,359.30
Manhole, P-7, <10'	EA	1	$8,218.45	$ 8,218.45
Outfall pipe (24")	LF	215	$177.79	$ 38,224.85
Inflow pipe (30")	LF	85	$151.34	$ 12,863.90
Excavation	CY	9,486	$13.68	$ 129,773.68
Performance turf	SY	13746	$3.53	$ 48,521.97
Contingency	LS	1	25%	$ 74,397.37
			TOTAL	**371,986.87**

CONSTRUCTION COST

Pond 3C				
Description	Unit	Quantity	Unit Price	Total Cost
Clearing and grubbing	AC	1.77	$31,576.50	$ 55,890.41
Outfall structure, DBI type C, <10	EA	1	$5,359.30	$ 5,359.30
Manhole, P-7, <10'	EA	1	$8,218.45	$ 8,218.45
Outfall pipe (24")	LF	200	$177.79	$ 35,558.00
Inflow pipe (30")	LF	120	$151.34	$ 18,160.80
Excavation	CY	8,098	$13.68	$ 110,779.39
Performance turf	SY	13891	$3.53	$ 49,034.52
Contingency	LS	1	25%	$ 70,750.22
			TOTAL	**353,751.08**

Pond 4A				
Description	Unit	Quantity	Unit Price	Total Cost
Clearing and grubbing	AC	3.69	$31,576.50	$ 116,517.29
Outfall structure, DBI type C, <10	EA	1	$5,359.30	$ 5,359.30
Manhole, P-7, <10'	EA	1	$8,218.45	$ 8,218.45
Outfall pipe (24")	LF	265	$177.79	$ 47,114.35
Inflow pipe (30")	LF	140	$151.34	$ 21,187.60
Excavation	CY	30,361	$13.68	$ 415,337.59
Performance turf	SY	8470	$3.53	$ 29,899.10
Contingency	LS	1	25%	$ 160,908.42
			TOTAL	**804,542.09**

Pond 4B				
Description	Unit	Quantity	Unit Price	Total Cost
Clearing and grubbing	AC	3.37	$31,576.50	$ 106,412.81
Outfall structure, DBI type C, <10	EA	1	$5,359.30	$ 5,359.30
Manhole, P-7, <10'	EA	0	$8,218.45	$ -
Outfall pipe (24")	LF	65	$177.79	$ 11,556.35
Inflow pipe (30")	LF	100	$151.34	$ 15,134.00
Excavation	CY	18,093	$13.68	$ 247,511.30
Performance turf	SY	10309	$3.53	$ 36,391.48
Contingency	LS	1	25%	$ 105,591.31
			TOTAL	**527,956.54**

Pond 4C				
Description	Unit	Quantity	Unit Price	Total Cost
Clearing and grubbing	AC	3.73	$31,576.50	$ 117,780.35
Outfall structure, DBI type C, <10	EA	1	$5,359.30	$ 5,359.30
Manhole, P-7, <10'	EA	1	$8,218.45	$ 8,218.45
Outfall pipe (24")	LF	320	$177.79	$ 56,892.80
Inflow pipe (30")	LF	160	$151.34	$ 24,214.40
Excavation	CY	25,652	$13.68	$ 350,918.63
Performance turf	SY	8131	$3.53	$ 28,703.14
Contingency	LS	1	25%	$ 148,021.77
			TOTAL	**740,108.83**

CONSTRUCTION COST

Pond 5A				
Description	Unit	Quantity	Unit Price	Total Cost
Clearing and grubbing	AC	9.4	$31,576.50	$ 296,819.10
Outfall structure, DBI type C, <10	EA	1	$5,359.30	$ 5,359.30
Manhole, P-7, <10'	EA	0	$8,218.45	$ -
Outfall pipe (24")	LF	120	$177.79	$ 21,334.80
Inflow pipe (30")	LF	180	$151.34	$ 27,241.20
Excavation	CY	68,529	$13.68	$ 937,482.44
Performance turf	SY	2081	$3.53	$ 7,346.64
Contingency	LS	1	25%	$ 323,895.87
			TOTAL	**1,619,479.35**

Pond 5B				
Description	Unit	Quantity	Unit Price	Total Cost
Clearing and grubbing	AC	3.4	$31,576.50	$ 107,360.10
Outfall structure, DBI type C, <10	EA	1	$5,359.30	$ 5,359.30
Manhole, P-7, <10'	EA	1	$8,218.45	$ 8,218.45
Outfall pipe (24")	LF	515	$177.79	$ 91,561.85
Inflow pipe (30")	LF	100	$151.34	$ 15,134.00
Excavation	CY	37,491	$13.68	$ 512,881.93
Performance turf	SY	8615	$3.53	$ 30,411.66
Contingency	LS	1	25%	$ 192,731.82
			TOTAL	**963,659.11**

Pond 5C				
Description	Unit	Quantity	Unit Price	Total Cost
Clearing and grubbing	AC	7.28	$31,576.50	$ 229,876.92
Outfall structure, DBI type C, <10	EA	1	$5,359.30	$ 5,359.30
Manhole, P-7, <10'	EA	1	$8,218.45	$ 8,218.45
Outfall pipe (24")	LF	150	$177.79	$ 26,668.50
Inflow pipe (30")	LF	680	$151.34	$ 102,911.20
Excavation	CY	61,141	$13.68	$ 836,411.26
Performance turf	SY	3098	$3.53	$ 10,934.53
Contingency	LS	1	25%	$ 305,095.04
			TOTAL	**1,525,475.19**

Pond 6A				
Description	Unit	Quantity	Unit Price	Total Cost
Clearing and grubbing	AC	3.03	$31,576.50	$ 95,676.80
Outfall structure, DBI type C, <10	EA	1	$5,359.30	$ 5,359.30
Manhole, P-7, <10'	EA	1	$8,218.45	$ 8,218.45
Outfall pipe (24")	LF	440	$177.79	$ 78,227.60
Inflow pipe (30")	LF	90	$151.34	$ 13,620.60
Excavation	CY	28,691	$13.68	$ 392,488.15
Performance turf	SY	10648	$3.53	$ 37,587.44
Contingency	LS	1	25%	$ 157,794.58
			TOTAL	**788,972.92**

CONSTRUCTION COST

Pond 6B				
Description	Unit	Quantity	Unit Price	Total Cost
Clearing and grubbing	AC	4.18	$31,576.50	$ 131,989.77
Outfall structure, DBI type C, <10	EA	1	$5,359.30	$ 5,359.30
Manhole, P-7, <10'	EA	1	$8,218.45	$ 8,218.45
Outfall pipe (24")	LF	310	$177.79	$ 55,114.90
Inflow pipe (30")	LF	90	$151.34	$ 13,620.60
Excavation	CY	44,743	$13.68	$ 612,088.17
Performance turf	SY	6921	$3.53	$ 24,431.84
Contingency	LS	1	25%	$ 212,705.76
			TOTAL	**1,063,528.79**

Pond 6C				
Description	Unit	Quantity	Unit Price	Total Cost
Clearing and grubbing	AC	3.03	$31,576.50	$ 95,676.80
Outfall structure, DBI type C, <10	EA	1	$5,359.30	$ 5,359.30
Manhole, P-7, <10'	EA	1	$8,218.45	$ 8,218.45
Outfall pipe (24")	LF	440	$177.79	$ 78,227.60
Inflow pipe (30")	LF	90	$151.34	$ 13,620.60
Excavation	CY	28,691	$13.68	$ 392,488.15
Performance turf	SY	10648	$3.53	$ 37,587.44
Contingency	LS	1	25%	$ 157,794.58
			TOTAL	**788,972.92**

Pond 8A				
Description	Unit	Quantity	Unit Price	Total Cost
Clearing and grubbing	AC	2.77	$31,576.50	$ 87,466.91
Outfall structure, DBI type C, <10	EA	1	$5,359.30	$ 5,359.30
Manhole, P-7, <10'	EA	0	$8,218.45	$ -
Outfall pipe (24")	LF	80	$177.79	$ 14,223.20
Inflow pipe (30")	LF	105	$151.34	$ 15,890.70
Excavation	CY	2,940	$13.68	$ 40,223.22
Performance turf	SY	12584	$3.53	$ 44,421.52
Contingency	LS	1	25%	$ 51,896.21
			TOTAL	**259,481.06**

Pond 8B				
Description	Unit	Quantity	Unit Price	Total Cost
Clearing and grubbing	AC	2.62	$31,576.50	$ 82,730.43
Outfall structure, DBI type C, <10	EA	1	$5,359.30	$ 5,359.30
Manhole, P-7, <10'	EA	1	$8,218.45	$ 8,218.45
Outfall pipe (24")	LF	440	$177.79	$ 78,227.60
Inflow pipe (30")	LF	90	$151.34	$ 13,620.60
Excavation	CY	3,049	$13.68	$ 41,712.97
Performance turf	SY	12197	$3.53	$ 43,054.70
Contingency	LS	1	25%	$ 68,231.01
			TOTAL	**341,155.07**

CONSTRUCTION COST

Pond 8C				
Description	Unit	Quantity	Unit Price	Total Cost
Clearing and grubbing	AC	2.12	$31,576.50	$ 66,942.18
Outfall structure, DBI type C, <10	EA	1	$5,359.30	$ 5,359.30
Manhole, P-7, <10'	EA	0	$8,218.45	$ -
Outfall pipe (24")	LF	50	$177.79	$ 8,889.50
Inflow pipe (30")	LF	90	$151.34	$ 13,620.60
Excavation	CY	2,916	$13.68	$ 39,892.17
Performance turf	SY	13068	$3.53	$ 46,130.04
Contingency	LS	1	25%	$ 45,208.45
			TOTAL	**226,042.23**

Pond 9A				
Description	Unit	Quantity	Unit Price	Total Cost
Clearing and grubbing	AC	5.29	$31,576.50	$ 167,039.69
Outfall structure, DBI type C, <10	EA	1	$5,359.30	$ 5,359.30
Manhole, P-7, <10'	EA	0	$8,218.45	$ -
Outfall pipe (24")	LF	50	$177.79	$ 8,889.50
Inflow pipe (30")	LF	125	$151.34	$ 18,917.50
Excavation	CY	55,135	$13.68	$ 754,243.33
Performance turf	SY	2275	$3.53	$ 8,030.04
Contingency	LS	1	25%	$ 240,619.84
			TOTAL	**1,203,099.19**

Pond 9B				
Description	Unit	Quantity	Unit Price	Total Cost
Clearing and grubbing	AC	5.82	$31,576.50	$ 183,775.23
Outfall structure, DBI type C, <10	EA	1	$5,359.30	$ 5,359.30
Manhole, P-7, <10'	EA	0	$8,218.45	$ -
Outfall pipe (24")	LF	50	$177.79	$ 8,889.50
Inflow pipe (30")	LF	125	$151.34	$ 18,917.50
Excavation	CY	92,869	$13.68	$ 1,270,442.43
Performance turf	SY	484	$3.53	$ 1,708.52
Contingency	LS	1	25%	$ 372,273.12
			TOTAL	**1,861,365.60**

Pond 9C				
Description	Unit	Quantity	Unit Price	Total Cost
Clearing and grubbing	AC	5.03	$31,576.50	$ 158,829.80
Outfall structure, DBI type C, <10	EA	1	$5,359.30	$ 5,359.30
Manhole, P-7, <10'	EA	2	$8,218.45	$ 16,436.90
Outfall pipe (24")	LF	1260	$177.79	$ 224,015.40
Inflow pipe (30")	LF	850	$151.34	$ 128,639.00
Excavation	CY	77,851	$13.68	$ 1,065,007.71
Performance turf	SY	3727	$3.53	$ 13,155.60
Contingency	LS	1	25%	$ 402,860.93
			TOTAL	**2,014,304.64**

CONSTRUCTION COST

Pond 10A				
Description	Unit	Quantity	Unit Price	Total Cost
Clearing and grubbing	AC	2.36	$31,576.50	$ 74,520.54
Outfall structure, DBI type C, <10	EA	1	$5,359.30	$ 5,359.30
Manhole, P-7, <10'	EA	0	$8,218.45	$ -
Outfall pipe (24")	LF	45	$177.79	$ 8,000.55
Inflow pipe (30")	LF	95	$151.34	$ 14,377.30
Excavation	CY	13,544	$13.68	$ 185,280.63
Performance turf	SY	12536	$3.53	$ 44,250.67
Contingency	LS	1	25%	$ 82,947.25
			TOTAL	**414,736.23**

Pond 10B				
Description	Unit	Quantity	Unit Price	Total Cost
Clearing and grubbing	AC	0	$31,576.50	$ -
Outfall structure, DBI type C, <10	EA	1	$5,359.30	$ 5,359.30
Manhole, P-7, <10'	EA	0	$8,218.45	$ -
Outfall pipe (24")	LF	60	$177.79	$ 10,667.40
Inflow pipe (30")	LF	120	$151.34	$ 18,160.80
Excavation	CY	0	$13.68	$ -
Performance turf	SY	0	$3.53	$ -
Contingency	LS	1	25%	$ 8,546.88
			TOTAL	**42,734.38**

Pond 10C				
Description	Unit	Quantity	Unit Price	Total Cost
Clearing and grubbing	AC	0	$31,576.50	$ -
Outfall structure, DBI type C, <10	EA	0	$5,359.30	$ -
Manhole, P-7, <10'	EA	0	$8,218.45	$ -
Outfall pipe (24")	LF	0	$177.79	$ -
Inflow pipe (30")	LF	110	$151.34	$ 16,647.40
Excavation	CY	0	$13.68	$ -
Performance turf	SY	0	$3.53	$ -
Contingency	LS	1	25%	$ 4,161.85
			TOTAL	**20,809.25**

APPENDIX I

Meeting Minutes

Meeting Minutes

Project:	FPID No. 436928-1-22-01 Burnt Store Road PD&E Study from Van Buren Parkway to Charlotte CL		
Subject:	Project Kickoff Meeting		
Date and time:	February 25, 2020 1:30 PM		
Meeting place:	FDOT District 1 Office	**Minutes by:**	Scalar Consulting Group Inc.
Present:	See sign-in Sheet		
Notes			

Following FDOT and Consultant team introductions, the group discussed specific disciplines followed by general project topics.

Drainage

The team is scoped to consider traditional stormwater ponds but will also evaluate potential joint-use options. Karina and Jennifer stated that we must make it clear in the documentation that any joint-use options are for County agreement since this is a county road. David Bennett (CONSOR) explained that we are not proposing co-mingling; a bypass-ditch system is anticipated to address off-site flows into the R/W (through drainage structures and to the west). Where possible, we will combine basins. Lee County expressed desire for off-site compensatory treatment/attenuation. As we get further into the drainage design and county coordination, Optional Services could be used if we are to evaluate this concept. David asked if District 1 would prefer a volumetric analysis for the pond sites or an ICPR analysis. It was agreed to prepare an ICPR model with all of the existing cross-drains.

The FEMA floodplain maps are being revised and may not yet be published. The floodplain areas are increasing based on our team's data collection. David explained that the SFWMD prefers cup-for-cup compensation but asked if Karina was aware of any existing models aside what we identified thus far (not at this time). When the project team is ready to meet with the SFWMD, we are to go through Nicole Monies (Permits) to add this project to the monthly meeting agenda. The LHR may be more involved for this project given the proposed ditch bypass system. For the BHR, INTERA is preparing a HEC-RAS model for the Gator Slough Canal. A BHR may also be needed for Yucca Pens Creek (existing bridge culvert).

Traffic

District 1 will provide the updated travel demand model which includes all future development plans. The 2045 model is in draft and District 1 will compare it to the 2040 model. Traffic data collection will occur in March 2020; March is high season and spring break is the week of March 16th (no collection that week to avoid spike in traffic). The draft Traffic Analysis Methodology will be developed and sent to District 1 for review and final approval before the team starts traffic analysis and develops the Project Traffic Analysis Report (PTAR). The team has several requests of Lee County for crash data, traffic data, and future development plans; these will be included in the County request from District 1/Steven.

Traffic and Typical Sections

The team is scoped to develop typical sections for 4-lanes, 4-lanes expandable to 6-lanes, and the "super street" which includes frontage roads and a wide median. Based on the existing data/model, a 6-lane facility does not appear to be warranted. The group agreed that following analysis of the current traffic data, we will see how close the traffic volumes are to the 6-lane warrant and then consult with OEM.

While the locals may want a designed typical section that allows for ultimate 6-lane widening, we would need more justification than local preference to recommend an expandable typical section.

Crash data
District 1 agreed to provide all crash data information through Signal Four Analytics. This will include the crash data spreadsheet, GIS shapefile, and long forms (police crash reports).

Roadway
Jay briefly described the design challenges including raising the profile grade change to meet base clearance requirements and address roadway flooding, modeling the corridor to accurately identify R/W acquisition need, and the identification and avoidance of utilities. We will need to meet with Lee County to discuss access management within the corridor given their Controlled Access Management Resolution which appears to prohibit left turns from side streets within the project limits.

Noise
KB Environmental explained that the noise effort can begin once the traffic data for noise studies spreadsheets are completed as part of the DTTM ant the typical sections of the proposed build alternatives are available. Noise contours will be created for each alternative under study to determine the number of potential noise impacts for the public workshop matrix. A detailed noise study will be completed for the preferred alternative.

Contamination
Data collection including field review is in progress.

Cultural Resources
There are no fatal flaws along the corridor. ACI will need the build alternatives to prepare the CRAS.

Natural Environment
Scalar will begin general species and wetland surveys in March. If we identify need for species-specific surveys (e.g. scrub-jay, Florida bonneted bat) we will notify District 1. Species-specific survey hours were discussed in negotiations but then it was determined to use Optional Services if needed.

Section 4(f)
Public lands (Section 4(f)) are adjacent to the corridor. Jennifer suggested the team review the property documentation (e.g. land management plans) for reference to transportation uses. If included, and impacts are within this designated area, Section 4(f) would not apply.

Public Involvement
The team has already submitted the draft PIP for District 1 review. Jennifer explained that going forward, any changes to the PIP will instead go into the Comments and Coordination Report. The PI templates will be going “live” but can be emailed now. A newsletter will be sent out in lieu of a public kickoff meeting. Prior to this, the project website must be set-up. Scalar is to provide project information in .html format to the DW Consultant who sets-up and manages the websites. Going forward, public hearings on county roadways will require that a County representative start the hearing with an address to the public. This will be part of the hearing script. As a new protocol for all Type 2 CEs, the consultant team will be required to publish a limitation of claims in the federal register, after the LDCA notice.

Coordination Protocols
The Consultant team can coordinate with District 1 Departments as needed and copy Steven. For now, Steven will be the point-person for County coordination. Steven will set-up the project kickoff meeting with Lee County, preferably in March. Kristin will provide Steven with a list of Lee County

Departments/personnel to include. It was discussed that this first meeting will be with Lee County alone, and we will then meet with Charlotte County, and then possibly the City of Cape Coral, separately. The team will combine later meetings if reasonable. Since this project is on a county facility, we must carefully document the local meetings and design decisions.

Funding and County Coordination

Since the project will extend into Charlotte County, the team discussed including Charlotte for informational purposes; funding, however, is from Lee County. Our team will confirm funding and design segments with Lee County. Currently, no funding is programmed beyond the PD&E Study. Jennifer advised that the team is to prepare a reasonable construction cost estimate and R/W estimate after the public workshop. This will be used for the work program update.

Schedule

Jennifer commented that the District will review the project documents after the public workshop to avoid multiple document reviews.

ETDM

ETDM information will be going to OEM for approval soon and expect that the summary data will be available May/June. This will include the Purpose and Need but not the Class of Action.

The following action items were developed:

Item	Description and Action	Responsible
Existing Geotechnical Data	Include in compiled list of team data requests and send to Steven to submit to Lee County	Kristin/Steven
Existing crash and traffic data, future development plans	Include in compiled list of team data requests and send to Steven to submit to Lee County	Kristin/Steven
PI templates	District 1 to provide current templates to Scalar	Steven
Signal Four Analytics data	District 1 to provide crash data spreadsheet, GIS shapefile, and long forms (police crash reports)	D1 EMO- Patrick/Dave who have access
Schedule Lee County kickoff meeting	Contact Lee County to schedule kickoff meeting	Steven
Team field meeting	Schedule team field meeting, may be same day as county kickoff meeting	Kristin

2/25/20 - Burnt Store Rd.
Sign-In

1	Steven Andrews	FDOT	steven.andrews@dot.state.fl.us
2	Kristin Caruso	Scalar	kcaruso@scalarin.com
3	Francina Gil	Consor	fgil@consoreng.com
4	David Bennett	Consa	dbennett@consoreng.com
5	Aniruddha Gotmare	SCALAR	agotmare@scalarinc.net
6	Karina Della Sera	FDOT - Drainage	Karina.dellasera@dot.state.fl.us
7	DAVID C. TURLEY	FDOT	david.turley@dot.state.fl.us
8	Vivianne Cross	FDOT	vivianne.cross@dot.state.fl.us
9	Lauren Peters	FDOT	lauren.peters@dot.state.fl.us
10	Jennifer Marshall	FDOT	jennifer.marshall@dot.state.fl.us
11	Christopher Simpson	FDOT	christopher.simpson@dot.state.fl.us
12	Jonathon Bennett	FDOT	jonathon.bennett@dot.state.fl.us
13	Patrick Bateman	FDOT	Patrick.Bateman@dot.state.fl.us
14	JAY WINTER	SCALAR	JWINTER@SCALARINC.NET
15	Ehsan Doustmohammadi	SCALAR	edoustmohammadi@scalarinc.net
16	Gwen Pipkin	FDOT	gwen.pipkin@...
17	John Scarlatos (phone)	Scalar	jscarlatos@scalarinc.net
18	Paul Looney (phone)	Scalar	plooney@scalarinc.net
19	Wayne Arner (phone)	KB Envi	
20	Lee Hutchinson (phone)	ACT	lhutchinson@aeiflorida.com
21	Marion Almy (phone)	ACT	malmy@aeiflorida.com
22	Mark Grosselin (phone)	Intera	mgosselin@intera.com

Meeting Minutes

Project:	FPID No. 436928-1-22-01 Burnt Store Road PD&E Study from Van Buren Parkway to Charlotte CL		
Subject:	Project Kickoff Meeting with Lee County		
Date and time:	March 31, 2020 1:00 PM		
Meeting place:	GoTo Meeting	**Minutes by:**	Scalar Consulting Group Inc.

Present:

LCDOT
David Murphy, Deputy Director
Stephen Jansen, Engineering-Traffic
Tom Marquardt, Public Works-Transportation
Vincent Miller, Engineering-Transportation

Other Lee County Department Representatives
Anura Karuna-Muni, Natural Resources
Karyn Allman, Land Stewardship
Tyler Marzella, Land Stewardship
Alvin (Chip) Block, Zoning

FDOT
Steven Andrews, Project Manager
Vivianne Cross, Environmental PM
Lauren Peters, Environmental PM

FDOT Consultant Staff
Kristin Caruso, Consultant PM (Scalar)
Rudy Gotmare, Deputy PM (Scalar)
Jay Winter, Roadway lead (Scalar)
Ehsan Doustmohammadi, Traffic Lead (Scalar)
David Bennett, Drainage Lead (CONSOR)
Francina Gil, Drainage (CONSOR)

Notes

Following Lee County, FDOT and Consultant team introductions, Kristin gave a brief overview of the project and the group discussed specific disciplines.

Project limits: Length is approximately 5.5 miles from Van Buren Parkway to Charlotte County line with an additional ¼-mile that extends into Lee County before the roadway transitions to 4-lanes. David M. indicated that this piece in Charlotte County has been briefly discussed in technical advisory committee meetings and they understand that an agreement would be needed to construct the project up to the 4-lane typical section.

Drainage

The team will be evaluating stormwater ponds as well as a bypass-ditch system which is anticipated to address off-site flows into the R/W (through drainage structures and to the west). As we get further into the drainage design and county coordination, we could potentially also evaluate off-site compensatory treatment. Anura commented that Charlotte Flatwoods Preserve could be an option. David B. concurred that and other County-owned parcels would be good options. Anura also recommended that the drainage team review the Northwest Lee County Surface Water Management Plan. The team will also prepare the project's Location Hydraulic Report which evaluates the floodplain impacts and analyzes the cross drain hydraulic capacities. Lee County staff suggested the use of their rainfall data collected by an outside contractor. The main contact for the County's hydrological monitoring is Scott Summerall. The 2005 Flood Study Report may be a good resource.

Environmental
Conservation lands are adjacent to the corridor and include Yucca Pens Preserve, Babcock Webb Yucca Pens Unit WMA, Charlotte Harbor Preserve State park, and Charlotte Harbor Buffer Preserve. Wetlands and protected species will be surveyed and assessed as part of the natural resources documentation. Similarly, cultural resources, contamination and noise will be evaluated. There is some potential for noise impacts at Burnt Store Marina.

Traffic and Planned Developments
The team will be collecting traffic data at intersections although this effort has been delayed due to the current health crisis. Ehsan asked if there was available traffic and/or crash data from the County. Stephen indicated that he would be able to provide some. Chip recently provided information on the one planned development within unincorporated Lee County and gave assistance for obtaining documentation for the others from the City of Cape Coral.

Structures
The southbound bridge over gator Slough Canal will be evaluated for improvement including replacement. The northbound bridge is new as part of the widening project to the south. Several culverts are located along the corridor. There is one bridge culvert at Yucca Pens Slough that the team will evaluate for extending. Vince indicated he can connect the team to a staff member to obtain additional structures data (plans, inspection reports).

Utilities
There are several utilities along the corridor, and most noteworthy is a CenturyLink building on the east side that the team will avoid. Impacts and relocation of this facility would be extremely costly ($10M plus). Vince explained that the Myriad Luxury Motorcoach Resort was required to bring utilities down from Charlotte County.

Roadway
Jay briefly described the design challenges including raising the profile grade change to meet base clearance requirements and address roadway flooding, and the identification and avoidance of utilities. David M. pointed out that the County recently scratch-coated this segment of Burnt Store Rd. to mitigate the rutting in advance of the rainy season. Regarding the Controlled Access Management Resolution, Stephen explained that the County had not yet brought the resolution to the Board in anticipation of this project development. The FDOT team will discuss access management with him in a separate meeting.

Typical Sections and Alignment
The FDOT team presented two typical sections currently under consideration, a 4-lane suburban and a 4-lane expandable to 6-lane suburban. These typical sections include 12’ travel lanes, a 6’ sidewalk on the west side and a 10’ trail on the east side and allow for the by-pass ditch previously discussed. The design speed for both is 60 mph. The LCDOT representatives discussed the potential of designing 11’ lanes with a 44’ raised median, which could be widened to the inside in the future for an ultimate 6-lane typical section. The roadway team will develop some additional typical sections and contact LCDOT for further discussion. Kristin explained that once we have a vetted typical section, we can evaluate the alignment along the existing 200’ of R/W and avoid and minimize impacts to adjacent parcels including the conservation properties.

Schedule and Public Involvement
The team provided a snapshot of the project schedule, with approximate dates for public meetings. Build alternatives under consideration will be presented at the Alternatives Public Meeting (tentatively scheduled for February 2021) and the Preferred Alternative will be presented at the Public Hearing (tentatively scheduled for January 2022). Vince requested that the FDOT team include Cella-Molnar

(public involvement firm) on project newsletters since they are working on the county projects and can help disseminate information on this study.

Other Discussion and Data Needs

The FDOT enquired about any available geotechnical data since new data collection for this project will be very limited. Anura directed the group to the Lee County Natural Resources website for well data. Scott Summerall may also be able to provide additional information. Chip suggested that we review Development Orders for site plans along the corridor and can contact Jessica Sulzer in Community Development.

Follow-Up Comments

Conservation 20/20 representatives pointed-out that hydrological restoration work has been completed on several of the adjacent conservation lands. Some portions of the county properties have management agreements with FDEP or are planned to have co-management with the FWC. It will be important to ensure that the roadway project does not adversely impact the ongoing restoration and maintenance activities or the native plant and wildlife populations onsite. Additionally, one aspect sometimes overlooked when evaluating potential impacts to adjacent conservation properties is access gates. Staff provided a map depicting locations of existing gates so that this issue can be considered.

The following action items were developed:

Item	Description and Action	Responsible
Revise typical sections	Lee County would like to review alternatives to reduce lane and median width	Scalar to develop and FDOT team to provide to Lee County for further reviews
Traffic data	Lee County can provide	Scalar to contact Stephen to obtain
Controlled access management resolution	Lee County ready to discuss with FDOT team regarding our comments	FDOT team to contact Stephen for a separate meeting
Planned developments	Contact the City of Cape Coral for information on developments	Scalar
Structures information	Lee County to provide any additional available information	Scalar to email Vince
Geotechnical and hydrological data	Review documents and websites listed as potential sources of information	Scalar and CONSOR
Project mailing list	Add Cella-Molnar	Scalar

BURNT STORE ROAD PD&E STUDY
FPID No. 436928-1-22-01

PROJECT KICKOFF MEETING WITH LEE COUNTY
Tuesday, March 31, 2020
GoTo Meeting
SIGN-IN SHEET

NAME	COMPANY/ENTITY AND DEPT/ROLE	E-MAIL ADDRESS	PHONE #
Steven Andrews	FDOT, Project Manager	Steven.Andrews@dot.state.fl.us	863-519-2270
Vivianne Cross	FDOT, Environmental PM	Vivianne.Cross@dot.state.fl.us	863-519-2805
Lauren Peters	FDOT, Environmental PM	Lauren.Peters@dot.state.fl.us	863-519-2515
David Murphy	LCDOT, Deputy Director, Public Works, Transportation	dmurphy@leegov.com	239-533-8578
Stephen Jansen	LCDOT, Transportation Engineering Manager, Traffic	jansensj@leegov.com	239-533-8503
Tom Marquardt	Lee County, Manager Public Works Programs- Transportation	tmarquardt@leegov.com	239-533-8530
Vincent Miller	LCDOT, Senior Engineer, Transportation	vmiller@leegov.com	239-533-8577
Anura Karuna-Muni	Lee County, Manager, Public Works Operations, Natural Resources	Akaruna-muni@leegov.com	239-533-8131
Karyn Allman	Lee County – Supervisor, Land Stewardship, Parks & Rec (Conservation 20/20)	kallman@leegov.com	239-533-5313
Tyler Marzella	Lee County - Land Stewardship Coordinator (Conservation 20/20)	tmarzella@leegov.com	239-533-7275
Alvin “Chip” Block	Lee County - Planner, Principal, Community Development	ablock@leegov.com	239-533-8371

BURNT STORE ROAD PD&E STUDY
FPID No. 436928-1-22-01

PROJECT KICKOFF MEETING WITH LEE COUNTY
Tuesday, March 31, 2020
GoTo Meeting
SIGN-IN SHEET

NAME	COMPANY/ENTITY AND DEPT/ROLE	E-MAIL ADDRESS	PHONE #
Kristin Caruso	Scalar Consulting Group (SCG); Consultant PM	kcaruso@scalarinc.net	813-988-1199 x209
Aniruddha Gotmare	SCG, Deputy PM	agotmare@scalarinc.net	561-429-5065
Jay Winter	SCG, Roadway Lead	jwinter@scalarinc.net	813-988-1199 x201
Ehsan Doustmohammadi	SCG, Traffic Lead	edoustmohammadi@scalarinc.net	407-440-3512 x202
David Bennett	CONSOR, Drainage Lead	dbennett@consoreng.com	407-378-3903
Francina Gil	CONSOR, Drainage	fgil@consoreng.com	407-957-1660 x2241

Meeting Minutes

Project:	FPID No. 436928-1-22-01 Burnt Store Road PD&E Study from Van Buren Parkway to Charlotte CL		
Subject:	Progress Meeting #1		
Date and time:	June 2, 2020 9:00 AM		
Meeting place:	GoTo Meeting	**Minutes by:**	Scalar Consulting Group Inc.
Present:	See sign-in Sheet		
Notes			

Roadway

The team held a design meeting with Lee County and finalized the typical section and design criteria based on Lee County coordination. One remaining item we are seeking to confirm with Central Office is Florida Greenbook criteria for median width in a high speed curbed roadway typical section, as the current design criteria does not address it. The roadway profile may require a 3-foot elevation increase due to seasonal high ground water data. Our horizontal alignment alternatives will incorporate this need. The alignments are in development.

Traffic

The Traffic Analysis Methodology memo has been approved. Development of the traffic operational analysis and PTAR has been delayed because of the pandemic affecting traffic data collection. D1 advised our team not to proceed with the data collection planned for late March. Traffic data collection is now tentatively anticipated in August/September pending the pandemic. The 5-year crash data (2015-2019) was obtained from Lee County and D1 approved use of this data in lieu of Signal Four Analytics data. The Lee County Access Management Resolution will be used for future traffic operational analysis.

Drainage

We discussed that the next Charlotte Harbor Flatwoods Initiative (CHFI) meeting is June 10th. Kristin and David will call-in (Kristin to forward invite to Steven and Vivianne) and FDOT had been approached by the group to present. We won't make a true presentation but will give an overview of the project. The land managers of the adjacent conservation areas are members of the group and are anticipated to be in attendance.

The group discussed the site challenges related to the off-site flows and the County request to consider upstream treatment/compensatory treatment to avoid traditional stormwater ponds within the roadway R/W. Preliminarily, there do not appear to be impaired basins which would provide this opportunity type but coordination with the CHFI group may provide additional information to consider.

Our team will get in touch with Nicole Monies when we are ready to schedule a SFWMD pre-app meeting. Nicole manages a monthly agenda with SFWMD to discuss FDOT projects.

Gwen mentioned that she received an email from Brian Barnett, requesting to add language to his previously submitted EST comments. The additional information was provided by Mike Kemmerer, land manager of Babcock Webb. It requests that the under-road hydrological flows be sufficient to handle historic flows to Charlotte Harbor. The group discussed that our participation in the June 10th meeting will be timely and allow us to get a better understanding of their long-term management goals and how that may interface with this project. Gwen will respond to Brian's email.

Natural Environment

Kristin asked to schedule a species strategy meeting, as is being done for some other current projects. Vivianne will set-up a meeting and Kristin will provide our team's current determination of effects for each species.

Public Involvement

The first public newsletter, which is to serve in lieu of a public kickoff meeting, was mailed in early May. Comments received thus far have all been positive. Some comments have requested widening to the east, adding a traffic light at Burnt Store Road marina, and evaluating particular intersections for safety of left turns.

Planning Consistency

Kristin asked how best to coordinate with Charlotte County/Charlotte County-Punta Gorda MPO to get the project within the County boundary added to their planning documents. Steven believes Michael Tisch is the FDOT Community Liaison for Charlotte County and he will look into this.

The following action items were developed:

Item	Description and Action	Responsible
Charlotte Harbor Flatwoods Initiative	call-in to 6/10/20 meeting and provide project overview; forward invite to Steven and Vivianne	Kristin, David
median width	Confirm greenbook median width for ultimate condition with Central Office	Jay
Brian Barnett email	Respond re: hydrological concerns	Gwen
SFWMD pre-app	Coordinate with Nicole Monies to add project to agenda at an appropriate time	David
Species strategy meeting	Prepare preliminary DOE table and schedule meeting	Kristin and Vivianne
Planning consistency	Coordinate with Charlotte County-Punta Gorda MPO to add project to planning docs	Steven

BURNT STORE ROAD PD&E STUDY
FPID No. 436928-1-22-01

PROGRESS MEETING #1
Tuesday, June 2, 2020
GoTo Meeting
SIGN-IN SHEET

NAME	COMPANY	POSITION	E-MAIL ADDRESS
Steven Andrews	FDOT	Project Manager	Steven.Andrews@dot.state.fl.us
Vivianne Cross	FDOT	Environmental Project Manager	Vivianne.Cross@dot.state.fl.us
Gwen Pipkin	FDOT	Environmental Manager	Gwen.Pipkin@dot.state.fl.us
Karina Della Sera	FDOT	Drainage Design	Karina.DellaSera@dot.state.fl.us
Kristin Caruso	Scalar Consulting Group	Consultant Project Manager	kcaruso@scalarinc.net
Aniruddha Gotmare	Scalar Consulting Group	Consultant Deputy Project Manager	agotmare@scalarinc.net
Jay Winter	Scalar Consulting Group	Consultant Roadway Lead	jwinter@scalarinc.net
Ehsan Doustmohammadi	Scalar Consulting Group	Consultant Traffic Lead	edoustmohammadi@scalarinc.net
John Scarlatos	Scalar Consulting Group	Consultant PI Lead	jscarlatos@scalarinc.net
David Bennett	CONSOR	Consultant Drainage Lead	dbennett@consoreng.com
Francina Gil	CONSOR	Consultant Drainage	fgil@consoreng.com

Meeting Minutes

Project:	FPID No. 436928-1-22-01 Burnt Store Road PD&E Study from Van Buren Parkway to Charlotte CL
Subject:	North Branch Yucca Pen Creek Hydrology and Burnt Store Widening
Date and time:	July 24, 2020 9:00 AM
Meeting place:	TEAMS meeting **Minutes by:** Scalar Consulting Group Inc.
Present:	Corey Anderson, FWC Aquatic Habitat Section; Paul "Jay" Garner, FDEP, Charlotte Harbor Preserve State Park; Steven Andrews, FDOT; Gwen Pipkin, FDOT; Kristin Caruso, Scalar; David Bennett, Francina Gil, and Christian Cardoza- CONSOR
Notes	

Corey, who requested the meeting with the FDOT, led the discussion by introducing the overarching hydrological concern in the area which is timing and volume of hydrologic flows to the west from Babcock Webb WMA (across I-75, Burnt Store Rd., residential developments, and Old Burnt Store Rd.). Corey explained that the north branch of Yucca Pens Creek was severed several decades ago by road and housing construction. He is looking into the feasibility of restoring the north branch flows. Currently the tidal influence from the bay reaches Burnt Store Marina.

Ideally, he is interested in re-establishing flow under Burnt Store Rd. at the location of the historical north branch with a new culvert or low water crossing. This route, however, interfaces with Charlee Rd. and residential parcels (with constructed homes) on the west side of Burnt Store Rd., before continuing eastward in the Charlotte Harbor Preserve State Park property. David pointed out that towards the outfall to the bay, the stream runs closely adjacent to additional home sites. The group discussed the importance of ensuring no deleterious off-site drainage effects (flooding) to adjacent and downstream properties.

Corey noted that there is a large pocket wetland on the east side of Burnt Store Rd. that currently holds water flowing from the branch and it likely prevents road overtopping to a degree. There is potential that with the widening of Burnt Store Rd. and potential impacts to this wetland, the water storage effect could be compromised. The group discussed another concept of diverting the flows from the north branch southward, to Yucca Pens Creek along the east side of Burnt Store Rd., and then flowing through the existing bridge culvert. While this may not be an ideal option from a hydrological restoration perspective, it could ensure that flows cross under Burnt Store Rd. Corey explained that the existing bridge culvert overtops at times, therefore he believes it needs to be re-sized and if additional water was routed here from the north branch, a downstream flood study would be needed.

Gwen asked for Corey's contact information to provide to FDOT drainage staff (Karina Della Sera was invited to the meeting but unable to attend).

Corey Anderson
Aquatic Habitat Conservation and Restoration Biologist
Florida Fish and Wildlife Conservation Commission
585 Prineville Street, Port Charlotte, FL 33954
Mobile: 863-581-6898
Corey.Anderson@MyFWC.com

The following action items were developed:

Item	Description and Action Deadline	Responsible
Presentation	Corey to send a copy of his presentation slides	Corey; complete
FDOT drainage staff coordination	Apprise FDOT drainage staff of discussion for input	David/Kristin/Steven

Follow-up email from Corey providing the presentation on 7/24/20:
Thank you for allowing me to share FWC and DEP's concerns and potential hydrological restoration project ideas related to Yucca Pen Creek and Burnt Store Road drainage. We appreciate your interest in mitigating risk to property from flooding and restoring natural flow ways around Burnt Store Road and Charlotte Harbor Preserve State Park. I am attaching the slides from today's discussion about surface water impacts from road widening, potential drainage options, and conceptual restoration of flows in North Branch Yucca Pen Creek. As I mentioned, some ecological lift (or possible mitigation) could be gained by improving drainage in the lower section of North Branch Yucca Pen Creek where trails have blocked flow to Charlotte Harbor since the 1970's. I appreciate the ability to bring these issues to your attention during the planning phase of the Burnt Store Road widening project and hope that there will be opportunities to satisfy all engineering, drainage, and natural systems objectives. Please feel free to reach out to me or the State Park partners to discuss any aspect further.

Meeting Minutes

Project:	FPID No. 436928-1-22-01 Burnt Store Road PD&E Study from Van Buren Parkway to Charlotte CL
Subject:	Meeting with South Florida Water Management District (SFWMD)
Date and time:	August 27, 2020 at 10:00 AM
Meeting place:	Virtual (Teams) **Minutes by:** Scalar Consulting Group Inc.
Present:	FDOT: Nicole Monies, Steven Andrews, Karina Della Sera, Sergio Figueroa SFWMD: Melissa Roberts, Angelica Hoffert, Laura Layman Scalar: Kristin Caruso, Katie Castor, Rudy Gotmare Consor: David Bennett, Francina Gil

Notes

Introduction: Kristin Caruso stated that the PD&E Study phase of this county road project is being conducted by FDOT and is following the NEPA process, but the design and construction phases will be conducted by Lee County. This PD&E Study will provide an evaluation of four alignment alternatives for 2-to-4 lane widening of Burnt Store Road from Van Buren Parkway to the Charlotte County Line. The project will tie-in to the recently constructed 4-lane typical section approximately 0.25-miles north of the county line. The alternatives include a left alignment, center alignment, right alignment, and best fit alignment. The widening would require a minimum of 30 feet of right-of-way to be acquired in various areas depending on the alternative. All alternatives propose replacement of the existing southbound bridge over Gator Slough Canal; the northbound bridge was recently replaced as part of the widening project to the south.

Drainage: David Bennett gave a brief overview of the hydrological conditions, explaining that there are some hydrological studies in the area to restore historic flows from east to west. There are nine water crossings along the project.

Attenuation discussion-

As part of the wet detention ponds he is designing to provide treatment, he asked if we need to also provide attenuation given proximity to the bay. The SFWMD requires attenuation for the 25-yr, 3-day storm if the profile of the road is raised.

Treatment discussion-

David asked if we would be required to treat all 4 lanes or the new impervious (2 lanes) even if the road will be raised, since we do not expect to be able to salvage any existing pavement. SFWMD responded that they would always encourage to treat as much as possible, but they will accept treatment for the new impervious (additional 2 lanes). Since the project eventually outfalls to an OFW/AP, we will need to provide an additional 50% of water quality treatment and nutrient loading calculations for nitrogen and phosphorus.

Floodplain discussion-

David asked if we would need to provide floodplain compensation in tidal floodplain areas. The project lies within flood zone AE (elevation 6 ft). For areas within the 100-year floodplain, we will need to provide compensation. SFWMD responded that they will accept cup-for-cup compensation within the proposed ponds.

Alternative drainage concepts-

David explained that although we will be providing a traditional off-site pond evaluation, Lee County requested that we also evaluate the potential for upstream compensatory treatment in lieu of on-site treatment. Lee County identified Charlotte Flatwoods Environmental Park (within Charlotte County) as a

potential location for upstream water quality improvements. Since the project's receiving waters are part of an OFW, SFWMD noted that they would have to see a proposed concept before they would be able to provide feedback as to whether that idea could be permittable. Given that the upstream land is predominantly conservation lands, and undeveloped, SFWMD preliminarily stated that it didn't appear there was sufficient "dirty water" to treat. Laura Layman suggested the team speak with Kim Fikoski (SFWMD, Charlotte Harbor Flatwoods Initiative member) regarding potential opportunities. Katie Castor mentioned that there were some potential upcoming developments such as Hudson Creek where we could partner with the developer for joint-use ponds. SFWMD agreed this concept is allowed but indicated that they believe the Hudson Creek development has slowed and may be many years out.

Wetlands: Katie Castor noted that historical disturbance appears to have re-routed many of the northeast-to-southwest flow-ways, causing several adjacent wetland areas to have become dehydrated. The National Wetlands Inventory (NWI) shows most of the east side of the road as herbaceous and forested wetlands, whereas only a portion of those areas were field-verified as wetlands during March 2020 field reviews. Based on aerial imagery, soil analysis, vegetative cover, and hydric indicators, it appears that only severe storm events (apparently less frequent than annually) re-hydrate many of these areas and simultaneously cause flooding of the roadway. Preliminary wetland impact acreages were calculated for each alternative using both field-verified wetland areas and historically documented wetland areas as shown in the NWI. Impacts range from 2.7 to 5.4 acres using the field-verified wetland areas, whereas the impacts range from 29.7 to 44.1 acres using the NWI wetland areas. Wet-season field reviews will be conducted in September 2020 and field-verified wetland polygons may be revised. SFWMD staff stated that regardless of historical wetland presence, wetland delineation during the design phase should reflect current conditions; therefore if the historic wetlands have been dehydrated and no longer meet wetland criteria as outline in chapter 62-340, F.A.C., these areas should be considered uplands. Kristin commented that our team spoke to some of the adjacent conservation land managers regarding site conditions and there was a general consensus that the area wetlands are experiencing reduced hydrology.

The team discussed that wetland mitigation will likely occur through purchase of mitigation credits. The team discussed Little Pine Island Mitigation Bank since it may be the most appropriate. Kristin asked if a cumulative impact analysis is still required since the bank is technically not in any drainage basins; Laura confirmed this. Laura mentioned that we need to use their proprietary wetland assessment method; Katie had been informed by the bank to use UMAM. We will need to verify this since the bank permit was not based on UMAM.

The following action items were developed:

Item	Description and Action	Deadline	Responsible
Compensatory Treatment Concepts	Coordinate with Lee and Charlotte Counties to determine feasibility of upstream compensatory treatment		David Bennett and Kristin Caruso
Little Pine Island MB	Confirm UMAM or proprietary assessment method		Katie Castor

SCALAR Consulting Group Inc.

TELEPHONE CONVERSATION RECORD

Date: 8/27/2020 Time: 9:20 ☒ am ☐ pm

CALL FROM:			CALL TO:	
Katie Castor, M.S.			Jason Thompson	
ORGANIZATION:			ORGANIZATION:	
Scalar Consulting Group Inc.			Charlotte County	
DIV/DEPT:	LOCATION:	TELEPHONE:	DIV/DEPT:	TELEPHONE:
Environmental	Tampa	301-938-9668	Flatwoods Environmental Park	(941) 613-3220

SUMMARY – HIGHLIGHTS – KEY POINTS – AGREEMENTS – COMMITMENTS:

Burnt Store Road
FPID No. 436928-1-22-01
SCG Project No. SP19D1000
Lee County

During a previous project coordination meeting, Lee County drainage staff had suggested the potential for an upstream compensatory treatment facility to be placed within the Charlotte County Flatwoods Environmental Park parcel. The purpose would be to reduce or eliminate the need for onsite stormwater treatment at Burnt Store Road. Upon speaking with Jason Thompson, the land manager of the Charlotte County property, he is not aware of any water quality issues on the property that could be corrected through compensatory treatment. He does not believe the adjacent landfills are contributing any contamination. When asked how he would feel about water quantity/flow improvements to the parcel, he said he would be open to ideas that would further the cause of the Charlotte Harbor Flatwoods Initiative (improving northeast-to-southwest sheet flow).

GENERAL SUBJECT OF DISCUSSION:

Burnt Store Road Drainage

ADDITIONAL DISTRIBUTION:

Kristin Caruso, M.S. (SCG)

*Distributed via e-mail

SCALAR Consulting Group Inc.

TELEPHONE CONVERSATION RECORD

Date: 8/28/2020 Time: 11:29 ☒ am ☐ pm

CALL FROM:			CALL TO:	
Katie Castor, M.S.			Mike Kemmerer	
ORGANIZATION:			ORGANIZATION:	
Scalar Consulting Group Inc.			Florida Fish and Wildlife Conservation Commission	
DIV/DEPT:	LOCATION:	TELEPHONE:	DIV/DEPT:	TELEPHONE:
Environmental	Tampa	301-938-9668	Babcock Webb WMA	941-833-2555

SUMMARY – HIGHLIGHTS – KEY POINTS – AGREEMENTS – COMMITMENTS:

Burnt Store Road
FPID No. 436928-1-22-01
SCG Project No. SP19D1000
Lee County

This discussion relates to the potential for an upstream compensatory treatment site (in lieu of on-site treatment) within (or upstream of) Babcock Webb WMA. The purpose of the conversation was to consider potential effectiveness or need for treatment opportunities just downstream of the Charlotte County landfill or the privately-owned disposal facility, both located north of the county line (adjacent to US 41). Upon asking Mike if he was aware of any water quality issues within Babcock-Webb coming from those facilities, he said that he is not aware of any water quality issues east of Burnt Store road (but FWC does not sample for contaminants either). The Charlotte Harbor Flatwoods Initiative hydrologic restoration project is not looking at contaminants either, only flow. He recommended we keep in touch with Roger Copp regarding our project.

FOLLOW-UP NOTES:

In order to determine whether any contamination is occurring downstream of the landfill and disposal facility parcels, Katie Castor conducted follow-up research using FDEP solid waste permitting and monitoring layers in Map Direct. She found that the landfills have exceedances in most of their groundwater monitoring reports, but FDEP doesn't seem to be alarmed by any of it. The following information was found:

<u>Charlotte County Landfill</u>
The facility was inspected (including a review of all monitoring reports) in December 2019 and determined to be in compliance. They have a deepwell injection permit, so that's where they discharge. The most recent groundwater monitoring report (January 2020) shows exceedance of thresholds for ammonia, chloride, iron, sodium, and TDS (all were relatively minor except iron was 9,640 – threshold is 300). They're in the process of putting together their second biannual monitoring report. From what I understand, exceedance of thresholds is kind of expected and is not considered a big deal unless it's alarming; they typically just need to keep monitoring.

<u>Landfill parcel to the east – Southwest Land Developers Inc</u>
Facility is closed, final inspection was 2018; no further monitoring required.

Landfill parcel to the southeast - SLD-Recycling and Disposal Facility

This Construction and Demolition Debris (C&D) disposal facility does not have a deepwell injection permit; leachate is treated and retained onsite. Groundwater monitoring in May exceeded thresholds for ammonia, arsenic, iron, sulfate, and TDS. Exceedances were not major except for iron (limit is 300, result was 9,300). The facility is in compliance and there doesn't appear to be any major concern regarding the groundwater exceedances. They still have one more permitted cell that has not yet been constructed; it will go to the west of the existing cells (where you see the dirt road going).

ADDITIONAL DISTRIBUTION:

Kristin Caruso, M.S. (SCG)

*Distributed via e-mail

L:\00_Scalar Forms\Telephone Log (Individual & Agency).docx

Meeting Minutes

Project:	FPID No. 436928-1-22-01 Burnt Store Road PD&E Study from Van Buren Parkway to Charlotte CL		
Subject:	Progress Meeting #3		
Date and time:	October 6, 2020 9:15 AM		
Meeting place:	TEAMS Meeting	**Minutes by:**	Scalar Consulting Group Inc.
Present:	See sign-in Sheet		
Notes			

Roadway

Completed items: existing R/W determination, LiDAR and geotech data built-in to model and existing and proposed roadway profiles developed, horizontal and vertical alignments developed including drainage needs. We are tying-in to the existing bridge alignments over Gator Slough Canal. In progress: tie-in to 4-lane typical (proceeding but also awaiting decision between MPOs/FDOT on issue of continuing into Charlotte Co) and refinements to the Best Fit/Optimized alignment. This includes design modifications in certain areas to avoid or minimize R/W impacts where feasible- Burnt Store Marina, fire station, Century Link facility, parcels NW of Gator Slough Canal bridge, and several state lands are the areas of concern.

Traffic

Development of the traffic operational analysis and PTAR has been delayed because of the pandemic affecting traffic data collection. As per D1 guidance, we believe we can continue to hold off on traffic analysis until January 2021. In January, we will coordinate with D1 but at this time based on the guidance believe it may be best to proceed with Option 3 from the decision tree.

Utilities

Design team coordinated with Century Link on the facility north of Lee Co line. Impacts to the facility are fully reimbursable. We will look at design options that will involve some R/W take but not require relocation.

Drainage

The group discussed the FWC request for considering a new crossing under the road for Yucca Pens Creek- north branch. Kristin addressed the issue of potential risk to the project if we are making drainage recommendations to accommodate this potential but not certain future project. It may be better to hold off and see if this project moves forward and provides hydrological data to our team, for us to include in the study documents. Karina commented that we should perform the hydrologic calculations and recommend a cross drain size that could be constructed during the design phase by “others” to accommodate the bypassing of the offsite flow.

The team held a pre-application meeting with SFWMD. Floodplain compensation will be required for areas within the 100-year floodplain. Karina advised that the team should plan for a separate pond for floodplain compensation. Options for upstream compensatory treatment seem limited based on SFWMD regulatory staff comments that we would need to find and treat upstream “dirty water”- upstream areas are mostly conservation lands and fairly pristine. The team has investigated some upstream lands outside this area (e.g. landfills by US 41) and coordinated with land managers regarding water quality but there are no clear opportunities. Since Lee County has made it clear that they are interested in fully exploring this concept, we will touch base with the Charlotte Harbor Flatwoods Initiative group again for other

potential concepts that could be more fully explored by Lee Co as they proceed towards design and construction. For attenuation, David indicated that we may have some out of the box options such as using an existing wetland area within and adjacent to the roadway near Burnt Store Marina.

Pond siting is now underway.

Natural Environment

Section 4(f) and ARC lands- we do anticipate impacts to some state lands and there is a new chapter in the PD&E manual with process. This requires analysis of identifying lands for acquisition and donation to offset impacts on a 2:1 ratio. If not land purchase is not feasible, and uplands easement is required. Gwen was not aware of an example that could be used for this project in terms of documentation.

Our team completed a wet season field review for wetlands which was important since the area's hydrology is flashy. Our goal is to adequately estimate wetland involvement based on field conditions since the data sources are so different. We are holding off on the Florida bonneted bat acoustic surveys until a future project phase is funded.

Planning Consistency

Kristin updated the group on the pending issue with extending the project into Charlotte Co to tie-in to the existing 4-lane typical section. The study team held a coordination meeting with Lee and Charlotte MPOs regarding this topic. This would federalize the project for both counties and may not be desirable by Charlotte County. OJ plans to coordinate with Jennifer Marshall and OEM to facilitate a decision.

Public Involvement

District 1 is now proceeding with virtual public meetings. Our workshop is currently planned for February 2021. The group discussed that the issue with the segment within Charlotte Co must be resolved before the workshop. We would either show the Charlotte Co segment as "work by others", and no roadway design in that area, or, if it is determined we continue the PD&E into Charlotte County, we will show the tie-in to the 4-lane typical section.

The following action items were developed:

Item	Description and Action	Responsible
Charlotte and Lee MPO coordination	Determine if this study will be shown to extend to 4-lane typical section in Charlotte Co or not	OJ
Lee MPO coordination	Determine if any future phases are programmed for future phases	OJ to request Mike Tisch to email MPO

Meeting Minutes

Project:	FPID No. 436928-1-22-01 Burnt Store Road PD&E Study from Van Buren Parkway to Charlotte CL		
Subject:	Design Criteria and Access Management Meeting with Lee County		
Date and time:	November 20, 2020 11:00 AM		
Meeting place:	GoTo Meeting	**Minutes by:**	Scalar Consulting Group Inc.
Present:	See attached Sign-In Sheet		

Notes

This meeting was held to update Lee County that with more evaluation of corridor drainage needs, the team determined that the west side existing ditch (present along approximately 2/3 of the corridor) will need to be maintained in the proposed typical section. This adds additional R/W need (see attached Typical Section #1) that made the team wish to take a step back and re-examine typical section alternatives.

The team developed 4 typical section options, these are attached to the minutes. Typical Section #4, which uses the median for conveyance, appears to be the preferred option based on drainage design, R/W impacts, and environmental impacts. The group discussed details of this option. Pros include limited R/W take (comparatively) and associated limited impact to adjacent conservation lands in particular the state lands, and ideal drainage design that exceeds treatment requirements. The main con is that for future widening to 6-lanes, the open median drainage design will need to be closed and a trunk line will need to be constructed. The team included a cost estimate for this in the comparison table (attached).

In answering Lee County questions, David B. explained that we will calculate spread for the final 6-lane construction. During the SFWMD pre-application meeting, SFWMD stated that we can treat just the new lanes. With this typical section option, we would be taking all water to the ponds and could likely treat all 4 lanes but would only treat the new lanes. The average pipe size would be 24-32 inches. Jay explained that the elevation change from the existing to the proposed roadway will be 2 to 3 feet. David M. asked about the inverted crown design and if we were familiar with any. David B. indicated that SR 520 in Orange County is an example. Kristin explained that there are fairly stringent compensation measures for taking R/W from state owned lands, and this is regardless of whether it is a designated park or conservation land.

Typical Section #2 was ranked as the next best option considering R/W, drainage and environmental issues. This one merges the 2 ditches on the left side. The left side of the roadway wouldn't be treated in this design, which is acceptable as per the SFWMD pre-app meeting.

Vince asked if we are tidally influenced, why doesn't that decrease our treatment and/or attenuation requirements. David B. explained that the SFWMD said they will require attenuation for the 25-yr, 3-day storm. He does agree with this assessment, he doesn't see this corridor as a non-attenuation situation. However he said that this will not increase the pond size by much, he believes the treatment volume will cover the attenuation volume. Again, the drainage design can treat a percentage of the water associated with the roadway improvements and the rest will flow through the corridor. Vince also asked about Typical Section #3, and why we didn't give this one more consideration. From a drainage perspective, this one does not adequately address the hydrological issues along the corridor. Also while David B. did contact

the SFWMD for a statement on whether comingling would be allowed, they have not responded. He is fairly confident that they will not allow/permit comingling for this area.

A question was asked about the bridge over Gator Slough Canal. The bridge would be sloped to the outside, and then there would be a rotation to slope towards the inside north of the canal.

The following action items were developed:

Item	Description and Action	Responsible
Inverted crown highway examples	Lee County requested some examples of this design	Scalar
comingling	Response from SFWMD on comingling being permittable or not on this corridor	CONSOR

BURNT STORE ROAD PD&E STUDY
FPID No. 436928-1-22-01

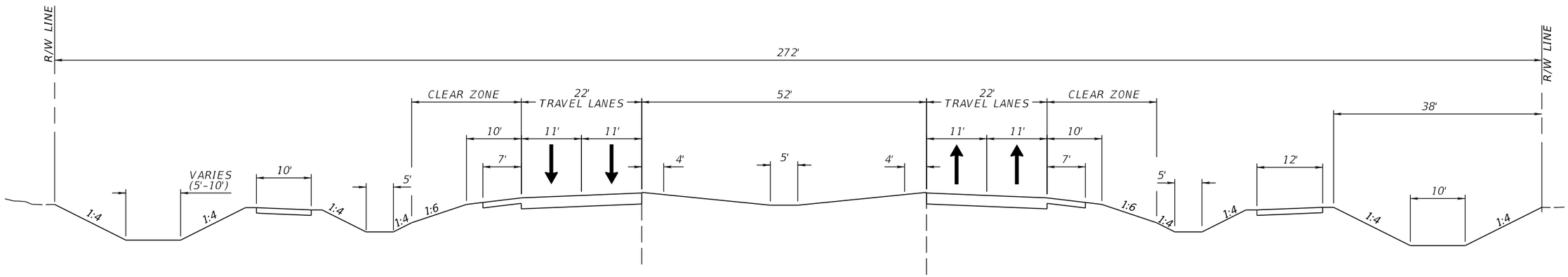
TYPICAL SECTION MEETING WITH LEE COUNTY
Friday, November 20, 2020
GoTo Meeting
SIGN-IN SHEET

NAME	COMPANY/ENTITY AND DEPT/ROLE	E-MAIL ADDRESS	PHONE #
Steven Andrews	FDOT, Project Manager	Steven.Andrews@dot.state.fl.us	863-519-2270
Richard (OJ) Oujevolk	FDOT, District Project Development Manager	Richard.Oujevolk@dot.state.fl.us	863-519-2293
Gwen Pipkin	FDOT, District Environmental Manager	Gwen.Pipkin@dot.state.fl.us	863-519-2375
David Murphy	LCDOT, Deputy Director, Public Works, Transportation	dmurphy@leegov.com	239-533-8578
Stephen Jansen	LCDOT, Transportation Engineering Manager, Traffic	jansensj@leegov.com	239-533-8503
Tom Marquardt	Lee County, Manager Public Works Programs- Transportation	tmarquardt@leegov.com	239-533-8530
Vincent Miller	LCDOT, Senior Engineer, Transportation	vmiller@leegov.com	239-533-8577
Robert Price	LCDOT, Senior Engineer, Transportation	rprice@leegov.com	239-533-9532
Kristin Caruso	Scalar Consulting Group (SCG); Consultant PM	kcaruso@scalarinc.net	813-988-1199 x209
Jay Winter	SCG, Roadway Lead	jwinter@scalarinc.net	813-988-1199 x201
Ignacio de Almagro	SCG, Consultant Engineer	ialmagro@scalarinc.net	305-205-3745
David Bennett	CONSOR, Drainage Lead	dbennett@consoreng.com	407-378-3903
Francina Gil	CONSOR, Drainage Engineer	fgil@consoreng.com	407-957-1660 x2241

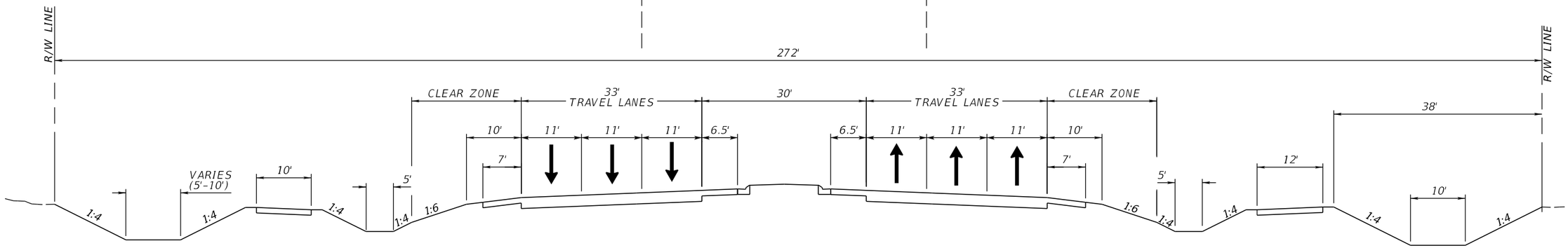
Burnt Store Road PD&E Study Typical Section Matrix
FPID No. 436928-1

Typical Section Option	R/W impacts from Gator Slough Canal to Kismet Pkwy	R/W impacts from Caloosa Pkwy to fire station	R/W impacts at fire station	R/W impacts at state owned properties (3 locations- South, Middle, North)	R/W impacts at BSR Marina development	R/W impacts at Century Link parcel	Overall R/W impact estimate (acres)	Cost analysis	Pros	Cons	Overall Ranking (based on R/W need and drainage needs)
	all options require some R/W take on west side, some also need R/W on east side	*east or west or combo R/W take options*	*east or west or combo R/W take options*	*east or west or combo R/W take options*	*east or west or combo R/W take options but east side take impacts North state land area*	*most R/W take on east side to tie-in to roadway to the north*					
#1- Road-side ditches between travel lanes and trail/sidewalk, offsite/bypass ditches on east and west sides where needed (up to 4 ditches total)	95 ft- most on west side (whole parcel purchases needed)	110 ft worst case 55 ft best case (whole parcel purchases needed if all on west side)	80 ft best case 105 ft worst case (relocation if all on west side)	S- 75 ft (could avoid- all R/W take on west side) M - 80 ft (could avoid some with R/W take on east side) N - 70 ft	100 ft worst case 40 ft best case (without gravity wall)	105 ft worst case 95 ft best case (relocation)	45	45 acre R/W purchase	ideal drainage design, can meet or exceed treatment requirements, no comingling on either side	most environmentally impactful- Section 4(f), ARC, wetlands, species	3
#2- One combined ditch on west side between sidewalk and R/W line, road-side ditch and bypass ditch on east side (up to 3 ditches total)	55 ft- approx. split on on west and east sides	70 ft worst case 30 ft best case	70 ft worst case 45 ft best case (relocation if all on west side)	S - 35 ft (could avoid- all R/W take on west side) M - 45 ft (could avoid most with R/W take on east side) N - 40 ft	30 ft worst case 15 ft best case (without gravity wall)	70 ft worst case 65 ft best case (anticipate no relocation, new drive needed, more R/W take on west side than #3 and #4)	34	34 acre R/W purchase	drainage design meets treatment requirements, no comingling on the east side	moderate impact to 4(f) and ARC lands, wetlands, species; comingling on the west side	2
#3- Combined ditches on both east and west sides between sidewalk/trail and R/W line (2 ditches total)	20 ft on west side	50 ft worst case 0 ft best case	40 ft worst case 20 ft best case	S - 0 to 10 ft (could avoid- all R/W take on west side) M - 10 ft (could avoid- all R/W take on east side) N - 10 ft (could avoid with gravity wall)	45 ft worst case 0 ft best case	45 ft worst case 35 ft best case (anticipate no relocation, new drive needed)	19	19 acre R/W purchase	least impactive for environmental issues	undesirable drainage design, comingling on both sides, ponds will receive offsite runoff, may alter the exiting drainage condition	3
#4- Combined ditches on both east and west sides between sidewalk/trail and R/W line (2 ditches total) using median for drainage	25 ft on west side	60 ft worst case 0 ft best case	50 ft worst case 30 ft best case	S - 0 to 15 ft (could avoid- all R/W take on west side) M - 20 ft (could avoid- all R/W take on east side) N - 15 ft (possibly could avoid with gravity wall)	55 ft worst case 5 ft best case (without gravity wall)	55 ft worst case 45 ft best case (anticipate no relocation, new drive needed)	22	22 acre R/W purchase plus $6,058,000 future expenditure for 6-laning (trunk line)	ideal drainage design, exceeds treatment requirements, no comingling on either side, existing drainage patterns can be maintained, close second to least impactive environmentally	future cost of median trunk line for conveyance to ponds	1

Typical Section Option #1



TYPICAL SECTION
BURNT STORE ROAD
FOUR-LANE RURAL
EXPANDABLE TO SIX-LANE SUBURBAN



TYPICAL SECTION
BURNT STORE ROAD
SIX-LANE SUBURBAN

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

SCALAR CONSULTING GROUP INC.
13337 N. 56TH STREET
TAMPA, FLORIDA 33617
CERTIFICATE OF AUTHORIZATION NO. 29560

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
CR 765	LEE	436928-1-22-01

TYPICAL SECTION (1)

SHEET NO.

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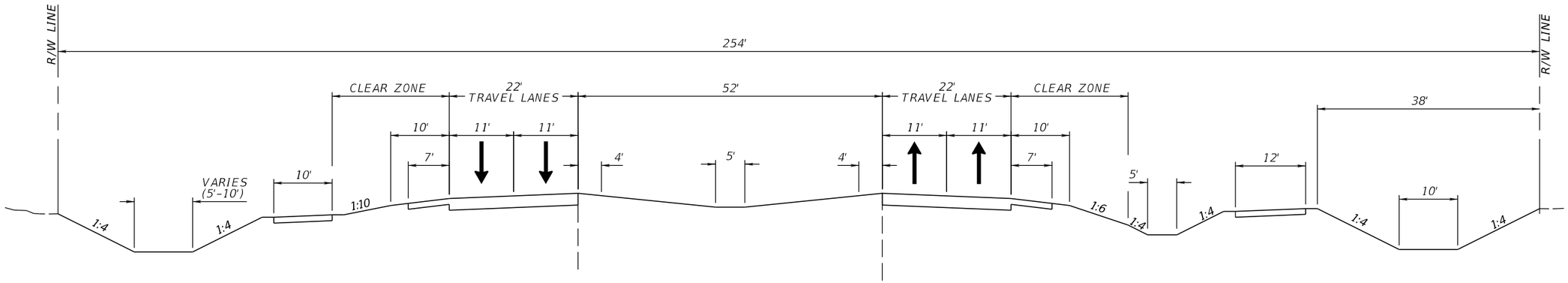
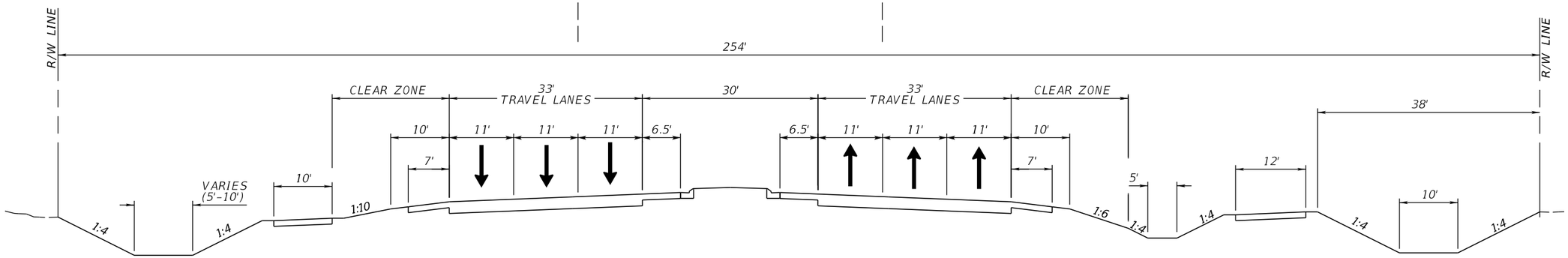
Typical Section Option #2



TYPICAL SECTION
BURNT STORE ROAD
FOUR-LANE RURAL
EXPANDABLE TO SIX-LANE SUBURBAN



TYPICAL SECTION
BURNT STORE ROAD
SIX-LANE SUBURBAN

REVISIONS			
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TYPICAL SECTION (2)

SHEET NO.

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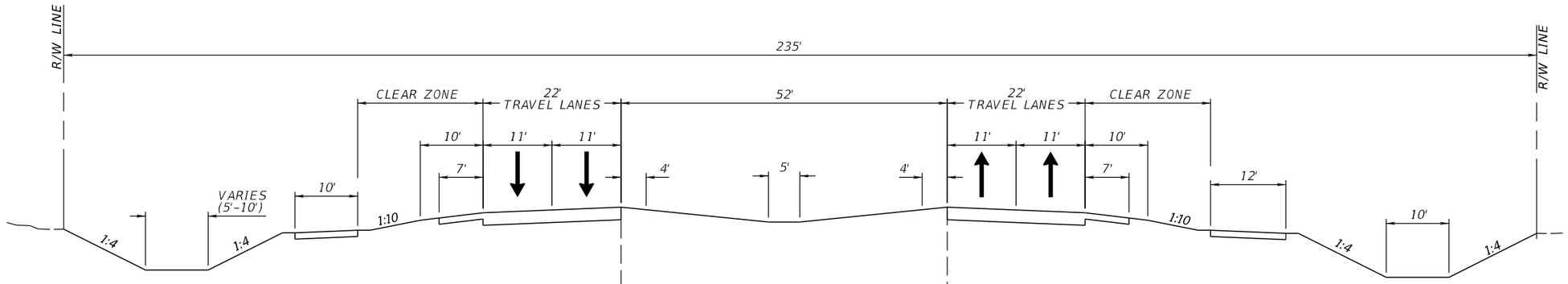
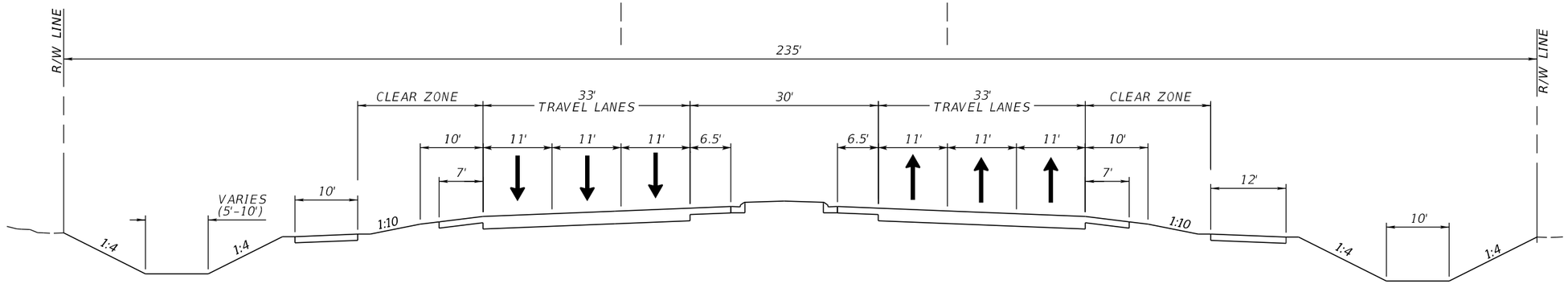
Typical Section Option #3



TYPICAL SECTION
BURNT STORE ROAD
FOUR-LANE RURAL
EXPANDABLE TO SIX-LANE SUBURBAN



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BURNT STORE ROAD
SIX-LANE SUBURBAN

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TYPICAL SECTION (3)

SHEET NO.

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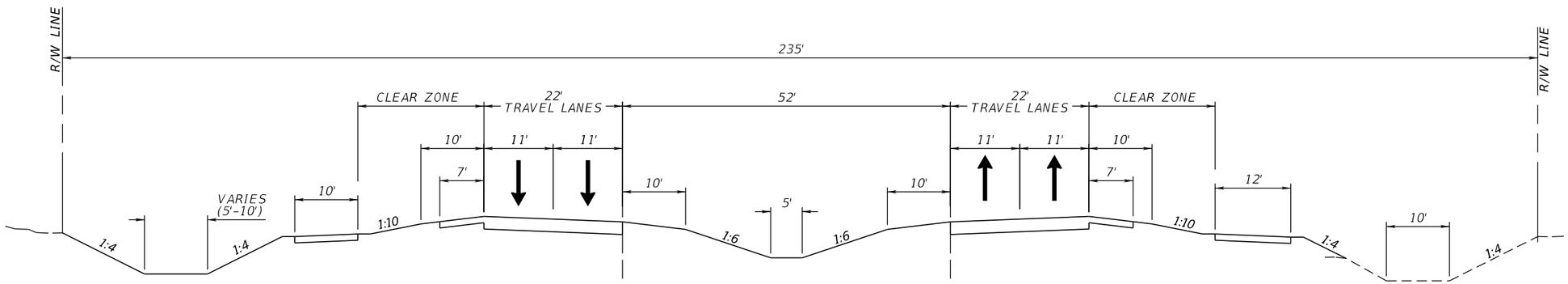
Typical Section Option #4



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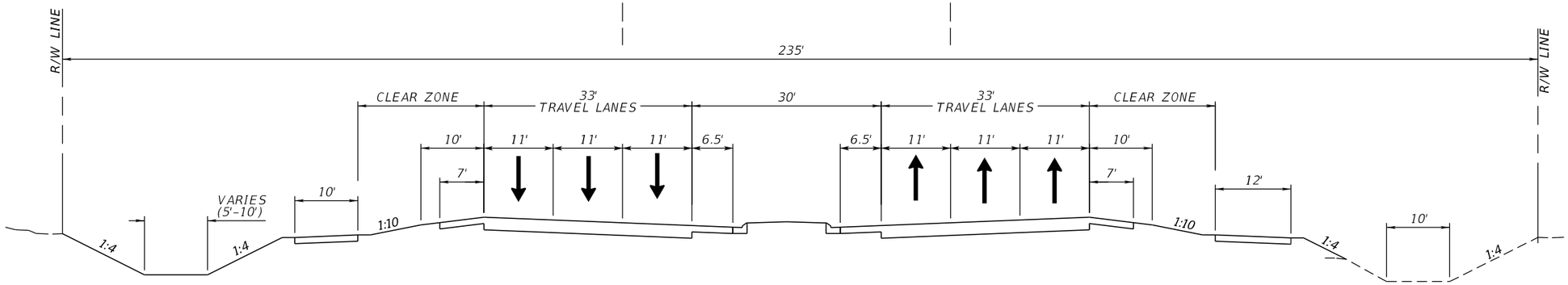
FOUR-LANE RURAL
EXPANDABLE TO SIX-LANE SUBURBAN



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SIX-LANE SUBURBAN

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DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
CR 765	LEE	436928-1-22-01

TYPICAL SECTION (4)

SHEET NO.

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Meeting Minutes

Project:	FPID No. 436928-1-22-01 Burnt Store Road PD&E Study from Van Buren Parkway to Charlotte CL
Subject:	Meeting with South Florida Water Management District (SFWMD)
Date and time:	January 27, 2021 at 10:00 AM
Meeting place:	Virtual (Teams) **Minutes by:** Scalar Consulting Group Inc.
Present:	FDOT: Nicole Monies, Brent Setchell, Karina Della Sera, Sergio Figueroa, Richard Oujevolk SFWMD: Melissa Roberts, Angelica Hoffert, Laura Layman, Jon Wadas, Jewelene Harris, Kim Fikoski Lee County: Vincent Miller, Nicholas DeFillippo Scalar: Kristin Caruso Consor: David Bennett Water Science Associates- Roger Copp Johnson Engineering- Andy Tilton

Notes

Introduction: This meeting was requested to serve as a follow-up to the prior FDOT pre-application meeting held on August 27, 2020 and was discussed generally in a Lee County pre-application meeting with SFWMD on January 13, 2021. The meeting intent was to clarify prior direction/understanding from SFWMD and include additional parties with interest and involvement in the PD&E Study and future design and construction phases.

Comingling

The consultant team explained that since the August 2020 pre-application meeting, we have requested input from SFWMD on whether co-mingling would be allowed. If allowed, depending on the criteria, this would provide more options for the roadway typical section and result in a narrower footprint and less impacts to adjacent properties which include county and state conservation lands. Brent explained that the intent of House Bill 599 was to allow comingling and not result in a dual ditch system, which is what otherwise would be needed for this roadway.

The team discussed that the offsite flows are within undeveloped properties, and much of this property is under county or state conservation. SFWMD indicated that we wouldn't have to evaluate presumptive treatment for the contributing basin(s) given the lack of development. The off-site conservation areas would be included in the nutrient loading calculations and it will be demonstrated that the significant off-site flows don't short circuit the chosen treatment system.

Treatment

Brent explained that since the project does not directly outfall to Outstanding Florida Waters (OFW) (team provided a map of the OFWs), the direct discharge intent of the 50% additional treatment is not met, and additional treatment doesn't seem applicable to this project. He referenced the "Bob Brown memo" and FDOT's "rebuttal" memos which refutes the need to provide the additional treatment as reasonable assurance. The group discussed the concept that the regional benefit of this project would outweigh the need to address any additional treatment. SFWMD requested a copy of the Bob Brown memo and FDOT "rebuttal" memos and concurred that the 50% additional treatment would not be required since the project

does not have a direct discharge to the OFW. Angelica noted that if attenuation is going to be provided, the additional 50% treatment volume requirement may not pose too much of a hardship since the attenuation volume would likely be the controlling factor and not the additional treatment volume.

David reminded the group that in the August 2020 pre-app meeting, SFWMD concurred that with the proposal of complete reconstruction from 2-4 lanes, treatment of only the 2 new lanes (net new impervious area) would be required.

Post pollutant calculations will be required that show a net improvement to all discharges that outfall to impaired water bodies.

Attenuation

Brent explained that at a minimum, the project would need to demonstrate no adverse impacts to the downstream canal systems and no increase in staging. We could do so by providing a pre- versus post-analysis for attenuation.

Alternative drainage concepts

Brent asked Andy to discuss some potential concepts related to utilizing the adjacent conservation parcels for stormwater management. Andy described how a spreader-swale type system could benefit the eastern conservation lands by directing water to these lands that experience hydrological impacts (reduction of water quantity/staging). When this additional water from the roadway is modeled over the large basin, it would be a very tiny net increase. The property managers would be supportive of this concept.

Andy also discussed compensatory treatment on these adjacent conservation lands. Andy suggested a small depth of water could be stored across the upland conservation areas to provide the required treatment and also meet the attenuation requirements. Laura stated that she would want to see as much pre-treatment as possible before the water is directed to the conservation lands. SFWMD indicated that this upland water storage concept would be a viable treatment and attenuation alternative.

Roger spoke about the overall goal to reduce peak flows from these eastern properties (Babcock Webb/Yucca Pens Unit Wildlife Management Unit and Yucca Pens Preserve), specifically in the regions of Yucca Pens Creek and Durden Creek. The wetland systems exhibit hydroperiods shorter than historic. He also discussed how potentially adding a berm on the west side, downstream of these properties could assist with compensating volumetric storage.

Floodplain

Vincent asked why floodplain compensation would apply to this project given its proximity to the gulf. SFWMD explained that they would require compensation for riverine flooding but not tidal storm events.

Summary

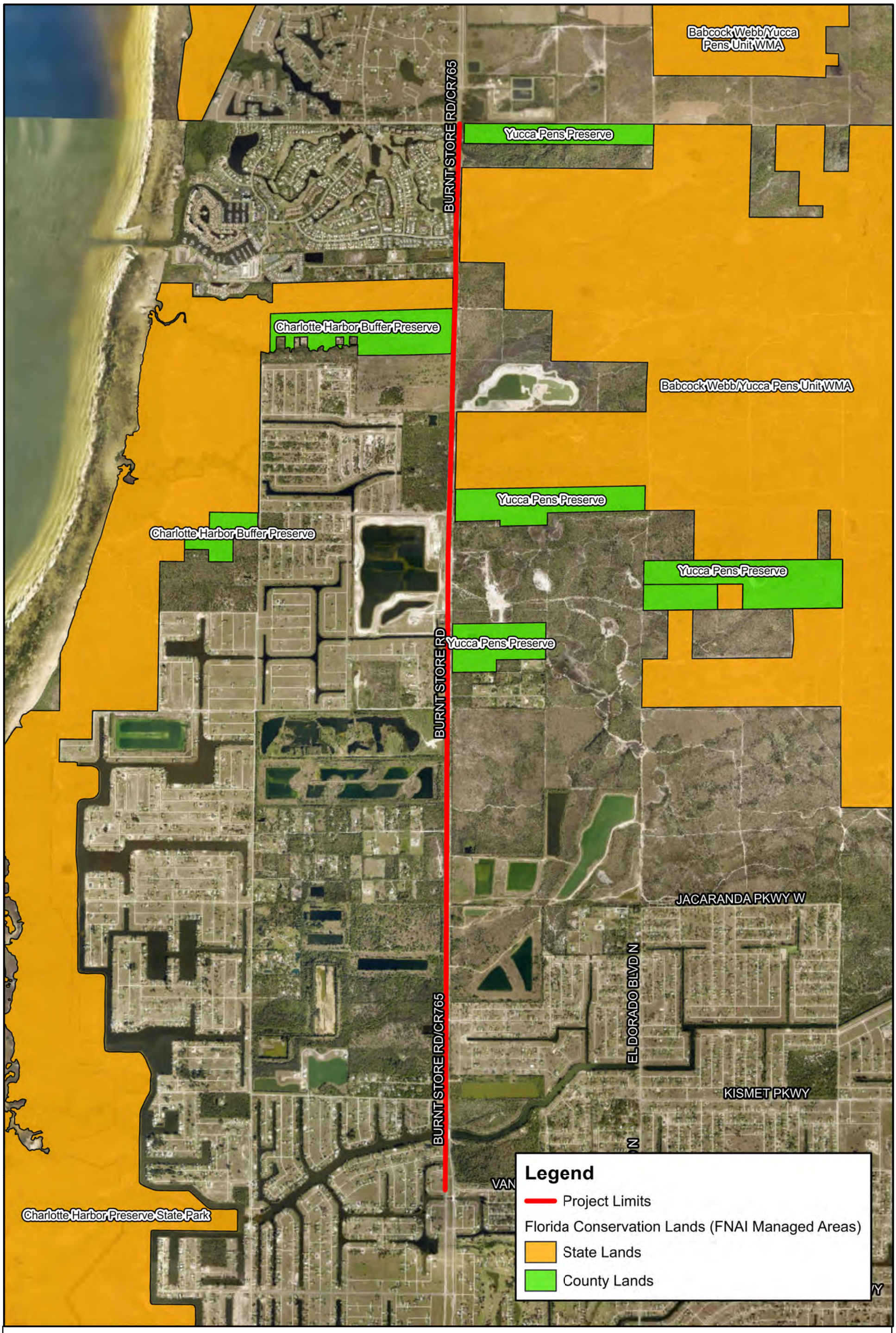
The following is the teams understanding from this meeting. **Please note that the drainage design criteria are of critical importance to this project, as these will now drive the selected typical section, estimated R/W impacts, environmental review of impacts, and overall approval of this PD&E Study by both the FDOT Office of Environmental Management (OEM) and Lee County, which will be responsible for all future phases of this project.**

1. Comingling is a permittable, viable option for this project. SFWMD will not require that the drainage analysis consider presumptive treatment of offsite flows, since the offsite contributing basin(s) are undeveloped. However, net improvement calculations must be provided to demonstrate that the comingled waters are not short circuiting the chosen treatment system.

2. Since the project doesn't have a direct discharge to OFWs, the additional 50% treatment volume requirement is not applicable.
3. Only the new lanes/pavement will require treatment as discussed in the August 2020 meeting.
4. An “out of the box” treatment and attenuation design is acknowledged to be desirable for this project by benefitting the regional hydrological restoration goals. Concepts such as attenuating and treating water on the eastern conservation lands, are valid.
5. In lieu of an off-site attenuation option, onsite attenuation via stormwater ponds can be provided using the 25-year, 3-day storm event. This is a permittable, viable option.

The following action items were developed:

Item	Description and Action	Deadline	Responsible
Bob Brown memo	Provide copy to SFWMD participants		FDOT Drainage



Conservation Lands

Burnt Store Road (CR 765) Widening
From Van Buren Parkway to Charlotte County Line
FPID No. 436928-1-22-01
Lee County

Data Source: ESRI
Imagery Date: 2020

0 0.23 0.45 0.9 Miles

Outstanding Florida Waters

Burnt Store Road (CR 765) Widening
From Van Buren Parkway to Charlotte County Line
FPID No. 436928-1-22-01
Lee County

Data Source: ESRI
Imagery Date: 2020

0 0.25 0.5 1 Miles

Meeting Minutes

Project:	FPID No. 436928-1-22-01 Burnt Store Road PD&E Study from Van Buren Parkway to Charlotte CL		
Subject:	Progress Meeting #5		
Date and time:	February 2, 2021 9:00 AM		
Meeting place:	TEAMS Meeting	**Minutes by:**	Scalar Consulting Group Inc.
Present:	See sign-in Sheet		
Notes			

Traffic

Ehsan explained that when comparing the January 2021 traffic data to the January 2020 data (County data) for nearby locations, the data are comparable. Scalar thinks that traffic data collection would be appropriate for the 2021 peak season (Feb-March). It could also occur later in the year but would start to affect the schedule if not collected by mid-2021. Chris asked that Ehsan email the data so he could review it and then provide a Dept. recommendation/approval.

Planning Consistency

Kristin updated the group that Charlotte-Punta Gorda MPO, which originally indicated they preferred that the project not extend past the county line (thus federalizing this section), has decided that they would like the project to extend to the existing 4-lane typical section in Charlotte Co. Email concurrence was provided. No future phases are currently funded.

Roadway and Drainage

The following is a brief summary of agency coordination meetings since the last FDOT progress meeting:

1. November 20, 2020: the team discussed the 4 alternative typical sections with Lee County.
2. January 7, 2021: Lee County stated their preference is Typical Section #3 (comingling). They are not in favor of the inverted crown (option #4) which the team recommended. The County indicated they have received different direction from SFWMD and the group agreed on the importance of confirming criteria.
3. January 13, 2021: some FDOT and consultant reps called-in to this monthly pre-app meeting with Lee County and SFWMD. The project was only discussed generally.
4. January 27, 2021: FDOT pre-app with SFWMD. Main points discussed included:
    a. Comingling ok without treating contributing basin flows
    b. Compensatory attenuation and treatment on conservation lands to east- this will require various inter-agency agreements
    c. Floodplain comp for riverine flooding

The team discussed and agreed that typical section #3 can be designed. The main risk associated with this typical section is the potential for SFWMD to change expectations of the design criteria and concepts discussed in the January 27th pre-app meeting at a later date when the project goes to final design and permitting. Kristin asked what level of confirmation/commitment we could get from SFWMD, such as an MOU, or at minimum, clear email response back from SFWMD that they concur with the discussion. O.J. discussed that in the PD&E documentation, it must be clearly stated that these drainage concepts are an assumption on which the design will be based. Jeff commented that we must also be prepared to support why Typical Section #4 is not selected.

For drainage and specifically pond siting, David explained that we can site 2 standard pond options and one alternative/compensatory/out of the box option per basin. He asked how detailed the third option would need to be. OJ commented that since we have no control over the agreements that may occur on off-site lands, it may be most reasonable to provide the general information without drainage analysis/calcs. It may be most logical to select a standard pond as the preferred option per basin. He and Jeff commented that as with many projects that transition to design, pond sites change and a re-evaluation could be done to address different pond options such as if a compensatory option were ultimately selected. Kristin asked how this would impact the environmental evaluations for ponds, since some disciplines do only a preliminary review of the options and then more detailed evaluation of the preferred sites (e.g. cultural resources). Jeff commented that the desk-top review could be completed, with field work delayed to final design.

Utilities

The team received cost estimates for partial takes of the Century Link facility (now Lumen) ranging from $725K-$1.825M. We are still awaiting a full take estimate. When Charlotte County inquired, they were advised that a full take was not an option.

Structures

Kristin explained that the new NB bridge was designed approximately 18 inches higher than the original SB bridge, and that our team is anticipating that we will match the low member elevation of the NB bridge. She asked if the guidance we have heard on other D1 projects, regarding an account for 2-foot sea level rise, would apply here, or if this 18-inch rise is adequate. OJ explained that this issue is in flux right now and topics in discussion also include wave action and withstanding hurricanes. Karina stated that it makes sense to move forward with the criteria that we have now, and can revisit this later if there is new direction. Predrag commented that we have the constraining factor of the adjacent bridge so this plays a role in determining what is appropriate for this bridge elevation. The team agreed it would be reasonable to ask the County if they have any other input.

Public Involvement

The schedule currently shows the public workshop in May. The team discussed if this is still achievable given the delay and pending final approval of the typical section. Jeff commented that D1 expects to see an evaluation matrix 6 weeks in advance of the meeting. The group agreed to see what decisions are made by Lee County in the next few weeks and make a decision on the meeting date at the next progress meeting.

Natural Environment

Did not discuss.

The team agreed that another coordination meeting with Lee County is needed. Kristin will set-up this meeting. The points to cover include:

1. Confirming that Lee County understands the risk of typical section #3
2. Advise the County that they may be asked to provide documentation such as an MOU with adjacent state lands concerning their willingness to allow treatment and attenuation on their managed lands for completion of the PD&E Study
3. Revisit typical section #4 to obtain more detail as to why they do not favor this option
4. Ask what profile reductions could be considered such as slimming-down the 10-ft wide sidewalk on the west side
5. Ask if they have any comments on the low member elevation of the SB bridge to be replaced

The following action items were developed:

Item	Description and Action	Responsible
Lee County coord meeting	Set-up another meeting	Kristin
Traffic data collection	Confirm appropriate to collect data this Feb/March- send data to Chris	Ehsan

BURNT STORE ROAD PD&E STUDY
FPID No. 436928-1-22-01

PROGRESS MEETING #5
Tuesday, January 2, 2021
TEAMS Meeting
SIGN-IN SHEET

NAME	COMPANY	POSITION	E-MAIL ADDRESS
Steven Andrews	FDOT	Project Manager	Steven.Andrews@dot.state.fl.us
Richard (OJ) Oujevolk	FDOT	District Project Development Manager	Richard.Oujevolk@dot.state.fl.us
Gwen Pipkin	FDOT	Environmental Manager	Gwen.Pipkin@dot.state.fl.us
Karina Della Sera	FDOT	Drainage Design	Karina.DellaSera@dot.state.fl.us
Jeff James	FDOT	District Contamination Impact Coordinator	JeffreyW.james@dot.state.fl.us
Chris Simpron	FDOT	Transportation Modeler/Planner	Christopher.simpron@dot.state.fl.us
Kristin Caruso	Scalar Consulting Group	Consultant Project Manager	kcaruso@scalarinc.net
Jay Winter	Scalar Consulting Group	Consultant Roadway Lead	jwinter@scalarinc.net
Aniruddha Gotmare	Scalar Consulting Group	Consultant DPM	agotmare@scalarinc.net
Ehsan Doustmohammadi	Scalar Consulting Group	Consultant Traffic Lead	edoustmohammadi@scalarinc.net
Predrag Milosavljevic	Scalar Consulting Group	Consultant Structures Lead	pmilosavljevic@scalarinc.net
Ignacio de Almagro	Scalar Consulting Group	Consultant Engineer	ialmagro@scalarinc.net
David Bennett	CONSOR	Consultant Drainage Lead	dbennett@consoreng.com
Francina Gil	CONSOR	Consultant Drainage	fgil@consoreng.com
Nicole Selly	KCA	In-house EMO support staff	nselly@kcaeng.com

Meeting Minutes

Project:	FPID No. 436928-1-22-01 Burnt Store Road PD&E Study from Van Buren Parkway to Charlotte CL		
Subject:	Typical Section and Drainage Meeting with Lee County		
Date and time:	February 11, 2021 11:00 AM		
Meeting place:	GoTo Meeting	**Minutes by:**	Scalar Consulting Group Inc.
Present:	See attached Sign-In Sheet		

Notes

This meeting was held to discuss drainage concepts and typical section selection following the January 2021 SFWMD pre-application meeting. Kristin updated the group that it appeared from the SFWMD meeting that comingling would be a viable design option for this project. The team will proceed with preparing roadway alternatives that will be based on what we have been calling “Typical Section #3”- which is the comingling option that combines ditches. This results in a single ditch on each side of the roadway, combining both off-site and on-site drainage. There is some risk in this option because SFWMD could indicate later, during final design and permitting, that comingling would not be permittable. Lee County acknowledges this potential but prefers Typical Section #3 over other options presented. To offset risk, Kristin explained that documentation of SFWMD confirmation/assurance will be needed. FDOT is trying to obtain written concurrence from the SFWMD regulatory department managers (engineering and environmental) through email submittal of the meeting minutes. To date, no responses have been received but Kristin will continue to touch base with SFWMD and may ask Lee County for assistance if SFWMD does not respond. Vincent expressed that other risk is impact to the adjacent properties (conservation lands and residential), and potential that the Lee Co Board of County Commissioners would not approve the project. Kristin stated that from the PD&E perspective, the property impacts are addressed as part of the study processes. OJ reiterated that FDOT’s intent is not to provide a conceptual design that is unfavorable to the county.

Kristin asked if any other adjustments could be made to the typical section, such as reducing the width of the sidewalk. No other adjustments are wanted/needed.

Regarding ponds, Kristin explained that we will be evaluating 3 options per basin, which will include 1 or more alternative concept (non-traditional pond site). Unless documentation is complete to demonstrate commitment between Lee County and an adjacent property owner for non-traditional options, we will need to “select” a traditional pond site option. This will ensure viability of the drainage design. However, any concepts and documentation developed will be included in the PD&E documentation.

Vincent expressed concern about completing the PD&E study that “selects” pond sites that would be unfavorable to the county and asked if the study would have to be done again in that scenario, or if the study expires after one year. OJ and Kristin discussed that it is common for pond sites to change following completion of the PD&E study, and that there is a re-evaluation process that addresses this type of a change. The approved PD&E study does not expire. The goal is to identify viable pond options, therefore at the PD&E phase, this tends to be traditional pond sites. At the time when ponds must be “selected”, if the County has an MOU, letter, etc. with a landowner that is specific enough to validate that alternative pond site option, there is a stronger chance that we could get that site approved by OEM. Vincent explained that he would like to get their Lee County DOT Director’s input on this approach because he

sees value in waiting for adjacent property owner agreements to be complete and included in the PD&E Study so that the desired pond options are “selected” in the PD&E phase. The team acknowledged that this approach would delay the project schedule.

Kristin asked if we could presume that the adjacent county-owned lands are available for pond siting. We were advised to contact Keith Gomez and Robert Clemens for County R/W questions.

Kristin asked if the County had input on the Gator Slough bridge elevation. Our coastal engineer will evaluate this but currently we are planning on matching the low member of the NB bridge. The team briefly discussed that sea level rise and coastal resiliency issues are being discussed now and are in flux. Lee County does not have information on a desired elevation.

Vincent confirmed that the Controlled Access Management Resolution for Burnt Store Road has been finalized and provided a copy during the meeting by email.

The project schedule was briefly discussed and Kristin indicated that the public meeting is tentatively scheduled for late May but may be pushed out a couple of months to allow time for the engineering and environmental analyses now that we have conclusion of the typical section decision. Vincent expressed that the County may have concerns with a May or summer meeting since it is out of season. OJ explained that with the pandemic, FDOT has been conducting virtual meetings and this removes the seasonal concerns. Vincent believes that the local population is less likely to attend a virtual meeting and would respond better to a more traditional method. He will discuss this with the Director for input.

The following action items were developed:

Item	Description and Action	Responsible
County R/W	Are adjacent parcels available for stormwater pond use- ask R/W staff	Scalar
Pond site selection and public meetings	Obtain feedback from Lee Co DOT Director on pond selection in PD&E and timing of public meetings	Vincent

BURNT STORE ROAD PD&E STUDY
FPID No. 436928-1-22-01

TYPICAL SECTION MEETING WITH LEE COUNTY
Thursday, February 11, 2021
GoTo Meeting
SIGN-IN SHEET

NAME	COMPANY/ENTITY AND DEPT/ROLE	E-MAIL ADDRESS	PHONE #
Steven Andrews	FDOT, Project Manager	Steven.Andrews@dot.state.fl.us	863-519-2270
Richard (OJ) Oujevolk	FDOT, District Project Development Manager	Richard.Oujevolk@dot.state.fl.us	863-519-2293
Karina Della Sera	FDOT, Drainage Lead	Karina.dellasera@dot.state.fl.us	863-519-2750
David Murphy	LCDOT, Deputy Director, Public Works, Transportation	dmurphy@leegov.com	239-533-8578
Stephen Jansen	LCDOT, Transportation Engineering Manager, Traffic	jansensj@leegov.com	239-533-8503
Tom Marquardt	Lee County, Manager Public Works Programs- Transportation	tmarquardt@leegov.com	239-533-8530
Vincent Miller	LCDOT, Senior Engineer, Transportation	vmiller@leegov.com	239-533-8577
Robert Price	LCDOT, Senior Engineer, Transportation	rprice@leegov.com	239-533-9532
Kristin Caruso	Scalar Consulting Group (SCG); Consultant PM	kcaruso@scalarinc.net	813-988-1199 x209
Jay Winter	SCG, Roadway Lead	jwinter@scalarinc.net	813-988-1199 x201
Rudy Gotmare	SCG, Consultant Deputy PM	agotmare@scalarinc.net	561-429-5065
David Bennett	CONSOR, Drainage Lead	dbennett@consoreng.com	407-378-3903
Michael Wilson	SCG, Roadway	mwilson@scalarinc.net	813-988-1199 x222

Meeting Minutes

Project:	FPID No. 436928-1-22-01 Burnt Store Road PD&E Study from Van Buren Parkway to Charlotte CL		
Subject:	Design Meeting with Lee County		
Date and time:	June 28, 2021 2:30 PM		
Meeting place:	GoTo Meeting	**Minutes by:**	Scalar Consulting Group Inc.
Present:	See attached Sign-In Sheet		

Notes

This meeting was held to update Lee County on the roadway alternatives, discuss right-of-way pinch points and impacts, and vet the pond site alternatives. Maps were provided to Lee County in advance by email when scheduling the meeting.

Kristin updated the group that the four roadway alignments have been developed and the following areas are in need of discussion:

1. Residential (mostly undeveloped) parcels on the west side north of Gator Slough Canal
    a. Northern-most parcel on the corner is now developed, driveway connects to Kismet Rd.
    b. Unless the County approves direct driveway connections to Burnt Store Rd., these lots will not be developable given need for access road and county building code requirements.

The group discussed that Kismet Rd. is a right in, right out intersection. The Burnt Store Road controlled access resolution does not allow backing into the roadway. Shared driveway connections could be an option but due to the narrow parcels to begin with they would need circular or hammerhead driveways. The Lee County board of commissioners is very hesitant to condemn a single-family residence however there does not seem to be a viable alternative. The team discussed that if the parcels will be rendered undevelopable, then complete takes may be prudent if the remainders can be used for stormwater management.

2. Residential (all undeveloped) parcels on the west side south of the fire station
    a. There is sufficient room to design an access road along these parcels which will connect to Caloosa Parkway North.

Lee County confirmed an access road is warranted here.

3. Northern segment between Burnt Store Marina and state lands
    a. Only the optimized/best-fit option can mostly avoid impacts to both sides, but a few feet of R/W acquisition will be needed. We currently are showing impacts to the west (development side) to the landscaping in front of the privacy wall.

Vince asked if FDOT could have a fall-back position of impacting the state lands since there are concerns about impacting the development. Jennifer mentioned that the state is very sensitive about impacts to their lands and Kristin briefly explained the process of Section 4(f) analysis (typically done once the preferred alternative has been identified, not for all viable alternatives) and land mitigation requirements.

OJ asked if Lee County would consider a design change to narrow the typical section. This would take the strain off the R/W impact concerns voiced by the County. For example, do we need the full median width, does this area need to allow for future 6-lane widening. The group discussed the design speed of 50 mph, we can't have an urban typical section with curbing (which would only require a 22-ft median) at

50 mph, would need to reduce to 45 mph. The County would like to maintain the higher design speed and does want to deviate from the required median width. Any other changes would require variations and/or exceptions, which Lee County would be responsible for signing. Rudy commented that there is only so much we can do engineering-wise if we are working with a 235-foot typical section in existing 200-ft of R/W. Kristin asked if Lee County would consider a narrower sidewalk in this area (10-ft to 5-ft on the left side) and David asked about handrail with 5-ft gravity wall (design team doesn't think this will eliminate the entire impact however). Vince said handrail is an option, but the County needs to make sure it is maintainable. Vince asked if FDOT is assuming right in, right out U-turns. Vincent Avenue is the only intersection in the project limits with a full median opening. All the rest are one directional or two directional openings.

Jennifer asked if the County would sign something saying that they have a constraint in this area, because of the desire to not impact the Burnt Store Marina development. This would give the FDOT what is needed to move forward with the alternative to impact state lands and show this impact at a public workshop. Randy Cerchie, the Transportation Director is on vacation for a few weeks, the Lee County team would need input from him.

General topics discussed at the end of the roadway conversation:

1. Jennifer explained that the County should consider funding the full project for design next, as opposed to design and construction for a single segment. This seems prudent given the R/W and drainage needs along the project. Vince commented that this could transition to a LAP-type project for the next phase.
2. Lee County and FDOT will need to sign the typical section, and Lee County will need to approve any design variations and exceptions.

Pond siting discussion:

Kristin briefly described that there are 10 basins and the two of most concern for state lands have been *avoided*- the drainage team was able to combine basins to do so. Several options are on City of Cape Coral property and the team forwarded this exhibit to the City. The northern basin is in Charlotte County. Vince asked who would be maintaining that pond, Kristin explained that Charlotte County is aware of the basin and was contacted while the pond options were identified. Francina walked through a few of the basins to discuss sites, several basins have a co-mingling option that would use an existing pond/borrow pit. Kristin stated that the team is hoping to know if any of these are immediately undesirable, and if the County would be contacting the owners of the potential development sites to see if they are viable options (prior Lee County R/W direction was not for the team to contact anyone). Vince said we should try speaking with Robert Clements directly to discuss. For Basin 1, the County was not in favor of pond sites using existing median ponds because they wouldn't want to open the existing WMD permit. The County reminded the team to include pond options in Basin 2 as previously discussed.

Vince commented that there appeared to be too many postage-sized ponds and expressed concern that the drainage is assuming attenuation when his understanding from the SFWMD pre-application meeting was that we would not need to attenuate. The team clarified that only one site per basin will ultimately be selected/needed, we are showing 3 alternatives per basin. Francina did not believe that SFWMD stated attenuation was not needed. The group reviewed the meeting minutes which stated that *at a minimum, the project would need to demonstrate no adverse impacts to the downstream canals and no increase in staging.* At this PD&E level, we should assume worst case and later during design when more data is available (survey, geotechnical) if some basins do not need attenuation, the ponds can be modified. Vince also asked about the use of the conservation lands for stormwater needs. OJ expressed concern that tying this project with these off-site hydrological concepts may not be the best course of action. The group has discussed in the past that written agreements will be required (between the County and state agency), at this PD&E level the data is not available to determine viability and permit-ability of these

ideas, and the PD&E Study may not be approved unless these concepts are fully vetted. At this stage since drainage was able to avoid the sensitive basins and state lands, FDOT thinks this is a viable option for showing stormwater needs along the corridor for the PD&E study. Vince expressed that their group will talk to Randy about this topic again.

The following action items were developed:

Item	Description and Action	Responsible
Land owner contacts	Speak to Robert Clements to explain need to reach out to owners of potential developments for viability of land use for stormwater	Scalar
R/W impacts and pond siting/selection	Obtain feedback from Lee Co DOT Director on impacts to Burnt Store Marina vs. state lands and pond siting	Vincent

Meeting Minutes

Project:	FPID No. 436928-1-22-01 Burnt Store Road PD&E Study from Van Buren Parkway to Charlotte CL		
Subject:	Design Meeting with Lee County		
Date and time:	September 1, 2021 10:00 AM		
Meeting place:	Lee County Public Works	**Minutes by:**	Scalar Consulting Group Inc.
Present:	See attached Sign-In Sheet		

Notes

Introduction and Overview

Following Lee County, FDOT and Consultant team introductions, Kristin gave a brief overview of the project. This meeting was held to discuss the roadway and drainage engineering analysis completed to date; to seek a decision on which typical section would be most preferred by the County; and to seek additional comments on conceptual pond sites as well as identification of preferred sites. This will allow the project team to complete our alternatives analysis, where we will be looking at different alignments of the typical section to minimize environmental impacts and R/W impacts. Ultimately. we will need Lee County to sign the typical section and approve any needed exceptions and variations.

The project is approximately 5.5 miles from Van Buren Parkway to Charlotte County line. Given lack of logical termini if the project were to end at the county line and leave a ¼-mile segment of 2-lane road before the roadway transitions to 4-lanes, FDOT coordinated with Charlotte County and the Charlotte-Punta Gorda MPO on inclusion of this small segment in the study. Randy expressed that Lee County can only address construction within Lee County. The project team explained that Charlotte County and their MPO are in agreement with this approach to include and federalize this segment, they have added this roadway segment to their planning documentation (LRTP, CIP) for future project phases, and understand they will be responsible for R/W acquisition and construction. When Charlotte County widened Burnt Store Road to the north a few years back, they stopped short of the County line due to the constraint of the existing Centurylink fiberoptic building/hub.

Existing R/W is 200 feet along the project limits (less in Charlotte County). The team has been modeling the various typical sections with LiDAR data given that we understand the flooding issues along the corridor and find that the roadway profile will need to be raised as much as 3 feet. Given tie-down slopes, this widens-out the typical section and all typicals we've looked at involve some level of R/W impact for the mainline. We have been seeking to avoid and minimize R/W impacts wherever possible, and this is partly why we've looked at a number of typical sections, trying to balance the roadway elements/characteristics expressed by Lee County and the associated mainline R/W impacts. Other constraints include the existing Burnt Store Marina residential development and conservation lands (county and state managed). Randy commented that the properties are selling fast and development is ramping-up, so while the Burnt Store Road Marina may be the only current development, it will soon be the smallest along the corridor. The southbound bridge over Gator Slough Canal will be replaced; the northbound bridge was recently constructed as part of the Lee County reconstruction segment to the south.

Randy asked about the historical flows to the west and if we've accommodated for enough crossings so that we can assure the public that we will not impact the east-west flows and not cause any flooding to off-site parcels. There are nine (9) crossings along the corridor, we are completing a location hydraulic report, to analyze the existing cross drains based on proposed conditions to see if they need to be upsized or if additional crossings are needed. We've been in coordination with the Charlotte Harbor Flatwoods Initiative (CHFI) and they expressed that the water from the east is being shuttled to the south quickly, mostly bypassing the historical east-west flow pattern. Vincent added that they want to hold more water on the east side in Yucca Pens. Richard (OJ) commented that we will make sure that the roadway drainage is fully analyzed but that we cannot be tied to the regional drainage issues since that is beyond the scope of the project.

Randy asked if the project team considered the "super street" concept for this corridor and if we were given any direction by the County to do so. Kristin and Rudy explained that we did not, our understanding was that the super street typical was intended to terminate at Gator Slough Canal.

Traffic Projections

Ehsan provided an overview of the traffic data. Using the FDOT District 1 Regional Planning Model (travel demand model) which is unique to this area, and accounts for future development plans and socio-economic data, we derived an annual growth rate of 8.2%. This is higher than the state-wide average, and normally the growth rate is around 2-4% but this growth rate is reasonable based on the trend analysis, which shows a similar growth factor. Ehsan applied this to the existing traffic numbers and finds that 4-lane widening is needed in design year 2045. With 4-lanes the corridor will operate at Level C which is acceptable for a rural area. The need for 6-lanes appears around 2055, 10 years after the design year. OJ explained that since we are required to look at a 20-year horizon, will have to justify a typical section with expandability to 6-lanes to the Office of Environmental Management (FDOT Central Office in Tallahassee), we will need to properly document other elements such as the Lee County comprehensive plan, future development plans, and future growth management plan. We can show that it is prudent to select a typical section with the 6-lane expandability. The project team may need to reach out to the County for some assistance in this documentation process. Randy asked if we have been in coordination with Don Scott of the Lee County MPO; we have. He also pointed out the development of the Punta Gorda airport and how that will affect the area.

Typical Sections

Kristin and Jay began walking through the packet of typical sections which provided a history of the options analyzed to date. Design speeds were discussed, most of the typical section options would be 50 mph. The roadway south of the project is posted at 50 mph, and to the north in Charlotte County it is currently posted at 55 mph but OJ stated that Charlotte County is re-evaluating the speeds along Burnt Store Rd. particularly near US 41. Kristin mentioned that several comments have been received from the public with concerns about speeding and hopes that the road widening would include lower posted speeds. The group discussed disparate public opinions and that speeding is more of an enforcement issue. The 5-year crash data (2015-2019) shows 53 crashes within the study limits, 8 off-road crashes, no head-on crashes. Ehsan mentioned the median openings will be directional based on the Burnt Store Road access management resolution, which is anticipated to help enhance safety. *Update: After reviewing the long forms, four head-on crashes were identified resulted in no fatalities and three injuries.*

Randy suggested that the group skip to typical section #5, since that one, and #6, show the road within the existing 200-feet of R/W and appears to have the road elements they want. The group discussed the design speed would be 45 mph for the urban typical section and discussed that after the road is constructed and posted at 45 mph, the County could follow-up with a speed study and if crash rates aren't

high, it could be re-posted at 50 mph. The bike lane could be removed from the typical section, and instead provide two, 12-foot shared-use paths. OJ explained that they have been using questionnaires to ask the public what their current preferences are; FDOT is finding that people are trending towards preference of shared-use paths since they feel safer separated from the roadway. Randy mentioned that these paths require more maintenance. OJ stated that the team could send-out a questionnaire for this project to gauge local preference.

Also discussed was a modification of the interim 4-lane condition, whereby the median could be reduced and re-shaped to allow for an inside shoulder (4-feet) and an outside shoulder (5-feet). This would allow for an interim speed limit of 50 mph. The team discussed incorporation of two, 12-foot paths. Vince pointed out that this additional space between the travel lane and the gutter would help the spread calculations. When the road is widened to 6-lanes, the inside shoulders would be incorporated into travel lanes, and the outside 5-foot shoulders would either be retained and used for gutter spread/drainage or can be used as a shoulder. The design speed would be 45 mph but could be raised to 50 mph later.

Vince clarified that this typical section will start out as a closed drainage system and there are obviously additional drainage infrastructure costs. A cost estimate for the closed drainage system was provided in the packet. Jay clarified that with a closed drainage system, we will no longer be matching existing terrain but instead will be looking at a sawtooth profile (up 9 inches, down 9 inches, with 1:4 slopes). Randy mentioned that this road is on a toll corridor- so toll funds are coordinated with the City of Cape Coral and could be used for this project.

Vince asked if we are showing sufficient clear zone given the 2018 Greenbook criteria with the urban typical sections. The group discussed that for an urban roadway, while meeting clear zone is ideal, it is usually not feasible.

The group discussed gravity wall as an option for reducing R/W impacts in select areas, but the County is not in favor of gravity wall.

OJ emphasized that this is an ecologically-sensitive corridor and that with the NEPA process, we must consider avoidance and minimization of environmental impacts. He asked if the urban typical section avoids all or most of the conservation lands, and Kristin explained that while the urban typical section has not been modelled as fully as the other options, we do believe the R/W impacts will be very minor. The group reviewed the comparison table and Rudy clarified that we are talking about mainline impacts, not pond site impacts. A question was raised about treatment and David confirmed that new impervious pavement will need to be treated.

Drainage

OJ asked if we do find R/W impacts for the mainline in some areas, what areas of the roadway elements could the County live without. The group enquired if the ditch side slopes could be changed to 1:3.
David stated freeboard is about 1 foot, ditches will always be wet, and the ditches won't always be able to contain all the off-site flows, like today where there is standing water at times beyond the ditches. We will not be able to berm-up the backside of the ditches because this would cut-off the off-site flow. Our challenge is to make sure that the standing water is not increased to ensure that there are no impacts to adjacent properties. David stated that in design, it can be ensured that the ditches are graded properly to provide positive flow. Vince agreed that with submerged conditions, the issue is grade lines. The area is tidally influenced so during permitting, if we can show that there our outfalls have direct discharge, the SFWMD should concur that attention is not needed. However, by providing treatment volume, we anticipate that this may cover most of the attenuation volume. David commented that without comingling,

Meeting Minutes

Project:	FPID No. 436928-1-22-01 Burnt Store Road PD&E Study from Van Buren Parkway to Charlotte CL		
Subject:	Coordination Meeting with Lee County		
Date and time:	March 7, 2022 1:00 PM		
Meeting place:	Lee County Public Works	**Minutes by:**	Scalar Consulting Group Inc.
Present:	See attached Sign-In Sheet		

Notes

Introduction and Overview

Prior to the meeting formally starting, the team discussed that the high water table is driving the mainline R/W impacts. Currently the water over-tops the road in seasonal high rain events. For drainage the off-site flows would be routed to simply flow through the roadway footprint. While it is a tidal area, the water is not currently flowing through the system freely. Vince asked about side street tie-downs and if significant re-paving would be required to account for the tie-down slopes; the design team responded it would not be significant.

Following Lee County, FDOT and Consultant team introductions, Kristin explained that following the September 2021 meeting typical section conversation, the team proceeded to prepare conceptual plans with R/W impact avoidance in mind as the key issue. We are presenting three (3) alternatives with the goal to walk through them, collect comments, and move forward to a public workshop with all or preferably a sub-set of the alternatives in addition to the no-build alternative. The draft alternatives matrix presented is draft form, one item we are awaiting is the R/W costs.

OJ explained a recent issue with another project on a county road, where the FDOT Central Office legal dept. asked why FDOT was purchasing R/W on a county road. This stopped the project. Therefore, we'd rather use their cost estimates since it is not our purview to be securing eminent domain on county roads. Lee County agreed to provide the cost estimates.

The team then walked through the 3 alternatives while comparing to the typical sections (4-lane and ultimate 6-lane) and matrix. They consist of:

Alternative #1: Rural/suburban typical (4-lane expandable to 6-lane)

- This is the Best Fit of the "Comingling" option which was the preferred of the 4 open-drainage alternatives.
- R/W takes up to approx. 65 feet. Widening to east in some areas, west in others, some locations with widening on both sides. Most property impacts including potential relocations.
- Impacts to 2 County-managed conservation lands and to several county and city-owned vacant parcels.

Alternative #2: Urban typical (4-lane expandable to 6-lane)

- For off-site water management, need ditch on east side (road and road drainage all within existing R/W).
- Widening all on east side, impacts up to 20 feet. No relocations.

- Impacts to 2 County-managed conservation lands, 1 state managed land, and to several county and city-owned vacant parcels.

Alternative #3: Urban typical with Piped Offsite Flows (4-lane expandable to 6-lane)

- For off-site water management, pipe ditch on east side. This will allow all work to remain in existing R/W.

Pond sites- shown on the roll plots are the Lee Co-preferred sites as per R/W Dept communication. The group discussed the Basin 10 preference; 10A was Lee County's preference but 10B was sized for the 6-laning in Charlotte Co. and Charlotte was unsuccessful in communicating with the utility owner (pond 10A site) when they widened their road. For Basin 9- an additional option is shown as a preferred site since 9A and 9B were of concern to Lee Co (development planned). Basin 2 will have 2 pond sites. The construction costs in the matrix do not include costs for piping to ponds. Vince asked for a table to include square footage and dimensions of the pond sites. For pond sites, impacts for the preferred sites will eventually be included in the alternatives matrix for the hearing, but for the workshop, we would only show the # of pond sites needed.

Intersections- shown on the roll plots and correspond to the Burnt Store Rd. access management resolution, with one change at the fire station for a full median opening. Large trucks will not be able to make U-turns once the road is widened to 6-lanes. Bulb-outs or other allowances will be required.

Lumen (FKA CenturyLink) property impact- not substantial enough for any alternative that a relocation would be required. Right to cure- replacing the driveway and parking spots- is included in the matrix and cost was provided by the utility.

Vince asked what will happen if Charlotte Co prefers a different alternative or different typical section. Mike explained that we could do a transition if needed. Vince asked if utilities coming down from Charlotte Co are all on the west side and if they would all need to be relocated. Mike believes there will be some adjustments needed.

The group talked about the public workshop date- currently planned for late September but it could be sooner depending on the amount of refinements needed on the alternatives. OJ confirmed that seasonality of the meeting is not a concern- Randy said it is not for this particular area.

Funding and future phases- OJ mentioned that there is new funding being made available and some PD&E projects are including design efforts to make them more likely to receive construction funding. Some projects have recently been considered for design-build. Randy commented this project is a Tier-2 as per their BOCC. If federal funds become available, would we have design segments identified? The team commented it would be logical to break-out by basin divides. Rudy commented that the faster we push the project, the more shovel-ready it will be, and higher potential to be allocated federal funding.

Vince asked how we balance the NEPA documents with the schedule of design and construction. OJ explained that the timeframe of the PD&E Study isn't a concern, a re-eval will need to be done later to address design changes. They key is to get LDCA.

Alternatives for the public workshop

- Alt 2- further refinements could be made in select areas to reduce or avoid R/W impacts, such as adding a ditch for off-site flows. Access management edits can also be made. Open to Lee Co comments on this.

- We could go forward with just 1 alternative in addition to the no-build for the public workshop, but we need to document the decisions that were made to eliminate alternatives.

Planning consistency- OJ asked if there is a county document/plan that shows the need for 6-lanes, otherwise OEM could question why we need a typical section that allows for this widening. Otherwise we would need to update the MPOs needs plan for proper documentation. Vince mentioned the Burnt Store Rd. Bi-County Corridor Study.
OJ commented that Charlotte needs to have the project properly documented in their planning docs as well, right now they do show it in their needs plan.

Cost estimates (summary)

- Lee Co to prepare R/W cost estimates with data table from FDOT team.
- currently missing the new bridge over Gator Slough Canal, we are waiting on updates. All three options will increase.
- Do not include the pipes to ponds or any other pond-specific cost- this will be added later for the preferred pond sites.
- Do include Lumen property impacts specific to the cost to cure and relocation of utilities along the road (no building relocation required).

The following action items were developed:

Item	Description and Action	Responsible
Pond information	Lee Co would like a table of the pond sites with sizes and dimensions- 1 week needed	Scalar team
R/W parcel information	Lee Co needs parcel impacts to prepare cost estimates- 1 week needed and combine with pond data	Scalar team
R/W cost estimates	Provide cost estimates within 1 month of receipt of parcel information	County
alternatives	Provide digital files of concept plans	Scalar team
alternatives	Lee Co. to provide comments within 1 month	County
county doc showing future plan for BSR	Check Bi-County Corridor Study	Scalar team

BURNT STORE ROAD PD&E STUDY
FPID No. 436928-1-22-01

LEE COUNTY COORDINATION MEETING
Monday, March 7, 2022
In-Person Meeting
SIGN-IN SHEET

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