STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

TECHNICAL REPORT COVERSHEET

650-050-38
ENVIRONMENTAL
MANAGEMENT
08/22

POND SITING REPORT

Florida Department of Transportation

District 1

SR 544 PD&E Study

Limits of Project: From Martin Luther King Boulevard to SR 17

Polk County, Florida

Financial Management Number: 440273-1-22-01

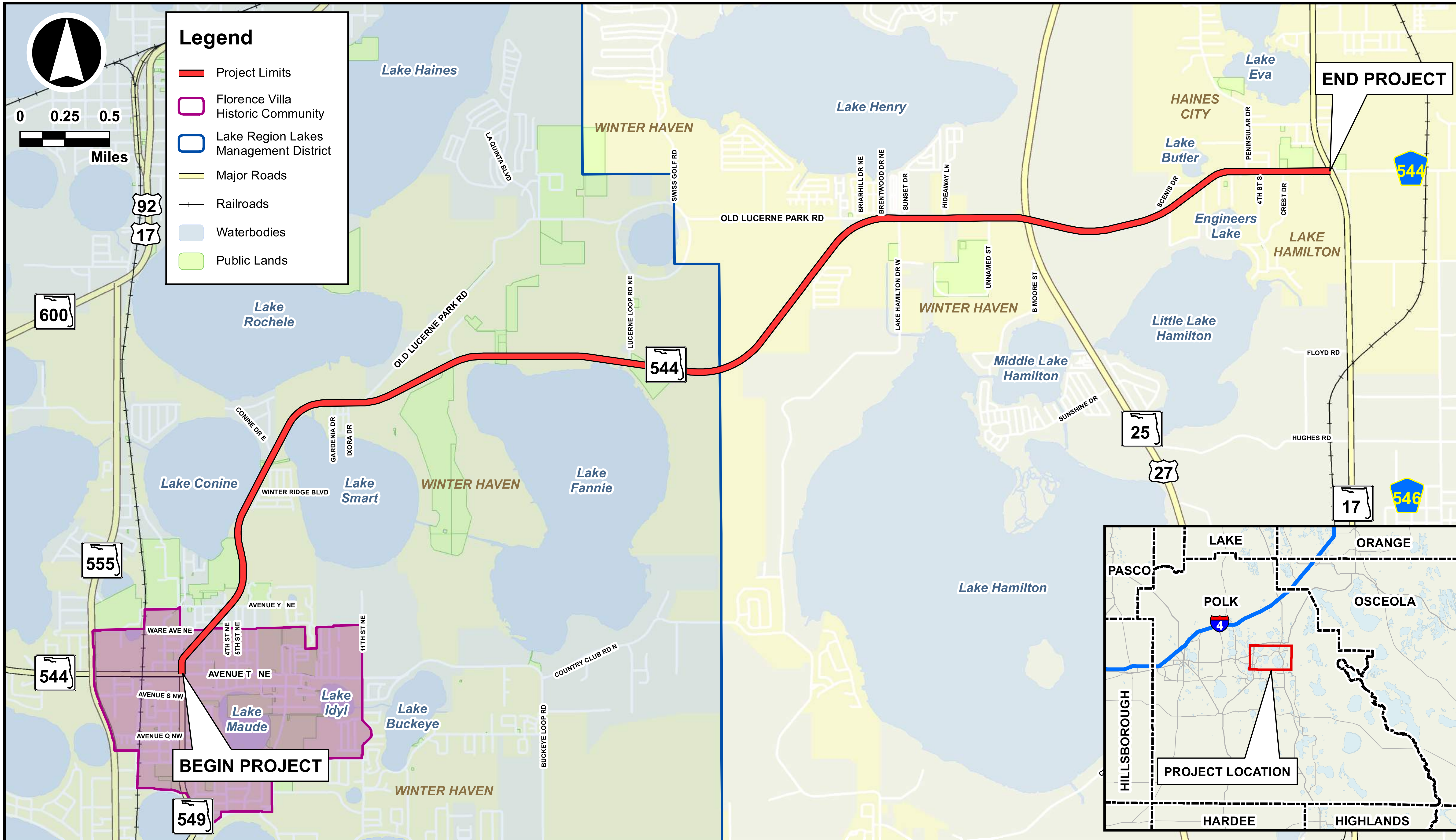
ETDM Number: 5873

Date: October 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.

APPENDIX A

Exhibits



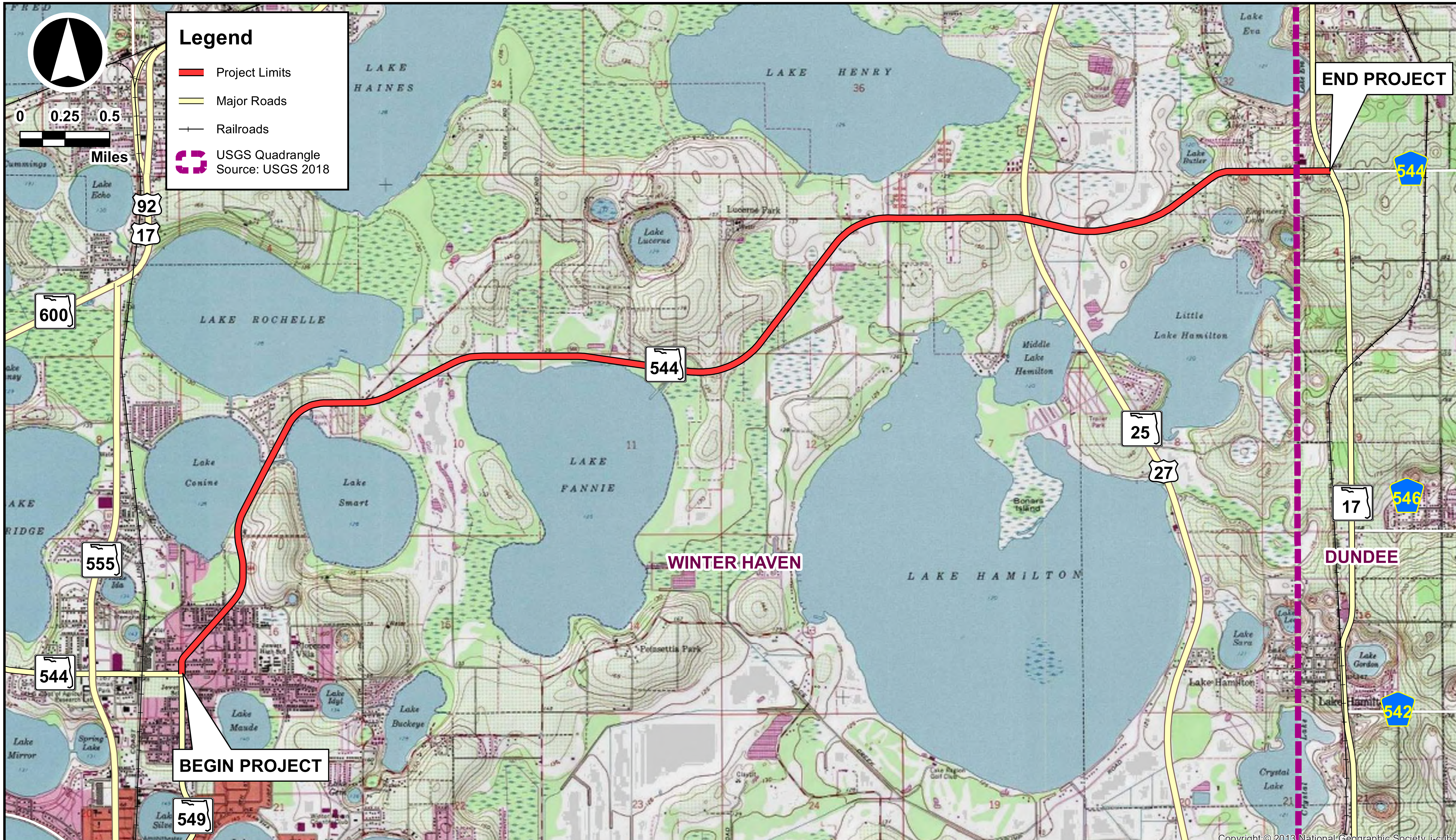
FDOT Florida Department of Transportation
District 1

State Road 544 PD&E Study
from Martin Luther King Blvd / Avenue T W
to State Road 17
Polk County, Florida

Financial Project ID: 440273-1-22-01

PROJECT LOCATION MAP

Figure
1



FDOT

Florida Department
of Transportation
District 1

State Road 544 PD&E Study

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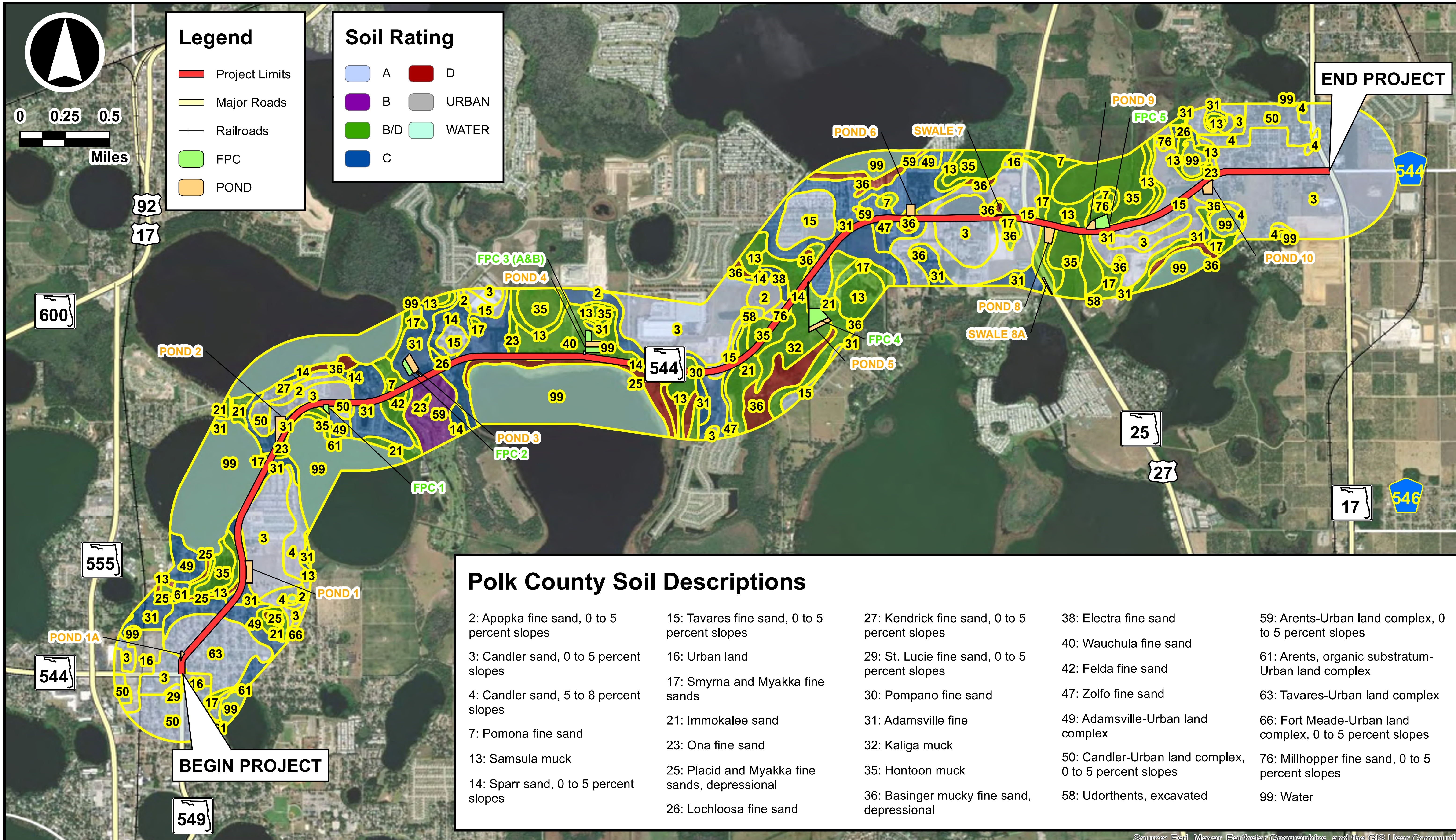
USGS QUADRANGLE MAP

Figure
2



Polk County Soil Descriptions

- 2: Apopka fine sand, 0 to 5 percent slopes
- 3: Candler sand, 0 to 5 percent slopes
- 4: Candler sand, 5 to 8 percent slopes
- 7: Pomona fine sand
- 13: Samsula muck
- 14: Sparr sand, 0 to 5 percent slopes
- 15: Tavares fine sand, 0 to 5 percent slopes
- 16: Urban land
- 17: Smyrna and Myakka fine sands
- 21: Immokalee sand
- 23: Ona fine sand
- 25: Placid and Myakka fine sands, depressional
- 26: Lochloosa fine sand
- 27: Kendrick fine sand, 0 to 5 percent slopes
- 29: St. Lucie fine sand, 0 to 5 percent slopes
- 30: Pompano fine sand
- 31: Adamsville fine
- 32: Kaliga muck
- 35: Hontoon muck
- 36: Basinger mucky fine sand, depressional
- 38: Electra fine sand
- 40: Wauchula fine sand
- 42: Felda fine sand
- 47: Zolfo fine sand
- 49: Adamsville-Urban land complex
- 50: Candler-Urban land complex, 0 to 5 percent slopes
- 58: Udorthents, excavated
- 59: Arents-Urban land complex, 0 to 5 percent slopes
- 61: Arents, organic substratum-Urban land complex
- 63: Tavares-Urban land complex
- 66: Fort Meade-Urban land complex, 0 to 5 percent slopes
- 76: Millhopper fine sand, 0 to 5 percent slopes
- 99: Water

FDOT
Florida Department of Transportation
District 1

State Road 544 PD&E Study
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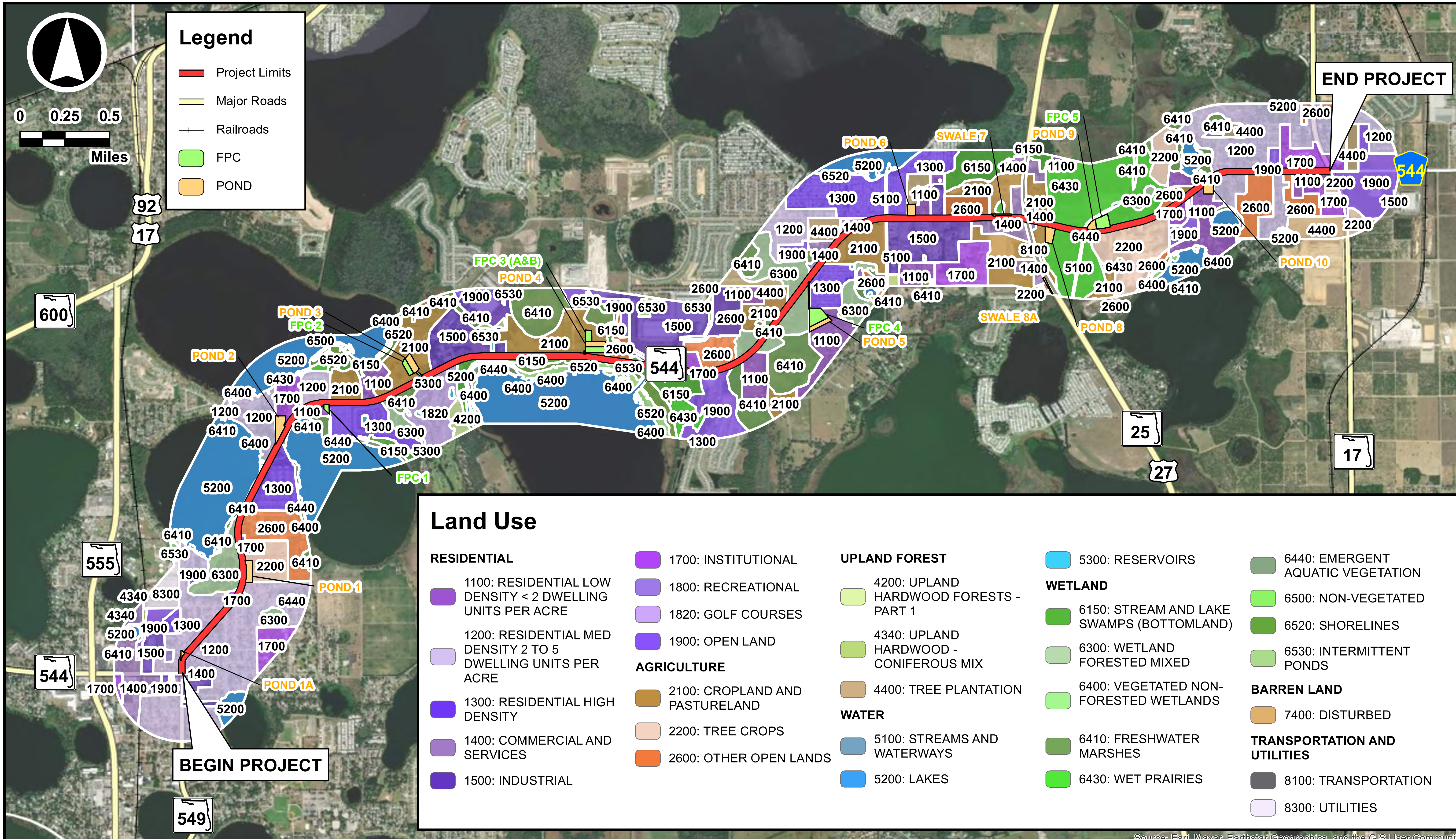
NRCS SOILS MAP

Figure
3



FDOT Florida Department of Transportation District 1

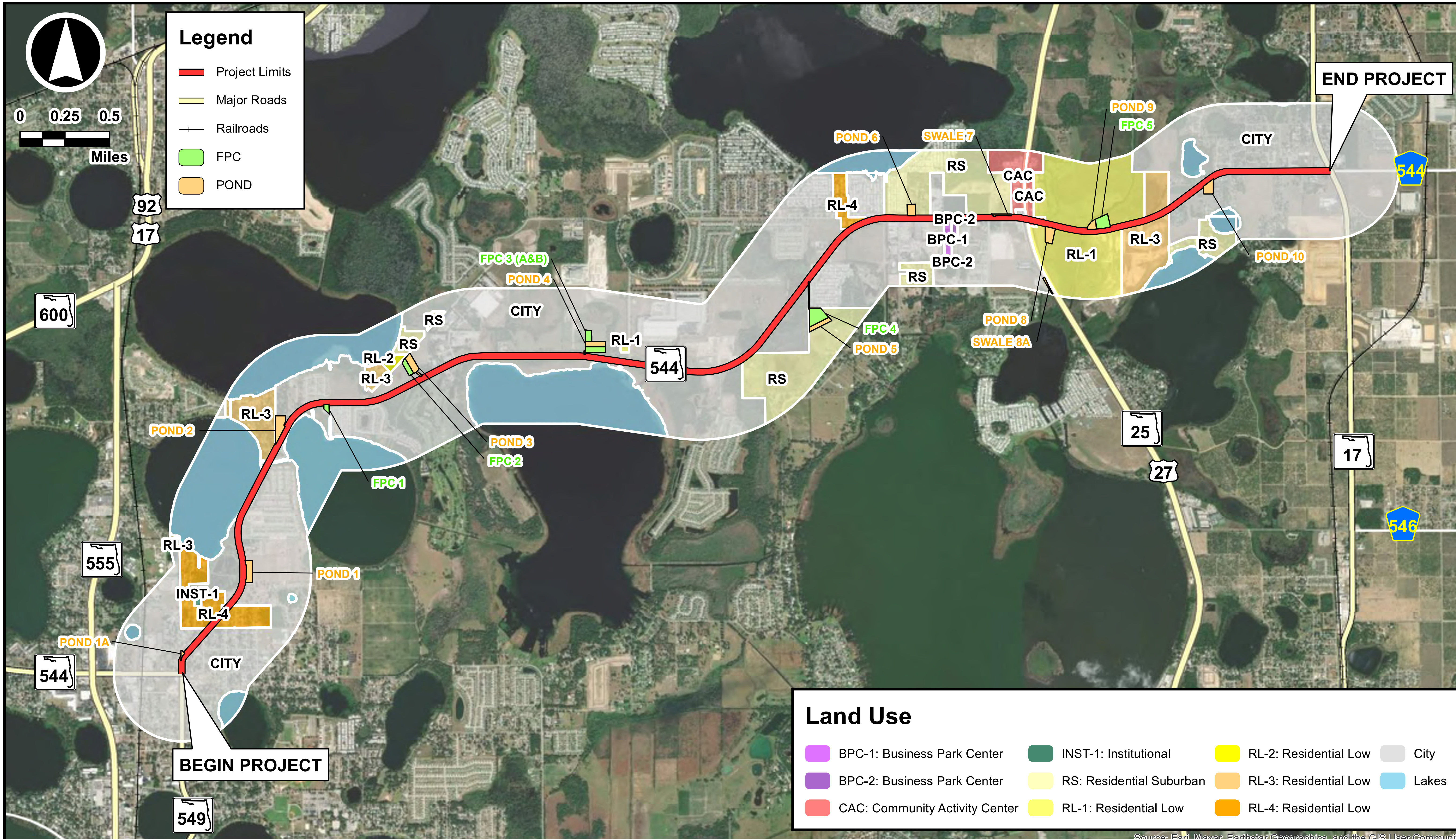
State Road 544 PD&E Study

from Martin Luther King Blvd / Avenue T W
to State Road 17
Polk County, Florida

Financial Project ID: 440273-1-22-01

EXISTING LAND USE MAP (SWFWMD)

Figure 4A



FDOT Florida Department of Transportation
District 1

State Road 544 PD&E Study
from Martin Luther King Blvd / Avenue T W
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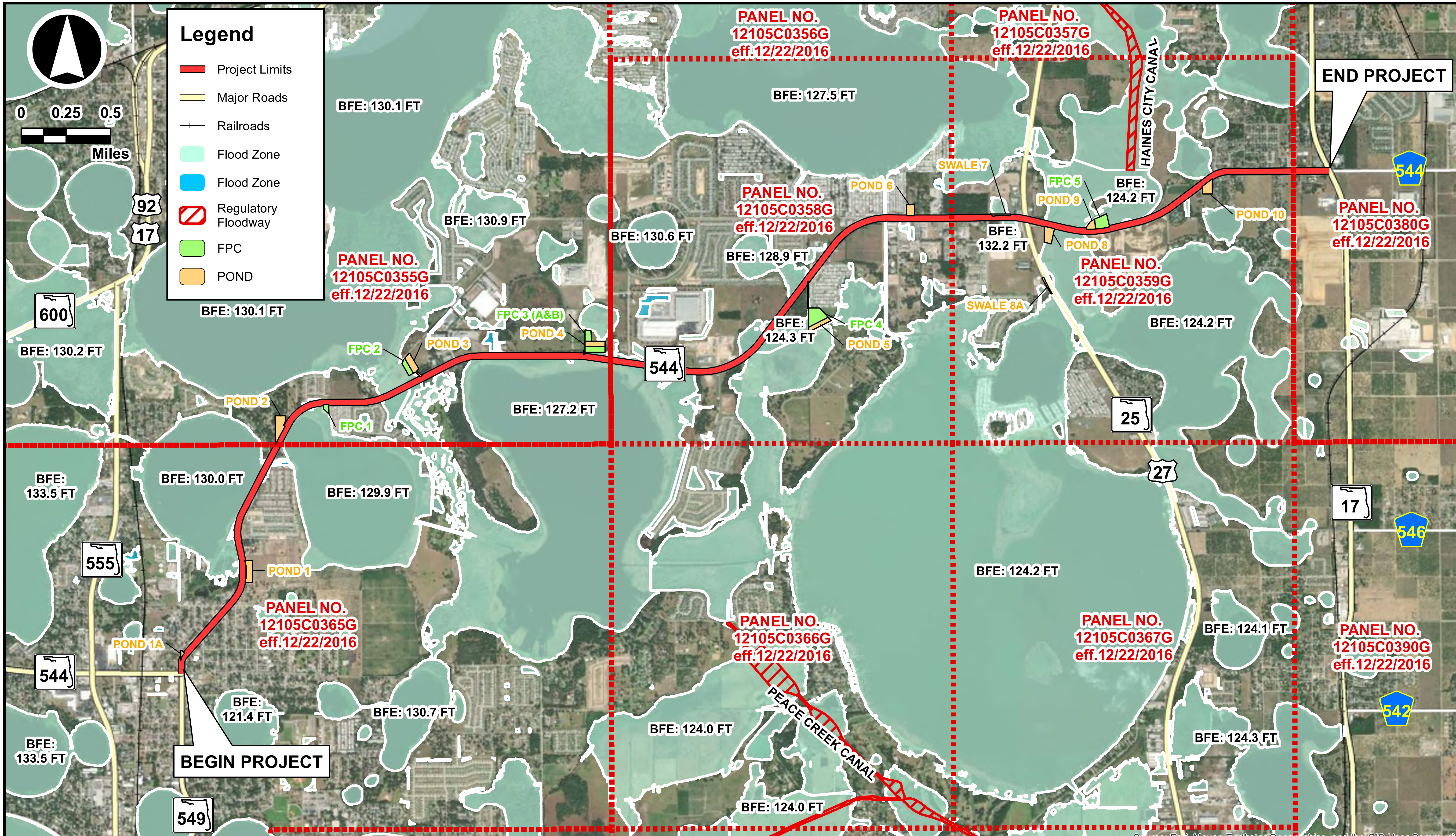
Polk County, Florida

Financial Project ID: 440273-1-22-01

PROPOSED LAND USE MAP (POLK COUNTY)

Figure
4B



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District 1

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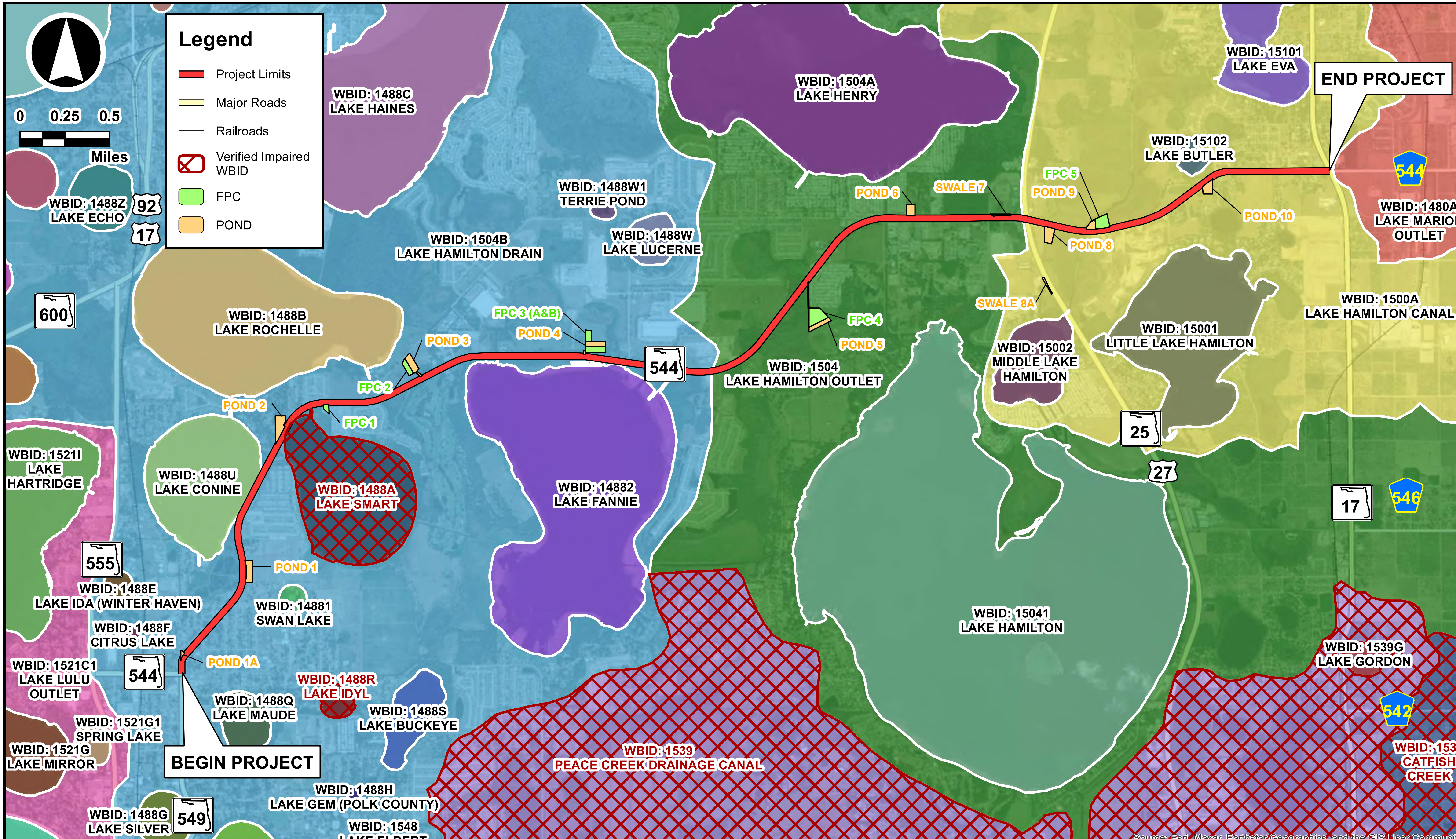
FEMA FLOODPLAINS MAP

Figure **5**



Florida Department of Transportation
District 1

State Road 544 PD&E Study

from Martin Luther King Blvd / Avenue T W
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Polk County, Florida

Financial Project ID: 440273-1-22-01

WBID MAP

Figure **6**

APPENDIX B

Basin Maps

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 544	POLK	440273-1-22-01

BASIN MAPS

SHEET NO.
1

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REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 544	POLK	440273-1-22-01

BASIN MAPS

SHEET NO.
2

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REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 544	POLK	440273-1-22-01

BASIN MAPS

SHEET NO.
3

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 544	POLK	440273-1-22-01

BASIN MAPS

SHEET NO.
4

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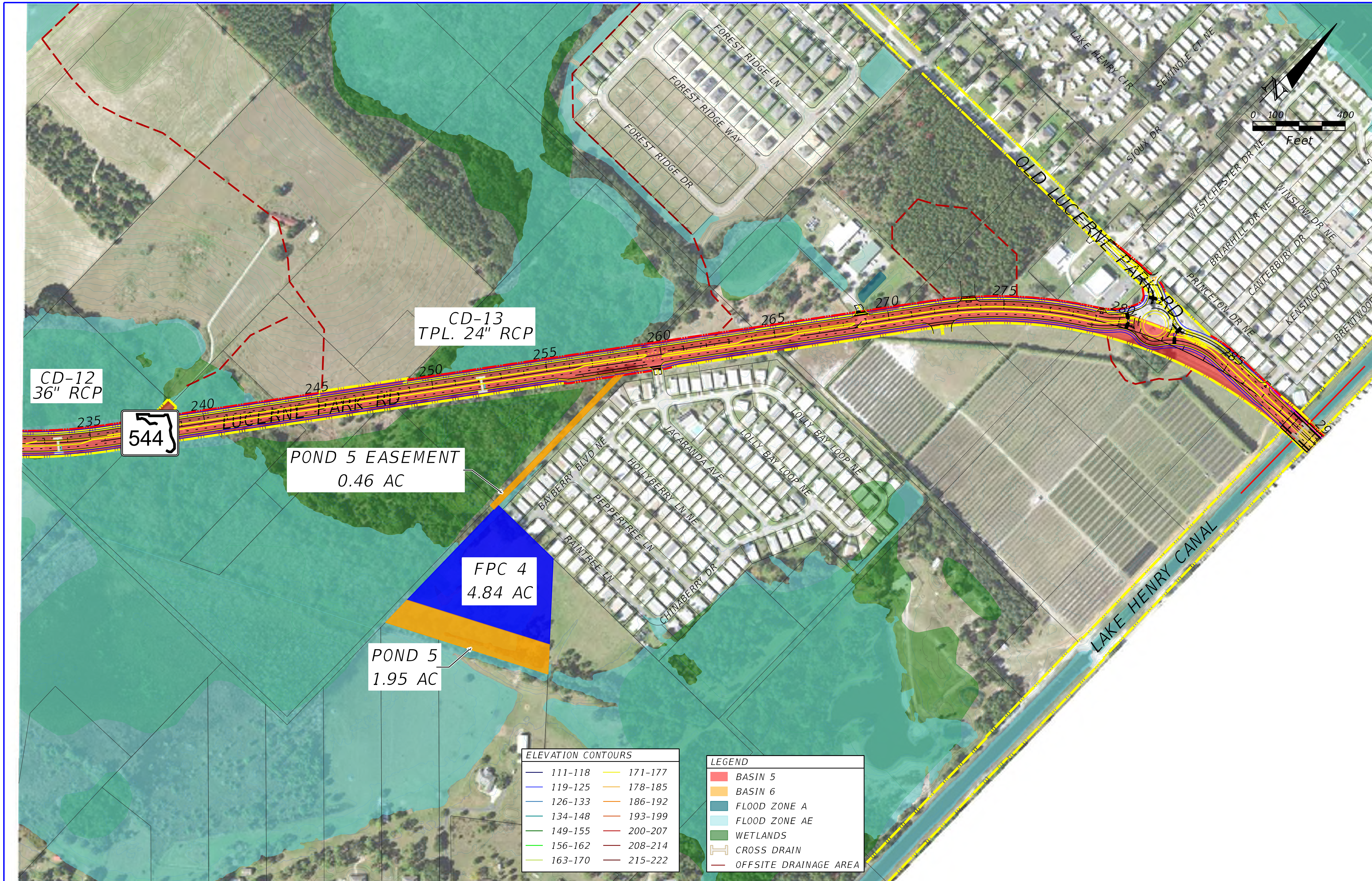


REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 544	POLK	440273-1-22-01

BASIN MAPS

SHEET NO.
5

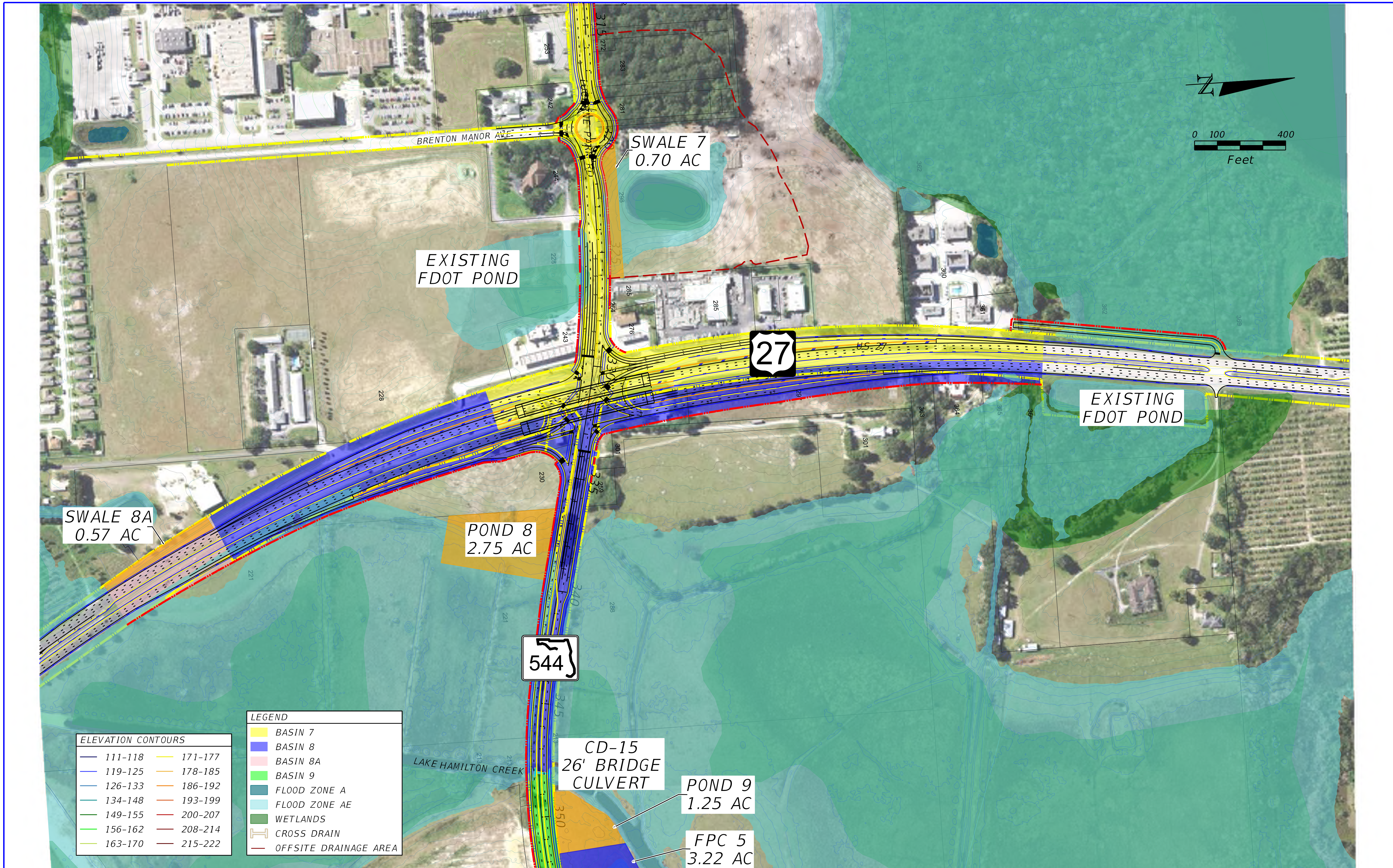
REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 544	POLK	440273-1-22-01

BASIN MAPS

SHEET NO. 6



REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 544	POLK	440273-1-22-01

BASIN MAPS

SHEET NO.
7

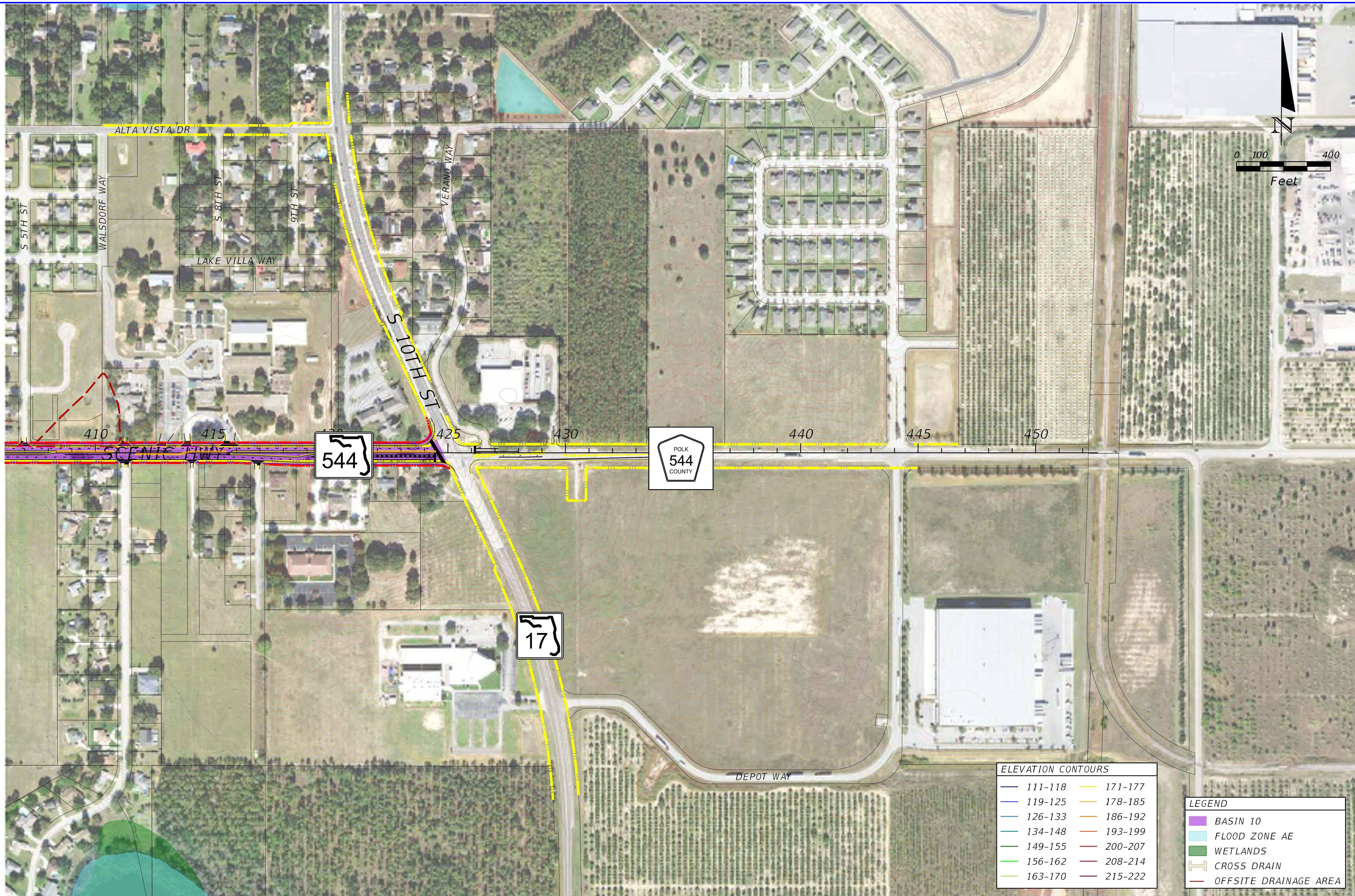
REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 544	POLK	440273-1-22-01

BASIN MAPS

SHEET NO.



REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 544	POLK	440273-1-22-01

BASIN MAPS

SHEET NO.
9

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APPENDIX C

Pond Design Calculations

BASIN 1A

Inwood consulting engineers
3000 Dovera Drive, Suite 200, Oviedo, FL 32765
(407) 971-8850 (phone)
(407) 971-8955 (fax)

Made by: DLD
Checked by: REC

DATE: August 7, 2023
Job Number: DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **1A**
POND NAME : **1A**

Station Limits: From: 004+80 To: 013+84

Roadway Length = 904 ft
*Areas mesaured in Microstation

EXISTING CONDITION

Roadway Impervious **Area:** 1.54 ac

Roadway Pervious: 0.80 ac

Total Area: **2.34 ac**

Curve Number:

Land Use Description	Soil Group	CN	Area	CN*Area
Impervious areas; Streets & roads	A	98	1.41 ac	138.2
Open Space; Good condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover > 75%)	A	39	0.62 ac	24.2
Impervious areas; Streets & roads	A	98	0.13 ac	12.7
Open Space; Fair condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover 50% to 75%)	A	49	0.18 ac	8.8
		Total:	2.34 ac	183.9

CN = Total CN*Area / Total Area = **78.6**

Denotes Pond Area

Runoff:

Soil Capacity (S) = $\frac{1000}{CN} - 10$ = **2.72 in**

Runoff (Q) = $\frac{(P - 0.2S)^2}{(P + 0.8S)}$

	SWFWMD (25yr/24 hr)	FDOT Critical Duration (100yr/72hr)	Storm Sewer Design (10yr/24hr)
Precipitation (P) =	7.00 in	14.00 in	6.50 in
Runoff (Q) =	**4.54 in**	**11.19 in**	**4.09 in**

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3000 Dovera Drive, Suite 200, Oviedo, FL 32765
(407) 971-8850 (phone)
(407) 971-8955 (fax)

Made by: DLD
Checked by: REC

DATE: August 7, 2023
Job Number: DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **1A**
POND NAME : **1A**

Station Limits:

From: 004+80
To: 013+84

Roadway Length = 904 ft
*Areas mesaured in Microstation

PROPOSED CONDITION

Pond Area:

Pervious Pond Area :	0.17 ac	Dry Pond
Water Surface Area:	0.00 ac	
Total Pond Area:	0.17 ac	

Total Area:

Impervious Area:	**1.70 ac**
Pervious Area:	**0.64 ac**
Water Surface Area:	**0.00 ac**
Total Area:	**2.34 ac**

Curve Number:

Land Use Description	Soil Group	CN	Area	CN*Area
Impervious areas; Streets & roads	A	98	1.70 ac	166.6
Proposed Roadway Pervious	A	39	0.47 ac	18.5
Proposed Ponds (Water Surface)	A	100	0.00 ac	0.0
Proposed Pond Pervious	A	39	0.17 ac	6.4
		Total:	2.34 ac	191.6

CN = Total CN*Area / Total Area = **81.9**

Runoff:

Soil Capacity (S) = $\frac{1000}{CN} - 10 =$ 2.22 in

Runoff (Q) = $\frac{(P - 0.2S)^2}{(P + 0.8S)}$

	SWFWMD (25yr/24 hr)	FDOT Critical Duration (100yr/72hr)	Storm Sewer Design (10yr/24hr)
Precipitation (P) =	7.00 in	14.00 in	6.50 in
Runoff (Q) =	**4.90 in**	**11.65 in**	**4.43 in**

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Job Number: DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **1A**
POND NAME : **1A**

POND SIZING

Required Treatment Volume (TV)

Selection criteria

Permitting Agency	**SWFWMD**
StormW.Mgmt.	**Dry Retention**
Online/Offline	**Online**
OFW	**No**
Open/Closed Basin	**Open**

Dry Retention	**0.50 in**	x DCIA =	0.07 ac-ft

Treatment V_{req} = Largest of Trt. Vol. = 0.07 ac-ft

Required Attenuation Volume:

Total Runoff (ac-ft)

	SWFWMD (25yr/24 hr)	FDOT Critical Duration (100yr/72hr)	Storm Sewer Design (10yr/24hr)
Q_{pre} =	0.89 ac-ft	2.18 ac-ft	0.80 ac-ft
Q_{post} =	0.96 ac-ft	2.27 ac-ft	0.86 ac-ft
ΔQ =	**0.07 ac-ft**	**0.09 ac-ft**	**0.07 ac-ft**

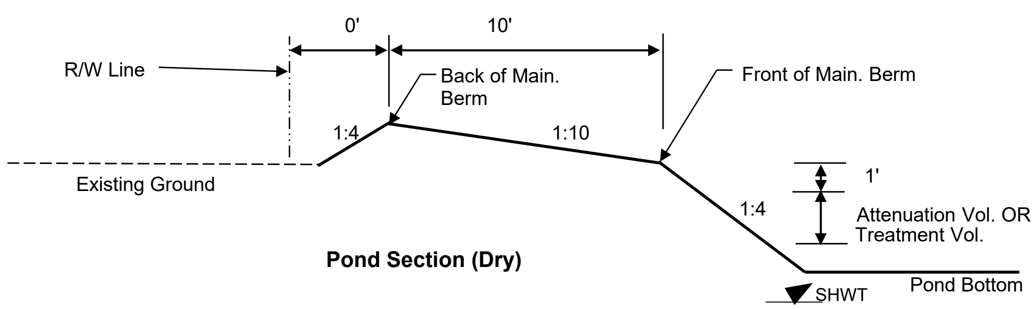
Attenuation V_{req} = 0.09 ac-ft (use largest value)

Maintenance Area Width =	10.0 ft	@ 1:10
Pond Tie-In Width =	0.0 ft	@ 1:4
Maximum Storage Depth (**SD**) =	5.00 ft	with 1.0 ft freeboard

Existing Ground Elevation =	151.00
Normal Water Elevation =	145.00
Lowest EOP Elevation =	149.00

Hydraulic Grade Line (HGL) check

HGL Slope =	0.100%	Use 0.05% for very flat terrain to 0.1% for flat terrain
Distance from Pond to Lowest EOP =	450 ft	
Estimated Energy Losses =	0.5 ft	
HGL Clearance =	1.0 ft	Use 1.0 foot as a standard HGL clearance (no junction losses)
Allowable Storm Sewer Tailwater EL =	147.55 ft	



Pond Section (Dry)

Inwood consulting engineers
3000 Dovera Drive, Suite 200, Oviedo, FL 32765
(407) 971-8850 (phone)
(407) 971-8955 (fax)

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DATE: August 7, 2023
Job Number: DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **1A**
POND NAME : **1A**

Pond Stage / Storage Calculations

ELEVATION	DESCRIPTION	AREA	DIMENSIONS		STORAGE
			LENGTH	WIDTH	
151.00	Pond R/W	0.17 ac	120.0 ft	120.0 ft	
151.00	Back of Main. Berm	0.17 ac	120.0 ft	120.0 ft	0.46 ac-ft
150.50		0.17 ac	120.0 ft	120.0 ft	0.38 ac-ft
150.00	Front of Main. Berm	0.11 ac	100.0 ft	100.0 ft	0.31 ac-ft
149.00	Provided Treat.Vol. OR Att.Vol	0.10 ac	92.0 ft	92.0 ft	0.20 ac-ft
147.80	Req'd Treat.Vol OR Att. Vol	0.08 ac	82.4 ft	82.4 ft	0.09 ac-ft
147.55	Estimated Storm Sewer TW	0.07 ac	80.4 ft	80.4 ft	0.07 ac-ft
147.55	Top of Treatment Vol.	0.07 ac	80.4 ft	80.4 ft	0.07 ac-ft
146.50	Pond Bottom	0.06 ac	72.0 ft	72.0 ft	0.00 ac-ft

Required Treatment OR Attenuation Vol.= 0.09 ac-ft
Required Treatment OR Attenuation Stage= 147.55 ft

Provided Treatment OR Attenuation Vol.= 0.20 ac-ft
Provided Treatment OR Attenuation Stage= 149.00 ft

Estimated Treat. Vol. OR Storm Sewer Att.= 0.07 ac-ft
Estimated Storm Sewer TW EL.= 147.55 ft

HGL requirements met

Required Treatment Vol. = 0.07 ac-ft

PROPOSED POND R/W (Safety Factor of 20%) =	0.20 ac

Note: Parcel area occupied by pond site is 0.37 acres

BASIN 1

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DATE: August 7, 2023
Job Number: DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **1**
POND NAME : **1**

				Soil
Station Limits:	From: 013+84	Roadway Length = 1166 ft		Type A
	To: 025+50	R/W Width = 64 ft		
	From: 025+50	Roadway Length = 400 ft		Type C
	To: 029+50	R/W Width = 64 ft		
Typical Section Changes	From: 029+50	Roadway Length = 2550 ft		Type C
	To: 055+00	R/W Width = 112 ft		
	From: 055+00	Roadway Length = 600 ft		Type A
	To: 061+00	R/W Width = 112 ft		
	From: 061+00	Roadway Length = 1400 ft		Type C
	To: 075+00	R/W Width = 112 ft		

EXISTING CONDITION

	Area:
Roadway Impervious	5.28 ac
Roadway Pervious:	8.72 ac
Pond Area:	1.76 ac
Offsite Area:	20.74 ac
Total Area:	**36.50 ac**

Curve Number:

Land Use Description	Soil Group	CN	Area	CN*Area
Impervious areas; Streets & roads	A	98	1.75 ac	171.8
Open Space; Good condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover > 75%)	A	39	1.50 ac	58.6
Impervious areas; Streets & roads	C	98	3.52 ac	345.3
Open Space; Good condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover > 75%)	C	74	7.22 ac	534.3
Open Space; Fair condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover 50% to 75%)	A	49	20.74 ac	1016.3
Open Space; Fair condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover 50% to 75%)	A	49	1.76 ac	86.3
		Total:	36.50 ac	2212.6

CN = Total CN*Area / Total Area = **60.6**

Denotes Pond Area

Runoff:

Soil Capacity (S) = $\frac{1000}{CN} - 10$ = **6.50 in**

Runoff (Q) = $\frac{(P - 0.2S)^2}{(P + 0.8S)}$

	SWFWMD (25yr/24 hr)	FDOT Critical Duration (100yr/72hr)	Storm Sewer Design (10yr/24hr)
Precipitation (P) =	7.00 in	14.00 in	6.50 in
Runoff (Q) =	**2.66 in**	**8.40 in**	**2.31 in**

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Job Number: DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **1**
POND NAME : **1**

Station Limits:

			Soil
From: 013+84	Roadway Length = 1166 ft		Type A
To: 025+50	R/W Width = 64 ft		
From: 025+50	Roadway Length = 400 ft		Type C
To: 029+50	R/W Width = 64 ft		
From: 029+50	Roadway Length = 2550 ft		Type C
To: 055+00	R/W Width = 112 ft		
From: 055+00	Roadway Length = 600 ft		Type A
To: 061+00	R/W Width = 112 ft		
From: 061+00	Roadway Length = 1400 ft		Type C
To: 075+00	R/W Width = 112 ft		

PROPOSED CONDITION

Roadway Area (From 13+84 to 29+50):

Description	Width	Quantity	Total Width
Travel Lane	12.0 ft	2	24.0 ft
Turn Lane	12.0 ft	1	12.0 ft
Outside Shoulder			0.0 ft
Sidewalk	8.0 ft	2	16.0 ft
Curb&Gutter E			0.0 ft
Curb&Gutter F	2.0 ft	2	4.0 ft
Trail			0.0 ft
Barrier Wall			0.0 ft
		Total Impervious Width	56.0 ft

Impervious Roadway Area: 2.01 ac
Pervious Roadway Area: 0.29 ac
Total Roadway Area: 2.30 ac

Roadway Area (From 29+50 to 75+00):

Description	Width	Quantity	Total Width
Travel Lane	23.0 ft	2	46.0 ft
Inside Shoulder			0.0 ft
Outside Shoulder			0.0 ft
Sidewalk			0.0 ft
Curb&Gutter E	2.3 ft	2	4.5 ft
Curb&Gutter F	2.0 ft	2	4.0 ft
Trail	10.0 ft	2	20.0 ft
Barrier Wall			0.0 ft
		Total Impervious Width	74.5 ft

Impervious Roadway Area: 7.78 ac
Pervious Roadway Area: 3.92 ac
Total Roadway Area: 11.70 ac

Pond Area:

Pervious Pond Area : 1.76 ac Dry Pond
Water Surface Area: 0.00 ac
Total Pond Area: 1.76 ac

Total Area:

Impervious Area: **9.80 ac**
Pervious Area: **5.97 ac**
Water Surface Area: **0.00 ac**
Offsite Area: **20.74 ac**
Total Area: **36.50 ac**

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Checked by: REC

DATE: August 7, 2023
Job Number: DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **1**
POND NAME : **1**

Curve Number:

Land Use Description	Soil Group	CN	Area	CN*Area
Impervious areas; Streets & roads	A	98	2.53 ac	247.5
Proposed Roadway Pervious	A	39	0.73 ac	28.5
Impervious areas; Streets & roads	C	98	7.27 ac	712.4
Proposed Roadway Pervious	C	74	3.47 ac	257.1
Open Space; Fair condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover 50% to 75%)	A	49	20.74 ac	1016.3
Proposed Ponds (Water Surface)	A	100	0.00 ac	0.0
Proposed Pond Pervious	A	39	1.76 ac	68.7
		Total:	36.50 ac	2330.4

CN = Total CN*Area / Total Area = **63.8**

Runoff:

Soil Capacity (S) = $\frac{1000}{CN} - 10$ = 5.66 in

Runoff (Q) = $\frac{(P - 0.2S)^2}{(P + 0.8S)}$

	SWFWMD (25yr/24 hr)	FDOT Critical Duration (100yr/72hr)	Storm Sewer Design (10yr/24hr)
Precipitation (P) =	7.00 in	14.00 in	6.50 in
Runoff (Q) =	**2.99 in**	**8.94 in**	**2.61 in**

Inwood consulting engineers
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Made by: DLD
Checked by: REC

DATE: August 7, 2023
Job Number: DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **1**
POND NAME : **1**

POND SIZING

Required Treatment Volume (TV)

Selection criteria

Permitting Agency	**SWFWMD**
StormW.Mgmt.	**Dry Retention**
Online/Offline	**Online**
OFW	**No**
Open/Closed Basin	**Open**

Dry Retention	**0.50 in**	x DCIA =	0.41 ac-ft

Treatment V_{req} = Largest of Trt. Vol. = **0.41 ac-ft**

Required Attenuation Volume:

Total Runoff (ac-ft)

	SWFWMD (25yr/24 hr)	FDOT Critical Duration (100yr/72hr)	Storm Sewer Design (10yr/24hr)
Q_{pre} =	8.10 ac-ft	25.56 ac-ft	7.03 ac-ft
Q_{post} =	9.08 ac-ft	27.18 ac-ft	7.94 ac-ft
ΔQ =	**0.98 ac-ft**	**1.62 ac-ft**	**0.91 ac-ft**

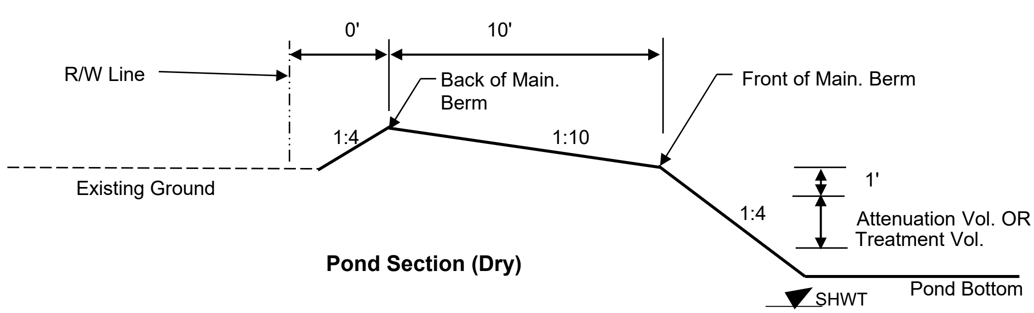
Attenuation V_{req} = **1.62 ac-ft** (use largest value)

Maintenance Area Width =	10.0 ft	@ 1:10
Pond Tie-In Width =	0.0 ft	@ 1:4
Maximum Storage Depth (**SD**) =	5.00 ft	with 1.0 ft freeboard

Existing Ground Elevation =	135.00
Normal Water Elevation =	129.00
Lowest EOP Elevation =	133.00

Hydraulic Grade Line (HGL) check

HGL Slope =	0.100%	Use 0.05% for very flat terrain to 0.1% for flat terrain
Distance from Pond to Lowest EOP =	200 ft	
Estimated Energy Losses =	0.2 ft	
HGL Clearance =	1.0 ft	Use 1.0 foot as a standard HGL clearance (no junction losses)
Allowable Storm Sewer Tailwater EL =	131.80 ft	



Pond Section (Dry)

Inwood consulting engineers
3000 Dovera Drive, Suite 200, Oviedo, FL 32765
(407) 971-8850 (phone)
(407) 971-8955 (fax)

Made by: DLD
Checked by: REC

DATE: August 7, 2023
Job Number: DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **1**
POND NAME : **1**

Pond Stage / Storage Calculations

ELEVATION	DESCRIPTION	AREA	DIMENSIONS		STORAGE
			LENGTH	WIDTH	
135.00	Pond R/W	1.76 ac	650.0 ft	118.0 ft	
135.00	Back of Main. Berm	1.76 ac	650.0 ft	118.0 ft	6.32 ac-ft
134.50		1.76 ac	650.0 ft	118.0 ft	5.44 ac-ft
134.00	Front of Main. Berm	1.42 ac	630.0 ft	98.0 ft	4.65 ac-ft
133.00	Provided Treat.Vol. OR Att.Vol	1.29 ac	622.0 ft	90.0 ft	3.29 ac-ft
131.61	Req'd Treat.Vol OR Att. Vol	1.11 ac	610.9 ft	78.9 ft	1.62 ac-ft
130.94	Estimated Storm Sewer TW	1.02 ac	605.5 ft	73.5 ft	0.91 ac-ft
130.44	Top of Treatment Vol.	0.96 ac	601.5 ft	69.5 ft	0.41 ac-ft
130.00	Pond Bottom	0.91 ac	598.0 ft	66.0 ft	0.00 ac-ft

Required Treatment OR Attenuation Vol.= 1.62 ac-ft
Required Treatment OR Attenuation Stage= 131.61 ft

Provided Treatment OR Attenuation Vol.= 3.29 ac-ft
Provided Treatment OR Attenuation Stage= 133.00 ft

Estimated Treat. Vol. OR Storm Sewer Att.= 0.91 ac-ft
Estimated Storm Sewer TW EL.= 130.94 ft

HGL requirements met

Required Treatment Vol. = 0.41 ac-ft

PROPOSED POND R/W (Safety Factor of 20%) =	**2.11 ac**
PROPOSED POND R/W PLUS 48' TIE-IN AT 1:3 SLOPE ON BACK OF POND =	**2.83 ac**

BASIN 2

Inwood consulting engineers
3000 Dovera Drive, Suite 200, Oviedo, FL 32765
(407) 971-8850 (phone)
(407) 971-8955 (fax)

Made by: DLD
Checked by: REC

DATE: August 3, 2023
Job Number: DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **2**
POND NAME : **2**

Station Limits:				
	From: 075+00	Roadway Length = 1050 ft		Soil Type D
	To: 085+50	R/W Width = 112 ft		
	From: 085+50	Roadway Length = 1550 ft		Type C
	To: 101+00	R/W Width = 128 ft		
	From: 101+00	Roadway Length = 550 ft		Type A
	To: 106+50	R/W Width = 118 ft		

EXISTING CONDITION

Roadway Impervious	**Area:**	2.46 ac
Roadway Pervious:		6.29 ac
Pond Area:		2.58 ac
Offsite Area:		9.73 ac
Total Area:		**21.06 ac**

Curve Number:

Land Use Description	Soil Group	CN	Area	CN*Area
Impervious areas; Streets & roads	A	98	0.43 ac	42.1
Open Space; Good condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover > 75%)	A	39	1.06 ac	41.4
Impervious areas; Streets & roads	C	98	1.21 ac	118.6
Open Space; Good condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover > 75%)	C	74	3.35 ac	248.3
Impervious areas; Streets & roads	D	98	0.82 ac	80.3
Open Space; Good condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover > 75%)	D	80	1.88 ac	150.4
Residential Areas (2.0 acre, 12% Impervious)	A	46	9.73 ac	447.6
Brush-weed-grass mixture; Good condition (> 75% ground cover)	C	65	2.58 ac	167.9
		Total:	21.06 ac	1296.5

CN = Total CN*Area / Total Area = **61.6**

Denotes Pond Area

Runoff:

Soil Capacity (S) = $\frac{1000}{CN} - 10 =$ **6.24 in**

Runoff (Q) = $\frac{(P - 0.2S)^2}{(P + 0.8S)}$

	SWFWMD (25yr/24 hr)	FDOT Critical Duration (100yr/72hr)	Storm Sewer Design (10yr/24hr)
Precipitation (P) =	7.00 in	14.00 in	6.50 in
Runoff (Q) =	**2.76 in**	**8.56 in**	**2.40 in**

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(407) 971-8850 (phone)
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Made by: DLD
Checked by: REC

DATE: August 3, 2023
Job Number: DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **2**
POND NAME : **2**

Station Limits:

			Soil
From: 075+00	To: 085+50	Roadway Length = 1050 ft, R/W Width = 112 ft	Type D
From: 085+50	To: 101+00	Roadway Length = 1550 ft, R/W Width = 128 ft	Type C
From: 101+00	To: 106+50	Roadway Length = 550 ft, R/W Width = 118 ft	Type A

PROPOSED CONDITION

Roadway Area:

Description	Width	Quantity	Total Width
Travel Lane	23.0 ft	2	46.0 ft
Inside Shoulder			0.0 ft
Outside Shoulder			0.0 ft
Sidewalk			0.0 ft
Curb&Gutter E	2.3 ft	2	4.5 ft
Curb&Gutter F	2.0 ft	2	4.0 ft
Trail	10.0 ft	2	20.0 ft
Barrier Wall			0.0 ft
		Total Impervious Width	74.5 ft

Impervious Roadway Area: 5.39 ac
Pervious Roadway Area: 3.36 ac
Total Roadway Area: 8.74 ac

Pond Area:

Pervious Pond Area : 0.67 ac
Water Surface Area: 1.91 ac Wet Pond
Total Pond Area: 2.58 ac

Total Area:

Impervious Area: **5.39 ac**
Pervious Area: **4.03 ac**
Water Surface Area: **1.91 ac**
Offsite Area: **9.73 ac**
Total Area: **21.06 ac**

Curve Number:

Land Use Description	Soil Group	CN	Area	CN*Area
Impervious areas; Streets & roads	A	98	0.94 ac	92.2
Proposed Roadway Pervious	A	39	0.55 ac	21.4
Impervious areas; Streets & roads	C	98	2.65 ac	259.8
Proposed Roadway Pervious	C	74	1.91 ac	141.6
Impervious areas; Streets & roads	D	98	1.80 ac	176.0
Proposed Roadway Pervious	D	80	0.90 ac	72.3
Residential Areas (2.0 acre, 12% Impervious)	A	46	9.73 ac	447.6
Proposed Ponds (Water Surface)	C	100	1.91 ac	190.9
Proposed Pond Pervious	C	74	0.67 ac	49.9
		Total:	21.06 ac	1451.7

CN = Total CN*Area / Total Area = **68.9**

Runoff:

	SWFWMD (25yr/24 hr)	FDOT Critical Duration (100yr/72hr)	Storm Sewer Design (10yr/24hr)
Precipitation (P) =	7.00 in	14.00 in	6.50 in
Runoff (Q) =	**3.51 in**	**9.75 in**	**3.10 in**

Soil Capacity (S) = $\frac{1000}{CN} - 10$ = 4.51 in

Runoff (Q) = $\frac{(P - 0.2S)^2}{(P + 0.8S)}$

Inwood consulting engineers
3000 Dovera Drive, Suite 200, Oviedo, FL 32765
(407) 971-8850 (phone)
(407) 971-8955 (fax)

Made by: DLD
Checked by: REC

DATE: August 3, 2023
Job Number: DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **2**
POND NAME : **2**

POND SIZING

Required Treatment Volume (TV)

Selection criteria

Permitting Agency	**SWFWMD**
StormW.Mgmt.	**Wet Detention**
Online/Offline	**Online**
OFW	**No**
Open/Closed Basin	**Open**

Wet Detention	**N/A**	x Impervious =	0.00 ac-ft
	1.00 in	x DCIA =	0.45 ac-ft

Treatment V_{req} = Largest of Trt. Vol. = 0.45 ac-ft

Required Attenuation Volume:

Total Runoff (ac-ft)	SWFWMD (25yr/24 hr)	FDOT Critical Duration (100yr/72hr)	Storm Sewer Design (10yr/24hr)
Q_{pre} =	4.84 ac-ft	15.02 ac-ft	4.21 ac-ft
Q_{post} =	6.16 ac-ft	17.10 ac-ft	5.44 ac-ft
ΔQ =	**1.32 ac-ft**	**2.08 ac-ft**	**1.23 ac-ft**

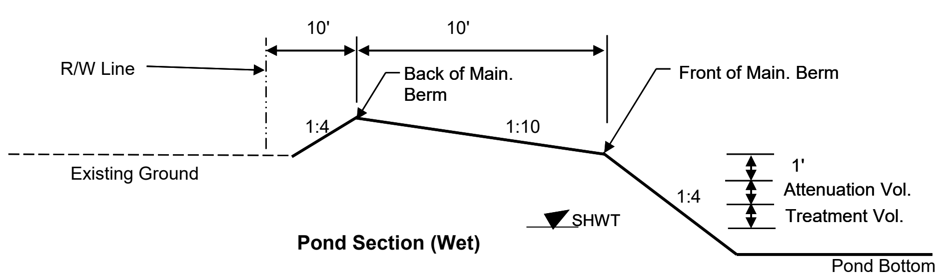
Attenuation V_{req} = 2.08 ac-ft (use largest value)

Maintenance Area Width =	10.0 ft	@ 1:10
Pond Tie-In Width =	10.0 ft	@ 1:4
Maximum Storage Depth (**SD**) =	2.50 ft	with 1.0 ft freeboard

Existing Ground Elevation =	131.00
Normal Water Elevation =	130.00
Lowest EOP Elevation =	132.00

Hydraulic Grade Line (HGL) check

HGL Slope =	0.100%	Use 0.05% for very flat terrain to 0.1% for flat terrain
Distance from Pond to Lowest EOP =	50 ft	
Estimated Energy Losses =	0.1 ft	
HGL Clearance =	1.0 ft	Use 1.0 foot as a standard HGL clearance (no junction losses)
Allowable Storm Sewer Tailwater EL =	130.95 ft	



Pond Section (Wet)

Inwood consulting engineers
3000 Dovera Drive, Suite 200, Oviedo, FL 32765
(407) 971-8850 (phone)
(407) 971-8955 (fax)

Made by: DLD
Checked by: REC

DATE: August 3, 2023
Job Number: DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **2**
POND NAME : **2**

Pond Stage / Storage Calculations

ELEVATION	DESCRIPTION	AREA	DIMENSIONS		STORAGE
			LENGTH	WIDTH	
131.00	Pond R/W	2.95 ac	600.0 ft	214.0 ft	
133.50	Back of Main. Berm	2.58 ac	580.0 ft	194.0 ft	7.59 ac-ft
133.00		2.41 ac	570.0 ft	184.0 ft	6.34 ac-ft
132.50	Front of Main. Berm	2.24 ac	560.0 ft	174.0 ft	5.18 ac-ft
131.50	Provided Treat.Vol.+Att.Vol	2.10 ac	552.0 ft	166.0 ft	3.10 ac-ft
131.22	Req'd Treat.Vol+Att. Vol	2.07 ac	549.8 ft	163.8 ft	2.53 ac-ft
130.81	Estimated Storm Sewer TW	2.01 ac	546.5 ft	160.5 ft	1.68 ac-ft
130.22	Top of Treatment Vol.	1.94 ac	541.7 ft	155.7 ft	0.45 ac-ft
130.00	Normal Water Level	1.91 ac	540.0 ft	154.0 ft	0.00 ac-ft
128.00		1.66 ac	524.0 ft	138.0 ft	
122.00	Pond Bottom	0.98 ac	476.0 ft	90.0 ft	

Required Treatment+Attenuation Vol.= 2.53 ac-ft
Required Treatment+Attenuation Stage= 131.22 ft

Provided Treatment+Attenuation Vol.= 3.10 ac-ft
Provided Treatment+Attenuation Stage= 131.50 ft

Estimated Treat. Vol. + Storm Sewer Att.= 1.68 ac-ft
Estimated Storm Sewer TW EL.= 130.81 ft

HGL requirements met

Required Treatment Vol. = 0.45 ac-ft

PROPOSED POND R/W (Safety Factor of 20%) =	**3.54 ac**
PROPOSED POND R/W PLUS 21' TIE-IN AT 1:3 SLOPE ON BACK OF POND =	**3.83 ac**

BASIN 3

Inwood consulting engineers
3000 Dovera Drive, Suite 200, Oviedo, FL 32765
(407) 971-8850 (phone)
(407) 971-8955 (fax)

Made by: DLD
Checked by: REC

DATE: July 28, 2023
Job Number: DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **3**
POND NAME : **3**

Station Limits:			Soil
	From: 106+50	Roadway Length = 300 ft	Type A
	To: 109+50	R/W Width = 118 ft	
	From: 109+50	Roadway Length = 800 ft	Type C
	To: 117+50	R/W Width = 130 ft	
	From: 117+50	Roadway Length = 950 ft	Type D
	To: 127+00	R/W Width = 130 ft	
	From: 127+00	Roadway Length = 2800 ft	Type C
	To: 155+00	R/W Width = 130 ft	

EXISTING CONDITION

Roadway Impervious **Area:** 3.79 ac

Roadway Pervious: 10.61 ac

Pond Area: 1.74 ac

Total Area: **16.14 ac**

Curve Number:

Land Use Description	Soil Group	CN	Area	CN*Area
Impervious areas; Streets & roads	A	98	0.23 ac	22.9
Open Space; Good condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover > 75%)	A	39	0.58 ac	22.6
Impervious areas; Streets & roads	C	98	2.81 ac	275.4
Open Space; Good condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover > 75%)	C	74	7.93 ac	587.1
Impervious areas; Streets & roads	D	98	0.74 ac	72.7
Open Space; Good condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover > 75%)	D	80	2.09 ac	167.5
Brush-weed-grass mixture; Good condition (> 75% ground cover)	C	65	1.74 ac	113.4
		Total:	16.14 ac	1261.5

CN = Total CN*Area / Total Area = **78.2**

Denotes Pond Area

Runoff:

	SWFWMD (25yr/24 hr)	FDOT Critical Duration (100yr/72hr)	Storm Sewer Design (10yr/24hr)
Precipitation (P) =	7.00 in	14.00 in	6.50 in
Runoff (Q) =	**4.49 in**	**11.13 in**	**4.04 in**

Soil Capacity (S) = $\frac{1000}{CN} - 10 =$ **2.79 in**

Runoff (Q) = $\frac{(P - 0.2S)^2}{(P + 0.8S)}$

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Made by: DLD
Checked by: REC

DATE: July 28, 2023
Job Number: DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **3**
POND NAME : **3**

Station Limits:

			Soil
From: 106+50	To: 109+50	Roadway Length = 300 ft; R/W Width = 118 ft	Type A
From: 109+50	To: 117+50	Roadway Length = 800 ft; R/W Width = 130 ft	Type C
From: 117+50	To: 127+00	Roadway Length = 950 ft; R/W Width = 130 ft	Type D
From: 127+00	To: 155+00	Roadway Length = 2800 ft; R/W Width = 130 ft	Type C

PROPOSED CONDITION

Roadway Area:

Description	Width	Quantity	Total Width
Travel Lane	23.0 ft	2	46.0 ft
Inside Shoulder			0.0 ft
Outside Shoulder			0.0 ft
Sidewalk			0.0 ft
Curb&Gutter E	2.3 ft	2	4.5 ft
Curb&Gutter F	2.0 ft	2	4.0 ft
Trail	10.0 ft	2	20.0 ft
Barrier Wall			0.0 ft
		Total Impervious Width	74.5 ft

Impervious Roadway Area: 8.29 ac
Pervious Roadway Area: 6.10 ac
Total Roadway Area: 14.39 ac

Pond Area:

Pervious Pond Area : 0.67 ac
Water Surface Area: 1.07 ac Wet Pond
Total Pond Area: 1.74 ac

Total Area:

Impervious Area: **8.29 ac**
Pervious Area: **6.77 ac**
Water Surface Area: **1.07 ac**
Total Area: **16.14 ac**

Curve Number:

Land Use Description	Soil Group	CN	Area	CN*Area
Impervious areas; Streets & roads	A	98	0.51 ac	50.3
Proposed Roadway Pervious	A	39	0.30 ac	11.7
Impervious areas; Streets & roads	C	98	6.16 ac	603.4
Proposed Roadway Pervious	C	74	4.59 ac	339.4
Impervious areas; Streets & roads	D	98	1.62 ac	159.2
Proposed Roadway Pervious	D	80	1.21 ac	96.8
Proposed Ponds (Water Surface)	C	100	1.07 ac	107.1
Proposed Pond Pervious	C	74	0.67 ac	49.9
		Total:	16.14 ac	1417.7

CN = Total CN*Area / Total Area = **87.9**

Denotes Pond Area

Runoff:

Soil Capacity (S) = $\frac{1000}{CN} - 10$ = 1.38 in

Runoff (Q) = $\frac{(P - 0.2S)^2}{(P + 0.8S)}$

	SWFWMD (25yr/24 hr)	FDOT Critical Duration (100yr/72hr)	Storm Sewer Design (10yr/24hr)
Precipitation (P) =	7.00 in	14.00 in	6.50 in
Runoff (Q) =	**5.58 in**	**12.47 in**	**5.09 in**

Inwood consulting engineers
3000 Dovera Drive, Suite 200, Oviedo, FL 32765
(407) 971-8850 (phone)
(407) 971-8955 (fax)

Made by: DLD
Checked by: REC

DATE: July 28, 2023
Job Number: DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **3**
POND NAME : **3**

POND SIZING

Required Treatment Volume (TV)

Selection criteria

Permitting Agency	**SWFWMD**
StormW.Mgmt.	**Wet Detention**
Online/Offline	**Online**
OFW	**No**
Open/Closed Basin	**Open**

Wet Detention	**N/A**	x Impervious =	0.00 ac-ft
	1.00 in	x DCIA =	0.69 ac-ft

Treatment V_{req} = Largest of Trt. Vol. = **0.69 ac-ft**

Required Attenuation Volume:

Total Runoff (ac-ft)

	SWFWMD (25yr/24 hr)	FDOT Critical Duration (100yr/72hr)	Storm Sewer Design (10yr/24hr)
Q_{pre} =	6.04 ac-ft	14.97 ac-ft	5.44 ac-ft
Q_{post} =	7.50 ac-ft	16.77 ac-ft	6.85 ac-ft
ΔQ =	**1.46 ac-ft**	**1.80 ac-ft**	**1.41 ac-ft**

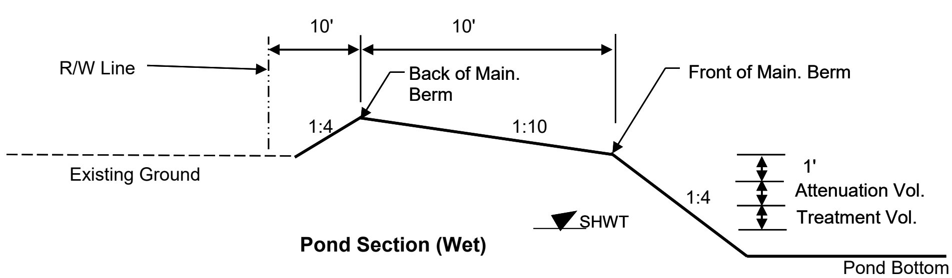
Attenuation V_{req} = **1.80 ac-ft** (use largest value)

Maintenance Area Width =	10.0 ft	@ 1:10
Pond Tie-In Width =	10.0 ft	@ 1:4
Maximum Storage Depth (**SD**) =	3.00 ft	with 1.0 ft freeboard

Existing Ground Elevation =	128.50
Normal Water Elevation =	127.00
Lowest EOP Elevation =	130.00

Hydraulic Grade Line (HGL) check

HGL Slope =	0.100%	Use 0.05% for very flat terrain to 0.1% for flat terrain
Distance from Pond to Lowest EOP =	300 ft	
Estimated Energy Losses =	0.3 ft	
HGL Clearance =	1.0 ft	Use 1.0 foot as a standard HGL clearance (no junction losses)
Allowable Storm Sewer Tailwater EL =	128.70 ft	



Pond Section (Wet)

Inwood consulting engineers
3000 Dovera Drive, Suite 200, Oviedo, FL 32765
(407) 971-8850 (phone)
(407) 971-8955 (fax)

Made by: DLD
Checked by: REC

DATE: July 28, 2023
Job Number: DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **3**
POND NAME : **3**

Pond Stage / Storage Calculations

ELEVATION	DESCRIPTION	AREA	DIMENSIONS		STORAGE
			LENGTH	WIDTH	
128.50	Pond R/W	2.08 ac	600.0 ft	151.0 ft	
131.00	Back of Main. Berm	1.74 ac	580.0 ft	131.0 ft	5.33 ac-ft
130.50		1.58 ac	570.0 ft	121.0 ft	4.50 ac-ft
130.00	Front of Main. Berm	1.43 ac	560.0 ft	111.0 ft	3.75 ac-ft
129.00	Provided Treat.Vol.+Att.Vol	1.31 ac	552.0 ft	103.0 ft	2.51 ac-ft
128.99	Req'd Treat.Vol+Att. Vol	1.30 ac	552.0 ft	103.0 ft	2.49 ac-ft
128.68	Estimated Storm Sewer TW	1.27 ac	549.5 ft	100.5 ft	2.10 ac-ft
127.55	Top of Treatment Vol.	1.13 ac	540.4 ft	91.4 ft	0.69 ac-ft
127.00	Normal Water Level	1.07 ac	536.0 ft	87.0 ft	0.00 ac-ft
125.00		0.85 ac	520.0 ft	71.0 ft	
119.00	Pond Bottom	0.25 ac	472.0 ft	23.0 ft	

Required Treatment+Attenuation Vol.= 2.49 ac-ft
Required Treatment+Attenuation Stage= 128.99 ft

Provided Treatment+Attenuation Vol.= 2.51 ac-ft
Provided Treatment+Attenuation Stage= 129.00 ft

Estimated Treat. Vol. + Storm Sewer Att.= 2.10 ac-ft
Estimated Storm Sewer TW EL.= 128.68 ft

HGL requirements met

Required Treatment Vol. = 0.69 ac-ft

PROPOSED POND R/W (Safety Factor of 20%) =	**2.50 ac**

BASIN 4

Inwood consulting engineers
3000 Dovera Drive, Suite 200, Oviedo, FL 32765
(407) 971-8850 (phone)
(407) 971-8955 (fax)

Made by: DLD
Checked by: REC

DATE: July 28, 2023
Job Number: DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **4**
POND NAME : **4**

Station Limits:

		Soil
From: 155+00 To: 157+50	Roadway Length = 250 ft, R/W Width = 130 ft	Type C
From: 157+50 To: 198+00	Roadway Length = 4050 ft, R/W Width = 130 ft	Type D
From: 198+00 To: 203+00	Roadway Length = 500 ft, R/W Width = 138 ft	Type C
From: 203+00 To: 214+00	Roadway Length = 1100 ft, R/W Width = 130 ft	Type D
From: 214+00 To: 216+75	Roadway Length = 275 ft, R/W Width = 138 ft	Type C
From: 216+75 To: 218+50	Roadway Length = 175 ft, R/W Width = 138 ft	Type A

EXISTING CONDITION

Roadway Impervious **Area:** 4.96 ac

Roadway Pervious: 14.17 ac

Pond Area: 1.63 ac

Total Area: **20.75 ac**

Curve Number:

Land Use Description	Soil Group	CN	Area	CN*Area
Impervious areas; Streets & roads	C	98	0.80 ac	78.4
Open Space; Good condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover > 75%)	C	74	2.40 ac	177.7
Impervious areas; Streets & roads	D	98	4.02 ac	393.9
Open Space; Good condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover > 75%)	D	80	11.35 ac	908.0
Impervious areas; Streets & roads	A	98	0.14 ac	13.4
Open Space; Good condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover > 75%)	A	39	0.42 ac	16.3
Woods; Fair condition (Woods grazed but not burned, and with some forest litter)	D	79	1.63 ac	128.7
		Total:	20.75 ac	1716.4

CN = Total CN*Area / Total Area = **82.7**

Denotes Pond Area

Runoff:

Soil Capacity (S) = $\frac{1000}{CN} - 10 =$ **2.09 in**

Runoff (Q) = $\frac{(P - 0.2S)^2}{(P + 0.8S)}$

	SWFWMD (25yr/24 hr)	FDOT Critical Duration (100yr/72hr)	Storm Sewer Design (10yr/24hr)
Precipitation (P) =	7.00 in	14.00 in	6.50 in
Runoff (Q) =	**4.99 in**	**11.77 in**	**4.53 in**

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(407) 971-8850 (phone)
(407) 971-8955 (fax)

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DATE: July 28, 2023
Job Number: DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **4**
POND NAME : **4**

Station Limits:

			Soil
From: 155+00	Roadway Length = 250 ft		Type C
To: 157+50	R/W Width = 130 ft		
From: 157+50	Roadway Length = 4050 ft		Type D
To: 198+00	R/W Width = 130 ft		
From: 198+00	Roadway Length = 500 ft		Type C
To: 203+00	R/W Width = 138 ft		
From: 203+00	Roadway Length = 1100 ft		Type D
To: 214+00	R/W Width = 130 ft		
From: 214+00	Roadway Length = 275 ft		Type C
To: 216+75	R/W Width = 138 ft		
From: 216+75	Roadway Length = 175 ft		Type A
To: 218+50	R/W Width = 138 ft		

PROPOSED CONDITION

Roadway Area:

Description	Width	Quantity	Total Width
Travel Lane	23.0 ft	2	46.0 ft
Inside Shoulder			0.0 ft
Outside Shoulder			0.0 ft
Sidewalk			0.0 ft
Curb&Gutter E	2.3 ft	2	4.5 ft
Curb&Gutter F	2.0 ft	2	4.0 ft
Trail	10.0 ft	2	20.0 ft
Barrier Wall			0.0 ft
		Total Impervious Width	74.5 ft

Impervious Roadway Area: 10.86 ac
Pervious Roadway Area: 8.27 ac
Total Roadway Area: 19.13 ac

Pond Area:

Pervious Pond Area : 0.52 ac
Water Surface Area: 1.11 ac Wet Pond
Total Pond Area: 1.63 ac

Total Area:

Impervious Area: **10.86 ac**
Pervious Area: **8.79 ac**
Water Surface Area: **1.11 ac**
Total Area: **20.75 ac**

Curve Number:

Land Use Description	Soil Group	CN	Area	CN*Area
Impervious areas; Streets & roads	C	98	1.75 ac	171.8
Proposed Roadway Pervious	C	74	1.45 ac	107.2
Impervious areas; Streets & roads	D	98	8.81 ac	863.2
Proposed Roadway Pervious	D	80	6.56 ac	524.9
Impervious areas; Streets & roads	A	98	0.30 ac	29.3
Proposed Roadway Pervious	A	39	0.26 ac	9.9
Proposed Ponds (Water Surface)	D	100	1.11 ac	110.9
Proposed Pond Pervious	D	80	0.52 ac	41.6
		Total:	20.75 ac	1858.9

CN = Total CN*Area / Total Area = **89.6**

Runoff:

Soil Capacity (S) = $\frac{1000}{CN} - 10$ = 1.17 in

Runoff (Q) = $\frac{(P - 0.2S)^2}{(P + 0.8S)}$

	SWFWMD (25yr/24 hr)	FDOT Critical Duration (100yr/72hr)	Storm Sewer Design (10yr/24hr)
Precipitation (P) =	7.00 in	14.00 in	6.50 in
Runoff (Q) =	**5.77 in**	**12.69 in**	**5.28 in**

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(407) 971-8955 (fax)

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Job Number: DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **4**
POND NAME : **4**

POND SIZING

Required Treatment Volume (TV)

Selection criteria

Permitting Agency	**SWFWMD**
StormW.Mgmt.	**Wet Detention**
Online/Offline	**Online**
OFW	**No**
Open/Closed Basin	**Open**

Wet Detention	**N/A**	x Impervious =	0.00 ac-ft
	1.00 in	x DCIA =	0.91 ac-ft

Treatment V_{req} = Largest of Trt. Vol. = **0.91 ac-ft**

Required Attenuation Volume:

Total Runoff (ac-ft)	SWFWMD (25yr/24 hr)	FDOT Critical Duration (100yr/72hr)	Storm Sewer Design (10yr/24hr)
Q_{pre} =	8.64 ac-ft	20.36 ac-ft	7.83 ac-ft
Q_{post} =	9.98 ac-ft	21.95 ac-ft	9.14 ac-ft
ΔQ =	**1.35 ac-ft**	**1.60 ac-ft**	**1.31 ac-ft**

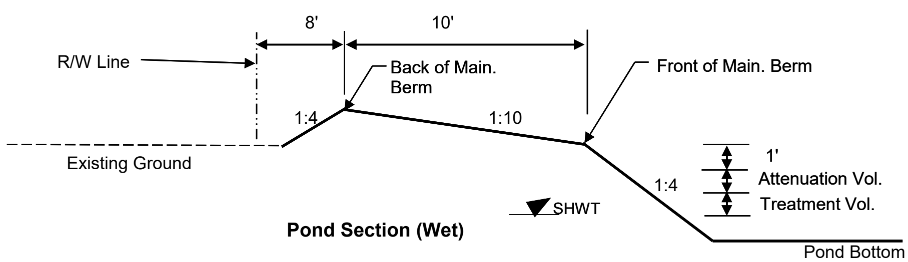
Attenuation V_{req} = **1.60 ac-ft** (use largest value)

Maintenance Area Width =	10.0 ft	@ 1:10
Pond Tie-In Width =	8.0 ft	@ 1:4
Maximum Storage Depth (**SD**) =	3.00 ft	with 1.0 ft freeboard

Existing Ground Elevation =	128.00
Normal Water Elevation =	126.00
Lowest EOP Elevation =	129.00

Hydraulic Grade Line (HGL) check

HGL Slope =	0.100%	Use 0.05% for very flat terrain to 0.1% for flat terrain
Distance from Pond to Lowest EOP =	100 ft	
Estimated Energy Losses =	0.1 ft	
HGL Clearance =	1.0 ft	Use 1.0 foot as a standard HGL clearance (no junction losses)
Allowable Storm Sewer Tailwater EL =	127.90 ft	



Pond Section (Wet)

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Job Number: DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **4**
POND NAME : **4**

Pond Stage / Storage Calculations

ELEVATION	DESCRIPTION	AREA	DIMENSIONS		STORAGE
			LENGTH	WIDTH	
128.00	Pond R/W	1.84 ac	380.0 ft	211.0 ft	
130.00	Back of Main. Berm	1.63 ac	364.0 ft	195.0 ft	5.24 ac-ft
129.50		1.50 ac	354.0 ft	185.0 ft	4.46 ac-ft
129.00	Front of Main. Berm	1.38 ac	344.0 ft	175.0 ft	3.74 ac-ft
128.00	Provided Treat.Vol.+Att.Vol	1.29 ac	336.0 ft	167.0 ft	2.50 ac-ft
128.00	Req'd Treat.Vol+Att. Vol	1.29 ac	336.0 ft	167.0 ft	2.50 ac-ft
127.78	Estimated Storm Sewer TW	1.27 ac	334.2 ft	165.2 ft	2.22 ac-ft
126.73	Top of Treatment Vol.	1.17 ac	325.8 ft	156.8 ft	0.91 ac-ft
126.00	Normal Water Level	1.11 ac	320.0 ft	151.0 ft	0.00 ac-ft
124.00		0.94 ac	304.0 ft	135.0 ft	
118.00	Pond Bottom	0.51 ac	256.0 ft	87.0 ft	

Required Treatment+Attenuation Vol.= 2.50 ac-ft
Required Treatment+Attenuation Stage= 128.00 ft

Provided Treatment+Attenuation Vol.= 2.50 ac-ft
Provided Treatment+Attenuation Stage= 128.00 ft

Estimated Treat. Vol. + Storm Sewer Att.= 2.22 ac-ft
Estimated Storm Sewer TW EL.= 127.78 ft

HGL requirements met

Required Treatment Vol. = 0.91 ac-ft

PROPOSED POND R/W (Safety Factor of 20%) = 2.21 ac

BASIN 5

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PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **5**
POND NAME : **5**

Station Limits:

		Soil
From: 218+50	Roadway Length = 500 ft	Type A
To: 223+50	R/W Width = 154 ft	
From: 223+50	Roadway Length = 300 ft	Type C
To: 226+50	R/W Width = 154 ft	
From: 226+50	Roadway Length = 1700 ft	Type D
To: 243+50	R/W Width = 112 ft	
From: 243+50	Roadway Length = 400 ft	Type A
To: 247+50	R/W Width = 112 ft	
From: 247+50	Roadway Length = 200 ft	Type C
To: 249+50	R/W Width = 112 ft	
From: 249+50	Roadway Length = 1050 ft	Type D
To: 260+00	R/W Width = 116 ft	
From: 260+00	Roadway Length = 2900 ft	Type C
To: 289+00	R/W Width = 120 ft	

EXISTING CONDITION

Roadway Impervious **Area:** 5.50 ac

Roadway Pervious: 14.02 ac

Pond Area: 1.16 ac

Total Area: **20.69 ac**

Curve Number:

Land Use Description	Soil Group	CN	Area	CN*Area
Impervious areas; Streets & roads	A	98	0.70 ac	68.8
Open Space; Good condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover > 75%)	A	39	2.09 ac	81.7
Impervious areas; Streets & roads	C	98	2.65 ac	260.1
Open Space; Good condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover > 75%)	C	74	6.91 ac	511.3
Impervious areas; Streets & roads	D	98	2.15 ac	210.4
Open Space; Good condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover > 75%)	D	80	5.02 ac	401.7
Brush-weed-grass mixture; Poor condition (< 50% ground cover)	D	83	1.16 ac	96.7
		Total:	20.69 ac	1630.6

CN = Total CN*Area / Total Area = **78.8**

Denotes Pond Area

Runoff:

Soil Capacity (S) = $\frac{1000}{CN} - 10$ = **2.69 in**

Runoff (Q) = $\frac{(P - 0.2S)^2}{(P + 0.8S)}$

	SWFWMD (25yr/24 hr)	FDOT Critical Duration (100yr/72hr)	Storm Sewer Design (10yr/24hr)
Precipitation (P) =	7.00 in	14.00 in	6.50 in
Runoff (Q) =	**4.56 in**	**11.22 in**	**4.11 in**

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Job Number: DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **5**
POND NAME : **5**

Station Limits:

			Soil
From:	218+50	Roadway Length = 500 ft	Type A
To:	223+50	R/W Width = 154 ft	
From:	223+50	Roadway Length = 300 ft	Type C
To:	226+50	R/W Width = 154 ft	
From:	226+50	Roadway Length = 1700 ft	Type D
To:	243+50	R/W Width = 112 ft	
From:	243+50	Roadway Length = 400 ft	Type A
To:	247+50	R/W Width = 112 ft	
From:	247+50	Roadway Length = 200 ft	Type C
To:	249+50	R/W Width = 112 ft	
From:	249+50	Roadway Length = 1050 ft	Type D
To:	260+00	R/W Width = 116 ft	
From:	260+00	Roadway Length = 2900 ft	Type C
To:	289+00	R/W Width = 120 ft	

PROPOSED CONDITION

Roadway Area:

Description	Width	Quantity	Total Width
Travel Lane	23.0 ft	2	46.0 ft
Inside Shoulder			0.0 ft
Outside Shoulder			0.0 ft
Sidewalk			0.0 ft
Curb&Gutter E	2.3 ft	2	4.5 ft
Curb&Gutter F	2.0 ft	2	4.0 ft
Trail	10.0 ft	2	20.0 ft
Barrier Wall			0.0 ft
		Total Impervious Width	74.5 ft

Impervious Roadway Area: 12.06 ac
Pervious Roadway Area: 7.47 ac
Total Roadway Area: 19.53 ac

Pond Area:

Pervious Pond Area : 0.63 ac
Water Surface Area: 0.54 ac Wet Pond
Total Pond Area: 1.16 ac

Total Area:

Impervious Area: **12.06 ac**
Pervious Area: **8.10 ac**
Water Surface Area: **0.54 ac**
Total Area: **20.69 ac**

Curve Number:

Land Use Description	Soil Group	CN	Area	CN*Area
Impervious areas; Streets & roads	A	98	1.54 ac	150.8
Proposed Roadway Pervious	A	39	1.26 ac	49.0
Impervious areas; Streets & roads	C	98	5.81 ac	569.9
Proposed Roadway Pervious	C	74	3.75 ac	277.4
Impervious areas; Streets & roads	D	98	4.70 ac	460.9
Proposed Roadway Pervious	D	80	2.46 ac	197.1
Proposed Ponds (Water Surface)	D	100	0.54 ac	53.7
Proposed Pond Pervious	D	80	0.63 ac	50.2
		Total:	20.69 ac	1809.1

CN = Total CN*Area / Total Area = **87.4**

Runoff:

Soil Capacity (S) = $\frac{1000}{CN} - 10$ = 1.44 in

Runoff (Q) = $\frac{(P - 0.2S)^2}{(P + 0.8S)}$

	SWFWMD (25yr/24 hr)	FDOT Critical Duration (100yr/72hr)	Storm Sewer Design (10yr/24hr)
Precipitation (P) =	7.00 in	14.00 in	6.50 in
Runoff (Q) =	**5.53 in**	**12.41 in**	**5.04 in**

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PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **5**
POND NAME : **5**

POND SIZING

Required Treatment Volume (TV)

Selection criteria

Permitting Agency	**SWFWMD**
StormW.Mgmt.	**Wet Detention**
Online/Offline	**Online**
OFW	**No**
Open/Closed Basin	**Open**

Wet Detention	**N/A**	x Impervious =	0.00 ac-ft
	1.00 in	x DCIA =	1.00 ac-ft

Treatment V_{req} = Largest of Trt. Vol. = **1.00 ac-ft**

Required Attenuation Volume:

Total Runoff (ac-ft)

	SWFWMD (25yr/24 hr)	FDOT Critical Duration (100yr/72hr)	Storm Sewer Design (10yr/24hr)
Q_{pre} =	7.87 ac-ft	19.35 ac-ft	7.08 ac-ft
Q_{post} =	9.53 ac-ft	21.40 ac-ft	8.70 ac-ft
ΔQ =	**1.67 ac-ft**	**2.05 ac-ft**	**1.61 ac-ft**

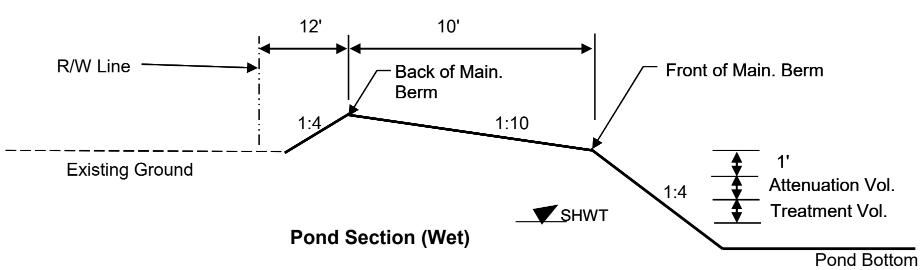
Attenuation V_{req} = **2.05 ac-ft** (use largest value)

Maintenance Area Width =	10.0 ft	@ 1:10
Pond Tie-In Width =	12.4 ft	@ 1:4
Maximum Storage Depth (**SD**) =	5.10 ft	with 1.0 ft freeboard

Existing Ground Elevation =	126.00
Normal Water Elevation =	123.00
Lowest EOP Elevation =	129.00

Hydraulic Grade Line (HGL) check

HGL Slope =	0.100%	Use 0.05% for very flat terrain to 0.1% for flat terrain
Distance from Pond to Lowest EOP =	1100 ft	
Estimated Energy Losses =	1.1 ft	
HGL Clearance =	1.0 ft	Use 1.0 foot as a standard HGL clearance (no junction losses)
Allowable Storm Sewer Tailwater EL =	126.90 ft	



Pond Section (Wet)

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Job Number: DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **5**
POND NAME : **5**

Pond Stage / Storage Calculations

ELEVATION	DESCRIPTION	AREA	DIMENSIONS		STORAGE
			LENGTH	WIDTH	
126.00	Pond R/W	1.47 ac	400.0 ft	160.0 ft	
129.10	Back of Main. Berm	1.16 ac	375.2 ft	135.2 ft	4.82 ac-ft
128.60		1.05 ac	365.2 ft	125.2 ft	4.26 ac-ft
128.10	Front of Main. Berm	0.94 ac	355.2 ft	115.2 ft	3.76 ac-ft
127.10	Provided Treat.Vol.+Att.Vol	0.85 ac	347.2 ft	107.2 ft	3.08 ac-ft
127.14	Req'd Treat.Vol+Att. Vol	0.86 ac	347.5 ft	107.5 ft	3.06 ac-ft
126.55	Estimated Storm Sewer TW	0.81 ac	342.8 ft	102.8 ft	2.62 ac-ft
124.36	Top of Treatment Vol.	0.64 ac	325.3 ft	85.3 ft	1.00 ac-ft
123.00	Normal Water Level	0.54 ac	314.4 ft	74.4 ft	0.00 ac-ft
121.00		0.40 ac	298.4 ft	58.4 ft	
117.00	Pond Bottom	0.16 ac	266.4 ft	26.4 ft	

Required Treatment+Attenuation Vol.= 3.06 ac-ft
Required Treatment+Attenuation Stage= 127.14 ft

Provided Treatment+Attenuation Vol.= 3.08 ac-ft
Provided Treatment+Attenuation Stage= 127.10 ft

Estimated Treat. Vol. + Storm Sewer Att.= 2.62 ac-ft
Estimated Storm Sewer TW EL.= 126.55 ft

HGL requirements met

Required Treatment Vol. = 1.00 ac-ft

PROPOSED POND R/W (Safety Factor of 20%) =	1.76 ac

Note: Remnant area in parcel after allocation to FPC 4 is 1.95 acres.

BASIN 6

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Job Number: DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **6**
POND NAME : **6**

Station Limits:

			Soil
From: 289+00	To: 294+50	Roadway Length = 550 ft; R/W Width = 112 ft	Type C
From: 294+50	To: 298+50	Roadway Length = 400 ft; R/W Width = 112 ft	Type D
From: 298+50	To: 300+00	Roadway Length = 150 ft; R/W Width = 112 ft	Type C
From: 300+00	To: 314+10	Roadway Length = 1410 ft; R/W Width = 112 ft	Type A

EXISTING CONDITION

Roadway Impervious **Area:** 1.96 ac

Roadway Pervious: 4.49 ac

Pond Area: 1.14 ac

Total Area: **7.60 ac**

Curve Number:

Land Use Description	Soil Group	CN	Area	CN*Area
Impervious areas; Streets & roads	C	98	0.55 ac	53.5
Open Space; Good condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover > 75%)	C	74	1.25 ac	92.8
Impervious areas; Streets & roads	D	98	0.31 ac	30.6
Open Space; Good condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover > 75%)	D	80	0.72 ac	57.3
Impervious areas; Streets & roads	A	98	1.10 ac	107.9
Open Space; Good condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover > 75%)	A	39	2.52 ac	98.5
Residential Areas (1.0 acre, 20% Impervious)	D	84	1.14 ac	96.1
		Total:	7.60 ac	536.6

CN = Total CN*Area / Total Area = **70.6**

Denotes Pond Area

Runoff:

Soil Capacity (S) = $\frac{1000}{CN} - 10$ = **4.16 in**

Runoff (Q) = $\frac{(P - 0.2S)^2}{(P + 0.8S)}$

	SWFWMD (25yr/24 hr)	FDOT Critical Duration (100yr/72hr)	Storm Sewer Design (10yr/24hr)
Precipitation (P) =	7.00 in	14.00 in	6.50 in
Runoff (Q) =	**3.68 in**	**10.01 in**	**3.27 in**

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Job Number: DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **6**
POND NAME : **6**

Station Limits:			Soil
	From: 289+00	Roadway Length = 550 ft	Type C
	To: 294+50	R/W Width = 112 ft	
	From: 294+50	Roadway Length = 400 ft	Type D
	To: 298+50	R/W Width = 112 ft	
	From: 298+50	Roadway Length = 150 ft	Type C
	To: 300+00	R/W Width = 112 ft	
	From: 300+00	Roadway Length = 1410 ft	Type A
	To: 314+10	R/W Width = 112 ft	

PROPOSED CONDITION

Roadway Area:

Description	Width	Quantity	Total Width
Travel Lane	23.0 ft	2	46.0 ft
Inside Shoulder			0.0 ft
Outside Shoulder			0.0 ft
Sidewalk			0.0 ft
Curb&Gutter E	2.3 ft	2	4.5 ft
Curb&Gutter F	2.0 ft	2	4.0 ft
Trail	10.0 ft	2	20.0 ft
Barrier Wall			0.0 ft
		Total Impervious Width	74.5 ft

Impervious Roadway Area: 4.29 ac
Pervious Roadway Area: 2.16 ac
Total Roadway Area: 6.45 ac

Pond Area:

Pervious Pond Area : 0.41 ac
Water Surface Area: 0.73 ac Wet Pond
Total Pond Area: 1.14 ac

Total Area:

Impervious Area: **4.29 ac**
Pervious Area: **2.57 ac**
Water Surface Area: **0.73 ac**
Total Area: **7.60 ac**

Curve Number:

Land Use Description	Soil Group	CN	Area	CN*Area
Impervious areas; Streets & roads	A	98	2.41 ac	236.3
Proposed Roadway Pervious	A	39	1.21 ac	47.3
Impervious areas; Streets & roads	C	98	1.20 ac	117.3
Proposed Roadway Pervious	C	74	0.60 ac	44.6
Impervious areas; Streets & roads	D	98	0.68 ac	67.0
Proposed Roadway Pervious	D	80	0.34 ac	27.5
Proposed Ponds (Water Surface)	D	100	0.73 ac	73.0
Proposed Pond Pervious	D	80	0.41 ac	33.1
		Total:	7.60 ac	646.3

CN = Total CN*Area / Total Area = **85.1**

Runoff:

	SWFWMD (25yr/24 hr)	FDOT Critical Duration (100yr/72hr)	Storm Sewer Design (10yr/24hr)
Precipitation (P) =	7.00 in	14.00 in	6.50 in
Runoff (Q) =	**5.26 in**	**12.09 in**	**4.78 in**

Soil Capacity (S) = $\frac{1000}{CN} - 10$ = 1.76 in

Runoff (Q) = $\frac{(P - 0.2S)^2}{(P + 0.8S)}$

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Job Number: DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **6**
POND NAME : **6**

POND SIZING

Required Treatment Volume (TV)

Selection criteria

Permitting Agency	**SWFWMD**
StormW.Mgmt.	**Wet Detention**
Online/Offline	**Online**
OFW	**No**
Open/Closed Basin	**Open**

Wet Detention	**N/A**	x Impervious =	0.00 ac-ft
	1.00 in	x DCIA =	0.36 ac-ft

Treatment V_{req} = Largest of Trt. Vol. = 0.36 ac-ft

Required Attenuation Volume:

Total Runoff (ac-ft)

	SWFWMD (25yr/24 hr)	FDOT Critical Duration (100yr/72hr)	Storm Sewer Design (10yr/24hr)
Q_{pre} =	2.33 ac-ft	6.34 ac-ft	2.07 ac-ft
Q_{post} =	3.33 ac-ft	7.66 ac-ft	3.03 ac-ft
ΔQ =	**1.00 ac-ft**	**1.32 ac-ft**	**0.96 ac-ft**

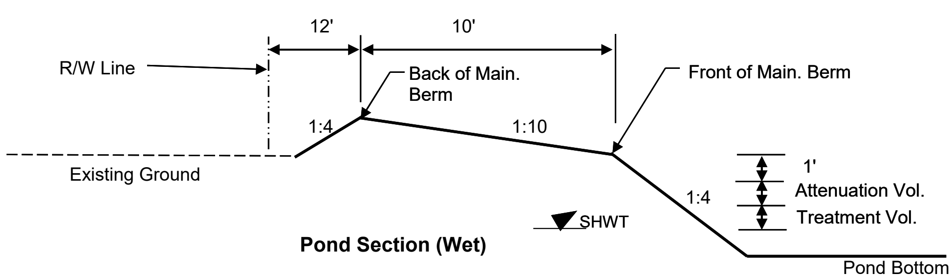
Attenuation V_{req} = 1.32 ac-ft (use largest value)

Maintenance Area Width =	10.0 ft	@ 1:10
Pond Tie-In Width =	12.0 ft	@ 1:4
Maximum Storage Depth (**SD**) =	3.00 ft	with 1.0 ft freeboard

Existing Ground Elevation =	130.00
Normal Water Elevation =	129.00
Lowest EOP Elevation =	134.00

Hydraulic Grade Line (HGL) check

HGL Slope =	0.100%	Use 0.05% for very flat terrain to 0.1% for flat terrain
Distance from Pond to Lowest EOP =	100 ft	
Estimated Energy Losses =	0.1 ft	
HGL Clearance =	1.0 ft	Use 1.0 foot as a standard HGL clearance (no junction losses)
Allowable Storm Sewer Tailwater EL =	132.90 ft	



Pond Section (Wet)

Inwood consulting engineers
3000 Dovera Drive, Suite 200, Oviedo, FL 32765
(407) 971-8850 (phone)
(407) 971-8955 (fax)

Made by: DLD
Checked by: REC

DATE: July 28, 2023
Job Number: DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **6**
POND NAME : **6**

Pond Stage / Storage Calculations

ELEVATION	DESCRIPTION	AREA	DIMENSIONS		STORAGE
			LENGTH	WIDTH	
130.00	Pond R/W	1.41 ac	292.0 ft	210.0 ft	
133.00	Back of Main. Berm	1.14 ac	268.0 ft	186.0 ft	3.56 ac-ft
132.50		1.04 ac	258.0 ft	176.0 ft	3.01 ac-ft
132.00	Front of Main. Berm	0.95 ac	248.0 ft	166.0 ft	2.51 ac-ft
131.00	Provided Treat.Vol.+Att.Vol	0.87 ac	240.0 ft	158.0 ft	1.68 ac-ft
131.00	Req'd Treat.Vol+Att. Vol	0.87 ac	240.0 ft	158.0 ft	1.68 ac-ft
130.57	Estimated Storm Sewer TW	0.84 ac	236.6 ft	154.6 ft	1.32 ac-ft
129.43	Top of Treatment Vol.	0.76 ac	227.4 ft	145.4 ft	0.36 ac-ft
129.00	Normal Water Level	0.73 ac	224.0 ft	142.0 ft	0.00 ac-ft
127.00		0.60 ac	208.0 ft	126.0 ft	
121.00	Pond Bottom	0.29 ac	160.0 ft	78.0 ft	

Required Treatment+Attenuation Vol.= 1.68 ac-ft
Required Treatment+Attenuation Stage= 131.00 ft

Provided Treatment+Attenuation Vol.= 1.68 ac-ft
Provided Treatment+Attenuation Stage= 131.00 ft

Estimated Treat. Vol. + Storm Sewer Att.= 1.32 ac-ft
Estimated Storm Sewer TW EL.= 130.57 ft

HGL requirements met

Required Treatment Vol. = 0.36 ac-ft

PROPOSED POND R/W (Safety Factor of 20%) = 1.69 ac

Note: Parcel area occupied by pond site is 1.87 acres.

BASIN 7 - SWALE

Inwood consulting engineers
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(407) 971-8850 (phone)
(407) 971-8955 (fax)

Made by: DLD
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DATE: August 7, 2023
Job Number: DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **7**
POND NAME : **7**

Station Limits: From: 314+50 To: 331+50

Roadway Length = 1700 ft
*Areas measured in Microstation

EXISTING CONDITION

Roadway Impervious **Area:** 9.25 ac

Roadway Pervious: 5.31 ac

Pond Area: 0.59 ac

Total Area: **15.15 ac**

Curve Number:

Land Use Description	Soil Group	CN	Area	CN*Area
Impervious areas; Streets & roads	A	98	9.25 ac	906.5
Open Space; Good condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover > 75%)	A	39	5.31 ac	207.1
Open Space; Fair condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover 50% to 75%)	A	49	0.59 ac	28.7
		Total:	15.15 ac	1142.3

CN = Total CN*Area / Total Area = **75.4**

Denotes Pond Area

Runoff:

Soil Capacity (S) = $\frac{1000}{CN} - 10$ = **3.26 in**

Runoff (Q) = $\frac{(P - 0.2S)^2}{(P + 0.8S)}$

	SWFWMD (100yr/24 hr)	FDOT Critical Duration (100yr/10day)	Storm Sewer Design (10yr/24hr)
Precipitation (P) =	9.00 in	18.00 in	6.50 in
Runoff (Q) =	**6.00 in**	**14.60 in**	**3.76 in**

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Made by: DLD
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DATE: August 7, 2023
Job Number: DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **7**
POND NAME : **7**

Station Limits:

From: 314+50
To: 331+50

Roadway Length = 1700 ft
*Areas measured in Microstation

PROPOSED CONDITION

Pond Area:

Pervious Pond Area :	0.59 ac	Dry Pond
Water Surface Area:	0.00 ac	
Total Pond Area:	0.59 ac	

Total Area:

Impervious Area:	**8.82 ac**
Pervious Area:	**6.33 ac**
Water Surface Area:	**0.00 ac**
Total Area:	**15.15 ac**

Curve Number:

Proposed Sidewalk

Land Use Description	Soil Group	CN	Area	CN*Area
Impervious areas; Streets & roads	A	98	8.82 ac	864.4
Proposed Roadway Pervious	A	39	5.74 ac	223.9
Proposed Ponds (Water Surface)	A	100	0.00 ac	0.0
Proposed Pond Pervious	A	39	0.59 ac	22.8
		Total:	15.15 ac	1111.1

CN = Total CN*Area / Total Area = **73.4**

Runoff:

Soil Capacity (S) = $\frac{1000}{CN} - 10$ = 3.63 in

Runoff (Q) = $\frac{(P - 0.2S)^2}{(P + 0.8S)}$

	SWFWMD (100yr/24 hr)	FDOT Critical Duration (100yr/10day)	Storm Sewer Design (10yr/24hr)
Precipitation (P) =	9.00 in	18.00 in	6.50 in
Runoff (Q) =	**5.75 in**	**14.27 in**	**3.54 in**

Made by:	DLD	**DATE:**	August 7, 2023
Checked by:	REC	**Job Number:**	DT1-022-01

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PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **7**
POND NAME : **7**

POND SIZING

Required Treatment Volume (TV)

Selection criteria

Permitting Agency	**SWFWMD**
StormW.Mgmt.	**Dry Retention**
Online/Offline	**Online**
OFW	**No**
Open/Closed Basin	**Closed**

Dry Retention	**0.50 in**	x DCIA =	0.37 ac-ft

Treatment V_{req} = Largest of Trt. Vol. = **0.37 ac-ft**

Required Attenuation Volume:

Total Runoff (ac-ft)

	SWFWMD (100yr/24 hr)	FDOT Critical Duration (100yr/10day)	Storm Sewer Design (10yr/24hr)
Q_{pre} =	7.58 ac-ft	18.43 ac-ft	4.74 ac-ft
Q_{post} =	7.26 ac-ft	18.01 ac-ft	4.47 ac-ft
ΔQ =	**-0.32 ac-ft**	**-0.42 ac-ft**	**-0.27 ac-ft**

Attenuation V_{req} = **0.00 ac-ft** (use largest value)

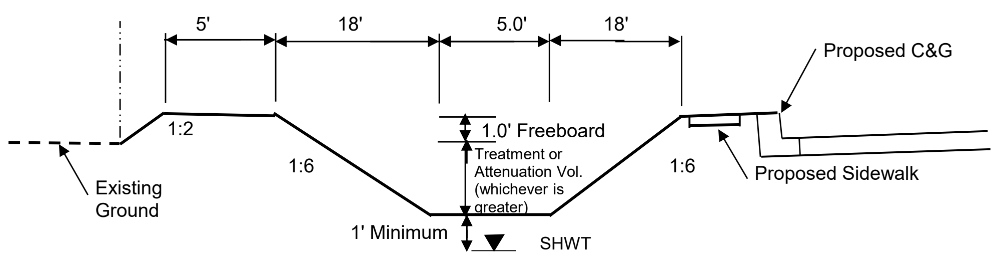
Original Permitted Attenuation V_{req} = **0.28 ac-ft**

Total Attenuation V_{req} = **0.28 ac-ft**

Maintenance Area Width =	0.0 ft	@ 1:20	Existing Ground Elevation =	129.00
Pond Tie-In Width =	4.0 ft	@ 1:2	Normal Water Elevation =	127.00
Maximum Storage Depth (**SD**) =	3.00 ft	with 1.0 ft freeboard	Lowest EOP Elevation =	132.50

Hydraulic Grade Line (HGL) check

HGL Slope =	0.050%	Use 0.05% for very flat terrain to 0.1% for flat terrain
Distance from Pond to Lowest EOP =	50 ft	
Estimated Energy Losses =	0.0 ft	
HGL Clearance =	1.0 ft	Use 1.0 foot as a standard HGL clearance (no junction losses)
Allowable Storm Sewer Tailwater EL =	131.48 ft	



Dry Retention Linear Swale

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3000 Dovera Drive, Suite 200, Oviedo, FL 32765
(407) 971-8850 (phone)
(407) 971-8955 (fax)

Made by: DLD
Checked by: REC

DATE: August 7, 2023
Job Number: DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **7**
POND NAME : **7**

Pond Stage / Storage Calculations

ELEVATION	DESCRIPTION	AREA	DIMENSIONS		STORAGE
			LENGTH	WIDTH	
129.00	Pond R/W	0.59 ac	510.0 ft	50.0 ft	
131.00	Back of Main. Berm	0.55 ac	520.0 ft	46.0 ft	0.82 ac-ft
131.00		0.55 ac	520.0 ft	46.0 ft	0.82 ac-ft
131.00	Front of Main. Berm	0.49 ac	520.0 ft	41.0 ft	0.82 ac-ft
130.00	Provided Treat.Vol. OR Att.Vol	0.34 ac	508.0 ft	29.0 ft	0.39 ac-ft
129.94	Req'd Treat.Vol OR Att. Vol	0.33 ac	507.3 ft	28.3 ft	0.37 ac-ft
129.94	Estimated Storm Sewer TW	0.33 ac	507.3 ft	28.3 ft	0.37 ac-ft
129.94	Top of Treatment Vol.	0.33 ac	507.3 ft	28.3 ft	0.37 ac-ft
128.00	Pond Bottom	0.06 ac	484.0 ft	5.0 ft	0.00 ac-ft

Required Treatment OR Attenuation Vol.= 0.37 ac-ft

Provided Treatment OR Attenuation Vol.= 0.39 ac-ft
Provided Treatment OR Attenuation Stage= 130.00 ft

Estimated Treat. Vol. OR Storm Sewer Att.= 0.37 ac-ft
Estimated Storm Sewer TW EL.= 129.94 ft

HGL requirements met

Required Treatment Vol. = 0.37 ac-ft

PROPOSED SWALE R/W (Safety Factor of 20%) =	0.70 ac

BASIN 8

Inwood consulting engineers
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Made by: DLD
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DATE: July 28, 2023
Job Number: DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **8**
POND NAME : **8**

Station Limits:

		Soil
From: 331+50 To: 335+00	Roadway Length = 350 ft R/W Width = 140 ft	Type A
From: 335+00 To: 348+00	Roadway Length = 1300 ft R/W Width = 140 ft	Type D

*Areas measured in Microstation

EXISTING CONDITION

	Area:
Roadway Impervious	8.73 ac
Roadway Pervious:	10.75 ac
Pond Area:	2.06 ac
Total Area:	**21.54 ac**

Curve Number:

Land Use Description	Soil Group	CN	Area	CN*Area
Impervious areas; Streets & roads	A	98	5.56 ac	544.9
Open Space; Good condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover > 75%)	A	39	5.33 ac	207.9
Impervious areas; Streets & roads	D	98	3.17 ac	310.7
Open Space; Good condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover > 75%)	D	80	5.42 ac	433.6
Brush-weed-grass mixture; Good condition (> 75% ground cover)	D	73	2.06 ac	150.6
		Total:	21.54 ac	1647.6

CN = Total CN*Area / Total Area = **76.5**

Denotes Pond Area

Runoff:

Soil Capacity (S) = $\frac{1000}{CN} - 10$ = **3.08 in**

Runoff (Q) = $\frac{(P - 0.2S)^2}{(P + 0.8S)}$

	SWFWMD (25yr/24 hr)	FDOT Critical Duration (100yr/72hr)	Storm Sewer Design (10yr/24hr)
Precipitation (P) =	7.00 in	14.00 in	6.50 in
Runoff (Q) =	**4.31 in**	**10.88 in**	**3.87 in**

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DATE: July 28, 2023
Job Number: DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **8**
POND NAME : **8**

Station Limits:

		Soil
From: 331+50	Roadway Length = 350 ft	Type A
To: 335+00	R/W Width = 140 ft	
From: 335+00	Roadway Length = 1300 ft	Type D
To: 348+00	R/W Width = 140 ft	

*Areas measured in Microstation

PROPOSED CONDITION

Pond Area:

Pervious Pond Area :	0.65 ac	
Water Surface Area:	1.41 ac	Wet Pond
Total Pond Area:	2.06 ac	

Total Area:

Impervious Area:	**12.46 ac**
Pervious Area:	**7.67 ac**
Water Surface Area:	**1.41 ac**
Total Area:	**21.54 ac**

Curve Number:

Land Use Description	Soil Group	CN	Area	CN*Area
Impervious areas; Streets & roads	A	98	6.98 ac	684.0
Proposed Roadway Pervious	A	39	3.91 ac	152.5
Impervious areas; Streets & roads	D	98	5.48 ac	537.0
Proposed Roadway Pervious	D	80	3.11 ac	248.8
Proposed Ponds (Water Surface)	D	100	1.41 ac	141.4
Proposed Pond Pervious	D	80	0.65 ac	51.9
		Total:	21.54 ac	1815.7

CN = Total CN*Area / Total Area = **84.3**

Runoff:

Soil Capacity (S) = $\frac{1000}{CN} - 10$ = 1.86 in

Runoff (Q) = $\frac{(P - 0.2S)^2}{(P + 0.8S)}$

	SWFWMD (25yr/24 hr)	FDOT Critical Duration (100yr/72hr)	Storm Sewer Design (10yr/24hr)
Precipitation (P) =	7.00 in	14.00 in	6.50 in
Runoff (Q) =	**5.17 in**	**11.99 in**	**4.70 in**

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Job Number: DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **8**
POND NAME : **8**

POND SIZING

Required Treatment Volume (TV)

Selection criteria

Permitting Agency	**SWFWMD**
StormW.Mgmt.	**Wet Detention**
Online/Offline	**Online**
OFW	**No**
Open/Closed Basin	**Open**

Wet Detention	**N/A**	x Impervious =	0.00 ac-ft
	1.00 in	x DCIA =	1.04 ac-ft

Treatment V_{req} = Largest of Trt. Vol. = **1.04 ac-ft**

Required Attenuation Volume:

Total Runoff (ac-ft)	SWFWMD (25yr/24 hr)	FDOT Critical Duration (100yr/72hr)	Storm Sewer Design (10yr/24hr)
Q_{pre} =	7.74 ac-ft	19.54 ac-ft	6.94 ac-ft
Q_{post} =	9.28 ac-ft	21.52 ac-ft	8.43 ac-ft
ΔQ =	**1.55 ac-ft**	**1.98 ac-ft**	**1.49 ac-ft**

Attenuation V_{req} = 1.98 ac-ft (use largest value)

Attenuation Vol. from Existing Pond 10 = 0.58 ac-ft

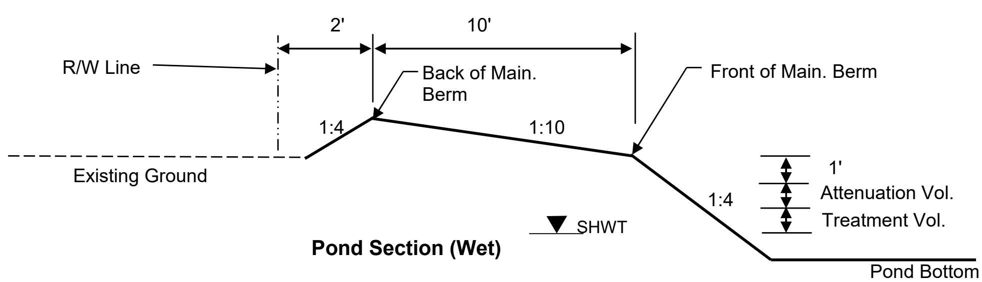
Total Attenuation V_{req} = **2.56 ac-ft**

Maintenance Area Width =	10.0 ft	@ 1:10
Pond Tie-In Width =	2.0 ft	@ 1:4
Maximum Storage Depth (**SD**) =	3.50 ft	with 1.0 ft freeboard

Existing Ground Elevation =	126.00
Normal Water Elevation =	122.00
Lowest EOP Elevation =	126.60

Hydraulic Grade Line (HGL) check

HGL Slope =	0.100%	Use 0.05% for very flat terrain to 0.1% for flat terrain
Distance from Pond to Lowest EOP =	2000 ft	
Estimated Energy Losses =	2.0 ft	
HGL Clearance =	1.0 ft	Use 1.0 foot as a standard HGL clearance (no junction losses)
Allowable Storm Sewer Tailwater EL =	123.60 ft	



Pond Section (Wet)

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DATE: July 28, 2023
Job Number: DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **8**
POND NAME : **8**

Pond Stage / Storage Calculations

ELEVATION	DESCRIPTION	AREA	DIMENSIONS		STORAGE
			LENGTH	WIDTH	
126.00	Pond R/W	2.12 ac	430.0 ft	215.0 ft	
126.50	Back of Main. Berm	2.06 ac	426.0 ft	211.0 ft	7.51 ac-ft
126.00		1.92 ac	416.0 ft	201.0 ft	6.52 ac-ft
125.50	Front of Main. Berm	1.78 ac	406.0 ft	191.0 ft	5.59 ac-ft
124.50	Provided Treat.Vol.+Att.Vol	1.67 ac	398.0 ft	183.0 ft	4.02 ac-ft
126.00	Req'd Treat.Vol+Att. Vol	1.84 ac	410.0 ft	195.0 ft	3.60 ac-ft
123.59	Estimated Storm Sewer TW	1.58 ac	390.7 ft	175.7 ft	2.53 ac-ft
122.65	Top of Treatment Vol.	1.48 ac	383.2 ft	168.2 ft	1.04 ac-ft
122.00	Normal Water Level	1.41 ac	378.0 ft	163.0 ft	0.00 ac-ft
120.00		1.22 ac	362.0 ft	147.0 ft	
114.00	Pond Bottom	0.71 ac	314.0 ft	99.0 ft	

Required Treatment+Attenuation Vol.= 3.60 ac-ft
Required Treatment+Attenuation Stage= 126.00 ft

Provided Treatment+Attenuation Vol.= 4.02 ac-ft
Provided Treatment+Attenuation Stage= 124.50 ft

Estimated Treat. Vol. + Storm Sewer Att.= 2.53 ac-ft
Estimated Storm Sewer TW EL.= 123.59 ft

HGL requirements met

Required Treatment Vol. = 1.04 ac-ft

PROPOSED POND R/W (Safety Factor of 20%) =	**2.55 ac**
PROPOSED POND R/W PLUS 21' TIE-IN AT 1:3 SLOPE ON BACK OF POND =	**2.75 ac**

BASIN 8A - SWALE

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(407) 971-8850 (phone)
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Made by: DLD
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DATE: July 28, 2023
Job Number: DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **8A**
POND NAME : **8A**

Station Limits: From: N/A
To: N/A

*Areas measured in Microstation

EXISTING CONDITION

Roadway Impervious **Area:** 0.98 ac

Roadway Pervious: 1.14 ac

Pond Area: 0.47 ac

Total Area: **2.59 ac**

Curve Number:

Land Use Description	Soil Group	CN	Area	CN*Area
Impervious areas; Streets & roads	D	98	0.98 ac	96.0
Open Space; Good condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover > 75%)	D	80	1.14 ac	90.8
Open Space; Fair condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover 50% to 75%)	B	69	0.47 ac	32.7
		Total:	2.59 ac	219.6

CN = Total CN*Area / Total Area = **84.8**

Denotes Pond Area

Runoff:

Soil Capacity (S) = $\frac{1000}{CN} - 10$ = **1.79 in**

Runoff (Q) = $\frac{(P - 0.2S)^2}{(P + 0.8S)}$

	SWFWMD (25yr/24 hr)	FDOT Critical Duration (100yr/10day)	Storm Sewer Design (10yr/24hr)
Precipitation (P) =	7.00 in	18.00 in	6.50 in
Runoff (Q) =	**5.23 in**	**16.01 in**	**4.75 in**

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DATE: July 28, 2023
Job Number: DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **8A**
POND NAME : **8A**

Station Limits: From: N/A
To: N/A

*Areas measured in Microstation

PROPOSED CONDITION

Pond Area:

Pervious Pond Area :	0.47 ac	Dry Pond
Water Surface Area:	0.00 ac	
Total Pond Area:	0.47 ac	

Total Area:

Impervious Area:	**1.36 ac**
Pervious Area:	**1.23 ac**
Water Surface Area:	**0.00 ac**
Total Area:	**2.59 ac**

Curve Number:

Land Use Description	Soil Group	CN	Area	CN*Area
Impervious areas; Streets & roads	D	98	1.36 ac	133.3
Open Space; Good condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover > 75%)	D	80	0.76 ac	60.4
Proposed Pond Pervious	B	61	0.47 ac	28.9
		Total:	2.59 ac	222.7

CN = Total CN*Area / Total Area = **86.0**

Runoff:

Soil Capacity (S) = $\frac{1000}{CN} - 10 =$ 1.63 in

Runoff (Q) = $\frac{(P - 0.2S)^2}{(P + 0.8S)}$

	SWFWMD (25yr/24 hr)	FDOT Critical Duration (100yr/10day)	Storm Sewer Design (10yr/24hr)
Precipitation (P) =	7.00 in	18.00 in	6.50 in
Runoff (Q) =	**5.36 in**	**16.18 in**	**4.88 in**

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PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **8A**
POND NAME : **8A**

POND SIZING

Required Treatment Volume (TV)

Selection criteria

Permitting Agency	**SWFWMD**
StormW.Mgmt.	**Dry Retention**
Online/Offline	**Online**
OFW	**No**
Open/Closed Basin	**Open**

Dry Retention	**0.50 in**	x DCIA =	0.06 ac-ft

Treatment V_{req} = Largest of Trt. Vol. = **0.06 ac-ft**

Required Attenuation Volume:

Total Runoff (ac-ft)

	SWFWMD (25yr/24 hr)	FDOT Critical Duration (100yr/10day)	Storm Sewer Design (10yr/24hr)
Q_{pre} =	1.13 ac-ft	3.46 ac-ft	1.03 ac-ft
Q_{post} =	1.16 ac-ft	3.49 ac-ft	1.05 ac-ft
ΔQ =	**0.03 ac-ft**	**0.04 ac-ft**	**0.03 ac-ft**

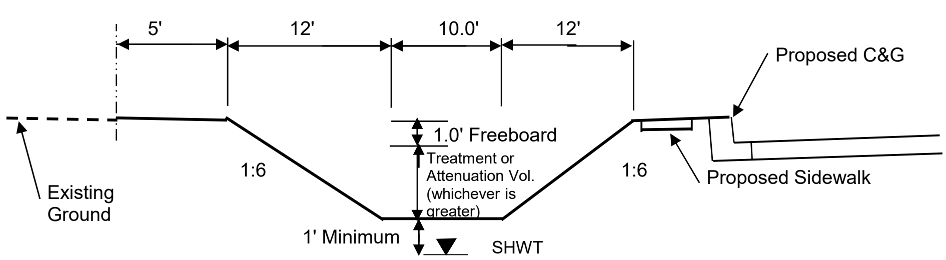
Attenuation V_{req} = **0.04 ac-ft** (use largest value)

Maintenance Area Width =	0.0 ft	@ 1:20
Pond Tie-In Width =	0.0 ft	@ 1:2
Maximum Storage Depth (**SD**) =	2.00 ft	with 1.0 ft freeboard

Existing Ground Elevation =	126.00
Normal Water Elevation =	123.00
Lowest EOP Elevation =	126.00

Hydraulic Grade Line (HGL) check

HGL Slope =	0.050%	Use 0.05% for very flat terrain to 0.1% for flat terrain
Distance from Pond to Lowest EOP =	50 ft	
Estimated Energy Losses =	0.0 ft	
HGL Clearance =	1.0 ft	Use 1.0 foot as a standard HGL clearance (no junction losses)
Allowable Storm Sewer Tailwater EL =	124.98 ft	



Dry Retention Linear Swale

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Made by: DLD
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DATE: July 28, 2023
Job Number: DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **8A**
POND NAME : **8A**

Pond Stage / Storage Calculations

ELEVATION	DESCRIPTION	AREA	DIMENSIONS		STORAGE
			LENGTH	WIDTH	
126.00	Pond R/W	0.47 ac	530.0 ft	39.0 ft	
126.00	Back of Main. Berm	0.47 ac	520.0 ft	39.0 ft	0.52 ac-ft
126.00		0.47 ac	520.0 ft	39.0 ft	0.52 ac-ft
126.00	Front of Main. Berm	0.41 ac	520.0 ft	34.0 ft	0.52 ac-ft
125.00	Provided Treat.Vol. OR Att.Vol	0.26 ac	508.0 ft	22.0 ft	0.19 ac-ft
124.60	Estimated Storm Sewer TW	0.20 ac	503.2 ft	17.2 ft	0.09 ac-ft
124.40	Req'd Treat.Vol OR Att. Vol	0.17 ac	500.8 ft	14.8 ft	0.06 ac-ft
124.40	Top of Treatment Vol.	0.17 ac	500.8 ft	14.8 ft	0.06 ac-ft
124.00	Pond Bottom	0.11 ac	496.0 ft	10.0 ft	0.00 ac-ft

Required Treatment OR Attenuation Vol.= 0.06 ac-ft

Provided Treatment OR Attenuation Vol.= 0.19 ac-ft
Provided Treatment OR Attenuation Stage= 125.00 ft

Estimated Treat. Vol.+Storm Sewer Att.= 0.09 ac-ft
Estimated Storm Sewer TW EL.= 124.40 ft

HGL requirements met

Required Treatment Vol. = 0.06 ac-ft

PROPOSED SWALE R/W (Safety Factor of 20%) =	**0.57 ac**

BASIN 9

Inwood consulting engineers
3000 Dovera Drive, Suite 200, Oviedo, FL 32765
(407) 971-8850 (phone)
(407) 971-8955 (fax)

Made by: DLD
Checked by: REC

DATE: July 28, 2023
Job Number: DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **9**
POND NAME : **9**

Station Limits:

		Soil
From: 348+00	Roadway Length = 200 ft	Type D
To: 350+00	R/W Width = 140 ft	
From: 350+00	Roadway Length = 550 ft	Type A
To: 355+50	R/W Width = 140 ft	
From: 355+50	Roadway Length = 350 ft	Type D
To: 359+00	R/W Width = 140 ft	
From: 359+00	Roadway Length = 1500 ft	Type A
To: 374+00	R/W Width = 140 ft	

EXISTING CONDITION

Roadway Impervious **Area:** 2.03 ac

Roadway Pervious: 6.33 ac

Pond Area: 0.82 ac

Total Area: **9.18 ac**

Curve Number:

Land Use Description	Soil Group	CN	Area	CN*Area
Impervious areas; Streets & roads	D	98	0.43 ac	42.1
Open Space; Good condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover > 75%)	D	80	1.34 ac	107.1
Impervious areas; Streets & roads	A	98	1.60 ac	156.8
Open Space; Good condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover > 75%)	A	39	4.99 ac	194.6
Brush-weed-grass mixture; Good condition (> 75% ground cover)	D	73	0.82 ac	60.1
		Total:	9.18 ac	560.6

CN = Total CN*Area / Total Area = **61.1**

Denotes Pond Area

Runoff:

Soil Capacity (S) = $\frac{1000}{CN} - 10$ = **6.37 in**

Runoff (Q) = $\frac{(P - 0.2S)^2}{(P + 0.8S)}$

	SWFWMD (25yr/24 hr)	FDOT Critical Duration (100yr/72hr)	Storm Sewer Design (10yr/24hr)
Precipitation (P) =	7.00 in	14.00 in	6.50 in
Runoff (Q) =	**2.71 in**	**8.48 in**	**2.35 in**

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3000 Dovera Drive, Suite 200, Oviedo, FL 32765
(407) 971-8850 (phone)
(407) 971-8955 (fax)

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DATE: July 28, 2023
Job Number: DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **9**
POND NAME : **9**

Station Limits:			Soil
	From: 348+00	Roadway Length = 200 ft	Type D
	To: 350+00	R/W Width = 140 ft	
	From: 350+00	Roadway Length = 550 ft	Type A
	To: 355+50	R/W Width = 140 ft	
	From: 355+50	Roadway Length = 350 ft	Type D
	To: 359+00	R/W Width = 140 ft	
	From: 359+00	Roadway Length = 1500 ft	Type A
	To: 374+00	R/W Width = 140 ft	

PROPOSED CONDITION

Roadway Area:

Description	Width	Quantity	Total Width
Travel Lane	23.0 ft	2	46.0 ft
Inside Shoulder			0.0 ft
Outside Shoulder			0.0 ft
Sidewalk			0.0 ft
Curb&Gutter E	2.3 ft	2	4.5 ft
Curb&Gutter F	2.0 ft	2	4.0 ft
Trail	10.0 ft	2	20.0 ft
Barrier Wall			0.0 ft
		Total Impervious Width	74.5 ft

Impervious Roadway Area:	4.45 ac
Pervious Roadway Area:	3.91 ac
Total Roadway Area:	8.36 ac

Pond Area:

Pervious Pond Area :	0.44 ac	
Water Surface Area:	0.38 ac	Wet Pond
Total Pond Area:	0.82 ac	

Total Area:

Impervious Area:	**4.45 ac**
Pervious Area:	**4.35 ac**
Water Surface Area:	**0.38 ac**
Total Area:	**9.18 ac**

Curve Number:

Land Use Description	Soil Group	CN	Area	CN*Area
Impervious areas; Streets & roads	A	98	3.51 ac	343.6
Proposed Roadway Pervious	A	39	3.08 ac	120.2
Impervious areas; Streets & roads	D	98	0.94 ac	92.2
Proposed Roadway Pervious	D	80	0.83 ac	66.2
Proposed Ponds (Water Surface)	D	100	0.38 ac	38.4
Proposed Pond Pervious	D	80	0.44 ac	35.2
		Total:	9.18 ac	695.7

CN = Total CN*Area / Total Area = **75.8**

Runoff:

Soil Capacity (S) = $\frac{1000}{CN} - 10$ = 3.19 in

Runoff (Q) = $\frac{(P - 0.2S)^2}{(P + 0.8S)}$

	SWFWMD (25yr/24 hr)	FDOT Critical Duration (100yr/72hr)	Storm Sewer Design (10yr/24hr)
Precipitation (P) =	7.00 in	14.00 in	6.50 in
Runoff (Q) =	**4.23 in**	**10.78 in**	**3.79 in**

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3000 Dovera Drive, Suite 200, Oviedo, FL 32765
(407) 971-8850 (phone)
(407) 971-8955 (fax)

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DATE: July 28, 2023
Job Number: DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **9**
POND NAME : **9**

POND SIZING

Required Treatment Volume (TV)

Selection criteria

Permitting Agency	**SWFWMD**
StormW.Mgmt.	**Wet Detention**
Online/Offline	**Online**
OFW	**No**
Open/Closed Basin	**Open**

Wet Detention	**N/A**	x Impervious =	0.00 ac-ft
	1.00 in	x DCIA =	0.37 ac-ft

Treatment V_{req} = Largest of Trt. Vol. = **0.37 ac-ft**

Required Attenuation Volume:

Total Runoff (ac-ft)	SWFWMD (25yr/24 hr)	FDOT Critical Duration (100yr/72hr)	Storm Sewer Design (10yr/24hr)
Q_{pre} =	2.07 ac-ft	6.49 ac-ft	1.80 ac-ft
Q_{post} =	3.24 ac-ft	8.25 ac-ft	2.90 ac-ft
ΔQ =	**1.17 ac-ft**	**1.76 ac-ft**	**1.10 ac-ft**

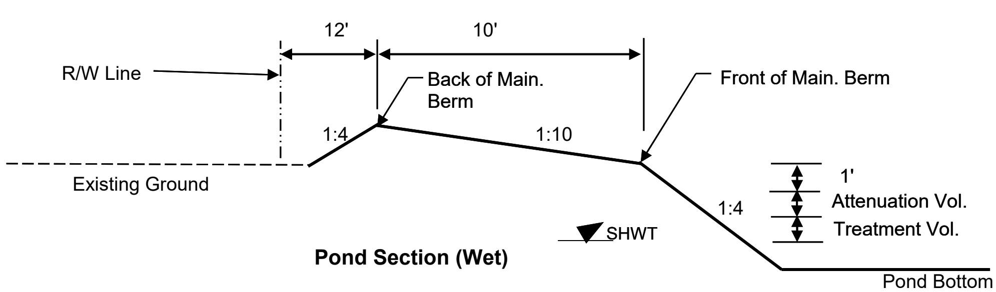
Attenuation V_{req} = **1.76 ac-ft** (use largest value)

Maintenance Area Width =	10.0 ft	@ 1:10
Pond Tie-In Width =	12.0 ft	@ 1:4
Maximum Storage Depth (**SD**) =	5.00 ft	with 1.0 ft freeboard

Existing Ground Elevation =	126.00
Normal Water Elevation =	123.00
Lowest EOP Elevation =	128.00

Hydraulic Grade Line (HGL) check

HGL Slope =	0.100%	Use 0.05% for very flat terrain to 0.1% for flat terrain
Distance from Pond to Lowest EOP =	100 ft	
Estimated Energy Losses =	0.1 ft	
HGL Clearance =	1.0 ft	Use 1.0 foot as a standard HGL clearance (no junction losses)
Allowable Storm Sewer Tailwater EL =	126.90 ft	



Pond Section (Wet)

Inwood consulting engineers
3000 Dovera Drive, Suite 200, Oviedo, FL 32765
(407) 971-8850 (phone)
(407) 971-8955 (fax)

Made by: DLD
Checked by: REC

DATE: July 28, 2023
Job Number: DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **9**
POND NAME : **9**

Pond Stage / Storage Calculations

ELEVATION	DESCRIPTION	AREA	DIMENSIONS LENGTH	DIMENSIONS WIDTH	STORAGE
126.00	Pond R/W	1.05 ac	220.0 ft	207.0 ft	
129.00	Back of Main. Berm	0.82 ac	196.0 ft	183.0 ft	3.35 ac-ft
128.50		0.74 ac	186.0 ft	173.0 ft	2.96 ac-ft
128.00	Front of Main. Berm	0.66 ac	176.0 ft	163.0 ft	2.61 ac-ft
127.00	Provided Treat.Vol.+Att.Vol	0.60 ac	168.0 ft	155.0 ft	2.14 ac-ft
127.09	Req'd Treat.Vol+Att. Vol	0.60 ac	168.7 ft	155.7 ft	2.13 ac-ft
125.82	Estimated Storm Sewer TW	0.53 ac	158.6 ft	145.6 ft	1.47 ac-ft
123.71	Top of Treatment Vol.	0.42 ac	141.7 ft	128.7 ft	0.37 ac-ft
123.00	Normal Water Level	0.38 ac	136.0 ft	123.0 ft	0.00 ac-ft
121.00		0.29 ac	120.0 ft	107.0 ft	
115.00	Pond Bottom	0.10 ac	72.0 ft	59.0 ft	

Required Treatment+Attenuation Vol.= 2.13 ac-ft
Required Treatment+Attenuation Stage= 127.09 ft

Provided Treatment+Attenuation Vol.= 2.14 ac-ft
Provided Treatment+Attenuation Stage= 127.00 ft

Estimated Treat. Vol. + Storm Sewer Att.= 1.47 ac-ft
Estimated Storm Sewer TW EL.= 125.82 ft

HGL requirements met

Required Treatment Vol. = 0.37 ac-ft

PROPOSED SWALE R/W (Safety Factor of 20%) =	**1.25 ac**

BASIN 10

Inwood consulting engineers
3000 Dovera Drive, Suite 200, Oviedo, FL 32765
(407) 971-8850 (phone)
(407) 971-8955 (fax)

Made by: DLD
Checked by: REC

DATE: August 7, 2023
Job Number: DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **10**
POND NAME : **10**

Station Limits:

From: 374+00		Roadway Length = 2600 ft
To: 400+00		R/W Width = 112 ft
From: 400+00		Roadway Length = 2450 ft
To: 424+50		R/W Width = 112 ft

EXISTING CONDITION

Roadway Impervious	**Area:**	5.24 ac
Roadway Pervious:		7.75 ac
Pond Area:		1.28 ac
Total Area:		**14.26 ac**

Curve Number:

Land Use Description	Soil Group	CN	Area	CN*Area
Impervious areas; Streets & roads	A	98	5.24 ac	513.1
Open Space; Good condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover > 75%)	A	39	7.75 ac	302.2
Open Space; Fair condition (lawns, parks, golf courses, cemeteries, etc.) (grass cover 50% to 75%)	A	49	1.28 ac	62.5
		Total:	14.26 ac	877.8

CN = Total CN*Area / Total Area = **61.6**

Denotes Pond Area

Runoff:

Soil Capacity (S) = $\frac{1000}{CN} - 10 =$ **6.25 in**

Runoff (Q) = $\frac{(P - 0.2S)^2}{(P + 0.8S)}$

	SWFWMD (25yr/24 hr)	FDOT Critical Duration (100yr/72hr)	Storm Sewer Design (10yr/24hr)
Precipitation (P) =	7.00 in	14.00 in	6.50 in
Runoff (Q) =	**2.76 in**	**8.56 in**	**2.40 in**

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3000 Dovera Drive, Suite 200, Oviedo, FL 32765
(407) 971-8850 (phone)
(407) 971-8955 (fax)

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DATE: August 7, 2023
Job Number: DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **10**
POND NAME : **10**

Station Limits:

From:	374+00	Roadway Length =	2600 ft
To:	400+00	R/W Width =	112 ft
From:	400+00	Roadway Length =	2450 ft
To:	424+50	R/W Width =	112 ft

PROPOSED CONDITION

Roadway Area:

Description	Width	Quantity	Total Width
Travel Lane	23.0 ft	2	46.0 ft
Inside Shoulder			0.0 ft
Outside Shoulder			0.0 ft
Sidewalk			0.0 ft
Curb&Gutter E	2.3 ft	2	4.5 ft
Curb&Gutter F	2.0 ft	2	4.0 ft
Trail	10.0 ft	2	20.0 ft
Barrier Wall			0.0 ft
		Total Impervious Width	74.5 ft

Impervious Roadway Area:	8.64 ac
Pervious Roadway Area:	4.35 ac
Total Roadway Area:	12.98 ac

Pond Area:

Pervious Pond Area :	1.28 ac	Dry Pond
Water Surface Area:	0.00 ac	
Total Pond Area:	1.28 ac	

Total Area:

Impervious Area:	**8.64 ac**
Pervious Area:	**5.62 ac**
Water Surface Area:	**0.00 ac**
Total Area:	**14.26 ac**

Curve Number:

Land Use Description	Soil Group	CN	Area	CN*Area
Impervious areas; Streets & roads	A	98	8.64 ac	846.4
Proposed Roadway Pervious	A	39	4.35 ac	169.6
Proposed Ponds (Water Surface)	A	100	0.00 ac	0.0
Proposed Pond Pervious	A	39	1.28 ac	49.7
		Total:	14.26 ac	1065.7

CN = Total CN*Area / Total Area = **74.7**

Runoff:

Soil Capacity (S) = $\frac{1000}{CN} - 10$ = 3.38 in

Runoff (Q) = $\frac{(P - 0.2S)^2}{(P + 0.8S)}$

	SWFWMD (25yr/24 hr)	FDOT Critical Duration (100yr/72hr)	Storm Sewer Design (10yr/24hr)
Precipitation (P) =	7.00 in	14.00 in	6.50 in
Runoff (Q) =	**4.12 in**	**10.63 in**	**3.68 in**

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3000 Dovera Drive, Suite 200, Oviedo, FL 32765
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(407) 971-8955 (fax)

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DATE: August 7, 2023
Job Number: DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **10**
POND NAME : **10**

POND SIZING

Required Treatment Volume (TV)

Selection criteria

Permitting Agency	**SWFWMD**
StormW.Mgmt.	**Dry Retention**
Online/Offline	**Online**
OFW	**No**
Open/Closed Basin	**Open**

Dry Retention **0.50 in** x DCIA = 0.36 ac-ft

Treatment V_{req} = Largest of Trt. Vol. = **0.36 ac-ft**

Required Attenuation Volume:

Total Runoff (ac-ft)

	SWFWMD (25yr/24 hr)	FDOT Critical Duration (100yr/72hr)	Storm Sewer Design (10yr/24hr)
Q_{pre} =	3.28 ac-ft	10.17 ac-ft	2.85 ac-ft
Q_{post} =	4.90 ac-ft	12.63 ac-ft	4.38 ac-ft
ΔQ =	**1.62 ac-ft**	**2.46 ac-ft**	**1.53 ac-ft**

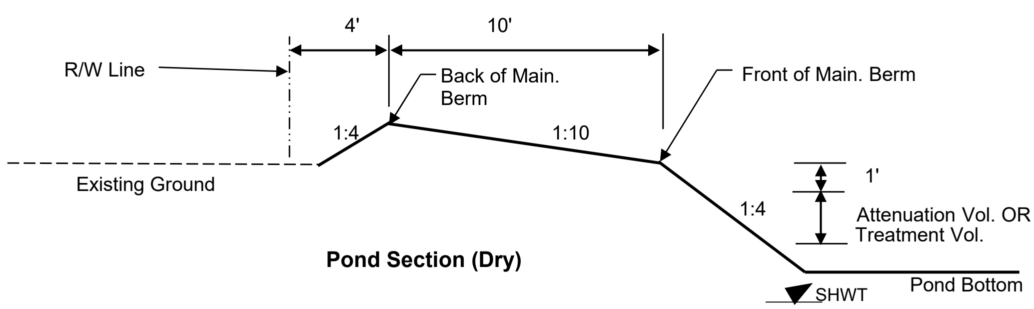
Attenuation V_{req} = 2.46 ac-ft (use largest value)

Maintenance Area Width =	10.0 ft	@ 1:10
Pond Tie-In Width =	4.0 ft	@ 1:4
Maximum Storage Depth (**SD**) =	6.20 ft	with 1.0 ft freeboard

Existing Ground Elevation =	133.00
Normal Water Elevation =	126.80
Lowest EOP Elevation =	131.50

Hydraulic Grade Line (HGL) check

HGL Slope =	0.100%	Use 0.05% for very flat terrain to 0.1% for flat terrain
Distance from Pond to Lowest EOP =	50 ft	
Estimated Energy Losses =	0.1 ft	
HGL Clearance =	1.0 ft	Use 1.0 foot as a standard HGL clearance (no junction losses)
Allowable Storm Sewer Tailwater EL =	130.45 ft	



Pond Section (Dry)

Inwood consulting engineers
3000 Dovera Drive, Suite 200, Oviedo, FL 32765
(407) 971-8850 (phone)
(407) 971-8955 (fax)

Made by: DLD
Checked by: REC

DATE: August 7, 2023
Job Number: DT1-022-01

PROJECT : **SR 544 PD&E**

FPID NO : **440273-1-22-01**
BASIN NAME : **10**
POND NAME : **10**

Pond Stage / Storage Calculations

ELEVATION	DESCRIPTION	AREA	DIMENSIONS		STORAGE
			LENGTH	WIDTH	
133.00	Pond R/W	1.36 ac	290.0 ft	205.0 ft	
134.00	Back of Main. Berm	1.28 ac	282.0 ft	197.0 ft	5.63 ac-ft
133.50		1.28 ac	282.0 ft	197.0 ft	4.99 ac-ft
133.00	Front of Main. Berm	1.06 ac	262.0 ft	177.0 ft	4.41 ac-ft
132.00	Provided Treat.Vol. OR Att.Vol	0.99 ac	254.0 ft	169.0 ft	3.37 ac-ft
131.05	Req'd Treat.Vol OR Att. Vol	0.91 ac	246.4 ft	161.4 ft	2.46 ac-ft
130.00	Estimated Storm Sewer TW	0.84 ac	238.0 ft	153.0 ft	1.53 ac-ft
128.50	Top of Treatment Vol.	0.73 ac	226.0 ft	141.0 ft	0.36 ac-ft
128.00	Pond Bottom	0.70 ac	222.0 ft	137.0 ft	0.00 ac-ft

Required Treatment OR Attenuation Vol.= 2.46 ac-ft
Required Treatment OR Attenuation Stage= 131.05 ft

Provided Treatment OR Attenuation Vol.= 3.37 ac-ft
Provided Treatment OR Attenuation Stage= 132.00 ft

Estimated Treat. Vol. OR Storm Sewer Att.= 1.53 ac-ft
Estimated Storm Sewer TW EL.= 130.00 ft

HGL requirements met

Required Treatment Vol. = 0.36 ac-ft

PROPOSED POND R/W (Safety Factor of 20%) =	1.64 ac

Note: Parcel area occupied by site is 2.28 acres.

APPENDIX D

Nutrient Loading Analysis (BMPTRAINS)

Complete Report (not including cost) Ver 4.3.5

Project: SR 544
Date: 9/20/2023 2:24:46 PM

Site and Catchment Information

Analysis: Net Improvement

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

Pre-Condition Landuse Information

Landuse	User Defined Values
Area (acres)	2.34
Rational Coefficient (0-1)	0.54
Non DCIA Curve Number	41.25
DCIA Percent (0-100)	65.81
Nitrogen EMC (mg/l)	1.190
Phosphorus EMC (mg/l)	0.155
Runoff Volume (ac-ft/yr)	5.217
Groundwater N (kg/yr)	0.000
Groundwater P (kg/yr)	0.000
Nitrogen Loading (kg/yr)	7.655
Phosphorus Loading (kg/yr)	0.997

Post-Condition Landuse Information

Landuse	User Defined Values
Area (acres)	2.34
Rational Coefficient (0-1)	0.59
Non DCIA Curve Number	39.00
DCIA Percent (0-100)	72.65
Wet Pond Area (ac)	0.00
Nitrogen EMC (mg/l)	1.190

Phosphorus EMC (mg/l)	0.155
Runoff Volume (ac-ft/yr)	5.753
Groundwater N (kg/yr)	0.000
Groundwater P (kg/yr)	0.000
Nitrogen Loading (kg/yr)	8.440
Phosphorus Loading (kg/yr)	1.099

Catchment Number: 1 Name: Basin 1A

Project: SR 544
Date: 9/20/2023

Retention Design

Retention Depth (in)	1.025
Retention Volume (ac-ft)	0.200

Watershed Characteristics

Catchment Area (acres)	2.34
Contributing Area (acres)	2.340
Non-DCIA Curve Number	39.00
DCIA Percent	72.65
Rainfall Zone	Florida Zone 2
Rainfall (in)	50.00

Surface Water Discharge

Required TN Treatment Efficiency (%)	9
Provided TN Treatment Efficiency (%)	79
Required TP Treatment Efficiency (%)	9
Provided TP Treatment Efficiency (%)	79

Media Mix Information

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

Groundwater Discharge (Stand-Alone)

Treatment Rate (MG/yr)	0.000
TN Mass Load (kg/yr)	6.700
TN Concentration (mg/L)	0.000
TP Mass Load (kg/yr)	0.873
TP Concentration (mg/L)	0.000

Load Diagram for Retention (stand-alone)

Load
N: 8.44 kg/yr
P: 1.10 kg/yr

→

Treatment
N: 79 %
P: 79 %

→

Surface Discharge
N: 1.74 kg/yr
P: 0.23 kg/yr

↓

Mass Reduction
N: 6.70 kg/yr
P: 0.87 kg/yr

Load Diagram for Retention (As Used In Routing)

Upstream Nodes
None

Load
N: 8.44 kg/yr
P: 1.10 kg/yr
Q: 5.75 ac-ft

→

Treatment
N: 79.4 %
P: 79.4 %

→

Mass Discharged
N: 1.74 kg/yr
P: 0.23 kg/yr
Q: 1.19 ac-ft

↓

Mass Removed
N: 6.70 kg/yr
P: 0.87 kg/yr

Summary Treatment Report Version: 4.3.5

Project: SR 544

Analysis Type: Net Improvement

Date:9/20/2023

BMP Types:

Catchment 1 - (Basin 1A) Retention

Based on % removal values to the nearest percent

Routing Summary

Catchment 1 Routed to Outlet

Total nitrogen target removal met? **Yes**

Total phosphorus target removal met? **Yes**

Summary Report

Nitrogen

Surface Water Discharge

Total N pre load	7.66 kg/yr	
Total N post load	8.44 kg/yr	
Target N load reduction	9 %	
Target N discharge load	7.66 kg/yr	
Percent N load reduction	79 %	
Provided N discharge load	1.74 kg/yr	3.84 lb/yr
Provided N load removed	6.7 kg/yr	14.77 lb/yr

Phosphorus

Surface Water Discharge

Total P pre load	.997 kg/yr	
Total P post load	1.099 kg/yr	
Target P load reduction	9 %	
Target P discharge load	.997 kg/yr	
Percent P load reduction	79 %	
Provided P discharge load	.227 kg/yr	.5 lb/yr
Provided P load removed	.873 kg/yr	1.924 lb/yr

Complete Report (not including cost) Ver 4.3.5

Project: SR 544
Date: 9/20/2023 1:54:02 PM

Site and Catchment Information

Analysis: Net Improvement

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

Pre-Condition Landuse Information

Landuse	User Defined Values	Agricultural - Pasture: TN=3.510TP=0.686
Area (acres)	15.76	20.74
Rational Coefficient (0-1)	0.30	0.01
Non DCIA Curve Number	64.78	49.00
DCIA Percent (0-100)	33.48	0.00
Nitrogen EMC (mg/l)	1.190	3.510
Phosphorus EMC (mg/l)	0.155	0.686
Runoff Volume (ac-ft/yr)	19.621	1.210
Groundwater N (kg/yr)	0.000	0.000
Groundwater P (kg/yr)	0.000	0.000
Nitrogen Loading (kg/yr)	28.789	5.236
Phosphorus Loading (kg/yr)	3.750	1.023

Post-Condition Landuse Information

Landuse	User Defined Values	Agricultural - Pasture: TN=3.510TP=0.686
Area (acres)	15.76	20.74
Rational Coefficient (0-1)	0.52	0.01
Non DCIA Curve Number	67.92	49.00

DCIA Percent (0-100)	62.15	0.00
Wet Pond Area (ac)	0.00	0.00
Nitrogen EMC (mg/l)	1.190	3.510
Phosphorus EMC (mg/l)	0.155	0.686
Runoff Volume (ac-ft/yr)	34.301	1.210
Groundwater N (kg/yr)	0.000	0.000
Groundwater P (kg/yr)	0.000	0.000
Nitrogen Loading (kg/yr)	50.329	5.236
Phosphorus Loading (kg/yr)	6.556	1.023

Catchment Number: 1 Name: Basin 1

Project: SR 544
Date: 9/20/2023

Retention Design

Retention Depth (in)	2.505
Retention Volume (ac-ft)	3.290

Watershed Characteristics

Catchment Area (acres)	15.76
Contributing Area (acres)	15.760
Non-DCIA Curve Number	67.92
DCIA Percent	62.15
Rainfall Zone	Florida Zone 2
Rainfall (in)	50.00

Surface Water Discharge

Required TN Treatment Efficiency (%)	43
Provided TN Treatment Efficiency (%)	96
Required TP Treatment Efficiency (%)	43
Provided TP Treatment Efficiency (%)	96

Media Mix Information

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

Groundwater Discharge (Stand-Alone)

Treatment Rate (MG/yr)	0.000
TN Mass Load (kg/yr)	48.393
TN Concentration (mg/L)	0.000
TP Mass Load (kg/yr)	6.303
TP Concentration (mg/L)	0.000

Load Diagram for Retention (stand-alone)

Load		Treatment		Surface Discharge
N: 50.33 kg/yr	→	N: 96 %	→	N: 1.94 kg/yr
P: 6.56 kg/yr		P: 96 %		P: 0.25 kg/yr

↓

Mass Reduction
N: 48.39 kg/yr
P: 6.30 kg/yr

Load Diagram for Retention (As Used In Routing)

Upstream Nodes	Load		Treatment		Mass Discharged
Node: 2	N: 55.57 kg/yr	→	N: 98.4 %	→	N: 0.90 kg/yr
	P: 7.58 kg/yr		P: 98.4 %		P: 0.12 kg/yr
	Q: 35.51 ac-ft				Q: 1.37 ac-ft

↓

Mass Removed
N: 54.66 kg/yr
P: 7.46 kg/yr

Catchment Number: 2 Name: Offsite Area

Project: SR 544
Date: 9/20/2023

None Design

Watershed Characteristics

Catchment Area (acres)	20.74
Contributing Area (acres)	20.740
Non-DCIA Curve Number	49.00
DCIA Percent	0.00
Rainfall Zone	Florida Zone 2
Rainfall (in)	50.00

Surface Water Discharge

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

Media Mix Information

Type of Media Mix	Not Specified
Media N Reduction (%)	0.000
Media P Reduction (%)	0.000

Groundwater Discharge (Stand-Alone)

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

Load Diagram for None (stand-alone)

Load
N: 5.24 kg/yr
P: 1.02 kg/yr

→

Treatment
N: %
P: %

→

Surface Discharge
N: 5.24 kg/yr
P: 1.02 kg/yr

↓

Mass Reduction
N: 0.00 kg/yr
P: 0.00 kg/yr

Load Diagram for None (As Used In Routing)

Upstream Nodes
None

Load
N: 5.24 kg/yr
P: 1.02 kg/yr
Q: 1.21 ac-ft

→

Treatment
N: 0.0 %
P: 0.0 %

→

Mass Discharged
N: 5.24 kg/yr
P: 1.02 kg/yr
Q: 1.21 ac-ft

↓

Mass Removed
N: 0.00 kg/yr
P: 0.00 kg/yr

Summary Treatment Report Version: 4.3.5

Project: SR 544

Analysis Type: Net Improvement

Date:9/20/2023

BMP Types:

Catchment 1 - (Basin 1) Retention

Catchment 2 - (Offsite Area) None

Based on % removal values to the nearest percent

Routing Summary

Catchment 1 Routed to Outlet

Catchment 2 Routed to Catchment 1

Total nitrogen target removal met? **Yes**

Total phosphorus target removal met? **Yes**

Summary Report

Nitrogen

Surface Water Discharge

Total N pre load	34.02 kg/yr	
Total N post load	55.57 kg/yr	
Target N load reduction	39 %	
Target N discharge load	34.02 kg/yr	
Percent N load reduction	98 %	
Provided N discharge load	.9 kg/yr	1.99 lb/yr
Provided N load removed	54.66 kg/yr	120.53 lb/yr

Phosphorus

Surface Water Discharge

Total P pre load	4.773 kg/yr	
Total P post load	7.579 kg/yr	
Target P load reduction	37 %	
Target P discharge load	4.773 kg/yr	
Percent P load reduction	98 %	
Provided P discharge load	.123 kg/yr	.27 lb/yr
Provided P load removed	7.456 kg/yr	16.44 lb/yr

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Site and Catchment Information

Analysis: Net Improvement

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

Pre-Condition Landuse Information

Landuse	User Defined Values	Single-Family: TN=2.070 TP=0.327
Area (acres)	11.33	9.73
Rational Coefficient (0-1)	0.20	0.01
Non DCIA Curve Number	59.79	46.00
DCIA Percent (0-100)	21.71	0.00
Nitrogen EMC (mg/l)	1.190	2.070
Phosphorus EMC (mg/l)	0.155	0.327
Runoff Volume (ac-ft/yr)	9.397	0.446
Groundwater N (kg/yr)	0.000	0.000
Groundwater P (kg/yr)	0.000	0.000
Nitrogen Loading (kg/yr)	13.788	1.138
Phosphorus Loading (kg/yr)	1.796	0.180

Post-Condition Landuse Information

Landuse	User Defined Values	Single-Family: TN=2.070 TP=0.327
Area (acres)	11.33	9.73
Rational Coefficient (0-1)	0.42	0.01
Non DCIA Curve Number	70.58	46.00

DCIA Percent (0-100)	47.56	0.00
Wet Pond Area (ac)	1.91	0.00
Nitrogen EMC (mg/l)	1.190	2.070
Phosphorus EMC (mg/l)	0.155	0.327
Runoff Volume (ac-ft/yr)	16.339	0.446
Groundwater N (kg/yr)	0.000	0.000
Groundwater P (kg/yr)	0.000	0.000
Nitrogen Loading (kg/yr)	23.974	1.138
Phosphorus Loading (kg/yr)	3.123	0.180

Catchment Number: 1 Name: Basin 2

Project: SR 544
Date: 9/20/2023

Wet Detention Design

Permanent Pool Volume (ac-ft)	11.500
Permanent Pool Volume (ac-ft) for 31 days residence	1.388
Annual Residence Time (days)	257
Littoral Zone Efficiency Credit	
Wetland Efficiency Credit	

Watershed Characteristics

Catchment Area (acres)	11.33
Contributing Area (acres)	9.420
Non-DCIA Curve Number	70.58
DCIA Percent	47.56
Rainfall Zone	Florida Zone 2
Rainfall (in)	50.00

Surface Water Discharge

Required TN Treatment Efficiency (%)	42
Provided TN Treatment Efficiency (%)	43
Required TP Treatment Efficiency (%)	42
Provided TP Treatment Efficiency (%)	82

Media Mix Information

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

Groundwater Discharge (Stand-Alone)

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

Load Diagram for Wet Detention (stand-alone)

Load		Treatment		Surface Discharge
N: 23.97 kg/yr	→	N: 43 %	→	N: 13.66 kg/yr
P: 3.12 kg/yr		P: 82 %		P: 0.56 kg/yr

↓

Mass Reduction
N: 10.31 kg/yr
P: 2.56 kg/yr

Load Diagram for Wet Detention (As Used In Routing)

	Load				Mass Discharged
Upstream Nodes	N: 25.11 kg/yr	→	Treatment	→	N: 14.31 kg/yr
Node: 2	P: 3.30 kg/yr		N: 43.0 %		P: 0.59 kg/yr
	Q: 16.78 ac-ft		P: 82.0 %		Q: 16.78 ac-ft

↓

Mass Removed
N: 10.80 kg/yr
P: 2.71 kg/yr

Catchment Number: 2 Name: Offsite Area

Project: SR 544
Date: 9/20/2023

None Design

Watershed Characteristics

Catchment Area (acres)	9.73
Contributing Area (acres)	9.730
Non-DCIA Curve Number	46.00
DCIA Percent	0.00
Rainfall Zone	Florida Zone 2
Rainfall (in)	50.00

Surface Water Discharge

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

Media Mix Information

Type of Media Mix	Not Specified
Media N Reduction (%)	0.000
Media P Reduction (%)	0.000

Groundwater Discharge (Stand-Alone)

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

Load Diagram for None (stand-alone)

Load		Treatment		Surface Discharge
N: 1.14 kg/yr	→	N: %	→	N: 1.14 kg/yr
P: 0.18 kg/yr		P: %		P: 0.18 kg/yr

↓

Mass Reduction
N: 0.00 kg/yr
P: 0.00 kg/yr

Load Diagram for None (As Used In Routing)

Upstream Nodes	Load		Treatment		Mass Discharged
None	N: 1.14 kg/yr	→	N: 0.0 %	→	N: 1.14 kg/yr
	P: 0.18 kg/yr		P: 0.0 %		P: 0.18 kg/yr
	Q: 0.45 ac-ft				Q: 0.45 ac-ft

↓

Mass Removed
N: 0.00 kg/yr
P: 0.00 kg/yr

Summary Treatment Report Version: 4.3.5

Project: SR 544

Date:9/20/2023

Analysis Type: Net Improvement

BMP Types:

Catchment 1 - (Basin 2) Wet Detention

Catchment 2 - (Offsite Area) None

Routing Summary

Catchment 1 Routed to Outlet

Catchment 2 Routed to Catchment 1

Based on % removal values to
the nearest percent

Total nitrogen target removal met? **Yes**
Total phosphorus target removal met? **Yes**

Summary Report

Nitrogen

Surface Water Discharge

Total N pre load	14.93 kg/yr	
Total N post load	25.11 kg/yr	
Target N load reduction	41 %	
Target N discharge load	14.93 kg/yr	
Percent N load reduction	43 %	
Provided N discharge load	14.31 kg/yr	31.55 lb/yr
Provided N load removed	10.8 kg/yr	23.82 lb/yr

Phosphorus

Surface Water Discharge

Total P pre load	1.976 kg/yr	
Total P post load	3.302 kg/yr	
Target P load reduction	40 %	
Target P discharge load	1.976 kg/yr	
Percent P load reduction	82 %	
Provided P discharge load	.593 kg/yr	1.31 lb/yr
Provided P load removed	2.709 kg/yr	5.974 lb/yr

Complete Report (not including cost) Ver 4.3.5

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Site and Catchment Information

Analysis: Net Improvement

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

Pre-Condition Landuse Information

Landuse	User Defined Values
Area (acres)	16.14
Rational Coefficient (0-1)	0.24
Non DCIA Curve Number	72.11
DCIA Percent (0-100)	23.46
Nitrogen EMC (mg/l)	1.190
Phosphorus EMC (mg/l)	0.155
Runoff Volume (ac-ft/yr)	16.192
Groundwater N (kg/yr)	0.000
Groundwater P (kg/yr)	0.000
Nitrogen Loading (kg/yr)	23.759
Phosphorus Loading (kg/yr)	3.095

Post-Condition Landuse Information

Landuse	User Defined Values
Area (acres)	16.14
Rational Coefficient (0-1)	0.66
Non DCIA Curve Number	71.87
DCIA Percent (0-100)	79.83
Wet Pond Area (ac)	1.07
Nitrogen EMC (mg/l)	1.190

Phosphorus EMC (mg/l)	0.155
Runoff Volume (ac-ft/yr)	41.394
Groundwater N (kg/yr)	0.000
Groundwater P (kg/yr)	0.000
Nitrogen Loading (kg/yr)	60.736
Phosphorus Loading (kg/yr)	7.911

Catchment Number: 1 Name: Basin 3

Project: SR 544
Date: 10/11/2023

Wet Detention Design

Permanent Pool Volume (ac-ft)	5.210
Permanent Pool Volume (ac-ft) for 31 days residence	3.516
Annual Residence Time (days)	46
Littoral Zone Efficiency Credit	
Wetland Efficiency Credit	

Watershed Characteristics

Catchment Area (acres)	16.14
Contributing Area (acres)	15.070
Non-DCIA Curve Number	71.87
DCIA Percent	79.83
Rainfall Zone	Florida Zone 2
Rainfall (in)	50.00

Surface Water Discharge

Required TN Treatment Efficiency (%)	61
Provided TN Treatment Efficiency (%)	40
Required TP Treatment Efficiency (%)	61
Provided TP Treatment Efficiency (%)	68

Media Mix Information

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

Groundwater Discharge (Stand-Alone)

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

Load Diagram for Wet Detention (stand-alone)

Load		Treatment		Surface Discharge
N: 60.74 kg/yr	→	N: 40 %	→	N: 36.48 kg/yr
P: 7.91 kg/yr		P: 68 %		P: 2.56 kg/yr
		↓		Mass Reduction N: 24.26 kg/yr P: 5.35 kg/yr

Load Diagram for Wet Detention (As Used In Routing)

Upstream Nodes	Load		Treatment		Mass Discharged
None	N: 60.74 kg/yr P: 7.91 kg/yr Q: 41.39 ac-ft	→	N: 39.9 % P: 67.6 %	→	N: 36.48 kg/yr P: 2.56 kg/yr Q: 41.39 ac-ft
			↓		
			Mass Removed N: 24.26 kg/yr P: 5.35 kg/yr		

Summary Treatment Report Version: 4.3.5

Project: SR 544

Analysis Type: Net Improvement

Date:10/11/2023

BMP Types:

Catchment 1 - (Basin 3) Wet Detention

Based on % removal values to the nearest percent

Routing Summary

Catchment 1 Routed to Outlet

Total nitrogen target removal met? **No**

Total phosphorus target removal met? **Yes**

Summary Report

Nitrogen

Surface Water Discharge

Total N pre load	23.76 kg/yr	
Total N post load	60.74 kg/yr	
Target N load reduction	61 %	
Target N discharge load	23.76 kg/yr	
Percent N load reduction	40 %	
Provided N discharge load	36.48 kg/yr	80.43 lb/yr
Provided N load removed	24.26 kg/yr	53.49 lb/yr

Phosphorus

Surface Water Discharge

Total P pre load	3.095 kg/yr	
Total P post load	7.911 kg/yr	
Target P load reduction	61 %	
Target P discharge load	3.095 kg/yr	
Percent P load reduction	68 %	
Provided P discharge load	2.56 kg/yr	5.65 lb/yr
Provided P load removed	5.351 kg/yr	11.799 lb/yr

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Project: SR 544
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Site and Catchment Information

Analysis: Net Improvement

Catchment Name	Basin 4
Rainfall Zone	Florida Zone 2
Annual Mean Rainfall	50.00

Pre-Condition Landuse Information

Landuse	User Defined Values
Area (acres)	20.75
Rational Coefficient (0-1)	0.27
Non DCIA Curve Number	77.90
DCIA Percent (0-100)	23.88
Nitrogen EMC (mg/l)	1.190
Phosphorus EMC (mg/l)	0.155
Runoff Volume (ac-ft/yr)	23.123
Groundwater N (kg/yr)	0.000
Groundwater P (kg/yr)	0.000
Nitrogen Loading (kg/yr)	33.927
Phosphorus Loading (kg/yr)	4.419

Post-Condition Landuse Information

Landuse	User Defined Values
Area (acres)	20.75
Rational Coefficient (0-1)	0.47
Non DCIA Curve Number	77.82
DCIA Percent (0-100)	52.33
Wet Pond Area (ac)	1.11
Nitrogen EMC (mg/l)	1.190

Phosphorus EMC (mg/l)	0.155
Runoff Volume (ac-ft/yr)	38.440
Groundwater N (kg/yr)	0.000
Groundwater P (kg/yr)	0.000
Nitrogen Loading (kg/yr)	56.402
Phosphorus Loading (kg/yr)	7.347

Catchment Number: 1 Name: Basin 4

Project: SR 544
Date: 9/22/2023

Wet Detention Design

Permanent Pool Volume (ac-ft)	6.410
Permanent Pool Volume (ac-ft) for 31 days residence	3.265
Annual Residence Time (days)	61
Littoral Zone Efficiency Credit	
Wetland Efficiency Credit	

Watershed Characteristics

Catchment Area (acres)	20.75
Contributing Area (acres)	19.640
Non-DCIA Curve Number	77.82
DCIA Percent	52.33
Rainfall Zone	Florida Zone 2
Rainfall (in)	50.00

Surface Water Discharge

Required TN Treatment Efficiency (%)	40
Provided TN Treatment Efficiency (%)	41
Required TP Treatment Efficiency (%)	40
Provided TP Treatment Efficiency (%)	70

Media Mix Information

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

Groundwater Discharge (Stand-Alone)

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

Load Diagram for Wet Detention (stand-alone)

Load
N: 56.40 kg/yr
P: 7.35 kg/yr

→

Treatment
N: 41 %
P: 70 %

→

Surface Discharge
N: 33.38 kg/yr
P: 2.21 kg/yr

↓

Mass Reduction
N: 23.02 kg/yr
P: 5.14 kg/yr

Load Diagram for Wet Detention (As Used In Routing)

Upstream Nodes
None

Load
N: 56.40 kg/yr
P: 7.35 kg/yr
Q: 38.44 ac-ft

→

Treatment
N: 40.8 %
P: 69.9 %

→

Mass Discharged
N: 33.38 kg/yr
P: 2.21 kg/yr
Q: 38.44 ac-ft

↓

Mass Removed
N: 23.02 kg/yr
P: 5.14 kg/yr

Summary Treatment Report Version: 4.3.5

Project: SR 544

Analysis Type: Net Improvement

Date:9/22/2023

BMP Types:

Catchment 1 - (Basin 4) Wet Detention

Based on % removal values to the nearest percent

Routing Summary

Catchment 1 Routed to Outlet

Total nitrogen target removal met? **Yes**

Total phosphorus target removal met? **Yes**

Summary Report

Nitrogen

Surface Water Discharge

Total N pre load	33.93 kg/yr	
Total N post load	56.4 kg/yr	
Target N load reduction	40 %	
Target N discharge load	33.93 kg/yr	
Percent N load reduction	41 %	
Provided N discharge load	33.38 kg/yr	73.61 lb/yr
Provided N load removed	23.02 kg/yr	50.76 lb/yr

Phosphorus

Surface Water Discharge

Total P pre load	4.419 kg/yr	
Total P post load	7.347 kg/yr	
Target P load reduction	40 %	
Target P discharge load	4.419 kg/yr	
Percent P load reduction	70 %	
Provided P discharge load	2.211 kg/yr	4.87 lb/yr
Provided P load removed	5.136 kg/yr	11.324 lb/yr

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Project: SR 544
Date: 9/22/2023 8:14:46 AM

Site and Catchment Information

Analysis: Net Improvement

Catchment Name	Basin 5
Rainfall Zone	Florida Zone 2
Annual Mean Rainfall	50.00

Pre-Condition Landuse Information

Landuse	User Defined Values
Area (acres)	20.69
Rational Coefficient (0-1)	0.26
Non DCIA Curve Number	71.85
DCIA Percent (0-100)	26.59
Nitrogen EMC (mg/l)	1.190
Phosphorus EMC (mg/l)	0.155
Runoff Volume (ac-ft/yr)	22.685
Groundwater N (kg/yr)	0.000
Groundwater P (kg/yr)	0.000
Nitrogen Loading (kg/yr)	33.285
Phosphorus Loading (kg/yr)	4.335

Post-Condition Landuse Information

Landuse	User Defined Values
Area (acres)	20.69
Rational Coefficient (0-1)	0.50
Non DCIA Curve Number	70.85
DCIA Percent (0-100)	58.24
Wet Pond Area (ac)	0.54
Nitrogen EMC (mg/l)	1.190

Phosphorus EMC (mg/l)	0.155
Runoff Volume (ac-ft/yr)	41.736
Groundwater N (kg/yr)	0.000
Groundwater P (kg/yr)	0.000
Nitrogen Loading (kg/yr)	61.238
Phosphorus Loading (kg/yr)	7.976

Catchment Number: 1 Name: Basin 5

Project: SR 544
Date: 9/22/2023

Wet Detention Design

Permanent Pool Volume (ac-ft)	2.060
Permanent Pool Volume (ac-ft) for 31 days residence	3.545
Annual Residence Time (days)	18
Littoral Zone Efficiency Credit	
Wetland Efficiency Credit	

Watershed Characteristics

Catchment Area (acres)	20.69
Contributing Area (acres)	20.150
Non-DCIA Curve Number	70.85
DCIA Percent	58.24
Rainfall Zone	Florida Zone 2
Rainfall (in)	50.00

Surface Water Discharge

Required TN Treatment Efficiency (%)	46
Provided TN Treatment Efficiency (%)	35
Required TP Treatment Efficiency (%)	46
Provided TP Treatment Efficiency (%)	60

Media Mix Information

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

Groundwater Discharge (Stand-Alone)

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

Load Diagram for Wet Detention (stand-alone)

Load
N: 61.24 kg/yr
P: 7.98 kg/yr

→

Treatment
N: 35 %
P: 60 %

→

Surface Discharge
N: 39.69 kg/yr
P: 3.16 kg/yr

↓

Mass Reduction
N: 21.55 kg/yr
P: 4.81 kg/yr

Load Diagram for Wet Detention (As Used In Routing)

Upstream Nodes
None

Load
N: 61.24 kg/yr
P: 7.98 kg/yr
Q: 41.74 ac-ft

→

Treatment
N: 35.2 %
P: 60.3 %

→

Mass Discharged
N: 39.69 kg/yr
P: 3.16 kg/yr
Q: 41.74 ac-ft

↓

Mass Removed
N: 21.55 kg/yr
P: 4.81 kg/yr

Summary Treatment Report Version: 4.3.5

Project: SR 544

Analysis Type: Net Improvement

Date:9/22/2023

BMP Types:

Catchment 1 - (Basin 5) Wet Detention

Based on % removal values to the nearest percent

Routing Summary

Catchment 1 Routed to Outlet

Total nitrogen target removal met? **No**

Total phosphorus target removal met? **Yes**

Summary Report

Nitrogen

Surface Water Discharge

Total N pre load	33.28 kg/yr	
Total N post load	61.24 kg/yr	
Target N load reduction	46 %	
Target N discharge load	33.28 kg/yr	
Percent N load reduction	35 %	
Provided N discharge load	39.69 kg/yr	87.51 lb/yr
Provided N load removed	21.55 kg/yr	47.52 lb/yr

Phosphorus

Surface Water Discharge

Total P pre load	4.335 kg/yr	
Total P post load	7.976 kg/yr	
Target P load reduction	46 %	
Target P discharge load	4.335 kg/yr	
Percent P load reduction	60 %	
Provided P discharge load	3.164 kg/yr	6.98 lb/yr
Provided P load removed	4.812 kg/yr	10.611 lb/yr

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Project: SR 544
Date: 9/22/2023 8:17:09 AM

Site and Catchment Information

Analysis: Net Improvement

Catchment Name	Basin 6
Rainfall Zone	Florida Zone 2
Annual Mean Rainfall	50.00

Pre-Condition Landuse Information

Landuse	User Defined Values
Area (acres)	7.60
Rational Coefficient (0-1)	0.23
Non DCIA Curve Number	61.12
DCIA Percent (0-100)	25.78
Nitrogen EMC (mg/l)	1.190
Phosphorus EMC (mg/l)	0.155
Runoff Volume (ac-ft/yr)	7.380
Groundwater N (kg/yr)	0.000
Groundwater P (kg/yr)	0.000
Nitrogen Loading (kg/yr)	10.829
Phosphorus Loading (kg/yr)	1.411

Post-Condition Landuse Information

Landuse	User Defined Values
Area (acres)	7.60
Rational Coefficient (0-1)	0.47
Non DCIA Curve Number	59.27
DCIA Percent (0-100)	56.50
Wet Pond Area (ac)	0.72
Nitrogen EMC (mg/l)	1.190

Phosphorus EMC (mg/l)	0.155
Runoff Volume (ac-ft/yr)	13.477
Groundwater N (kg/yr)	0.000
Groundwater P (kg/yr)	0.000
Nitrogen Loading (kg/yr)	19.774
Phosphorus Loading (kg/yr)	2.576

Catchment Number: 1 Name: Basin 6

Project: SR 544
Date: 9/22/2023

Wet Detention Design

Permanent Pool Volume (ac-ft)	4.000
Permanent Pool Volume (ac-ft) for 31 days residence	1.145
Annual Residence Time (days)	108
Littoral Zone Efficiency Credit	
Wetland Efficiency Credit	

Watershed Characteristics

Catchment Area (acres)	7.60
Contributing Area (acres)	6.880
Non-DCIA Curve Number	59.27
DCIA Percent	56.50
Rainfall Zone	Florida Zone 2
Rainfall (in)	50.00

Surface Water Discharge

Required TN Treatment Efficiency (%)	45
Provided TN Treatment Efficiency (%)	42
Required TP Treatment Efficiency (%)	45
Provided TP Treatment Efficiency (%)	75

Media Mix Information

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

Groundwater Discharge (Stand-Alone)

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

Load Diagram for Wet Detention (stand-alone)

Load
N: 19.77 kg/yr →
P: 2.58 kg/yr

Treatment
N: 42 % →
P: 75 %

↓

Surface Discharge
N: 11.46 kg/yr
P: 0.65 kg/yr

Mass Reduction
N: 8.31 kg/yr
P: 1.92 kg/yr

Load Diagram for Wet Detention (As Used In Routing)

Upstream Nodes
None

Load
N: 19.77 kg/yr →
P: 2.58 kg/yr
Q: 13.48 ac-ft

Treatment
N: 42.0 % →
P: 74.7 %

Mass Discharged
N: 11.46 kg/yr
P: 0.65 kg/yr
Q: 13.48 ac-ft

↓

Mass Removed
N: 8.31 kg/yr
P: 1.92 kg/yr

Summary Treatment Report Version: 4.3.5

Project: SR 544

Date:9/22/2023

Analysis Type: Net Improvement

BMP Types:

Catchment 1 - (Basin 6) Wet Detention

Based on % removal values to the nearest percent

Routing Summary

Catchment 1 Routed to Outlet

Total nitrogen target removal met? **No**

Total phosphorus target removal met? **Yes**

Summary Report

Nitrogen

Surface Water Discharge

Total N pre load	10.83 kg/yr	
Total N post load	19.77 kg/yr	
Target N load reduction	45 %	
Target N discharge load	10.83 kg/yr	
Percent N load reduction	42 %	
Provided N discharge load	11.46 kg/yr	25.27 lb/yr
Provided N load removed	8.31 kg/yr	18.33 lb/yr

Phosphorus

Surface Water Discharge

Total P pre load	1.411 kg/yr	
Total P post load	2.576 kg/yr	
Target P load reduction	45 %	
Target P discharge load	1.411 kg/yr	
Percent P load reduction	75 %	
Provided P discharge load	.653 kg/yr	1.44 lb/yr
Provided P load removed	1.923 kg/yr	4.24 lb/yr

Complete Report (not including cost) Ver 4.3.5

Project: SR 544
Date: 9/22/2023 8:24:43 AM

Site and Catchment Information

Analysis: Net Improvement

Catchment Name	Basin 7
Rainfall Zone	Florida Zone 2
Annual Mean Rainfall	50.00

Pre-Condition Landuse Information

Landuse	User Defined Values
Area (acres)	15.15
Rational Coefficient (0-1)	0.50
Non DCIA Curve Number	39.99
DCIA Percent (0-100)	61.07
Nitrogen EMC (mg/l)	1.190
Phosphorus EMC (mg/l)	0.155
Runoff Volume (ac-ft/yr)	31.345
Groundwater N (kg/yr)	0.000
Groundwater P (kg/yr)	0.000
Nitrogen Loading (kg/yr)	45.992
Phosphorus Loading (kg/yr)	5.991

Post-Condition Landuse Information

Landuse	User Defined Values
Area (acres)	15.15
Rational Coefficient (0-1)	0.47
Non DCIA Curve Number	39.00
DCIA Percent (0-100)	58.24
Wet Pond Area (ac)	0.00
Nitrogen EMC (mg/l)	1.190

Phosphorus EMC (mg/l)	0.155
Runoff Volume (ac-ft/yr)	29.904
Groundwater N (kg/yr)	0.000
Groundwater P (kg/yr)	0.000
Nitrogen Loading (kg/yr)	43.877
Phosphorus Loading (kg/yr)	5.715

Catchment Number: 1 Name: Basin 7

Project: SR 544
Date: 9/22/2023

Retention Design

Retention Depth (in)	0.309
Retention Volume (ac-ft)	0.390

Watershed Characteristics

Catchment Area (acres)	15.15
Contributing Area (acres)	15.150
Non-DCIA Curve Number	39.00
DCIA Percent	58.24
Rainfall Zone	Florida Zone 2
Rainfall (in)	50.00

Surface Water Discharge

Required TN Treatment Efficiency (%)	
Provided TN Treatment Efficiency (%)	46
Required TP Treatment Efficiency (%)	
Provided TP Treatment Efficiency (%)	46

Media Mix Information

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

Groundwater Discharge (Stand-Alone)

Treatment Rate (MG/yr)	0.000

TN Mass Load (kg/yr)	19.998
TN Concentration (mg/L)	0.000
TP Mass Load (kg/yr)	2.605
TP Concentration (mg/L)	0.000

Load Diagram for Retention (stand-alone)

Load		Treatment		Surface Discharge
N: 43.88 kg/yr	→	N: 46 %	→	N: 23.88 kg/yr
P: 5.72 kg/yr		P: 46 %		P: 3.11 kg/yr

↓

Mass Reduction
N: 20.00 kg/yr
P: 2.60 kg/yr

Load Diagram for Retention (As Used In Routing)

Upstream Nodes	Load		Treatment		Mass Discharged
None	N: 43.88 kg/yr	→	N: 45.6 %	→	N: 23.88 kg/yr
	P: 5.72 kg/yr		P: 45.6 %		P: 3.11 kg/yr
	Q: 29.90 ac-ft				Q: 16.27 ac-ft

↓

Mass Removed
N: 20.00 kg/yr
P: 2.60 kg/yr

Summary Treatment Report Version: 4.3.5

Project: SR 544

Analysis Type: Net Improvement

Date:9/22/2023

BMP Types:

Catchment 1 - (Basin 7) Retention

Routing Summary
Catchment 1 Routed to Outlet

Based on % removal values to the nearest percent

Total nitrogen target removal met? **Yes**
Total phosphorus target removal met? **Yes**

Summary Report

Nitrogen

Surface Water Discharge		
Total N pre load	45.99 kg/yr	
Total N post load	43.88 kg/yr	
Target N load reduction	%	
Target N discharge load	45.99 kg/yr	
Percent N load reduction	46 %	
Provided N discharge load	23.88 kg/yr	52.65 lb/yr
Provided N load removed	20 kg/yr	44.1 lb/yr

Phosphorus

Surface Water Discharge		
Total P pre load	5.991 kg/yr	
Total P post load	5.715 kg/yr	
Target P load reduction	%	
Target P discharge load	5.991 kg/yr	
Percent P load reduction	46 %	
Provided P discharge load	3.11 kg/yr	6.86 lb/yr
Provided P load removed	2.605 kg/yr	5.744 lb/yr

Complete Report (not including cost) Ver 4.3.5

Project: SR 544
Date: 9/22/2023 8:27:03 AM

Site and Catchment Information

Analysis: Net Improvement

Catchment Name	Basin 8
Rainfall Zone	Florida Zone 2
Annual Mean Rainfall	50.00

Pre-Condition Landuse Information

Landuse	User Defined Values
Area (acres)	21.54
Rational Coefficient (0-1)	0.35
Non DCIA Curve Number	61.82
DCIA Percent (0-100)	40.52
Nitrogen EMC (mg/l)	1.190
Phosphorus EMC (mg/l)	0.155
Runoff Volume (ac-ft/yr)	31.284
Groundwater N (kg/yr)	0.000
Groundwater P (kg/yr)	0.000
Nitrogen Loading (kg/yr)	45.902
Phosphorus Loading (kg/yr)	5.979

Post-Condition Landuse Information

Landuse	User Defined Values
Area (acres)	21.54
Rational Coefficient (0-1)	0.48
Non DCIA Curve Number	59.10
DCIA Percent (0-100)	57.84
Wet Pond Area (ac)	1.41
Nitrogen EMC (mg/l)	1.190

Phosphorus EMC (mg/l)	0.155
Runoff Volume (ac-ft/yr)	40.296
Groundwater N (kg/yr)	0.000
Groundwater P (kg/yr)	0.000
Nitrogen Loading (kg/yr)	59.125
Phosphorus Loading (kg/yr)	7.701

Catchment Number: 1 Name: Basin 8

Project: SR 544
Date: 9/22/2023

Wet Detention Design

Permanent Pool Volume (ac-ft)	8.440
Permanent Pool Volume (ac-ft) for 31 days residence	3.422
Annual Residence Time (days)	76
Littoral Zone Efficiency Credit	
Wetland Efficiency Credit	

Watershed Characteristics

Catchment Area (acres)	21.54
Contributing Area (acres)	20.130
Non-DCIA Curve Number	59.10
DCIA Percent	57.84
Rainfall Zone	Florida Zone 2
Rainfall (in)	50.00

Surface Water Discharge

Required TN Treatment Efficiency (%)	22
Provided TN Treatment Efficiency (%)	41
Required TP Treatment Efficiency (%)	22
Provided TP Treatment Efficiency (%)	72

Media Mix Information

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

Groundwater Discharge (Stand-Alone)

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

Load Diagram for Wet Detention (stand-alone)

Load		Treatment		Surface Discharge
N: 59.13 kg/yr	→	N: 41 %	→	N: 34.66 kg/yr
P: 7.70 kg/yr		P: 72 %		P: 2.17 kg/yr
		↓		Mass Reduction N: 24.47 kg/yr P: 5.53 kg/yr

Load Diagram for Wet Detention (As Used In Routing)

Upstream Nodes	Load		Treatment		Mass Discharged
None	N: 59.13 kg/yr P: 7.70 kg/yr Q: 40.30 ac-ft	→	N: 41.4 % P: 71.8 %	→	N: 34.66 kg/yr P: 2.17 kg/yr Q: 40.30 ac-ft
			↓		

Mass Removed
N: 24.47 kg/yr
P: 5.53 kg/yr

Summary Treatment Report Version: 4.3.5

Project: SR 544

Analysis Type: Net Improvement

Date:9/22/2023

BMP Types:

Catchment 1 - (Basin 8) Wet Detention

Based on % removal values to the nearest percent

Routing Summary

Catchment 1 Routed to Outlet

Total nitrogen target removal met? **Yes**

Total phosphorus target removal met? **Yes**

Summary Report

Nitrogen

Surface Water Discharge

Total N pre load	45.9 kg/yr	
Total N post load	59.13 kg/yr	
Target N load reduction	22 %	
Target N discharge load	45.9 kg/yr	
Percent N load reduction	41 %	
Provided N discharge load	34.66 kg/yr	76.42 lb/yr
Provided N load removed	24.47 kg/yr	53.95 lb/yr

Phosphorus

Surface Water Discharge

Total P pre load	5.979 kg/yr	
Total P post load	7.701 kg/yr	
Target P load reduction	22 %	
Target P discharge load	5.979 kg/yr	
Percent P load reduction	72 %	
Provided P discharge load	2.174 kg/yr	4.79 lb/yr
Provided P load removed	5.527 kg/yr	12.187 lb/yr

Complete Report (not including cost) Ver 4.3.5

Project: SR 544
Date: 9/22/2023 8:29:31 AM

Site and Catchment Information

Analysis: Net Improvement

Catchment Name	Basin 8A
Rainfall Zone	Florida Zone 2
Annual Mean Rainfall	50.00

Pre-Condition Landuse Information

Landuse	User Defined Values
Area (acres)	2.59
Rational Coefficient (0-1)	0.35
Non DCIA Curve Number	74.40
DCIA Percent (0-100)	37.84
Nitrogen EMC (mg/l)	1.190
Phosphorus EMC (mg/l)	0.155
Runoff Volume (ac-ft/yr)	3.818
Groundwater N (kg/yr)	0.000
Groundwater P (kg/yr)	0.000
Nitrogen Loading (kg/yr)	5.603
Phosphorus Loading (kg/yr)	0.730

Post-Condition Landuse Information

Landuse	User Defined Values
Area (acres)	2.59
Rational Coefficient (0-1)	0.46
Non DCIA Curve Number	72.67
DCIA Percent (0-100)	52.51
Wet Pond Area (ac)	0.00
Nitrogen EMC (mg/l)	1.190

Phosphorus EMC (mg/l)	0.155
Runoff Volume (ac-ft/yr)	4.939
Groundwater N (kg/yr)	0.000
Groundwater P (kg/yr)	0.000
Nitrogen Loading (kg/yr)	7.247
Phosphorus Loading (kg/yr)	0.944

Catchment Number: 1 Name: Basin 8A

Project: SR 544
Date: 9/22/2023

Retention Design

Retention Depth (in)	0.880
Retention Volume (ac-ft)	0.190

Watershed Characteristics

Catchment Area (acres)	2.59
Contributing Area (acres)	2.590
Non-DCIA Curve Number	72.67
DCIA Percent	52.51
Rainfall Zone	Florida Zone 2
Rainfall (in)	50.00

Surface Water Discharge

Required TN Treatment Efficiency (%)	23
Provided TN Treatment Efficiency (%)	79
Required TP Treatment Efficiency (%)	23
Provided TP Treatment Efficiency (%)	79

Media Mix Information

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

Groundwater Discharge (Stand-Alone)

Treatment Rate (MG/yr)	0.000
TN Mass Load (kg/yr)	5.711
TN Concentration (mg/L)	0.000
TP Mass Load (kg/yr)	0.744
TP Concentration (mg/L)	0.000

Load Diagram for Retention (stand-alone)

Load N: 7.25 kg/yr P: 0.94 kg/yr	→	Treatment N: 79 % P: 79 %	→	Surface Discharge N: 1.54 kg/yr P: 0.20 kg/yr
		↓		Mass Reduction N: 5.71 kg/yr P: 0.74 kg/yr

Load Diagram for Retention (As Used In Routing)

Upstream Nodes None	Load N: 7.25 kg/yr P: 0.94 kg/yr Q: 4.94 ac-ft	→	Treatment N: 78.8 % P: 78.8 %	→	Mass Discharged N: 1.54 kg/yr P: 0.20 kg/yr Q: 1.05 ac-ft
			↓		
			Mass Removed N: 5.71 kg/yr P: 0.74 kg/yr		

Summary Treatment Report Version: 4.3.5

Project: SR 544

Analysis Type: Net Improvement

Date:9/22/2023

BMP Types:

Catchment 1 - (Basin 8A) Retention

Based on % removal values to the nearest percent

Routing Summary

Catchment 1 Routed to Outlet

Total nitrogen target removal met? **Yes**
Total phosphorus target removal met? **Yes**

Summary Report

Nitrogen

Surface Water Discharge

Total N pre load	5.6 kg/yr	
Total N post load	7.25 kg/yr	
Target N load reduction	23 %	
Target N discharge load	5.6 kg/yr	
Percent N load reduction	79 %	
Provided N discharge load	1.54 kg/yr	3.39 lb/yr
Provided N load removed	5.71 kg/yr	12.59 lb/yr

Phosphorus

Surface Water Discharge

Total P pre load	.73 kg/yr	
Total P post load	.944 kg/yr	
Target P load reduction	23 %	
Target P discharge load	.73 kg/yr	
Percent P load reduction	79 %	
Provided P discharge load	.2 kg/yr	.44 lb/yr
Provided P load removed	.744 kg/yr	1.64 lb/yr

Complete Report (not including cost) Ver 4.3.5

Project: SR 544
Date: 9/22/2023 8:31:42 AM

Site and Catchment Information

Analysis: Net Improvement

Catchment Name	Basin 9
Rainfall Zone	Florida Zone 2
Annual Mean Rainfall	50.00

Pre-Condition Landuse Information

Landuse	User Defined Values
Area (acres)	9.18
Rational Coefficient (0-1)	0.19
Non DCIA Curve Number	50.59
DCIA Percent (0-100)	22.11
Nitrogen EMC (mg/l)	1.190
Phosphorus EMC (mg/l)	0.155
Runoff Volume (ac-ft/yr)	7.324
Groundwater N (kg/yr)	0.000
Groundwater P (kg/yr)	0.000
Nitrogen Loading (kg/yr)	10.746
Phosphorus Loading (kg/yr)	1.400

Post-Condition Landuse Information

Landuse	User Defined Values
Area (acres)	9.18
Rational Coefficient (0-1)	0.40
Non DCIA Curve Number	50.94
DCIA Percent (0-100)	48.44
Wet Pond Area (ac)	0.38
Nitrogen EMC (mg/l)	1.190

Phosphorus EMC (mg/l)	0.155
Runoff Volume (ac-ft/yr)	14.686
Groundwater N (kg/yr)	0.000
Groundwater P (kg/yr)	0.000
Nitrogen Loading (kg/yr)	21.548
Phosphorus Loading (kg/yr)	2.807

Catchment Number: 1 Name: Basin 9

Project: SR 544
Date: 9/22/2023

Wet Detention Design

Permanent Pool Volume (ac-ft)	1.860
Permanent Pool Volume (ac-ft) for 31 days residence	1.247
Annual Residence Time (days)	46
Littoral Zone Efficiency Credit	
Wetland Efficiency Credit	

Watershed Characteristics

Catchment Area (acres)	9.18
Contributing Area (acres)	8.800
Non-DCIA Curve Number	50.94
DCIA Percent	48.44
Rainfall Zone	Florida Zone 2
Rainfall (in)	50.00

Surface Water Discharge

Required TN Treatment Efficiency (%)	50
Provided TN Treatment Efficiency (%)	40
Required TP Treatment Efficiency (%)	50
Provided TP Treatment Efficiency (%)	68

Media Mix Information

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

Groundwater Discharge (Stand-Alone)

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

Load Diagram for Wet Detention (stand-alone)

Load		Treatment		Surface Discharge
N: 21.55 kg/yr	→	N: 40 %	→	N: 12.94 kg/yr
P: 2.81 kg/yr		P: 68 %		P: 0.91 kg/yr

↓

Mass Reduction
N: 8.61 kg/yr
P: 1.90 kg/yr

Load Diagram for Wet Detention (As Used In Routing)

Upstream Nodes	Load		Treatment		Mass Discharged
None	N: 21.55 kg/yr	→	N: 40.0 %	→	N: 12.94 kg/yr
	P: 2.81 kg/yr		P: 67.7 %		P: 0.91 kg/yr
	Q: 14.69 ac-ft				Q: 14.69 ac-ft

↓

Mass Removed
N: 8.61 kg/yr
P: 1.90 kg/yr

Summary Treatment Report Version: 4.3.5

Project: SR 544

Analysis Type: Net Improvement

Date:9/22/2023

BMP Types:

Catchment 1 - (Basin 9)
Wet Detention
Based on % removal values to the nearest percent

Routing Summary
Catchment 1 Routed to Outlet

Total nitrogen target removal met? **No**
Total phosphorus target removal met? **Yes**

Summary Report

Nitrogen

Surface Water Discharge

Total N pre load	10.75 kg/yr	
Total N post load	21.55 kg/yr	
Target N load reduction	50 %	
Target N discharge load	10.75 kg/yr	
Percent N load reduction	40 %	
Provided N discharge load	12.94 kg/yr	28.53 lb/yr
Provided N load removed	8.61 kg/yr	18.99 lb/yr

Phosphorus

Surface Water Discharge

Total P pre load	1.4 kg/yr	
Total P post load	2.807 kg/yr	
Target P load reduction	50 %	
Target P discharge load	1.4 kg/yr	
Percent P load reduction	68 %	
Provided P discharge load	.907 kg/yr	2 lb/yr
Provided P load removed	1.9 kg/yr	4.189 lb/yr

Complete Report (not including cost) Ver 4.3.5

Project: SR 544
Date: 9/22/2023 8:33:56 AM

Site and Catchment Information

Analysis: Net Improvement

Catchment Name	Basin 10
Rainfall Zone	Florida Zone 2
Annual Mean Rainfall	50.00

Pre-Condition Landuse Information

Landuse	User Defined Values
Area (acres)	14.26
Rational Coefficient (0-1)	0.30
Non DCIA Curve Number	40.41
DCIA Percent (0-100)	36.71
Nitrogen EMC (mg/l)	1.190
Phosphorus EMC (mg/l)	0.155
Runoff Volume (ac-ft/yr)	17.935
Groundwater N (kg/yr)	0.000
Groundwater P (kg/yr)	0.000
Nitrogen Loading (kg/yr)	26.315
Phosphorus Loading (kg/yr)	3.428

Post-Condition Landuse Information

Landuse	User Defined Values
Area (acres)	14.26
Rational Coefficient (0-1)	0.49
Non DCIA Curve Number	39.00
DCIA Percent (0-100)	60.57
Wet Pond Area (ac)	0.00
Nitrogen EMC (mg/l)	1.190

Phosphorus EMC (mg/l)	0.155
Runoff Volume (ac-ft/yr)	29.256
Groundwater N (kg/yr)	0.000
Groundwater P (kg/yr)	0.000
Nitrogen Loading (kg/yr)	42.926
Phosphorus Loading (kg/yr)	5.591

Catchment Number: 1 Name: Basin 10

Project: SR 544
Date: 9/22/2023

Retention Design

Retention Depth (in)	2.836
Retention Volume (ac-ft)	3.370

Watershed Characteristics

Catchment Area (acres)	14.26
Contributing Area (acres)	14.260
Non-DCIA Curve Number	39.00
DCIA Percent	60.57
Rainfall Zone	Florida Zone 2
Rainfall (in)	50.00

Surface Water Discharge

Required TN Treatment Efficiency (%)	39
Provided TN Treatment Efficiency (%)	98
Required TP Treatment Efficiency (%)	39
Provided TP Treatment Efficiency (%)	98

Media Mix Information

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

Groundwater Discharge (Stand-Alone)

Treatment Rate (MG/yr)	0.000
TN Mass Load (kg/yr)	42.121
TN Concentration (mg/L)	0.000
TP Mass Load (kg/yr)	5.486
TP Concentration (mg/L)	0.000

Load Diagram for Retention (stand-alone)

Load		Treatment		Surface Discharge
N: 42.93 kg/yr	→	N: 98 %	→	N: 0.81 kg/yr
P: 5.59 kg/yr		P: 98 %		P: 0.10 kg/yr
		↓		Mass Reduction N: 42.12 kg/yr P: 5.49 kg/yr

Load Diagram for Retention (As Used In Routing)

Upstream Nodes	Load		Treatment		Mass Discharged
None	N: 42.93 kg/yr P: 5.59 kg/yr Q: 29.26 ac-ft	→	N: 98.1 % P: 98.1 %	→	N: 0.81 kg/yr P: 0.10 kg/yr Q: 0.55 ac-ft
			↓		
			Mass Removed N: 42.12 kg/yr P: 5.49 kg/yr		

Summary Treatment Report Version: 4.3.5

Project: SR 544

Analysis Type: Net Improvement

Date:9/22/2023

BMP Types:

Catchment 1 - (Basin 10) Retention

Based on % removal values to the nearest percent

Routing Summary

Catchment 1 Routed to Outlet

Total nitrogen target removal met? **Yes**

Total phosphorus target removal met? **Yes**

Summary Report

Nitrogen

Surface Water Discharge

Total N pre load	26.31 kg/yr	
Total N post load	42.93 kg/yr	
Target N load reduction	39 %	
Target N discharge load	26.31 kg/yr	
Percent N load reduction	98 %	
Provided N discharge load	.81 kg/yr	1.78 lb/yr
Provided N load removed	42.12 kg/yr	92.88 lb/yr

Phosphorus

Surface Water Discharge

Total P pre load	3.428 kg/yr	
Total P post load	5.591 kg/yr	
Target P load reduction	39 %	
Target P discharge load	3.428 kg/yr	
Percent P load reduction	98 %	
Provided P discharge load	.105 kg/yr	.23 lb/yr
Provided P load removed	5.486 kg/yr	12.097 lb/yr

APPENDIX E

Pond Alternatives Evaluation Matrix

Inwood consulting engineers
3000 Dovera Drive, Suite 200, Oviedo FL32765
(407) 971-8850 phone (407) 971-8955 fax

SR 544 PD&E

SUMMARY OF POND SITES

ENGINEERING DATA & ANALYSIS

Pond	Location	Existing Ground Elevation (ft)	Pond Type	Soil Names & Hydrologic Groups	Estimated SHWT Elevation (ft)	Lowest Edge of Existing Roadway (ft)	Distance From Lowest Edge of Proposed Roadway (ft)	Estimated Allowable $DHW_{25yr/24hr}$ (ft)	Estimated Allowable Treatment & Attenuation Depth (ft)	Outfall Location	Roadway Drainage Area Excluding Pond (ac)	Required Treatment & Attenuation Volume (ac-ft)	Required Pond Access Area (ac)	Required Pond Area (ac)	Required Pond Area Including Access (ac)
Pond 1A	Sta.09+00 (LT.) Existing R/W	151.00	Dry Retention	Tavares-Urban land complex (HSG A)	145.00	149.00	450	149.00	4.00	Lake Conine via Basin 1	2.17	0.09	0.00	0.20	0.20
Pond 1	Sta.41+00 (RT.) Parcel No. 26-28-16-000000-013020, & 26-28-16-000000-031060	135.00	Dry Retention	Candler sand (HSG A) & Adamsville fine sand (HSG C)	129.00	133.00	200	133.00	4.00	Lake Conine	14.00	1.62	0.00	2.83	2.83
Pond 2	Sta.86+00 (LT.) Parcel No. 26-28-09-530000-000042	131.00	Wet Detention	Candler sand (HSG A) & Adamsville fine sand (HSG C)	130.00	132.00	50	131.50	1.50	Lake Smart	8.74	2.53	0.00	3.83	3.83
Pond 3	Sta.131+00 (LT.) Parcel No. 26-28-10-530500-002601	128.50	Wet Detention	Adamsville fine sand (HSG C)	127.00	130.00	300	129.00	2.00	Lake Fannie	13.32	2.49	0.23	2.50	2.73
Pond 4	Sta.183+00 (LT.) Parcel No. 26-28-02-521500-002400	128.00	Wet Detention	Wauchula fine sand (HSG B/D)	126.00	129.00	100	128.00	2.00	Lake Fannie	19.13	2.50	0.11	2.21	2.32
Pond 5	Sta. 250+00 (RT.) Parcel No. 26-28-12-531502-000100	126.00	Wet Detention	Immokalee sand (HSG B/D) & Kaliga muck (HSG B/D)	123.00	0.00	1100	127.10	4.10	Lake Hamilton via Wetlands	19.53	3.06	0.46	1.76	2.22
Pond 6	Sta. 297+00 (LT.) Parcel No. 27-28-06-000000-033070	130.00	Wet Detention	Adamsville fine sand (HSG C) & Basinger mucky fine sand (HSG D)	129.00	129.00	100	131.00	2.00	Lake Hamilton via Lake Henry Canal	6.45	1.68	0.00	1.69	1.69
Swale 7	Sta. 323+00 (LT.) Parcel No. 27-28-06-000000-013010	129.00	Dry Retention	Tavares fine sand (HSG A)	127.00	132.50	50	130.00	3.00	Existing Depression	14.56	0.37	0.00	0.70	0.70
Pond 8	Sta. 338+00 (RT.) Parcel No. 27-28-06-000000-012070	126.00	Wet Detention	Samsula muck, frequently ponded (HSG B/D) & Smyrna and Myakka fine sands (HSG B/D)	122.00	126.60	2000	124.50	2.50	Little Lake Hamilton via Creek	19.48	3.60	0.00	2.75	2.75
Swale 8A	Sta. 331+00 (RT.) Existing R/W	126.00	Dry Retention	Samsula muck, frequently ponded (HSG B/D) & Smyrna and Myakka fine sands (HSG B/D)	123.00	126.00	50	125.00	2.00	Haines City Drainage Canal	2.12	0.06	0.00	0.57	0.57
Pond 9	Sta. 351+00 (LT.) Parcel No. 27-28-05-000000-031010	126.00	Wet Detention	Smyrna and Myakka fine sands (HSG B/D) & Adamsville fine sand (HSG C)	123.00	128.00	100	127.00	4.00	Little Lake Hamilton via Creek	8.36	2.13	0.00	1.25	1.25
Pond 10	Sta. 387+00 (RT.) Parcel No. 27-28-05-000000-031010	133.00	Dry Retention	Candler sand (HSG A)	126.80	131.50	50	132.00	5.20	Lake Butler	12.98	2.46	0.00	1.64	1.64

Inwood consulting engineers
3000 Dovera Drive, Suite 200, Oviedo FL32765
(407) 971-8850 phone (407) 971-8955 fax

SR 544 PD&E

SUMMARY OF POND SITES

IMPACT & COST ANALYSIS

Pond	Pond Floodplain Impacts (ac-ft)	FEMA Floodzone	Arch. / Historical Impact Potential	Wetland Impacts (ac)	Environmental Impact Risk	Threatened or Endangered Species Impacts	Hazardous Materials & Contamination Potential	Major Utility Conflict Potential (Y/N)	Existing Land Use	Future Land Use	Total Area Provided for Pond (ac)	Total Pond Costs
Pond 1A	0	N/A	Low	0.00	Low	Gopher tortoise, eastern indigo snake	High	Y	Residential Med Density 2 to 5 Dwelling Units Per Acre	City	0.37	$232,792
Pond 1	0	N/A	Low	0.00	Medium	Gopher tortoise, eastern indigo snake, Florida burrowing owl, southeastern American kestrel, sand skink, blue-tailed mole skink, Florida sandhill crane	Medium	N	Tree Crops	City	2.83	$1,005,782
Pond 2	0	N/A	Low	0.00	Medium	Southeastern American kestrel, southern fox squirrel	Low	N	Institutional	City	3.83	$1,311,478
Pond 3	0	N/A	Low	0.00	Medium	Florida sandhill crane, southeastern American kestrel	Low	N	Cropland and Pastureland	City	2.73	$1,732,875
Pond 4	0	N/A	Low	0.00	Medium	Wood stork, wading birds, Florida sandhill crane	Low	N	Cropland and Pastureland	City	2.32	$1,065,540
Pond 5	1.41	AE	Low	1.05	High	Wood stork, wading birds, southeastern American kestrel, southern fox squirrel	Low	N	Residential Low Density <2 Dwelling Units Per Acre	Residential	2.41	$1,258,256
Pond 6	0	N/A	Low	0.33	Medium	Wood stork, wading birds, Florida sandhill crane	Low	N	Residential Low Density <2 Dwelling Units Per Acre	Residential	1.87	$1,053,930
Swale 7	0	N/A	Low	0.00	Medium	Wood stork, wading birds, Florida sandhill crane	High	N	Cropland and Pastureland	Residential	0.70	$550,241
Pond 8	1.72	AE	Low	1.59	High	Gopher tortoise, eastern indigo snake, Florida burrowing owl, southeastern American kestrel, wood stork, wading birds, Florida sandhill crane	Low	N	Cropland and Pastureland	Residential	2.75	$1,773,443
Swale 8A	0	N/A	Low	0.00	Low	Gopher tortoise, eastern indigo snake	Low	N	Cropland and Pastureland	Residential	0.57	$259,168
Pond 9	0	N/A	Low	0.00	High	Gopher tortoise, eastern indigo snake, Florida burrowing owl, southeastern American kestrel, wood stork, wading birds, Florida sandhill crane	Low	Y	Wet Prairies, & Emergent Aquatic Vegetation	City	1.25	$417,565
Pond 10	0	N/A	Low	0.00	Medium	Gopher tortoise, eastern indigo snake, Florida burrowing owl, southeastern American kestrel	Medium	N	Residential Low Density <2 Dwelling Units Per Acre	City	2.28	$747,288

Note: The cost evaluation for the stormwater management facility alternatives in this report include 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 grading, berm construction, erosion protection, fencing, access accommodations, sodding and any potential impermeable liners. The associated parcel acquisition cost for each alternative evaluated include the estimated cost of land and any impacted improvements, administrative costs and legal fees.

The potential occurrence of any listed species within each proposed pond site was valued as low, medium, or high based on FLUCFCS type, FNAI reports, and data gathered during field reviews. A determination of low was given for areas that are developed and exhibited minimal to no available habitat for listed species. A determination of medium was given for areas where suitable habitat was identified within one quarter mile of the pond site, or suboptimal habitat was observed within the pond site. A determination of high was given for direct observations of listed species, or areas with greater than one mile of contiguous suitable habitat.

Inwood consulting engineers
3000 Dovera Drive, Suite 200, Oviedo FL32765
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SR 544 PD&E

FDOT

SUMMARY OF FLOODPLAIN COMPENSATION SITES

ENGINEERING DATA & ANALYSIS

Alternatives	Location	Existing Ground Elevation (ft)	Soil Names & Hydrologic Groups	Estimated SHWT Elevation (ft)	Estimated 100-Year Floodplain Elevation	Roadway Floodplain Impacts (ac-ft)	Pond Floodplain Compensation (ac-ft)	FEMA Floodzone	Outfall Location	Required Pond Access Area (ac)	Required Pond Area (ac)	Required Pond Area Including Access (ac)
FPC 1	Sta. 102+00 (RT.) Parcel No. 26-28-09-530000-000110	131.00	Samsula muck, frequently ponded (HSG B/D) & Adamsville fine sand (HSG C)	128.00	129.90	0.99	1.07	AE	Lake Smart	0.00	0.74	0.74
FPC 2	Sta. 129+00 (LT.) Parcel No. 26-28-10-530500-002601	130.00	Adamsville fine sand (HSG C)	127.00	130.10	3.35	3.64	AE	Lake Fannie	0.00	1.62	1.62
FPC 3 A & B	Sta. 183+00 (LT.) Parcel No. 26-28-02-521500-002400	129.00	Wauchula fine sand (HSG B/D)	126.00	128.30	6.53	10.14	AE	Lake Fannie	0.00	3.62	3.62
FPC 4	Sta. 252+00 (RT.) Parcel No. 26-28-12-531502-000100	124.00	Immokalee sand (HSG B/D) & Kaliga muck (HSG B/D)	123.00	124.30	4.57	5.27	AE	Lake Hamilton via Wetlands	0.00	4.84	4.84
FPC 5	Sta. 364+00 (LT.) Parcel No. 27-28-05-000000-031010	124.00	Smyrna and Myakka fine sands (HSG B/D) & Hontoon muck, frequently ponded (HSG B/D)	123.00	124.20	3.31	3.31	AE	Little Lake Hamilton via Creek	0.00	3.22	3.22

IMPACT & COST ANALYSIS

Alternatives	Arch. / Historical Impact Potential	Wetland Impacts (ac)	Environmental Impact Risk	Threatened or Endangered Species Impacts	Hazardous Materials & Contamination Potential	Major Utility Conflict Potential (Y/N)	Existing Land Use	Future Land Use	Total Area Provided for FPC (ac)	Total Pond Costs
FPC 1	Low	0.09	Medium	Wood stork, wading birds, Florida sandhill crane	Low	N	Residential Low Density <2 Dwelling Units Per Acre	City	0.74	$277,723
FPC 2	Low	0.00	Medium	Florida sandhill crane, southeastern American kestrel	Low	N	Cropland and Pastureland	City	1.62	$624,156
FPC 3 A & B	Low	0.00	Medium	Gopher tortoise, eastern indigo snake, wood stork, wading birds, Florida sandhill crane	Low	N	Cropland and Pastureland	City	3.62	$1,249,748
FPC 4	Low	0.76	High	Wood stork, wading birds, southeastern American kestrel, southern fox squirrel	Low	N	Residential Low Density <2 Dwelling Units Per Acre	Residential	4.84	$827,595
FPC 5	Low	1.66	High	Gopher tortoise, eastern indigo snake, Florida burrowing owl, southeastern American kestrel, wood stork, wading birds, Florida sandhill crane	Low	Y	Wet Prairies, & Emergent Aquatic Vegetation	Residential	3.22	$742,230

Note: The cost evaluation for the stormwater management facility alternatives in this report include 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 grading, berm construction, erosion protection, fencing, access accommodations, sodding and any potential impermeable liners. The associated parcel acquisition cost for each alternative evaluated include the estimated cost of land and any impacted improvements, administrative costs and legal fees.

The potential occurrence of any listed species within each proposed pond site was valued as low, medium, or high based on FLUCFCS type, FNAI reports, and data gathered during field reviews and species-specific surveys. A determination of low was given for areas that exhibited minimal to no available habitat for listed species. A determination of medium was given for areas where suitable habitat was identified within one quarter mile of the pond site, or suboptimal habitat was observed within the pond site. A determination of high was given for direct observations of listed species, or areas with greater than one mile of contiguous suitable habitat.

APPENDIX F

Existing Permits

PERMIT NO. 13706.001

SR 544 Resurfacing

Southwest Florida
Water Management District

2379 Broad St., Brooksville, Florida 34604-6899
(352) 796-7211 or 1-800-423-1476 (FL only)
SUNCOM 628-4150 TDD only 1-800-231-6103 (FL only)
On the Internet at: WaterMatters.org

An Equal Opportunity Employer

Tampa Service Office
7601 Highway 301 North
Tampa, Florida 33637-6759
(813) 985-7481 or
1-800-836-0797 (FL only)
SUNCOM 578-2070

Bartow Service Office
170 Century Boulevard
Bartow, Florida 33830-7700
(863) 534-1448 or
1-800-492-7862 (FL only)
SUNCOM 572-6200

Sarasota Service Office
6750 Fruitville Road
Sarasota, Florida 34240-9711
(941) 377-3722 or
1-800-320-3503 (FL only)
SUNCOM 531-6900

Lecanto Service Office
3600 West Sovereign Path
Suite 226
Lecanto, Florida 34461-8070
(352) 527-8131
SUNCOM 667-3271

September 3, 2002

File of Record
Permit No ____________

Eduardo A. Ponce', P.E.
Florida Department of Transportation
Post Office Box 1249
Bartow, FL 33831-1249

Subject: **Notice of Final Agency Action - Approval**
Environmental Resource Noticed General Construction

Project Name:	FDOT - S.R. 544 from Avenue Y NE to West of U.S. 27
Permit No:	47013706.001
County:	Polk
Sec/Twp/Rge:	6/28S/27E and 1,9,10,11,12,16/28S/26E
Expiration Date:	August 5, 2007

Dear Mr. Ponce':

The District acknowledges your intent to use a Noticed General Construction Permit for the project referenced above. Plans and information received will be kept on file in the Bartow Service Office in support of this determination. The proposed construction must be completed before the expiration date indicated above.

The proposed construction is subject to general conditions of Rule 40D-400.215, Florida Administrative Code (F.A.C.) (Exhibit A, copy enclosed) and the specific conditions of Rule 40D-400.447, F.A.C. Deviations from these conditions may subject you to enforcement action and possible penalties. You are responsible for conducting construction in a manner which satisfies all criteria.

Final approval is contingent upon no objection to the District's action being received by the District within the time frames described below.

You or any person whose substantial interests are affected by the District's action regarding a permit may request an administrative hearing in accordance with Sections 120.569 and 120.57, F.S., and Chapter 28-106, Florida Administrative Code (F.A.C.), of the Uniform Rules of Procedure. *A request for hearing must: (1) explain how the substantial interests of each person requesting the hearing will be affected by the District's action, or proposed action, (2) state all material facts disputed by the person requesting the hearing or state that there are no disputed facts, and (3) otherwise comply with Chapter 28-106, F.A.C.* Copies of Sections 28-106.201 and 28-106.301, F.A.C. are enclosed for your reference. A request for hearing must be filed with (received by) the Agency Clerk of the District at the District's Brooksville address within 21 days of receipt of this notice. Receipt is deemed to be the fifth day after the date on which this notice is deposited in the United States mail. Failure to file a request for hearing within this time period shall constitute a waiver of any right you or such person may have to request a hearing under Sections 120.569 and 120.57, F.S. Mediation pursuant to Section 120.573, F.S., to settle an administrative dispute regarding the District's action in this matter is not available prior to the filing of a request for hearing.

If you have questions, please contact Sherry M. Windsor, E.I., at the Bartow Service Office.

Sincerely,

Brian S. Starford, P.G., Director
Bartow Regulation Department

BSS:SMW:po

Enclosures: Rule 40D-400.447, F.A.C.
Exhibit A
Approved Construction Drawings
Notice of Authorization to Commence Construction
Noticing Packet (42.00-039)
Sections 28-106.201 and 28-106.301, F.A.C.

cc: File of Record 47013706.001
Joey Murphy, City of Winter Haven
Pat Moylan, Polk County
J. Whealton

EXHIBIT "A"

GENERAL CONDITIONS:

1. The terms, conditions, requirements, limitations, and restrictions set forth in this section are binding upon the Permittee for all noticed general permits in this chapter. These conditions are enforceable under part IV of Chapter 373, F.S.

2. The general permit is valid only for the specific activity indicated. Any deviation from the specified activity and the conditions for undertaking that activity shall constitute a violation of the permit. A violation of the permit is a violation of part IV of Chapter 373, F.S., and may result in suspension or revocation of the Permittee's right to conduct such activity under the general permit. The District may also begin legal proceedings seeking penalties or other remedies as provided by law for any violation of these conditions.

3. This general permit does not eliminate the necessity to obtain any required federal, state, local and special District authorizations prior to the start of any construction, alteration, operation, maintenance, removal or abandonment authorized by this permit.

4. This general permit does not convey to the Permittee or create in the Permittee any property right, or any interest in real property, nor does it authorize any entrance upon or activities on property which is not owned or controlled by the Permittee, or convey any rights or privileges other than those specified in the general permit and this chapter.

5. This general permit does not relieve the Permittee from liability and penalties when the permitted activity causes harm or injury to human health or welfare; animal, plant or aquatic life; or property. It does not allow the Permittee to cause pollution in contravention of Florida Statutes and District rules.

6. The Permittee is hereby advised that Section 253.77, F.S., states that a person may not commence any excavation, construction, or other activity involving the use of sovereign or other lands of the state, the title to which is vested in the Board of Trustees of the Internal Improvement Trust Fund without obtaining the required lease, license, easement, or other form of consent authorizing the proposed use. Therefore, the Permittee is responsible for obtaining any necessary authorizations from the Board of Trustees prior to commencing activity on sovereignty lands or other state-owned lands.

7. The Board may modify or revoke the authorization to conduct activities pursuant to this noticed general permit at any time if it determines that a stormwater management system, dam, impoundment, reservoir, appurtenant work, or works has become a danger to the public health or safety of its operation has become inconsistent with the objectives of he District or is in violation of any rule or order of the District, or the provisions of this noticed general permit.

8. This permit shall not be transferred to a third party except pursuant to section 40D-4.351, F.A.C. The Permittee transferring the general permit shall remain liable for any corrective actions that may be required as a result of any permit violations prior to sale, conveyance, or other transfer of ownership or control of the permitted system or the real property at which the permitted system is located.

9. Upon reasonable notice to the Permittee, District staff with proper identification shall have permission to enter, inspect, sample and test the permitted system to insure conformity with the plans and specifications approved by the permit.

10. The Permittee shall maintain any permitted system in accordance with the plans submitted and authorized by this permit.

11. A Permittee's right to conduct a specific activity under this noticed general permit is authorized for a duration of five years.

12. Construction, alteration, operation, maintenance, removal and abandonment approved by this general permit shall be conducted in a manner which does not cause violations of state water quality standards, including any antidegradation provisions of sections 62-4.242(1)(a) and (b), 62-4.242(2) and (3), and 62-302.300, F.A.C., and any special standards for Outstanding Florida Waters and Outstanding National Resource Waters. The Permittee shall implement best management practices for erosion, turbidity, and other pollution control to prevent violation of state water quality standards. Temporary erosion control measures such as sodding, mulching, and seeding shall be implemented and shall be maintained on all erodible ground areas prior to and during construction. Permanent erosion control measures such as sodding and planting of wetland species shall be completed within seven days of any construction activity. Turbidity barriers shall be installed and maintained at all locations where the possibility of transferring suspended solids into wetlands or surface waters exists due to the permitted activity. Turbidity barriers shall remain in place and shall be maintained in a functional condition at all locations until construction is completed, soils are stabilized and vegetation has been established. Thereafter the Permittee shall be responsible for the removal of the barriers. The Permittee shall correct any erosion or shoaling that causes adverse impacts to the water resources.

13. The Permittee shall hold and save the District harmless from any and all damages, claims, or liabilities which may arise by reason of the construction, alteration, operation, maintenance, removal, abandonment or use of any system authorized by the general permit.

14. The Permittee shall immediately notify the District in writing of any previously submitted information that is later discovered to be inaccurate.

40D-400.447 General Permit to the Florida Department of Transportation, Counties and Municipalities for Minor Activities Within Existing Rights-of-Way or Easements.

(1) A general permit is hereby granted to the Florida Department of Transportation, Counties and Municipalities to conduct the activities described below:

(a) The extension of existing culverts and crossing approaches to accommodate widening of the roadway where excavation or deposition of material shall not exceed 1000 cubic yards in wetlands and other surface waters and the area from which material is excavated or to which material is deposited shall not exceed a total of 0.25 acres at any one location (project site). The 1000 cubic yardage limitation shall be separately applied to excavation and deposition of material.

(b) Relocation, recontouring, widening, or reconstruction of existing highway drainage ditches through uplands provided the floor elevation of the ditch is not deepened below the original design elevation and provided that the work does not cause a change in the hydrology of any wetlands which are connected to or which are adjacent to the ditch.

(c) Culvert placement, replacement and maintenance associated with existing roadways, in streams with an average discharge of less than 10 cubic feet per second at the culvert location or streams draining less than 10 square miles, provided that construction does not cause scour in the downstream waters or increase the velocity of the water downstream, does not reduce existing flood conveyance of the stream for the 100 year flood flow and does not reduce existing flood storage within the 10 year flood plain. The material excavated or deposited as fill shall not exceed 1000 cubic yards in wetlands and other surface waters. The cross sectional area of the culvert shall not be reduced unless the reduced cross section provides for an equal or greater discharge capability. In the case of a culvert installed as a wildlife crossing, the cross sectional area shall not be reduced.

(d) Construction of temporary bypass lanes and stream channel diversions necessary to complete projects detailed in paragraph (c) above, provided the area used for the temporary bypass lanes and temporary diversion is restored to its previous contours and elevations.

(e) Channel clearing and shaping, not to exceed a combined total of 0.5 acres of dredging and filling in wetlands and other surface waters, to facilitate maximum hydraulic efficiency of structures authorized by paragraph (c) above, where the spoil material is used on an upland portion of the project or is deposited on a self-contained, upland spoil site. Escape of spoil material or return water from the spoil deposition area into wetlands or other surface waters is prohibited.

(f) Repair of existing concrete bridge pilings by the construction of pile jackets, provided that the permanent outer form is composed of inert materials and the quantity of material shall not exceed 300 cubic yards of dredging or 300 cubic yards of filling per project. Although the bottom sediments within the forms may be removed by jetting or pumping, and may not be recoverable, proper turbidity control measures shall be employed as necessary to prevent violations of state water quality standards.

(2) This general permit shall be subject to the following specific conditions:

(a) The permittee shall use erosion and sediment control best management practices, including turbidity curtains or similar devices, in strict adherence to these practices as described in Chapter 6, The Florida Land Development Manual: A Guide to Sound Land and Water Management (Florida Department of Environmental Regulation, 1988) incorporated by reference to prevent violation of state water quality standards.

(b) Immediately following completion of slope construction, the fill areas and any disturbed banks of wetlands or other surface waters shall be stabilized with vegetation or riprap to prevent erosion. Temporary erosion controls for all exposed soils within wetlands and other surface waters shall be completed within seven calendar days of the most recent construction activity. Prevention of erosion of exposed earth into wetlands and other surface waters is a construction priority and completed slopes shall not remain unstabilized while other construction continues.

(c) In addition to complying with the notice provisions of section 40D-400.211, F.A.C., at least 90 days prior to commencement of construction, the permittee shall provide written notification to the appropriate District office of the date the permitted construction activities are planned to begin and within 90 days following completion of construction the permittee shall provide written notification to the District of the date construction activities are completed.

(d) The permittee shall limit stream channel relocation to streams which have an average annual discharge of 10 cubic feet per second or less. The length of relocated channels or those significantly altered shall be limited to 200 feet per stream. A stream channel shall be altered only when such a measure will reduce the long term adverse water quality impacts and will maintain or restore the stream's natural hydraulic capability.

(e) This general permit shall not apply to ditch construction in Class I or Class II surface waters, Outstanding National Resource Waters or waters designated as Outstanding Florida Waters.

(3) This general permit does not authorize the construction of additional traffic lanes. Systems which require additional traffic lanes must first obtain a general or individual environmental resource permit under chapters 40D-4 or 40D-40, F.A.C., as applicable, before the start of construction.

Specific Authority 373.044, 373.113, 373.118, F.S., Law Implemented 373.413, 373.416, 373.426, F.S. History--New: 10-3-95.

PART II HEARINGS INVOLVING DISPUTED ISSUES OF MATERIAL FACT

28-106.201 Initiation of Proceedings.

(1) Unless otherwise provided by statute, initiation of proceedings shall be made by written petition to the agency responsible for rendering final agency action. The term "petition" includes any document that requests an evidentiary proceeding and asserts the existence of a disputed issue of material fact. Each petition shall be legible and on 8 1/2 by 11 inch white paper. Unless printed, the impression shall be on one side of the paper only and lines shall be double-spaced.

(2) All petitions filed under these rules shall contain:

(a) The name and address of each agency affected and each agency's file or identification number, if known;

(b) The name, address, and telephone number of the petitioner; the name, address, and telephone number of the petitioner's representative, if any, which shall be the address for service purposes during the course of the proceeding; and an explanation of how the petitioner's substantial interests will be affected by the agency determination;

(c) A statement of when and how the petitioner received notice of the agency decision;

(d) A statement of all disputed issues of material fact. If there are none, the petition must so indicate;

(e) A concise statement of the ultimate facts alleged, including the specific facts the petitioner contends warrant reversal or modification of the agency's proposed action;

(f) A statement of the specific rules or statutes the petitioner contends require reversal or modification of the agency's proposed action; and

(g) A statement of the relief sought by the petitioner, stating precisely the action petitioner wishes the agency to take with respect to the agency's proposed action.

(3) Upon receipt of a petition involving disputed issues of material fact, the agency shall grant or deny the petition, and if granted shall, unless otherwise provided by law, refer the matter to the Division of Administrative Hearings with a request that an administrative law judge be assigned to conduct the hearing. The request shall be accompanied by a copy of the petition and a copy of the notice of agency action.

(4) A petition shall be dismissed if it is not in substantial compliance with subsection (2) of this rule or it has been untimely filed. Dismissal of a petition shall, at least once, be without prejudice to petitioner's filing a timely amended petition curing the defect, unless it conclusively appears from the face of the petition that the defect cannot be cured.

(5) The Agency shall promptly give written notice to all parties of the action taken on the petition, shall state with particularity its reasons if the petition is not granted, and shall state the deadline for filing an amended petition if applicable.

Specific Authority 120.54(3), 120.54(5) FS.
Law Implemented 120.54(5), 120.569, 120.57 FS.
History—New 4-1-97, Amended 9-17-98.

PART III PROCEEDINGS AND HEARINGS NOT INVOLVING DISPUTED ISSUES OF MATERIAL FACT

28-106.301 Initiation of Proceedings.

(1) Initiation of a proceeding shall be made by written petition to the agency responsible for rendering final agency action. The term "petition" includes any document which requests a proceeding. Each petition shall be legible and on 8 1/2 by 11 inch white paper or on a form provided by the agency. Unless printed, the impression shall be on one side of the paper only and lines shall be double-spaced.

(2) All petitions filed under these rules shall contain:

(a) The name and address of each agency affected and each agency's file or identification number, if known;

(b) The name, address, and telephone number of the petitioner; the name, address, and telephone number of the petitioner's representative, if any, which shall be the address for service purposes during the course of the proceeding; and an explanation of how the petitioner's substantial interests will be affected by the agency determination;

(c) A statement of when and how the petitioner received notice of the agency decision;

(d) A concise statement of the ultimate facts alleged, including the specific facts the petitioner contends warrant reversal or modification of the agency's proposed action;

(e) A statement of the specific rules or statutes the petitioner contends require reversal or modification of the agency's proposed action; and

(f) A statement of the relief sought by the petitioner, stating precisely the action petitioner wishes the agency to take with respect to the agency's proposed action.

(3) If the petition does not set forth disputed issues of material fact, the agency shall refer the matter to the presiding officer designated by the agency with a request that the matter be scheduled for a proceeding not involving disputed issues of material fact. The request shall be accompanied by a copy of the petition and a copy of the notice of agency action.

(4) A petition shall be dismissed if it is not in substantial compliance with subsection (2) of this Rule or it has been untimely filed. Dismissal of a petition shall, at least once, be without prejudice to petitioner's filing a timely amended petition curing the defect, unless it conclusively appears from tthe face of the petition that the defect cannot be cured.

(5) The agency shall promptly give written notice to all parties of the action taken on the petition, shall state with particularity its reasons if the petition is not granted, and shall state the deadline for filing an amended petition if applicable.

Specific Authority 120.54(5) FS.
Law Implemented 120.54(5), 120.569, 120.57 FS.
History—New 4-1-97, Amended 9-17-98.

PROFESSIONAL CERTIFICATION*
FOR THE ENGINEERING EVALUATION REPORT

MSSW/ERP Permit Number:	47013706.001
Date Application Received:	August 5, 2002
Permittee's Name:	Florida Department of Transportation
Address:	Post Office Box 1249 Bartow, FL 33831-1249
Project Name:	FDOT - S.R. 544 from Avenue Y NE to West of U.S. 27
Project Description:	Road Project
Project Size:	0.07 Acre
Activity:	Construction
Section(s)/Township/Range:	6/28S/27E and 1,9,10,11,12,16/28S/26E

Imaged As Is

I HEREBY CERTIFY that the engineering features described in the referenced application to construct and/or operate a surface water management system associated with the indicated project have been evaluated regarding provision of reasonable assurance of compliance with Part IV, Chapter 373, Florida Statutes, and Chapters 40D-4, 40D-40 or 40D-400, Florida Administrative Code (F.A.C.), as applicable. I have not evaluated and do not make any certifications as to other aspects of the proposal.

This evaluation was conducted within limited time frames and focused on a summary review of the construction plans, permit abstract and conditions, engineering worksheet, and District rule requirements relative to the Conditions of Issuance. Ongoing responsible oversight of degreed engineering staff was provided during the detailed project review.

William A. Hartmann 9/5/02 (Seal)

William A. Hartmann, P.E., Surface Water Regulation Manager
FL P.E. #36694
Bartow Regulation Department
Southwest Florida Water Management District

* When required by Section 61G15-26.001(1), F.A.C., a professional engineer's seal, signature and date (i.e., "Professional Certification") means that the work indicated has been conducted under the responsible supervision, direction or control of a person licensed by the State to practice engineering, who by authority of their license is required to have some specialized knowledge of engineering. Professional Certification is not a guaranty or warranty of fitness or suitability, either explicit or implied.

Appvl: Meets rule reqs for 40D-400.447 F.A.C. Activities recognized under this authorization include resurfacing of an existing roadway (U.S. 27) and extending existing culverts (cross-drains) @ 5 locations. The appropriate sed. & erosion control measures will be in place prior to initiation of construction

CERTIFICATE OF MAILING

I hereby certify that a copy of the FAA letter on Application No. 47013706.001 was mailed by United States Mail to the below listed parties this Sept 3, 2002.

FAA Expiration Date: September 29 2002
(Enter date 26 days from the date of mailing)

Permittee	Eduardo A. Ponce', P.E., District Permit Engineer Florida Department of Transportation Post Office Box 1249 Bartow, FL 33831-1249	**Agent:**
Engineer/Consultant	Eduardo A. Ponce', P.E. Florida Department of Transportation Post Office Box 1249 Bartow, FL 33831-1249	**Applicant:**
FAA Request(s):	See cc's on letter	**Requests for RAIs/FAA:**
Required Noticing: (w/ Letter & Copy of the Permit)		
Documents sent by Regular US Mail to Permittee/Consultant	FAA Transmittal Letter Sections 28-106.201 and 28-106.301, F.A.C. Noticing Packet Approved Permit with Conditions	
Documents sent by Regular US Mail to FAA Requestors and others	FAA Transmittal Letter Sections 28-106.201 and 28-106.301, F.A.C. Approved Permit with Conditions	

( ) ERP - Eminent Domain Property Owners (EPOs) **mailed regular U.S. Mail** (see list)
( ) WRP - Adjacent Waterfront Property Owners (AWPOs) **if requested**

Administrative Section
Bartow Regulation Department

MSW/ERP PERMIT ROUTING SLIP
SWFWMD BARTOW REGULATION DEPARTMENT

BOARD MONTH N/A

MSW/ERP PERMIT NO.:	DEFAULT DATE:	INTENDED ISSUE DATE (21 days from complete date)
47013706.001	September 4, 2002	September 3, 2002

RUSH OR
MISC INFO.

FDOT SR 544 Avenue Y NE to West of US27

ROUGH DRAFT	INITIALS	DATE SIGNED	FINAL REVIEW	INITIALS	DATE SIGNED
REVIEW ES	[illegible]	3510 02	REVIEW ES	[illegible]	3310
REVIEW PE/PC	SMW	9-3-02	REVIEW PE/PC	SMW	9-3-02
PERMIT COORD	[illegible]	9/3/02	ES MANAGER	[illegible]	9-3-02
			SW MANAGER	William A. Hartmann	9/3/02
			ADMIN. REVIEW		
			DEPT DIRECTOR	[illegible]	9/3/02

(X) APPROVAL ( ) DENIAL ( ) CZM DEADLINE

(X) ERP TYPE: NOTICED GENERAL

(X) ERP NOTICED GENERAL RULE: 40D-400.447

( ) Letter Mods: MSW/ERP No.____ ISSUE DATE:____ EXP DATE:____

PROJECT NAME:____

( ) Permit Mods: MSW/ERP No.____ ISSUE DATE:____ EXP. DATE:____

I	Water Quantity/Quality:	(X)	No ponds, see engineer's comments below.
II	Env. Considerations:	(X)	There are no wetlands within the project area.
III	Wetlands:	( ) ( )	Field Work Copy (Worksheets, permit, etc.) Wetlands Adjacent to project area.

Comments:

- The extension/replacement of five existing drainage structures located within the proposed 5.5 mile resurfacing of SR 544 from north of Avenue Y to 0.6 mile west of US27. This project proposed 0.07 acre of wetland impacts, 404.3 cubic yards of fill in wetlands, and 15.5 cubic yards of excavation in wetlands, meeting the criteria specified under Rule 40D-400.447, F.A.C. for a Noticed General Permit. No adverse impacts are anticipated.

- Please generate Eng. Certification for W.A.H.

cc: Pat Moylan, Polk County
Joey Murphy, City of Winter Haven
J. Whealton

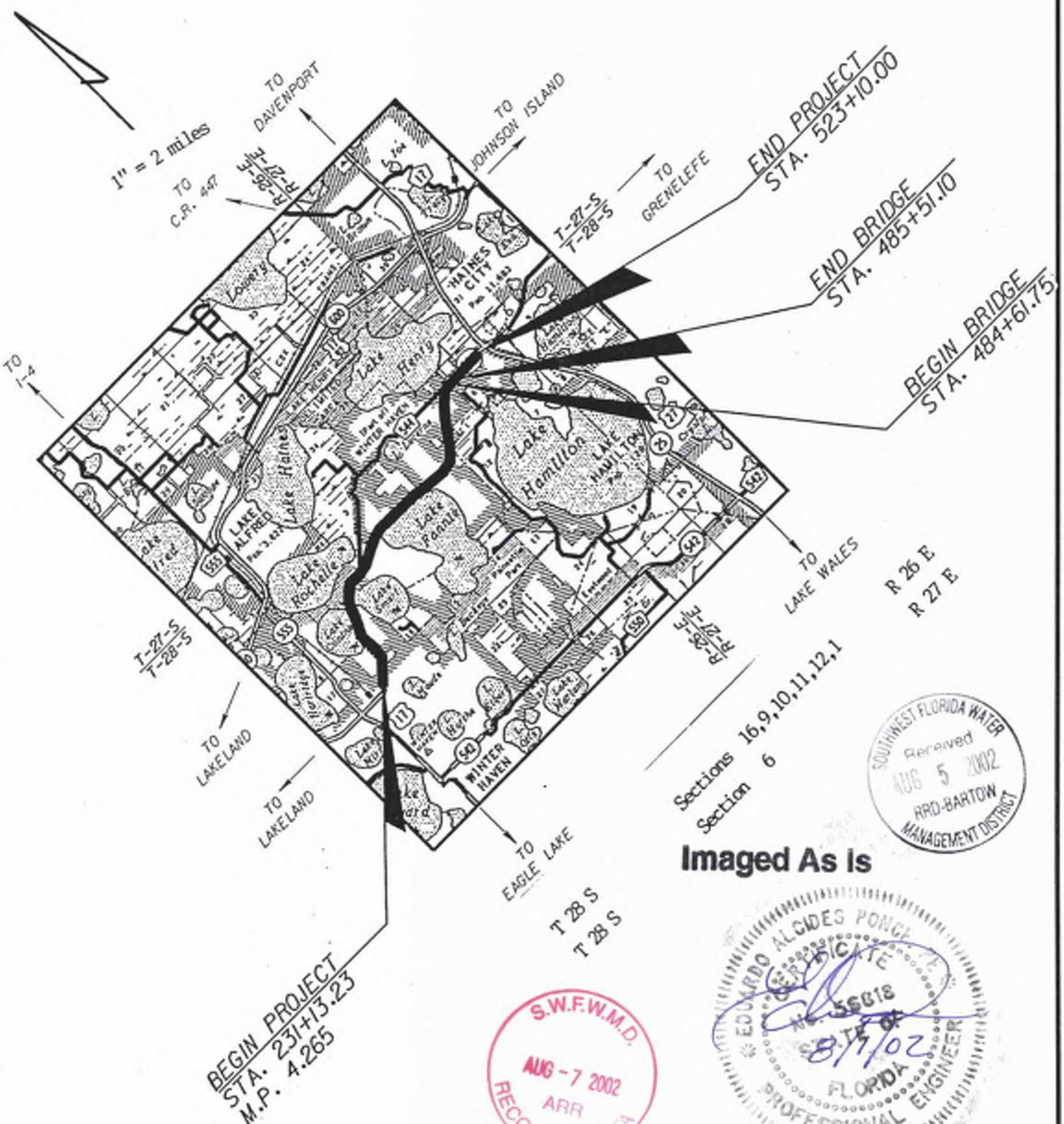
REVIEWER, have you purged your work file for File of Record and ( ) Yes (X) No
is the permit number on the purged data?

Typist Initials and Date: Pat 9/3/02

File of Record

Permit No. 47013706.001

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
APPROVED CONSTRUCTION DRAWINGS
APPROVED BY SMW 9-3-02



Applicant: Florida Department of Transportation FPID: 1976971 Polk County SR 544 from N. of Ave. "Y" NE to W. of US 27	July 2002	Sheet 1 of 12

GENERAL NOTES

1. The Florida Department of Transportation proposes to resurface approximately 5.5 miles of SR 544 from North of Ave. "Y" NE to 0.6 Mi. West of US 27. Five existing drainage structures will be extended or replaced in conjunction with the resurfacing project..

2. Strict adherence to Section 104 of the Florida Department of Transportation Standard Specifications for Road and Bridge Construction used in conjunction with this application provide reasonable assurance that water quality will not be violated.

3. Types of equipment involved in the construction will include: gradeall, dump trucks, bulldozer, pumps and front end loader. The equipment will be trucked or self propelled to the site.

4. Turbidity curtains, silt fences, sand bags, hay bales or some combination of these items will be used as directed by the project engineer to maintain State Water Quality Standards.

5. Excavated material that is suitable will be used in construction of the shoulders. Unsuitable material will be disposed of and contained in upland sites provided by the contractor.

6. Traffic will be maintained on SR 544 during construction.

7. Fill material shall be of satisfactory material that is clean and compactable into a suitable and enduring roadway.

8. During the construction or extension of multiple opening structures, the contractor, as directed by the Project Engineer, shall be required to phase construct drainage structures in order to maintain adequate water flow.

9. All elevations shown in this permit application are referenced to U.S.G.S. National Vertical Datum of 1929.

10. The following volume of earthwork is required for the project. (The following volume represents fill or excavation within waters of the State.)

<u>Sta. 242+14.01</u>
Juris. Fill = 10 cy (0.0044 A.)

<u>Sta. 271+03.47</u>
Juris. Fill = 372 cy (0.04 A.)
Juris. Exc. = 14.5 cy (0.008 A.)

<u>Sta. 282+64.11</u>
Juris. Fill = 5.3 cy (0.0018 A.)
Juris. Exc. = 1 cy (0.001 A.)

<u>Sta. 429+41.06</u>
Juris. Fill = 9 cy (0.0024 A.)

<u>Sta. 447+90.35</u>
Juris. Fill = 8 cy (0.0026 A.)

TOTAL: Juris. Fill = 404 cy (0.05 A.)
Juris. Exc. = 15.5 cy (0.018 A.)

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT Received AUG 5 2002 BRD-BARTOW

Imaged As Is

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT APPROVED CONSTRUCTION DRAWINGS
APPROVED BY SMW 9-3-02

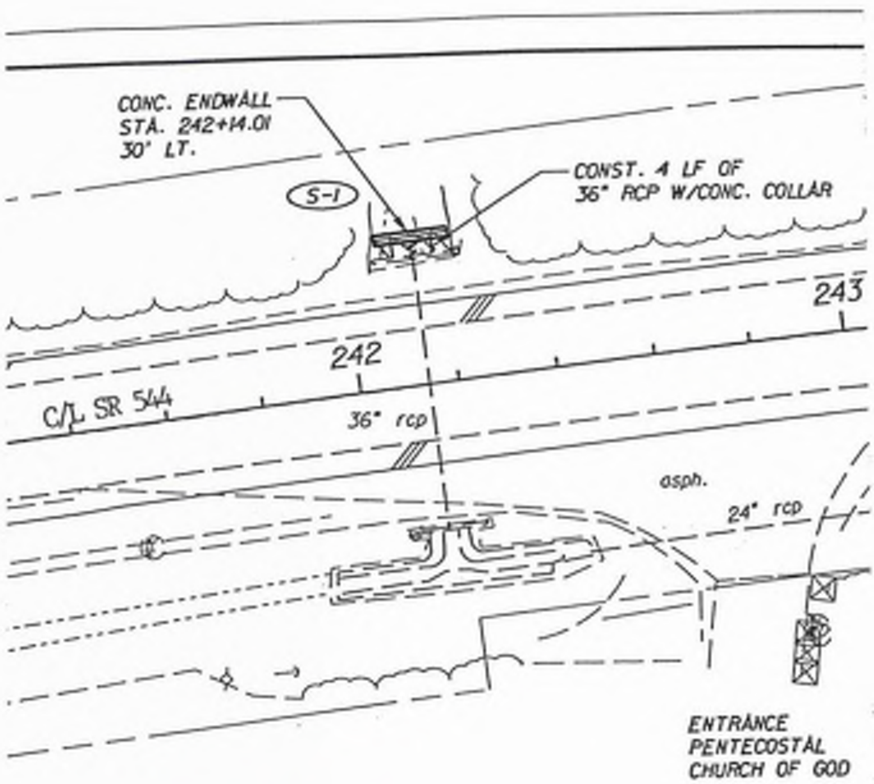
RICARDO ALCIDES PONCE DE LEON CERTIFICATE No. 56818 STATE OF FLORIDA PROFESSIONAL ENGINEER
8/1/02

<u>STATEMENT OF CERTIFICATION FOR SOVEREIGN SUBMERGED LANDS</u>
Pursuant to Section 339.135, F.S., the Florida Department of Community affairs has determined that this project is not inconsistent with the local comprehensive plan for the affected area.

Applicant: Florida Department of Transportation **FPID: 1976971 Polk County** **SR 544 from N. of Ave. "Y" NE to W. of US 27**	**July 2002**	**Sheet 2 of 12**

Juris. Fill = \\\
Juris. Exc. = ///

1" = 40'



SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT Received AUG 5 2002 RRD-BARTOW

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT APPROVED CONSTRUCTION DRAWINGS
APPROVED BY SMW 9-3-02

Imaged As Is

Plan View

Sta. 242 + 14.01

S.W.F.W.M.D. AUG - 7 2002 ARR RECORDS & DATA

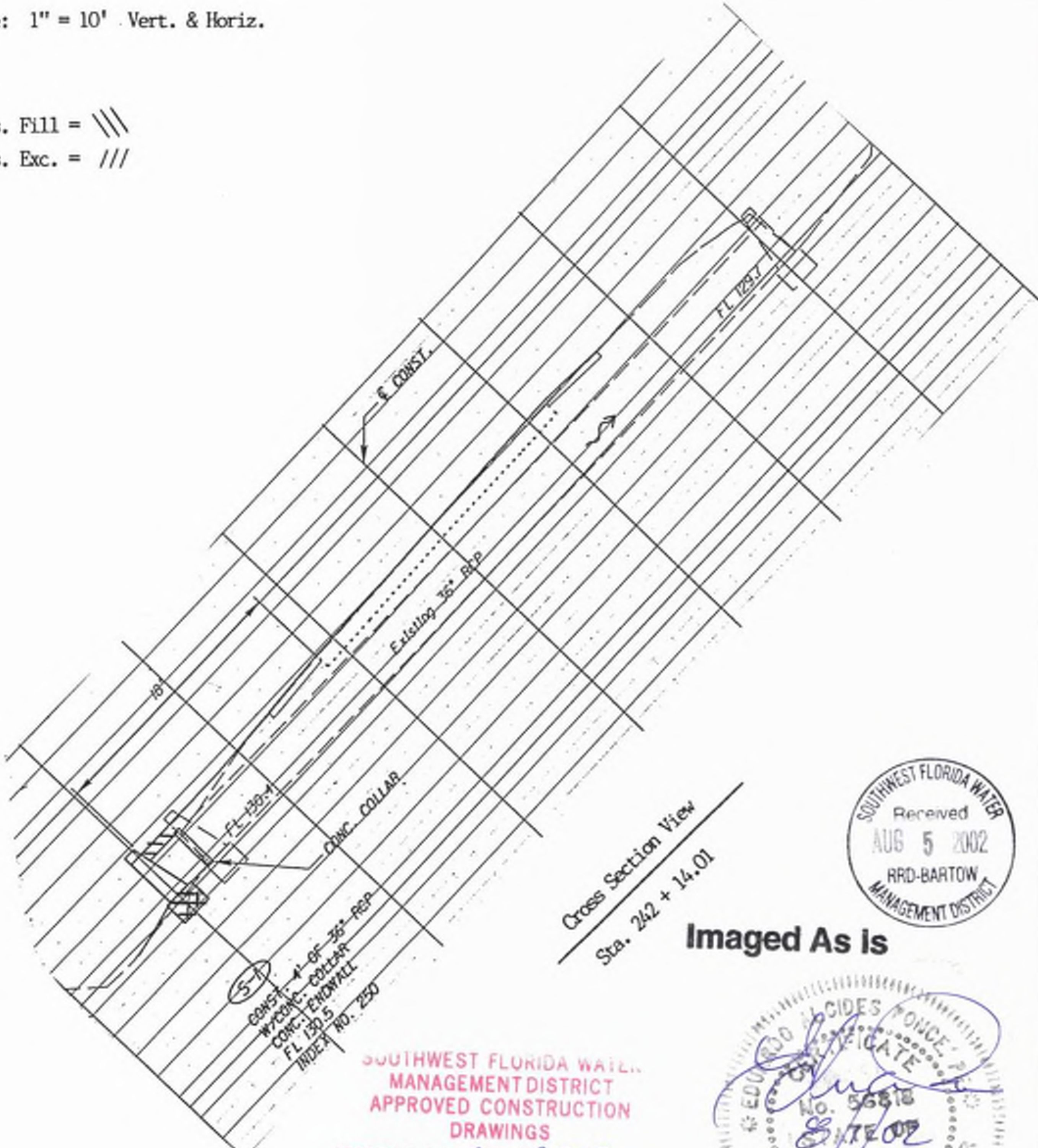
EDUARDO ALCIDES PONCE, P.E. CERTIFICATE No. 56818 STATE OF FLORIDA PROFESSIONAL ENGINEER
8/1/02

Applicant: Florida Department of Transportation FPID: 1976971 Polk County SR 544 from N. of Ave. "Y" NE to W. of US 27	July 2002	Sheet 3 of 12

Scale: 1" = 10' Vert. & Horiz.

Juris. Fill = \\\

Juris. Exc. = ///



SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
Received
AUG 5 2002
RRD-BARTOW

Imaged As Is

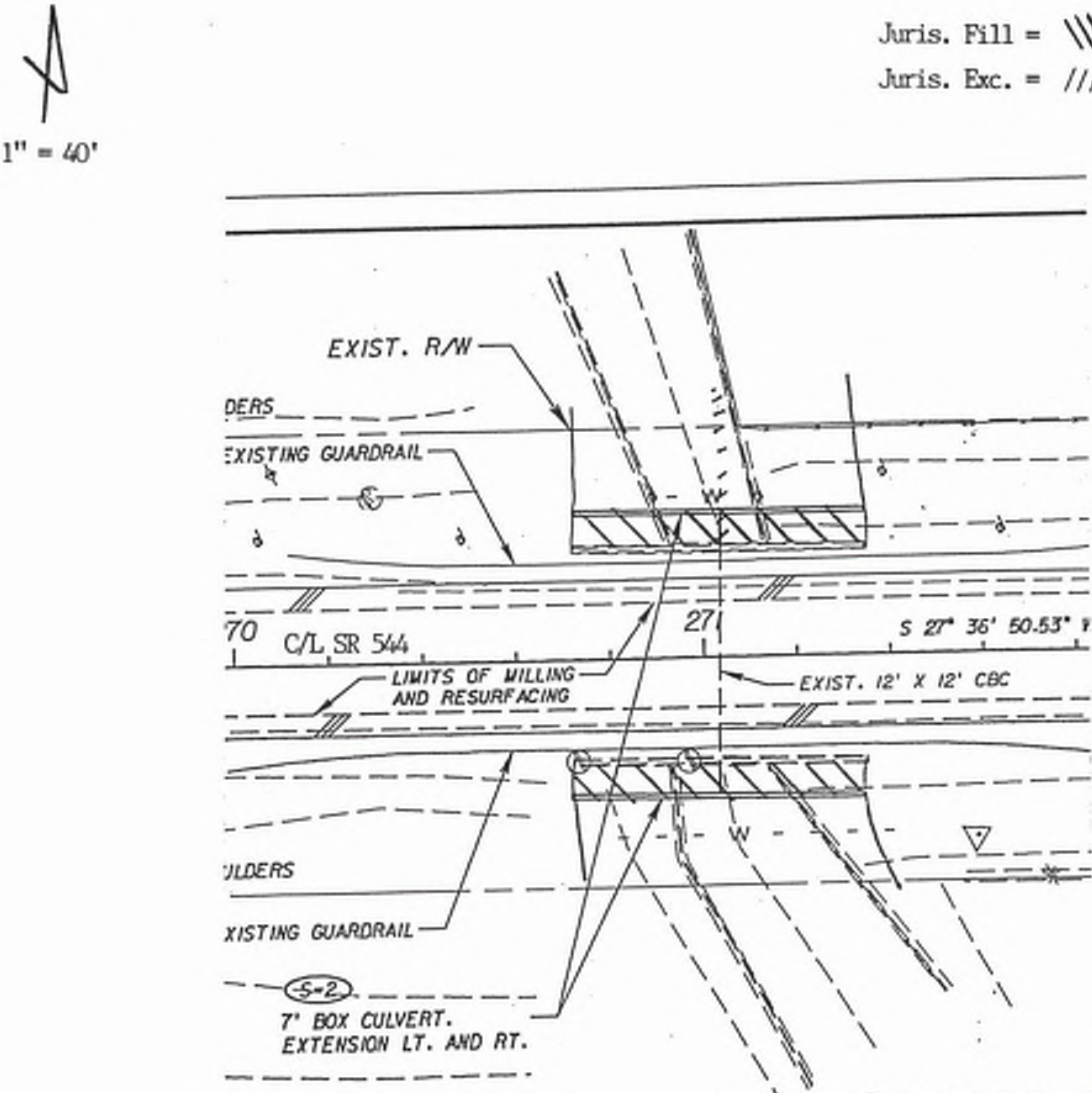
SOUTHWEST FLORIDA WATER
MANAGEMENT DISTRICT
APPROVED CONSTRUCTION
DRAWINGS
APPROVED BY SMW 9-3-02

EDUARDO ALCIDES PONCE, P.E.
CERTIFICATE
No. 56818
8/1/02
FLORIDA
PROFESSIONAL ENGINEER

Applicant: Florida Department of Transportation **FPID: 1976971 Polk County** **SR 544 from N. of Ave. "Y" NE to W. of US 27**	**July 2002**	**Sheet 4 of 12**

Juris. Fill = \\\
Juris. Exc. = ///

1" = 40'



Imaged As Is

SOUTHWEST FLORIDA WATER Received AUG 5 2002 RRD-BARTOW MANAGEMENT DISTRICT

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT APPROVED CONSTRUCTION DRAWINGS
APPROVED BY SMW 9-3-02

S.W.F.W.M.D. AUG -7 2002 ARR RECORDS & DATA

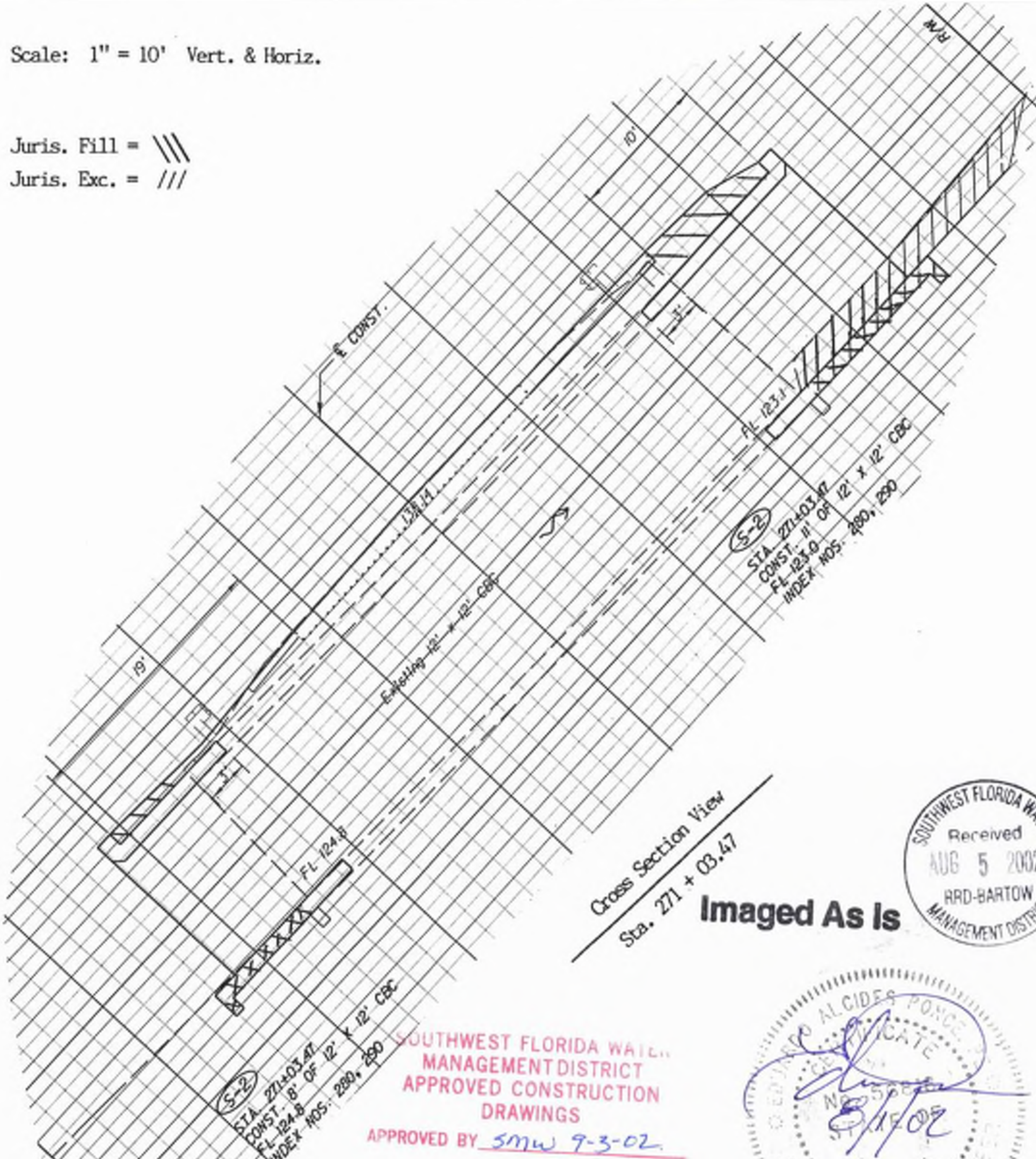
EDUARDO ALCIDES PONCE, P.E. CERTIFICATE NO. 56818 STATE OF FLORIDA PROFESSIONAL ENGINEER
8/1/02

Applicant: Florida Department of Transportation **FPID: 1976971 Polk County** **SR 544 from N. of Ave. "Y" NE to W. of US 27**	**July 2002**	**Sheet 5 of 12**

CD-5

Scale: 1" = 10' Vert. & Horiz.

Juris. Fill = \\\
Juris. Exc. = ///



Imaged As Is

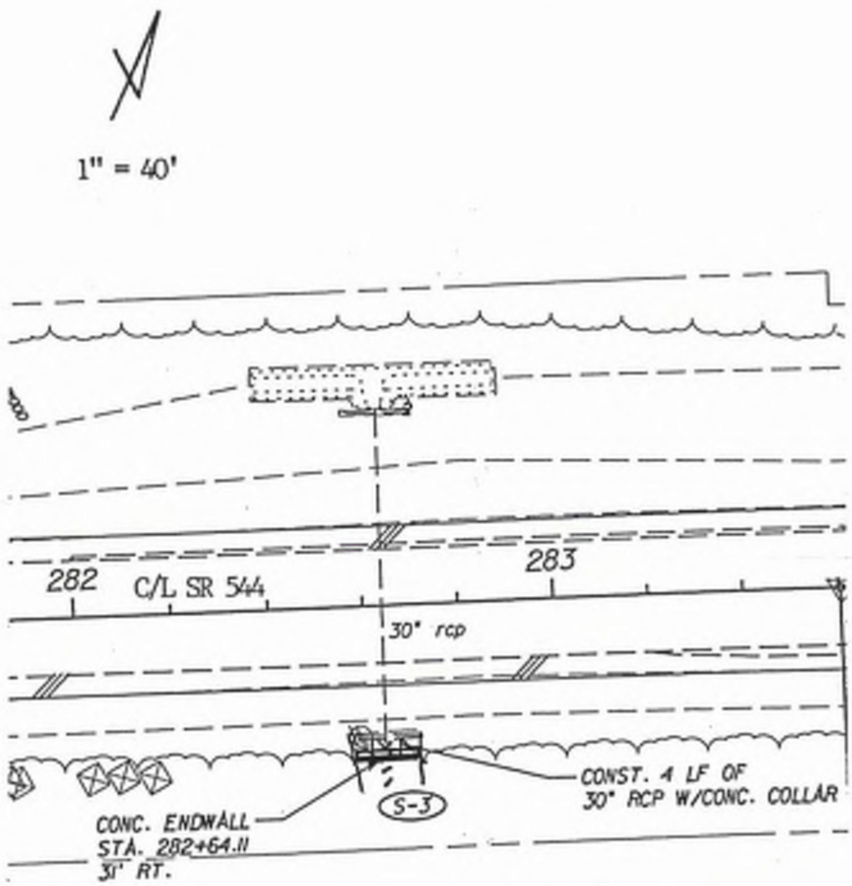
SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
Received
AUG 5 2002
RRD-BARTOW

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
APPROVED CONSTRUCTION DRAWINGS
APPROVED BY SMW 9-3-02

EDUARDO ALCIDES PONCE
CERTIFICATE NO.
STATE OF FLORIDA
PROFESSIONAL ENGINEER
8/1/02

Applicant: Florida Department of Transportation FPID: 1976971 Polk County SR 544 from N. of Ave. "Y" NE to W. of US 27	July 2002	Sheet 6 of 12

Juris. Fill = \\\
Juris. Exc. = ///



Plan View

Sta. 282 + 64.11

Imaged As Is

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
Received
AUG 5 2002
RRD-BARTOW

SOUTHWEST FLORIDA WATER
MANAGEMENT DISTRICT
APPROVED CONSTRUCTION
DRAWINGS
APPROVED BY SMW 9-3-02

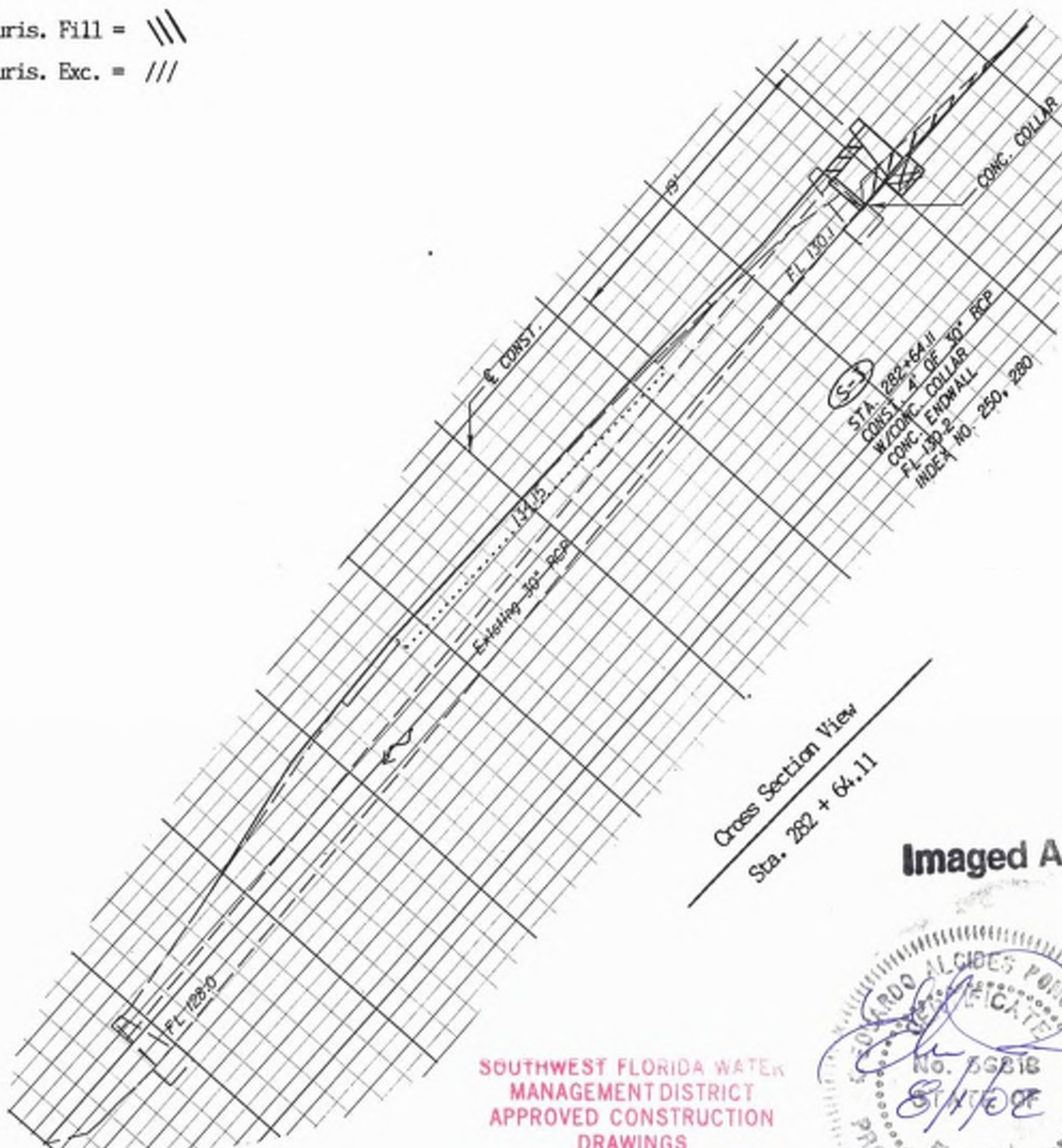
GERARDO ALCIDES PONCE
CERTIFICATE
No. 56818
STATE OF FLORIDA
PROFESSIONAL ENGINEER
8/1/02

Applicant: Florida Department of Transportation FPID: 1976971 Polk County SR 544 from N. of Ave. "Y" NE to W. of US 27	July 2002	Sheet 7 of 12

Scale: 1" = 10' Vert. & Horiz.

Juris. Fill = \\\

Juris. Exc. = ///



Cross Section View

Sta. 282 + 64.11

Imaged As Is

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
APPROVED CONSTRUCTION DRAWINGS
APPROVED BY SMW 9-3-02

ALCIDES PONCE, P.E.
No. 56818
STATE OF FLORIDA
PROFESSIONAL ENGINEER
8/1/02

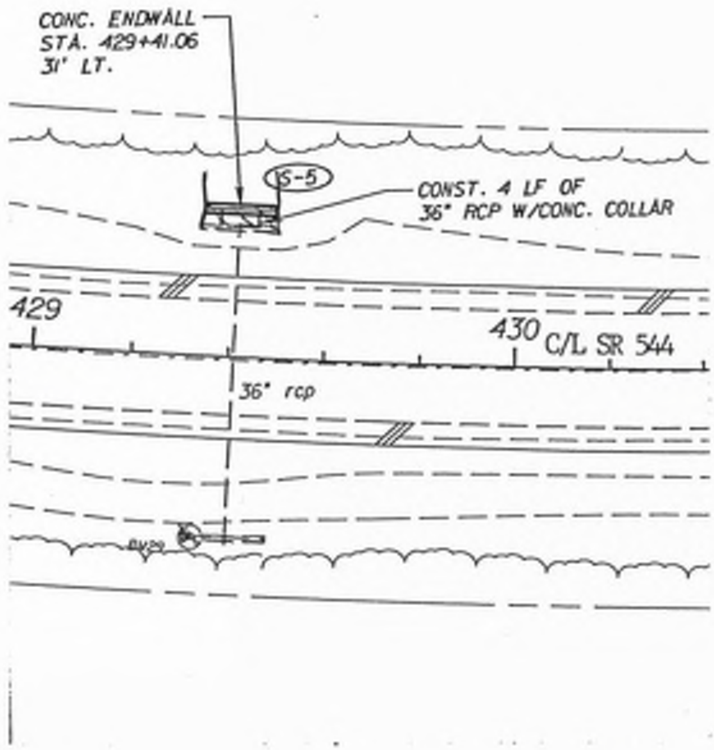
Applicant: Florida Department of Transportation FPID: 1976971 Polk County SR 544 from N. of Ave. "Y" NE to W. of US 27	July 2002	Sheet 8 of 12

CD-10

Juris. Fill = \\\

Juris. Exc. = ///

1" = 40'



Plan View

Sta. 429 + 41.06

Imaged As Is

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT Received AUG 5 2002 RRD-BARTOW

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT APPROVED CONSTRUCTION DRAWINGS

APPROVED BY SMW 9-3-02

S.W.F.W.M.D. AUG -7 2002 ARR RECORDS & DATA

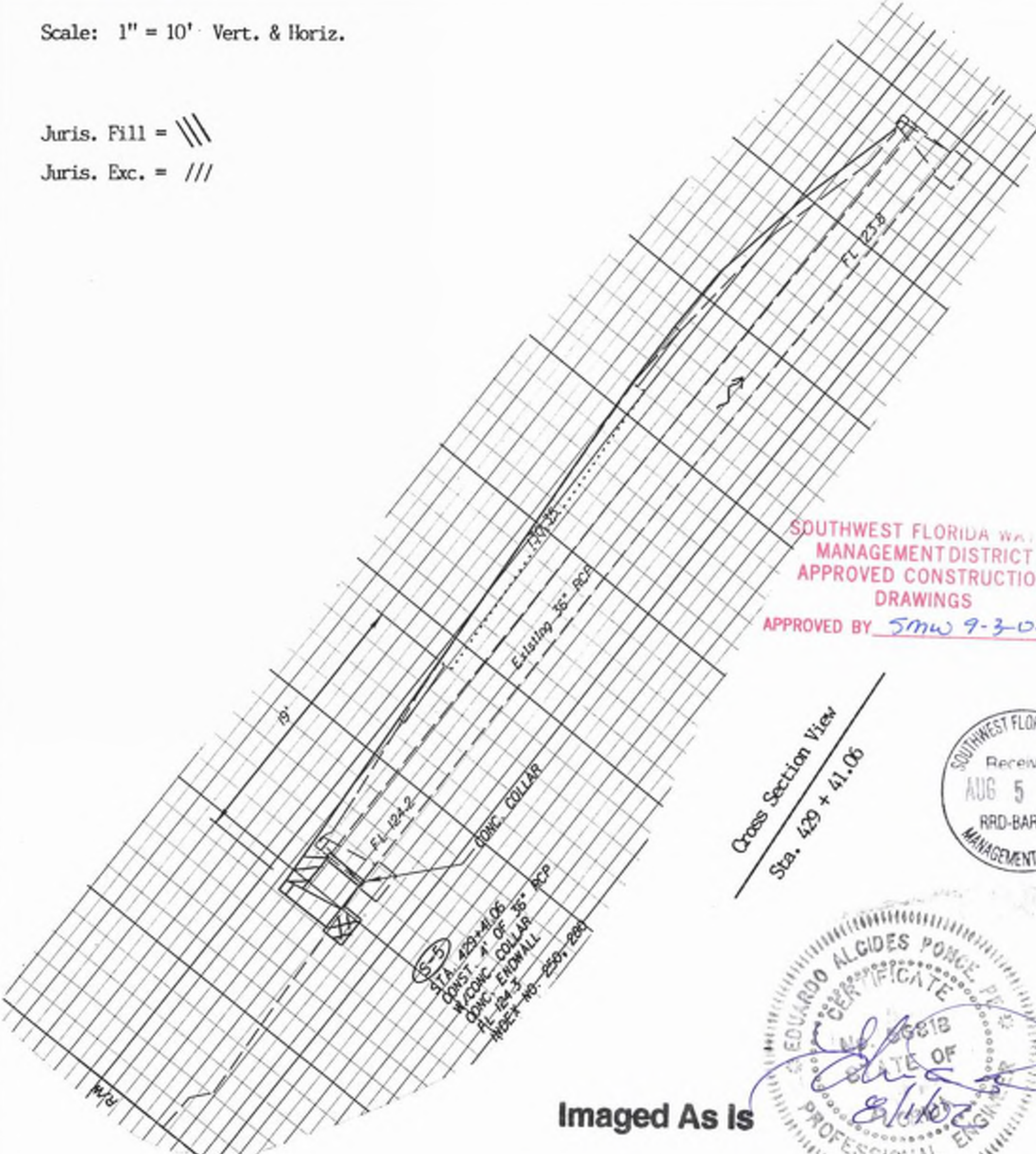
8/1/02

Applicant: Florida Department of Transportation FPID: 1976971 Polk County SR 544 from N. of Ave. "Y" NE to W. of US 27	July 2002	Sheet 9 of 12

Scale: 1" = 10' Vert. & Horiz.

Juris. Fill = \\\

Juris. Exc. = ///



Cross Section View
Sta. 429 + 41.06

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
APPROVED CONSTRUCTION DRAWINGS
APPROVED BY SMW 9-3-02

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
Received
AUG 5 2002
RRD-BARTOW

EDUARDO ALCIDES PONCE, P.E.
CERTIFICATE No. 56818
STATE OF FLORIDA
PROFESSIONAL ENGINEER
8/1/02

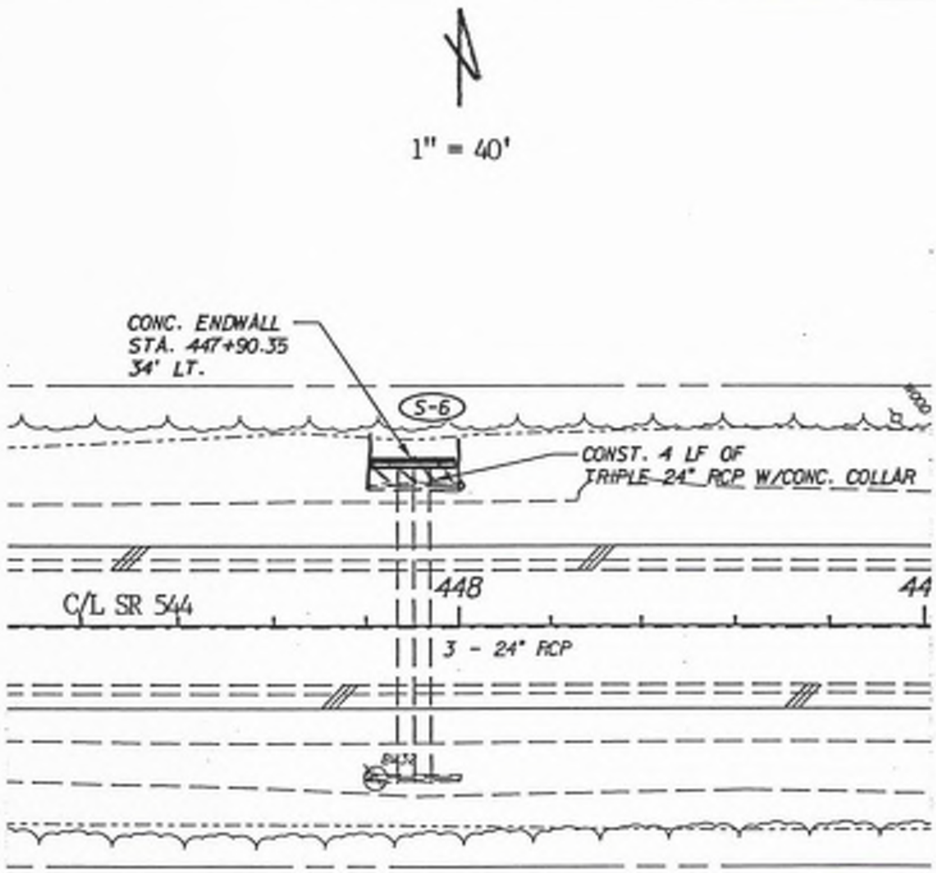
Imaged As Is

Applicant: Florida Department of Transportation FPID: 1976971 Polk County SR 544 from N. of Ave. "Y" NE to W. of US 27	July 2002	Sheet 10 of 12

CD-13

Juris. Fill = \\\

Juris. Exc. = ///



Plan View

Sta. 447 + 90.35

Imaged As Is

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT Received AUG 5 2002 RRD-BARTOW

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT APPROVED CONSTRUCTION DRAWINGS APPROVED BY SMW 9-3-02

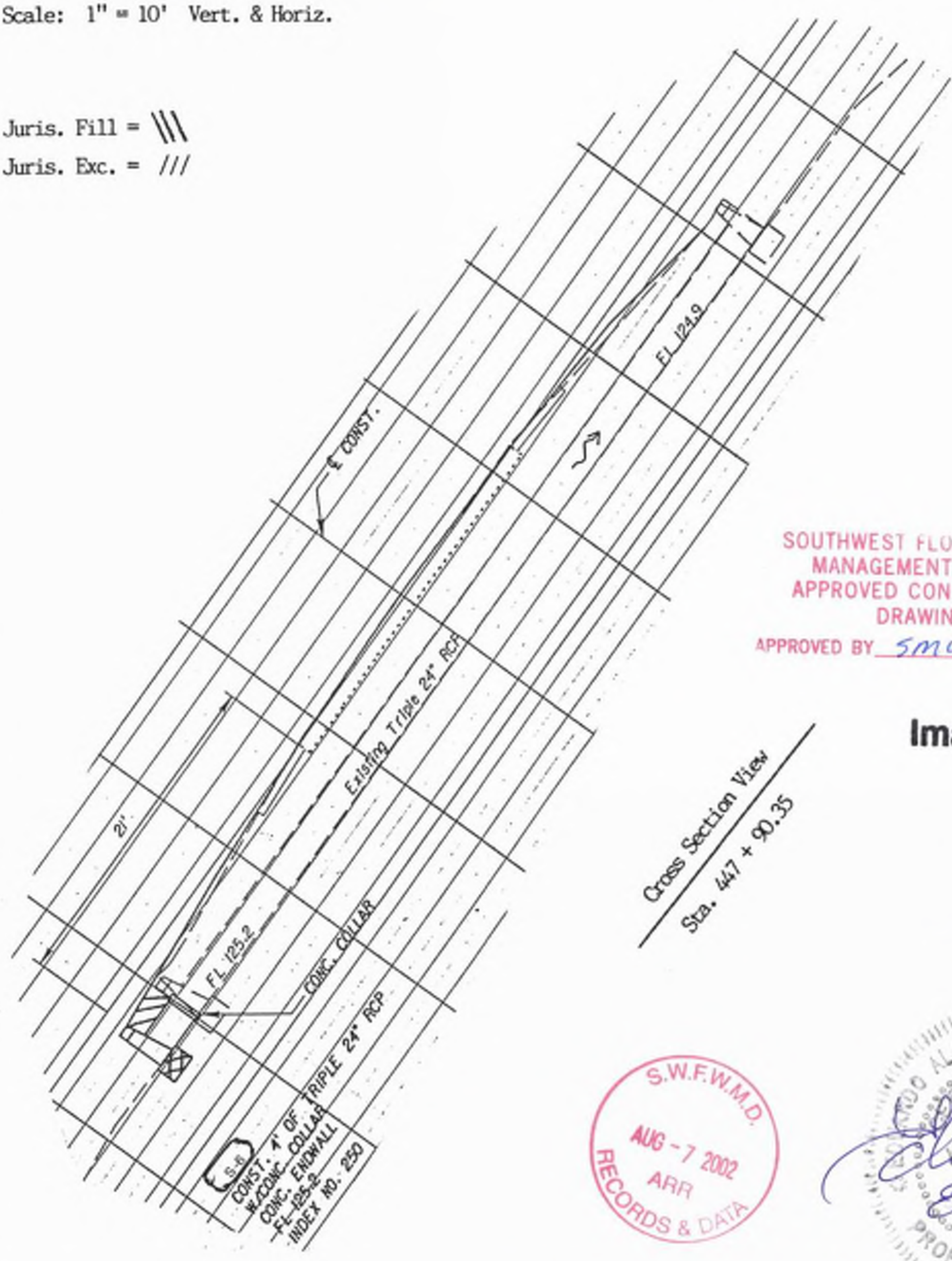
EDUARDO ALCIDES PONCE, P.E. CERTIFICATE NO. 56818 STATE OF FLORIDA PROFESSIONAL ENGINEER 8/1/02

Applicant: Florida Department of Transportation FPID: 1976971 Polk County SR 544 from N. of Ave. "Y" NE to W. of US 27	July 2002	Sheet 11 of 12

Scale: 1" = 10' Vert. & Horiz.

Juris. Fill = \\\

Juris. Exc. = ///



SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT APPROVED CONSTRUCTION DRAWINGS
APPROVED BY SMW 9-3-02

Imaged As Is

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT Received AUG 5 2002 BARTOW

S.W.F.W.M.D. AUG - 7 2002 ARR RECORDS & DATA

ALCIDES PONCE CERTIFICATE No. 56818 STATE OF FLORIDA PROFESSIONAL ENGINEER

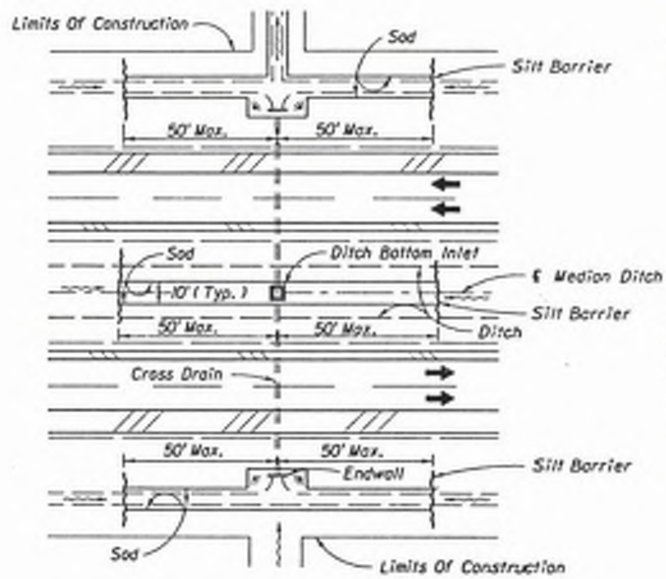
8/1/02

Applicant: Florida Department of Transportation FPID: 1976971 Polk County SR 544 from N. of Ave. "Y" NE to W. of US 27	July 2002	Sheet 12 of 12

EROSION AND SEDIMENT CONTROL DETAILS
PIPE CULVERT EXTENSION

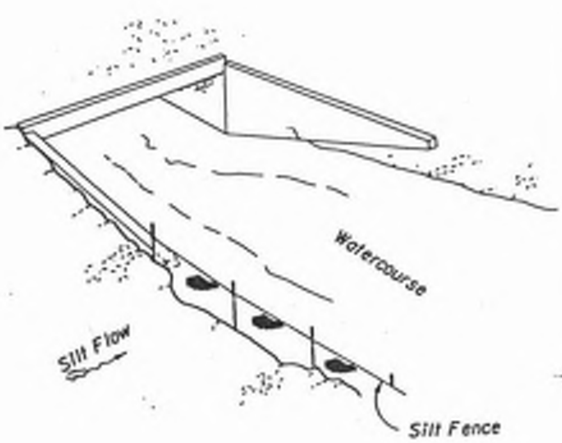
IN ACCORDANCE WITH FDOT STANDARD INDEX 102

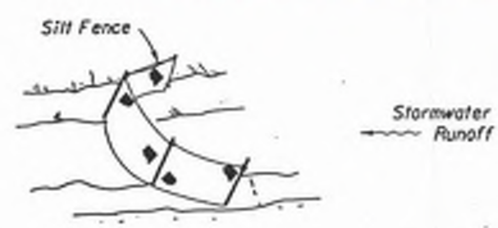
Imaged As Is



DITCH INSTALLATIONS AT DRAINAGE STRUCTURES

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
APPROVED CONSTRUCTION DRAWINGS
APPROVED BY SMW 9-3-02





Silt Fence Protection
In Ditches with Intermittent Flow

Typical Installation: STA 242+14.01, STA 271+03.47, STA 282+64.11, STA 429+41.06, STA 447+90.35

All Erosion and Sediment Control Best Management Practices shall be in compliance with the FDOT Standard Specifications for Road and Bridge Construction, Section 104-5, and the National Pollution Discharge Elimination System, 33 USC 1342.

Applicant: Florida Department of Transportation **FPID: 1976971 Polk County** **SR 544 from N. of Ave. "Y" NE to W. of US 27**	**August 2002**	**Sheet 1 of 1**

PERMIT NO. 43213.000

Lake Smart Properties

SECTION 3.3

Pre-Basin 100

SCS Runoff Volume Calculations

From NEH 4

Curve Number (CN) =	67.5				
Rainfall Depth (P) =	7.0	inches			
Potential Storage Abstraction (S) =	4.81				$S = (1000/CN) - 10$
Runoff Depth (Q) =	**3.36**	inches			$Q = ((P - 0.2S)^2) / (P + 0.8S)$
Drainage Area (A) =	1,028,887	sq. ft.	**23.62**	acres	
Runoff Volume (V) =	**287,959**	cu. ft. =	**6.61**	acre ft.	$V = Q\ A$

SCS Peak Runoff Rate

Peak Runoff Rate = **47.99** cfs

Time (Hrs)	Type II Fl. Mod.	Accum. Rain (In.)	Hist. Runoff (Ft.)	Hist. Runoff (Ac.-Ft.)	Hist. Runoff (cfs)
0.0	0.000	0.00	0.00	0.00	0.00
0.5	0.006	0.04	0.02	0.04	0.96
1.0	0.012	0.08	0.04	0.08	0.96
1.5	0.019	0.13	0.06	0.13	1.12
2.0	0.025	0.18	0.08	0.17	0.96
2.5	0.032	0.22	0.11	0.21	1.12
3.0	0.039	0.27	0.13	0.26	1.12
3.5	0.047	0.33	0.16	0.31	1.28
4.0	0.054	0.38	0.18	0.36	1.12
4.5	0.062	0.43	0.21	0.41	1.28
5.0	0.071	0.50	0.24	0.47	1.44
5.5	0.080	0.56	0.27	0.53	1.44
6.0	0.089	0.62	0.30	0.59	1.44
6.5	0.099	0.69	0.33	0.65	1.60
7.0	0.110	0.77	0.37	0.73	1.76
7.5	0.122	0.85	0.41	0.81	1.92
8.0	0.134	0.94	0.45	0.89	1.92
8.5	0.148	1.04	0.50	0.98	2.24
9.0	0.164	1.15	0.55	1.08	2.56
9.5	0.181	1.27	0.61	1.20	2.72
10.0	0.201	1.41	0.68	1.33	3.20
10.5	0.226	1.58	0.76	1.49	4.00
11.0	0.258	1.81	0.87	1.71	5.12
11.5	0.308	2.16	1.03	2.04	8.00
11.6	0.368	2.58	1.24	2.43	47.99
11.7	0.428	3.00	1.44	2.83	47.99
11.8	0.487	3.41	1.64	3.22	47.19
11.9	0.547	3.83	1.84	3.62	47.99
12.0	0.607	4.25	2.04	4.01	47.99
12.1	0.629	4.40	2.11	4.16	17.60
12.2	0.652	4.56	2.19	4.31	18.40
12.3	0.674	4.72	2.26	4.46	17.60

12.4	0.697	4.88	2.34	4.61	18.40
12.5	0.719	5.03	2.41	4.75	17.60
13.0	0.757	5.30	2.54	5.00	6.08
13.5	0.785	5.50	2.64	5.19	4.48
14.0	0.807	5.65	2.71	5.33	3.52
14.5	0.826	5.78	2.77	5.46	3.04
15.0	0.842	5.89	2.83	5.57	2.56
15.5	0.857	6.00	2.88	5.67	2.40
16.0	0.870	6.09	2.92	5.75	2.08
16.5	0.882	6.17	2.96	5.83	1.92
17.0	0.893	6.25	3.00	5.90	1.76
17.5	0.904	6.33	3.04	5.98	1.76
18.0	0.913	6.39	3.07	6.04	1.44
18.5	0.923	6.46	3.10	6.10	1.60
19.0	0.931	6.52	3.13	6.15	1.28
19.5	0.940	6.58	3.16	6.21	1.44
20.0	0.948	6.64	3.18	6.27	1.28
20.5	0.955	6.69	3.21	6.31	1.12
21.0	0.962	6.73	3.23	6.36	1.12
21.5	0.969	6.78	3.25	6.41	1.12
22.0	0.976	6.83	3.28	6.45	1.12
22.5	0.983	6.88	3.30	6.50	1.12
23.0	0.989	6.92	3.32	6.54	0.96
23.5	0.995	6.97	3.34	6.58	0.96
24.0	1.000	7.00	3.36	6.61	0.80

Post-Basin 100

SCS Runoff Volume Calculations

From NEH 4

Curve Number (CN) =	78.0				
Rainfall Depth (P) =	7.0	inches			
Potential Storage Abstraction (S) =	2.82				S = (1000/CN) - 10
Runoff Depth (Q) =	**4.47**	inches			Q = ((P - 0.2S)^2) / (P + 0.8S)
Drainage Area (A) =	1,028,887	sq. ft.	**23.62**	acres	
Runoff Volume (V) =	**383,674**	cu. ft. =	**8.81**	acre ft.	V = Q A

SCS Peak Runoff Rate

Peak Runoff Rate = **63.95** cfs

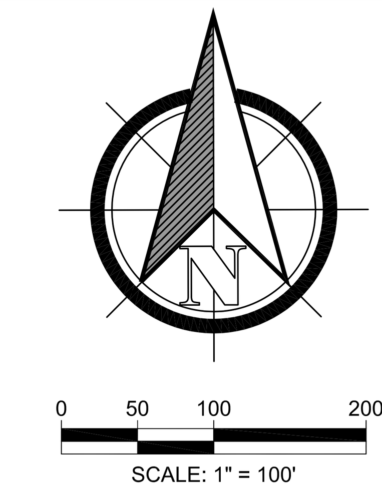
Time (Hrs)	Type II Fl. Mod.	Accum. Rain (In.)	Hist. Runoff (Ft.)	Hist. Runoff (Ac.-Ft.)	Hist. Runoff (cfs)
0.0	0.000	0.00	0.00	0.00	0.00
0.5	0.006	0.04	0.03	0.05	1.28
1.0	0.012	0.08	0.05	0.11	1.28
1.5	0.019	0.13	0.09	0.17	1.49
2.0	0.025	0.18	0.11	0.22	1.28
2.5	0.032	0.22	0.14	0.28	1.49
3.0	0.039	0.27	0.17	0.34	1.49
3.5	0.047	0.33	0.21	0.41	1.71
4.0	0.054	0.38	0.24	0.48	1.49
4.5	0.062	0.43	0.28	0.55	1.71
5.0	0.071	0.50	0.32	0.63	1.92
5.5	0.080	0.56	0.36	0.70	1.92
6.0	0.089	0.62	0.40	0.78	1.92
6.5	0.099	0.69	0.44	0.87	2.13
7.0	0.110	0.77	0.49	0.97	2.34
7.5	0.122	0.85	0.55	1.07	2.56
8.0	0.134	0.94	0.60	1.18	2.56
8.5	0.148	1.04	0.66	1.30	2.98
9.0	0.164	1.15	0.73	1.44	3.41
9.5	0.181	1.27	0.81	1.59	3.62
10.0	0.201	1.41	0.90	1.77	4.26
10.5	0.226	1.58	1.01	1.99	5.33
11.0	0.258	1.81	1.15	2.27	6.82
11.5	0.308	2.16	1.38	2.71	10.66
11.6	0.368	2.58	1.65	3.24	63.95
11.7	0.428	3.00	1.92	3.77	63.95
11.8	0.487	3.41	2.18	4.29	62.88
11.9	0.547	3.83	2.45	4.82	63.95
12.0	0.607	4.25	2.72	5.35	63.95
12.1	0.629	4.40	2.81	5.54	23.45
12.2	0.652	4.56	2.92	5.74	24.51
12.3	0.674	4.72	3.02	5.94	23.45

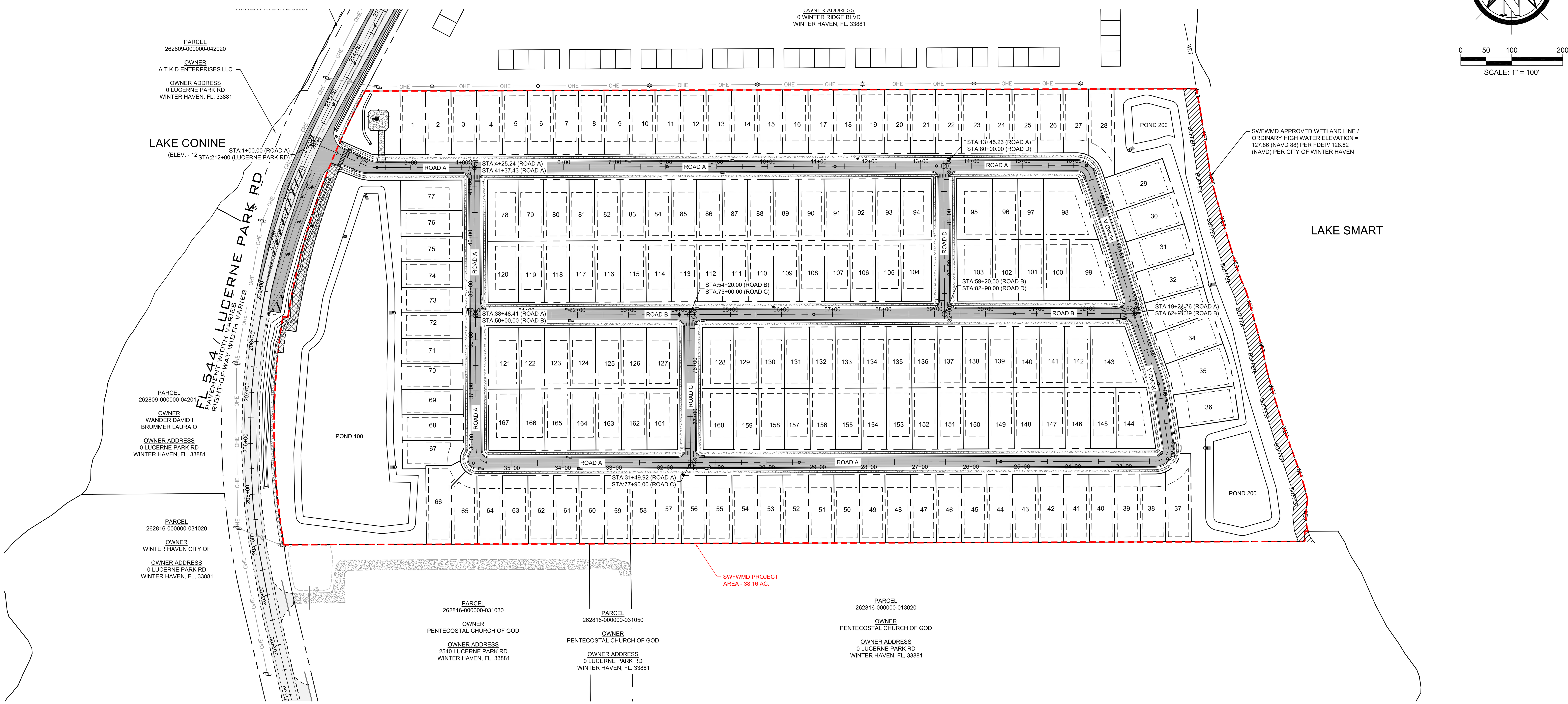
12.4	0.697	4.88	3.12	6.14	24.51
12.5	0.719	5.03	3.22	6.33	23.45
13.0	0.757	5.30	3.39	6.67	8.10
13.5	0.785	5.50	3.51	6.91	5.97
14.0	0.807	5.65	3.61	7.11	4.69
14.5	0.826	5.78	3.70	7.28	4.05
15.0	0.842	5.89	3.77	7.42	3.41
15.5	0.857	6.00	3.83	7.55	3.20
16.0	0.870	6.09	3.89	7.66	2.77
16.5	0.882	6.17	3.95	7.77	2.56
17.0	0.893	6.25	4.00	7.87	2.34
17.5	0.904	6.33	4.05	7.96	2.34
18.0	0.913	6.39	4.09	8.04	1.92
18.5	0.923	6.46	4.13	8.13	2.13
19.0	0.931	6.52	4.17	8.20	1.71
19.5	0.940	6.58	4.21	8.28	1.92
20.0	0.948	6.64	4.24	8.35	1.71
20.5	0.955	6.69	4.27	8.41	1.49
21.0	0.962	6.73	4.30	8.47	1.49
21.5	0.969	6.78	4.34	8.53	1.49
22.0	0.976	6.83	4.37	8.60	1.49
22.5	0.983	6.88	4.40	8.66	1.49
23.0	0.989	6.92	4.43	8.71	1.28
23.5	0.995	6.97	4.45	8.76	1.28
24.0	1.000	7.00	4.47	8.81	1.07

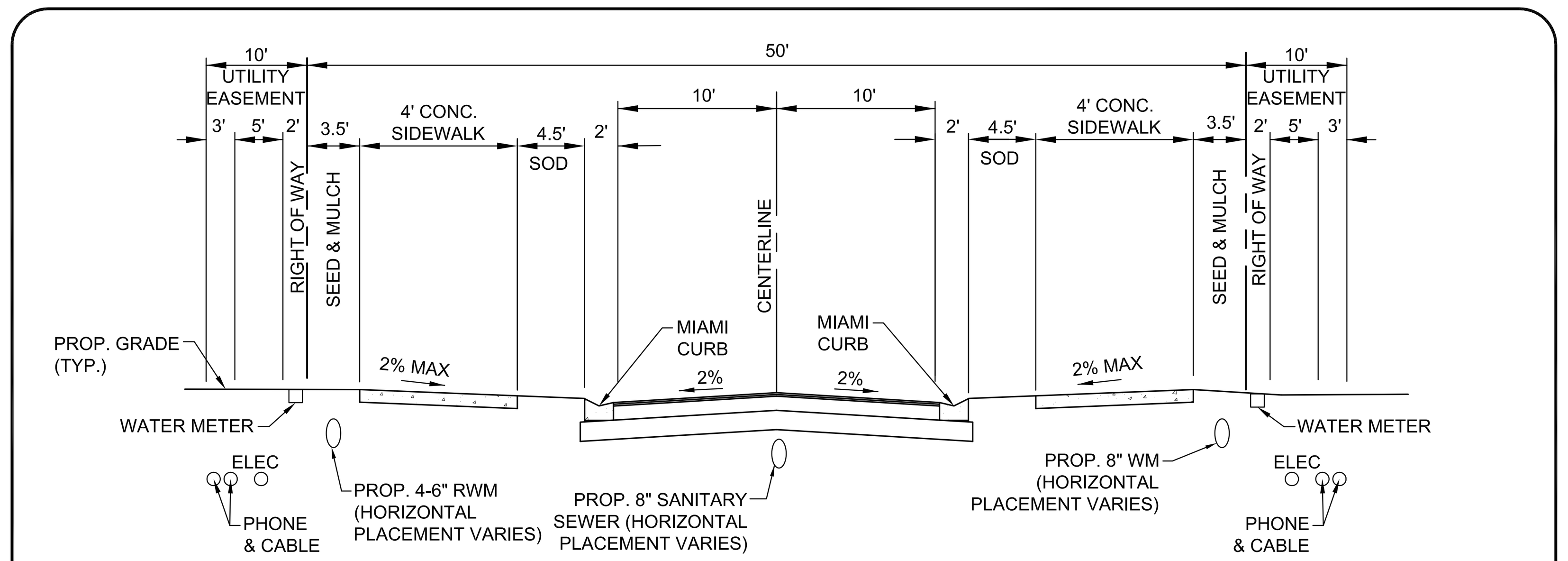
Project Name: Lake Smart **Pond 100** **Date:** 7/21/17
Project No.: 1352.02

Pond Feature	Elevation/Stage (ft)	Area (sf)	Area (acres)	Incremental Volume (cf)	Total Volume (cf)	Incremental Volume (ac-ft)	Total Volume (ac-ft)
Bottom	134.00	85889.06	1.97	0.00	0.00	0.00	0.00
1/2" Treament	134.55	89382.00	2.05	48199.54	48199.54	1.11	1.11
Increment	135.00	92264.88	2.12	40870.55	89070.09	0.94	2.04
25-Year DHWL	135.70	96792.04	2.22	66169.92	155240.01	1.52	3.56
Increment	136.00	98752.02	2.27	29331.61	184571.62	0.67	4.24
Increment	137.00	105350.75	2.42	102051.39	286623.00	2.34	6.58
TOB	137.50	108692.07	2.50	53510.71	340133.71	1.23	7.81

Sim	Node Name	Warning Stage [ft]	Maximum Stage [ft]	Maximum Total Inflow Rate [cfs]
100yr24hr	Pond 200	140.00	139.56	40.00
25yr24hr	Outfall 100	129.90	129.90	12.42
25yr24hr	Pond 100	137.50	135.70	55.99
25yr24hr	Pre	160.00	160.00	41.27
25yr24hr	Swale	131.65	130.78	12.43

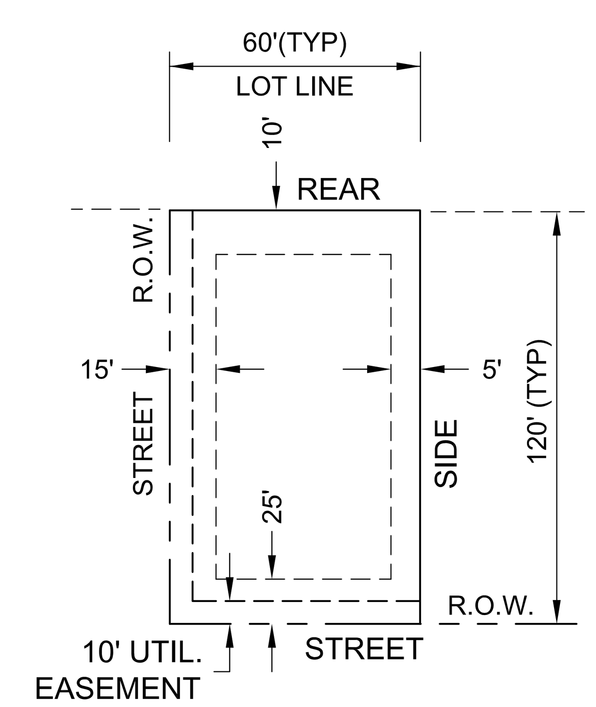




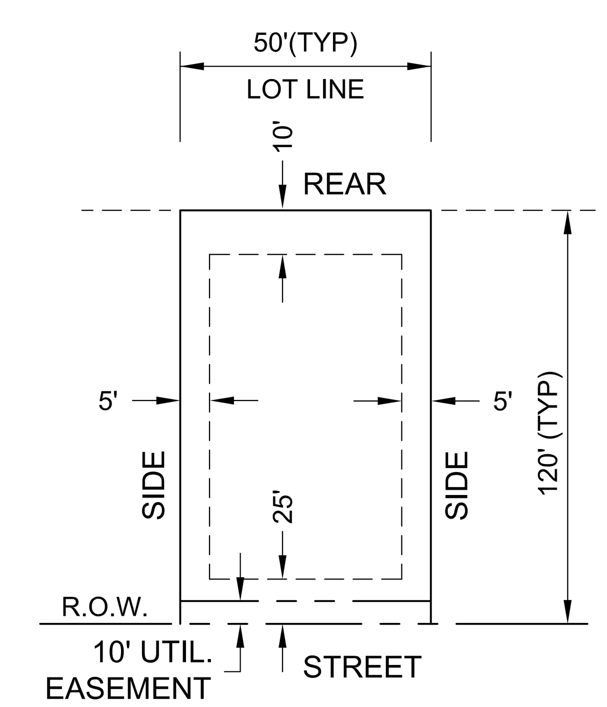


TYP ROAD SECTION (N.T.S.)

Know what's **below.** Call before you dig.



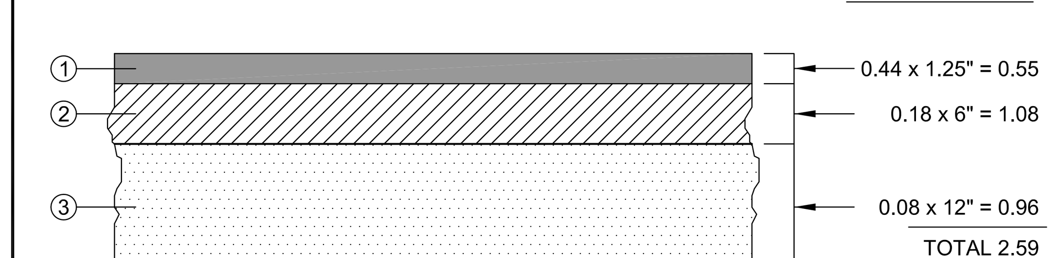
TYPICAL 7,200 S.F.
CORNER LOT
N.T.S.



TYPICAL 6,000 S.F.
WIDE LOT
N.T.S.

LOTS ADJACENT TO LAKE SMART SHALL MAINTAIN A MINIMUM 40' SETBACK FROM THE HIGH WATER ELEVATION OF 128.82 (NAVD)

STRUCTURAL NO.



MATERIAL SPECIFICATIONS FOR NEW CONSTRUCTION WITHIN ON SITE RIGHT-OF-WAY (SEE NOTE)

1. 1 1/4" TYPE S-3 ASPHALTIC CONCRETE, F.D.O.T. SPEC. #320
2. 6" LIMEROCK BASE , COMPACTED TO 98% AASHTO - T180 (L.B.R. 100), F.D.O.T. SPEC. #200 , PRIME @ 0.10 GALS. PER SQ. YD., F.D.O.T. SPEC. #300.
3. 12" TYPE "B" STABILIZATION, LBR 40 (MIN.), F.D.O.T. SPEC. 160-7 , COMPACTED TO 98% AASHTO T-180.

NOTE:
FOR MATERIAL SPECIFICATION FOR NEW CONSTRUCTION WITHIN FDOT R.O.W, REFER TO THE FDOT PLANS

GENERAL SITE NOTES

1. CONTRACTOR TO REFER TO ARCHITECTURAL DRAWINGS FOR DETAILED LAYOUT OF SPECIFIC BUILDINGS AND SITE FEATURES.
2. CONTRACTOR TO PROVIDE CONCRETE PAVING ALTERNATE FOR PROPOSED ASPHALT PAVING PER TYPICAL CONCRETE SECTION.

DESIGNED BY:	JH	DATE: Dec 21, 2017
DRAFTED BY:	AH	JOB NO.: 1325.02
CHECKED BY:	MJ	

NO.	DATE	DESCRIPTION
1		
2		
3		
4		
5		
6		

JSK CONSULTING
CREATING • IMPLEMENTING • SOLVING
Engineers, Land Planners
Construction Managers
5904 Hillside Heights Drive
Lakeland, Florida 33812
Phone (863) 619-6131
Fax (863) 619-6103
Certificate of Authorization No. 26032
www. jsk-consulting.com

LAKE SMART PROPERTIES

LUCERNE PARK RD
WINTER HAVEN, FL 33881

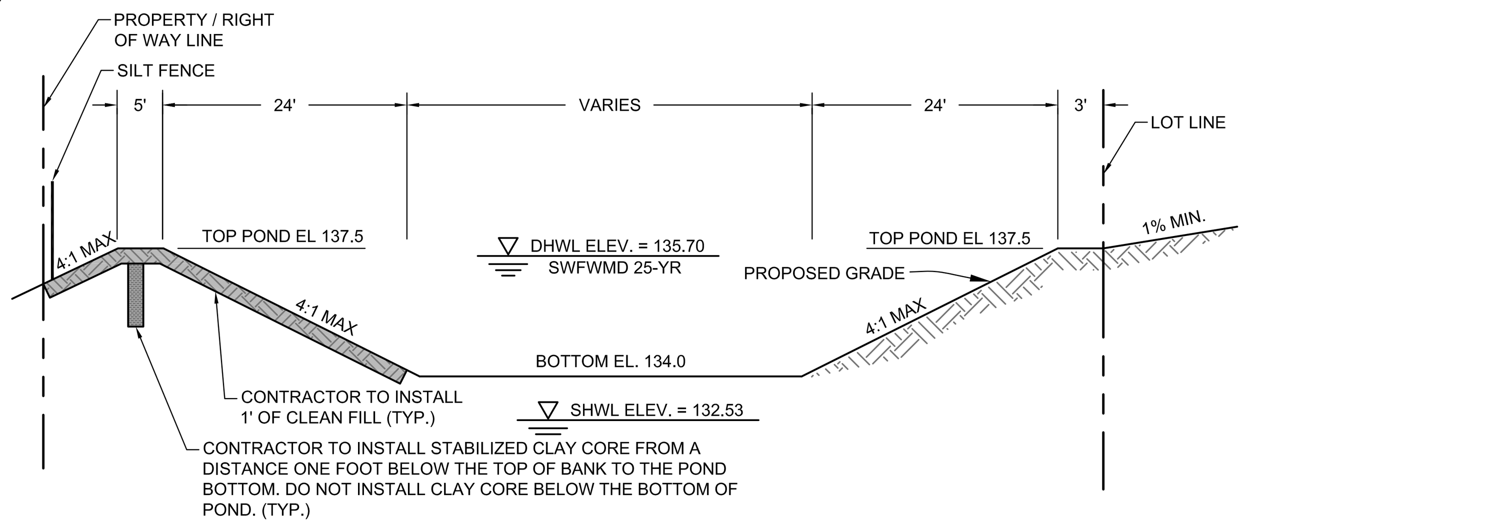
OVERALL GEOMETRY PLAN

THIS ITEM HAS BEEN ELECTRONICALLY SIGNED AND SEALED BY MATTHEW K. JOHNSON, P.E. USING A SHA-1 AUTHENTICATION CODE.

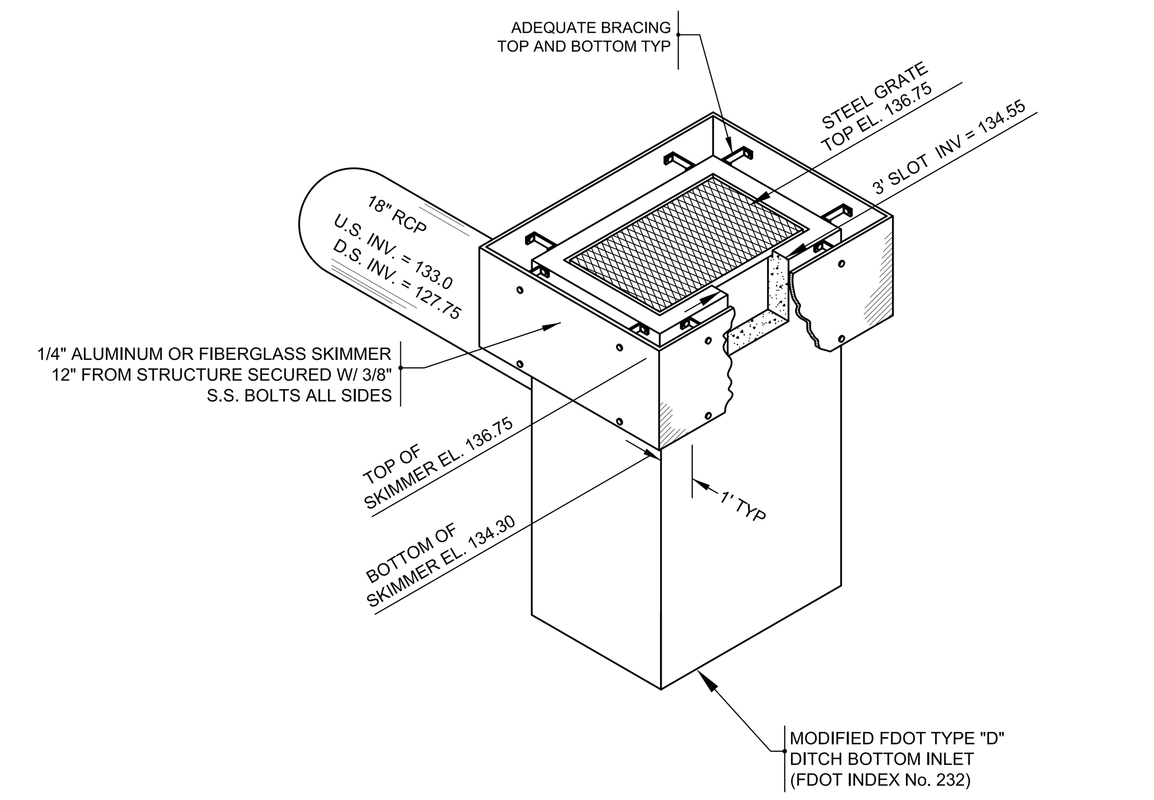
MATTHEW K. JOHNSON, P.E.
FLA. P.E. No. 60129

DATE

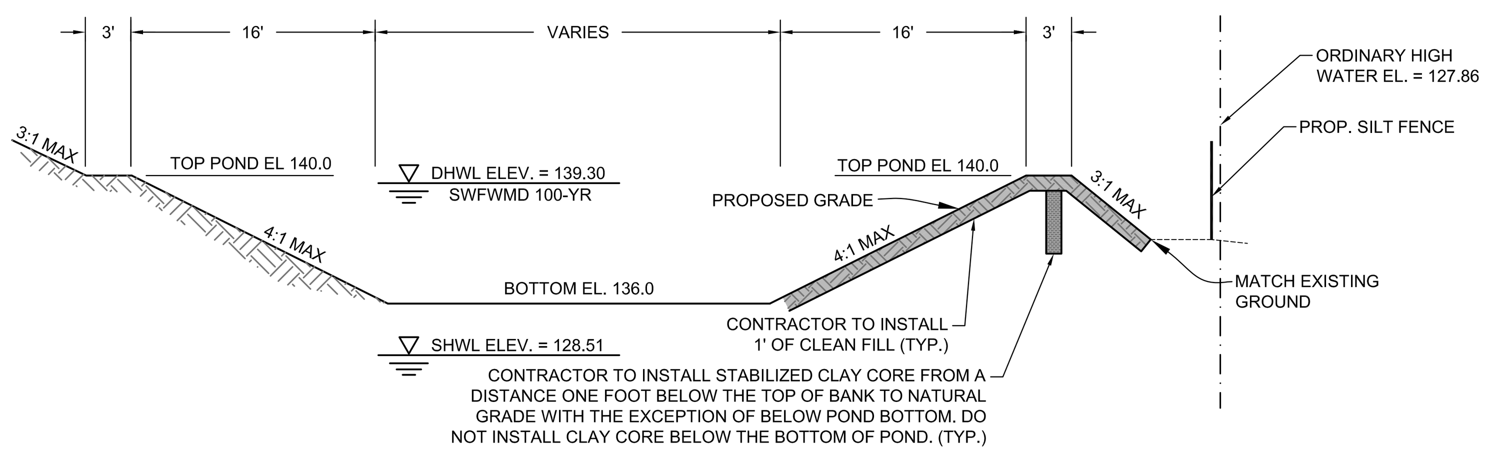
SHEET NUMBER
C500



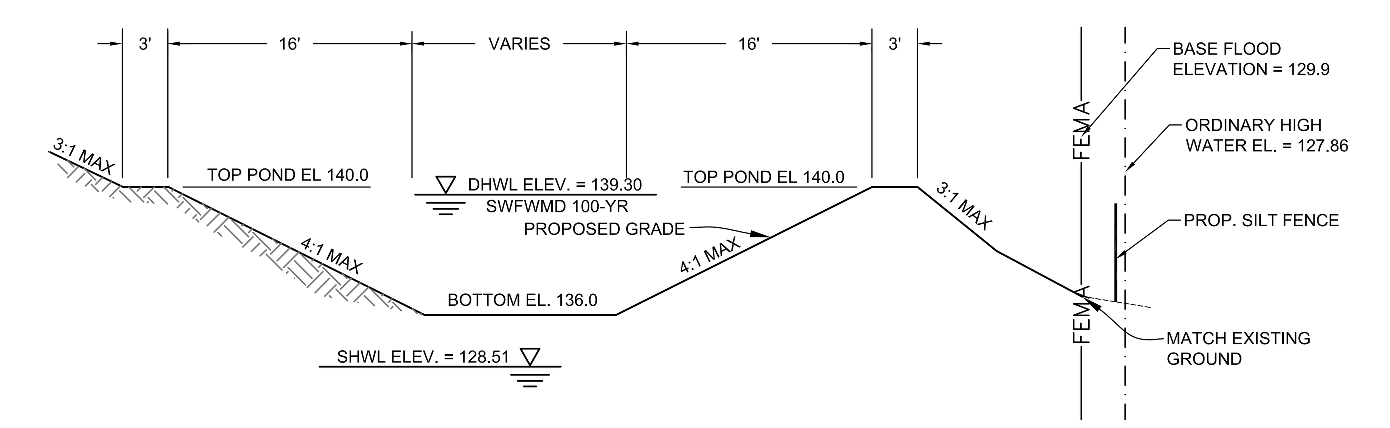
B POND 100 SECTION
N.T.S.



CONTROL STRUCTURE 'CS-1' DETAIL
N.T.S.



C POND 200 SECTION
N.T.S.



J POND 200 SECTION
N.T.S.

811 Know what's below. Call before you dig.

P:\1325.02 - Lake Smart\ENGINEERING\1325.02 - GRADING.dwg
Thursday, December 21, 2017 11:59:51 AM

DESIGNED BY: JH
DRAFTED BY: AH
CHECKED BY: MJ
DATE Dec 21, 2017
JOB NO. 1325.02

NO.	DATE	DESCRIPTION
1		
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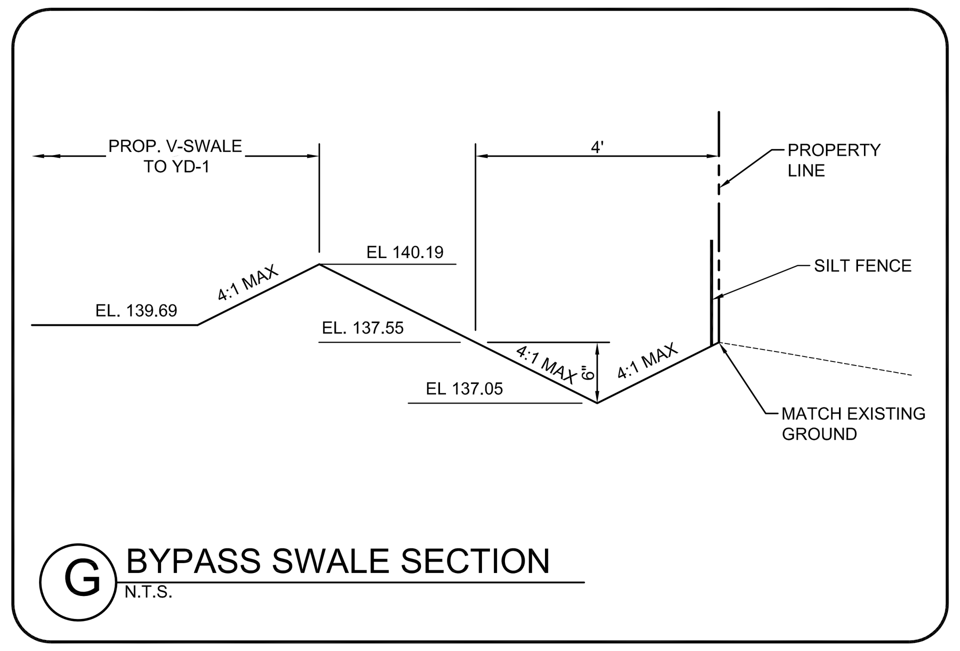
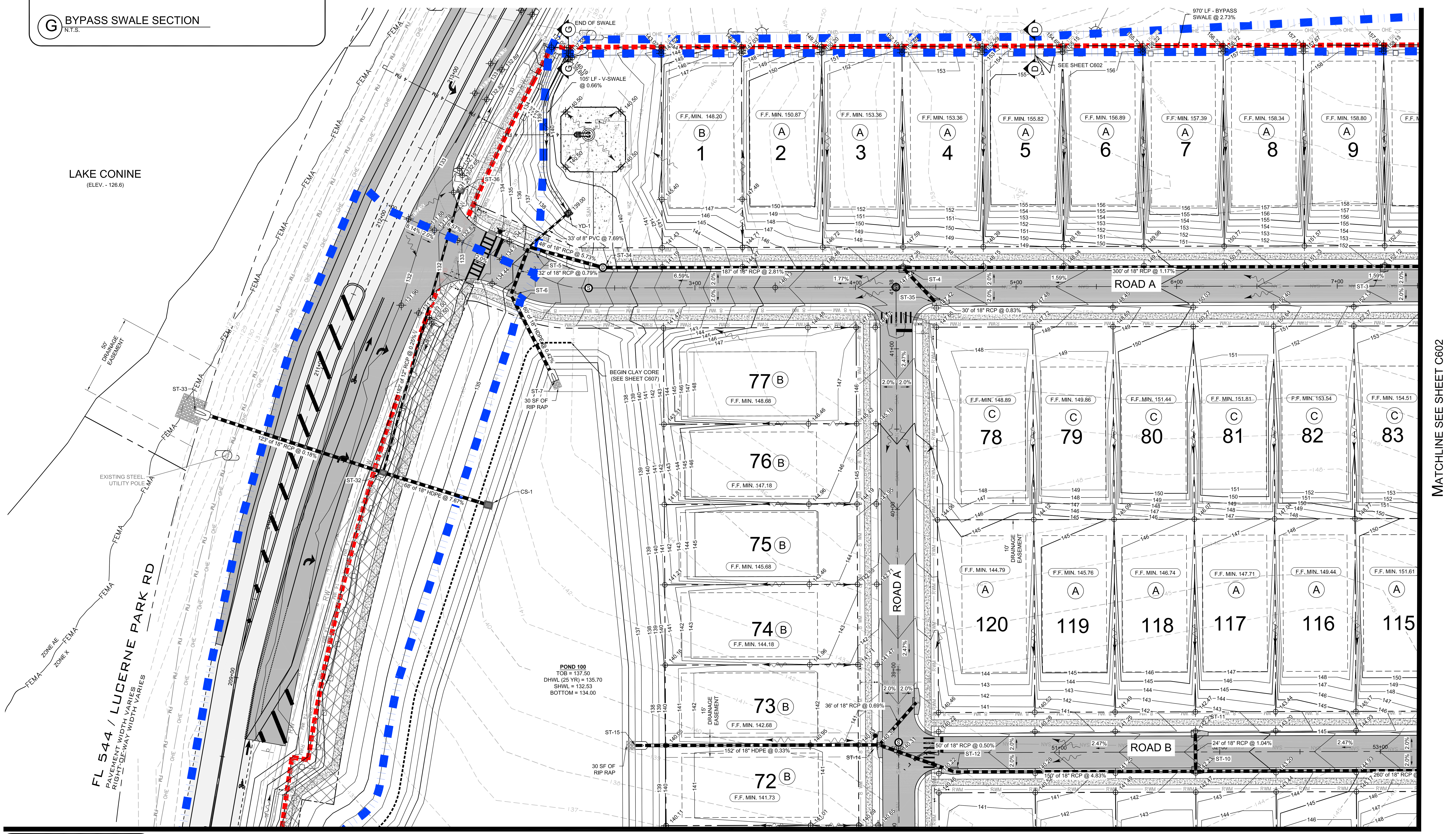
LAKE SMART PROPERTIES
LUCERNE PARK RD
WINTER HAVEN, FL 33881
POND CROSS SECTION

MATTHEW K. JOHNSON, P.E.
FLA. P.E. No. 60129
DATE

SHEET NUMBER
C607





MATCHLINE SEE SHEET C604

811 Know what's below. Call before you dig.

DESIGNED BY:	JH
DRAFTED BY:	AH
CHECKED BY:	MJ
DATE	Dec 21, 2017
JOB NO.	1325.02

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LAKE SMART PROPERTIES
LUCERNE PARK RD
WINTER HAVEN, FL 33881

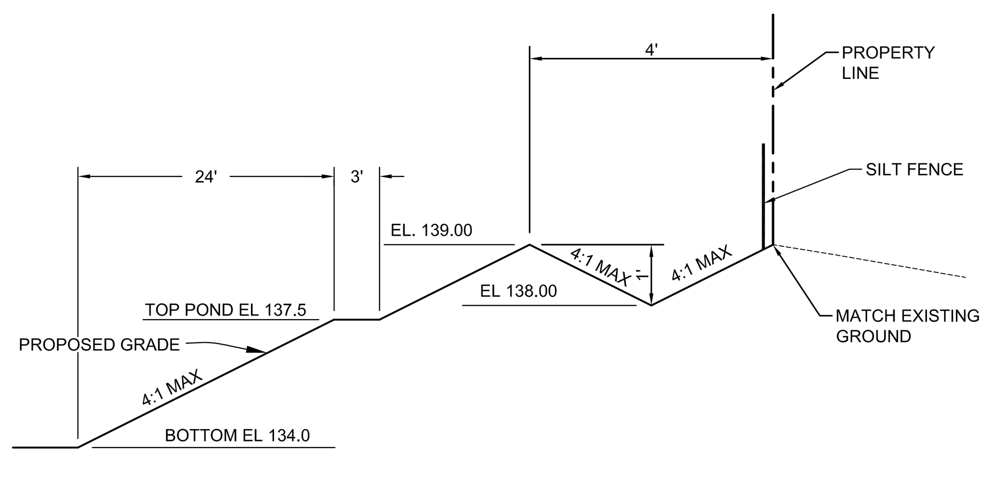
GRADING AND DRAINAGE 1

MATTHEW K. JOHNSON, P.E.
FLA. P.E. No. 60129

DATE

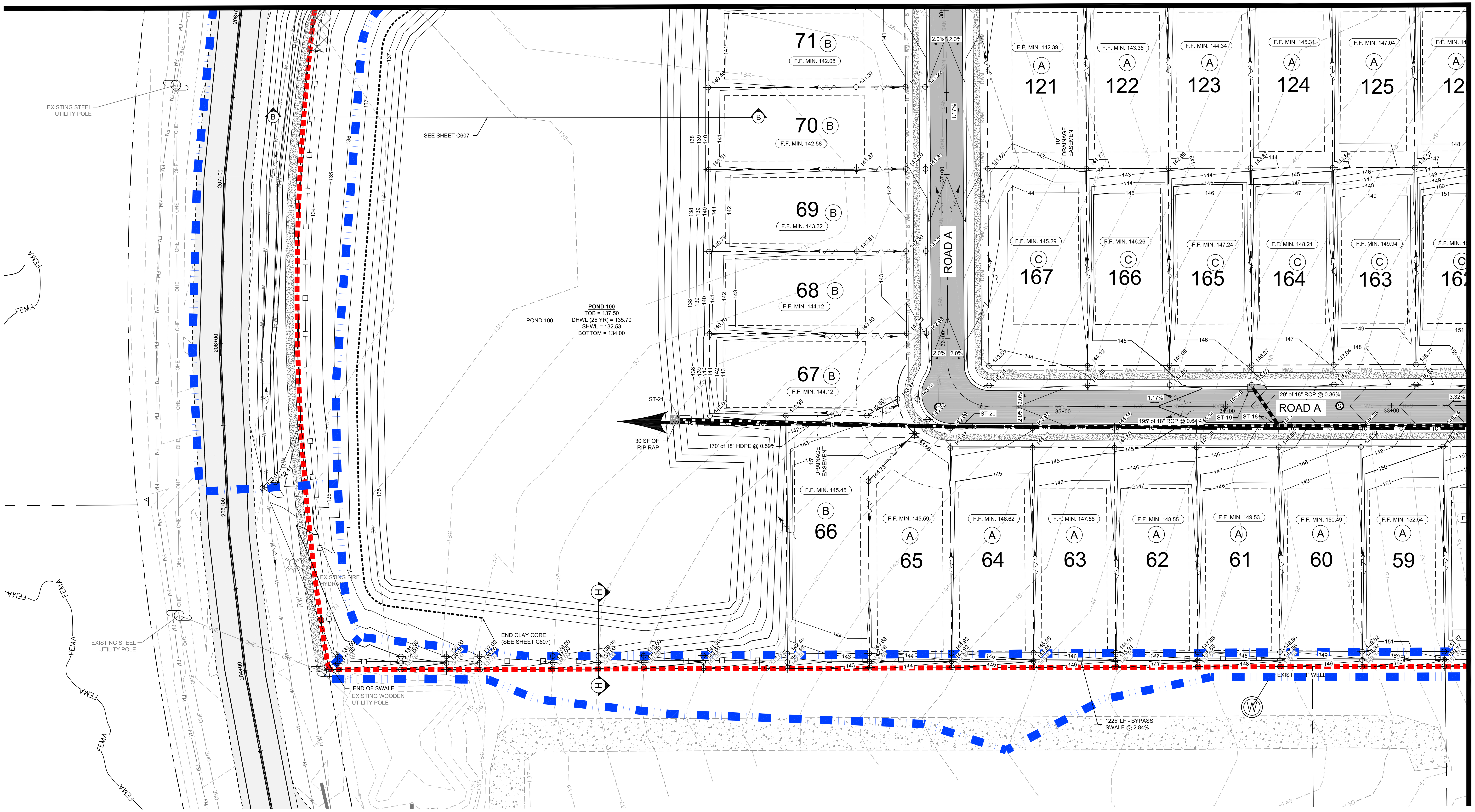
SHEET NUMBER
C601

P:\1325.02 - Lake Smart\ENGINEERING\1325.02 - GRADING.dwg
Thursday, December 21, 2017 11:46:54 AM



H BYPASS SWALE SECTION
N.T.S.

MATCHLINE SEE SHEET C601



MATCHLINE SEE SHEET C605

0 15 30 60
SCALE: 1" = 30'

811 Know what's below. Call before you dig.

NO.	DATE	DESCRIPTION
1		
2		
3		
4		
5		
6		

DESIGNED BY: JH
DRAFTED BY: AH
CHECKED BY: MJ
DATE: Dec 21, 2017
JOB NO.: 1325.02

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LAKE SMART PROPERTIES
LUCERNE PARK RD
WINTER HAVEN, FL 33881

GRADING AND DRAINAGE 4

MATTHEW K. JOHNSON, P.E.
FLA. P.E. No. 60129
DATE

SHEET NUMBER
C604

P:\1325.02 - Lake Smart\ENGINEERING\1325.02 - GRADING.dwg
Thursday, December 21, 2017 11:32:31 AM

PERMIT NO. 9134.000

Winter Ridge Condominiums

NOTES:

1) ALL CATCH BASINS TO BE D.O.T TYPE "E" INLETS. (C.B.)
2) ALL DRAINAGE AREAS TO BE RESERVED FOR WATER MANAGEMENT PURPOSES WILL BE MAINTAINED, OPERATED, AND PRESERVED AS PERMITTED AND SHOWN ON THE APPROVED CONSTRUCTION PLANS.
3) NO CONSTRUCTION SHALL BE PERMITTED WATERWARD OF THE WETLAND JURISDICTIONAL LINE, EXCEPT DOCK CONSTRUCTION. SEE CERTIFIED WETLAND LIMITS SURVEY FOR EXACT LINE LOCATION.
4) ALL ROOF DRAINS FROM BUILDINGS SHALL DRAIN TOWARD ADJACENT PAVED AREA. BUILDINGS WITH * AND ARROW MUST DRAIN IN THE DIRECTION OF ARROW. BUILDINGS WITH * AND NO ARROW MAY DRAIN TO REAR, IF OWNER ELECTS AND INSTALLS SUITABLE EROSION CONTROL.

FILE OF RECORD
PERMIT NO. 40913400

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
MAY 17 1991
RECEIVED
BARTOW, FLORIDA

PERMITTEE SHALL NOTIFY IN WRITING THE BARTOW PERMITTING DEPARTMENT SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT, WHEN CONSTRUCTION BEGINS.

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
CONSTRUCTION DRAWINGS
APPROVED
JUN 14 1991

BM#	SECT. #	ELEV.	LOCATIONS:
N.E. 52	9	137.115	Bridge at Lake Conine and Lake Smart, DOT bronze disc in wingwall, south end of bridge, 15.0 east EOP Lucerne Park Road.

PERMIT SET
NOT FOR CONSTRUCTION

DESIGNED	DCL
DRAWN	JAS
CHECKED	LdB
APPROVED	DMD
JOB NO.	910015.00
DATE	APRIL 1991

NO.	REVISION DESCRIPTION	BY	CHK	DATE
1			LdB	5/1/91

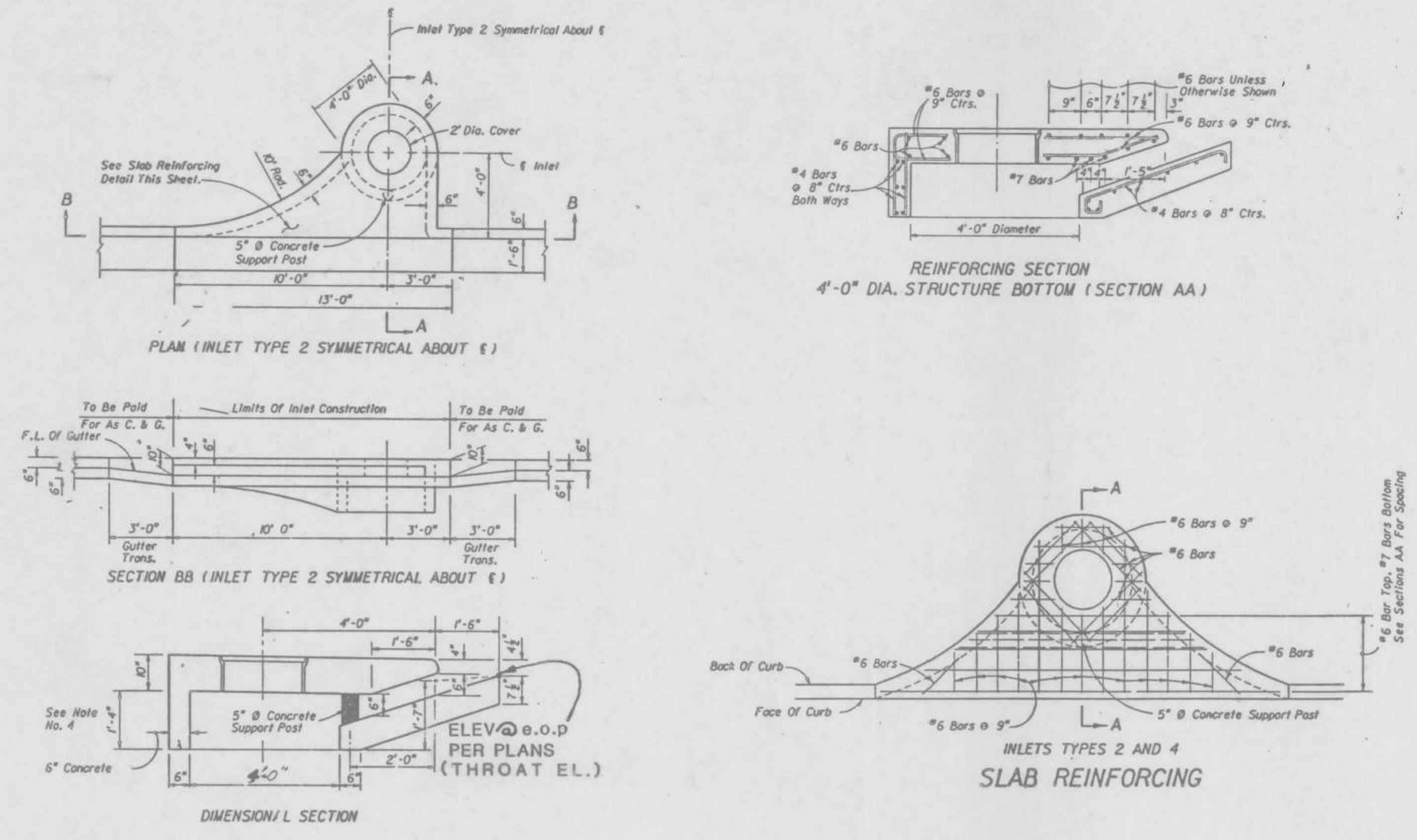
ENVISORS, Inc
ENGINEERING & PLANNING
WINTER HAVEN, FLA. (813) 324-1112

PAVING, GRADING, AND DRAINAGE PLAN
1 OF 2
LAKE SMART VILLAGE, CONDOMINIUM DEVELOPMENT
GUY T. RIZZO
FLORIDA P.E. NO. 13097
DATE: 5/16/91

SHEET NO.
6
OF SHEETS

13

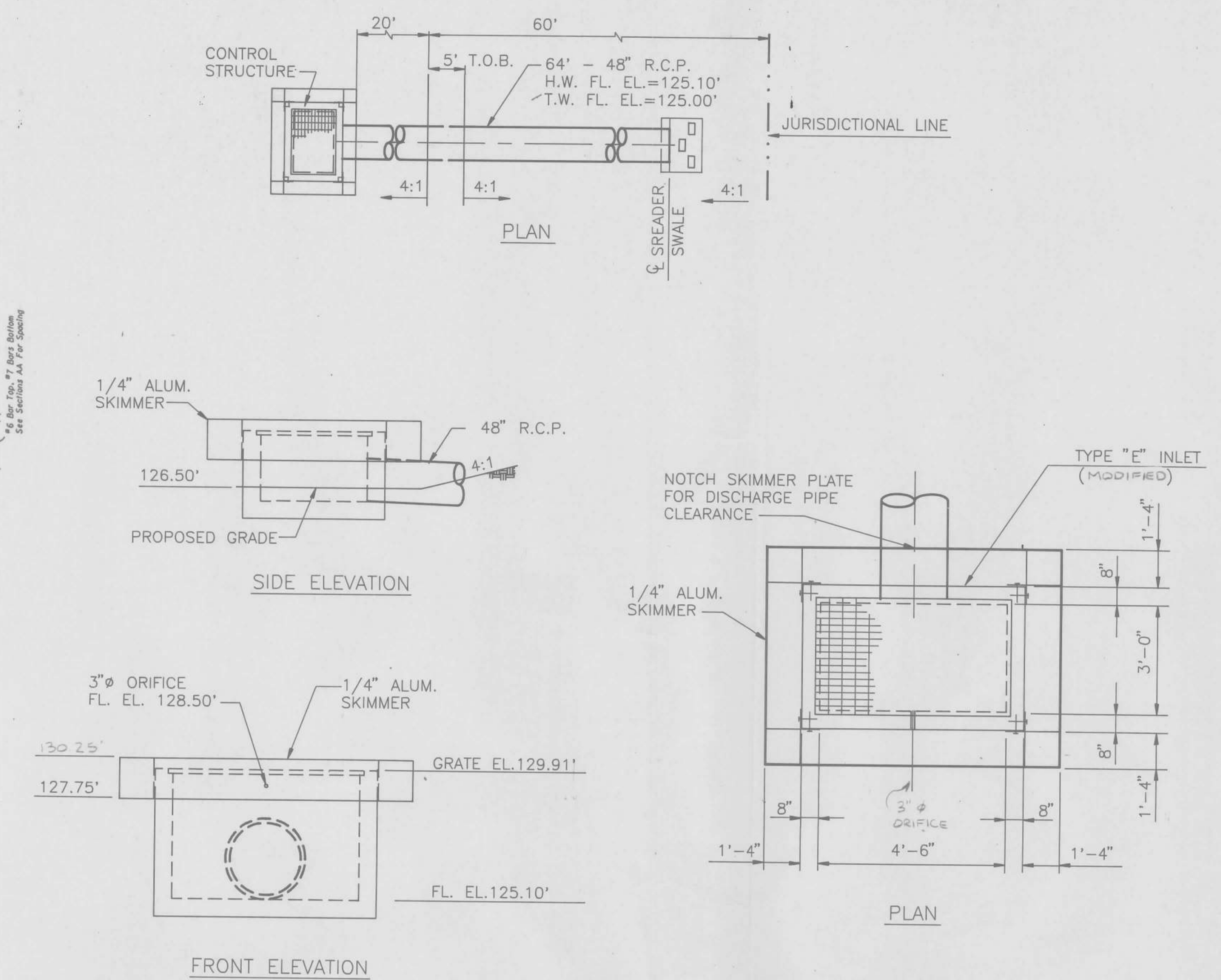
MAY 10 1991



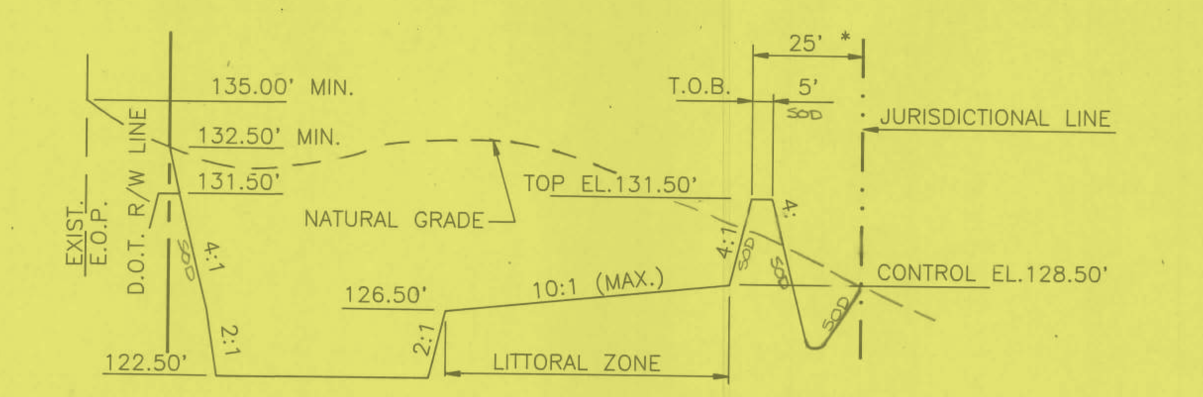
TYPE 2 INLET DETAIL

NOTES:
1) RESERVED PARKING SIGN TO BE TYPE "B" U.S. GOVERNMENT REGULATORY SIGN FOR H.D.
2) PLACE SIGN @ CENTER OF PARKING STALLS.

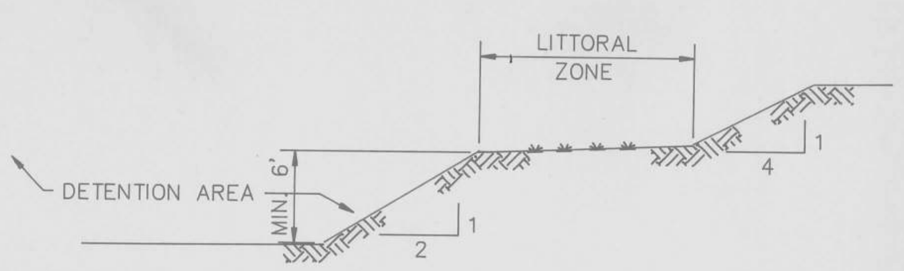
HANDICAPPED PARKING SIGN (2)
N.T.S.



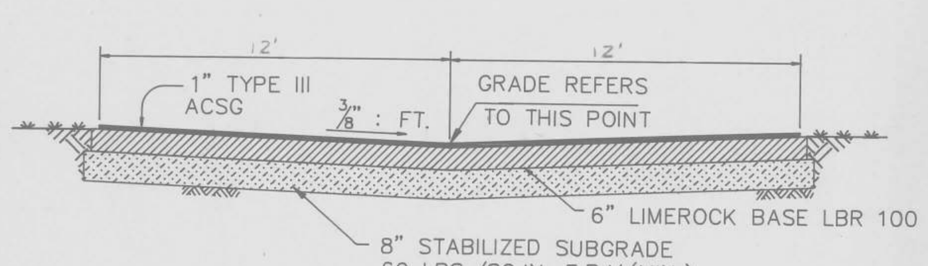
STORMWATER MANAGEMENT POND STRUCTURE (3/6)
N.T.S.



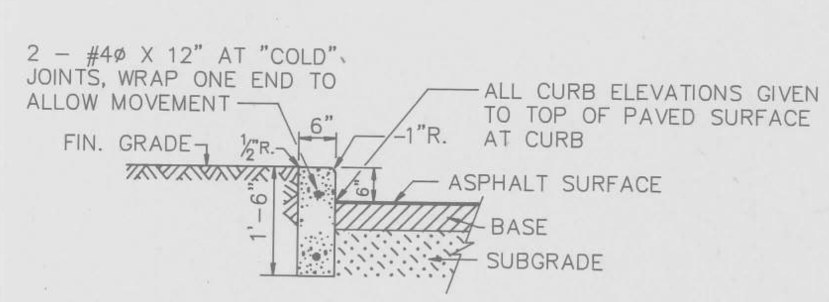
STORMWATER MANAGEMENT POND (A/6)
N.T.S.



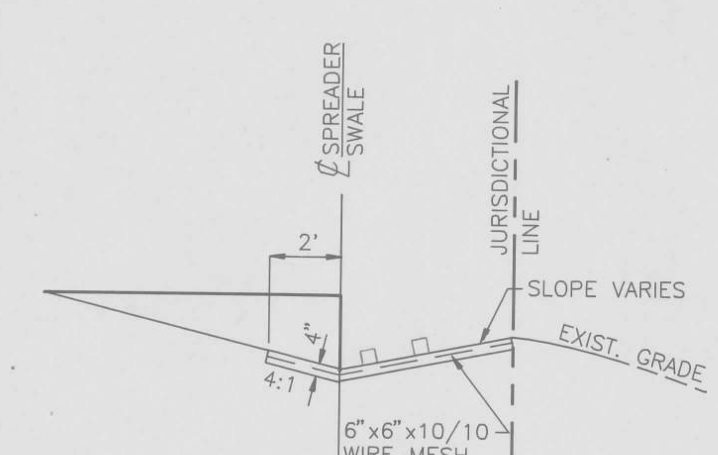
TYPICAL SECTION AT WET DETENTION POND
N.T.S.

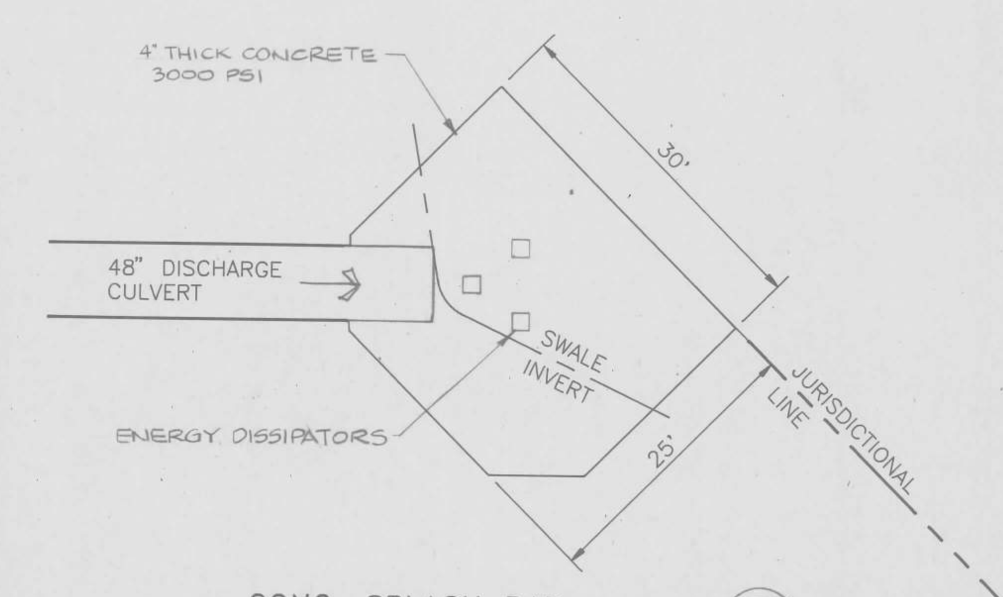


INVERTED CROWN ROAD SECTION
N.T.S.

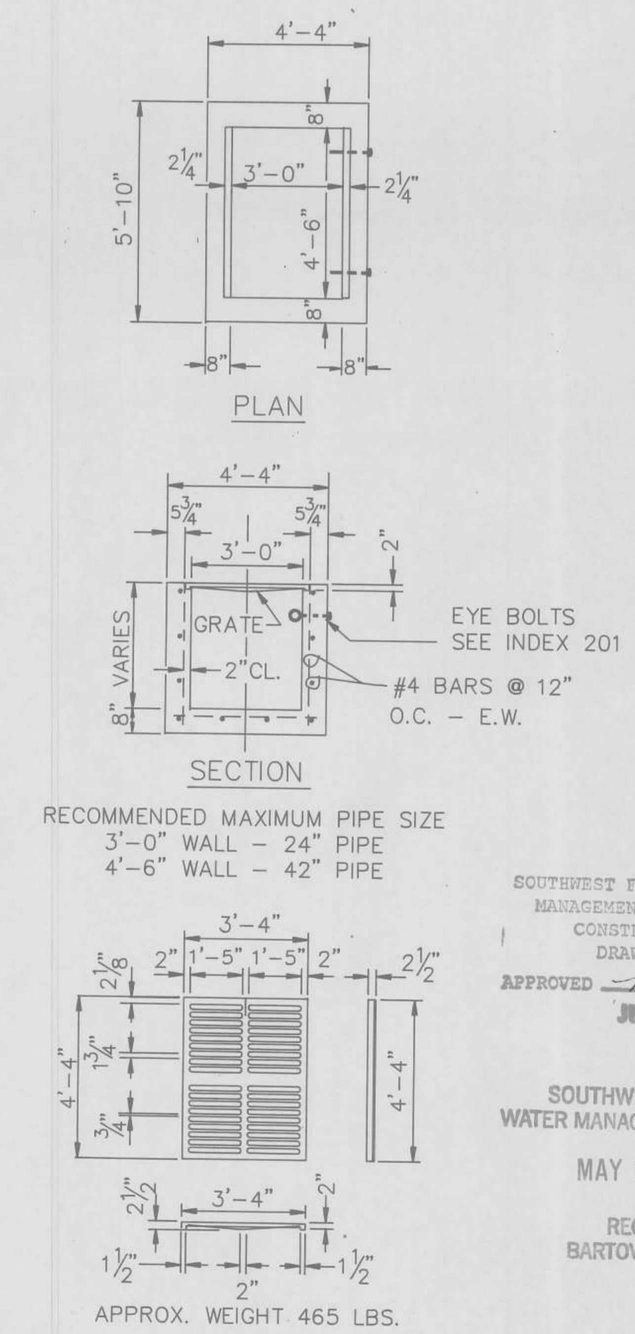


VERTICAL CURB (4)
1/2" = 1'-0"





CONC. SPLASH PAD (5/6)
FOR CONTROL STRUCTURE DISCHARGE



RECOMMENDED MAXIMUM PIPE SIZE
3'-0" WALL - 24" PIPE
4'-6" WALL - 42" PIPE

APPROX. WEIGHT 465 LBS.

(21 SPACES @ 2 3/16" 22 BARS @ 3/16")
STRAIGHT BARS 2" X 3/16
RETICULINE BARS 1 1/4" X 3/16
BANDS 1 1/2 X 1/4
APPROX. WEIGHT 215 LBS.

TYPE "E" INLET (6)
N.T.S.
STRUCTURES CALLED OUT AS C.B.

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
CONSTRUCTION DRAWINGS
APPROVED
JUN 14 1991

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
MAY 17 1991
RECEIVED
BARTOW, FLORIDA

FILE OF RECORD
PERMIT NO. 409 13400

PERMITTEE SHALL NOTIFY IN WRITING THE BARTOW PERMITTING DEPARTMENT, SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT, WHEN CONSTRUCTION BEGINS.

PERMIT SET
NOT FOR CONSTRUCTION

NO.	REVISION DESCRIPTION	BY	CHK	DATE
1	CONSTRUCTED S.W.M. POND DETAIL (REMOVED) ...			5/1/90

DESIGNED DCL
DRAWN JAS
CHECKED LdB
APPROVED DMD
JOB NO. 910015.00
DATE APRIL 1991

910015-D

EV ENVISORS, Inc
ENGINEERING & PLANNING
WINTER HAVEN, FLA. (813) 324-1112

LAKE SMART VILLAGE, CONDOMINIUM DEVELOPMENT

PAVING, GRADING, AND DRAINAGE DETAILS

GUY T. RIZZO
FLORIDA P.E. NO. 13097
DATE: 5/14

SHEET NO. 17 OF SHEETS

15

MAY 16 1991

ENgineering aDVISORS, Inc.

STORMWATER MANAGEMENT COMPUTATIONS

For

LAKE SMART VILLAGE

WINTER HAVEN, FLORIDA

S9, T28, R26

1-28-91

0 150

EVI

BASIN 10

AREA = 34.71 ACRES

CN (PRE) = $\frac{(100)(0.30) + (85)(6.10) + (67)(28.31)}{34.71}$ = 70

(EXIST. PAV'T; HYD "C"; HYD "A")

TIME OF CONCENTRATION = 800' @ 1.0 F.P.S. = 13 MIN (PRE); = 10 MIN (POST)

CN (POST) = $\frac{(100)(2.24) + (98)(18.30) + (39)(14.17)}{34.71}$ = 74

- IMPERVIOUS = 18.30 ACRES

    * STRU.S 73 X 6000 SQ. FT. = 10.06 ACRES

    * ROADS = 7.20 ACRES

    * FUTURE COMMERCIAL = 1 AC @ 80% IMP; FUTURE TENNIS COURT = 0.17 AC; CLUBHOUSE = 0.07 AC

- AVERAGE RETENTION = 2.24 ACRES

RETENTION 100

TOP ELEVATION = 131.50'

TOP AREA = 2.58 ACRES

CREST ELEVATION = 129.91'

(TOP OF 17-25 F.A.C. 1" TREATMENT ZONE = CREST ELEVATION)

TREATMENT ZONE TOP AREA =

CONTROL ELEVATION = 128.50

CONTROL ELEVATION AREA = 1.89 ACRES

MAXIMUM STORAGE = 6.70 AC-FT 2.31 IN/AC

D. E. R. REQUIRED STORAGE = (1 INCH/ACRE) = 2.89 AC-FT (125,888 CU.FT.)

Table 2-2b.—Runoff curve numbers for cultivated agricultural lands[1]

Cover description			Curve numbers for hydrologic soil group—			
Cover type	Treatment[2]	Hydrologic condition[3]	A	B	C	D
Fallow	Bare soil	—	77	86	91	94
	Crop residue cover (CR)	Poor	76	85	90	93
		Good	74	83	88	90
Row crops	Straight row (SR) (TYP. GROVE)	Poor	72	81	88	91
		Good	$\boxed{67}$	78	$\boxed{85}$	89
	SR + CR	Poor	71	80	87	90
		Good	64	75	82	85
	Contoured (C)	Poor	70	79	84	88
		Good	65	75	82	86
	C + CR	Poor	69	78	83	87
		Good	64	74	81	85
	Contoured & terraced (C&T)	Poor	66	74	80	82
		Good	62	71	78	81
	C&T + CR	Poor	65	73	79	81
		Good	61	70	77	80
Small grain	SR	Poor	65	76	84	88
		Good	63	75	83	87
	SR + CR	Poor	64	75	83	86
		Good	60	72	80	84
	C	Poor	63	74	82	85
		Good	61	73	81	84
	C + CR	Poor	62	73	81	84
		Good	60	72	80	83
	C&T	Poor	61	72	79	82
		Good	59	70	78	81
	C&T + CR	Poor	60	71	78	81
		Good	58	69	77	80
Close-seeded or broadcast legumes or rotation meadow	SR	Poor	66	77	85	89
		Good	58	72	81	85
	C	Poor	64	75	83	85
		Good	55	69	78	83
	C&T	Poor	63	73	80	83
		Good	51	67	76	80

[1]Average runoff condition, and $I_a = 0.2S$.
[2]*Crop residue cover* applies only if residue is on at least 5% of the surface throughout the year.
[3]Hydrologic condition is based on combination of factors that affect infiltration and runoff, including (a) density and canopy of vegetative areas, (b) amount of year-round cover, (c) amount of grass or close-seeded legumes in rotations, (d) percent of residue cover on the land surface (good ≥ 20%), and (e) degree of surface roughness.
Poor: Factors impair infiltration and tend to increase runoff.
Good: Factors encourage average and better than average infiltration and tend to decrease runoff.

LAKE SMART VILLAGE
EVI JOB #: 910015.00

Table 2-2a.—Runoff curve numbers for urban areas[1]

Cover description		Curve numbers for hydrologic soil group—			
Cover type and hydrologic condition	Average percent impervious area[2]	A	B	C	D
Fully developed urban areas (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.)[3]:					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		$\boxed{39}$	61	74	80
		POST-DEV. LAWN AREAS			
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only)[4]		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
Developing urban areas					
Newly graded areas (pervious areas only, no vegetation)[5]		77	86	91	94
Idle lands (CN's are determined using cover types similar to those in table 2-2c).					

[1]Average runoff condition, and $I_a = 0.2S$.
[2]The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.
[3]CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.
[4]Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.
[5]Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4, based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.

LAKE SMART VILLAGE
EVI JOB # : 910015.00

SCS TR-55

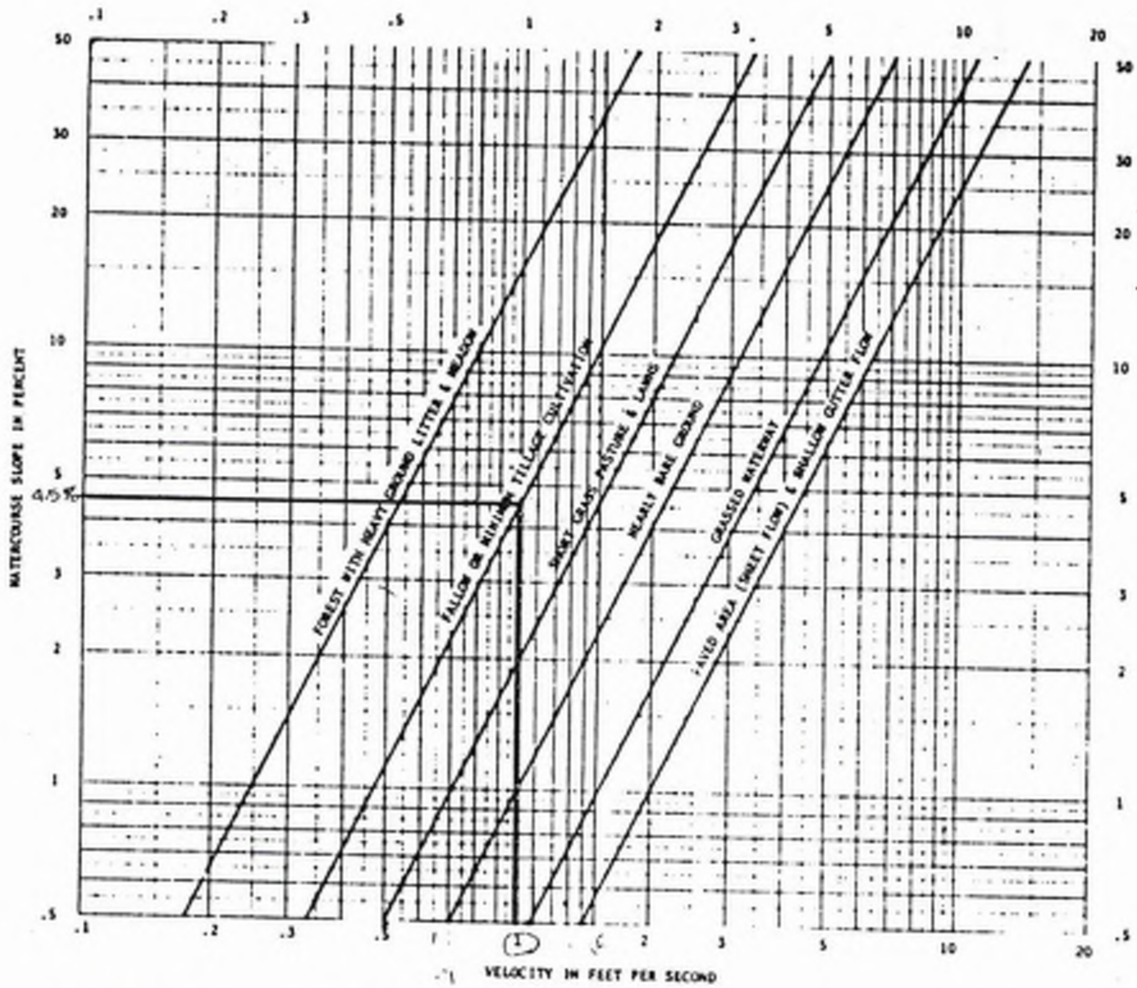


Figure 3-1.--Average velocities for estimating travel time for overland flow.

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LAKE SMART VILLAGE
EVI JOB #:910015.00

```
SCS UNIT HYDROGRAPH PACKAGE                 SC85138          VER 1.01
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          LAKE SMART VILLAGE PRE-DEV 25YR/24HR     BASIN  1

                   BASIN INPUT DATA
====================================================

     BASIN AREA                  34.71  ACRES
     SCS CURVE NUMBER            70.00
     INITIAL ABSTRACTION          0.86  INCHES
     TIME OF CONCENTRATION       13.00  MINUTES
     SCS SHAPE FACTOR              256

                    OUTPUT SUMMARY
====================================================

     STORM RAINFALL              7.00  INCHES
     STORM DURATION             24.00  HOURS
     TOTAL RUNOFF                3.59  INCHES
     PEAK RUNOFF RATE           68.26  CFS (PEAK ALLOWABLE DISCHARGE POST-DEV)
     TIME OF PEAK               12.05  HOURS
     UNIT GRAPH VOLUME           0.99  INCHES

                   REFERENCE FILES
====================================================

     INPUT DATA                      B:LASIT1.DAT
     OUTPUT TO DISK
     RAINFALL DISTRIBUTION           B:FLAMOD.RAI
     UNIT HYDROGRAPH                 UNIT1.UHG
```

SCS UNIT HYDROGRAPH PACKAGE SC85138 VER 1.01

LAKE SMART VILLAGE POST-DEV 25YR/24HR BASIN 10

BASIN INPUT DATA

BASIN AREA	34.71	ACRES
SCS CURVE NUMBER	74.00	
INITIAL ABSTRACTION	0.70	INCHES
TIME OF CONCENTRATION	10.00	MINUTES
SCS SHAPE FACTOR	256	

OUTPUT SUMMARY

STORM RAINFALL	7.00	INCHES
STORM DURATION	24.00	HOURS
TOTAL RUNOFF	4.02	INCHES
PEAK RUNOFF RATE	84.00	CFS
TIME OF PEAK	12.00	HOURS
UNIT GRAPH VOLUME	1.00	INCHES

REFERENCE FILES

INPUT DATA	B:LASIFI.DAT
OUTPUT TO DISK	9115
RAINFALL DISTRIBUTION	B:FLAMOD.RAI
UNIT HYDROGRAPH	UNIT1.UHG

```
Version D2.10 Copyright IBM Corp. 1981, 1982, 1983
60891 Bytes free

Ok
RUN"VOLUME
ENTER TOP ELEVATION OF POND? 131.5
ENTER BOTTOM ELEVATION OF POND? 128.5
ENTER TOP AREA OF POND? 2.58
ENTER BOTTOM AREA OF POND? 1.89
ENTER ELEVATION THAT YOU WISH TO HAVE THE VOLUME CALCULATION PERFORMED? 128.5
VOLUME = 0
ENTER NEXT ELEVATION(0 TO END)? 129
VOLUME = .97375
ENTER NEXT ELEVATION(0 TO END)? 129.5
VOLUME = 2.005
ENTER NEXT ELEVATION(0 TO END)? 129.91
VOLUME = 2.89354
ENTER NEXT ELEVATION(0 TO END)? 130.5
VOLUME = 4.24
ENTER NEXT ELEVATION(0 TO END)? 131
VOLUME = 5.44375
ENTER NEXT ELEVATION(0 TO END)? 131.5
VOLUME = 6.705
ENTER NEXT ELEVATION(0 TO END)?
1LIST   2RUN   3 L O A D "        4 S A V E "        5 C
O N  8 T R O F F K  E  Y                              0  S
```

0 157

DRAWDOWN CALCULATION

NODE 100

ELEV	H	VOL	Q	AVG Q	DELTA T	TOTAL T	
129.82	1.37	%117495	%1028	%1045	8.0	8.0	
129.72	1.27	%109103	992	%1010	8.3	16.3	
129.63	1.18	%100710	954	973	8.6	25.0	
129.53	1.08	92318	915	935	9.0	33.9	INT'L STAGE 129.51 @ 36 HRS
129.44	0.99	83925	875	895	9.4	43.3	
129.35	0.90	75533	832	854	9.8	53.2	
129.25	0.80	67140	787	810	10.4	63.5	
129.16	0.71	58748	740	764	11.0	74.5	
129.06	0.61	50355	689	714	11.7	86.2	
128.97	0.52	41963	634	661	12.7	98.9	
128.88	0.43	33570	574	604	13.9	112.8	
128.78	0.33	25178	507	540	15.5	128.4	
128.69	0.24	16785	429	468	17.9	146.3	
128.59	0.14	8393	334	381	22.0	168.3	
128.50	0.05	0	197	265	31.7	200.0	

ORIFICE DIAMETER USED = 3 IN.
COEFFECIENT OF DISCHARGE = .62
TOTAL VOLUME DRAWNDOWN = 125888

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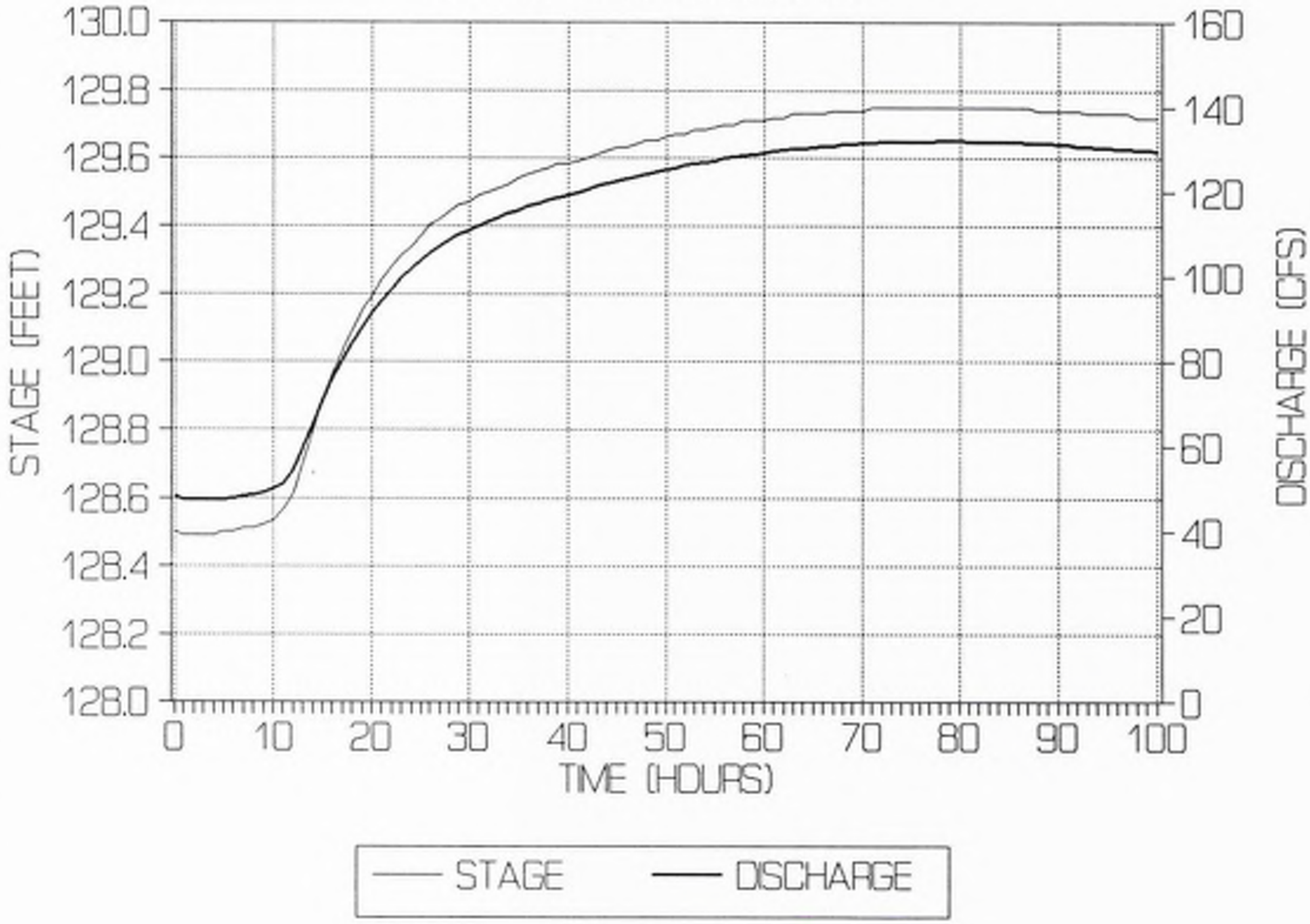
BASIN / NODE RELATIONSHIPS

INDEX	NODE	SUB-BASINS					
1	100	10	0	0	0	0	0
2	990	99	0	0	0	0	0

LAKE SMART - 25 YEAR 1 DAY STORM
STAGE AND DISCHARGE



LAKE SMART

1 DAY - 25 YEAR RETURN P

TIME (HOURS	STAGE (FEET)	DISCHAR (CFS)
* 0	128.50	48.02
1	128.49	47.57
2	128.49	47.39
3	128.49	47.35
4	128.49	47.41
5	128.50	47.55
6	128.50	47.78
7	128.51	48.08
8	128.51	48.47
* 9	128.52	49.01
* 10	128.53	49.72
* 11	128.56	51.20
* 12	128.61	54.41
13	128.70	59.35
14	128.79	64.94
* 15	128.88	70.45
* 16	128.96	75.69
17	129.03	80.30
* 18	129.09	84.31
19	129.15	87.94
* 20	129.19	91.23
21	129.24	94.22
* 22	129.28	96.94
23	129.31	99.43
* 24	129.34	101.68
25	129.37	103.69
26	129.40	105.46
27	129.42	107.04
28	129.44	108.45
29	129.46	109.73
30	129.47	110.90
31	129.49	111.98
32	129.50	112.97

* POINTS USED FOR TAILWATER CONDITIONS IN ICPR MODELING

LAKE SMART

1 DAY - 25 YEAR RETURN P

TIME (HOURS	STAGE (FEET)	DISCHAR (CFS)
33	129.51	113.91
34	129.52	114.79
35	129.54	115.63
36	129.55	116.43
37	129.56	117.19
38	129.57	117.91
39	129.58	118.61
40	129.58	119.28
41	129.59	119.40
42	129.60	120.58
43	129.61	121.20
44	129.62	121.81
45	129.63	122.39
46	129.63	122.95
47	129.64	123.51
48	129.65	124.05
49	129.65	124.56
50	129.66	125.07
51	129.67	125.55
52	129.67	126.02
53	129.68	126.48
54	129.68	126.91
55	129.69	127.33
56	129.70	127.73
57	129.70	128.11
58	129.71	128.48
59	129.71	128.82
60	129.71	129.15
61	129.72	129.46
62	129.72	129.75
63	129.73	130.03
64	129.73	130.28
65	129.73	130.52

LAKE SMART

1 DAY - 25 YEAR RETURN P

TIME (HOURS	STAGE (FEET)	DISCHAR (CFS)
66	129.73	130.74
67	129.74	130.93
68	129.74	131.12
69	129.74	131.28
70	129.74	131.43
71	129.75	131.56
72	129.75	131.68
73	129.75	131.77
74	129.75	131.85
75	129.75	131.92
76	129.75	131.97
77	129.75	132.00
78	129.75	132.02
79	129.75	132.03
80	129.75	132.02
81	129.75	132.00
82	129.75	131.96
83	129.75	131.91
84	129.75	131.85
85	129.75	131.77
86	129.75	131.69
87	129.75	131.59
88	129.74	131.48
89	129.74	131.36
90	129.74	131.23
91	129.74	131.10
92	129.74	130.95
93	129.73	130.79
94	129.73	130.63
95	129.73	130.46
96	129.73	130.29
97	129.73	130.10
98	129.72	129.92

LAKE SMART

1 DAY - 25 YEAR RETURN P

TIME (HOURS	STAGE (FEET)	DISCHAR (CFS)
99	129.72	129.72
100	129.72	129.52

*** INTER-CONNECTED POND ROUTING PROGRAM ***   ICB5145   VER 2.7

LAKE SMART VILLAGE
4/10/90

****
*** CONTROL DATA ***
****

Simulation time increment (mins) --> 3
Simulation duration (hrs) --> 24
Starting time (hrs) --> 0
Print interval --> 20

****
*** NODE AND INITIALIZATION DATA ***
****

NODE #	NODE TYPE	INITIAL STAGE	
100	1	129.510	(SEE DRAWDOWN CALCULATIONS)
990	2	128.500	(SEE FLOOD STUDY DATA)

*** INTER-CONNECTED POND ROUTING PROGRAM ***   ICB5145   VER 2.7

LAKE SMART VILLAGE
4/10/90

****
*** STAGE/STORAGE/TIME DATA ***
****

NODE # 100

STAGE	128.500	129.000	129.500	129.910	130.500
STORAGE	0.000	0.970	2.000	2.890	4.240
STAGE	131.000	131.500	0.000	0.000	0.000
STORAGE	5.440	6.700	0.000	0.000	0.000
STAGE	0.000	0.000	0.000	0.000	0.000
STORAGE	0.000	0.000	0.000	0.000	0.000

NODE # 990

STAGE	128.500	128.520	128.530	128.560	128.610
TIME	0.000	9.000	10.000	11.000	12.000
STAGE	128.880	128.960	129.090	129.190	129.280
TIME	15.000	16.000	18.000	20.000	22.000
STAGE	129.340	0.000	0.000	0.000	0.000
TIME	24.000	0.000	0.000	0.000	0.000

```
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LAKE SMART VILLAGE
4/10/90


*****************
*** REACH DATA ***
*****************

NOTE: Type 1 for sharp crested weir/gate and orifice
      Type 2 for broad crested weir/gate and orifice
   *  Type 3 for culvert
   *  Type 4 for trapezoidal channel
   *  Type 5 for parabolic channel
      Type 6 for rating curve

* (Negative type indicates riser)

      REACH      FROM        TO      REACH
          #      NODE      NODE       TYPE
      -----     -----     -----      -----
          1       100       990          1

 REACH # 1    from node # 100  -- to node # 990

-> Sharp Crested Weir/Gate and Orifice <-

Crest elevation (feet)                   -->  129.91
Crest length (feet)                      -->  15
Weir discharge coefficient               -->  3.13
Weir exponent                            -->  1.5
% to effective submergence               -->  0
Gate opening (feet)                      -->  999
# of end contractions                    -->  8
Discharge coef for gate under ori flw -> 0
Circular orifice centerline (feet)   -->  128.62
Orifice diameter (feet)                  -->  .25
Orifice discharge coefficient            -->  .62
# identical orifices                     -->  1
```

```
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LAKE SMART VILLAGE
4/10/90


*************************
*** INFLOW HYDROGRAPHS ***
*************************

INFLOW HYDROGRAPHS TO BE READ FROM DISK FILE
```

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LAKE SMART VILLAGE
4/10/90

NODE #	TIME (hrs)	STAGE (feet)	STORAGE (acft)	INFLOW (cfs)	OUTFLOW (cfs) # 1	TOTAL
100	0.00	129.51	2.02	0.00	0.23	0.23
990	0.00	128.50	0.00	0.23	------	0.00
100	1.00	129.50	2.00	0.00	0.23	0.23
990	1.00	128.50	0.02	0.23	------	0.00
100	2.00	129.49	1.98	0.00	0.23	0.23
990	2.00	128.50	0.04	0.23	------	0.00
100	3.00	129.48	1.97	0.00	0.23	0.23
990	3.00	128.51	0.06	0.23	------	0.00
100	4.00	129.47	1.95	0.00	0.23	0.23
990	4.00	128.51	0.08	0.23	------	0.00
100	5.00	129.46	1.93	0.00	0.22	0.22
990	5.00	128.51	0.09	0.22	------	0.00
100	6.00	129.46	1.91	0.00	0.22	0.22
990	6.00	128.51	0.11	0.22	------	0.00
100	7.00	129.45	1.89	0.10	0.22	0.22
990	7.00	128.52	0.13	0.22	------	0.00
100	8.00	129.45	1.90	0.62	0.22	0.22
990	8.00	128.52	0.15	0.22	------	0.00
100	9.00	129.48	1.97	1.45	0.23	0.23
990	9.00	128.52	0.17	0.23	------	0.00
100	10.00	129.55	2.11	2.69	0.24	0.24
990	10.00	128.53	0.19	0.24	------	0.00
100	11.00	129.71	2.45	6.28	0.25	0.25
990	11.00	128.56	0.21	0.25	------	0.00
100	12.00	130.68	4.68	84.00	30.90	30.90
990	12.00	128.61	0.57	30.90	------	0.00
100	13.00	130.76	4.86	19.02	35.31	35.31
990	13.00	128.70	4.29	35.31	------	0.00

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LAKE SMART VILLAGE
4/10/90

NODE #	TIME (hrs)	STAGE (feet)	STORAGE (acft)	INFLOW (cfs)	OUTFLOW (cfs) # 1	OUTFLOW (cfs) TOTAL
100	14.00	130.37	3.95	9.46	14.76	14.76
990	14.00	128.79	6.21	14.76	------	0.00
100	15.00	130.24	3.64	6.64	8.94	8.94
990	15.00	128.88	7.17	8.94	------	0.00
100	16.00	130.18	3.50	5.42	6.63	6.63
990	16.00	128.96	7.80	6.63	------	0.00
100	17.00	130.14	3.42	4.77	5.41	5.41
990	17.00	129.03	8.30	5.41	------	0.00
100	18.00	130.12	3.36	3.85	4.60	4.60
990	18.00	129.09	8.71	4.60	------	0.00
100	19.00	130.10	3.32	3.46	4.04	4.04
990	19.00	129.14	9.07	4.04	------	0.00
100	20.00	130.09	3.30	3.52	3.74	3.74
990	20.00	129.19	9.39	3.74	------	0.00
100	21.00	130.07	3.26	[illegible]	3.27	3.27
990	21.00	129.24	[illegible]	3.27	------	0.00
100	22.00	130.06	[illegible]	[illegible]	3.05	3.05
990	22.00	129.28	[illegible]	3.05	------	0.00
100	23.00	130.06	[illegible]	[illegible]	2.92	2.92
990	23.00	129.31	10.19	2.92	------	0.00

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*** INTER-CONNECTED POND ROUTING PROGRAM ***   ICB5145   VER 2.7

LAKE SMART VILLAGE
4/10/90

NODE #	TIME (hrs)	STAGE (feet)	STORAGE (acft)	INFLOW (cfs)	OUTFLOW (cfs) # 1	TOTAL
100	24.00	130.05	3.21	1.91	2.59	2.59
990	24.00	129.34	10.42	2.59	------	0.00

*** INTER-CONNECTED POND ROUTING PROGRAM ***   ICB5145   VER 2.7

LAKE SMART VILLAGE
4/10/90

*** PEAK CONDITIONS SUMMARY ***

NODE #	PEAK STAGE (feet)	PEAK STORAGE (acft)	TIME TO PEAK (hrs)	PEAK OUTFLOW (cfs)	TIME TO PEAK (hrs)	TOP OF POND (FEET)
100	131.01	5.45	12.50	51.06	12.50	131.50
990	129.34	10.42	24.00	0.00	0.05	DUMMY NODE *

FROM NODE	TO NODE	PEAK OUTFLOW (cfs)	TIME TO PEAK (hrs)
100	990	51.06	12.50

(PEAK ALLOWABLE DISCHARGE = 68.26 C.F.S.
SEE PRE-DEV HYDROGRAPH)

* FOR OUTFALL & TAILWATER MODELING

HYDRAULIC ANALYSIS

Run date: 04-12-1991
File: 91151.ST3

Return Period = 10 Yrs
Rainfall file: Your_County

LINE 1 / Q = 39.4 / HT = 36 / WID = 36 / N = .013 / L = 272 / JLC = 0

1 / Outfall

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	131.00	36.00	125.50	5.57	131.48	0.00	3	7.07
UPSTRM	131.95	36.00	125.70	5.57	132.43	0.00	6.3	7.07

Drainage area (ac)	= 0	Slope of invert (%)	= 0.074
Runoff coefficient	= 0	Slope energy grade line (%)	= 0.348
Time of conc (min)	= 4	Critical depth (in)	= 23.99
Inlet time (min)	= 0	Req'd length curb inlet (ft)	= 0.0
Intensity (in/hr)	= 0.00	Req'd grate area (sf)	= 0.0
Cumulative C*A	= 0.0	Depth at inlet opening (in)	= 0
Flow contrib (cfs)	= 39.3	Confluence angle (deg)	= 0
Default Q (cfs)	= 39.36	Natural ground elev (ft)	= 135
Line capac. (cfs)	= 18.1	Line storage (cuft)	= 1922

LINE 2 / Q =   1.4 / HT = 15 / WID = 15 / N = .013 / L = 4 / JLC = 0

2 / DNLN = 1

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	131.95	14.37	130.75	1.15	131.97	5.72	3	1.21
UPSTRM	131.95	14.37	130.75	1.15	131.97	6.00	3.99	1.21

Drainage area (ac)	= 0	Slope of invert (%)	= 0.046
Runoff coefficient	= 0	Slope energy grade line (%)	= 0.050
Time of conc (min)	= 0	Critical depth (in)	= 5.66
Inlet time (min)	= 0	Req'd length curb inlet (ft)	= 0.0
Intensity (in/hr)	= 0.00	Req'd grate area (sf)	= 0.0
Cumulative C*A	= 0.0	Depth at inlet opening (in)	= 0
Flow contrib (cfs)	= 1.3	Confluence angle (deg)	= 90
Default Q (cfs)	= 1.39	Natural ground elev (ft)	= 136
Line capac. (cfs)	= 1.4	Line storage (cuft)	= 5

LINE 3 / Q =   0.8 / HT = 15 / WID = 15 / N = .013 / L = 32 / JLC = 0

3 / DNLN = 2

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	132.09	4.19	131.75	2.50	132.19	13.69	3	0.30
UPSTRM	132.23	5.71	131.75	1.77	132.27	14.57	3	0.43

Drainage area (ac) = 0
Runoff coefficient = 0
Time of conc (min) = 0
Inlet time (min) = 0
Intensity (in/hr) = 0.00
Cumulative C*A = 0.0
Flow contrib (cfs) = .7
Default Q (cfs) = .76
Line capac. (cfs) = 0.8

Slope of invert (%) = 0.014
Slope energy grade line (%) = 0.259
Critical depth (in) = 4.19
Req'd length curb inlet (ft) = 0.0
Req'd grate area (sf) = 0.0
Depth at inlet opening (in) = 0
Confluence angle (deg) = 0
Natural ground elev (ft) = 136
Line storage (cuft) = 12

LINE 4 / Q = 38.0 / HT = 30 / WID = 30 / N = .013 / L = 124 / JLC = 0

4 / DNLN = 1

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	131.95	30.00	128.00	7.74	132.88	0.00	4.5	4.91
UPSTRM	142.04	24.42	140.00	8.87	143.26	23.34	4.3	4.28

Drainage area (ac) = 0
Runoff coefficient = 0
Time of conc (min) = 3
Inlet time (min) = 0
Intensity (in/hr) = 0.00
Cumulative C*A = 0.0
Flow contrib (cfs) = 37.9
Default Q (cfs) = 37.97
Line capac. (cfs) = 127.6

Slope of invert (%) = 9.677
Slope energy grade line (%) = 8.371
Critical depth (in) = 24.71
Req'd length curb inlet (ft) = 0.0
Req'd grate area (sf) = 0.0
Depth at inlet opening (in) = 0
Confluence angle (deg) =-60
Natural ground elev (ft) = 146.8
Line storage (cuft) = 570

0 174

LINE 5 / Q = 28.0 / HT = 30 / WID = 30 / N = .013 / L = 220 / JLC = 0

5 / DNLN = 4

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	142.04	24.42	140.00	6.41	142.67	22.37	4.3	4.37
UPSTRM	143.21	20.55	141.50	7.82	144.16	27.87	3.5	3.58

Drainage area (ac)	= 0	Slope of invert (%)	= 0.682
Runoff coefficient	= 0	Slope energy grade line (%)	= 0.677
Time of conc (min)	= 2	Critical depth (in)	= 21.23
Inlet time (min)	= 0	Req'd length curb inlet (ft)	= 0.0
Intensity (in/hr)	= 0.00	Req'd grate area (sf)	= 0.0
Cumulative C*A	= 0.0	Depth at inlet opening (in)	= 0
Flow contrib (cfs)	= 28	Confluence angle (deg)	= 0
Default Q (cfs)	= 28.03	Natural ground elev (ft)	= 147.5
Line capac. (cfs)	= 33.9	Line storage (cuft)	= 875

LINE 6 / Q = 15.8 / HT = 24 / WID = 24 / N = .013 / L = 220 / JLC = 0

6 / DNLN = 5

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	143.41	16.88	142.00	6.64	144.09	21.82	3.5	2.38
UPSTRM	144.89	22.64	143.00	5.14	145.30	11.12	3	3.07

Drainage area (ac)	= 0	Slope of invert (%)	= 0.455
Runoff coefficient	= 0	Slope energy grade line (%)	= 0.548
Time of conc (min)	= 0	Critical depth (in)	= 16.88
Inlet time (min)	= 0	Req'd length curb inlet (ft)	= 0.0
Intensity (in/hr)	= 0.00	Req'd grate area (sf)	= 0.0
Cumulative C*A	= 0.0	Depth at inlet opening (in)	= 0
Flow contrib (cfs)	= 15.7	Confluence angle (deg)	= 0
Default Q (cfs)	= 15.79	Natural ground elev (ft)	= 148
Line capac. (cfs)	= 15.2	Line storage (cuft)	= 599

LINE 7 / Q = 2.0 / HT = 15 / WID = 15 / N = .013 / L = 88 / JLC = 0

7 / DNLN = 6

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	144.89	13.64	143.75	1.72	144.93	8.37	3	1.18
UPSTRM	144.96	13.51	143.84	1.74	145.01	8.98	4.91	1.16

Drainage area (ac) = 0
Runoff coefficient = 0
Time of conc (min) = 0
Inlet time (min) = 0
Intensity (in/hr) = 0.00
Cumulative C*A = 0.0
Flow contrib (cfs) = 2
Default Q (cfs) = 2.02
Line capac. (cfs) = 2.0

Slope of invert (%) = 0.098
Slope energy grade line (%) = 0.087
Critical depth (in) = 6.82
Req'd length curb inlet (ft) = 0.0
Req'd grate area (sf) = 0.0
Depth at inlet opening (in) = 0
Confluence angle (deg) = 0
Natural ground elev (ft) = 150
Line storage (cuft) = 103

HYDRAULIC ANALYSIS

Run date: 04-12-1991
File: 91152.ST3

Return Period = 10 Yrs
Rainfall file: Your_County

LINE 1 / Q = 60.6 / HT = 48 / WID = 48 / N = .013 / L = 120 / JLC = 0

8 / Outfall

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	131.00	48.00	124.00	4.82	131.36	0.00	3.5	12.56
UPSTRM	131.21	48.00	124.50	4.82	131.58	0.00	7	12.57

Drainage area (ac)	= 0	Slope of invert (%)	= 0.417
Runoff coefficient	= 0	Slope energy grade line (%)	= 0.178
Time of conc (min)	= 7	Critical depth (in)	= 27.63
Inlet time (min)	= 0	Req'd length curb inlet (ft)	= 0.0
Intensity (in/hr)	= 0.00	Req'd grate area (sf)	= 0.0
Cumulative C*A	= 0.0	Depth at inlet opening (in)	= 0
Flow contrib (cfs)	= 60.6	Confluence angle (deg)	= 0
Default Q (cfs)	= 60.62	Natural ground elev (ft)	= 135.5
Line capac. (cfs)	= 92.7	Line storage (cuft)	= 1508

LINE 2 / Q =   8.1 / HT = 15 / WID = 15 / N = .013 / L = 196 / JLC = 0

9 / DNLN = 1

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	131.21	15.00	127.25	6.57	131.88	0.00	7	1.23
UPSTRM	134.27	15.00	132.25	6.57	134.94	0.00	6	1.23

Drainage area (ac)	= 0	Slope of invert (%)	= 2.551
Runoff coefficient	= 0	Slope energy grade line (%)	= 1.558
Time of conc (min)	= 0	Critical depth (in)	= 13.73
Inlet time (min)	= 0	Req'd length curb inlet (ft)	= 0.0
Intensity (in/hr)	= 0.00	Req'd grate area (sf)	= 0.0
Cumulative C*A	= 0.0	Depth at inlet opening (in)	= 0
Flow contrib (cfs)	= 8	Confluence angle (deg)	= 0
Default Q (cfs)	= 8.06	Natural ground elev (ft)	= 139.5
Line capac. (cfs)	= 10.3	Line storage (cuft)	= 241

0 177

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LINE 3 / Q =  46.8 / HT = 42 / WID = 42 / N = .013 / L = 196 / JLC = 0
---------------------------------------------------------------------------
10 / DNLN = 1

             HGL     DEPTH   INVERT     VEL    EGL      T WID   COVER     AREA

DNSTRM    131.21    42.00   125.00     4.87  131.58     0.00    7         9.62

UPSTRM    131.64    42.00   126.00     4.86  132.01     0.00    3         9.62


Drainage area (ac) =  0             Slope of invert (%)             = 0.510
Runoff coefficient =  0             Slope energy grade line (%)     = 0.216
Time of conc (min) =    6           Critical depth (in)             = 25.13
Inlet time (min)   =  0             Req'd length curb inlet (ft)  =   0.0
Intensity (in/hr)  =    0.00        Req'd grate area (sf)         =   0.0
Cumulative C*A     =    0.0         Depth at inlet opening (in)   = 0
Flow contrib (cfs) =  46.7          Confluence angle (deg)        = 0
Default Q (cfs)    =  46.8          Natural ground elev    (ft)   = 132.5
Line capac. (cfs)  =  71.9          Line storage (cuft)           = 1886
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LINE 4 / Q =  41.7 / HT = 36 / WID = 36 / N = .013 / L = 176 / JLC = 0
---------------------------------------------------------------------------
11 / DNLN = 3

             HGL     DEPTH   INVERT     VEL    EGL      T WID   COVER     AREA

DNSTRM    131.64    36.00   126.50     5.90  132.18     0.00    3         7.07

UPSTRM    132.33    36.00   128.50     5.90  132.87     0.00    2.75      7.07


Drainage area (ac) =  0             Slope of invert (%)             = 1.136
Runoff coefficient =  0             Slope energy grade line (%)     = 0.390
Time of conc (min) =    5           Critical depth (in)             = 24.68
Inlet time (min)   =  0             Req'd length curb inlet (ft)  =   0.0
Intensity (in/hr)  =    0.00        Req'd grate area (sf)         =   0.0
Cumulative C*A     =    0.0         Depth at inlet opening (in)   = 0
Flow contrib (cfs) =  41.6          Confluence angle (deg)        = 0
Default Q (cfs)    =  41.67         Natural ground elev    (ft)   = 134.25
Line capac. (cfs)  =  71.1          Line storage (cuft)           = 1244
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0 178

LINE 5 / Q = 39.3 / HT = 36 / WID = 36 / N = .013 / L = 112 / JLC = 0

12 / DNLN = 4

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	132.33	36.00	128.50	5.56	132.81	0.00	2.75	7.07
UPSTRM	132.71	36.00	129.50	5.56	133.19	0.00	4.5	7.07

Drainage area (ac)	= 0	Slope of invert (%)	= 0.893
Runoff coefficient	= 0	Slope energy grade line (%)	= 0.347
Time of conc (min)	= 4	Critical depth (in)	= 23.97
Inlet time (min)	= 0	Req'd length curb inlet (ft)	= 0.0
Intensity (in/hr)	= 0.00	Req'd grate area (sf)	= 0.0
Cumulative C*A	= 0.0	Depth at inlet opening (in)	= 0
Flow contrib (cfs)	= 39.2	Confluence angle (deg)	= 0
Default Q (cfs)	= 39.29	Natural ground elev (ft)	= 137
Line capac. (cfs)	= 63.0	Line storage (cuft)	= 792

LINE 6 / Q = 31.7 / HT = 30 / WID = 30 / N = .013 / L = 392 / JLC = 0

13 / DNLN = 5

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	132.71	30.00	130.00	6.46	133.36	0.00	4.5	4.91
UPSTRM	139.83	21.92	138.00	8.25	140.88	26.62	5	3.84

Drainage area (ac)	= 0	Slope of invert (%)	= 2.041
Runoff coefficient	= 0	Slope energy grade line (%)	= 1.919
Time of conc (min)	= 2	Critical depth (in)	= 22.57
Inlet time (min)	= 0	Req'd length curb inlet (ft)	= 0.0
Intensity (in/hr)	= 0.00	Req'd grate area (sf)	= 0.0
Cumulative C*A	= 0.0	Depth at inlet opening (in)	= 0
Flow contrib (cfs)	= 31.6	Confluence angle (deg)	= 0
Default Q (cfs)	= 31.69	Natural ground elev (ft)	= 145.5
Line capac. (cfs)	= 58.6	Line storage (cuft)	= 1715

0 179

LINE 7 / Q = 22.9 / HT = 24 / WID = 24 / N = .013 / L = 196 / JLC = 0

14 / DNLN = 6

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	140.19	20.34	138.50	8.04	141.20	17.08	5	2.85
UPSTRM	142.32	24.00	139.00	7.29	143.15	0.00	5	3.14

Drainage area (ac)	= 0	Slope of invert (%)	= 0.255
Runoff coefficient	= 0	Slope energy grade line (%)	= 0.995
Time of conc (min)	= 1	Critical depth (in)	= 20.34
Inlet time (min)	= 0	Req'd length curb inlet (ft)	= 0.0
Intensity (in/hr)	= 0.00	Req'd grate area (sf)	= 0.0
Cumulative C*A	= 0.0	Depth at inlet opening (in)	= 0
Flow contrib (cfs)	= 22.9	Confluence angle (deg)	= 0
Default Q (cfs)	= 22.91	Natural ground elev (ft)	= 146
Line capac. (cfs)	= 11.4	Line storage (cuft)	= 587

LINE 8 / Q = 12.1 / HT = 24 / WID = 24 / N = .013 / L = 204 / JLC = 0

15 / DNLN = 7

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	142.32	24.00	139.00	3.87	142.55	0.00	5	3.14
UPSTRM	142.91	24.00	139.50	3.87	143.14	0.00	4.5	3.14

Drainage area (ac)	= 0	Slope of invert (%)	= 0.245
Runoff coefficient	= 0	Slope energy grade line (%)	= 0.289
Time of conc (min)	= 0	Critical depth (in)	= 14.81
Inlet time (min)	= 0	Req'd length curb inlet (ft)	= 0.0
Intensity (in/hr)	= 0.00	Req'd grate area (sf)	= 0.0
Cumulative C*A	= 0.0	Depth at inlet opening (in)	= 0
Flow contrib (cfs)	= 12.1	Confluence angle (deg)	= 0
Default Q (cfs)	= 12.15	Natural ground elev (ft)	= 146
Line capac. (cfs)	= 11.2	Line storage (cuft)	= 641

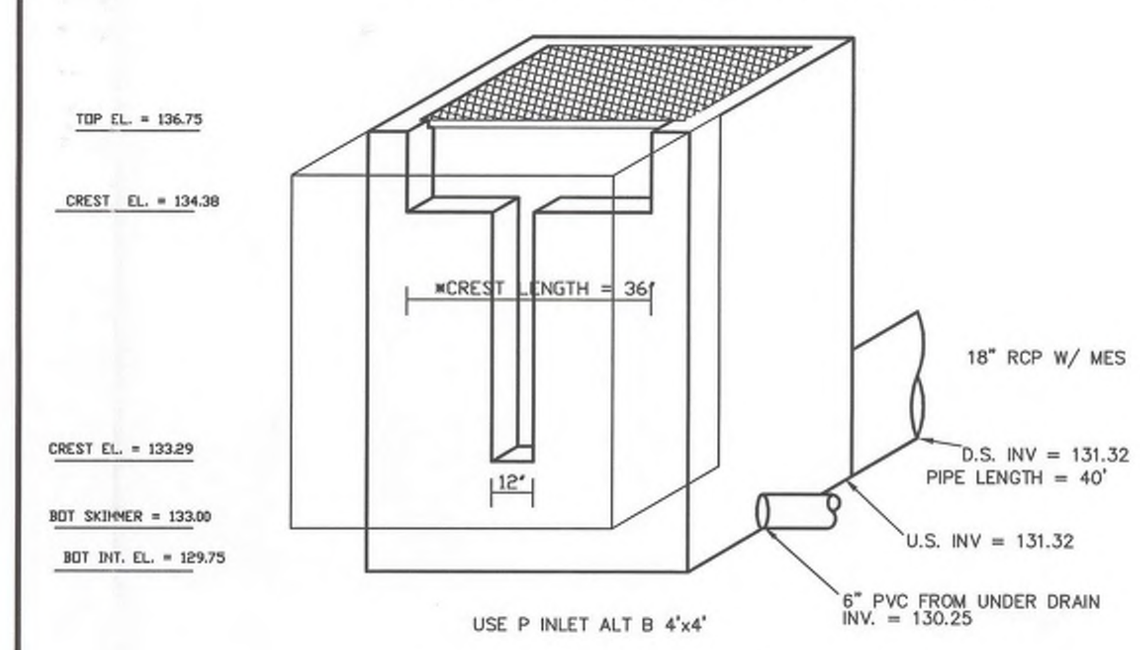
PERMIT NO. 25800.000

Lake Rochelle Estates

LEGEND

- BASIN BOUNDARY
- TURBIDITY BARRIER
- FLOW DIRECTION
- CONTROL AREA RETENTION POND
- SOIL BORING
- WETLANDS AREA
- UPLAND BUFFER AREA

SCALE: 1" = 50'



CONTROL STRUCTURE (CONTSTR1) FOR POND1B

REMAINING DRAINAGE DETAILS ON CONSTRUCTION DETAILS SHEET

POND	TOP EL.	CONT EL.	TOP AREA	CONT AREA
POND1A	136.50	132.75	0.676 AC.	0.394 AC.
POND1B	136.50	132.75	0.214 AC.	0.093 AC.
POND2	133.50	130.00	0.380 AC.	0.236 AC.
POND3	130.65	129.65	0.190 AC.	0.059 AC.

BASIN	AREA	REQ. TREATMENT VOL.	CN	TC
POND1	6.65 AC.	0.277 AC.FT.	69.1	10.00 MIN.
POND2	7.54 AC.	0.314 AC.FT.	70.0	10.00 MIN.
POND3	1.89 AC.	0.079 AC.FT.	68.8	10.00 MIN.

- ADD SSL CONDITION TO PERMIT
128.5

STORM DRAINAGE INLET HYDRAULICS

FROM INLET	TO INLET	HYDRAULICS
INLET-1	INLET-2	34' – 15" RCP AT 0.53%
INLET-2	POND1A	39' – 15" RCP AT 0.71%
INLET-3	INLET-4	136' – 15" RCP AT 0.27%
INLET-4	INLET-5	30' – 15" RCP AT 0.93%
INLET-5	POND1A	142' – 24" RCP AT 0.26%
INLET-6	INLET-7	130' – 15" RCP AT 0.19%
INLET-7	INLET-8	101' – 15" RCP AT 0.21%
INLET-8	INLET-9	156' – 15" RCP AT 0.65%
INLET-9	INLET-10	100' – 24" RCP AT 0.24%
INLET-10	INLET-11	165' – 24" RCP AT 0.42%
INLET-11	INLET-12	44' – 30" RCP AT 0.24%
INLET-12	POND2	43' – 30" RCP AT 0.37%
INLET-13	GRATE	27' – 15" ADSN12 AT 0.50%

STORM DRAINAGE INLETS

INLET #	TYPE	GRATE	INVERT	LOCATION
INLET-1	C	135.50	E 131.67	14.00' LT. STA 11+00.00
INLET-2	C	136.38	W 131.49 E 130.28	18.00' RT. STA 11+00.00
INLET-3	C	139.74	E 134.27	14.00' RT. STA 31+02.55
INLET-4	C	138.39	W 133.90 S 133.90	14.00' RT. STA 29+63.56
INLET-5	C	138.38	N 133.62 S 130.87	14.00' LT. STA 29+67.12
INLET-6	C	137.10	E 131.42	162.25' LT. STA 17+61.55
INLET-7	C	139.43	W 131.17 E 131.17	28.92' LT. STA 17+63.04
INLET-8	C	136.29	W 130.96 E 130.96	14.00' RT. STA 18+61.48
INLET-9	D	134.53	W 129.95 E 129.20	14.00' RT. STA 20+24.97
INLET-10	D	134.04	W 128.96 E 128.96	14.00' RT. STA 21+29.56
INLET-11	D	133.22	W 128.27 N 127.77	14.00' RT. STA 23+06.51
INLET-12	D	133.14	S 127.66 N 127.16	27.72' LT. STA 23+16.90
INLET-13	C	134.40	N 129.79	140.16' LT. STA 23+57.45

NOTES:

EROSION CONTROL

1. CONTRACTOR TO INSTALL TURBIDITY BARRIERS PRIOR TO THE COMMENCEMENT OF CONSTRUCTION. CONTRACTOR IS RESPONSIBLE FOR THE MAINTENANCE AND INSPECTION OF SAID TURBIDITY BARRIERS TO ENSURE THEIR PROPER FUNCTION. SEDIMENTS MAY NOT BE ALLOWED TO ACCUMULATE MORE THAN HALF WAY UP THE FACE OF THE SILT SCREEN. SEDIMENTS MUST BE PROPERLY DISPOSED OF. AFTER REMOVAL OF SILT FENCES, ALL DISTURBED AREAS SHALL BE GRASSED & MULCHED.

2. RETENTION PONDS & BASIN CONTROLL SHALL BE THE FIRST ITEM CONSTRUCTED. SIDE SLOPES SHOULD BE IMMEDIATELY SODDED UPON COMPLETION. NO AREAS OUTSIDE THE STORM WATER FACILITIES SHALL BE CLEARED UNTIL THE RECIEVING STORM WATER FACILITIES ARE COMPLETED. THE MAINTENANCE ENTITY SHALL BE RESPONSIBLE FOR MAINTAINING THE GRASS & REMOVING ALL SEDIMENTS, TRASH, DEBRIS FROM THE STORM WATER FACILITIES. FACILITIES SHALL BE INSPECTED BY A PROFESSIONAL ENGINEER AT INTERVALS OUTLINED IN THE ENVIRONMENTAL RESOURCE PERMIT OR 18 MONTHS AT A MINIMUM. DEBRIS AND VEGETATION SHALL BE CONTROLLED IN THE GRAVEL BED OF THE UNDER DRAIN SYSTEMS BY A DISTRICT APPROVED HERBECIDE. OUTLETS OF ALL PIPES SHALL BE INSPECTED REGULARLY AND ANY BLOCKAGES REMOVED. ALL FLOW DOWN SWALES MUST BE MAINTAINED WITH ANY FENCING CONSTRUCTED TO ALLOW FLOW THROUGH OR UNDER THE FENCE.

3. THEL EXISTING WELL SHALL BE PROPERLY ABANDONED BY A LICENSED WELL CONTRACTOR IN ACCORDANCE WITH SWFWMD RULE 40D-3.531.

4. FOR SUGGESTED MINIMUM FLOOR ELEVATIONS AND LOT GRADING DETAILS SEE SHEET 5 OF 6.

5. THE 25 YEAR / 24 HOUR CALCULATED PEAK STAGE IS BASED ON A TYPE II FLORIDA MODIFIED STORM DISTRIBUTION FOR A RAINFALL OF 7.0 INCHES WITH A DURATION OF 24 HOURS. FURTHERMORE THE SCS PARAMETERS SUCH AS CURVE NUMBER AND TIME OF CONCENTRATION ARE BASED ON THE EXISTING CONDITIONS OF BASIN AT THE TIME OF STUDY.

6. GROUNDWATER AND SEASONAL HIGH WATER ELEVATIONS WERE PROVIDED TO ALPHA ENGINEERING BY FTE, INC. AND WERE CONSIDERED THE BEST AVAILABLE DATA. ALPHA ENGINEERING DOES NOT GUARANTEE THE ACCURACY NOR ASSUME ANY LIABILITY FOR THE INACCURACY OF SAID DATA.

7. WARNING AND DISCLAIMER OF LIABILITY
THIS PROJECT WAS DESIGNED TO BE IN COMPLIANCE WITH CITY OF WINTERHAVEN MUNICIPAL CODE. THE DEGREE OF FLOOD PROTECTION AND SURFACE AND GROUND WATER PROTECTION REQUIRED BY THIS CODE IS CONSIDERED REASONABLE FOR REGULATORY PURPOSES AND IS BASED ON SCIENTIFIC AND ENGINEERING CONSIDERATIONS. LARGER FLOODS CAN AND WILL OCCUR ON RARE OCCASIONS. FLOOD HEIGHTS MAY BE INCREASED BY MAN MADE OR NATURAL CAUSES. THIS CODE DOES NOT IMPLY THAT LAND OUTSIDE AREAS OF SPECIAL FLOOD HAZARDS OR USES PERMITTED WITHIN SUCH AREA WILL BE FREE FROM FLOODING OR FLOOD DAMAGES. THIS CODE SHALL NOT CREATE LIABILITY ON THE PART OF THE CITY OF WINTERHAVEN, ALPHA ENGINEERING & SURVEYING, OR BY ANY OFFICER OR EMPLOYEE THEREOF FOR ANY FLOOD DAMAGES OR ADVERSE EFFECTS OF CHANGES IN QUANTITY OR QUALITY OF SURFACE OR GROUND WATER THAT RESULT FROM RELIANCE ON THIS ORDINANCE OR ANY ADMINISTRATIVE DECISION MADE THEREUNDER.

8. ALL BERMS OF FILLED AREAS TO BE STABILIZED TO 98% PROCTOR DENSITY AND SODDED.

9. FOR EXISTING STRUCTURES ,UTILITY, AND MISCELANEOUS LOCATIONS, SEE SHEET 2 OF 6. ALL EXISTING STRUCTURES, UTILITY POLES, WELLS, STORAGE TANKS, ETC. ARE TO BE PROPERLY REMOVED IN ACCORDANCE WITH ALL APPLICABLE STANDARDS.

10. THERE ARE NO IMPACTS TO ARMY CORE OR SWFWMD JURISDICTIONAL WETLANDS WITHIN THIS PROJECT AREA.

11. THE CONTRACTOR SHALL NOTIFY THE CITY OF WINTERHAVEN AT LEAST ONE WEEK PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.

12. AS-BUILT DRAWINGS AND CERTIFICATION OF COMPLETION SHALL BE SUBMITTED, SIGNED, SEALED, AND DATED BY THE ENGINEER OF RECORD INDICATING ANY DEPARTURES FROM THE APPROVED PLANS DURING CONSTRUCTION.

13. THE HIGHEST GROUNDWATER WITHIN THE ROADWAY SHALL BE AT LEAST 1.5 FEET BELOW THE LIMEROCK BASE.

14. BASIN BOUNDARIES ARE TO CONSTRUCTED TO CONTROL WATER AS SHOWN ON PLAN WHETHER A WATER CONTROL FEATURE IS SPECIFIED OR NOT. IN THE EVENT OF CONFUSION CAUSED BY OMMISION BY ENGINEER, CONTRACTOR TO CONTACT ENGINEER FOR DIRECTION.

15. BEFORE ANY DEPARTURES NO MATTER HOW MINOR ARE MADE FROM THE APPROVED CONSTRUCTION PLANS THE CONTRACTOR SHALL NOTIFY THE ENGINEER DESCRIBING THE PROPOSED CHANGES. THE ENGINEER SHALL APPROVE ALL CHANGES IN WRITING AND AS BUILT DRAWINGS WILL REFLECT ALL CHANGES.

16. ALL CONSTRUCTED FACILITIES SHALL COMMENCE FROM HORIZONTAL AND VERTICAL CONTROL AS SHOWN ON THE BOUNDARY & TOPOGRAPHICAL SURVEY SHEET 2 OF 6.

17. A CERTIFIED "AS BUILT" SURVEY LOCATING ALL CONSTRUCTED FACILITIES PERFORMED BY A REGISTERED SURVEYOR AND MAPPER SHALL BE DELIVERED TO THE ENGINEER.

18. CONTRACTOR SHALL TAKE ELEVATIONS AT TERMINATIONS OF ALL STORM LINES INTO THE STORM INLETS BEFORE THE TOP RISERS ARE SET. THE ELEVATIONS SHALL BE TAKEN WITH REFERENCE TO ONE OF THE CONTROL BENCH MARKS OR FROM MANHOLE LAYOUT BENCH MARK SET BY A REGISTERED SURVEYOR AND MAPPER. THE PROCEDURES USED FOR TAKING ELEVATIONS SHALL DERIVE FROM INSTRUCTIONS AND DIRECTION AS SPECIFIED BY THE SURVEYOR AND MAPPER. THE CONTRACTOR SHALL DELIVER HIS FIELD NOTES TO THE SURVEYOR AND MAPPER WHO WILL BE FOR USING THE INFORMATION IN PREPARING HIS AS BUILT SURVEY.

19. AN AS BUILT SURVEY SHALL BE DELIVERED TO THE ENGINEER, SHOWING ITEMS DESCRIBED NOTE 18 BEFORE LIME ROCK IS PUT IN PLACE. THE ENGINEER SHALL DETERMINE IF THE UNDERGROUND FACILITIES ARE ACCEPTABLE AND SHALL NOTIFY THE CONTRACTOR IN WRITING WHETHER CORRECTIVE MEASURES ARE NEEDED OR THAT WORK IS ACCEPTABLE FOR CONTINUATION OF CONSTRUCTION.

20. RETENTION PONDS AND DRAINAGE STRUCTURES SHALL BE STAKED OUT UNDER THE DIRECTION OF A PROFESSIONAL SURVEYOR AND MAPPER. THE SURVEYOR SHALL FIRST STAKE OUT THE TOP OF BANK OR LIMITS OF FILL AND EXCAVATION FOR THE CONTRACTOR. THE CONTRACTOR SHALL THEN MAKE BEST ATTEMPT TO CONSTRUCT PONDS AS SHOWN ON PLANS AND NOTIFY SURVEYOR UPON COMPLETION. THE SHALL THEN RESTAKE TOP AND BOTTOM OF POND. THE CONTRACTOR SHALL FINISH GRADE THE POND TO FINAL STAKES. IF SOD IS PROPOSED CONTRACTOR SHALL BRING TOP OF POND TO WITHIN 2 INCHES OF GRADE TO ALLOW FOR SOD. CONTRACTOR SHALL THEN IMMEDIATELY NOTIFY SURVEYOR TO COMPLETE ASBUILT OF POND. SURVEYOR SHALL DELIVER AS BUILT SURVEY FOR PONDS TO ENGINEER. ENGINEER WILL DETERMINE IF POND IS ACCEPTABLE AND NOTIFY CONTRACTOR IN WRITING WHETHER TO IMMEDIATELY PROCEED WITH SODDING OR THAT ADDITIONAL GRADING IS NECESSARY.

21. SOIL BORINGS REPORT AVAILABLE FROM ENGINEER ON REQUEST.

22. STORM WATER SYSTEM IS SIZED FOR 3000 SQUARE FEET OF IMPERVIOUS AREA PER LOT.

23. THERE MUST BE A MINIMUM OF 6" CLEARANCE FROM THE BOTTOM OF DRAINAGE INLETS TO THE INVERTS OF STORM PIPES.

24. ALL INLET GRATES SHALL BE TRAFFIC BEARING & FDOT APPROVED.

FIRM PANEL 12105C 0355F DATED 12/20/2000, HAS GRAPHICALLY DEPICTED THIS SITE AS LYING IN FLOOD ZONE "X", ACCORDING TO BEST FIT OF THE GRAPHICAL MONUMENTATION SHOWN. A BASE FLOOD ELEVATION FOR LAKE ROCHELLE IS SHOWN ON THIS FIRM PANEL AS ZONE "AE" BEING 130.6. THIS BASE FLOOD ENCROACHES INTO THE PROPERTY AS DELINEATED BY THE SURVEYED 130.6 CONTOUR LINE.

I CERTIFY THAT I HAVE REVIEWED THIS STORM WATER MANAGEMENT & EROSION CONTROL PLAN
DAVID MAGNESS, APPLICANT ERP NO. 44025800.000

ROBERT E. LAZENBY, IV P.E. # 52006, P.S.M. #6369 DATE: 10-31-03
AUTORIZATION #1022

DRAWN BY: DAVE
DATE: 08/14/03

REVISION
(1) REL4 SWFWMD RAI 10/28/03

ALPHA ENGINEERING & SURVEYING, INC.
4506 SOUTH FLORIDA AVE.
LAKELAND, FLORIDA 33813
(863) 646-8571 FAX 646-4977

DRAINAGE PLAN

LAKE ROCHELLE ESTATES

SECTION	09	
TOWNSHIP	28	S.
RANGE	26	E.

DWG: LREDR

SHEET NO. 4 OF 6 SHEETS

SCALE: 1" = 50'

DESIGN NOTES

1. THE FINISHED BUILDING PAD AREA SHALL BE CONSTRUCTED TO A MINIMUM ELEVATION OF 0.25' BELOW THE PROPOSED FINISHED FLOOR ELEVATION FOR TYPE "A" AND "B" GRADED LOTS.

2. ALL FILLED AREAS SHALL COMPACTED TO 98% MAXIMUM PROCTOR DENSITY.

3. REFER TO THE CONSTRUCTION DETAILS SHEET 14 OF 15 FOR TYPE "A" AND "B" GRADING DETAILS

EXISTING GROUND CONTOUR — 132 —

FINISHED GROUND CONTOUR — 138 —

ROBERT E. LAZENBY, IV
P.E. #52006
RYAN M. LAZENBY
P.E. #57517

DRAWN BY: R.M.L.
DATE: 08/15/03

REVISION
(1) R.M.L. 11-02-03 REVISE BOUNDARY GRADING PER SWFWMD

ALPHA ENGINEERING & SURVEYING, INC.
4506 SOUTH FLORIDA AVE.
LAKELAND, FLORIDA 33813
(863) 646-8571 FAX 646-4977

GRADING PLAN

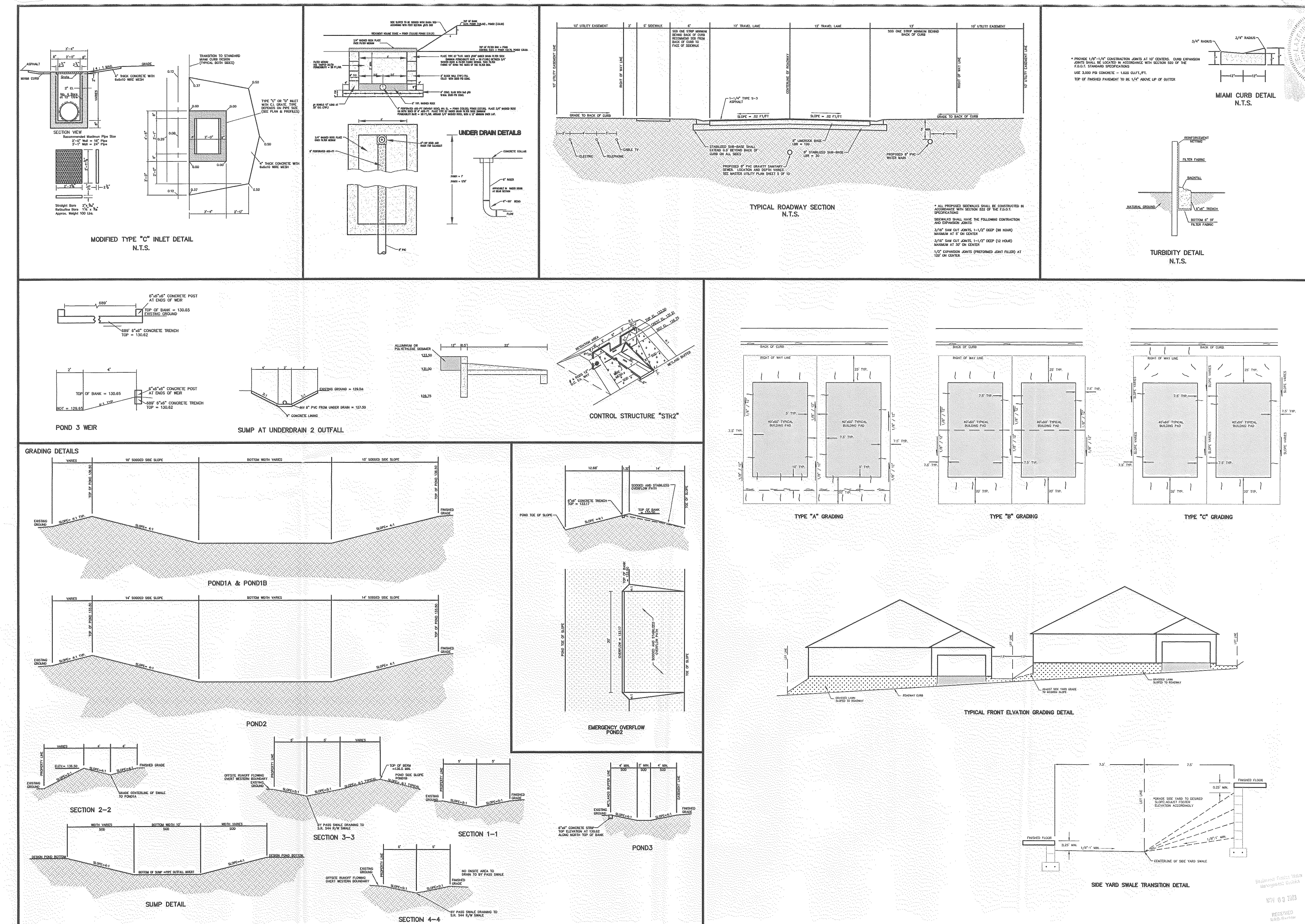
LAKE ROCHELLE ESTATES

18745

SECTION	09
TOWNSHIP	28 S.
RANGE	26 E.

DWG: LOT LAYOUT

SHEET NO. 5 OF 6 SHEETS



ROBERT E. LAZENBY, IV, P.E.
P.E. #52006
RYAN M. LAZENBY, P.E.
P.E. #57517

DESIGNED BY: R.M.L.
DATE: 08/25/03

REVISION	DATE
REVISED PER SWFWMD RAI 10-28-03	

ALPHA ENGINEERING & SURVEYING, INC.
4506 SOUTH FLORIDA AVENUE
LAKELAND, FLORIDA 33813
(863) 646-8571 FAX 646-4977

CONSTRUCTION DETAILS

LAKE ROCHELLE ESTATES

18745

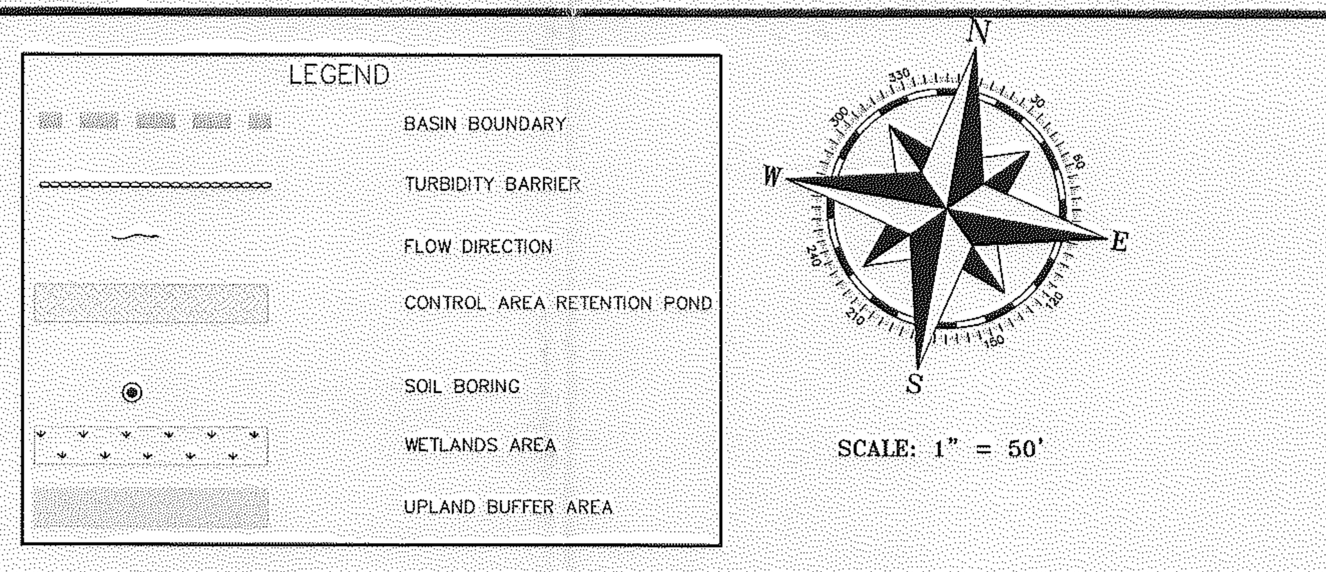
SECTION 09
TOWNSHIP 28 S.
RANGE 26 E.

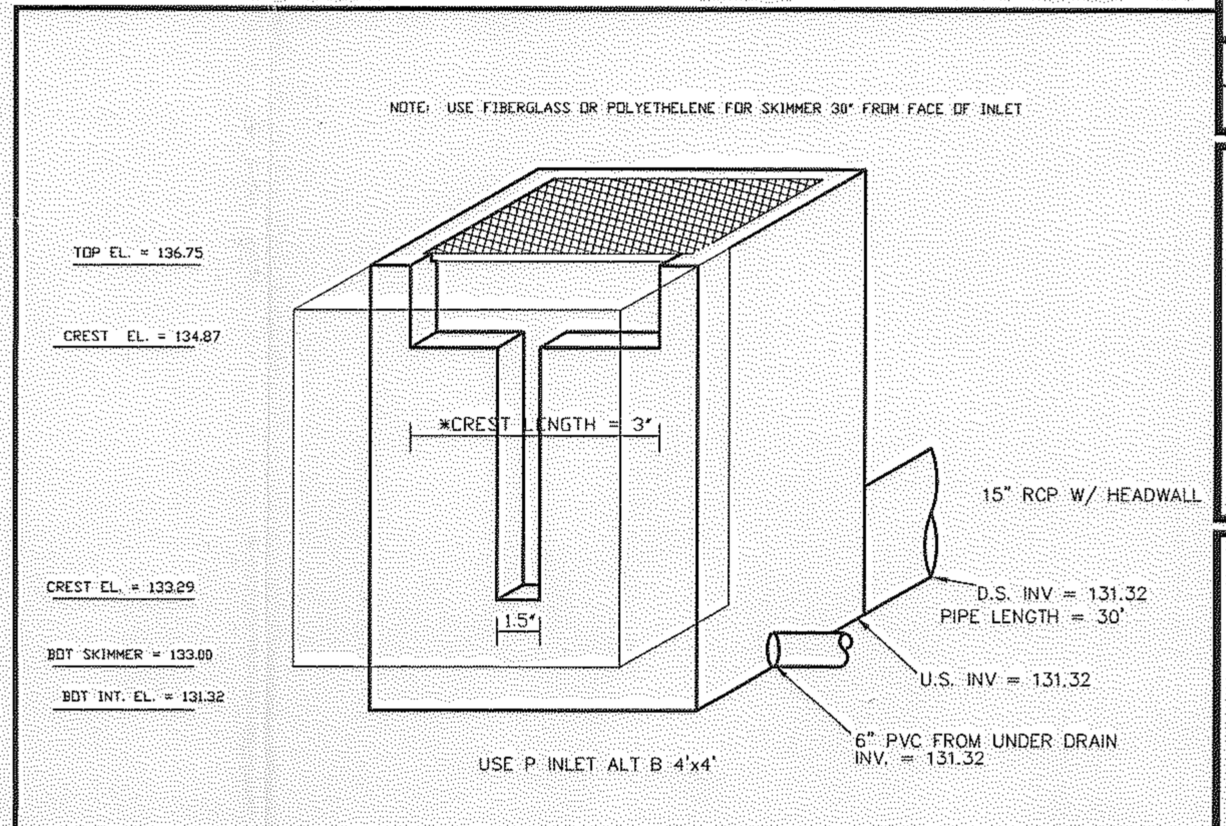
DWG: CONST. DET.

SHEET NO.
6
OF 6 SHEETS

PERMIT NO. 25800.001

Lake Rochelle Estates
Turn Lane Addition





CONTROL STRUCTURE (CONSTR1) FOR POND1B

I CERTIFY THAT I HAVE REVIEWED THIS STORM WATER MANAGEMENT & EROSION CONTROL PLAN

DAVID MAGNESS, APPLICANT ERP NO. 44025800.000

ROBERT E. LAZENBY, IV P.E. # 52006, P.S.M. # 6369 AUTORIZATION #1022

2-24-04

DRAWN BY: DAVE

DATE: 08/14/03

REVISION
(1) REL4 SWFWMD RAI 10/28/03
(2) REL4 SWFWMD RAI 11/21/03
(3) REL4 SWFWMD RAI 12/02/03

ALPHA ENGINEERING & SURVEYING, INC.
4505SOUTH FLORIDA AVE.
LAKELAND, FLORIDA 33813
(863) 646-8571 FAX 646-4977

DRAINAGE PLAN

LAKE ROCHELLE ESTATES

REMAINING DRAINAGE DETAILS ON CONSTRUCTION DETAILS SHEET

POND	TOP EL.	CONT EL.	TOP AREA	CONT AREA
POND1A	136.50	132.75	0.676 AC.	0.394 AC.
POND1B	136.50	132.75	0.214 AC.	0.093 AC.
POND2	133.50	130.00	0.380 AC.	0.236 AC.
POND3	130.65	129.65	0.190 AC.	0.059 AC.

BASIN	AREA	REQ. TREATMENT VOL.	CN	TC
POND1	6.65 AC.	0.277 AC.FT.	69.1	10.00 MIN.
POND2	7.54 AC.	0.314 AC.FT.	70.0	10.00 MIN.
POND3	1.89 AC.	0.079 AC.FT.	68.8	10.00 MIN.

STORM DRAINAGE INLET HYDRAULICS

FROM INLET	TO INLET	HYDRAULICS
INLET-1	INLET-2	34' - 15" RCP AT 0.53%
INLET-2	POND1A	39' - 15" RCP AT 0.71%
INLET-3	INLET-4	136' - 15" RCP AT 0.27%
INLET-4	INLET-5	30' - 15" RCP AT 0.93%
INLET-5	POND1A	142' - 24" RCP AT 0.26%
INLET-6	INLET-7	130' - 15" RCP AT 0.19%
INLET-7	INLET-8	101' - 15" RCP AT 0.21%
INLET-8	INLET-9	156' - 15" RCP AT 0.65%
INLET-9	INLET-10	100' - 24" RCP AT 0.24%
INLET-10	INLET-11	165' - 24" RCP AT 0.42%
INLET-11	INLET-12	44' - 30" RCP AT 0.24%
INLET-12	POND2	43' - 30" RCP AT 0.37%
INLET-13	GRATE	27' - 15" ADSN12 AT 0.50%

STORM DRAINAGE INLETS

INLET #	TYPE	GRATE	INVERT	LOCATION
INLET-1	C	135.50	E 131.67	14.00' LT. STA 11+00.00
INLET-2	C	136.38	W 131.49 E 130.28	18.00' RT. STA 11+00.00
INLET-3	C	139.74	E 134.27	14.00' RT. STA 31+02.55
INLET-4	C	138.39	W 133.90 S 133.90	14.00' RT. STA 29+63.56
INLET-5	C	138.38	N 133.62 S 130.87	14.00' RT. STA 29+67.12
INLET-6	C	137.10	E 131.42	162.25' LT. STA 17+61.55
INLET-7	C	139.43	W 131.17 E 131.17	28.92' LT. STA 17+63.04
INLET-8	C	136.29	W 130.96 E 130.96	14.00' RT. STA 18+61.48
INLET-9	D	134.53	W 129.95 E 129.20	14.00' RT. STA 20+24.97
INLET-10	D	134.04	W 128.96 E 128.96	14.00' RT. STA 21+29.56
INLET-11	D	133.22	W 128.27 N 127.77	14.00' RT. STA 23+06.51
INLET-12	D	133.14	S 127.66 N 127.16	27.72' LT. STA 23+16.90
INLET-13	C	134.40	N 129.79	140.16' LT. STA 23+57.45

NOTES:

EROSION CONTROL

1. CONTRACTOR TO INSTALL TURBIDITY BARRIERS PRIOR TO THE COMMENCEMENT OF CONSTRUCTION. CONTRACTOR IS RESPONSIBLE FOR THE MAINTENANCE AND INSPECTION OF SAID TURBIDITY BARRIERS TO ENSURE THEIR PROPER FUNCTION. SEDIMENTS MAY NOT BE ALLOWED TO ACCUMULATE MORE THAN HALF WAY UP THE FACE OF THE SILT SCREEN. SEDIMENTS MUST BE PROPERLY DISPOSED OF. AFTER REMOVAL OF SILT FENCES, ALL DISTURBED AREAS SHALL BE GRASSED & MULCHED.

2. RETENTION PONDS & BASIN CONTROLL SHALL BE THE FIRST ITEM CONSTRUCTED. SIDE SLOPES SHOULD BE IMMEDIATELY SODDED UPON COMPLETION. NO AREAS OUTSIDE THE STORM WATER FACILITIES SHALL BE CLEARED UNTIL THE RECIEVING STORM WATER FACILITIES ARE COMPLETED. THE MAINTENANCE ENTITY SHALL BE RESPONSIBLE FOR MAINTAINING THE GRASS & REMOVING ALL SEDIMENTS, TRASH, DEBRIS FROM THE STORM WATER FACILITIES. FACILITIES SHALL BE INSPECTED BY A PROFESSIONAL ENGINEER AT INTERVALS OUTLINED IN THE ENVIRONMENTAL RESOURCE PERMIT OR 18 MONTHS AT A MINIMUM. DEBRIS AND VEGETATION SHALL BE CONTROLLED IN THE GRAVEL BED OF THE UNDER DRAIN SYSTEMS BY A DISTRICT APPROVED HERBECIDE. OUTLETS OF ALL PIPES SHALL BE INSPECTED REGULARLY AND ANY BLOCKAGES REMOVED. WHEN FILTER HAS DEGRADED TO THE POINT OF NOT DRAWING DOWN VOLUME WITHIN 36 DRY HOURS OF A RAINFALL, THE FILTER MEDIA SHALL BE REPLACED PER SPECS SHOWN IN THESE PLANS. USED FILTER MEDIA SHALL BE PROPERLY DISPOSED OF. ALL FLOW DOWN SWALES MUST BE MAINTAINED WITH ANY FENCING CONSTRUCTED TO ALLOW FLOW THROUGH OR UNDER THE FENCE.

3. THE EXISTING WELL SHALL BE PROPERLY ABANDONED BY A LICENSED WELL CONITRACTOR IN ACCORDANCE WITH SWFWMD RULE 40D-3.531.

4. FOR SUGGESTED MINIMUM FLOOR ELEVATIONS AND LOT GRADING DETAILS SEE SHIEET 5 OF 6.

5. THE 25 YEAR / 24 HOUR CALCULATED PEAK STAGE IS BASED ON A TYPE II FLORIDA MODIFIED STORM DISTRIBUTION FOR A RAINFALL OF 7.0 INCHES WITH A DURATION OF 24 HOURS. FURTHERMORE THE SCS PARAMETERS SUCH AS CURVE NUMBER AND TIME OF CONCENTRATION ARE BASED ON THE EXISTING CONDITIONS OF BASIN AT THE TIME OF STUDY.

6. GROUNDWATER AND SEASONAL HIGH WATER ELEVATIONS WERE PROVIDED TO ALPHA ENGINEERING BY FTE, INC. AND WERE CONSIDERED THE BEST AVAILABLE DATA. ALPHA ENGINEERING DOES NOT GUARANTEE THE ACCURACY NOR ASSUME ANY LIABILITY FOR THE INACCURACY OF SAID DATA.

7. WARNING AND DISCLAIMER OF LIABILITY
THIS PROJECT WAS DESIGNED TO BE IN COMPLIANCE WITH CITY OF WINTERHAVEN MUNICIPAL CODE. THE DEGREE OF FLOOD PROTECTION AND SURFACE AND GROUND WATER PROTECTION REQUIRED BY THIS CODE IS CONSIDERED REASONABLE FOR REGULATORY PURPOSES AND IS BASED ON SCIENTIFIC AND ENGINEERING CONSIDERATIONS. LARGER FLOODS CAN AND WILL OCCUR ON RARE OCCASIONS.
FLOOD HEIGHTS MAY BE INCREASED BY MAN MADE OR NATURAL CAUSES. THIS CODE DOES NOT IMPLY THAT LAND OUTSIDE AREAS OF SPECIAL FLOOD HAZARDS OR USES PERMITTED WITHIN SUCH AREA WILL BE FREE FROM FLOODING OR FLOOD DAMAGES. THIS CODE SHALL NOT CREATE LIABILITY ON THE PART OF THE CITY OF WINTERHAVEN, ALPHA ENGINEERING & SURVEYING, OR BY ANY OFFICER OR EMPLOYEE THEREOF FOR ANY FLOOD DAMAGES OR ADVERSE EFFECTS OF CHANGES IN QUANTITY OR QUALITY OF SURFACE OR GROUND WATER THAT RESULT FROM RELIANCE ON THIS ORDINANCE OR ANY ADMINISTRATIVE DECISION MADE THEREUNDER.

8. ALL BERMS OF FILLED AREAS TO BE STABILIZED TO 98% PROCTOR DENSITY AND SODDED.

9. FOR EXISTING STRUCTURES ,UTILITY, AND MISCELANEOUS LOCATIONS, SEE SHEET 2 OF 6. ALL EXISTING STRUCTURES, UTILITY POLES, WELLS, STORAGE TANKS, ETC. ARE TO BE PROPERLY REMOVED IN ACCORDANCE WITH ALL APPLICABLE STANDARDS.

10. THERE ARE NO IMPACTS TO ARMY CORE OR SWFWMD JURISDICTIONAL WETLANDS WITHIN THIS PROJECT AREA.

11. THE CONTRACTOR SHALL NOTIFY THE CITY OF WINTERHAVEN AT LEAST ONE WEEK PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.

12. AS-BUILT DRAWINGS AND CERTIFICATION OF COMPLETION SHALL BE SUBMITTED, SIGNED, SEALED, AND DATED BY THE ENGINEER OF RECORD INDICATING ANY DEPARTURES FROM THE APPROVED PLANS DURING CONSTRUCTION.

13. THE HIGHEST GROUNDWATER WITHIN THE ROADWAY SHALL BE AT LEAST 1.5 FEET BELOW THE LIMEROCK BASE.

14. BASIN BOUNDARIES ARE TO CONSTRUCTED TO CONTROL WATER AS SHOWN ON PLAN WHETHER A WATER CONTROL FEATURE IS SPECIFIED OR NOT. IN THE EVENT OF CONFUSION CAUSED BY OMMISION BY ENGINEER, CONTRACTOR TO CONTACT ENGINEER FOR DIRECTION.

15. BEFORE ANY DEPARTURES NO MATTER HOW MINOR ARE MADE FROM THE APPROVED CONSTRUCTION PLANS THE CONTRACTOR SHALL NOTIFY THE ENGINEER DESCRIBING THE PROPOSED CHANGES. THE ENGINEER SHALL APPROVE ALL CHANGES IN WRITING AND AS BUILT DRAWINGS WILL REFLECT ALL CHANGES.

16. ALL CONSTRUCTED FACILITIES SHALL COMMENCE FROM HORIZONTAL AND VERTICAL CONTROL AS SHOWN ON THE BOUNDARY & TOPOGRAPHICAL SURVEY SHEET 2 OF 6.

17. A CERTIFIED "AS BUILT" SURVEY LOCATING ALL CONSTRUCTED FACILITIES PERFORMED BY A REGISTERED SURVEYOR AND MAPPER SHALL BE DELIVERED TO THE ENGINEER.

18. CONTRACTOR SHALL TAKE ELEVATIONS AT TERMINATIONS OF ALL STORM LINES INTO THE STORM INLETS BEFORE THE TOP RISERS ARE SET. THE ELEVATIONS SHALL BE TAKEN WITH REFERENCE TO ONE OF THE CONTROL BENCH MARKS OR FROM MANHOLE LAYOUT BENCH MARK SET BY A REGISTERED SURVEYOR AND MAPPER. THE PROCEDURES USED FOR TAKING ELEVATIONS SHALL DERIVE FROM INSTRUCTIONS AND DIRECTION AS SPECIFIED BY THE SURVEYOR AND MAPPER. THE CONTRACTOR SHALL DELIVER HIS FIELD NOTES TO THE SURVEYOR AND MAPPER WHO WILL BE FOR USING THE INFORMATION IN PREPARING HIS AS BUILT SURVEY.

19. AN AS BUILT SURVEY SHALL BE DELIVERED TO THE ENGINEER, SHOWING ITEMS DESCRIBED NOTE 18 BEFORE LIME ROCK IS PUT IN PLACE. THE ENGINEER SHALL DETERMINE IF THE UNDERGROUND FACILITIES ARE ACCEPTABLE AND SHALL NOTIFY THE CONTRACTOR IN WRITING WHETHER CORRECTIVE MEASURES ARE NEEDED OR THAT WORK IS ACCEPTABLE FOR CONTINUATION OF CONSTRUCTION.

20. RETENTION PONDS AND DRAINAGE STRUCTURES SHALL BE STAKED OUT UNDER THE DIRECTION OF A PROFESSIONAL SURVEYOR AND MAPPER. THE SURVEYOR SHALL FIRST STAKE OUT THE TOP OF BANK OR LIMITS OF FILL AND EXCAVATION FOR THE CONTRACTOR. THE CONTRACTOR SHALL THEN MAKE BEST ATTEMPT TO CONSTRUCT PONDS AS SHOWN ON PLANS AND NOTIFY SURVEYOR UPON COMPLETION. THE SHALL THEN RESTAKE TOP AND BOTTOM OF POND. THE CONTRACTOR SHALL FINISH GRADE THE POND TO FINAL STAKES. IF SOD IS PROPOSED CONTRACTOR SHALL BRING TOP OF POND TO WITHIN 2 INCHES OF GRADE TO ALLOW FOR SOD. CONTRACTOR SHALL THEN IMMEDIATELY NOTIFY SURVEYOR TO COMPLETE ASBUILT OF POND. SURVEYOR SHALL DELIVER AS BUILT SURVEY FOR PONDS TO ENGINEER. ENGINEER WILL DETERMINE IF POND IS ACCEPTABLE AND NOTIFY CONTRACTOR IN WRITING WHETHER TO IMMEDIATELY PROCEED WITH SODDING OR THAT ADDITIONAL GRADING IS NECESSARY.

21. SOIL BORINGS REPORT AVAILABLE FROM ENGINEER ON REQUEST.

22. STORM WATER SYSTEM IS SIZED FOR 3000 SQUARE FEET OF IMPERVIOUS AREA PER LOT.

23. THERE MUST BE A MINIMUM OF 6" CLEARANCE FROM THE BOTTOM OF DRAINAGE INLETS TO THE INVERTS OF STORM PIPES.

24. ALL INLET GRATES SHALL BE TRAFFIC BEARING & FDOT APPROVED.

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT CONSTRUCTION DRAWINGS APPROVED 1/18/2005

AUG 26 2004 RECEIVED

File of Record
Permit No. 44025800.001

FIRM PANEL 12105C 0355F DATED 12/20/2000, HAS GRAPHICALLY DEPICTED THIS SITE AS LYING IN FLOOD ZONE "X", ACCORDING TO BEST FIT OF THE GRAPHICAL MONUMENTATION SHOWN. A BASE FLOOD ELEVATION FOR LAKE ROCHELLE IS SHOWN ON THIS FIRM PANEL AS ZONE "AE" BEING 130.6. THIS BASE FLOOD ENCROACHES INTO THE PROPERTY AS DELINEATED BY THE SURVEYED 130.6 CONTOUR LINE.

SECTION	09	
TOWNSHIP	28	S.
RANGE	26	E.

DWG: LREDR

SHEET NO. 4 OF 6 SHEETS

STATE PROJ. NO.	SHEET NO.

CERTIFIED BY: ROBERT E. LAZENBY, IV P.E. # 52006

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

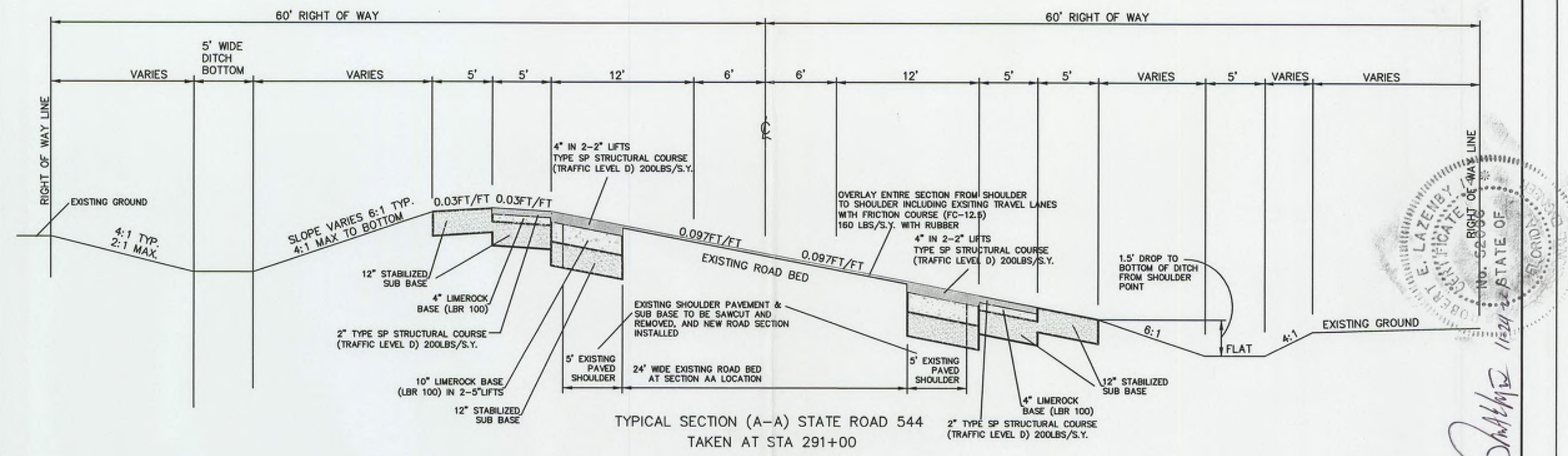
DESIGNED BY / CHECKED BY / SUPERVISED BY: — NAME — DATE

FLORIDA DEPARTMENT OF TRANSPORTATION — APPROVED BY: — DATE:

ALPHA ENGINEERING & SURVEYING, INC. 4506 S. FLORIDA AVE. LAKELAND, FLORIDA 33813 (863) 646-8571 FAX 646-4977

LAKE ROCHELLE ESTATES STATE ROAD 544

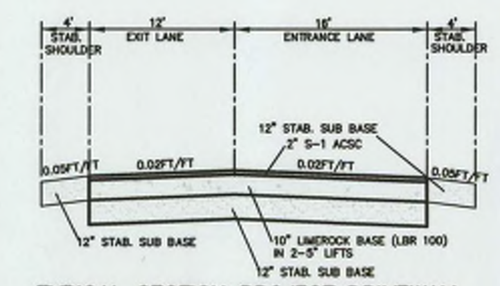
STATE PROJ. NO.	SHEET NO.
	15



TYPICAL SECTION (A-A) STATE ROAD 544
TAKEN AT STA 291+00

ROBERT E. LAZENBY — CERTIFICATE No. 52006 — STATE OF FLORIDA

11/24/04



TYPICAL SECTION PROJECT DRIVEWAY
SOUTH OF RIGHT OF WAY LINE

NOTES:

1. ALL CONSTRUCTION WITHIN FDOT RIGHT OF WAY IS TO BE IN ACCORDANCE WITH CURRNET FDOT STANDARD SPECIFICATIONS FOR ROADWAY CONSTRUCTION AND THE ROADWAY AND TRAFFIC DESIGN STANDARD INDEX.
2. ALL EXISTING SIGNS SHALL BE PROTECTED DURING CONSTRUCTION AND REPLACED IN ORIGINAL LOCATION UNLESS OTHERWISE DESIGNATED ON THESE PLANS.
3. SOD ALL DISTURBED RIGHT-OF-WAY AREAS.
4. CIVIL ENGINEER (CE) INSPECTOR WILL BE REQUIRED TO BE HIRED BY THE GENERAL CONTRACTOR OR DEVELOPER TO OVERSEE AND CERTIFY ALL CONSTRUCTION. ENGINEER OF RECORD MAY ACT AS CE INSPECTOR UNDER SEPARATE CONTRACT.
5. PRIOR TO THE START OF CONSTRUCTION, A PRE CONSTRUCTION CONFERENCE WITH FDOT STAFF, ENGINEER OF RECORD, GENERAL CONTRACTOR, PAVING CONTRACTOR, AND THE C.E. INSPECTOR, WILL BE REQUIRED TO BE ATTENDED AT THE BARTOW MAINTENANCE OFFICE.
6. ALL CONSTRUCTION STAKEOUT SURVEYING TO BE PERFORMED UNDER THE DIRECTION OF A PROFESSIONAL SURVEYOR, REGISTERED IN THE STATE OF FLORIDA.
7. A PERFORMANCE BOND FOR ALL PROPOSED WORK BASED ON AN ESTIMATE BY THE ENGINEER OF RECORD, MUST BE ISSUED TO THE FDOT PRIOR TO THE PRECONSTRUCTION CONFERENCE.
8. EROSION AND TURBIDITY TO BE CONTROLLED IN ACCORDANCE TO BEST MANAGEMENT PRACTICES.
9. TRAFFIC CONTROL & MAINTENANCE PER INDEX 604
10. NO LANE CLOSURE IS ALLOWED BETWEEN 4:00 P.M. AND 9:00 A.M. FDOT RESERVES THE RIGHT TO REQUIRE DIFFERENT HOURS OF LANE CLOSURE INCLUDING NIGHT TIME WORK.

CERTIFIED BY: ROBERT E. LAZENBY, IV P.E. # 52006

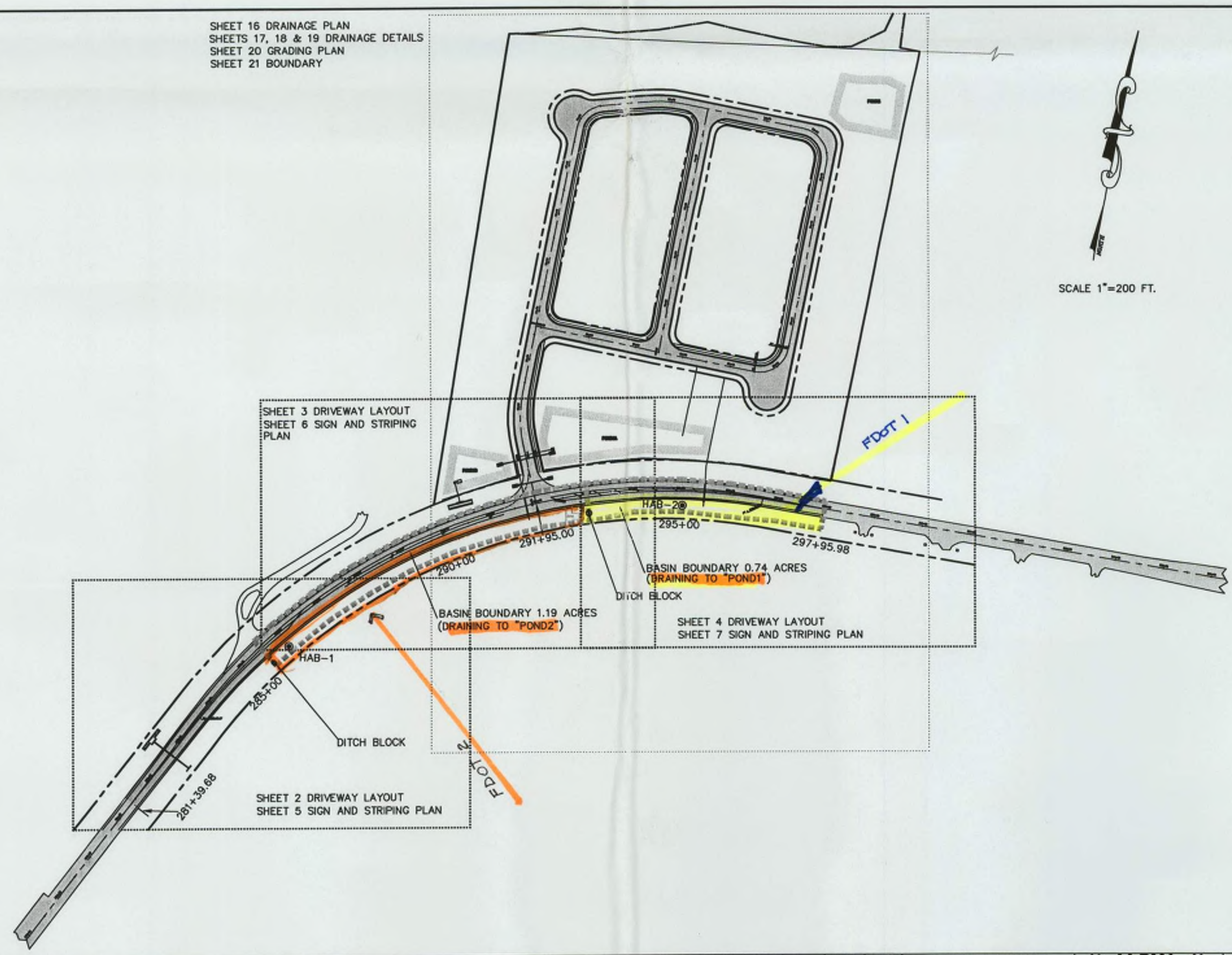
REVISIONS — FLORIDA DEPARTMENT OF TRANSPORTATION — ALPHA ENGINEERING & SURVEYING, INC. (863) 646-8571 FAX 646-4977

LAKE ROCHELLE ESTATES STATE ROAD 544

TYPICAL SECTION AND NOTES

STATE PROJ. NO.	SHEET NO.
	1

SHEET 16 DRAINAGE PLAN
SHEETS 17, 18 & 19 DRAINAGE DETAILS
SHEET 20 GRADING PLAN
SHEET 21 BOUNDARY



SCALE 1"=200 FT.

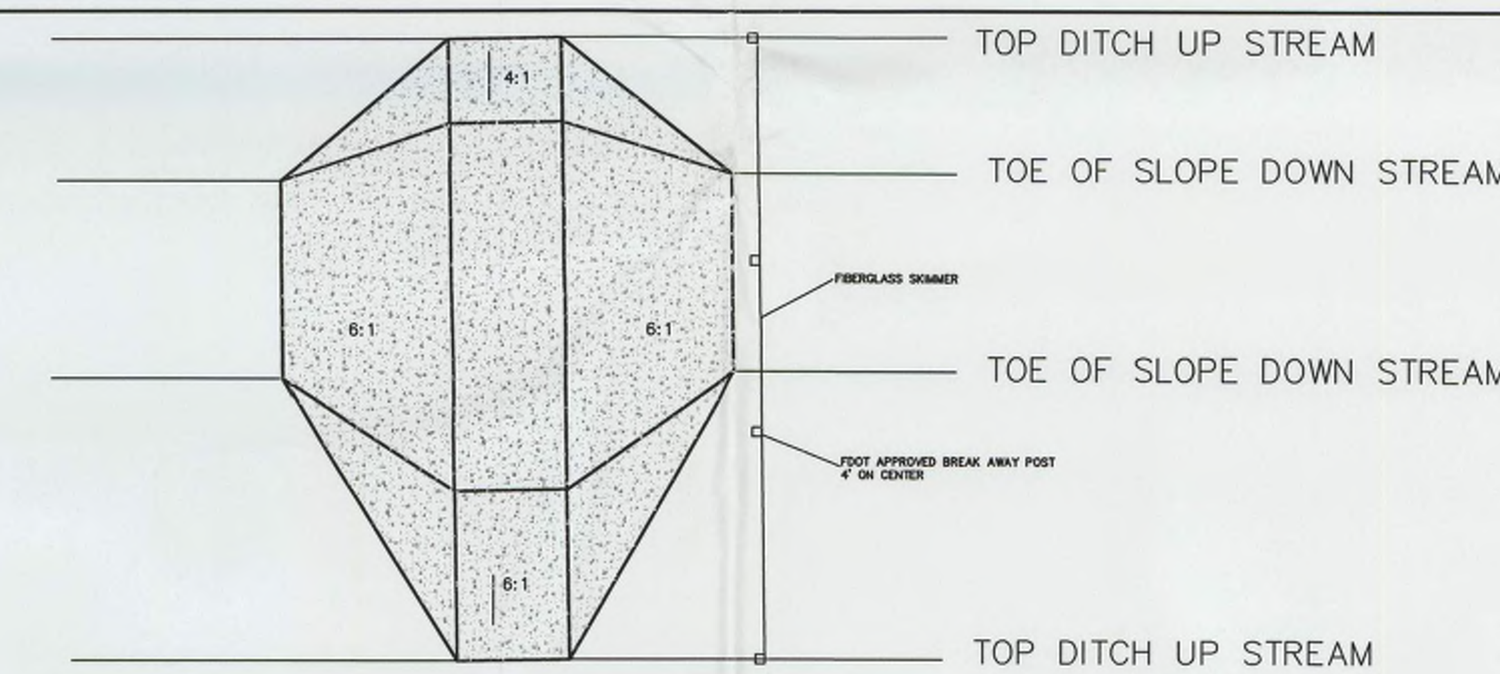
CERTIFIED BY: ROBERT E. LAZENBY, IV P.E. # 52006

REVISIONS — FLORIDA DEPARTMENT OF TRANSPORTATION — ALPHA ENGINEERING & SURVEYING, INC. 4506 S. FLORIDA AVE. LAKELAND, FLORIDA 33813 (863) 646-8571 FAX 646-4977

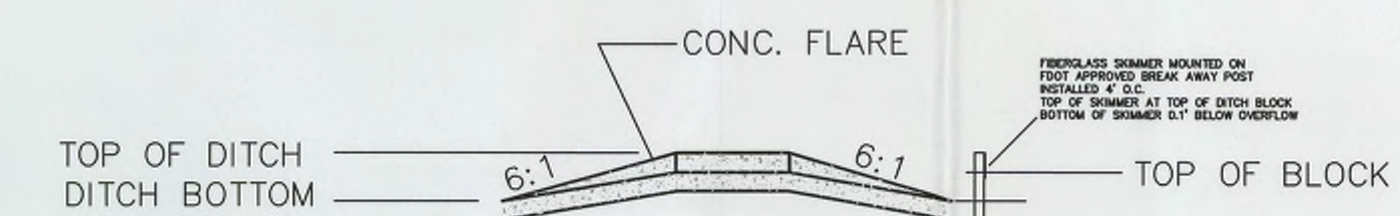
LAKE ROCHELLE ESTATES STATE ROAD 544

KEY SHEET

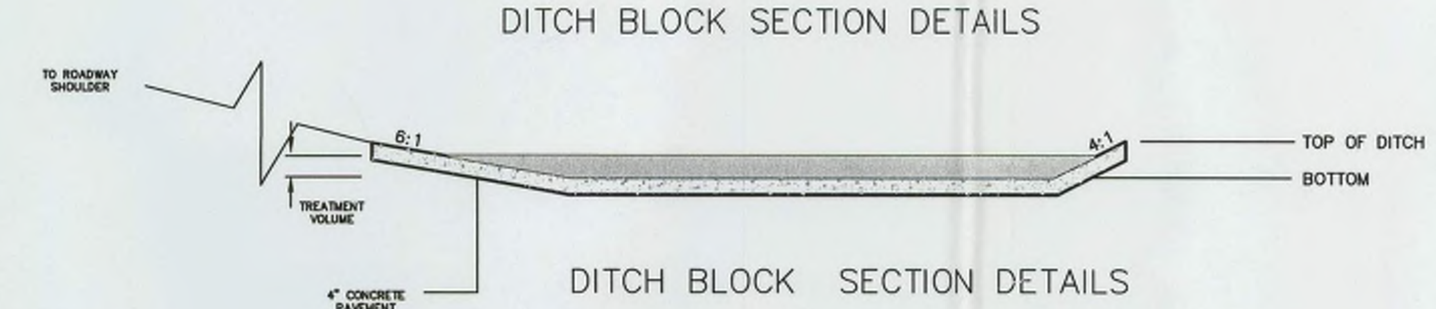
STATE PROJ. NO.	SHEET NO.
	19B



DITCH BLOCK 1 PLAN VEIW



DITCH BLOCK SECTION DETAILS



DITCH BLOCK SECTION DETAILS

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT CONSTRUCTION DRAWINGS APPROVED Francis K Ritchie 44025800.001 1/18/2005

CERTIFIED BY: ROBERT E. LAZENBY, IV P.E. # 52006

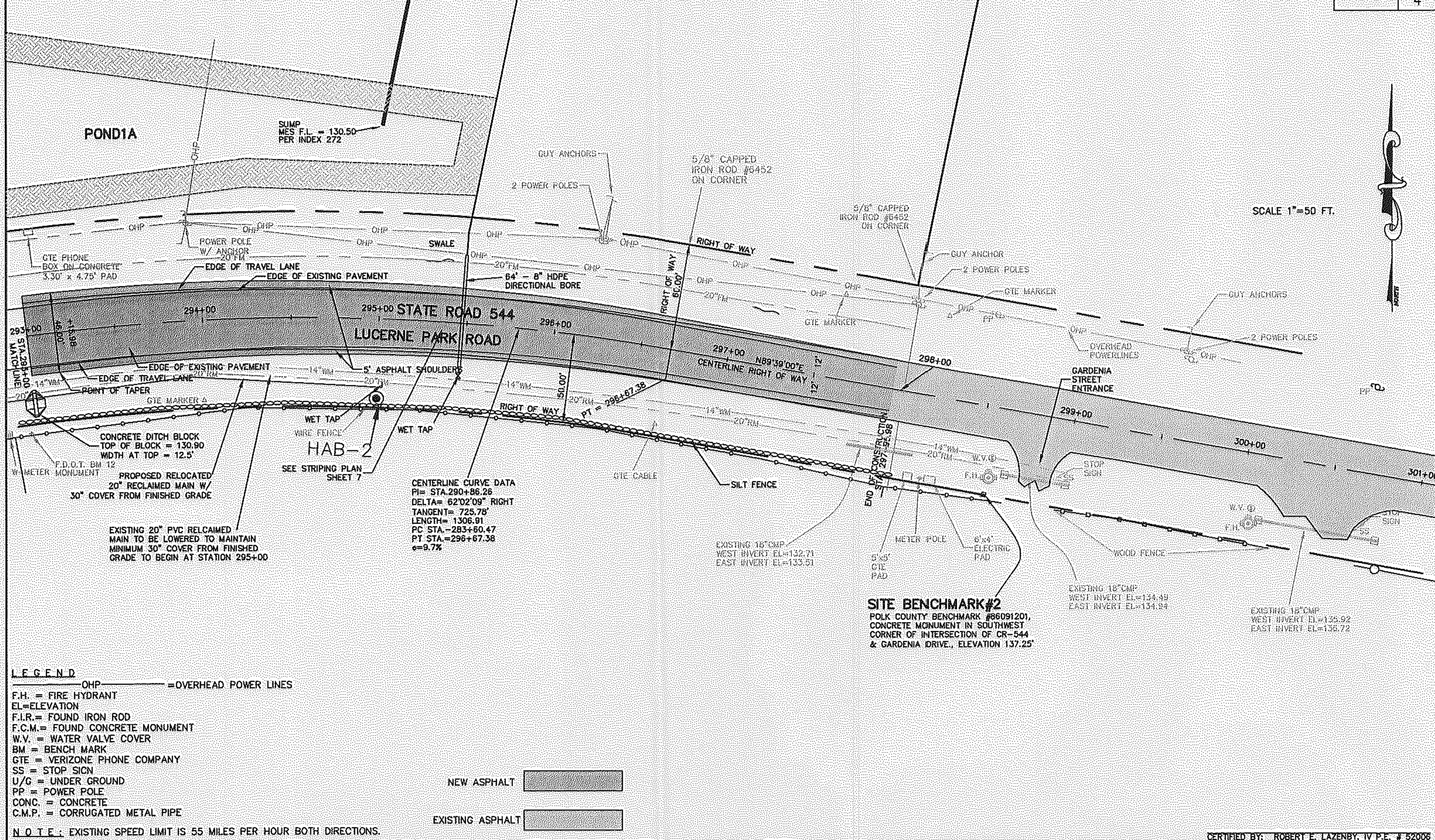
REVISIONS — FLORIDA DEPARTMENT OF TRANSPORTATION — ALPHA ENGINEERING & SURVEYING, INC. 4506 S. FLORIDA AVE. LAKELAND, FLORIDA 33813 (863) 646-8571 FAX 646-4977

LAKE ROCHELLE ESTATES STATE ROAD 544

DRAINAGE DETAILS # 4

Southwest Florida Water Management District
NOV 2 4 2004
RECEIVED
RRD-Bartow

STATE PROJ. NO. | SHEET NO. 4



CERTIFIED BY: ROBERT E. LAZENBY, IV P.E. # 52006

REVISIONS: DATE | BY | DESCRIPTION

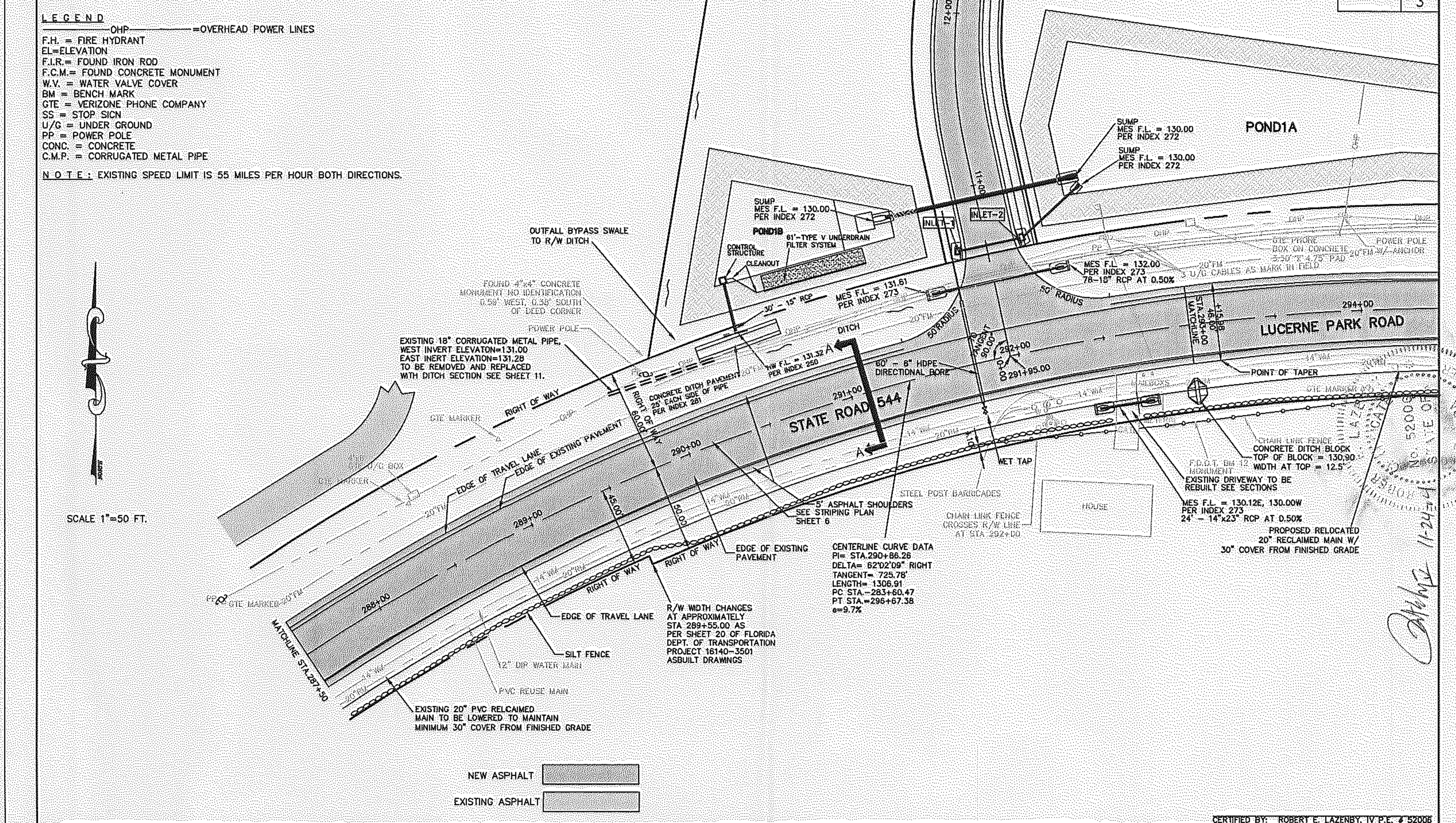
DESIGNED BY | CHECKED BY | SUPERVISED BY: | FLORIDA DEPARTMENT OF TRANSPORTATION | APPROVED BY: | DATE:

ALPHA ENGINEERING & SURVEYING, INC. 4506 S. FLORIDA AVE. LAKELAND, FLORIDA 33813 (863) 646-8571 FAX 646-4977

LAKE ROCHELLE ESTATES
STATE ROAD 544

DRIVEWAY LAYOUT

STATE PROJ. NO. | SHEET NO. 3



CERTIFIED BY: ROBERT E. LAZENBY, IV P.E. # 52006

REVISIONS: DATE | BY | DESCRIPTION

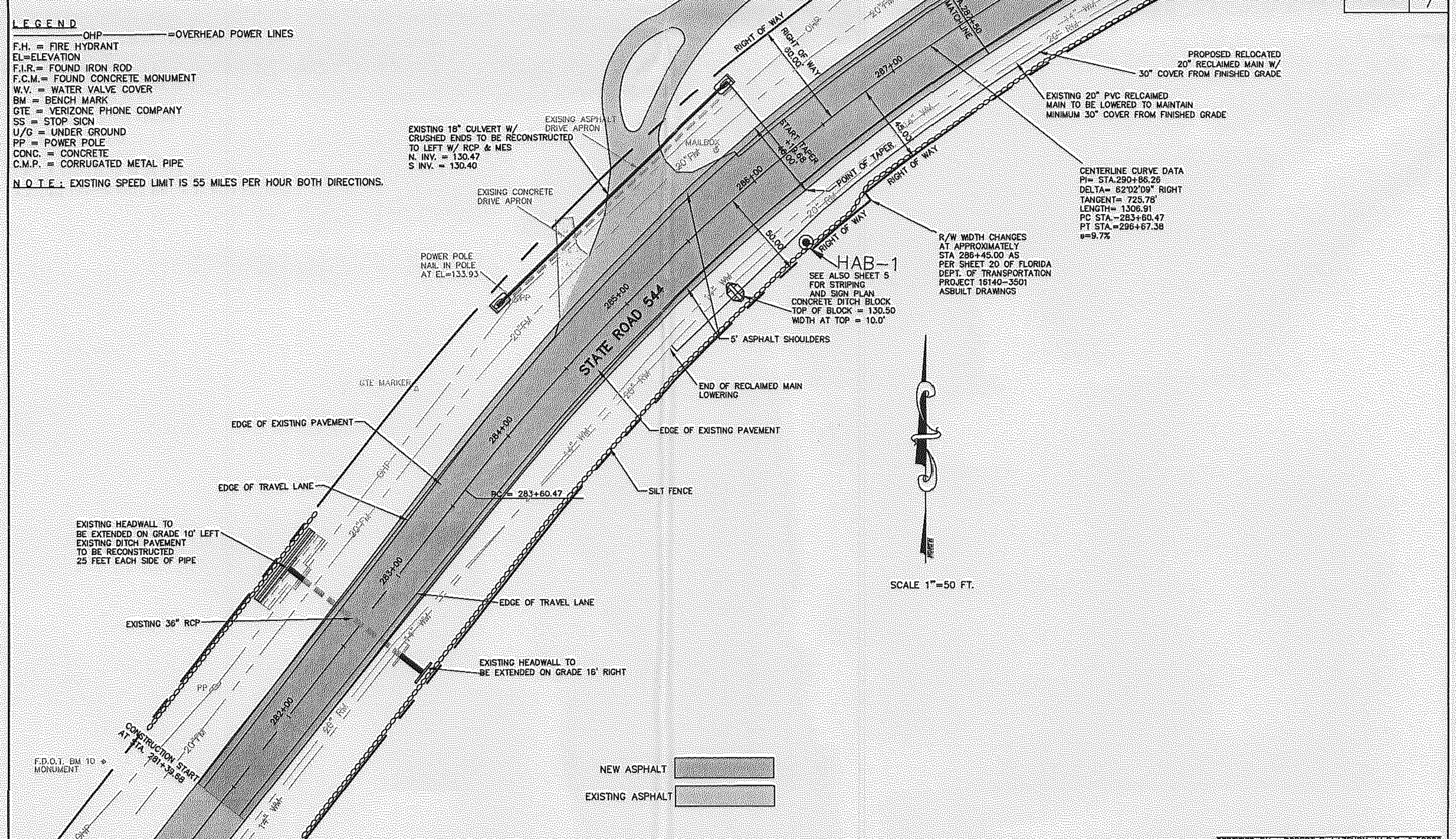
DESIGNED BY | CHECKED BY | SUPERVISED BY: | FLORIDA DEPARTMENT OF TRANSPORTATION | APPROVED BY: | DATE:

ALPHA ENGINEERING & SURVEYING, INC. 4506 S. FLORIDA AVE. LAKELAND, FLORIDA 33813 (863) 646-8571 FAX 646-4977

LAKE ROCHELLE ESTATES
STATE ROAD 544

DRIVEWAY LAYOUT

STATE PROJ. NO. | SHEET NO. 7



CERTIFIED BY: ROBERT E. LAZENBY, IV P.E. # 52006

REVISIONS: DATE | BY | DESCRIPTION

DESIGNED BY | CHECKED BY | SUPERVISED BY: | FLORIDA DEPARTMENT OF TRANSPORTATION | APPROVED BY: | DATE:

ALPHA ENGINEERING & SURVEYING, INC. 4506 S. FLORIDA AVE. LAKELAND, FLORIDA 33813 (863) 646-8571 FAX 646-4977

LAKE ROCHELLE ESTATES
STATE ROAD 544

DRIVEWAY LAYOUT

STATE PROJ. NO. | SHEET NO.

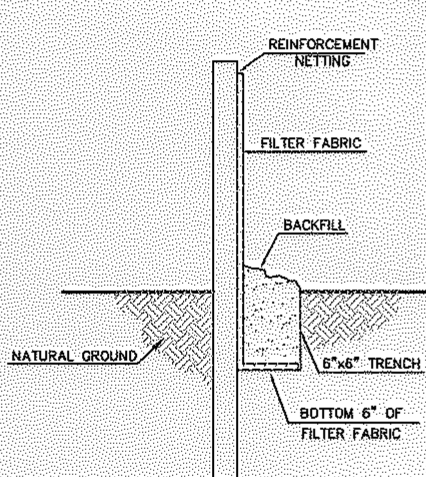
CONSTRUCTION SURFACE WATER MANAGEMENT PLAN

NOTES

1. SILT FENCES SHALL BE INSTALLED AT THE DESIGNATED LOCATIONS PRIOR TO THE COMMENCEMENT OF CONSTRUCTION. CONTRACTOR IS RESPONSIBLE FOR MAINTAINING THE FENCES TO FUCNTION AS DESIGNED. MINIUMUM MAINTENANCE SHALL OCCUR AT PERIODS NO LONGER THAN TWO WEEKS APART OR WHEN SILTATION COVERS MORE THAN 50% OF THE HEIGHT OF THE SILT FENCE.

2. ALL DISTURBED AREAS WITHIN THE RIGHT OF WAY SHALL BE RESODDED WITH LIKE SOD.

3. SEE SHEETS 2–4 ON THIS PLAN FOR LOCATION OF SILT FENCES.



TURBIDITY / SILT FENCE DETAIL
N.T.S.

I HAVE REVIEWED THIS CONSTRUCTION SURFACE WATER MANAGEMENT PLAN

DAVID MAGNESS
D. MAGNESS CONSTRUCTION

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT CONSTRUCTION DRAWINGS APPROVED 1/18/2005 44025800.001

CERTIFIED BY: ROBERT E. LAZENBY, IV P.E. # 52006

REVISIONS: DATE | BY | DESCRIPTION

DESIGNED BY | CHECKED BY | SUPERVISED BY: | FLORIDA DEPARTMENT OF TRANSPORTATION | APPROVED BY: | DATE:

ALPHA ENGINEERING & SURVEYING, INC. 4506 S. FLORIDA AVE. LAKELAND, FLORIDA 33813 (863) 646-8571 FAX 646-4977

LAKE ROCHELLE ESTATES
STATE ROAD 544

Southwest Florida Water Management District
NOV 2 4 2004
RECEIVED
BRD-Bartow

DRAINAGE CERTIFICATION

LAKE ROCHELLE ESTATES
ADICPR INPUT
Revised 5/14/04

8-24-04

Certified by: Robert E. Lazenby IV P.E. # 52006

ROBERT E. LAZENBY IV
CERTIFICATE No. 52006
STATE OF FLORIDA

S.W.F.W.M.D.
AUG 27
RECORDS & DATA

Alpha Engineering & Surveying, Inc.
4506 South Florida Avenue...Lakeland, Florida 33813...(864) 646-8571

LAKE ROCHELLE ESTATES

The proposed modification will keep the onsite portion of the project unchanged. The control structure in pond 1b named control structure # 1 will be modified per changes required by the FDOT drainage connection permit designed for critical storm and duration. The modification will modify the permit to include FDOT improvements on the adjacent State Road 544 right of way which consist of adding a left turn lane to the project driveway. The additional impervious area added for the left turn lane will be approximately 15000 square feet. Water quantity for the proposed FDOT improvement will be provided by over compensating attenuation volume in the onsite ponds 1A & 1B. Water quality will be provided without retention catchments by using infiltration to treat the first inch of rainfall by initial abstraction in the grassed right of way.

PRE BASIN ANALYSIS
Basin: Pre
Onsite Area = 6.60 acre

Land Use: Citrus Grove A soils fair to poor cover, CN = 49

Time of Concentration: = 10.0min
L = 325ft, S = 0.025ft/ft, wooded low storage, v = 38ft/min

Offsite in SR544 R/W area = 4.17 acre
Impervious = 1.27 acre CN = 98, grassed green space C soils = 2.90 CN = 74

CN = 6.60(49) + 1.27(98) + 2.90(74) / 10.77 = 61.51

Alpha Engineering & Surveying, Inc.
4506 South Florida Avenue...Lakeland, Florida 33813...(864) 646-8571

LAKE ROCHELLE ESTATES

POST BASIN ANALYSIS

Basin: Pond1
Onsite Area = 6.65 acre

Land Use	Area	CN
Road, Curb, Sidewalk	0.99 acre	98
Houses (25 x 3000sqft/Ho)	1.72 acre	98
Avg Retention	0.66 acre	100
Greenspace / Lawns	3.28 acre	39

Composite CN = (0.99 + 1.72)98 + (0.66)100 + (3.28)39 / 6.65 = 69.1

Offsite in SR544 R/W area = 4.17 acre
Impervious = 1.62 acre CN = 98, grassed green space C soils = 2.55 CN = 74

CN = + 1.62(98) + 2.55(74) / 10.82 = 83.32

Time of Concentration = 10.0 Min.

Pre development peak discharge rate = 19.81 cfs (from basin summary)
Post development peak discharge rate = 14.07 cfs (from node maximum conditions max inflow)

Treatment volume = runoff from first one inch of rainfall
impervious area = 1.62 acres x 1in x 1ft/12 in = 0.135 acft
grassed area = 2.55 acre x 0.023in* x 1ft/12in = 0.005 acft
Total treatment volume = 0.14 acft

Initial abstraction for grassed acre = 0.2S
S = 1000/74 - 10 = 3.5135

2.55 acre x .2 x 3.5135 x1/12 = 0.149 acft

* runoff for grassed area = (1-.2(3.5135))^2 / (1+.8(3.5135) = 0.023 in

Advanced Interconnected Channel & Pond Routing (ICPR Ver 2.20) [1]
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LAKE ROCHELLE ESTATES MODIFICATION
25 YEAR / 24 HOUR

********** Basin Summary - ROCHELLE ***

Basin Name:	ONSITE	SR544	PRE
Group Name:	BASE	BASE	BASE
Node Name:	POND1A	SR544	PRE
Hydrograph Type:	UH	UH	UH
Unit Hydrograph:	UH323	UH323	UH323
Peaking Factor:	323.00	323.00	323.00
Spec Time Inc (min):	1.33	1.33	1.33
Comp Time Inc (min):	1.33	1.33	1.33
Rainfall File:	FLMOD	FLMOD	FLMOD
Rainfall Amount (in):	7.00	7.00	7.00
Storm Duration (hr):	24.00	24.00	24.00
Status:	ONSITE	ONSITE	ONSITE
Time of Conc. (min):	10.00	10.00	10.00
Lag Time (hr):	0.00	0.00	0.00
Area (acres):	6.65	4.17	10.77
Vol of Unit Hyd (in):	1.00	1.00	1.00
Curve Number:	69.10	83.32	61.51
DCIA (%):	0.00	0.00	0.00
Time Max (hrs):	12.02	12.02	12.04
Flow Max (cfs):	15.92	14.05	19.81
Runoff Volume (in):	3.50	5.03	2.73
Runoff Volume (cf):	84408	76172	106638

□□ Advanced Interconnected Channel & Pond Routing (ICPR Ver 2.20) [1]

LAKE ROCHELLE ESTATES MODIFICATION
25 YEAR / 24 HOUR

********** Node Maximum Conditions - ROCHELLE **

(Time units - hours)

Node Name	Group Name	Max Time Conditions	Max Stage (ft)	Warning Stage (ft)	Max Delta Stage (ft)	Max Surface Area (sf)	Max Time Inflow	Max Inflow (cfs)	Max Time Outflow	Max Outflow (cfs)
POND1A	BASE	17.07	134.92	132.75	0.0030	24291.63	12.00	15.70	12.01	3.33
POND1B	BASE	17.08	134.92	136.50	0.0030	7112.09	12.01	3.33	17.08	0.84
SR544	BASE	24.00	132.01	133.00	0.0000	0.00	12.00	14.07	0.00	0.00

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LAKE ROCHELLE ESTATES MODIFICATION
25 YEAR / HOUR

********** Link Maximum Conditions - ROCHELLE **

(Time units - hours)

Link Name	Group Name	Max Time Flow	Max Flow (cfs)	Max Delta Q (cfs)	Max Time U/S Stage	Max US Stage (ft)	Max Time D/S Stage	Max DS Stage (ft)
CONTSTR1	BASE	17.08	0.84	0.00	17.08	134.92	24.00	132.01
PIPEATOB	BASE	12.01	3.33	-0.31	17.07	134.92	17.08	134.92

Advanced Interconnected Channel & Pond Routing (ICPR Ver 2.20) [1]

LAKE ROCHELLE ESTATES MODIFICATION

```
********** Input Report ********************************************************
--------Class: Node--------------------------------------------------------------
   Name: POND1A     Base Flow(cfs): 0          Init Stage(ft): 132.75
  Group: BASE                                  Warn Stage(ft): 132.75
Comment:

Stage(ft)    Area(ac)
132.75       0.394
136.5        0.676
--------Class: Node--------------------------------------------------------------
   Name: POND1B     Base Flow(cfs): 0          Init Stage(ft): 132.75
  Group: BASE                                  Warn Stage(ft): 136.5
Comment:

Stage(ft)    Area(ac)
132.75       0.093
136.5        0.214
--------Class: Node--------------------------------------------------------------
   Name: SR544      Base Flow(cfs): 0          Init Stage(ft): 132
  Group: BASE                                  Warn Stage(ft): 133
Comment:

Time(hrs)    Stage(ft)
0            132
24           132.01
--------Class: Pipe--------------------------------------------------------------

          Name: PIPEATOB     From Node: POND1A    Length(ft): 101
         Group: BASE           To Node: POND1B        Count: 1

                UPSTREAM     DOWNSTREAM              Equation: Average K
      Geometry: Circular     Circular                    Flow: Both
      Span(in): 30           30            Entrance Loss Coef: 0.5
      Rise(in): 30           30                Exit Loss Coef: 1
    Invert(ft): 130          130               Bend Loss Coef: 0
    Manning's N: 0.012       0.012         Outlet Cntrl Spec: Use dc or tw
   Top Clip(in): 0           0              Inlet Cntrl Spec: Use dn
Bottom Clip(in): 0           0              Stabilizer Option: None


     Upstream FHWA Inlet Edge Description:
     Circular Concrete: Square edge w/ headwall                 1      1

     Downstream FHWA Inlet Edge Description:
     Circular Concrete: Square edge w/ headwall                 1      1
```


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```
Advanced Interconnected Channel & Pond Routing (ICPR Ver 2.20) [2]
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LAKE ROCHELLE ESTATES MODIFICATION


********** Input Report ****************************************************
--------Class: Drop Structure-----------------------------------------------
    Name: CONTSTR1      From Node: POND1B        Length(ft): 30
   Group: BASE            To Node: SR544              Count: 1

   Outlet Cntrl Spec: Use dc or tw     Inlet Cntrl Spec: Use dn
   Upstream Geometry: Circular      Downstream Geometry: Circular
                         UPSTREAM                 DOWNSTREAM
              Span(in): 15                    15
              Rise(in): 15                    15
            Invert(ft): 131.32                131.32
           Manning's N: 0.012                 0.012
          Top Clip(in): 0                     0
       Bottom Clip(in): 0                     0

    Entrance Loss Coef: 0.5                     Flow: Both
        Exit Loss Coef: 1                   Equation: Aver Conveyance

     Upstream FHWA Inlet Edge Description:
     Circular Concrete: Square edge w/ headwall                1     1
     Downstream FHWA Inlet Edge Description:
     Circular Concrete: Square edge w/ headwall                1     1

 *** Weir 1 of 2 for Drop Structure CONTSTR1 ***              [TABLE]
   Count: 1                  Bottom Clip(in): 0
    Type: Mavis                 Top Clip(in): 0
    Flow: Both             Weir Discharge Coef: 3.13
Geometry: Rectangular  Orifice Discharge Coef: 0.6

        Span(in): 1.5                    Invert(ft): 133.29
        Rise(in): 18.96            Control Elev(ft): 133.29

 *** Weir 2 of 2 for Drop Structure CONTSTR1 ***              [TABLE]
   Count: 1                  Bottom Clip(in): 0
    Type: Horiz                 Top Clip(in): 0
    Flow: Both             Weir Discharge Coef: 3.13
Geometry: Circular     Orifice Discharge Coef: 0.6

        Span(in): 3                      Invert(ft): 134.87
        Rise(in): 999              Control Elev(ft): 134.87
```

```
    Advanced Interconnected Channel & Pond Routing (ICPR Ver 2.20) [3]
    Copyright 1995, Streamline Technologies, Inc.

    LAKE ROCHELLE ESTATES MODIFICATION

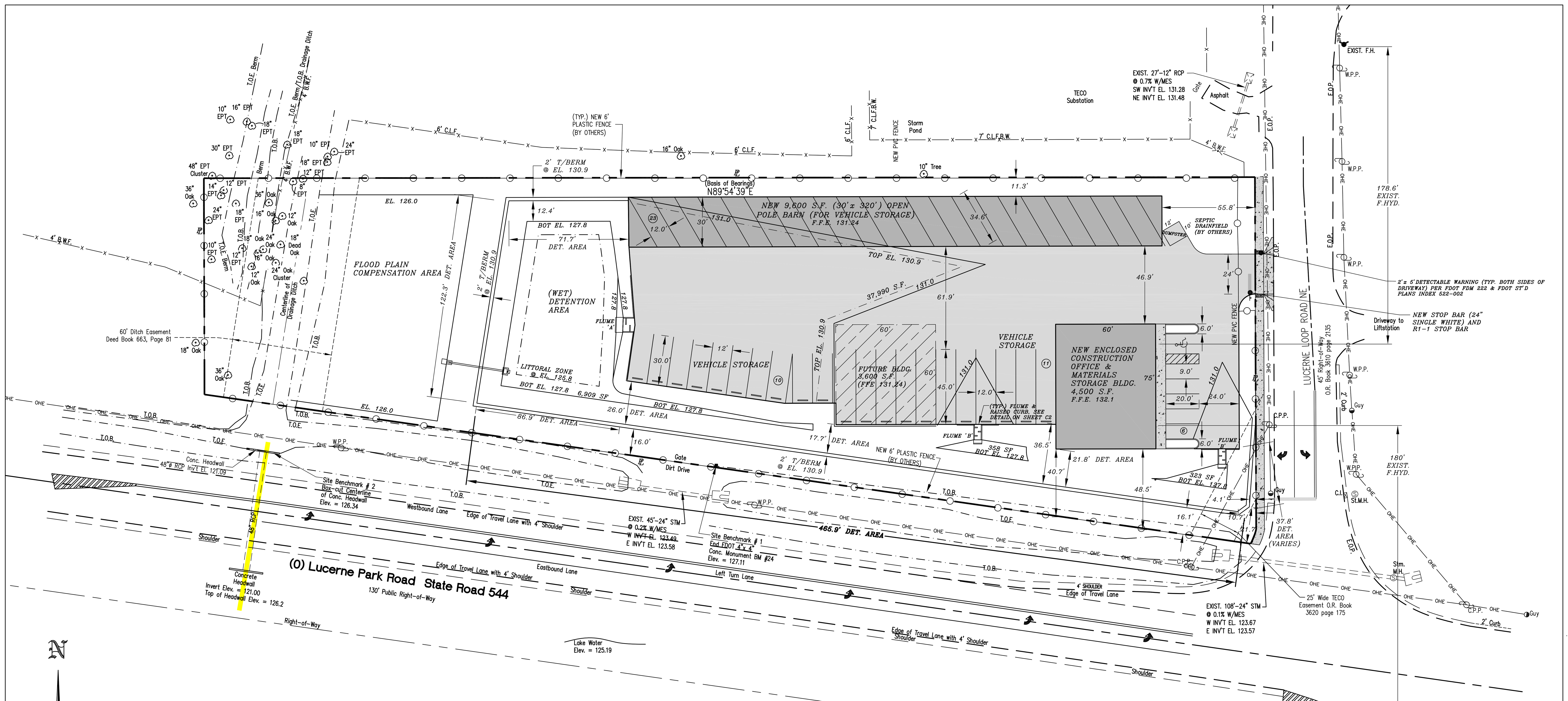

    ********** Input Report ****************************************************
    --------Class: Simulation---------------------------------------------------
 C:\ICPR2\ROCHELLE\ROCHELLE
 Execution: Both
    Header: LAKE ROCHELLE ESTATES MODIFICATION


---------HYDRAULICS-----------------------------HYDROLOGY--------------------
        Max Delta Z (ft): 1
          Delta Z Factor: 0.01          Override Defaults: No
     Time Step Optimizer: 0
Drop Structure Optimizer: 0
     Sim Start Time(hrs): 0
       Sim End Time(hrs): 24
      Min Calc Time(sec): 1
      Max Calc Time(sec): 5
        To Hour:   PInc(min):                    To Hour:   PInc(min):
        24         15                            24         15
---------GROUP SELECTIONS-----------------------------------------------------
+ BASE     [08/24/04]
```


44025800.001

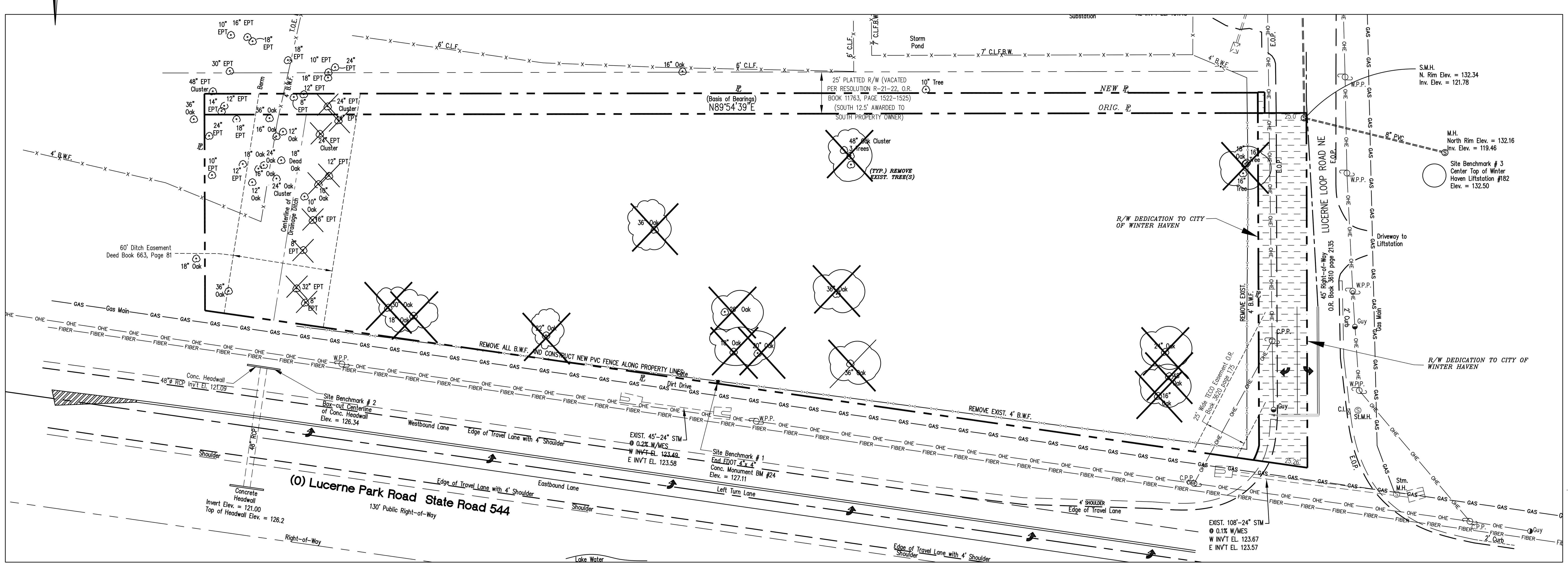
PERMIT NO. 43262.001

"Keep it Safe" Storage



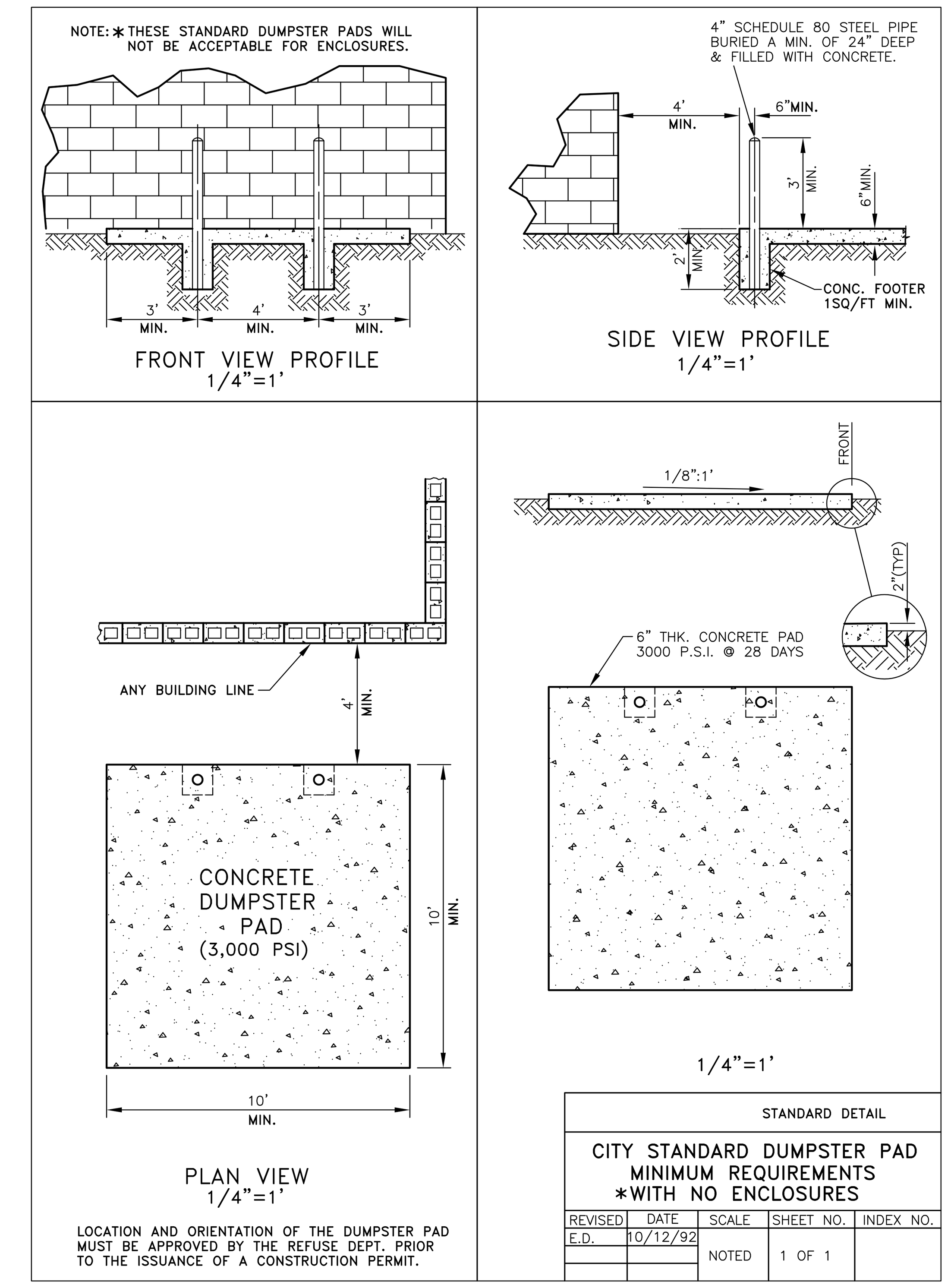
SITE LAYOUT

SCALE: 1" = 40'

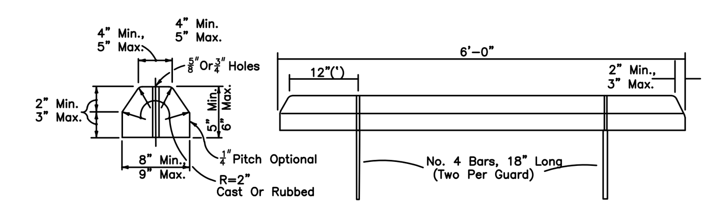


DEMO PLAN

SCALE: 1" = 40'

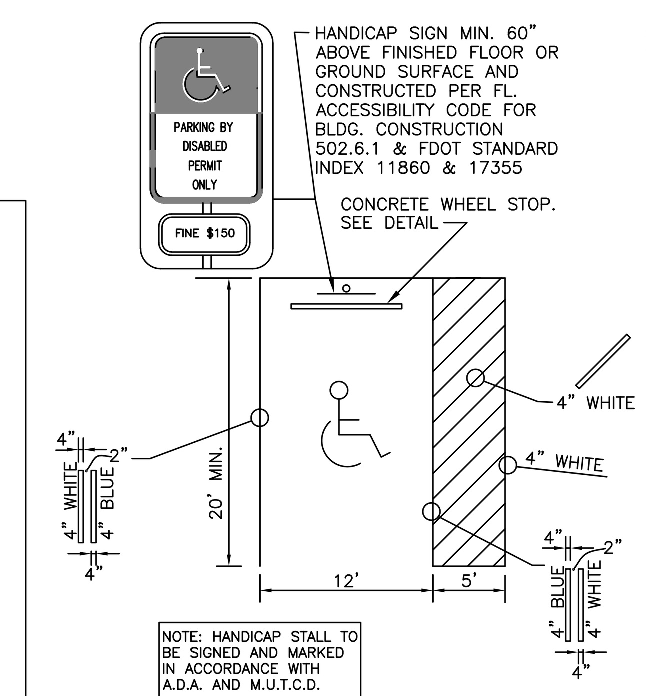


CITY STANDARD DUMPSTER PAD MINIMUM REQUIREMENTS *WITH NO ENCLOSURES



CONCRETE WHEEL STOP

N.T.S.



TYPICAL HANDICAP PARKING

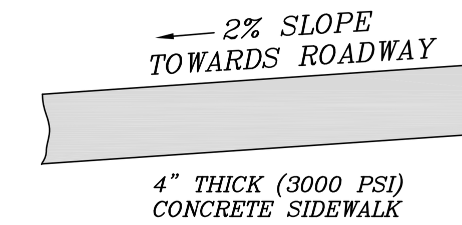
N.T.S.

NOTE: EACH PARKING SPACE WHICH IS RESTRICTED FOR THE USE OF PHYSIALLY DISABLED PERSONS SHALL BE IDENTIFIED, POSTED, AND MAINTAINED WITH A PERMANENT SIGN MEETING THE FOLLOWING CRITERIA:

1– SHALL BEAR THE INTERNATIONAL SYMBOL OF ACCESSIBILITY, BEING A WHITE REFLECTORIZED SYMBOL WITH A BLUE REFLECTORIZED BACKGROUND, AS REFERENCED IN AMERICAN NATIONAL STANDARDS SPECIFICATIONS ANSI, A117.1–1980

2– SHALL BEAR THE CAPTION "PARKING BY DISABLED PERMIT ONLY" BEING A BLACK OPAQUE LEGEND ON A WHITE REFLECTORIZED BACKFROUND

3– SHALL BEAR THE MONETARY FINE FOR PARKING VIOLATIONS.



5' WIDE CONCRETE SIDEWALK

N.T.S.

DESIGNED BY: SER

APPROVED BY: DRN

REVISIONS

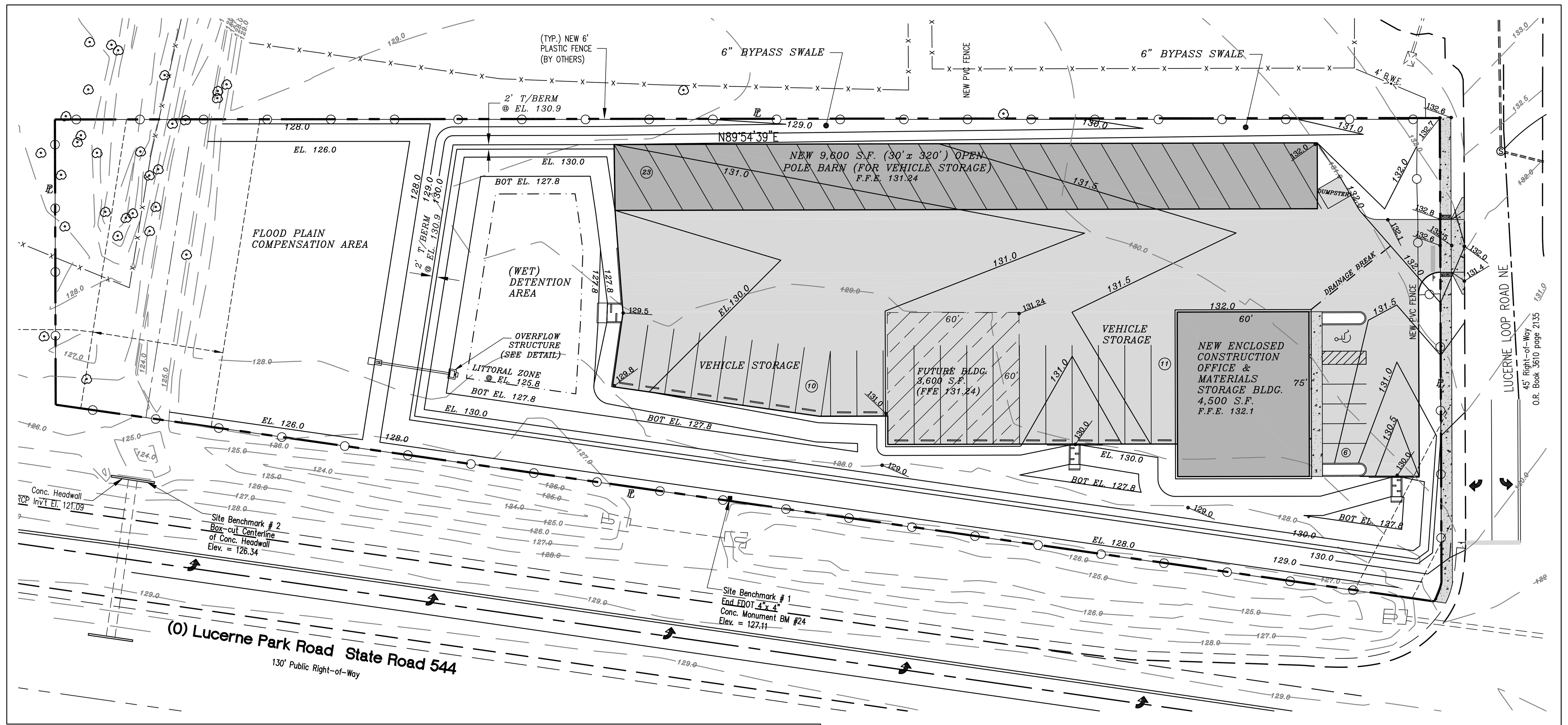
DAVID NORRIS ENGINEERING
CERTIFICATE OF AUTHORIZATION NUMBER: 8283
COMMERCIAL PLANS • INSPECTIONS • PERMITTING
"SPECIALIZING IN CHURCH DESIGN"
112 COLEMAN ROAD
WINTER HAVEN, FLORIDA 33880
OFFICE: (863)299-1048 FAX: (863)291-4305
PE #: 32186 E-MAIL: D.NORRIS@EARTHLINK.NET

JOB NO. 20–14

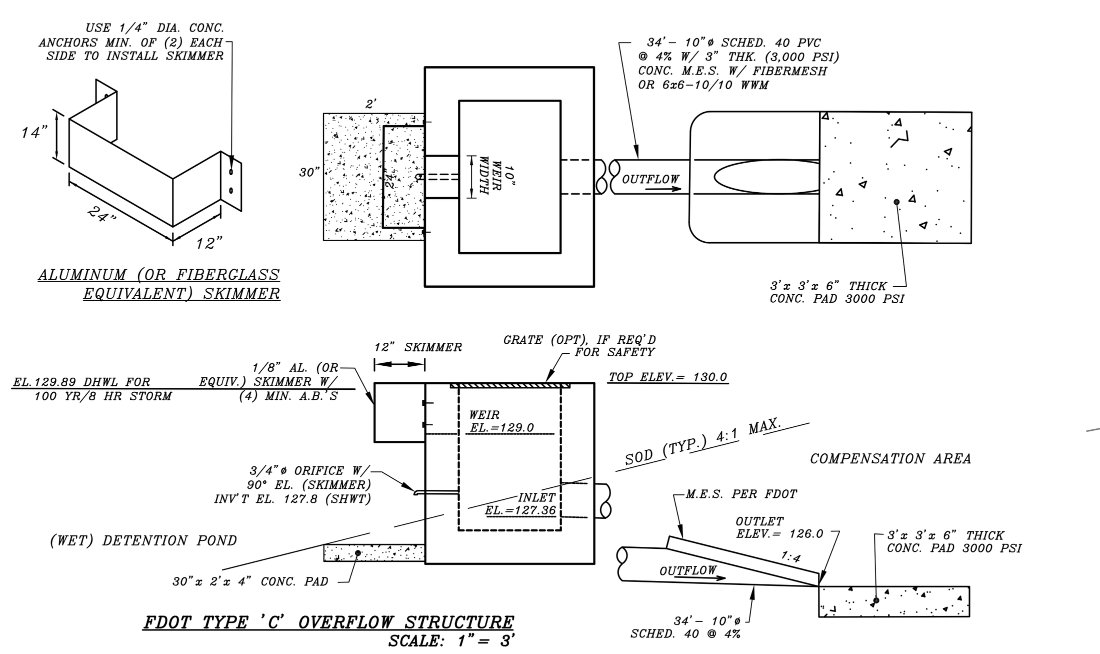
KEEP IT SAFE STORAGE

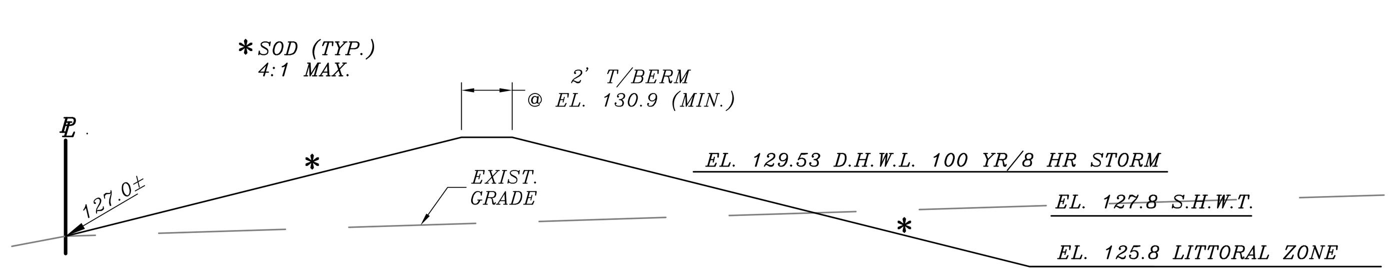
SITE LAYOUT & DEMO PLAN

SHEET C1

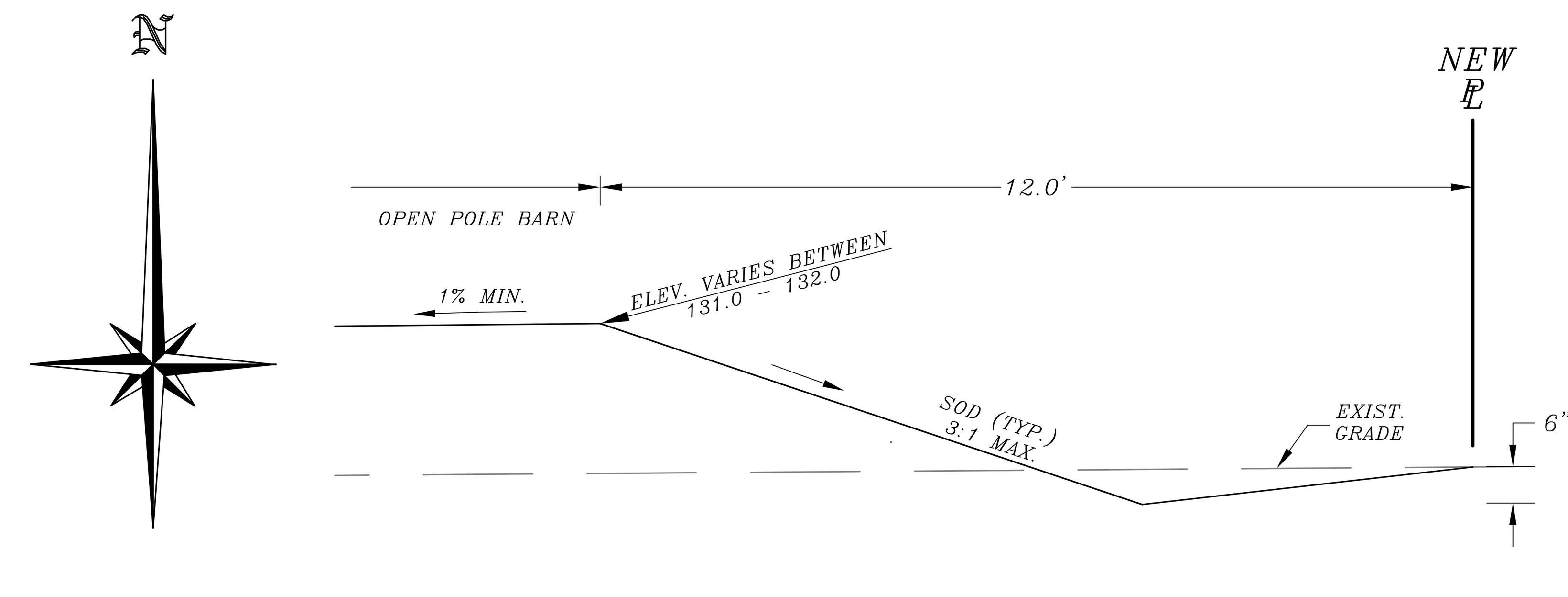


GRADING PLAN
SCALE: 1" = 40'

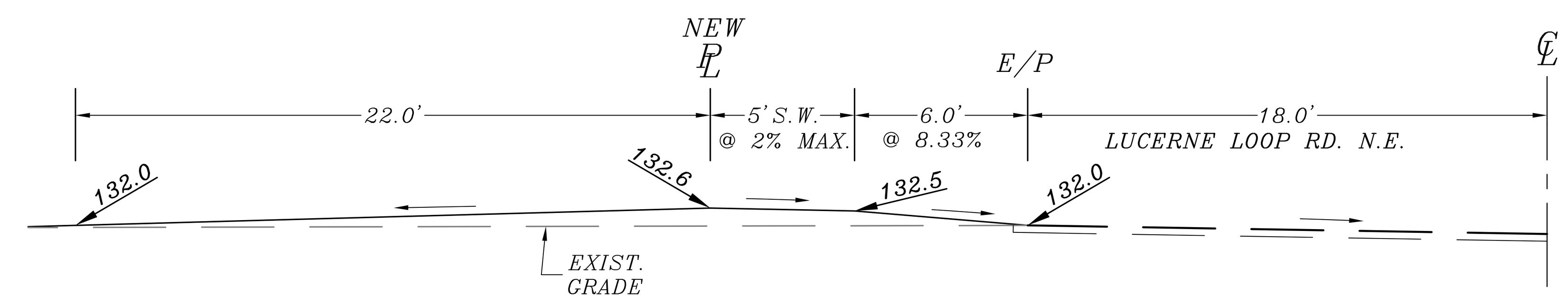




TYP. (WET) DETENTION POND SECTION
(ALONG S. ℄) SCALE: 1" = 6'



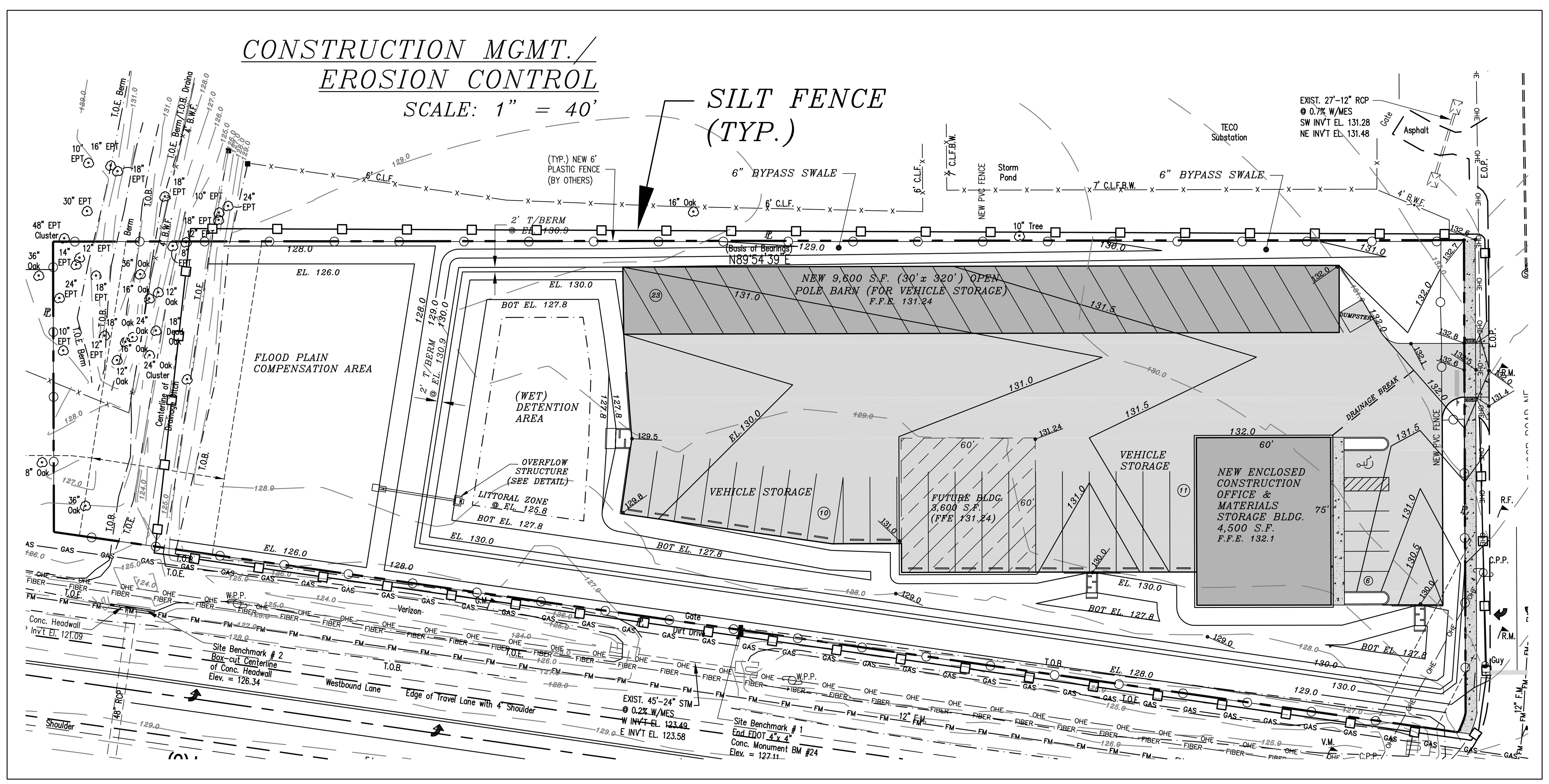
TYP. SECTION – 6" BYPASS SWALE
SCALE: 1" = 2'



TYP. ℄ SECTION – NEW 24' DRIVEWAY
SCALE: 1" = 2'

CONSTRUCTION MGMT./
EROSION CONTROL
SCALE: 1" = 40'

SILT FENCE (TYP.)



TEMPORARY EROSION AND SEDIMENTATION CONTROL SPECIFICATIONS 1.01 DESCRIPTION:

A) The work specified on this Section consists of designing, providing, maintaining, and removing temporary erosion and sedimentation controls as necessary.
B) Temporary erosion controls include, but are not limited to, grassing, setting watering and re–seeding on–site surfaces and spoil and barrow area surfaces and providing interceptor ditches at ends of berms and at those locations which will ensure that erosion during construction will be either eliminated or maintained within acceptable limits as established by the owner.
C) Temporary sedimentation controls include, but are not limited to, silt dams, traps, barriers, and appurtenances at the foot of sloped surfaces that will stop sedimentation pollution.
D) The contractor is responsible for providing effective temporary erosion and sediment control measures during construction or until final controls become effective.

1.02 REFERENCE DOCUMENTS

A) Florida Building Code
B) Florida Department of Transportation Specifications

STORM WATER MANAGEMENT MAINTENANCE/OPERATION INSTRUCTIONS

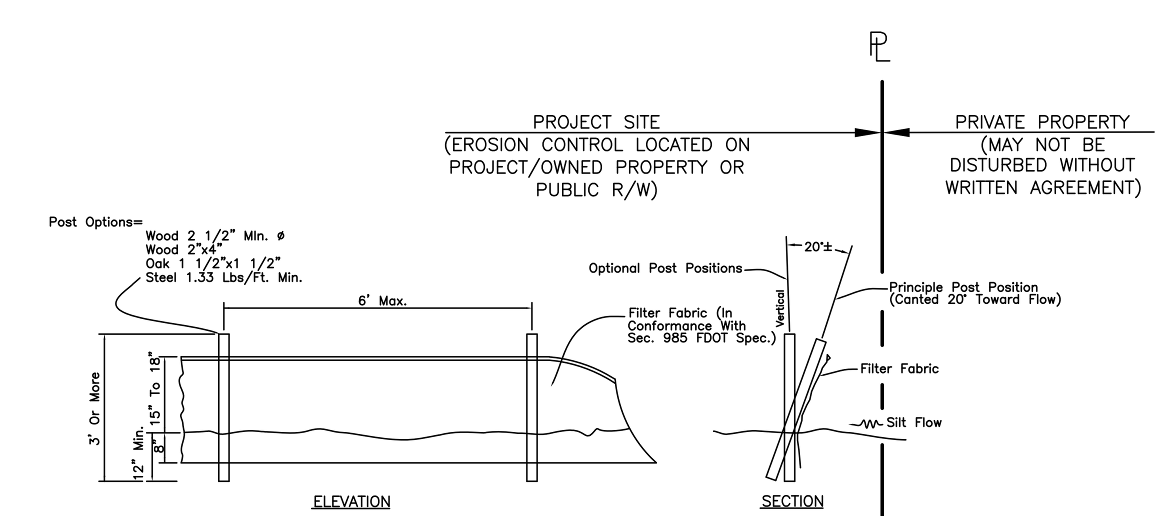
Sediment: Sediment deposition should be continually monitored in the basin. The sediment shall be removed when reaching 2"–3" accumulative depth.
Inlets: Pipe inlets should be inspected after each storm, and accumulated debris and sediment should be removed. Erosion during construction will be either eliminated or maintained within acceptable limits as established by the owner.
Outlets: Pipe outlets should be inspected after each storm to determine whether outflow is causing erosion. Wherever such erosion is detected, effective measures would be taken to stabilize and protect the affected area.
Vegetation: Trees should be kept off dam and emergency spillway area. Vegetation should be maintained for critical area stabilization.
Insects: Precautions should be taken to minimize the production of fast breeding insects in and around the pond area. Possible control measures include controlling the growth of grass at shorelines, varying the water depth every few days, and stocking the pond with larvae eating fish.
Safety Inspection: All permanent impoundments should be inspected periodically by a qualified professional engineer to ensure the they remain structurally sound and mechanically efficient. An annual safety inspection is recommended where the potential for downstream damage and loss of life due to impoundment failure is high. All structures should be inspected following major storms as well. The entire drainage system must be inspected every 1–5 yrs. as required by the Water Management District.

2.01 EROSION CONTROL:

A) Minimum procedures for grassing are:
1) Scarify slopes to a depth of not less than six inches and remove large clods, rocks, stumps roots larger than 1/2" in diameter, and debris.
2) Sow seed within (24) hours after the ground is scarified with either mechanical seed drills or rotary hand seeders.
3) Apply mulch loosely and to a thickness of between 3/4" and 1 1/2".
4) Apply netting over mulched areas on sloped surfaces.
5) Roll and water seeded area in a manner that will encourage sprouting of seeds and growing of grass. Re–seed areas which exhibit unsatisfactory growth. Backfill and seed eroded areas.

2.02 SEDIMENTATION CONTROL: Install and maintain silt dams, traps, barriers, and appurtenances as shown on the approved description and working drawings.

2.03 PERFORMANCE: Should any of the temporary erosion and sediment control measures employed be the contractor fail to produce results which comply with the requirements of the Florida DOT Specifications, the Contractor shall immediately take whatever steps are necessary to correct the deficiency at his own expense. NOTE: Hay bales are not acceptable for erosion, sedimentation, and turbidity control. Muck–grown sod is not acceptable for use in retention area banks and bottom.



EROSION CONTROL:
TYPE III SILT FENCE

DESIGNED BY: SER
APPROVED BY: DRN
REVISIONS

DAVID NORRIS ENGINEERING
CERTIFICATE OF AUTHORIZATION NUMBER: 8283
COMMERCIAL PLANS • INSPECTIONS • PERMITTING
"SPECIALIZING IN CHURCH DESIGN"
112 COLEMAN ROAD
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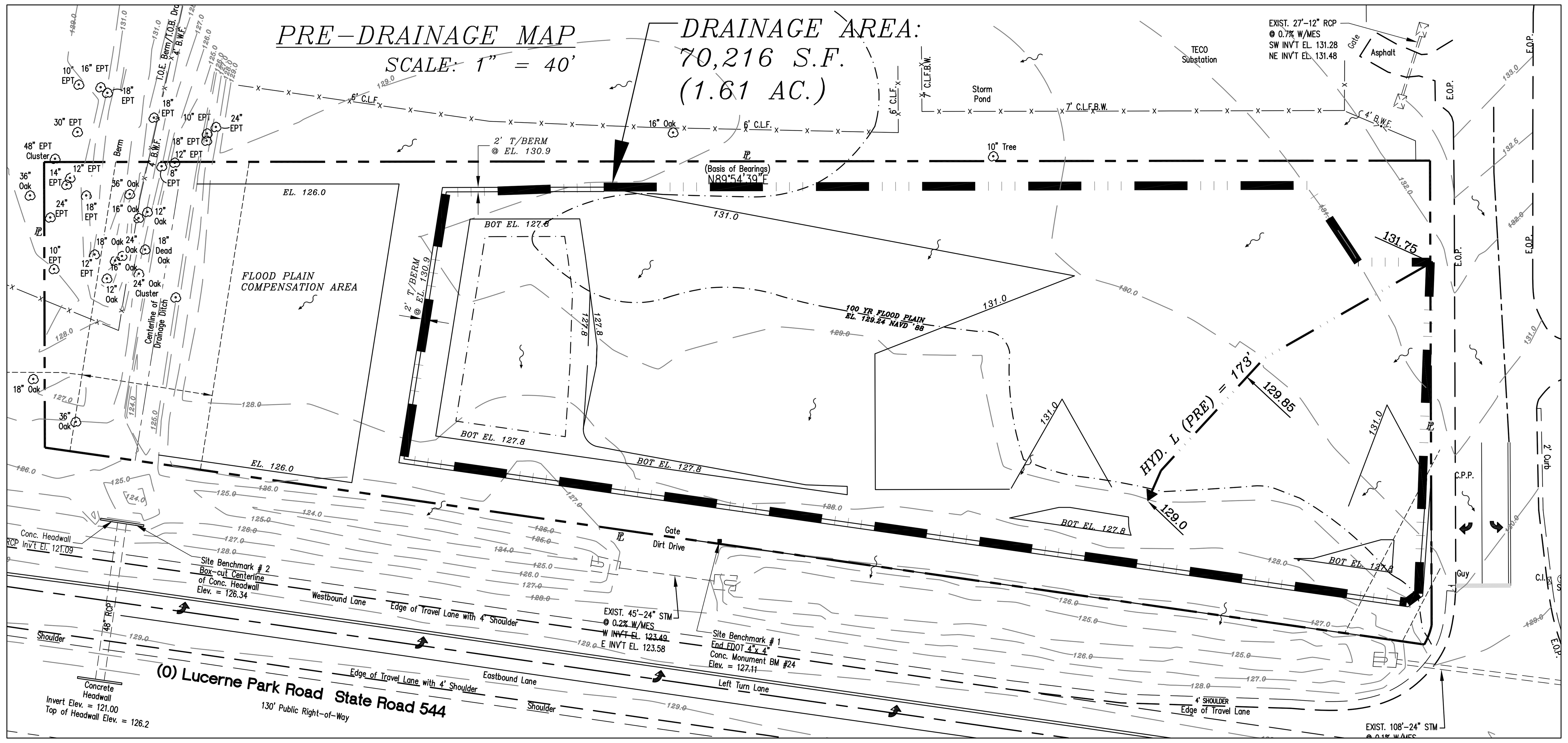
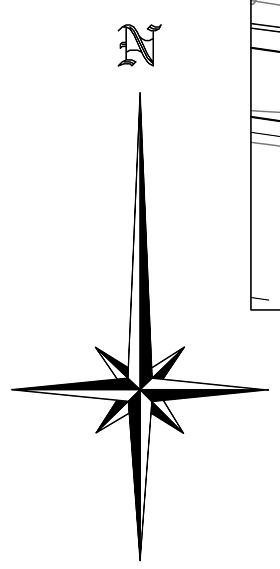
PE #: 32186 E-MAIL: D.NORRIS@EARTHLINK.NET

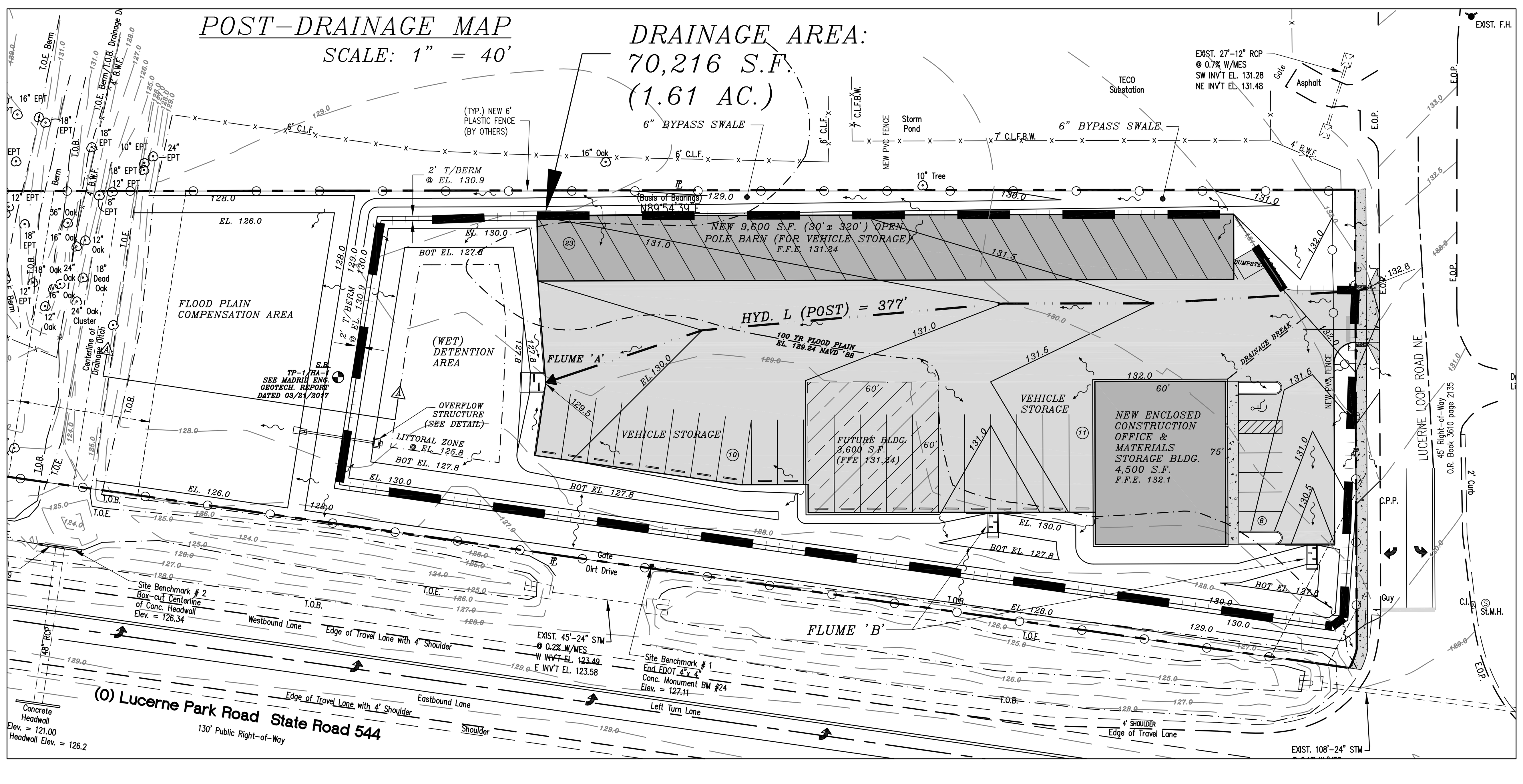
JOB NO. 20–14

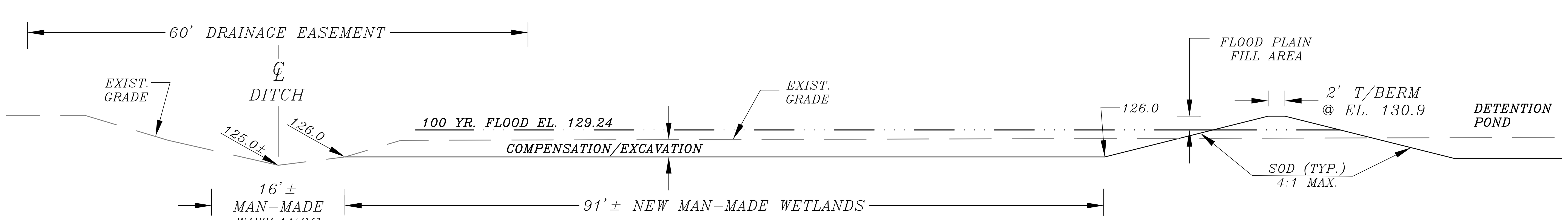
KEEP IT SAFE STORAGE
GRADING & CONSTRUCTION MANAGEMENT PLAN

SHEET C2

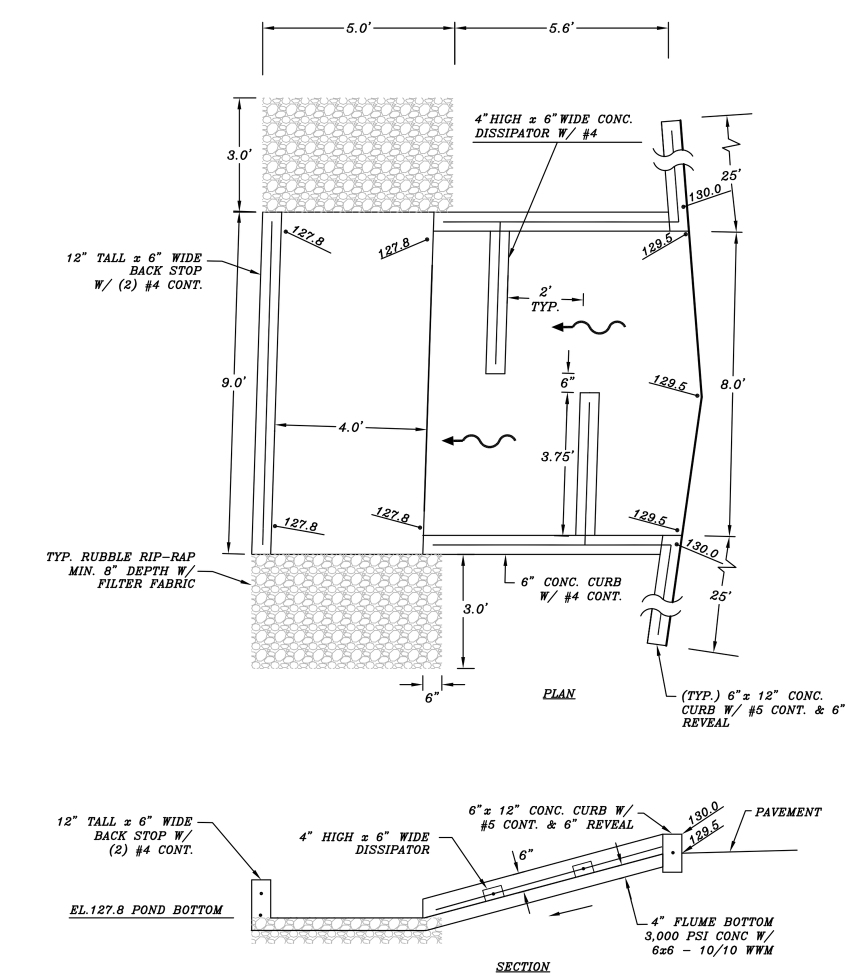




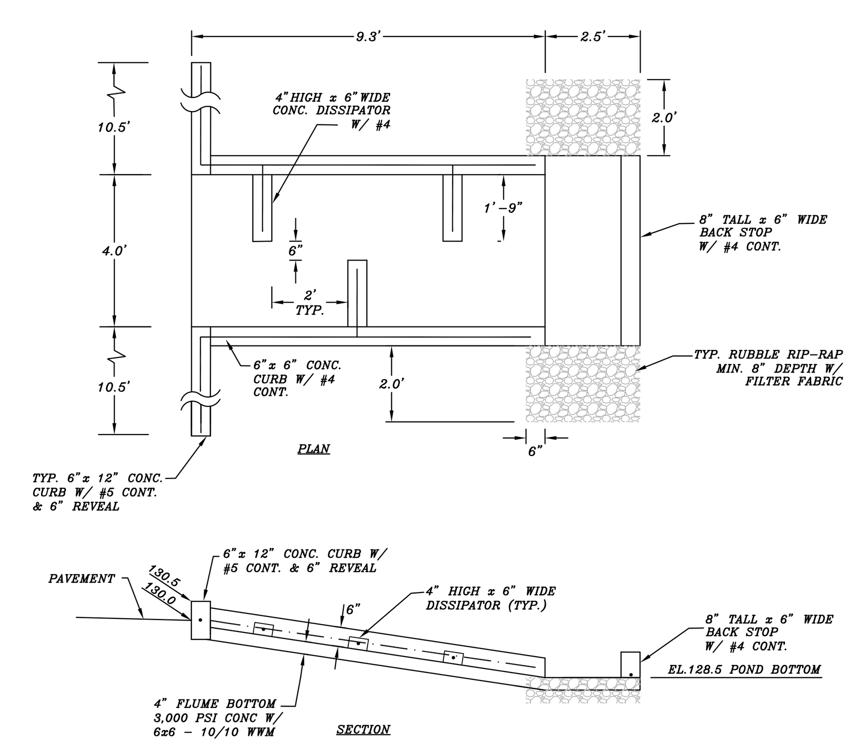




TYP. SECTION A-A: COMPENSATION AREA & DETENTION POND
SCALE: 1" = 10'



FLUME 'A' DETAIL
SCALE: 1" = 4'



FLUME(S) 'B' DETAIL
SCALE: 1" = 4'

DESIGNED BY: SER
APPROVED BY: DRN

REVISIONS

DAVID NORRIS ENGINEERING
CERTIFICATE OF AUTHORIZATION NUMBER: 8283
COMMERCIAL PLANS • INSPECTIONS • PERMITTING
"SPECIALIZING IN CHURCH DESIGN"
112 COLEMAN ROAD
WINTER HAVEN, FLORIDA 33880
OFFICE: (863)299-1048 FAX: (863)291-4305
PE #: 32186 E-MAIL: D.NORRIS@EARTHLINK.NET

JOB NO.
20-14

KEEP IT SAFE STORAGE
PRE/POST-DRAINAGE MAPS

SHEET
C3

Design # 6

Drainage Design Parameters

Date: 11-15-21

Project Name: Greenland Services (Lake Fannie) Job No.: 20-14

Design for: ~~Polk Co.~~ X SWFWMD ✓ FDOT ✓ City of W.H. ✓

Open Basin: ✓ ~~Closed Basin:~~ X

(Post) D.A.: 77,404 S.F. 1.77 Ac. (Pre) D.A.: Same S.F. Same Ac.

½" R.O. = N/A C.F. N/A Ac.-Ft. 1" R.O. = 6450 C.F. .148 Ac.-Ft.

Soils: SCS # 40, Wauchula Fine Sand Type: B/D

SHWT = 0-1' Permeability= 6-20 in/hr

CN (Pre)= 80

CN (Post)= 95

TC (Pre) = 10 min. TC (Post) = 10 min.

P = N/A in (25 yr/24 hr) P = N/A in (100 yr/24 hr)

(See F.D.O.T. Rainfall)

Pond: (Dry) Retention N/A (Wet) Detention ✓

		S.F. area	C.F./Ac-Ft volume
Soil Brg. EL:	128.8	22,400 − 6,100 = 16,300 / 22 = 740.91	1.2 8891 11,509 6427; .73 5453 11,583 6543
Aquifer EL:	124.5 (126.5)	(4860)	
SHWT EL:	127.8		~~.72 5338 11,458 6312~~ ≈ 6321
Bottom EL:	127.8	6100	0
Weir EL:	128.53 129.0 } 1.2 .73	14,991 11,657	12,655 > 6450 O.K
EL:	129.5 130.0	18,695 22,400	21,016 31,350
T/POND	130.9	29,068	54,511

127.8 + .73 = 128.53

L/W = 580/15.24 = 38.06

for L = 580'

H = .74

W = 15.24 (W= ½" Vol. / L x H)

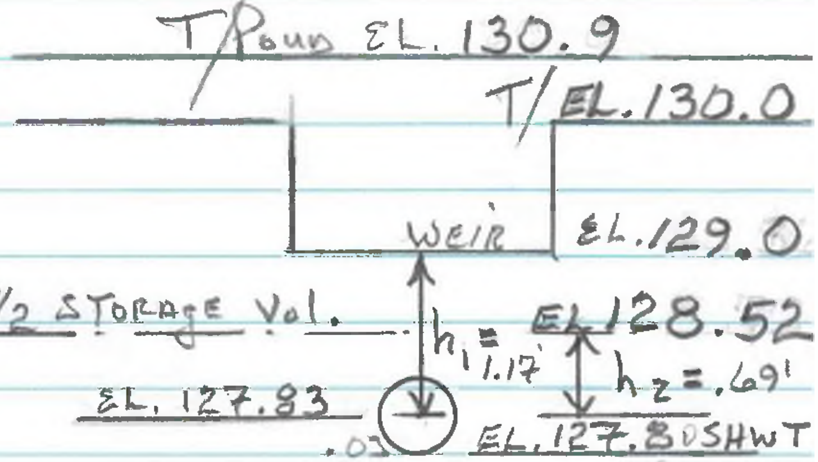
6542 / .74 (580) = 15.24

130.9 − 127.8 = 3.1 ... = 12.4

Greenland - Lk. Fannie #20-14

Drawdown Calcs for 3/4" ϕ Orifice

Total Storage Vol = 12,655 C.F.
A_R = 14,991



1/2 Stor. Vol = 6,328 C.F.
A_R = 11,435

h_1 = 129.0 - 127.83 = 1.17'

h_2 = 128.52 - 127.83 = .69'
[.251]

Avg. Pond Surface Area
$\frac{14,991 + 11,435}{2}$ = 13,213 S.F.

$$t = \frac{2(13,213)}{.61\,(.00306)\,8.025}\left[(1.17)^{.5} - (.69)^{.5}\right]$$
1.08166 - .83066

A_o (3/4" ϕ) = .0030625 ft

= 442,440 SEC. ÷ 3600

= 122.9 Hr. > 60 o.k.

Runoff curve number (CN)

Project : Greenlawn - Lk. Fannie
Location :

By :
Checked :

JOB # 20-14
DRN 8/27/21

Check One :
☐ Present
☑ Developed

Runoff curve number

Soil name and hydrologic group (appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN Figure 2-2	CN Figure 2-3	CN Figure 2-4	Area ☑ acres ☐ sq. mi. ☐ %	Product of CN x Area
# 40/B/D Wauchula F S.		80			.26	20.8
Impervious Area		98			1.24	121.52
D Retention Area	Area @ 21,127.8 / SHWT	100			.27	27.0

Totals 1.77 169.32

CN (weighted) = total product / total area

Use CN $\boxed{95}$ 95.66

TR 55 Urban Hydrology for Small Watersheds

(PRE)

Time of concentration (Tc) or travel time (Tt)

Project : Greenland - Lk. Fannie By : DENo JOB # 20-14
Location : Polk County, FL Checked : Date: 8/27/21

Check One : ☐ Present ☐ Developed

Check One : ☑ Tc ☑ Tt through subarea

Notes: Space for as many as two segments per flow type can be used for each worksheet. Include map, schematic, or description of flow segments.

Sheet flow (Applicable to Tc only)

		Segment ID	AB			
1. Surface description (Table 3-1)			GRASS			
2. Mannings roughness coeff., n (Table 3-1)			0.15			
3. Flow length, L (total L < 300 ft.)		ft	100.00			
4. Two-yr 24-hr rainfall, P2		in	4.70			
5. Calculated Land slope, s	2.2/100	ft/ft	.022			
5a. Land Elevation For Upper End Of Flow Path			132.5			
5b. Land Elevation For Lower End Of Flow Path			130.3			
6. Compute Tt [Eq. 3-3]		hr	.13	+ 0	=	.13 hours

= .007 (.15 × 100)^.8 / (P2)^.5 (S)^.4 = .007(15)^.8 / 2.168 (.022)^.4 = (.007) 8.738 / 2.168 (.217)

.017
.147

Shallow concentrated flow

		Segment ID	BC			
7. Surface description (Paved or Unpaved)			Unpaved			
8. Flow length, L		ft	110			
9. Calculated Watercourse slope, s	1.3'/110'	ft/ft	.012			
9a. Land Elevation For Upper End Of Flow Path			130.3			
9b. Land Elevation For Lower End Of Flow Path			129.0			
10. Average velocity, V (Figure 3-1)		ft/s	1.8			
11. Tt = L/3600V Compute Tt	= 110'/3600 (1.8) →	hr	.017	+ .13	=	.147 hours

Channel Flow

	Segment ID	CD			
12. Cross sectional flow area, a	sf				
13. Wetted perimeter, Pw	ft				
14. Hydraulic radius, r = a/Pw Compute r	ft				
15. Channel slope, s	ft/ft				
16. Manning's roughness coeff., n					
17 V = 1.49(r^0.667)(s^0.50)/n Compute V	ft/s				
18. Flow length, L	ft				
19. Tt = L/3600V Compute Tt	hr		+	=	~~X~~ hours

20. Watershed or subarea Tc or Tt (add Tt in steps 6, 11, and 19) .147 hours

×60
8.82

Reference: Urban Hydrology for Small Watersheds
Technical Release 55, Soil Conservation Service

U.S. Department of Agriculture, June 1986

Use Time of Concentration = 10 minutes

use

Design Storm	Discharge Rate (CFS) (pre/post)	Peak Pond Stage (ft)	Design Storm	Discharge Rate (CFS) (pre/post)	Peak Pond Stage (ft)	Basin & Pond Config Info	
FDOT 2 yr, 1 hr	2.66	128.94	**FDOT 10 yr, 8 hr**	3.23	129.56	**Basin Information**	
	0.02			1.14		Pre Area (Ac.)	1.77
FDOT 2yr, 2 hr	2.20	129.09	**FDOT 10 yr, 24 hr**	1.07	129.43	Pre CN	80
	0.09			0.78		Pre Tc (min)	10
FDOT 2 yr, 4 hr	1.64	129.22	**FDOT 10 yr, 72 hr**	0.74	129.40	Pre PRF	256
	0.30			0.68			
FDOT 2 yr, 8 hr	1.84	129.25	**FDOT 25 yr, 1 hr**	5.65	129.37	Post Area (Ac.)	1.77
	0.36			0.62		Post CN	95
FDOT 2 yr, 24 hr	0.60	129.26	**FDOT 25 yr, 2 hr**	4.98	129.52	Post Tc (min)	10
	0.36			1.01		Post PRF	256
FDOT 2 yr, 72 hr	0.46	129.29	**FDOT 25 yr, 4 hr**	3.33	129.66		
	0.44			1.44		**Pond Information**	
FDOT 5 yr, 1 hr	3.75	129.13	**FDOT 25 yr, 8 hr**	3.94	129.69	Top of Pond	130.9
	0.14			1.55		Bottom of Pond	126.5
FDOT 5 yr, 2 hr	3.29	129.29	**FDOT 25 yr, 24 hr**	1.30	129.51	SHWT	127.8
	0.44			0.99		Orifice	0.75" (@SHWT)
FDOT 5 yr, 4 hr	2.27	129.41	**FDOT 25 yr, 72 hr**	0.88	129.45	Weir (10")	10"@129.00
	0.71			0.81		Grate Top (Type "C")	130.0
FDOT 5 yr, 8 hr	2.61	129.43	**FDOT 50 yr, 1 hr**	6.65	129.48		
	0.77			0.90		**Notes:**	
FDOT 5 yr, 24 hr	0.85	129.36	**FDOT 50 yr, 2 hr**	5.86	129.62	Routings were based upon using	
	0.59			1.32		the high tailwater of 125.09 for the	
FDOT 5 yr, 72 hr	0.65	129.36	**FDOT 50 yr, 4 hr**	3.86	129.76	48" diameter outfall pipe under	
	0.60			1.79		Lucerne Park Road. The peak pond	
FDOT 10 yr, 1 hr	4.45	129.23	**FDOT 50 yr, 8 hr**	4.58	129.80	stage for the 100 yr., 8 hr. event did	
	0.31			1.91		not increase and all post discharge	
FDOT 10 yr, 2 hr	3.95	129.39	**FDOT 50 yr, 24 hr**	1.52	129.58	rates for all storm events were less	
	0.66			1.20		than the pre-development values.	
FDOT 10 yr, 4 hr	2.76	129.53	**FDOT 50 yr, 72 hr**	1.01	129.49	Grate overflow set at 130.0 is	
	1.04			0.93		slightly above the routed peak	

FDOT 100 yr, 1 hr	7.67 1.20	129.58
FDOT 100 yr, 2 hr	6.75 1.63	129.72
FDOT 100 yr, 4 hr	4.42 1.14	129.86
FDOT 100 yr, 8 hr	5.13 2.23	129.89
FDOT 100 yr, 24 hr	1.67 1.34	129.63
FDOT 100 yr, 72 hr	1.19 1.10	129.55

Max

stage of 129.89 for the 100 yr., 8 hr. event.

Simple Basin: POST

Scenario:	Scenario1
Node:	POND 1
Hydrograph Method:	NRCS Unit Hydrograph
Infiltration Method:	Curve Number
Time of Concentration:	10.0000 min
Max Allowable Q:	0.00 cfs
Time Shift:	0.0000 hr
Unit Hydrograph:	UH256
Peaking Factor:	256.0
Area:	1.7700 ac
Curve Number:	95.0
% Impervious:	0.00
% DCIA:	0.00
% Direct:	0.00
Rainfall Name:	

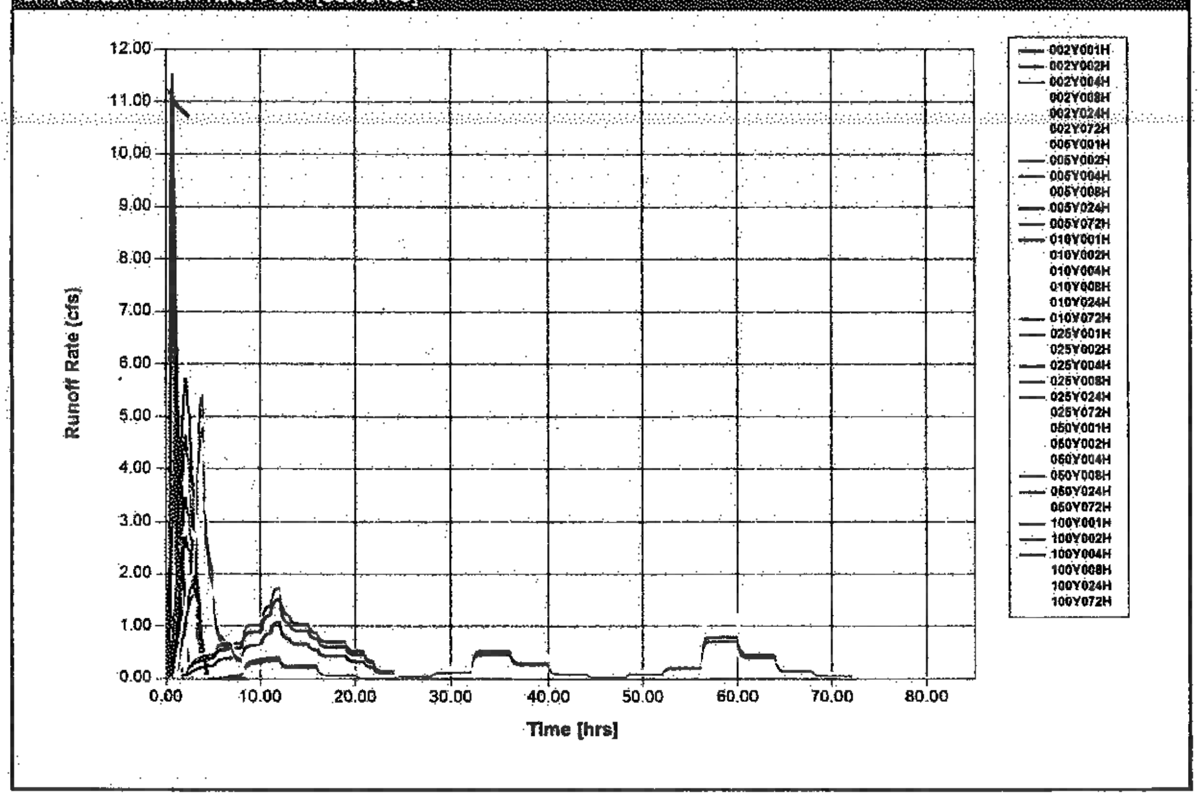
Comment:

Simple Basin Runoff Summary [Scenario1]

Basin Name	Sim Name	Max Flow [cfs]	Time to Max Flow [hrs]	Total Rainfall [in]	Total Runoff [in]	Area [ac]	Equivalent Curve Number	% Imperv	% DCIA
POST	002Y001H	5.61	0.6500	2.40	1.86	1.7700	95.0	0.00	0.00
POST	002Y002H	4.48	0.8333	2.80	2.25	1.7700	95.0	0.00	0.00
POST	002Y004H	2.71	2.0500	3.30	2.74	1.7700	95.0	0.00	0.00
POST	002Y008H	2.73	4.0000	3.80	3.23	1.7700	95.0	0.00	0.00
POST	002Y024H	0.84	12.0000	4.90	4.32	1.7700	95.0	0.00	0.00
POST	002Y072H	0.52	59.9167	6.00	5.41	1.7700	95.0	0.00	0.00
POST	005Y001H	7.01	0.6500	2.90	2.35	1.7700	95.0	0.00	0.00
POST	005Y002H	5.80	0.8333	3.50	2.94	1.7700	95.0	0.00	0.00
POST	005Y004H	3.44	2.0500	4.10	3.53	1.7700	95.0	0.00	0.00
POST	005Y008H	3.49	4.0000	4.80	4.22	1.7700	95.0	0.00	0.00
POST	005Y024H	1.08	12.0000	6.20	5.60	1.7700	95.0	0.00	0.00
POST	005Y072H	0.70	59.9167	8.00	7.39	1.7700	95.0	0.00	0.00
POST	010Y001H	7.86	0.6500	3.20	2.64	1.7700	95.0	0.00	0.00
POST	010Y002H	6.55	0.8333	3.90	3.33	1.7700	95.0	0.00	0.00
POST	010Y004H	3.99	2.0333	4.70	4.12	1.7700	95.0	0.00	0.00
POST	010Y008H	4.10	4.0000	5.60	5.01	1.7700	95.0	0.00	0.00
POST	010Y024H	1.30	12.0000	7.40	6.80	1.7700	95.0	0.00	0.00
POST	010Y072H	0.79	59.9167	9.00	8.39	1.7700	95.0	0.00	0.00
POST	025Y001H	9.27	0.6500	3.70	3.13	1.7700	95.0	0.00	0.00
POST	025Y002H	7.68	0.8333	4.50	3.92	1.7700	95.0	0.00	0.00
POST	025Y004H	4.63	2.0333	5.40	4.81	1.7700	95.0	0.00	0.00
POST	025Y008H	4.79	4.0000	6.50	5.90	1.7700	95.0	0.00	0.00
POST	025Y024H	1.51	12.0000	8.60	7.99	1.7700	95.0	0.00	0.00
POST	025Y072H	0.92	59.9167	10.50	9.88	1.7700	95.0	0.00	0.00

Basin Name	Sim Name	Max Flow [cfs]	Time to Max Flow [hrs]	Total Rainfall [in]	Total Runoff [in]	Area [ac]	Equivalent Curve Number	% Imperv	% DCIA
POST	050Y001H	10.39	0.6500	4.10	3.53	1.7700	95.0	0.00	0.00
POST	050Y002H	8.61	0.8333	5.00	4.41	1.7700	95.0	0.00	0.00
POST	050Y004H	5.18	2.0333	6.00	5.41	1.7700	95.0	0.00	0.00
POST	050Y008H	5.39	4.0000	7.30	6.70	1.7700	95.0	0.00	0.00
POST	050Y024H	1.73	12.0000	9.80	9.18	1.7700	95.0	0.00	0.00
POST	050Y072H	1.06	59.9167	12.00	11.38	1.7700	95.0	0.00	0.00
POST	100Y001H	11.52	0.6333	4.50	3.92	1.7700	95.0	0.00	0.00
POST	100Y002H	9.55	0.8333	5.50	4.91	1.7700	95.0	0.00	0.00
POST	100Y004H	5.72	2.0333	6.60	6.00	1.7700	95.0	0.00	0.00
POST	100Y008H	5.92	4.0000	8.00	7.39	1.7700	95.0	0.00	0.00
POST	100Y024H	1.87	12.0000	10.60	9.98	1.7700	95.0	0.00	0.00
POST	100Y072H	1.23	59.9167	14.00	13.37	1.7700	95.0	0.00	0.00

Simple Basin Runoff Rate: POST [Scenario1]



Simple Basin: PRE_Greenland

Scenario:	Scenario1
Node:	PRE
Hydrograph Method:	NRCS Unit Hydrograph
Infiltration Method:	Curve Number
Time of Concentration:	10.0000 min
Max Allowable Q:	0.00 cfs
Time Shift:	0.0000 hr
Unit Hydrograph:	UH256
Peaking Factor:	256.0
Area:	1.7700 ac
Curve Number:	80.0
% Impervious:	0.00
% DCIA:	0.00
% Direct:	0.00
Rainfall Name:	

Comment:

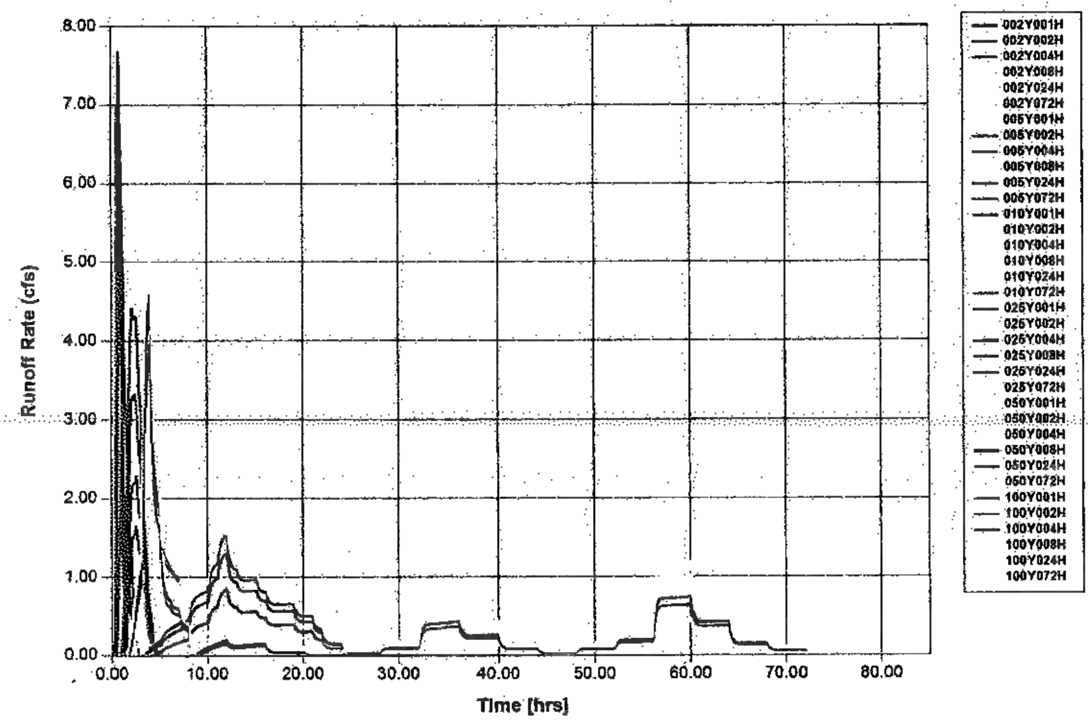
Simple Basin Runoff Summary [Scenario1]

Basin Name	Sim Name	Max Flow [cfs]	Time to Max Flow [hrs]	Total Rainfall [in]	Total Runoff [in]	Area [ac]	Equivalent Curve Number	% Imperv	% DCIA
PRE_Greenland	002Y001H	2.66	0.7333	2.40	0.82	1.7700	80.0	0.00	0.00
PRE_Greenland	002Y002H	2.20	0.8833	2.80	1.10	1.7700	80.0	0.00	0.00
PRE_Greenland	002Y004H	1.64	2.5167	3.30	1.48	1.7700	80.0	0.00	0.00
PRE_Greenland	002Y008H	1.84	4.0167	3.80	1.88	1.7700	80.0	0.00	0.00
PRE_Greenland	002Y024H	0.60	12.0000	4.90	2.80	1.7700	80.0	0.00	0.00
PRE_Greenland	002Y072H	0.46	59.9500	6.00	3.78	1.7700	80.0	0.00	0.00
PRE_Greenland	005Y001H	3.75	0.7167	2.90	1.17	1.7700	80.0	0.00	0.00
PRE_Greenland	005Y002H	3.29	0.8833	3.50	1.63	1.7700	80.0	0.00	0.00
PRE_Greenland	005Y004H	2.27	2.5167	4.10	2.12	1.7700	80.0	0.00	0.00
PRE_Greenland	005Y008H	2.61	4.0167	4.80	2.72	1.7700	80.0	0.00	0.00
PRE_Greenland	005Y024H	0.85	12.0000	6.20	3.96	1.7700	80.0	0.00	0.00
PRE_Greenland	005Y072H	0.65	59.9333	8.00	5.62	1.7700	80.0	0.00	0.00

Basin Name	Sim Name	Max Flow [cfs]	Time to Max Flow [hrs]	Total Rainfall [in]	Total Runoff [in]	Area [ac]	Equivalent Curve Number	% Imperv	% DCIA
PRE_Greenland	010Y001H	4.45	0.7000	3.20	1.40	1.7700	80.0	0.00	0.00
PRE_Greenland	010Y002H	3.95	0.8667	3.90	1.96	1.7700	80.0	0.00	0.00
PRE_Greenland	010Y004H	2.76	2.5000	4.70	2.63	1.7700	80.0	0.00	0.00
PRE_Greenland	010Y008H	3.23	4.0167	5.60	3.42	1.7700	80.0	0.00	0.00
PRE_Greenland	010Y024H	1.07	12.0000	7.40	5.06	1.7700	80.0	0.00	0.00
PRE_Greenland	010Y072H	0.74	59.9333	9.00	6.56	1.7700	80.0	0.00	0.00
PRE_Greenland	025Y001H	5.65	0.7000	3.70	1.79	1.7700	80.0	0.00	0.00
PRE_Greenland	025Y002H	4.98	0.8667	4.50	2.46	1.7700	80.0	0.00	0.00
PRE_Greenland	025Y004H	3.33	2.5000	5.40	3.24	1.7700	80.0	0.00	0.00
PRE_Greenland	025Y008H	3.94	4.0000	6.50	4.23	1.7700	80.0	0.00	0.00
PRE_Greenland	025Y024H	1.30	12.0000	8.60	6.18	1.7700	80.0	0.00	0.00
PRE_Greenland	025Y072H	0.88	59.9333	10.50	7.99	1.7700	80.0	0.00	0.00
PRE_Greenland	050Y001H	6.65	0.6833	4.10	2.12	1.7700	80.0	0.00	0.00
PRE_Greenland	050Y002H	5.86	0.8667	5.00	2.89	1.7700	80.0	0.00	0.00
PRE_Greenland	050Y004H	3.86	2.0667	6.00	3.78	1.7700	80.0	0.00	0.00
PRE_Greenland	050Y008H	4.58	4.0000	7.30	4.97	1.7700	80.0	0.00	0.00
PRE_Greenland	050Y024H	1.52	12.0000	9.80	7.32	1.7700	80.0	0.00	0.00
PRE_Greenland	050Y072H	1.01	59.9167	12.00	9.44	1.7700	80.0	0.00	0.00
PRE_Greenland	100Y001H	7.67	0.6833	4.50	2.46	1.7700	80.0	0.00	0.00
PRE_Greenland	100Y002H	6.75	0.8667	5.50	3.33	1.7700	80.0	0.00	0.00
PRE_Greenland	100Y004H	4.42	2.0667	6.60	4.32	1.7700	80.0	0.00	0.00
PRE_Greenland	100Y008H	5.13	4.0000	8.00	5.62	1.7700	80.0	0.00	0.00
PRE_Greenland	100Y024H	1.67	12.0000	10.60	8.09	1.7700	80.0	0.00	0.00
PRE_Gree	100Y072H	1.19	59.9167	14.00	11.38	1.7700	80.0	0.00	0.00

Basin Name	Sim Name	Max Flow [cfs]	Time to Max Flow [hrs]	Total Rainfall [in]	Total Runoff [in]	Area [ac]	Equivalent Curve Number	% Imperv	% DCIA
nland									

Simple Basin Runoff Rate: PRE_Greenland [Scenario1]



Node: POND 1

Scenario: Scenario1
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 127.80 ft
Warning Stage: 130.90 ft

Stage [ft]	Area [ac]	Area [ft2]
126.50	0.1100	4792
127.80	0.1400	6098
129.30	0.4000	17424
129.50	0.4300	18731
130.00	0.5100	22216
130.90	0.6700	29185

Comment: Pond bottom excavated to 126.5 and seasonal high water table elevation set at 127.8. Warning stage is set at top of pond of 130.9.

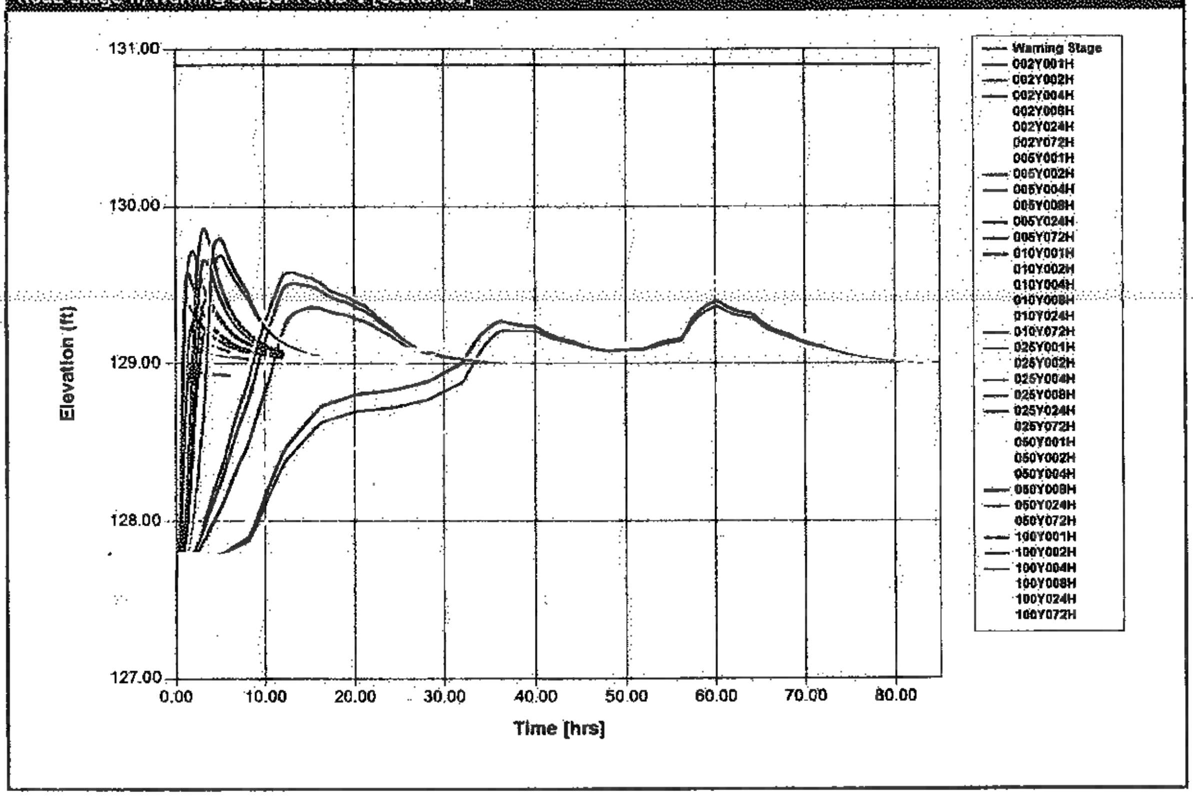
Node Max Conditions w/ Times [Scenario1]

Node Name	Sim Name	Warning Stage [ft]	Max Stage [ft]	Min/Max Delta Stage [ft]	Max Total Inflow [cfs]	Max Total Outflow [cfs]	Max Surface Area [ft2]	Time to Max Stage [hr]	Time to Min/Max Delta Stage [hr]	Time to Max Total Inflow [hr]	Time to Max Total Outflow [hr]
POND 1	002Y001H	130.90	128.94	0.0010	5.61	0.02 1.66	14734	1.7344	1.0186	0.6499	1.6901
POND 1	002Y002H	130.90	129.09	0.0010	4.48	0.09 2.20	15854	2.4773	1.3644	0.8339	2.4327
POND 1	002Y004H	130.90	129.22	0.0010	2.71	0.30 1.64	16853	3.9234	1.7768	2.0497	3.8873
POND 1	002Y008H	130.90	129.25	0.0010	2.73	0.36 1.84	17077	6.2737	3.3106	3.9989	6.2404
POND 1	002Y024H	130.90	129.26	0.0010	0.84	0.38 0.60	17146	16.2713	3.3305	12.0001	16.2046
POND 1	002Y072H	130.90	129.29	0.0010	0.52	0.44 0.46	17360	60.1647	57.2245	59.9147	60.1480
POND 1	005Y001H	130.90	129.13	0.0010	7.01	0.14 3.75	16156	1.5596	0.4143	0.6500	1.5527
POND 1	005Y002H	130.90	129.29	0.0010	5.80	0.44 3.29	17364	2.1859	0.9959	0.8334	2.1669
POND 1	005Y004H	130.90	129.41	-0.0010	3.44	0.71 2.27	18138	3.6193	4.1655	2.0493	3.6104
POND 1	005Y008H	130.90	129.43	0.0010	3.49	0.77 2.61	18287	5.3124	1.6711	3.9998	5.2918
POND 1	005Y024H	130.90	129.36	0.0010	1.08	0.59 0.89	17818	15.2322	11.0589	11.9983	15.2155
POND 1	005Y07	130.90	129.36	0.0010	0.70	0.60 0.65	17841	60.1382	9.6096	59.9049	60.1382

Node Name	Sim Name	Warning Stage [ft]	Max Stage [ft]	Min/Max Delta Stage [ft]	Max Total Inflow [cfs]	Max Total Outflow [cfs]	Max Surface Area [ft2]	Time to Max Stage [hr]	Time to Min/Max Delta Stage [hr]	Time to Max Total Inflow [hr]	Time to Max Total Outflow [hr]
	2H										
POND 1	010Y00 1H	130.90	129.23	0.0010	7.86	0.31 4.45	16879	1.4832	0.5266	0.6498	1.4654
POND 1	010Y00 2H	130.90	129.39	0.0010	6.55	0.66 3.55	18003	2.1269	1.2950	0.8336	2.1087
POND 1	010Y00 4H	130.90	129.53	-0.0010	3.99	1.04 2.76	18936	3.4921	4.7358	2.0338	3.4837
POND 1	010Y00 8H	130.90	129.56	0.0010	4.10	1.14 3.29	19161	5.1765	1.2260	3.9997	5.1642
POND 1	010Y02 4H	130.90	129.43	0.0010	1.30	0.78 1.07	18302	15.0550	8.5878	11.9956	14.9883
POND 1	010Y07 2H	130.90	129.40	0.0010	0.79	0.68 0.74	18061	60.1310	8.7188	59.9143	60.1143
POND 1	025Y00 1H	130.90	129.37	0.0010	9.27	0.62 5.65	17901	1.4044	0.5638	0.6500	1.3931
POND 1	025Y00 2H	130.90	129.52	0.0010	7.68	1.01 4.58	18868	2.0535	1.0440	0.8334	2.0446
POND 1	025Y00 4H	130.90	129.66	0.0010	4.63	1.44 3.33	19840	3.3393	1.3782	2.0334	3.3196
POND 1	025Y00 8H	130.90	129.69	0.0010	4.79	1.55 3.44	20071	5.1121	3.1675	3.9997	5.1121
POND 1	025Y02 4H	130.90	129.51	0.0010	1.51	0.99 1.30	18817	13.1888	2.8580	11.9992	13.1555
POND 1	025Y07 2H	130.90	129.45	0.0010	0.92	0.81 0.88	18375	60.1203	8.8867	59.9036	60.1036
POND 1	050Y00 1H	130.90	129.48	0.0010	10.39	0.90 6.65	18603	1.3617	0.3463	0.6499	1.3523
POND 1	050Y00 2H	130.90	129.62	0.0010	8.61	1.32 5.86	19571	1.9673	0.6666	0.8333	1.9588
POND 1	050Y00 4H	130.90	129.76	0.0010	5.18	1.79 3.86	20563	3.2744	2.3941	2.0338	3.2572
POND 1	050Y00 8H	130.90	129.80	0.0010	5.39	1.91 4.58	20809	5.0762	3.3422	3.9997	5.0631
POND 1	050Y02 4H	130.90	129.58	0.0010	1.73	1.20 1.52	19311	13.0542	2.3418	11.9937	13.0042
POND 1	050Y07 2H	130.90	129.49	-0.0010	1.06	0.93 1.01	18675	60.1193	64.5143	59.9026	60.1026
POND 1	100Y00 1H	130.90	129.58	0.0010	11.52	1.20 7.67	19303	1.3333	0.4327	0.6335	1.3238
POND 1	100Y00 2H	130.90	129.72	0.0010	9.55	1.63 6.75	20242	1.8941	0.9082	0.8332	1.8797
POND 1	100Y00 4H	130.90	129.86	0.0010	5.72	2.14 4.42	21245	3.2358	2.1080	2.0337	3.2190
POND 1	100Y00 8H	130.90	129.89	-0.0010	5.92	2.23 5.13	21414	5.0409	5.5090	3.9992	5.0409

Node Name	Sim Name	Warning Stage [ft]	Max Stage [ft]	Min/Max Delta Stage [ft]	Max Total Inflow [cfs]	Max Total Outflow [cfs]	Max Surface Area [ft2]	Time to Max Stage [hr]	Time to Min/Max Delta Stage [hr]	Time to Max Total Inflow [hr]	Time to Max Total Outflow [hr]
POND 1	100Y024H	130.90	129.63	0.0010	1.87	1.34 1.67	19617	12.6835	6.8687	11.9941	12.6230
POND 1	100Y072H	130.90	129.55	0.0010	1.23	1.10 1.19	19076	60.1228	8.1650	59.9062	60.1062

Node Stage w/Warning Stage: POND 1 [Scenario1]



Drop Structure Link: Pond 1 Outfall		Upstream Pipe		Downstream Pipe	
Scenario:	Scenario1	Invert:	126.50 ft	Invert:	124.00 ft
From Node:	POND 1	Manning's N:	0.0130	Manning's N:	0.0130
To Node:	POST	Geometry: Circular		Geometry: Circular	
Link Count:	1	Max Depth:	1.50 ft	Max Depth:	1.50 ft
Flow Direction:	Both	Bottom Clip			
Solution:	Combine	Default:	0.00 ft	Default:	0.00 ft
Increments:	0	Op Table:		Op Table:	
Pipe Count:	1	Ref Node:		Ref Node:	
Damping:	0.0000 ft	Manning's N:	0.0000	Manning's N:	0.0000
Length:	40.00 ft	Top Clip			
FHWA Code:	1	Default:	0.00 ft	Default:	0.00 ft
Entr Loss Coef:	0.50	Op Table:		Op Table:	
Exit Loss Coef:	1.00	Ref Node:		Ref Node:	
Bend Loss Coef:	0.00	Manning's N:	0.0000	Manning's N:	0.0000
Bend Location:	0.00 dec				
Energy Switch:	Energy				

Pipe Comment:

Weir Component			
Weir:	1	Bottom Clip	
Weir Count:	1	Default:	0.00 ft
Weir Flow Direction:	Both	Op Table:	
Damping:	0.0000 ft	Ref Node:	
Weir Type:	Sharp Crested Vertical	Top Clip	
Geometry Type:	Rectangular	Default:	0.00 ft
Invert:	129.00 ft	Op Table:	
Control Elevation:	129.00 ft	Ref Node:	
Max Depth:	999.00 ft	Discharge Coefficients	
Max Width:	0.83 ft	Weir Default:	3.200
Fillet:	0.00 ft	Weir Table:	
		Orifice Default:	0.600
		Orifice Table:	

Weir Comment: Weir slot- set to 10"

Weir Component			
Weir:	2	Bottom Clip	
Weir Count:	1	Default:	0.00 ft
Weir Flow Direction:	Both	Op Table:	
Damping:	0.0000 ft	Ref Node:	
Weir Type:	Sharp Crested Vertical	Top Clip	
Geometry Type:	Circular	Default:	0.00 ft
Invert:	127.80 ft	Op Table:	
Control Elevation:	127.80 ft	Ref Node:	
Max Depth:	0.06 ft	Discharge Coefficients	
		Weir Default:	3.200
		Weir Table:	
		Orifice Default:	0.600
		Orifice Table:	

Weir Comment: 3/4" diameter orifice slot set at the SHWL of 127.8.

Weir Component			
Weir:	3	**Bottom Clip**	
Weir Count:	1	Default:	0.00 ft
Weir Flow Direction:	Both	Op Table:	
Damping:	0.0000 ft	Ref Node:	
Weir Type:	Horizontal	**Top Clip**	
Geometry Type:	Rectangular	Default:	0.00 ft
Invert:	130.00 ft	Op Table:	
Control Elevation:	130.00 ft	Ref Node:	
Max Depth:	2.00 ft	**Discharge Coefficients**	
Max Width:	3.00 ft	Weir Default:	3.200
Fillet:	0.00 ft	Weir Table:	
		Orifice Default:	0.600
		Orifice Table:	

Weir Comment: Type C inlet grate top at 130.0; top of pond is 130.9

Drop Structure Comment:

Link Min/Max Conditions [Scenario1]

Link Name	Sim Name	Max Flow [cfs]	Min Flow [cfs]	Min/Max Delta Flow [cfs]	Max Us Velocity [fps]	Max Ds Velocity [fps]	Max Avg Velocity [fps]
Pond 1 Outfall - Pipe	002Y001H	0.02	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 1	002Y001H	0.00	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 2	002Y001H	0.02	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 3	002Y001H	0.00	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Pipe	002Y002H	0.09	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 1	002Y002H	0.07	0.00	0.00	0.97	0.97	0.97
Pond 1 Outfall - Weir: 2	002Y002H	0.02	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 3	002Y002H	0.00	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Pipe	002Y004H	0.30	0.00	0.00	0.00	0.00	0.00

Link Name	Sim Name	Max Flow [cfs]	Min Flow [cfs]	Min/Max Delta Flow [cfs]	Max Us Velocity [fps]	Max Ds Velocity [fps]	Max Avg Velocity [fps]
Pond 1 Outfall - Weir: 1	002Y004H	0.28	0.00	0.00	1.52	1.52	1.52
Pond 1 Outfall - Weir: 2	002Y004H	0.02	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 3	002Y004H	0.00	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Pipe	002Y008H	0.36	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 1	002Y008H	0.34	0.00	0.00	1.61	1.61	1.61
Pond 1 Outfall - Weir: 2	002Y008H	0.02	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 3	002Y008H	0.00	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Pipe	002Y024H	0.38	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 1	002Y024H	0.36	0.00	0.00	1.64	1.64	1.64
Pond 1 Outfall - Weir: 2	002Y024H	0.02	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 3	002Y024H	0.00	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Pipe	002Y072H	0.44	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 1	002Y072H	0.42	0.00	0.00	1.73	1.73	1.73
Pond 1 Outfall - Weir: 2	002Y072H	0.02	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 3	002Y072H	0.00	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Pipe	005Y001H	0.14	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 1	005Y001H	0.13	0.00	0.00	1.16	1.16	1.16

Link Name	Sim Name	Max Flow [cfs]	Min Flow [cfs]	Min/Max Delta Flow [cfs]	Max Us Velocity [fps]	Max Ds Velocity [fps]	Max Avg Velocity [fps]
Pond 1 Outfall - Weir: 2	005Y001H	0.02	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 3	005Y001H	0.00	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Pipe	005Y002H	0.44	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 1	005Y002H	0.42	0.00	0.00	1.73	1.73	1.73
Pond 1 Outfall - Weir: 2	005Y002H	0.02	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 3	005Y002H	0.00	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Pipe	005Y004H	0.71	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 1	005Y004H	0.70	0.00	0.00	2.05	2.05	2.05
Pond 1 Outfall - Weir: 2	005Y004H	0.02	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 3	005Y004H	0.00	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Pipe	005Y008H	0.77	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 1	005Y008H	0.75	0.00	0.00	2.10	2.10	2.10
Pond 1 Outfall - Weir: 2	005Y008H	0.02	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 3	005Y008H	0.00	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Pipe	005Y024H	0.59	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 1	005Y024H	0.57	0.00	0.00	1.92	1.92	1.92
Pond 1 Outfall - Weir: 2	005Y024H	0.02	0.00	0.00	0.00	0.00	0.00

Link Name	Sim Name	Max Flow [cfs]	Min Flow [cfs]	Min/Max Delta Flow [cfs]	Max Us Velocity [fps]	Max Ds Velocity [fps]	Max Avg Velocity [fps]
Pond 1 Outfall - Weir: 3	005Y024H	0.00	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Pipe	005Y072H	0.60	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 1	005Y072H	0.58	0.00	0.00	1.93	1.93	1.93
Pond 1 Outfall - Weir: 2	005Y072H	0.02	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 3	005Y072H	0.00	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Pipe	010Y001H	0.31	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 1	010Y001H	0.29	0.00	0.00	1.53	1.53	1.53
Pond 1 Outfall - Weir: 2	010Y001H	0.02	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 3	010Y001H	0.00	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Pipe	010Y002H	0.66	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 1	010Y002H	0.64	0.00	0.00	1.99	1.99	1.99
Pond 1 Outfall - Weir: 2	010Y002H	0.02	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 3	010Y002H	0.00	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Pipe	010Y004H	1.04	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 1	010Y004H	1.02	0.00	0.00	2.33	2.33	2.33
Pond 1 Outfall - Weir: 2	010Y004H	0.02	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 3	010Y004H	0.00	0.00	0.00	0.00	0.00	0.00

Link Name	Sim Name	Max Flow [cfs]	Min Flow [cfs]	Min/Max Delta Flow [cfs]	Max Us Velocity [fps]	Max Ds Velocity [fps]	Max Avg Velocity [fps]
Pond 1 Outfall - Pipe	010Y008H	1.14	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 1	010Y008H	1.12	0.00	0.00	2.40	2.40	2.40
Pond 1 Outfall - Weir: 2	010Y008H	0.02	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 3	010Y008H	0.00	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Pipe	010Y024H	0.78	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 1	010Y024H	0.76	0.00	0.00	2.11	2.11	2.11
Pond 1 Outfall - Weir: 2	010Y024H	0.02	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 3	010Y024H	0.00	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Pipe	010Y072H	0.68	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 1	010Y072H	0.67	0.00	0.00	2.02	2.02	2.02
Pond 1 Outfall - Weir: 2	010Y072H	0.02	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 3	010Y072H	0.00	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Pipe	025Y001H	0.62	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 1	025Y001H	0.60	0.00	0.00	1.95	1.95	1.95
Pond 1 Outfall - Weir: 2	025Y001H	0.02	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 3	025Y001H	0.00	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Pipe	025Y002H	1.01	0.00	0.00	0.00	0.00	0.00
Pond 1	025Y002H	0.99	0.00	0.00	2.31	2.31	2.31

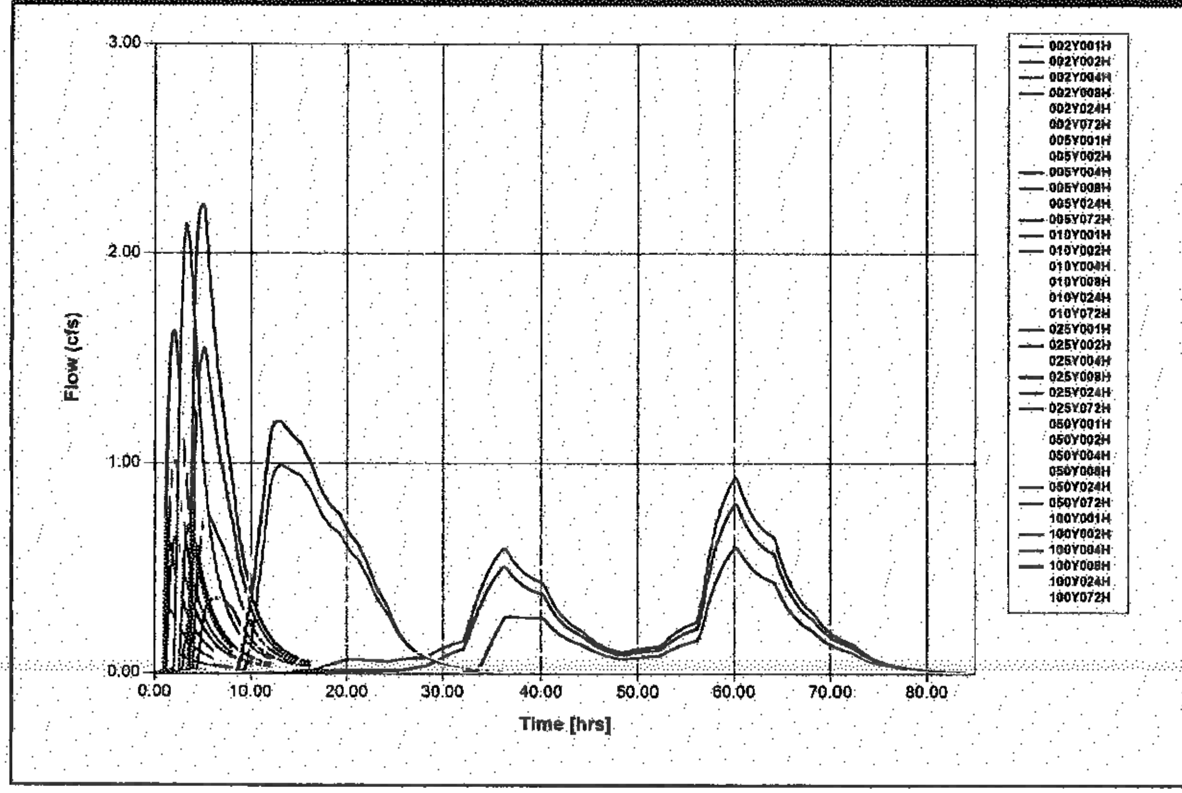
Link Name	Sim Name	Max Flow [cfs]	Min Flow [cfs]	Min/Max Delta Flow [cfs]	Max Us Velocity [fps]	Max Ds Velocity [fps]	Max Avg Velocity [fps]
Outfall - Weir: 1							
Pond 1 Outfall - Weir: 2	025Y002H	0.02	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 3	025Y002H	0.00	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Pipe	025Y004H	1.44	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 1	025Y004H	1.42	0.00	0.00	2.60	2.60	2.60
Pond 1 Outfall - Weir: 2	025Y004H	0.02	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 3	025Y004H	0.00	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Pipe	025Y008H	1.55	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 1	025Y008H	1.53	0.00	0.00	2.66	2.66	2.66
Pond 1 Outfall - Weir: 2	025Y008H	0.02	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 3	025Y008H	0.00	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Pipe	025Y024H	0.99	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 1	025Y024H	0.97	0.00	0.00	2.29	2.29	2.29
Pond 1 Outfall - Weir: 2	025Y024H	0.02	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 3	025Y024H	0.00	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Pipe	025Y072H	0.81	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 1	025Y072H	0.79	0.00	0.00	2.14	2.14	2.14
Pond 1	025Y072H	0.02	0.00	0.00	0.00	0.00	0.00

Link Name	Sim Name	Max Flow [cfs]	Min Flow [cfs]	Min/Max Delta Flow [cfs]	Max Us Velocity [fps]	Max Ds Velocity [fps]	Max Avg Velocity [fps]
Outfall - Weir: 2							
Pond 1 Outfall - Weir: 3	025Y072H	0.00	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Pipe	050Y001H	0.90	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 1	050Y001H	0.88	0.00	0.00	2.22	2.22	2.22
Pond 1 Outfall - Weir: 2	050Y001H	0.02	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 3	050Y001H	0.00	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Pipe	050Y002H	1.32	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 1	050Y002H	1.30	0.00	0.00	2.52	2.52	2.52
Pond 1 Outfall - Weir: 2	050Y002H	0.02	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 3	050Y002H	0.00	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Pipe	050Y004H	1.79	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 1	050Y004H	1.77	0.00	0.00	2.79	2.79	2.79
Pond 1 Outfall - Weir: 2	050Y004H	0.02	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 3	050Y004H	0.00	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Pipe	050Y008H	1.91	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 1	050Y008H	1.89	0.00	0.00	2.86	2.86	2.86
Pond 1 Outfall - Weir: 2	050Y008H	0.02	0.00	0.00	0.00	0.00	0.00
Pond 1	050Y008H	0.00	0.00	0.00	0.00	0.00	0.00

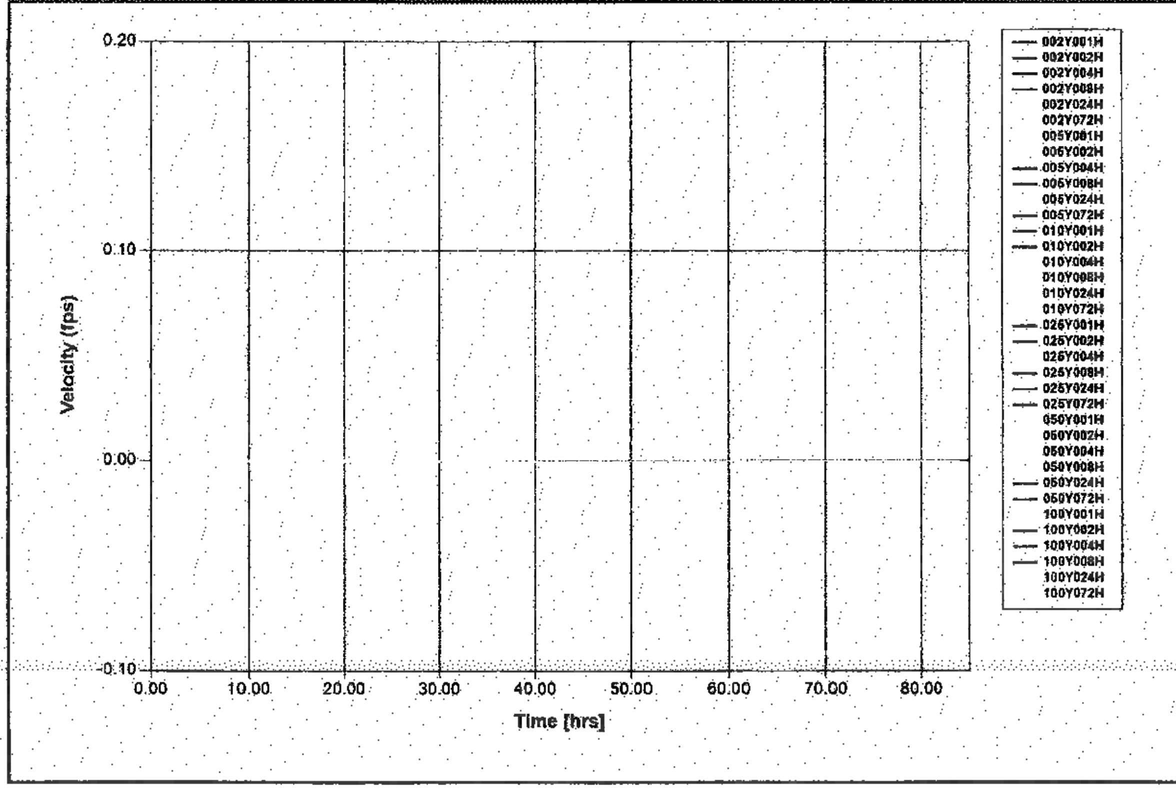
Link Name	Sim Name	Max Flow [cfs]	Min Flow [cfs]	Min/Max Delta Flow [cfs]	Max Us Velocity [fps]	Max Ds Velocity [fps]	Max Avg Velocity [fps]
Outfall - Weir: 3							
Pond 1 Outfall - Pipe	050Y024H	1.20	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 1	050Y024H	1.18	0.00	0.00	2.44	2.44	2.44
Pond 1 Outfall - Weir: 2	050Y024H	0.02	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 3	050Y024H	0.00	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Pipe	050Y072H	0.93	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 1	050Y072H	0.91	0.00	0.00	2.24	2.24	2.24
Pond 1 Outfall - Weir: 2	050Y072H	0.02	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 3	050Y072H	0.00	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Pipe	100Y001H	1.20	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 1	100Y001H	1.18	0.00	0.00	2.44	2.44	2.44
Pond 1 Outfall - Weir: 2	100Y001H	0.02	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 3	100Y001H	0.00	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Pipe	100Y002H	1.63	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 1	100Y002H	1.61	0.00	0.00	2.71	2.71	2.71
Pond 1 Outfall - Weir: 2	100Y002H	0.02	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 3	100Y002H	0.00	0.00	0.00	0.00	0.00	0.00
Pond 1	100Y004H	2.14	0.00	-0.01	0.00	0.00	0.00

Link Name	Sim Name	Max Flow [cfs]	Min Flow [cfs]	Min/Max Delta Flow [cfs]	Max Us Velocity [fps]	Max Ds Velocity [fps]	Max Avg Velocity [fps]
Outfall - Pipe							
Pond 1 Outfall - Weir: 1	100Y004H	2.12	0.00	0.00	2.97	2.97	2.97
Pond 1 Outfall - Weir: 2	100Y004H	0.02	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 3	100Y004H	0.00	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Pipe	100Y008H	2.23	0.00	-0.01	0.00	0.00	0.00
Pond 1 Outfall - Weir: 1	100Y008H	2.21	0.00	0.00	3.01	3.01	3.01
Pond 1 Outfall - Weir: 2	100Y008H	0.02	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 3	100Y008H	0.00	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Pipe	100Y024H	1.34	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 1	100Y024H	1.32	0.00	0.00	2.53	2.53	2.53
Pond 1 Outfall - Weir: 2	100Y024H	0.02	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 3	100Y024H	0.00	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Pipe	100Y072H	1.10	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 1	100Y072H	1.08	0.00	0.00	2.37	2.37	2.37
Pond 1 Outfall - Weir: 2	100Y072H	0.02	0.00	0.00	0.00	0.00	0.00
Pond 1 Outfall - Weir: 3	100Y072H	0.00	0.00	0.00	0.00	0.00	0.00

Link Flow: Pond 1 Outfall [Scenario1]



Link Upstream Velocity: Pond 1 Outfall [Scenario1]



PERMIT NO. 13706.003

Lucerne Loop Road Intersection Improvements

Southwest Florida Water Management District

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

7601 Highway 301 North
Tampa, Florida 33637-6759
1-800-836-0797 or (813) 985-7481
SUNCOM 578-2070

170 Century Boulevard
Bartow, Florida 33830-7700
1-800-492-7862 or (941) 534-1448
SUNCOM 572-6200

115 Corporation Way
Venice, Florida 34292-3524
1-800-320-3503 or (941) 483-5970
SUNCOM 549-5970

2303 Highway 44 West
Inverness, Florida 34453-3809
(904) 637-1360

November 22, 1995

William Gerber, Vice President
Acceptance Insurance Company, Inc.
One Central Park Plaza
222 S. 15th Street, Suite 600 North
Omaha, NE 68102

Ken Frink, P.E.
City of Winter Haven
P.O. Box 2277
Winter Haven, FL 33883

John H. May, President
May Enterprises, Inc.
560 East Lake Elbert Drive
Winter Haven, FL 33881

James R. Wilt, Jr., P.E.
Florida Department of
Transportation (District
One)
P.O. Box 1249
Bartow, FL 33830

Subject: **Notice of Final Agency Action for Approval**
Permit No: 4013706.00
Project Name: Improvements to SR 544 and Lucerne Loop Road
County: Polk
Sec/Twp/Rge: 2,11/28S/26E

Gentlemen:

This letter constitutes notice of Final Agency Action for **approval** of the permit application referenced above. Approval is contingent upon no objection to the permit being received by the District within the time frames described below.

The following statements describe procedures established by Florida law, should you or any other person disagree with the District's decision regarding this permit. State law and District rules provide that any person who is substantially affected by this decision for approval may petition for an administrative hearing in accordance with Section 120.57, Florida Statutes (F.S.), and Part V of Chapter 40D-1, Florida Administrative Code.

A request for hearing must be filed with (received by) the Agency Clerk of the District within 14 days after the date of receipt of this notice.

Failure to file a request for hearing within the 14 day period constitutes a waiver of the right such person has to request a hearing under Section 120.57, F.S. When the actual date of receipt of this notice cannot be determined, receipt is deemed to be the fifth day after the date on which this letter is postmarked.

The enclosed approved construction plans are part of the permit, and construction must be in accordance with these plans.

Excellence Through Quality Service

FILE OF RECORD
PERMIT NO. ________

0063

If you have any questions concerning the permit, please contact Jan R. Burke, P.E., at the Bartow Service Office.

Sincerely,

Robert M. Viertel, P.G., Director
Bartow Regulation Department

RMV:JRB:kmh
Enc. 4: Approved Permit w/Conditions
Construction Plans
Statement of Completion
Notice of Authorization

cc: File of Record, 4013706.00
Douglas M. Darden, P.E., Envisors, Inc.
M. Kehoe

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
MANAGEMENT AND STORAGE OF SURFACE WATER
GENERAL CONSTRUCTION
PERMIT NO. 4013706.00

EXPIRATION DATE: November 22, 1998

PERMIT ISSUE DATE: November 22, 1995

This permit, issued under the provisions of Chapter 373, Florida Statutes and Florida Administrative Code Rule 40D-40 authorizes the Permittee to perform the work outlined herein and shown by the application, approved drawing(s), plans, and other documents, attached hereto and kept on file at the Southwest Florida Water Management District (District).

PROJECT NAME: Improvements to SR 544 and Lucerne Loop Road

GRANTED TO: **Acceptance Insurance Company, Inc.**
One Central Park Plaza
222 S. 15th Street, Suite 600 North
Omaha, NE 68102

John H. May, President
May Enterprises, Inc.
560 East Lake Elbert Drive
Winter Haven, FL 33881

Ken Frink, P.E.
City of Winter Haven
Post Office Box 2277
Winter Haven, FL 33883

James R. Wilt, Jr., P.E.
Florida Department of Transportation (District One)
Post Office Box 1249
Bartow, FL 33830

ABSTRACT: This permit authorization is for the construction of a new surface water management system serving a 16.89-acre roadway project as named above and as shown on the approved construction drawings. The construction activities include grading, paving, retention swales and a wet detention pond (Pond No. 540) associated with the improvements to SR 544 and Lucerne Loop Road. The post-development peak discharge rate for a 25-year, 24-hour rainfall event will not exceed the pre-development conditions. Water quality treatment will be provided by three on-line retention swales (510, 520, and 530) through natural infiltration and a wet detention pond system (540).

The project area includes 0.88 acre of forested, waters of the state wetlands, and 0.10 acre of non-forested, isolated wetlands. No wetland impacts are proposed.

OP. & MAINT. ENTITY: City of Winter Haven

PROPERTY LOCATION: Polk County

FILE OF RECORD
PERMIT NO. ___ 0006

SEC/TWP/RGE: 2,11/28S/26E

TOTAL ACRES OWNED: N/A

PROJECT SIZE: 16.89 Acres

LAND USE: Road Project

DATE APPLICATION FILED: September 26, 1995

AMENDED DATE: N/A

I. Water Quantity/Quality

POND #	AREA ACRES @ T.O.B.	TREATMENT TYPE
510	0.08	Retention
520	0.10	Retention
530	0.35	Retention
540	0.79	Wet Detention
TOTAL	1.32	

II. 100-Year Floodplain

Encroachment (ac-ft):	Compensation (ac-ft):
0.22	0.35

III. Environmental Considerations

Wetland Information:				
WETLAND #	TOTAL AC.	PRESERVED AC.	TEMPORARILY DISTURBED AC.	PERMANENTLY DESTROYED AC.
South of SR 544	0.10	0.10	0.00	0.00
North of SR 544	0.78	0.78	0.00	0.00
South of SR 544	0.06	0.06	0.00	0.00
TOTAL	0.94	0.94	0.00	0.00

" 0007

Compensation Information:

Comments: No wetland impacts associated with this project.

Conservation easement required: YES ( ) NO (X)

SPECIFIC CONDITIONS

1. If the ownership of the project area covered by the subject permit is divided, with someone other than the Permittee becoming the owner of part of the project area, this permit shall terminate, pursuant to Rule 40D-1.6105, F.A.C. In such situations, each land owner shall obtain a permit (which may be a modification of this permit) for the land owned by that person. This condition shall not apply to the division and sale of lots or units in residential subdivisions or condominiums.

2. The discharges from this system shall meet state water quality standards as set forth in Chapter 62-302 and Rule 62-4.242, F.A.C., for class waters equivalent to the receiving waters.

3. Unless specified otherwise herein, two copies of all information and reports required by this permit shall be submitted to:

   Permit Data Section - Records & Data Department
   Southwest Florida Water Management District
   2379 Broad Street
   Brooksville, Florida 34609-6899

   The permit number, title of report or information and event (for recurring report or information submittal) shall be identified on all information and reports submitted.

4. All construction is prohibited within the permitted project area until the Permittee acquires legal ownership or legal control of the project area as delineated in the permitted construction drawings.

5. The Permittee shall retain the design engineer, or other professional engineer registered in Florida, to conduct on-site observations of construction and assist with the as-built certification requirements of this project. The Permittee shall inform the District in writing of the name, address and phone number of the professional engineer so employed. This information shall be submitted prior to construction.

6. The following boundaries, as shown on the approved construction drawings, shall be clearly delineated on the site prior to initial clearing or grading activities:

   (X) wetland preservation;

   The delineation shall endure throughout the construction period and be readily discernible to construction and District personnel.

" 0008

7. If limestone bedrock is encountered during construction of the surface water management system, the District must be notified and construction in the affected area shall cease.

8. Within 30 days after completion of construction of the permitted activity, the Permittee shall submit to the Bartow Service Office a written statement of completion and certification by a registered professional engineer or other appropriate individual as authorized by law, utilizing the required Statement of Completion and Request for Transfer to Operation Entity form identified in Chapter 40D-1, F.A.C., and signed, dated, and sealed as-built drawings. The as-built drawings shall identify any deviations from the approved construction drawings.

9. Wetland buffers shall remain in an undisturbed condition except for **approved drainage facility construction/maintenance.**

10. The removal of littoral shelf vegetation (including cattails) from wet detention ponds is prohibited unless otherwise approved by the District. Removal includes dredging, the application of herbicide, cutting, and the introduction of grass carp. Any questions regarding authorized activities within the wet detention ponds shall be addressed to the District's Surface Water Regulation Manager, Bartow Service Office.

11. Wetland boundaries shown on the approved construction drawings shall be binding upon the Permittee and the District.

12. For dry bottom retention systems, the retention area(s) shall become dry within 72 hours after a rainfall event. If a retention area is regularly wet, this situation shall be deemed to be a violation of this permit.

13. The Permittee shall notify the District of any sinkhole development in the surface water management system within 48 hours of discovery and must submit a detailed sinkhole evaluation and repair plan for approval by the District within 30 days of discovery.

14. For the area(s) shown on the construction drawings as proposed construction, a permit modification shall be obtained for any construction in this/these area(s). As a requirement of the permit modification for this/these area(s), the Permittee shall submit a Statement of Completion and As-Built drawings.

15. The operation and maintenance entity shall submit inspection reports in the form required by the District, in accordance with the following schedule.

    ( ) For systems utilizing effluent filtration or exfiltration, the inspections shall be performed 18 months after operation is authorized and every 18 months thereafter.

    (X) For systems utilizing retention or wet detention, the inspections shall be performed two (2) years after operation is authorized and every two (2) years thereafter.

" 0009

( ) For systems utilizing effluent filtration or exfiltration and retention or wet detention, the inspections shall be performed 18 months after operation is authorized and every 18 months thereafter.

16. The District reserves the right, upon prior notice to the Permittee, to conduct on-site research to assess the pollutant removal efficiency of the surface water management system. The Permittee may be required to cooperate in this regard by allowing on-site access by District representatives, by allowing the installation and operation of testing and monitoring equipment, and by allowing other assistance measures as needed on site.

17. Refer to LIMITING CONDITION No. 4 herein.

LIMITING AND STANDARD CONDITIONS

1. The limiting and standard conditions attached hereto as Exhibit "A" are hereby incorporated into this permit by reference and the Permittee shall comply with them.

Robert M. Viertel 11/22/95
Authorized Signature

0010

EXHIBIT "A"

LIMITING CONDITIONS:

1. The Permittee shall perform the construction authorized in a manner so as to minimize any adverse impact of the system on fish, wildlife, natural environmental values, and water quality. The Permittee shall institute necessary measures during the construction period, including full compaction of any fill material placed around newly installed structures, to reduce erosion, turbidity, nutrient loading and sedimentation in the receiving waters.

2. Water quality data for the water discharged from the Permittee's property or into the surface waters of the state shall be submitted to the District as required. Parameters to be monitored may include those listed in Chapter 17-3. Analyses shall be performed according to procedures outlined in the current edition of Standard Methods for the Examination of Water and Wastewater by American Public Health Association of Methods for Chemical analyses of Water and Wastes by the U.S. Environmental Protection Agency. If water quality data are required, the Permittee shall provide data as required on volumes of water discharged, including total volume discharged during the days of sampling and total monthly discharges from the property or into surface waters of the state.

3. The Permittee shall comply with all applicable local subdivision regulations and other local requirements. In addition the Permittee shall obtain all necessary Federal, State, local and special district authorizations prior to the start of any construction or alteration of works authorized by this permit.

4. The operation phase of this permit shall not become effective until the owner or his authorized agent certifies that all facilities have been constructed in accordance with the design permitted by the District. Within 30 days after completion of construction of the surface water management system, the Permittee shall submit the certification and notify the District that the facilities are complete. Upon completion of the surface water management system, the Permittee shall request transfer of the permit to the responsible entity approved by the District. The District may inspect the system and require remedial measures as a condition of transfer of the permit.

5. All roads shall be set at or above elevations required by the applicable local governmental flood criteria.

6. All building floors shall be set at or above elevations acceptable to the applicable local government.

7. Off-site discharges during construction and development shall be made only through the facilities authorized by this permit. Water discharged from the project shall be through structures having a mechanism suitable for regulating upstream stages. Stages may be subject to operating schedules satisfactory to the District.

8. No construction authorized herein shall commence until a responsible entity acceptable to the District has been established and has agreed to operate and maintain the system. The entity must be provided with sufficient ownership so that it has control over all water management facilities authorized herein. Upon receipt of written evidence of the satisfaction of this condition, the District will issue an authorization to commence construction.

9. The permit does not convey to the Permittee any property right nor any rights or privileges other than those specified in the permit and Chapter 40D-4.

10. The Permittee shall hold and save the District harmless from any and all damages, claims, or liabilities which may arise by reason of the construction, operation, maintenance or use of any facility authorized by the permit.

11. This permit is issued based on the Permittee's submitted information which reasonably demonstrates that adverse off-site water resource related impacts will not be caused by the completed permit activity. It is also the responsibility of the Permittee to insure that adverse off-site water resource related impacts do not occur during construction.

12. Prior to dewatering, plans shall be submitted to the District for approval. Information shall include as a minimum; pump sizes, locations and hours of operation for each pump. If off-site discharge is proposed, or off-site adverse impacts are evident, an individual water use permit may be required. The Permittee is cautioned that several months may be required for consideration of the water use permit application. Temporary dewatering during construction, i.e., well pointing, ditching, etc. that will not affect adjacent wetlands or off-site lands is exempt from this requirement.

STANDARD CONDITIONS

13. This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings, exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action by the District.

14. This permit conveys no title to land or water, does not constitute state recognition or acknowledgment of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the state. Only the Trustees of the Internal Improvement Trust Fund may express state opinion as to title.

15. The Permittee shall at all times properly operate and maintain the systems of treatment and control (and related appurtenances) that are installed or used by the Permittee to achieve compliance with conditions of this permit, as required by District rules.

16. The Permittee, by accepting this permit, specifically agrees to allow authorized District personnel, upon presentation of credentials or other documents as may be required by law, access to the premises, at reasonable times, where the permitted activity is located or conducted; for the purposes of inspection and testing to determine compliance with this permit and District regulations, such as:

    a. Having access to and copying any records that must be kept under the conditions of the permit;
    b. Inspecting the facility, equipment, practices, or operations regulated or required under this permit;
    c. Sampling or monitoring any substances or parameters at any location reasonably necessary to assure compliance with this permit or District rules; and
    d. Gathering of data and information.

    Reasonable time may depend on the nature of the concern being investigated.

17. The Permittee shall notify the District within 30 days of the sale or transfer of ownership of land on which a surface water management system will be or is located, and request transfer of the permit to the new owner. A surface water management permit to construct or alter a system can be transferred if the new owner agrees to the transfer and the permit has not expired. The District can transfer the operation phase permit provided the project has been properly completed, the new owner meets the rule requirements for operation and maintenance entities and the land use remains the same. This permit is transferable only upon District approval in accordance with Rule 40D-4.351, F.A.C., as applicable. The Permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the District.

18. When requested by the District, the Permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the Permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the District, such facts or information shall be submitted or corrected promptly.

19. Drawings, plans, calculations, specifications or other information submitted by the Permittee, not attached hereto, but retained on file at the District office, are made a part of this permit.

20. The discharges from this system shall meet state water quality standards as set forth in Chapter 62-302 and Rule 62-4.242 for class waters equivalent to the receiving waters.

21. Any water discharged from the site during construction of the project shall meet State water quality standards at the property boundary or point of discharge to wetlands or State waters. If the discharge does not meet these standards, the discharge will be immediately stopped and the District shall be notified of corrective action taken to correct the violation. Turbidity shall not exceed 29 N.T.U. above background level. Turbidity shall be monitored at least daily during discharge, or more often as determined by the project engineer if needed, to ensure compliance.

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22. The Permittee and construction representatives shall assure that erosion and sediment control measures as necessary and as required by Rule 40D-4.091, F.A.C., shall be effectively implemented continuously from beginning of project construction until completion to prevent erosion and transport and discharge of sediment to wetlands or any property other than the project area. Project detention/retention ponds and discharge control structures which are to be constructed as part of the project shall be initially built and maintained continuously during project construction to avoid adverse impact to receiving waters or off site.

23. Except as authorized by this Permit, any further land development, wetlands disturbance or other construction within the total land area of this site will require additional permitting in accordance with Chapters 40D-4, 40D-40 and 40D-45, F.A.C.

24. Construction of the discharge control and water quality treatment facilities which are part of the permitted surface water management system shall be completed and operational prior to beneficial occupancy and use of the project development being served.

25. Any existing wells in the path of construction shall be properly plugged and abandoned by a licensed water well contractor in accordance with Chapter 40D-3, F.A.C.

26. All retention/detention pond side slopes, except over filter media, shall be sodded, and staked as necessary, to prevent erosion. Filter media surfaces shall also be stabilized to prevent erosion, but in a manner that does not restrict infiltration.

27. By issuance of this permit the District, its employees and representatives assume no responsibility and/or liability in regard to either the design, construction or performance of the permitted facilities.

28. Any system alteration, including for augmentation into or withdrawal of water from the permitted system, other than as specifically authorized by this permit will require additional District permitting consideration. The water level of retention and detention ponds shall not be augmented by pumping or diversion of water into the ponds to artificially control their level above the design normal or beginning storage level. Wells and diversion facilities for such augmentation may require water use permitting according to Chapter 40D-2, F.A.C.

29. The excavation of retention/detention ponds is limited to the permitted design elevation(s).

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MSW PERMIT ROUTING SLIP
SWFWMD BARTOW PERMITTING DEPARTMENT

MSW PERMIT NO.: 4013706.00	DEFAULT DATE: Nov 25	INTENDED ISSUE DATE (21 days from complete date) Nov. 21

RUSH OR MISC INFO: IMPROVEMENTS TO SR 544 & LUCERNE LOOP ROAD ROAD

ROUGH DRAFT	INITIALS	DATE SIGNED	FINAL REVIEW	INITIALS	DATE SIGNED
REVIEW ES opt	MJK	11-17-95	REVIEW ES	MJK	11-21-95
REVIEW PE	JRB	11/17/95	REVIEW PE	JMB	11/21/95
ES SUPERVISOR		11/17/95	ES SUPERVISOR		11/21/95
SW SUPERVISOR	SMH	11/20/95	SW SUPERVISOR	SMH	11/21/95
PERMIT COORD					
			DEPT DIRECTOR		

(✓) APPROVAL ( ) DENIAL (KEEP DISK _______ MOS.)

( ) Noticed General: Contractor's Condition ( ) Yes ( ) No

(✓) General

( ) Mining

( ) Individual/Conceptual ( ) Individual/Construction

Proposed Board Date ______________ Last Date Possible ______________

( ) Letter Mods: MSW NO. ______________ EXP DATE: ______________

( ) Permit Mods: MSW NO. ______________ EXP DATE: ______________

GEN & IND MODS (.01, .02, etc.): Fill in SPEC COND #1 on Project Data Sheet.

I Water Quantity/Quality: ( ) No ponds, see engineer's comments below.

III Env. Considerations: ( ) There are no wetlands within the project area.

Wetlands: ( ) ES Compliance Copy (Worksheets, permit, etc.)

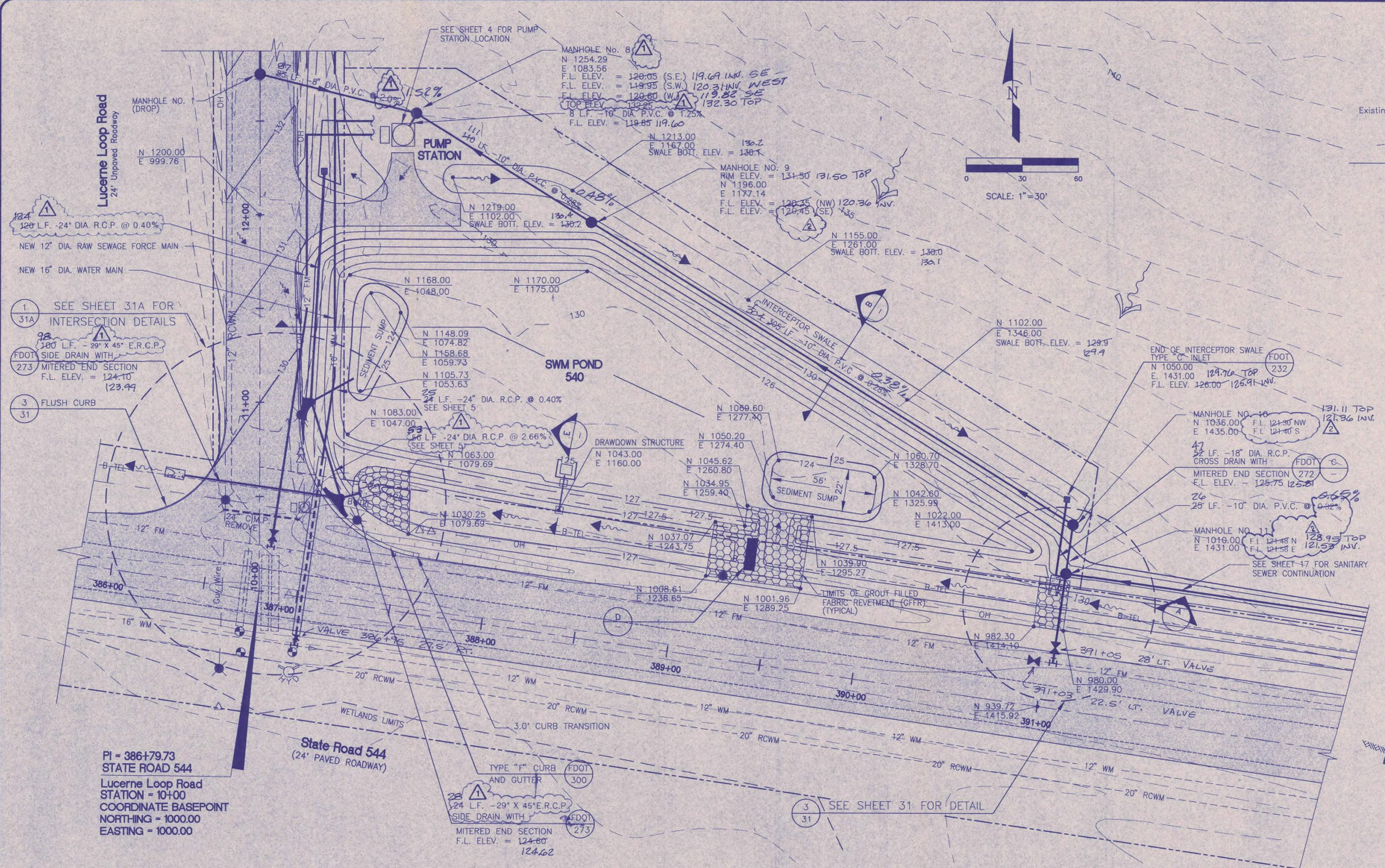
Comments:

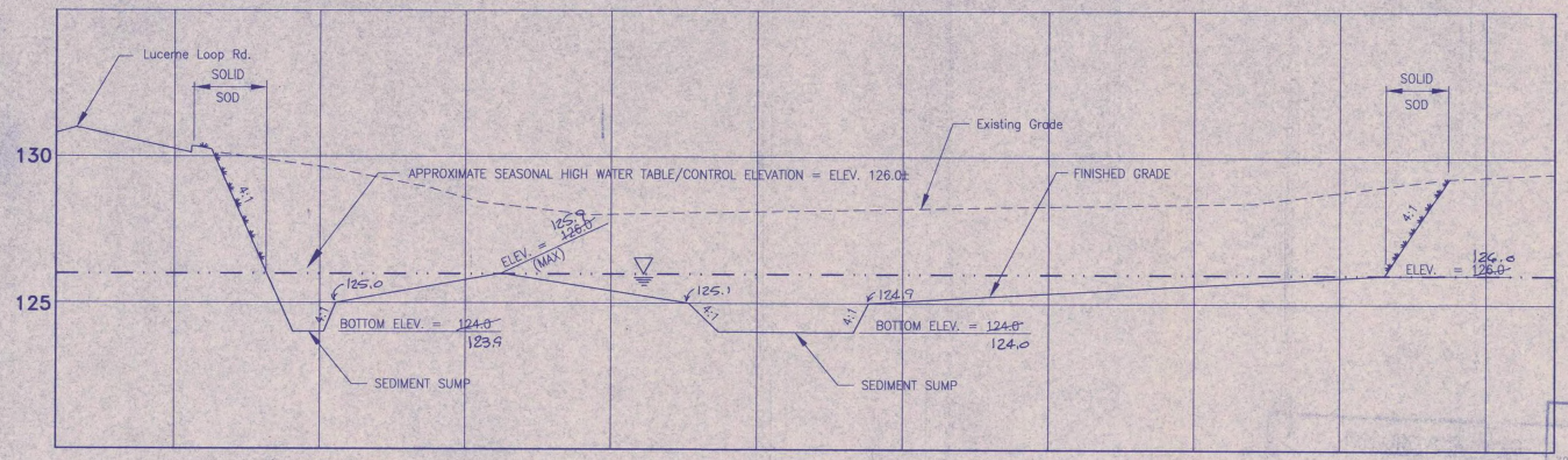
REVIEWER, have you purged your work file for File of Record? ( ) NO (✓) YES

Typist Initials and Date: KH 11/21/95

BPD/cal(06/93)MSWROUTE.FRM

Imaged As Is 0020

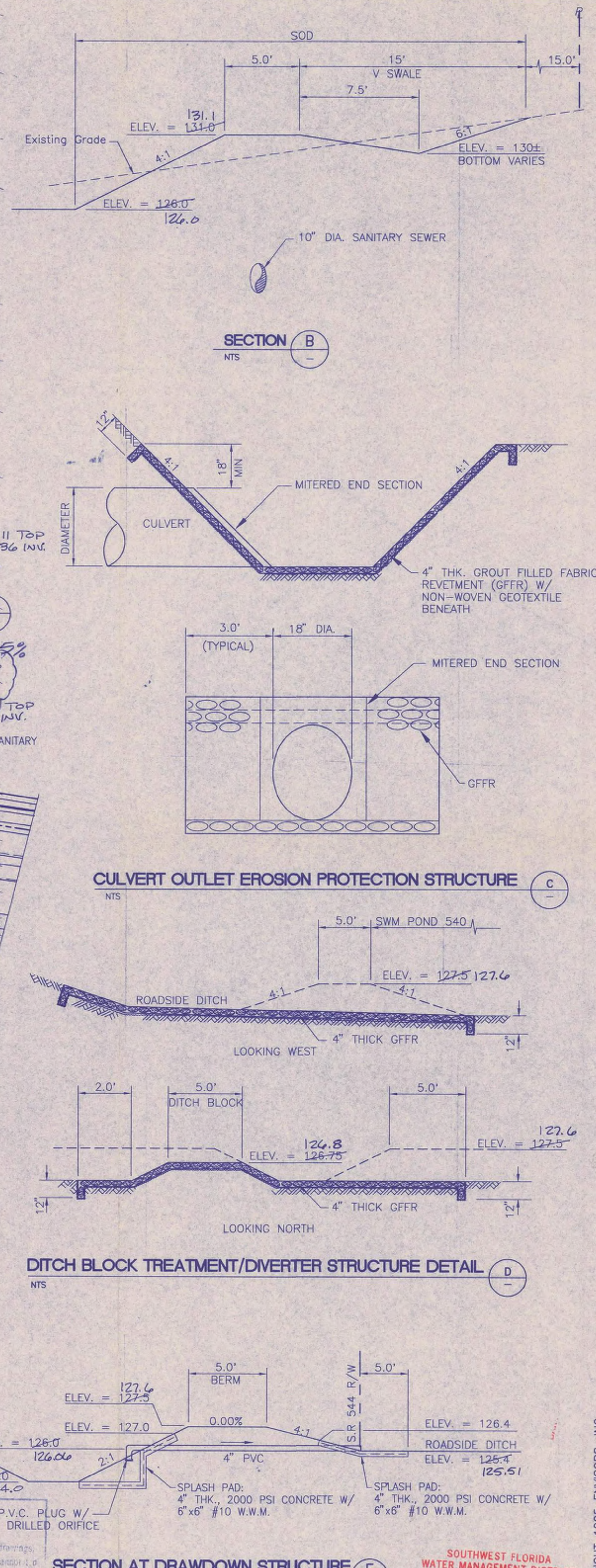




SECTION A

SCALE:
HORIZONTAL 1" = 30'
VERTICAL 1" = 3'

NOTE: SEE LUCERNE LOOP ROAD PROFILE STA. 10+00 TO 12+00 FOR ADDITIONAL CROSS-SECTION INFORMATION



SECTION B — NTS

CULVERT OUTLET EROSION PROTECTION STRUCTURE C — NTS

DITCH BLOCK TREATMENT/DIVERTER STRUCTURE DETAIL D — NTS

SECTION AT DRAWDOWN STRUCTURE E — NTS

RECORD DRAWING

NO.	REVISION DESCRIPTION	BY	CHK	DATE
1	REVISE PER FDEP COMMENTS	JLF	RWM	12.14.95
2	CHANGED DROP M.H. #8 TO STD. M.H.	RRB	DCL	11.16.95
3	CHANGED E.R.C.P. UNDER LLR TO 29" X 45"	RRB	DCL	11.14.95

DESIGNED RWM/DCL
DRAWN JLF/JPO
CHECKED RWM
APPROVED DMD
JOB NO. 70895041
DATE NOV. 1995

ENVISORS, Inc
ENGINEERING & SURVEYING
WINTER HAVEN, FLA. (813) 324-1112

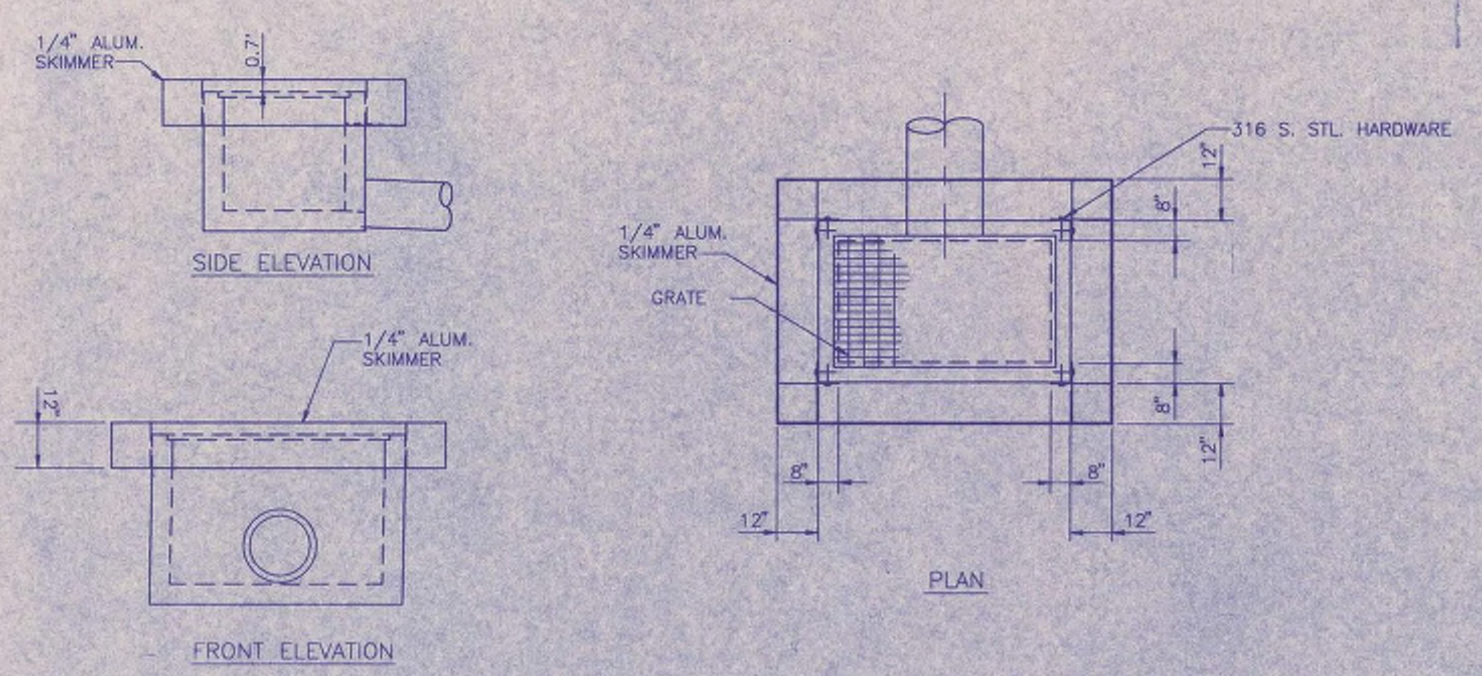
CITY OF WINTER HAVEN
ROAD, WATER, SEWER, AND DRAINAGE IMPROVEMENTS - LUCERNE PARK AREA

STORMWATER RETENTION POND 540

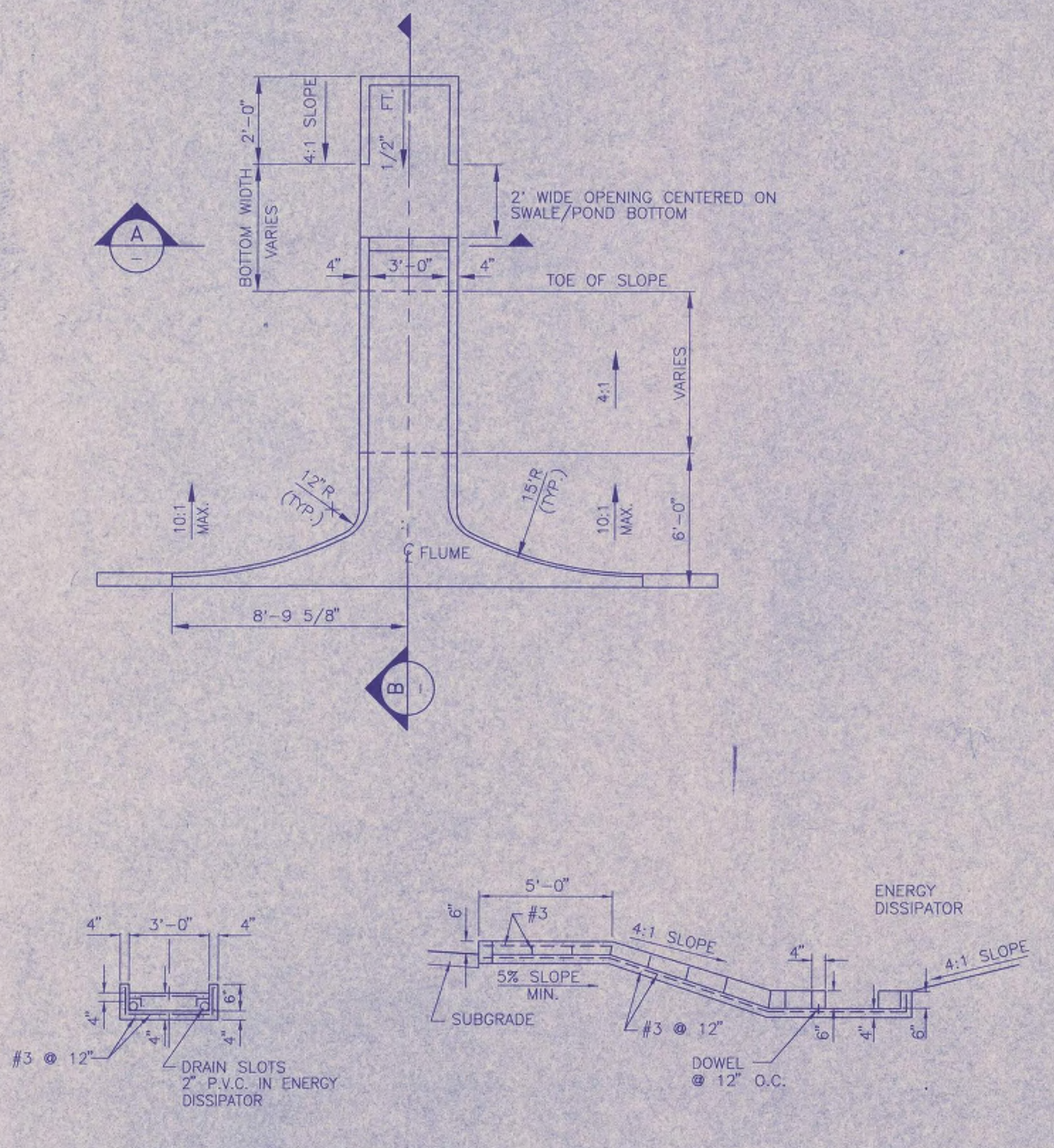
FLORIDA P.E. NO.

SHEET NO. 13 OF 37 SHEETS

1ST ADDENDUM TO RE-BID



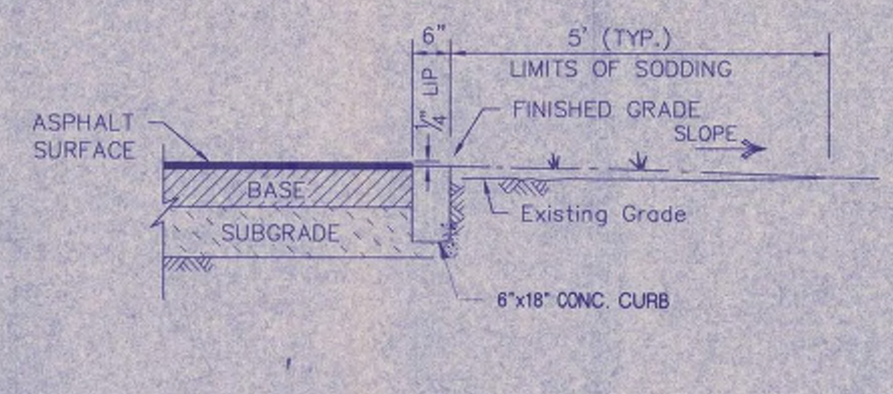
MODIFICATION TO TYPE 'C' INLET 1/5 1/6
N.T.S.



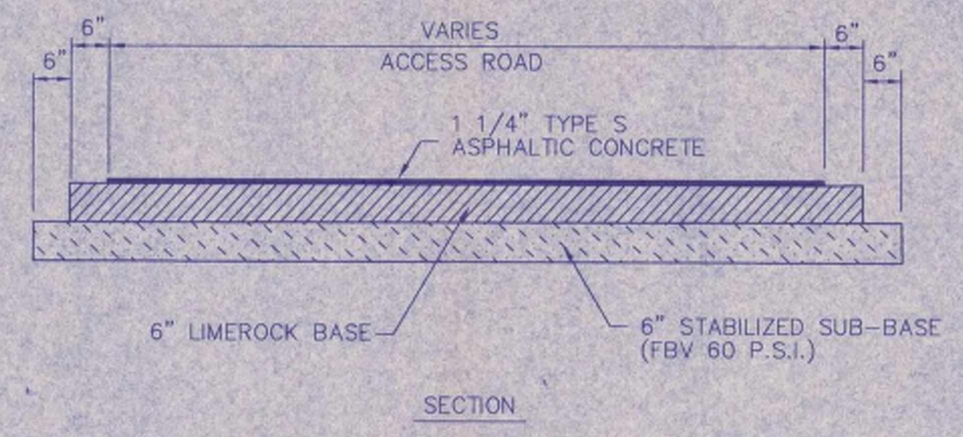
SECTION A

SECTION B

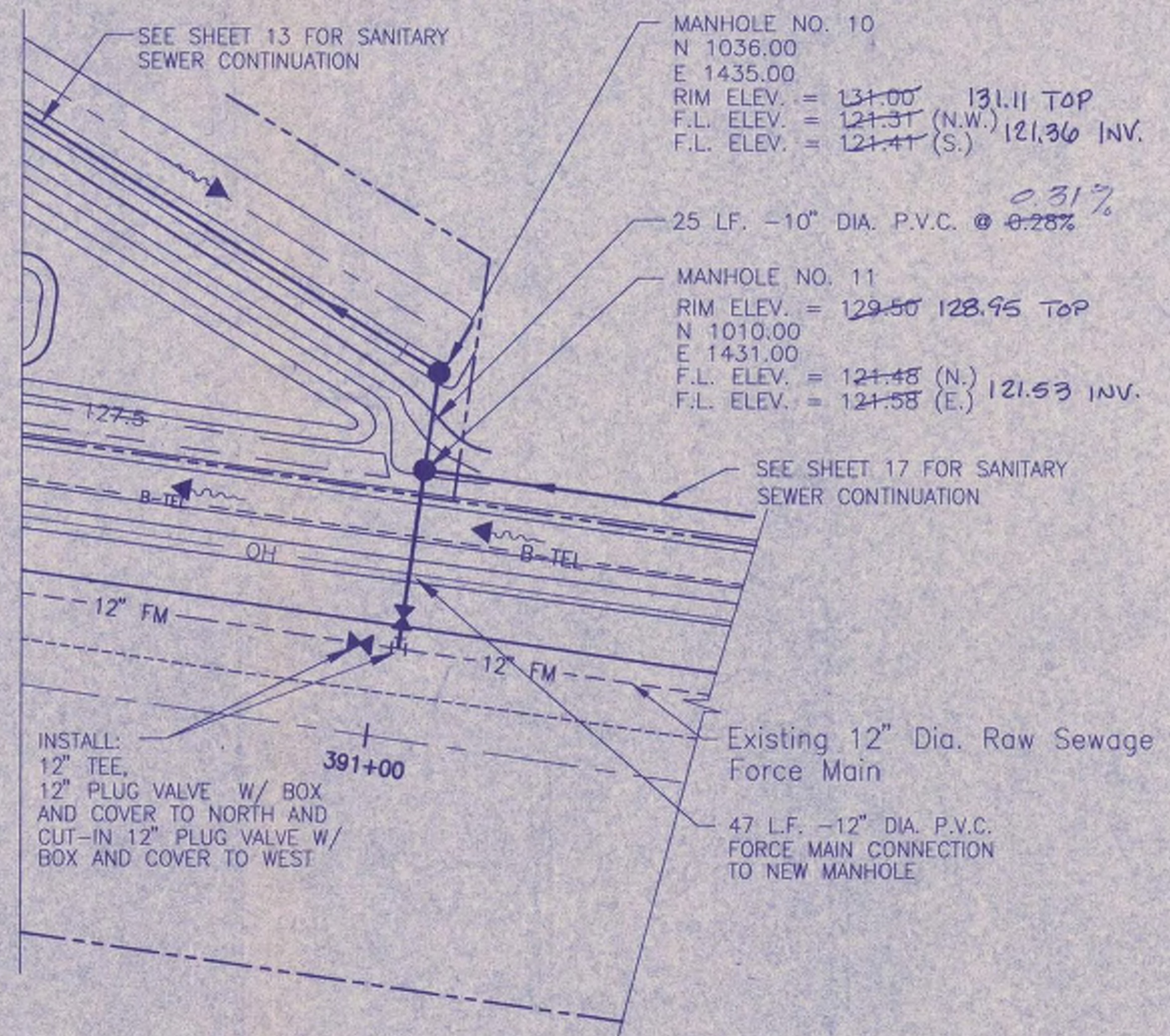
CONCRETE SPILLWAY 2/5 2/6
N.T.S.



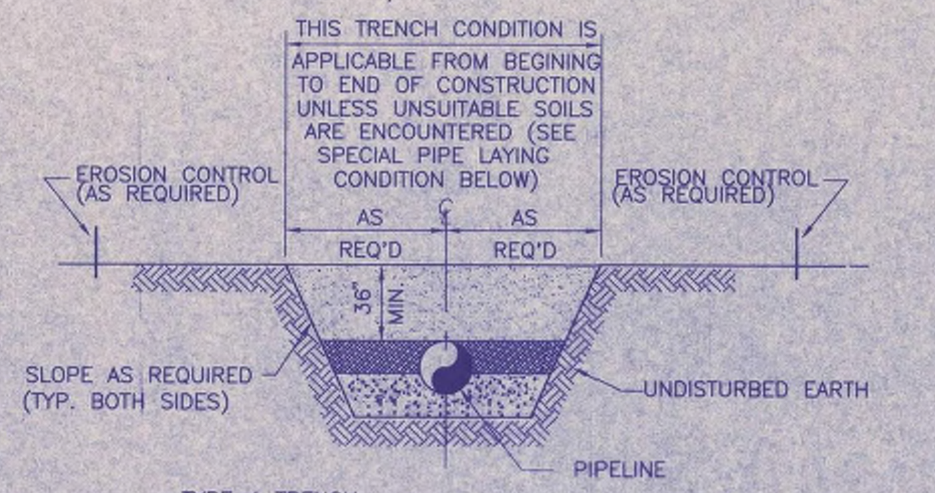
FLUSH CURB 3/5 3/6
N.T.S.



TYPICAL ACCESS ROAD CONSTRUCTION 4/5 4/6
N.T.S.

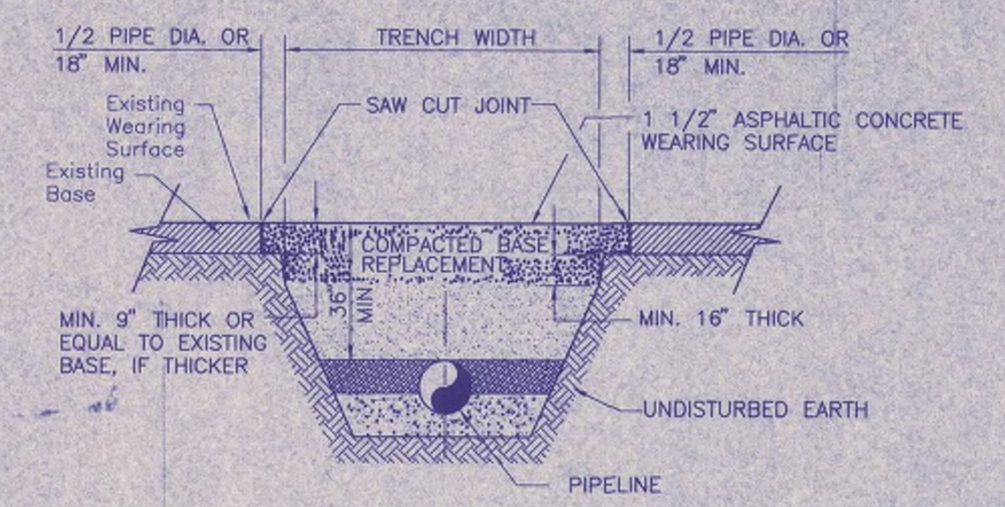


CONNECTION DETAIL 3/13 3/17
1"=40'

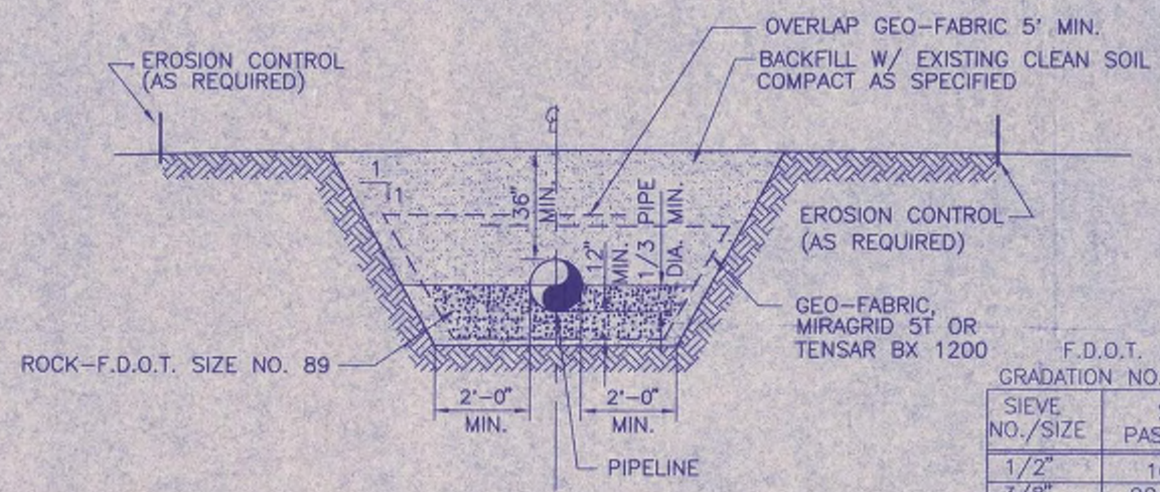


TYPE 4 TRENCH
PIPE BEDDED IN SAND, GRAVEL, OR CRUSHED STONE TO DEPTH OF 1/8 PIPE DIAMETER, 4" MINIMUM. BACKFILL COMPACTED TO TOP OF PIPE: APPROX. 90% STANDARD PROCTOR, AASHTO T-99. (TYPICAL)

TYPICAL PIPE LAYING CONDITION



OPEN CUT ASPHALT ROADWAY



F.D.O.T. GRADATION NO. 89

SIEVE NO./SIZE	% PASSING
1/2"	100
3/8"	90-100
4	20-55
8	5-30
16	0-10
50	0-5

NOTE: TO BE USED IN AREAS WHERE SLIMES AND/OR OTHER SIMILAR UNSUITABLE SOIL CONDITIONS ARE ENCOUNTERED AND AS APPROVED BY OWNER AND ENGINEER

SPECIAL PIPE LAYING CONDITION

TYPICAL TRENCH DETAILS 5/31A
N.T.S.

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
OCT 29 1996
RECEIVED
BARTOW, FLORIDA

RECORD DRAWING

NO.	REVISION DESCRIPTION	BY	CHK	DATE

7089DET 10-26-95

DESIGNED	DCL
DRAWN	ZPO
CHECKED	DCL
APPROVED	DMD
JOB NO.	70895041
DATE	NOV. 1995

EV ENVISORS, Inc — ENGINEERING AD VISORS
ENGINEERING & SURVEYING
WINTER HAVEN, FLA. (813) 324-1112

CITY OF WINTER HAVEN
ROAD, WATER, SEWER, AND DRAINAGE IMPROVEMENTS - LUCERNE PARK AREA

STRUCTURES AND DETAILS

FLORIDA P.E. NO. ~~13097~~ 9445 Richard W. Madaus DATE 10/28/96

SHEET NO. 31
OF 37 SHEETS

2

SWFWMD ENGINEERING WORKSHEET

PERMIT NO. ________.____

PERMIT NAME ROAD IMPROVEMENTS FOR SR 544 & LLR

						TOTALS	
BASIN NO. - POND NO.	O OR C	540	O	TOTAL	O	1	1
POND DATA	POND BOTTOM ELEVATION	125.0					
	SEASONAL HIGH WATER ELEVATION	126.0					
	CONTROL DEVICE ELEVATION	126.0					
	DESIGN LOW WATER ELEVATION	126.55					
	WEIR INVERT ELEVATION	126.75					
	DESIGN HIGH WATER ELEVATION	127.50					
	TOP OF BANK ELEVATION	127.50					
	AREA AT TOP OF BANK (AC)	0.785				0.785	2
	VOLUME AT DHW (AC-FT)	1.103					
	VOLUME AT TOB (AC-FT)	1.103					
QUANTITY 25YR/24HR DISCHARGE RATES	WEIR WIDTH (FT)	10					
	PRE-DEVELOPED (CFS)	SEE →		75.8			
	POST-DEVELOPED (CFS)	TOTAL →		56.2			
100YR/24HR RETENTION VOLUMES	PROVIDED (AC-FT)	NA					
	REQUIRED (AC-FT)	NA					
QUALITY	TREATMENT AREA (AC) / OFW? Y OR N	5.194	N				
	TREATMENT VOL. REQUIRED (AC-FT)	0.433					
	TREATMENT VOL. PROVIDED (AC-FT)	0.533					
	METHOD OF TREATMENT	WET DET.					3
	CONTROL DEVICE TYPE	ORIFICE					
	CONTROL DEVICE DIMENSIONS	1.5" ϕ					
	RECOVERY TIME (HRS)	217 ±					
100 YEAR FLOODPLAIN	ENCROACHMENT (AC-FT)			0.219		0.219	4
	COMPENSATION (AC-FT)			0.352		0.352	5

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
SEP 26 1995
RECEIVED
BARTOW, FLORIDA

Comments: PRE- VS- POST DEV. ATTENUATION PROVIDED BY UPGRADIENT WAL*MART FOOD DISTRIBUTION CENTER. SWFWMD MSSW PERMIT # 407322.01

Evaluator: ______________________

Supervisor: ______________________

0107

STORMWATER TREATMENT PONDS DATA AND DESIGN
(Continued)

POND 530 (ONLINE DRY RETENTION)

CONTRIBUTING BASIN 53

TOP EL. =	144.0	TOP AREA =	0.352 AC.
BOTTOM EL. =	142.0	BOTTOM AREA =	0.066 AC

REQUIRED 1/2" TREATMENT VOLUME = 0.103 AC-FT
* AND 0.085 AC-FT (FROM PONDS 510 AND 520) = 0.188 AC-FT

VOLUME PROVIDED = 0.138 AT EL. 143.0'

* VOLUME DEFICIT = 0.050 AC-FT - REQUIRES DOUBLE THIS VOLUME IN DOWN STREAM WET-DETENTION POND 540 OR 0.100 AC-FT

POND 540 (OFFLINE WET DETENTION)

CONTRIBUTING BASIN 54 A, 54 B, 54 C, 54 D, IMPERVIOUS SURFACE FROM 544 A AND 544 B, AND 0.100 AC-FT DEFICIT FROM ONLINE DRY RETENTION AREAS)

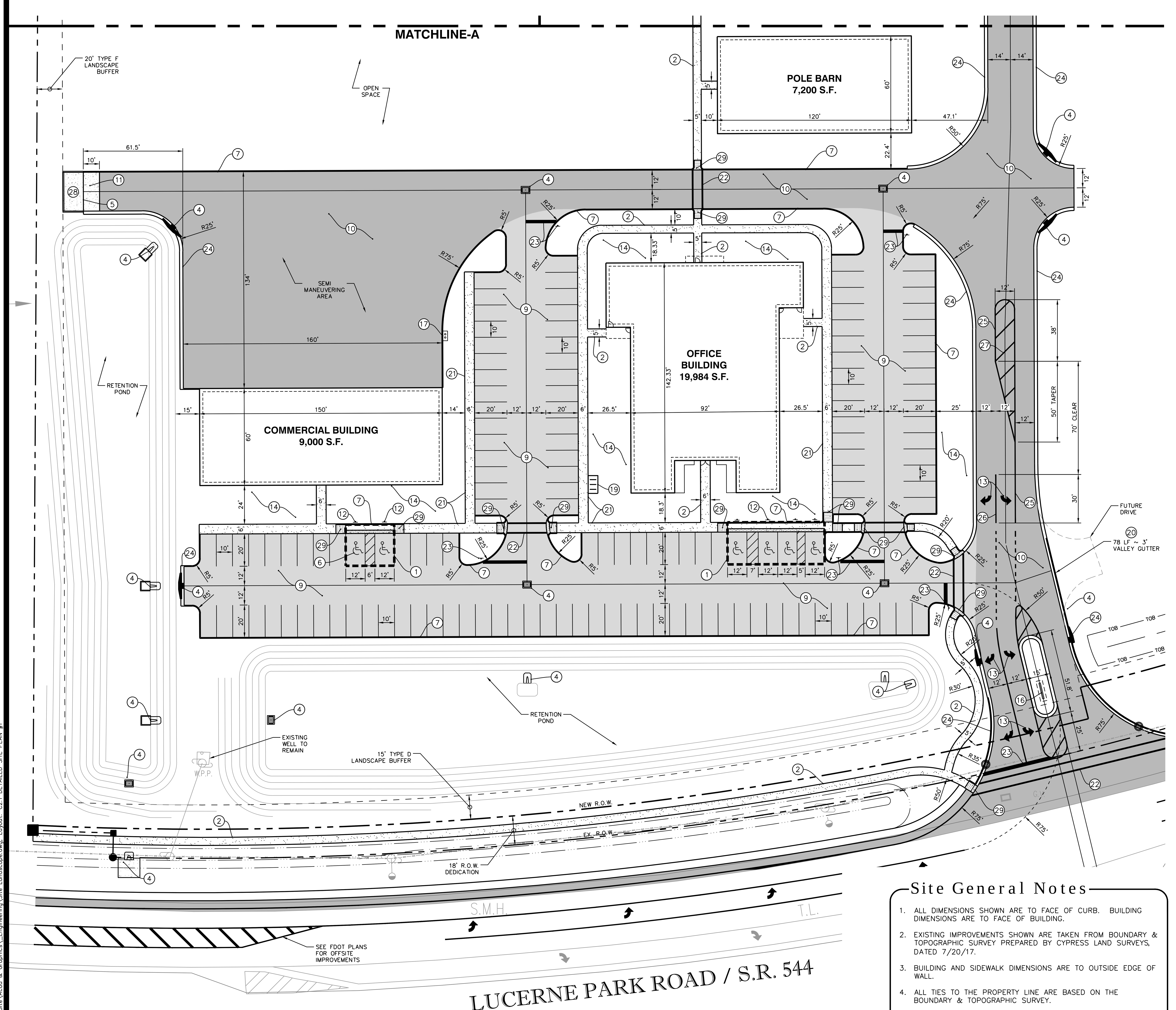
TOP EL. =	127.50	TOP AREA =	0.785 AC.
CONTROL EL. =	126.0	AREA AT CONTROL EL. =	0.685 AC.

REQUIRED 1" TREATMENT VOLUME = 0.025 + 0.110 + 0.036 + 0.135 + 0.077 + 0.050 + 0.100 = 0.533 AC-FT

VOLUME PROVIDED = 0.533 AT EL. 126.75'

PERMIT NO. 43208.000

Tucker Paving



SCALE: 1"=30'

Site Legend

TYP	TYPICAL
R	RADIUS
	PAINTED TRAFFIC ARROW
	HANDICAP PARKING
	NEW CURB
	PROPERTY LINE
	CENTER LINE
	RIGHT-OF-WAY
	FLOOD LINE
	EX. EDGE OF PAVEMENT
	NEW PAVEMENT MILLINGS
	EX. CONCRETE PAVEMENT
	NEW HEAVY DUTY PAVEMENT
	NEW LIGHT DUTY PAVEMENT

Site Plan Keyed Notes

ITEM	DESCRIPTION
1	ADA ACCESSIBLE ZONE. SLOPES NOT TO EXCEED 2.0% ALL IN DIRECTIONS.
2	4-INCH THICK CONCRETE SIDEWALK WITH JOINT 5' O.C. AND EXPANSION JOINT 50' O.C. SEE DETAIL SHEET.
3	LANDSCAPE BUFFER. SEE LANDSCAPE PLAN.
4	PROPOSED STORM SEWER STRUCTURE. SEE DRAINAGE PLAN.
5	INSTALL 1/2" PREFORMED EXPANSION JOINT WHEN ABUTTING CONCRETE.
6	ADA PAVEMENT MARKINGS PER DETAIL SHEET.
7	6-INCH CONCRETE CURB. SEE DETAIL SHEET.
8	FIRE HYDRANT ASSEMBLY.
9	LIGHT DUTY ASPHALT. SEE DETAIL SHEET.
10	HEAVY DUTY ASPHALT. SEE DETAIL SHEET.
11	6" THICK, 4,000 PSI CONCRETE PAD. SEE DETAIL SHEET.
12	ADA HANDICAP SIGNS. SEE DETAIL SHEET.
13	4-INCH WHITE THERMOPLASTIC STRIP OR WHITE DIRECTIONAL ARROW.
14	LANDSCAPE AREA. SEE LANDSCAPE PLANS.
15	6' HIGH CHAIN LINK FENCE
16	MONUMENT SIGN, DESIGN BY OTHERS.
17	RV DUMP STATION. SEE DETAIL SHEET.
18	60" WIDE PEDESTRIAN GATE
19	BIKE RACK. SEE DETAIL SHEET.
20	3' VALLEY GUTTER PER FDOT INDEX #300.
21	6' CURB MOUNTED SIDEWALK. SEE DETAIL SHEET.
22	6' WIDE PEDESTRIAN CROSSWALK PER FDOT INDEX #17346
23	24" WHITE STOP BAR WITH R1-1 STOP SIGN.
24	TYPE-F CURB AND GUTTER PER FDOT INDEX #300
25	6-INCH YELLOW STRIPE
26	6-INCH WHITE STRIPE
27	12-INCH YELLOW, 10' O.C.
28	ENCLOSED DUMPSTER WITH RECYCLE BIN. SEE DETAIL SHEET.
29	6' ADA RAMP WITH DETECTABLE WARNING STRIP. 1:12 MAX SLOPE.
30	PAVEMENT MILLINGS. SEE DETAIL SHEET.
31	6' HIGH CHAIN LINK FENCE
32	16' SWING GATE

Site General Notes

1. ALL DIMENSIONS SHOWN ARE TO FACE OF CURB. BUILDING DIMENSIONS ARE TO FACE OF BUILDING.
2. EXISTING IMPROVEMENTS SHOWN ARE TAKEN FROM BOUNDARY & TOPOGRAPHIC SURVEY PREPARED BY CYPRESS LAND SURVEYS, DATED 7/20/17.
3. BUILDING AND SIDEWALK DIMENSIONS ARE TO OUTSIDE EDGE OF WALL.
4. ALL TIES TO THE PROPERTY LINE ARE BASED ON THE BOUNDARY & TOPOGRAPHIC SURVEY.
5. ALL CURB RADIUS ARE 3' UNLESS OTHERWISE NOTED.
6. WATER SUPPLY SHALL BE AVAILABLE PRIOR TO CONSTRUCTION.
7. COMBUSTIBLE MATERIALS CAN NOT BE STORED ONSITE UNTIL FIREWATER IS INSTALLED

NO.	DATE	APPR.	REVISIONS

NOT VALID WITHOUT THE SIGNATURE AND EMBOSSED SEAL OF DAVID C. CARTER

DAVID C. CARTER, P.E. NO. 31915

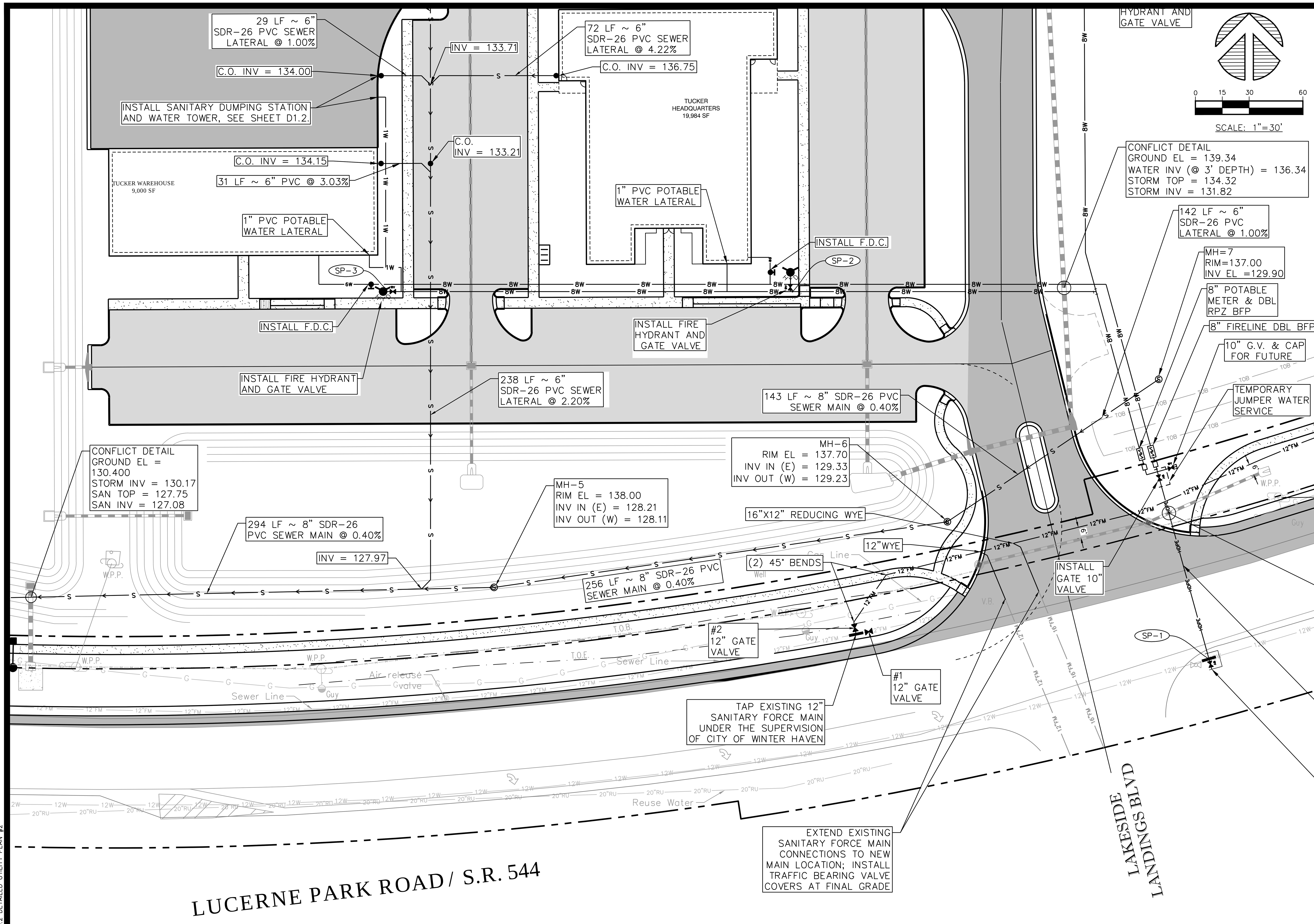
DRAWN BY:
DESIGNED BY:
CHECKED BY:
ISSUE DATE:
FIELD DATE:

CARTER ENGINEERING
137 5th. St. N.W., Winter Haven Fl. 33881
(863) 294-6965 * E-mail: dave@carter-eng.com

DETAILED SITE PLAN # 1

TUCKER PAVING OFFICE
LUCERNE PARK ROAD (SR 544)
WINTER HAVEN, FLORIDA

PROJECT No.	SHEET #
-000-	C2.1
PLOT DATE	
Nov 08, 2017-14:24	



Water General Notes

1. WATER AND SEWER LINES SHALL NOT BE PLACED IN THE SAME TRENCH. A LATERAL SEPARATION OF AT LEAST 6 FEET, OR IN CASE OF CROSSING A VERTICAL DISTANCE NOT LESS THAN 12" SHALL BE MAINTAINED. IF THESE CONDITIONS ARE NOT MET, THE WATER MAIN SHALL BE DUCTILE IRON FOR A DISTANCE OF 20' SPACED EQUALLY OVER THE INTERFERENCE.
2. WATER MAINS ARE TO BE DISINFECTED PER POLK COUNTY HEALTH DEPARTMENT STANDARDS AND AWWA C651-92. 3. WATER MAINS ARE TO BE PRESSURE TESTED PER THE STANDARDS OF THE UTILITY SUPPLYING SERVICE AND AWWA MANUAL M23.
3. ALL LINES TO HAVE #14 GAUGE, COPPER, BLUE COATED UF SOLID TRACER WIRE TAPED TO THE PIPE, STUB-UPS PER CITY'S DIRECTION.
4. THE CONTRACTOR SHALL BE RESPONSIBLE TO OBTAIN AND FOLLOW THE REGULATIONS OF THE UTILITY SUPPLYING SERVICE.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING COPIES OF ALL PERMITS ISSUED FOR THE WATER DISTRIBUTION SYSTEM AND CONFORMING TO ALL CONDITIONS OF ISSUANCE.
6. ALL TAPS AND THEIR COORDINATION OF INSTALLATION ARE THE RESPONSIBILITY OF THE CONTRACTOR. WET TAP SHALL BE PERFORMED UNDER CITY SUPERVISION. CONTRACTOR TO COORDINATE WITH CITY'S INSPECTOR.
7. ALL WATER MAIN PIPING TO BE AWWA C-900 DR-18 DYED BLUE.
8. CONTRACTOR TO SUPPLY COMPLETE "AS-BUILT" DRAWINGS. ALL INSTALLATIONS ARE TO BE DIMENSIONED FROM PERMANENT ABOVE GROUND FACILITIES (I.E., MANHOLES, FIRE HYDRANTS, ETC.). ITEMS SUCH AS SERVICE VALVES, ETC. ALSO SHALL BE LOCATED.
9. ALL GATE VALVES TO BE ANSI/AWWA C-509 W/O RING STEM SEAL.
10. BUTTERFLY VALVES ARE NOT ALLOWED.
11. ALL JOINTS SHALL BE RESTRAINED USING MEGA-LUG RESTRAINTS.
12. ALL UTILITIES INSTALLATION SHALL BE TO CITY OF WINTER HAVEN SPECIFICATIONS.

Sewer General Notes

1. ALL SANITARY SEWER GRAVITY PIPING AND LATERALS TO BE PVC SDR 26, DYED GREEN.
2. WATER AND SEWER LINES SHALL NOT BE PLACED IN THE SAME TRENCH AND SHALL REQUIRE A LATERAL SEPARATION OF AT LEAST 6 FEET, OR IN CASE OF CROSSING, A VERTICAL DISTANCE NOT LESS THAN 12" SHALL BE MAINTAINED. IF THESE CONDITIONS ARE NOT MET, THE WATER MAIN SHALL BE DUCTILE IRON FOR A DISTANCE OF 20' SPACED EQUALLY OVER THE INTERFERENCE.
3. ALL GRAVITY SEWER LINES SHALL BE TESTED BY "LAMPING" THE MANHOLES AND A CAMERA SHALL BE PASSED THROUGH ALL LINES FOR THE PURPOSE OF MAKING A VIDEO TAPE OF THE INTERNAL SYSTEM. REFERENCE SECTION 5.9 OF THE CITY OF WINTER HAVEN SPECIFICATIONS - WASTEWATER COLLECTION AND TRANSMISSION SYSTEM DESIGN AND CONSTRUCTION.
4. ALL FORCE MAINS TO BE TESTED PER THE PROCEDURE OF THE UTILITY PROVIDING SERVICE.
5. CONTRACTOR TO SUPPLY COMPLETE "AS-BUILT" DRAWINGS. ALL INSTALLATIONS ARE TO BE DIMENSIONED FROM PERMANENT ABOVE GROUND FACILITIES (I.E., MANHOLES, FIRE HYDRANTS, ETC.). ITEMS SUCH AS SERVICE VALVES, ETC., SHALL BE LOCATED.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING COPIES OF ALL PERMITS ISSUED FOR THE SANITARY SEWER SYSTEM AND CONFORM TO ALL CONDITIONS OF ISSUANCE.
7. ALL UTILITIES INSTALLATION SHALL BE TO CITY OF WINTER HAVEN SPECIFICATIONS.
8. THE ONSITE SANITARY SEWER SYSTEM (MANIFOLD AND SERVICE LATERALS) WILL BE PRIVATELY OWNED AND MAINTAINED.
9. ALL FORCE MAIN MATERIAL SHALL BE C-900 DR-25.

Utility Backfill Notes

ALL UNDERGROUND UTILITIES MUST BE BACKFILLED IN 10 INCH LIFTS WITH THE TRENCH SPOIL, UNLESS THE SPOILS DO NOT MEET AT LEAST 95% OF STANDARD PROCTOR MAXIMUM DRY DENSITY (ASTM D698)., IN WHICH CASE A SUITABLE STRUCTURAL FILL MUST BE IMPORTED AND THE UNSUITABLE SPOILS DISPOSED OFF SITE.

Existing Utility Locations

EXISTING UTILITY LOCATIONS SHOWN SUCH AS GAS, WATER, CABLE, ETC. ARE BASED ON BEST AVAILABLE INFORMATION AS PROVIDED BY THE UTILITY COMPANY. THESE UTILITIES ARE NOT SURVEYED LOCATIONS AND NEED TO BE FIELD VERIFIED BY THE SITE CONTRACTOR PRIOR TO CONSTRUCTION. UPON ACTUAL FIELD LOCATION, THE CONTRACTOR SHOULD NOTIFY THE ENGINEER OF RECORD OF ANY DESCEPENCIES THAT CONFLICT WITH THE PROPOSED DESIGN.
WATER MAIN ELEVATION IS ASSUMED TO HAVE 3' COVER.
GAS MAIN ELEVATION IS ASSUMED TO HAVE 4' COVER.

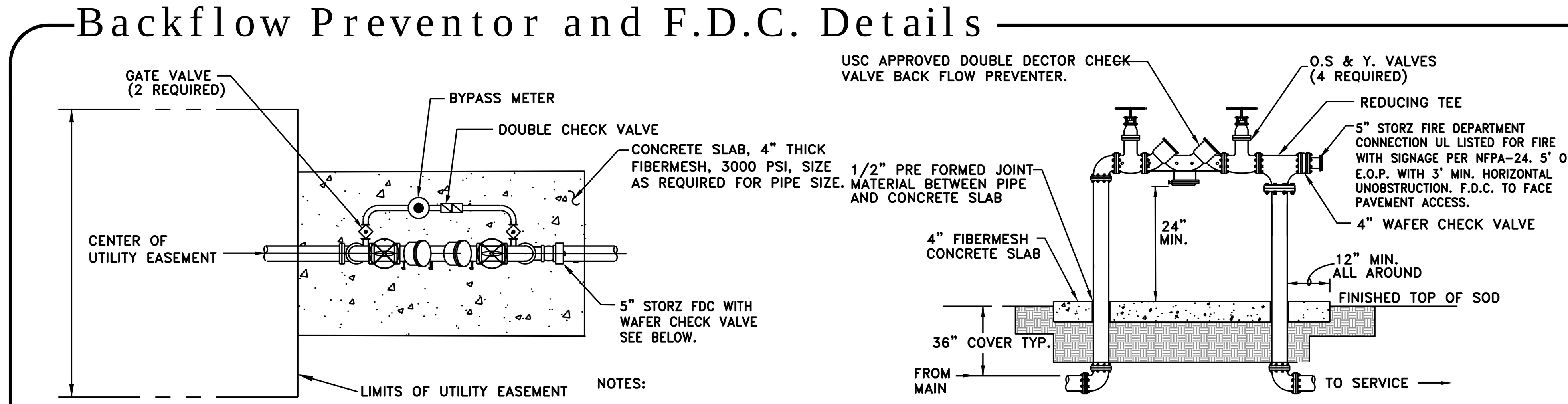
Utility Legend

Ⓢ	SANITARY MANHOLE
	CLEAN OUT
	8" PVC SAN. SEWER MAIN
—12"FM—	12" PVC FORCE MAIN
—20"RU—	20" PVC REUSE WATER
	CAP
	GATE VALVE
BO⊗	BLOW OFF
	FIRE HYDRANT ASS'Y
—1W—	1" PVC WATER MAIN
—2W—	2" PVC WATER MAIN
—6W—	6" PVC WATER MAIN
—8W—	8" PVC WATER MAIN
—10WM—	10" PVC WATER MAIN
SP-1	SAMPLE POINT LOCATION
	STORM PIPE
	STORM INLET

Force Main Tie-in

1. INSTALL VALVES #1 AND #4.
2. TAP 12" FORCE MAIN NEAR VALVE #1 AND #4.
3. INSTALL VALVES #2 AND #3 AND CLOSE VALVES.
4. INSTALL 12" FORCE MAIN BETWEEN VALVES #2 AND #3.
5. TEST NEW 12" FORCE MAIN AND CLEAR FOR PUBLIC USE.
6. OPEN VALVES #2 AND #3.
7. CLOSE VALVES #1 AND #4. REMOVE AND CAP EXISTING 12" FORCE MAIN BETWEEN VALVE #1 AND #4.

Backflow Preventor and F.D.C. Details



NOTES:

1. ALL PIPE, FITTINGS AND APPURTENANCES SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR.
2. ALL ABOVE GROUND PIPE SHALL BE FLANGE DUCTILE IRON.
3. APPROVED DEVICES: HERSEY DDC11, FEBCO 806 DDC, WATTS 709, OAE.
4. PROVIDE PIPE SUPPORT STANDS AS REQUIRED.
5. BY-PASS DOUBLE CHECK MUST BE THE SAME TYPE AS THE MAIN DOUBLE CHECK.
6. A 3' CLEAR SPACE SHALL BE MAINTAINED AROUND THE CIRCUMFERENCE OF THE F.D.C.

811 Know what's below. Call before you dig.

IMPORTANT:

ALL SERVICE LATERALS, VALVES, FIRE HYDRANTS, FITTINGS, INLETS, ETC... SHOWN HEREON ARE GRAPHICAL SYMBOLS ONLY AND NOT TO SCALE. REFER TO DETAIL SHEETS FOR EXACT LOCATION, SIZE AND OTHER SPECIFICS.

Dwg: N:\Tucker\2-Saterbo Site\Acad & Graphics_Engineering\Utility Plan.dwg; Layout: C3.2 DETAILED UTILITY PLAN #2

REVISIONS

NO.	DATE	APPR.

NOT VALID WITHOUT THE SIGNATURE AND EMBOSSED SEAL OF DAVID C. CARTER

DAVID C. CARTER, P.E. NO. 31915

DRAWN BY:
DESIGNED BY:
CHECKED BY:
ISSUE DATE:
FIELD DATE:

CARTER ENGINEERING
137 5th St. N.W., Winter Haven Fl. 33881
(863) 294-6965 * E-mail: dave@carter-eng.com

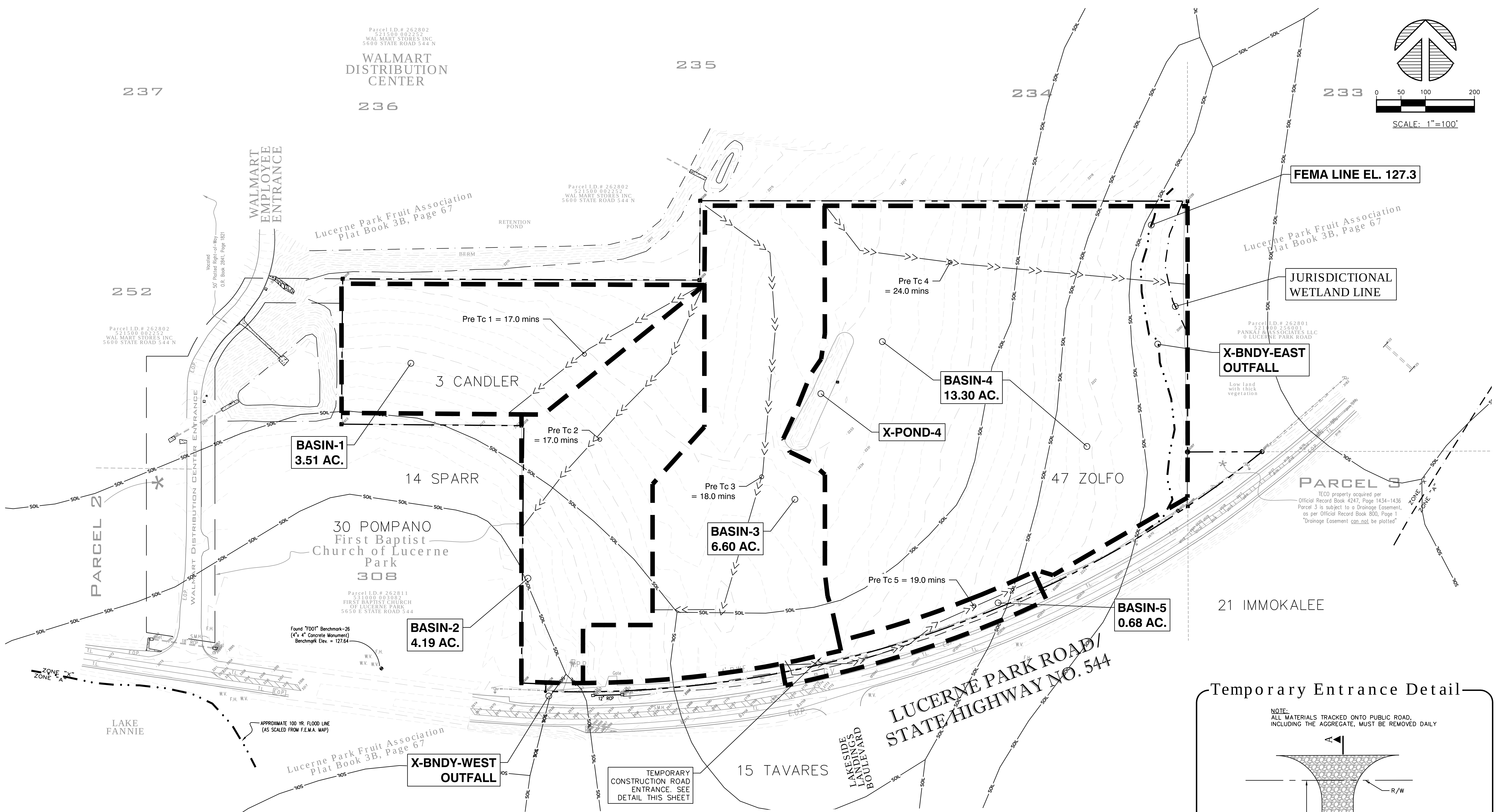
DETAILED UTILITY PLAN #2

TUCKER PAVING OFFICE

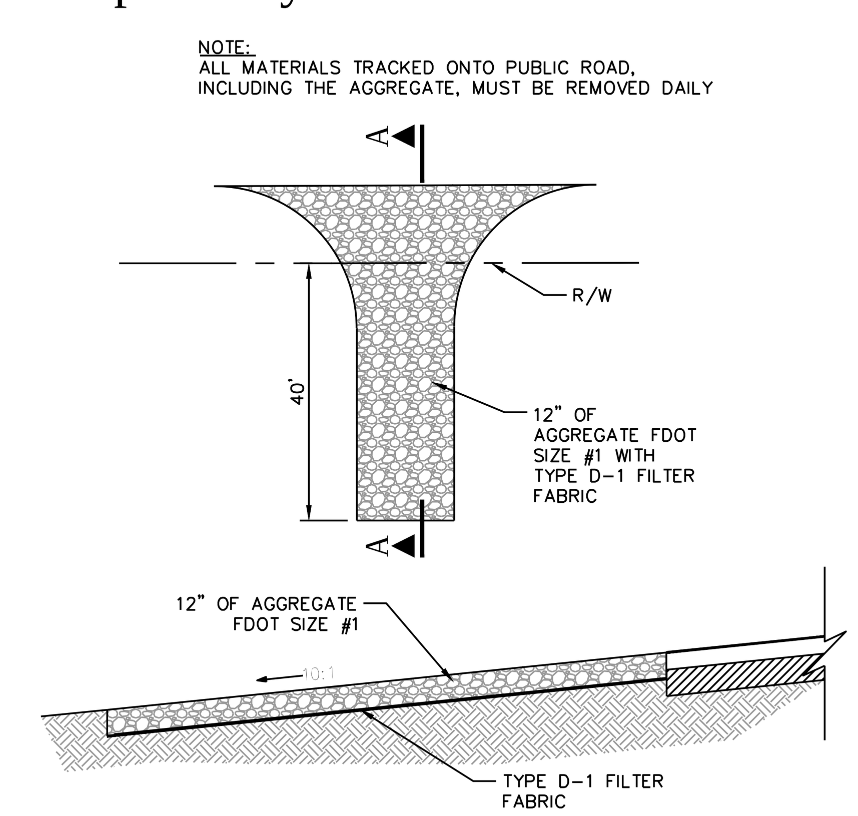
LUCERNE PARK ROAD (SR 544)

WINTER HAVEN, FLORIDA

PROJECT No.	SHEET #
-000-	C3.2
PLOT DATE	
Nov 08, 2017-14:27	



Temporary Entrance Detail



SECTION A-A

General Notes

1. EXISTING IMPROVEMENTS SHOWN ARE TAKEN FROM BOUNDARY & TOPOGRAPHIC SURVEY PREPARED BY CYPRESS LAND SURVEYS, DATED 07/20/17.

2. SOILS INFORMATION OBTAINED FROM SCS SOIL SURVEY OF POLK COUNTY FLORIDA AND ARE MAPPED WITH THE FOLLOWING CHARACTERISTICS:
   - #3 – CANDLER – SOIL GROUP "A"
   - #14 – SPARR – SOIL GROUP "C"
   - #15 – TAVARES – SOIL GROUP "A"
   - #21 – IMMOKALEE – SOIL GROUP "B/D"
   - #30 – POMPANO – SOIL GROUP "B/D"
   - #31 – ADAMSVILLE – SOIL GROUP "C"
   - #47 – ZOLFO – SOIL GROUP "C"

811 Know what's below. Call before you dig.

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REVISIONS

NO.	DATE	APPR.

NOT VALID WITHOUT THE SIGNATURE AND EMBOSSED SEAL OF DAVID C. CARTER

DAVID C. CARTER, P.E. NO. 31915

DRAWN BY: | DESIGNED BY: | CHECKED BY: | ISSUE DATE: | FIELD DATE:

CARTER ENGINEERING
137 5th. St. N.W., Winter Haven Fl. 33881
(863) 294-6965 * E-mail: dave@carter-eng.com

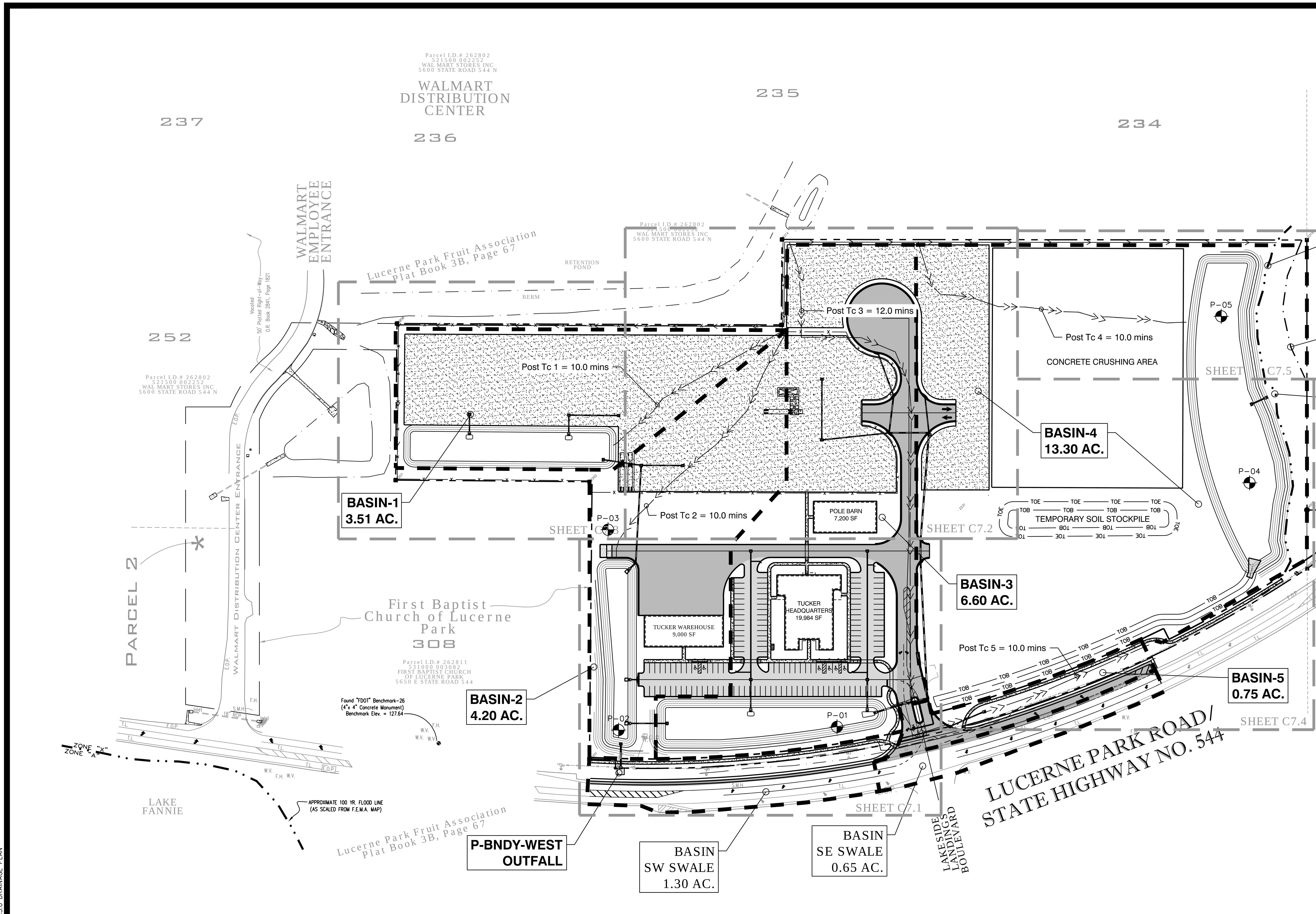
PRE-DEVELOPMENT DRAINAGE

TUCKER PAVING OFFICE

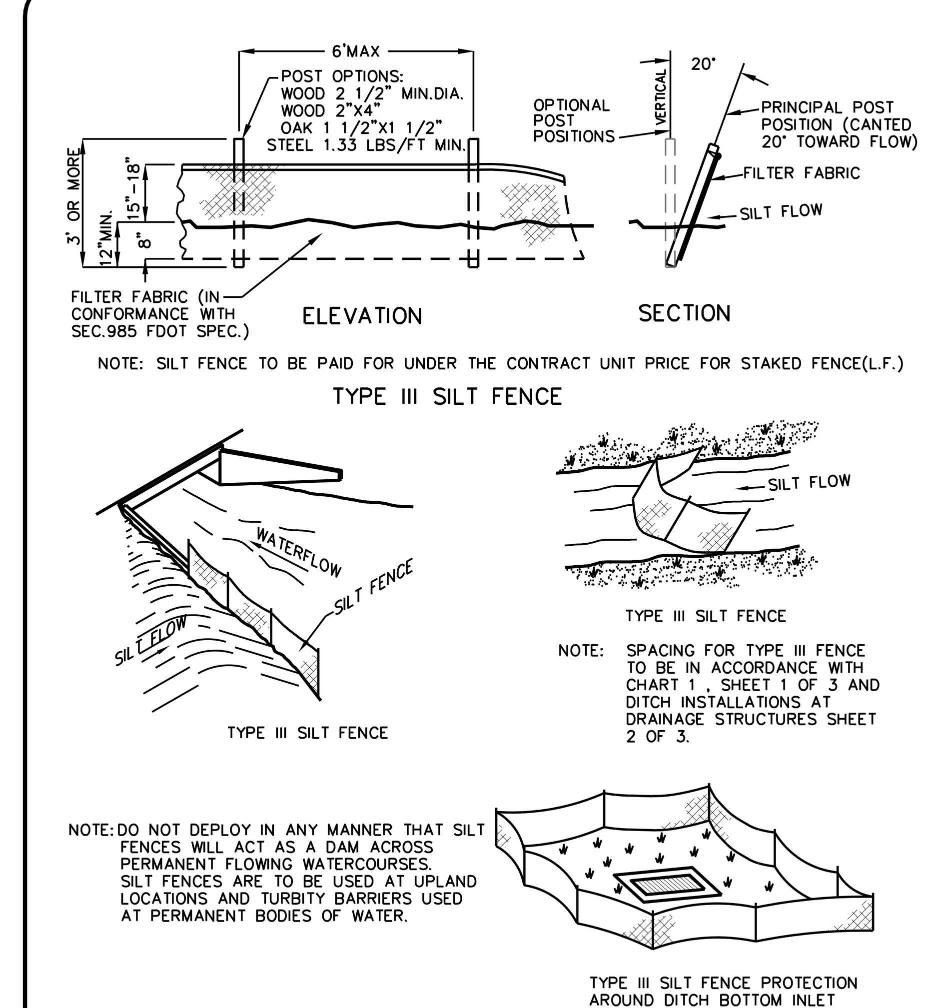
LUCERNE PARK ROAD (SR 544)
WINTER HAVEN, FLORIDA

PROJECT No. ----
SHEET # C4.0
PLOT DATE Nov 08, 2017–14:29

Dwg: N:\Tucker\2–Saterbo Site\Acad & Graphics_Engineering\Base Plan.dwg; Layout: C4.0 PRE–DEVELOPMENT DRAINAGE



Silt Fence Detail



EROSION AND SEDIMENT CONTROL
PER FDOT STANDARDS
NOT TO SCALE

FEMA FLOOD ZONE:

A PORTION OF THIS SITE LIES IN FEMA FIRM PANEL NUMBER 12105C0358G WITH AN EFFECTIVE DATE OF DECEMBER 22, 2016 WITH AN ESTABLISHED BFE OF 127.3 NAVD 88.

IMPORTANT:

ALL SERVICE LATERALS, VALVES, FIRE HYDRANTS, FITTINGS, INLETS, ETC... SHOWN HEREON ARE GRAPHICAL SYMBOLS ONLY AND NOT TO SCALE. REFER TO DETAIL SHEETS FOR EXACT LOCATION, SIZE AND OTHER SPECIFICS.

811 Know what's below. Call before you dig.

REVISIONS

NO.	DATE	APPR.

NOT VALID WITHOUT THE SIGNATURE AND EMBOSSED SEAL OF DAVID C. CARTER

DAVID C. CARTER, P.E. NO. 31915

DRAWN BY: | DESIGNED BY: | CHECKED BY: | ISSUE DATE: | FIELD DATE:

CARTER ENGINEERING
137 5th. St. N.W., Winter Haven Fl. 33881
(863) 294-6965 * E-mail: dave@carter-eng.com

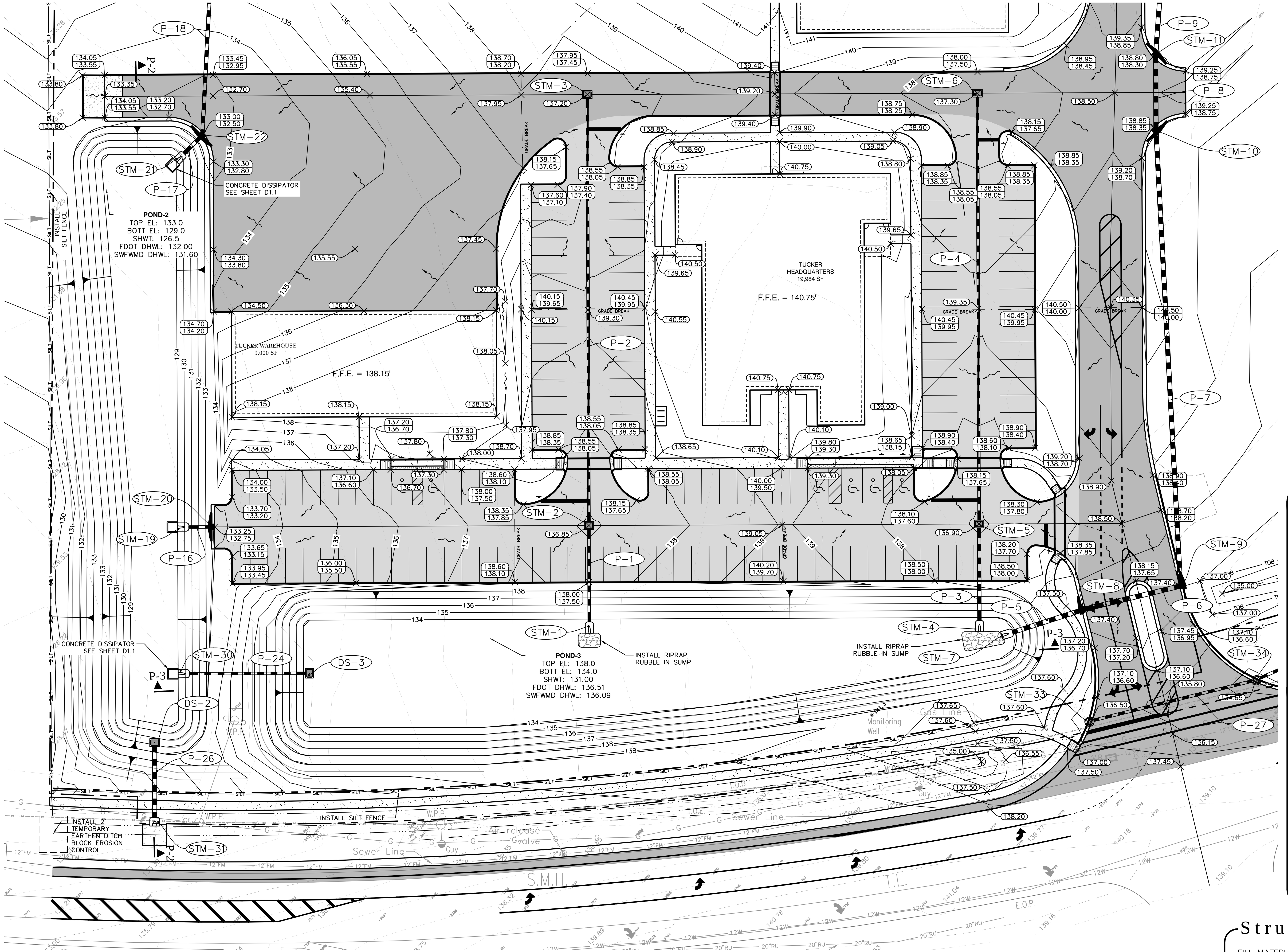
DRAINAGE PLAN

TUCKER PAVING OFFICE

LUCERNE PARK ROAD (SR 544)
WINTER HAVEN, FLORIDA

PROJECT No.	SHEET #
----	C5.0
PLOT DATE: Nov 08, 2017–14:29	

Dwg: N:\Tucker\2-Saterbo Site\Acad & Graphics_Engineering\Base Plan.dwg; Layout: C5.0 DRAINAGE PLAN



Drainage Legend

EL	ELEVATION
TYP	TYPICAL
CO	CLEANOUT
IE	INVERT ELEVATION
	EXISTING ELEVATION
	PROPOSED PAVEMENT ELEVATION
	GRATE INLET
FFE	FINISH FLOOR ELEVATION
RCP	REINFORCED CONCRETE PIPE
S-7	STORM SEWER STRUCTURE NUMBER
GRADE BREAK	GRADE BREAK
MEG	MATCH EXISTING GRADE
DS	BUILDING DOWN SPOUT
	12" OR GREATER STORMWATER PIPE
	LESS THAN 12" STORMWATER PIPE
	SURFACE STORMWATER FLOW
	DIRECTION OF PIPE FLOW

Paving & Grading Notes

1. ALL STORM PIPE SHALL BE REINFORCED CONCRETE PIPE (RCP) UNLESS OTHERWISE NOTED.
2. PROPERTY OWNER IS RESPONSIBLE FOR MAINTANANCE OF ALL ON-SITE STORMWATER MANAGEMENT SYSTEMS.
3. THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF RECORD 48 HOURS PRIOR TO COVERING STORMWATER PIPING FOR INSPECTION.
4. SEE PRE-DEVELOPMENT DRAINAGE PLAN, SHEET C6.0 FOR EROSION AND SILTATION CONTROL ALONG WITH GENERAL NOTES.
5. SEE SITE PLAN, SHEET C4.0 FOR SITE DATA.
6. SEE BOUNDARY & TOPOGRAPHIC SURVEY FOR TEMPORARY BENCH MARK (TBM) LOCATIONS.
7. THE CONTRACTOR SHALL MEET ALL REQUIREMENTS FOR LOCAL MUNICIPALITY AND THE FLORIDA DEPARTMENT OF TRANSPORTATION WITH REGARD TO IMPROVEMENTS WITHIN THEIR RESPECTIVE RIGHTS-OF-WAY.
8. ALL DISTURBED AREAS WITHIN RIGHTS-OF-WAY TO BE RETURNED TO MATCH EXISTING CONDITION UNLESS OTHERWISE INDICATED ON ROADWAY PLANS.
9. ALL CLEANOUT TOP ELEVATION SHALL MATCH FINISH GRADE ELEVATIONS.
10. CONTRACTOR SHALL INSTALL EROSION CONTROL SILT FENCE AROUND THE PERIMETER OF THE SITE AND MUST MAINTAIN THE SILT FENCE IN GOOD REPAIR UNTIL ALL CONSTRUCTION IS COMPLETE AND THE AREA IS STABILIZED, SEE PRE-DEVELOPMENT AND DEMOLITION PLANS.
11. THE CONTRACTOR SHALL CONTACT THE ENGINEER PRIOR TO ANY CONSTRUCTION IF ANY PROBLEMS OR DISCREPANCIES EXIST.

Structural Fill Note

FILL MATERIAL SHALL BE PER GEOTECHNICAL REPORT. FILL SHOULD BE PLACED IN LIFTS NOT TO EXCEED ONE FOOT THICK. THE FILL MATERIAL SHOULD BE COMPACTED TO AT LEAST 95 PERCENT OF ITS MODIFIED PROCTOR MAXIMUM DRY DENSITY (ASTM D 1557). CONFINED AREAS, SUCH AS UTILITY TRENCHES, SHOULD BE COMPACTED WITH MANUALLY OPERATED VIBRATORY COMPACTION EQUIPMENT.

SHEET 7.1 STRUCTURE TABLE

STR NAME	TYPE	RIM	DOWNSTREAM PIPE						
			PIPE NAME	LENGTH (ft)	SIZE (in)	MATERIAL	UPPER INV (el)	LOWER INV (el)	SLOPE (%)
DS-2	MODIFIED TYPE "H" INLET FDOT INDEX 232	132.50	P-26	45	19x30	EL. RCP	130.35	130.15	0.44%
DS-3	MODIFIED TYPE "C" INLET FDOT INDEX 232	136.86	P-24	75	24	ADS	129.75	129.00	1.00%
STM-1	M.E.S PER FDOT INDEX #272	131.42	---	---	---	CONC	---	131.42	---
STM-2	TYPE "J" INLET FDOT INDEX 234	136.86	P-1	61	18	ADS	132.61	132.00	1.00%
STM-3	TYPE "J" INLET FDOT INDEX 234	137.20	P-2	244	18	RCP	133.83	132.61	0.50%
STM-4	M.E.S PER FDOT INDEX #272	131.00	---	---	---	CONC	---	131.00	---
STM-5	TYPE "J" INLET FDOT INDEX 234	136.90	P-3	61	24	ADS	131.46	131.00	0.75%
STM-6	TYPE "J" INLET FDOT INDEX 234	137.30	P-4	244	18	RCP	133.79	131.96	0.75%
STM-7	M.E.S PER FDOT INDEX #272	131.00	---	---	---	CONC	---	131.00	---
STM-8	TYPE "5" INLET FDOT INDEX 211	137.40	P-5	49	18	ADS	131.20	131.00	0.40%

SHEET 7.1 STRUCTURE TABLE

STR NAME	TYPE	RIM	DOWNSTREAM PIPE						
			PIPE NAME	LENGTH (ft)	SIZE (in)	MATERIAL	UPPER INV (el)	LOWER INV (el)	SLOPE (%)
STM-9	TYPE "5" INLET FDOT INDEX 211	137.40	P-6	56	30	RCP	131.42	131.20	0.40%
STM-10	TYPE "6" INLET FDOT INDEX 211	138.35	P-7	258	30	ADS	132.45	131.42	0.40%
STM-11	TYPE "6" INLET FDOT INDEX 211	138.30	P-8	43	30	RCP	132.62	132.45	0.40%
STM-12	TYPE "6" INLET FDOT INDEX 211	138.80	P-9	203	30	ADS	133.44	132.62	0.40%
STM-19	M.E.S PER FDOT INDEX #272	129.00	---	---	---	CONC	---	129.00	---
STM-20	TYPE "6" INLET FDOT INDEX 211	132.75	P-16	21	18	ADS	129.16	129.00	0.75%
STM-21	M.E.S PER FDOT INDEX #272	129.00	---	---	---	CONC	---	129.00	---
STM-22	TYPE "6" INLET FDOT INDEX 211	132.50	P-17	21	24	ADS	129.26	129.00	1.25%
STM-23	TYPE "J" INLET FDOT INDEX 234	136.75	P-18	183	24	RCP	131.09	129.26	1.00%
STM-31	M.E.S PER FDOT INDEX #273	130.15	---	---	---	CONC	---	130.15	---

811
Know what's below.
Call before you dig.

IMPORTANT:

ALL SERVICE LATERALS, VALVES, FIRE HYDRANTS, FITTINGS, INLETS, ETC... SHOWN HEREON ARE GRAPHICAL SYMBOLS ONLY AND NOT TO SCALE. REFER TO DETAIL SHEETS FOR EXACT LOCATION, SIZE AND OTHER SPECIFICS.

NO.	DATE	APPR.	REVISIONS

NOT VALID WITHOUT THE SIGNATURE AND EMBOSSED SEAL OF DAVID C. CARTER

DAVID C. CARTER, P.E. NO. 31915

DRAWN BY:
DESIGNED BY:
CHECKED BY:
ISSUE DATE:
FIELD DATE:

CARTER ENGINEERING
137 5th St. N.W., Winter Haven Fl. 33881
(863) 294-6965 * E-mail: dave@carter-eng.com

DETAILED DRAINAGE PLAN #1

TUCKER PAVING OFFICE

LUCERNE PARK ROAD (SR 544)
WINTER HAVEN, FLORIDA

PROJECT No. ----
SHEET # C5.1
PLOT DATE Nov 08, 2017–14:29

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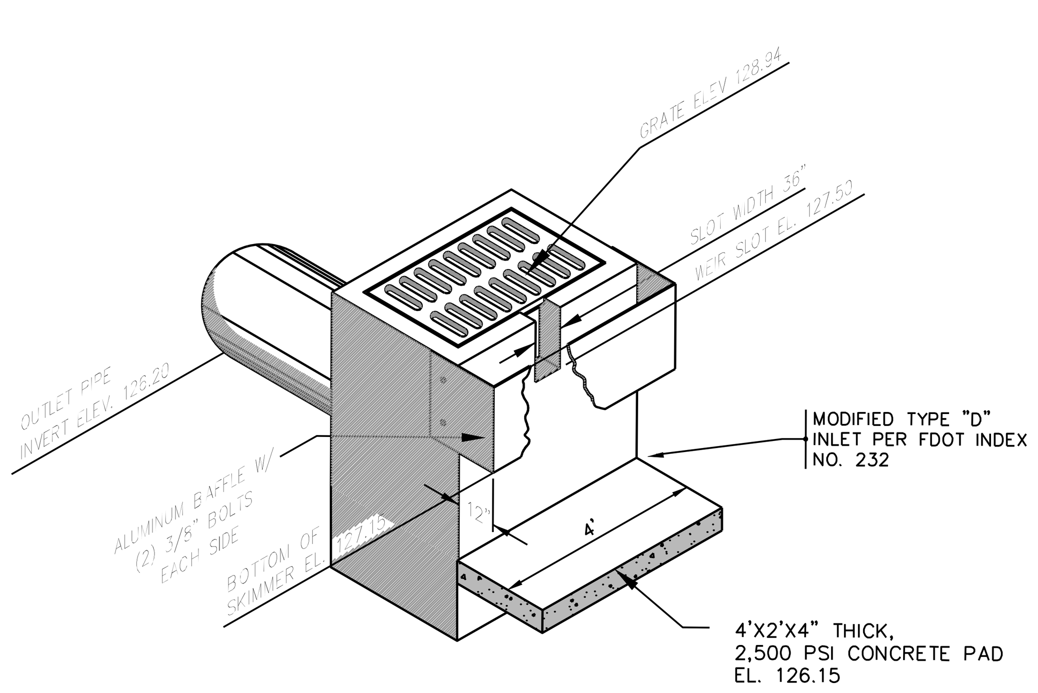
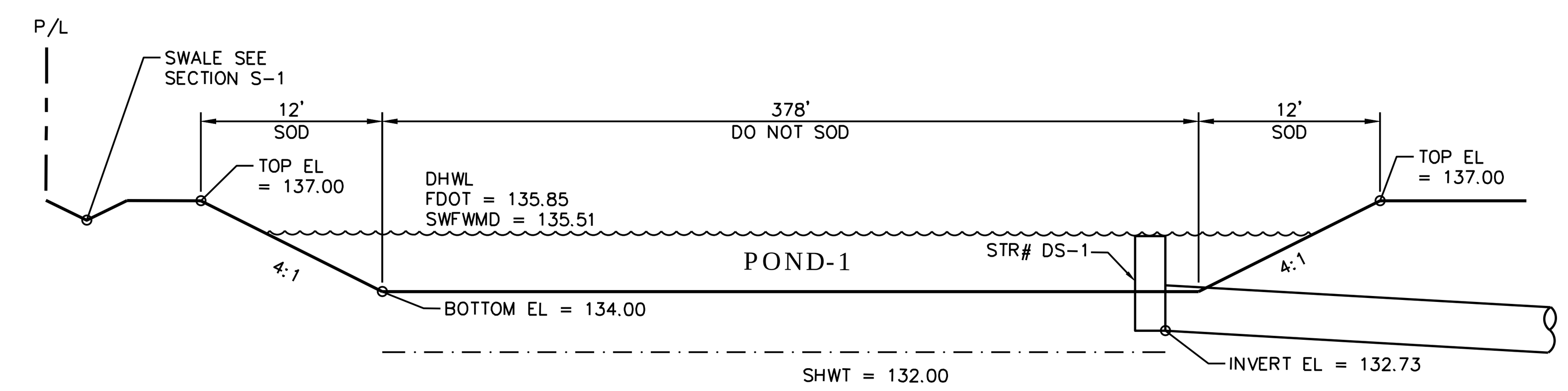
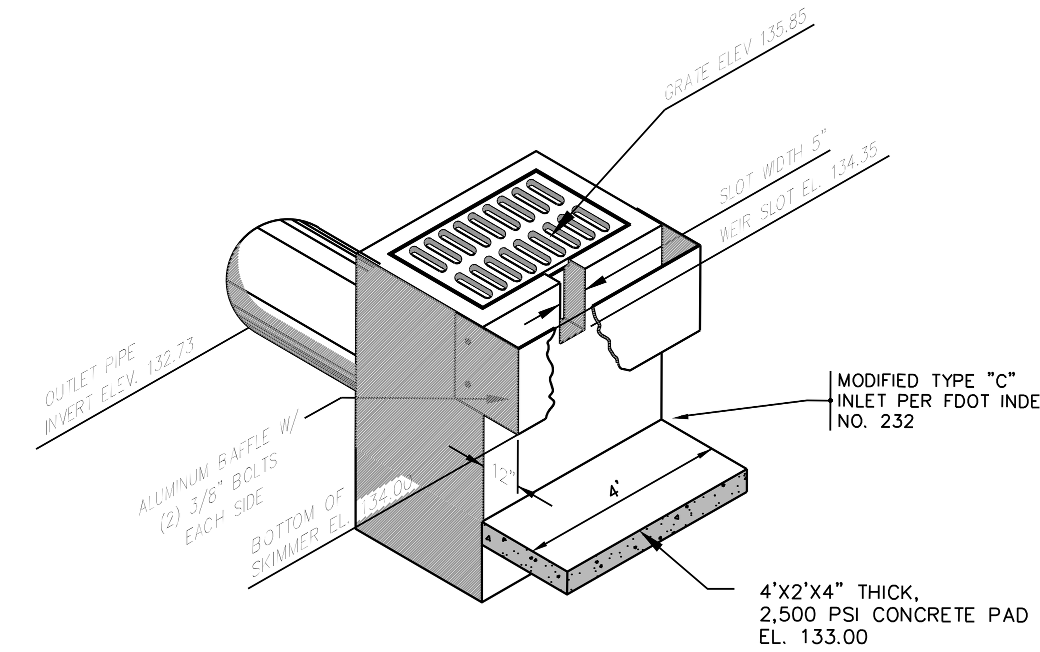


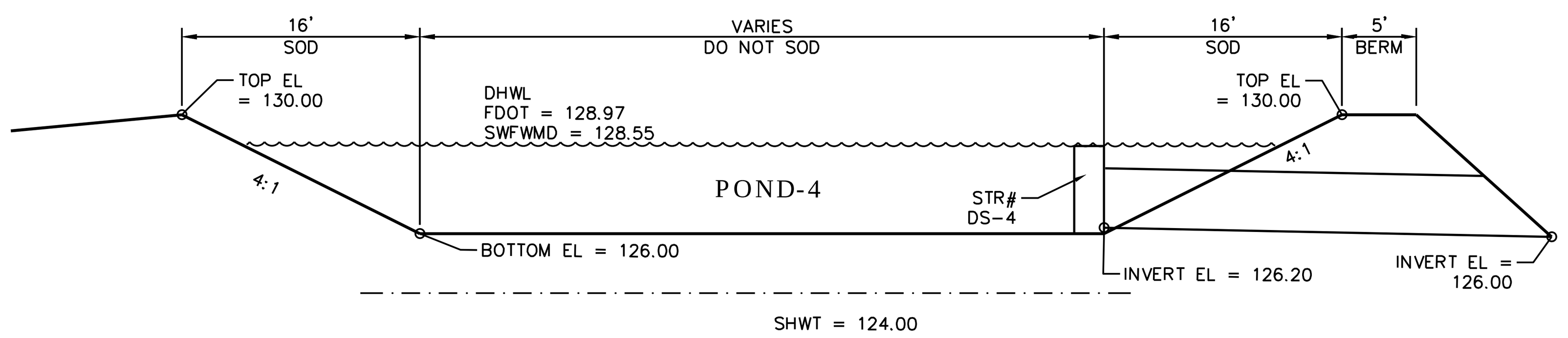
POND-4 OUTFALL DETAIL
STRUCTURE #DS-4
N.T.S.



Section P-1



POND-1 OUTFALL DETAIL
STRUCTURE #DS-1
N.T.S.



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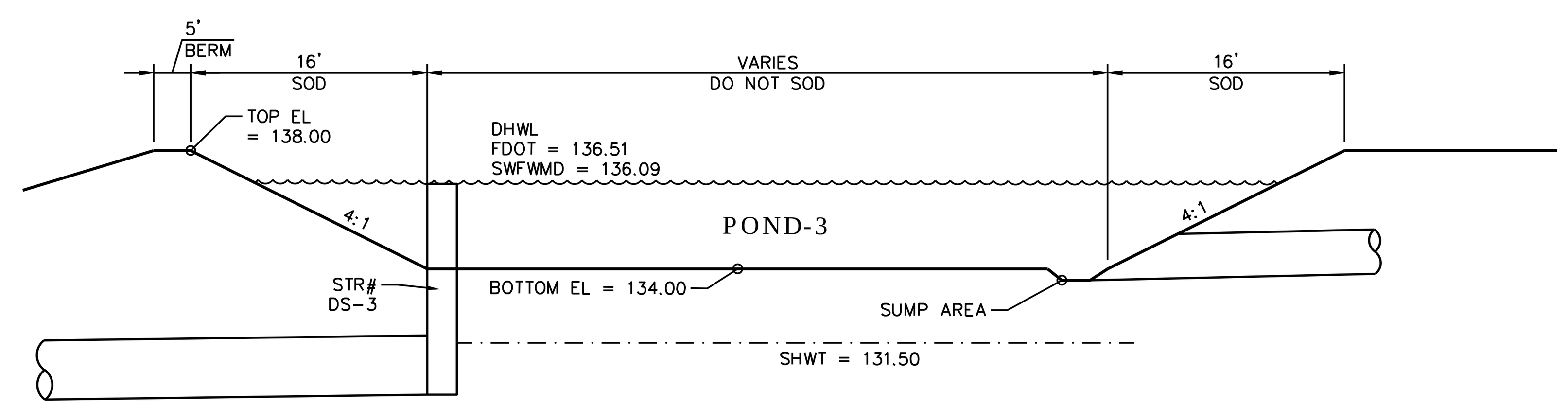

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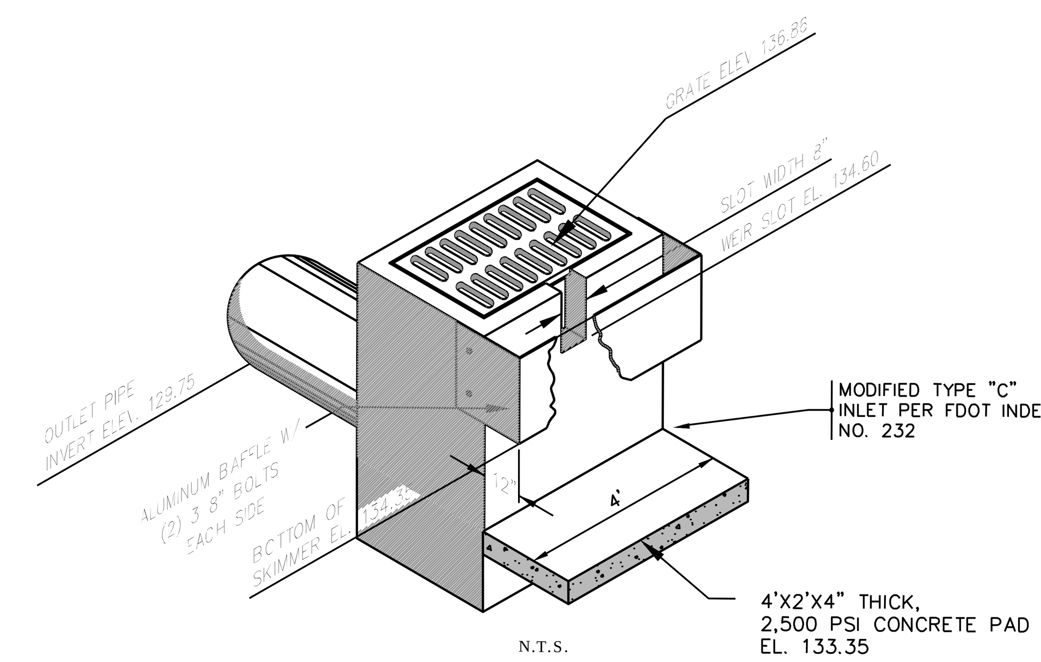
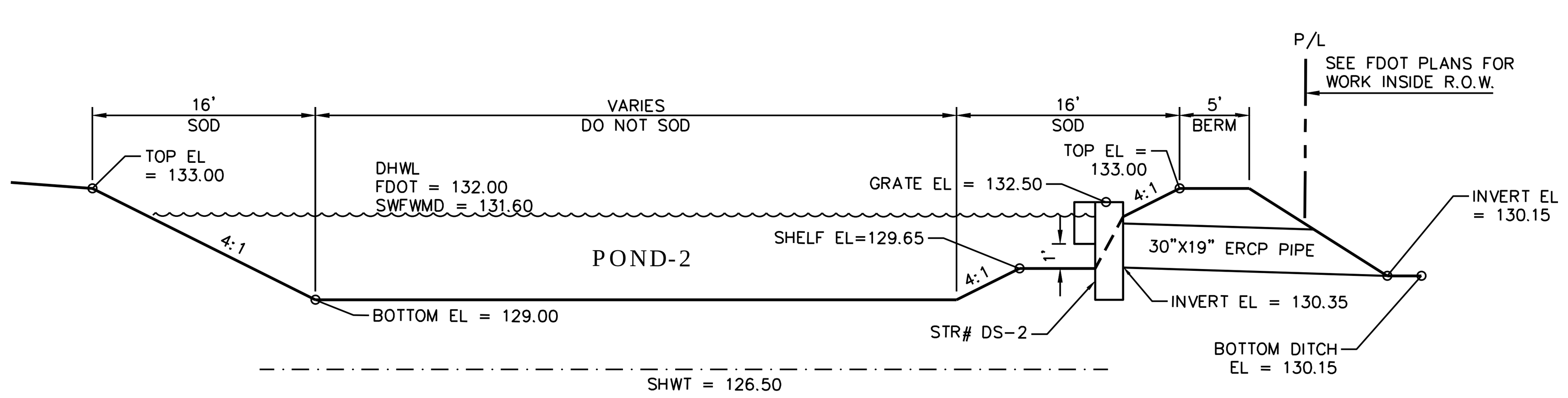
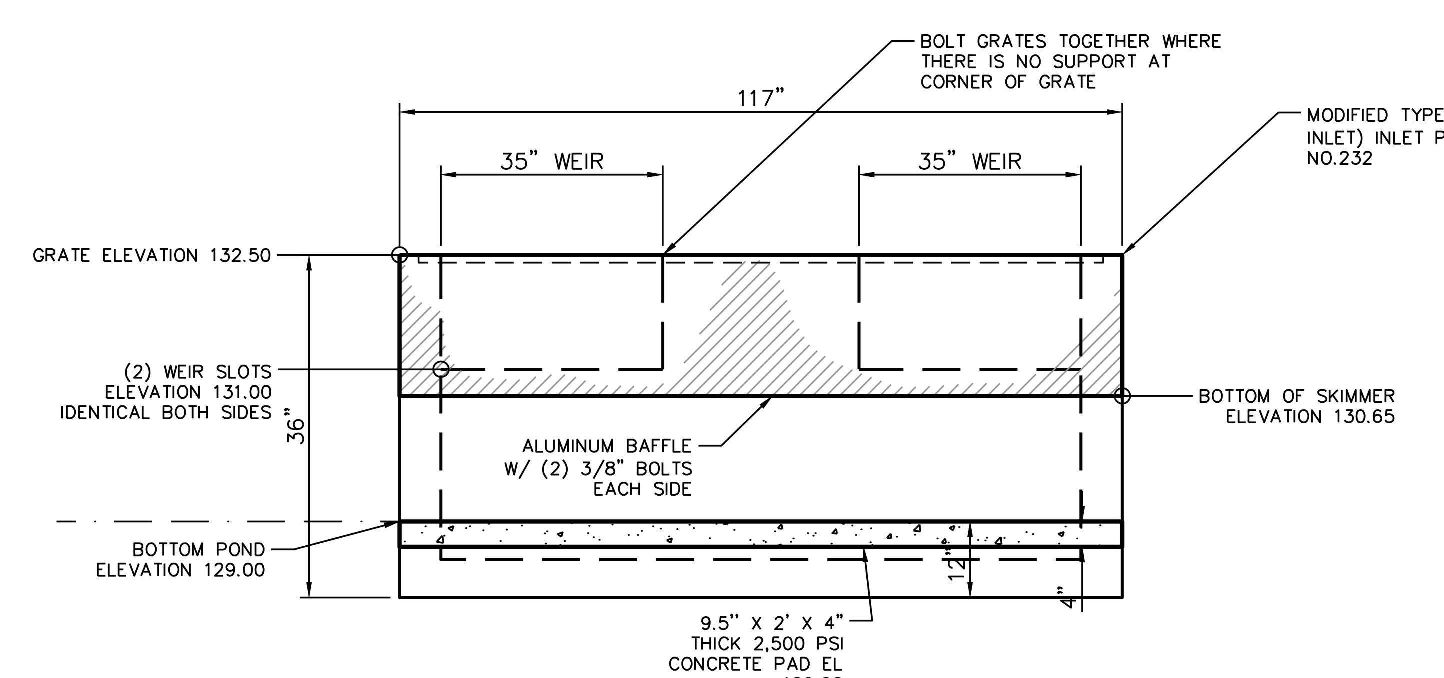


POND-3 OUTFALL DETAIL
STRUCTURE #DS-3

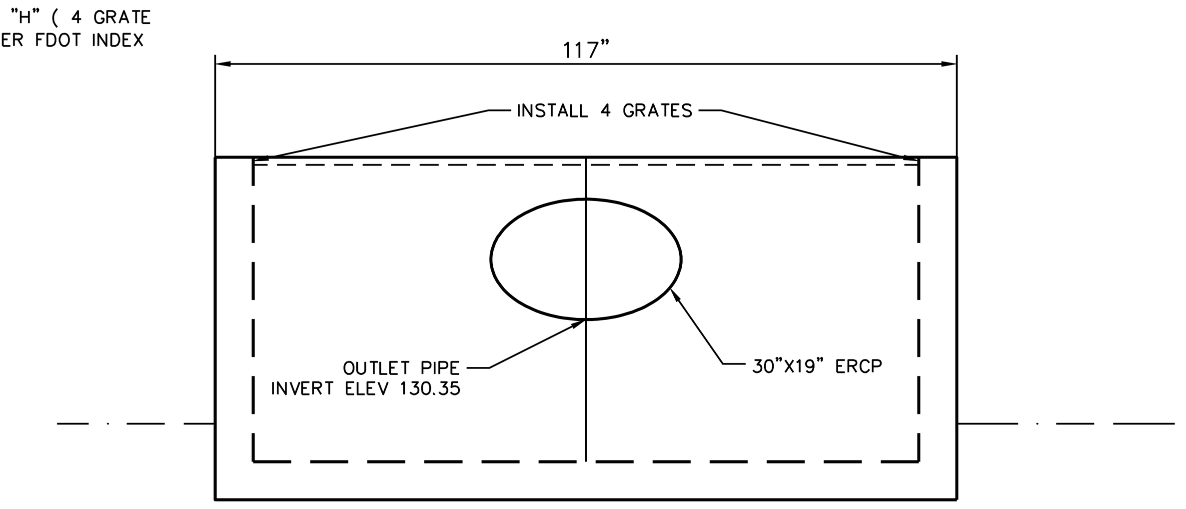


Section P-2



FRONT VIEW

POND-2 OUTFALL DETAIL
STRUCTURE #DS-2
N.T.S.



REAR VIEW

REVISIONS		
NO.	DATE	APPR.

NOT VALID WITHOUT
THE SIGNATURE AND
EMBOSSED SEAL OF
DAVID C. CARTER
DAVID C. CARTER, P.E. NO. 31915

DRAWN BY:
DESIGNED BY:
CHECKED BY:
ISSUE DATE:
FIELD DATE:

CARTER ENGINEERING
137 5th. St. N.W., Winter Haven Fl. 33881
(863) 294-6965 * E-mail: dave@carter-eng.com

DRAINAGE DETAILS

TUCKER PAVING OFFICE
LUCERNE PARK ROAD (S.R. 544)
WINTER HAVEN, FLORIDA

PROJECT No. -000-
SHEET # D2.1
PLOT DATE Nov 08, 2017-14:31

Dwg: N:\Tucker\2-Saterbo Site\Acad & Graphics_Engineering\Cover Notes Details.dwg; Layout: D2.1 DRAINAGE DETAILS

4. Water Quality & Stage Storage

WATER QUALITY VOLUME CALCULATION:

Project: **Tucker Office** Basin: **P-BASIN-1**

Pond: **P-POND-1**

WATER QUALITY CALCULATION: Date: **10/12/2017**

Required Treatment:	0.50	INCH		
Treatment Area (Ac.) :	3.51	AC		
Req'd Treatment Vol :	0.146	AF or	6,371	CF

POND STAGE / AREA:

	Stage: (El)	Area: (Ac.)	Area: (sf)	Vol: (cf)	Cumul Vol: (cf)
				0	
Pond Top El.	137.00	0.73	31,816		79,132
				29,963	
	136.00	0.65	28,148		49,168
				26,344	
	135.00	0.56	24,580		22,825
				22,825	
Pond Bottom Elev.:	134.00	0.48	21,113		0

DETERMINE WEIR CREST ELEV:

	Stage: (El)	Area: (Ac.)	Area: (sf)	Vol: (cf)	Cumul Vol: (cf)
Weir Crest Elevation (WCE):	134.40	0.517	22,500	8,721	8,721

Provided Volume beneath weir: = **0.200** Ac.ft. Or **8,721** ft^3

Is >

Req'd Treatment Volume: = **0.146** Ac.ft. Or **6,371** ft^3

EQUIVALENT POND DIMENSIONS:

(P) effective perimeter = 792 feet

(h) Treatment depth = 0.40 feet

(V) Treatment volume: = 6,371 ft^3

Calculated Length = **351** ft

Calculated Width = **45** ft

WATER QUALITY VOLUME CALCULATION:

Project: **Tucker Office** Basin: **P-BASIN-2**

Pond: **P-POND-2**

WATER QUALITY CALCULATION: Date: **10/12/2017**

Required Treatment: 0.50 INCH

Treatment Area (Ac.) : 4.20 AC

Req'd Treatment Vol : 0.175 AF or 7,623 CF

POND STAGE / AREA:

	Stage: (El)	Area: (Ac.)	Area: (sf)	Vol: (cf)	Cumul Vol: (cf)
				0	
Pond Top El.	133.00	0.51	22,367		64,552
				20,752	
	132.00	0.44	19,177		43,800
				17,609	
	131.00	0.37	16,087		26,191
				14,567	
	130.00	0.30	13,098		11,624
				11,624	
Pond Bottom Elev.:	129.00	0.23	10,210		0

DETERMINE WEIR CREST ELEV:

	Stage: (El)	Area: (Ac.)	Area: (sf)	Vol: (cf)	Cumul Vol: (cf)
Weir Crest Elevation (WCE):	131.00	0.369	16,087	0	26,191

* Elevated weir used in order to outfall to FDOT ditch

Provided Volume beneath weir: = **0.601** Ac.ft. Or **26,191** ft^3

Is >

Req'd Treatment Volume: = **0.175** Ac.ft. Or **7,623** ft^3

EQUIVALENT POND DIMENSIONS:

(P) effective perimeter = 724 feet

(h) Treatment depth = 2.00 feet

(V) Treatment volume: = 7,623 ft^3

Calculated Length = **351** ft

Calculated Width = **11** ft

WATER QUALITY VOLUME CALCULATION:

Project:	Tucker Office	Basin:	P-BASIN-3
		Pond:	P-POND-3
WATER QUALITY CALCULATION:		Date:	10/12/2017

Required Treatment:	0.50	INCH		
Treatment Area (Ac.) :	6.60	AC		
Req'd Treatment Vol :	0.28	AF or	11,979	CF

POND STAGE / AREA:

	Stage: (El)	Area: (Ac.)	Area: (sf)	Vol: (cf)	Cumul Vol: (cf)
				0	
Pond Top El.	138.00	0.80	34,665		108,261
				32,707	
	137.00	0.71	30,788		75,553
				28,879	
	136.00	0.62	27,012		46,674
				25,151	
	135.00	0.54	23,335		21,523
				21,523	
Pond Bottom Elev.:	134.00	0.45	19,760		0

DETERMINE WEIR CREST ELEV:

	Stage: (El)	Area: (Ac.)	Area: (sf)	Vol: (cf)	Cumul Vol: (cf)
Weir Crest Elevation (WCE):	134.60	0.503	21,905	12,494	12,494

Provided Volume beneath weir:	=	**0.287**	Ac.ft.	Or	**12,494**	ft^3
					Is >	
Req'd Treatment Volume:	=	**0.275**	Ac.ft.	Or	**11,979**	ft^3

EQUIVALENT POND DIMENSIONS:

(P) effective perimeter	=	881	feet
(h) Treatment depth	=	0.60	feet
(V) Treatment volume:	=	11,979	ft^3

Calculated Length	=	**389**	ft
Calculated Width	=	**51**	ft

WATER QUALITY VOLUME CALCULATION:

Project: **Tucker Office** Basin: **P-BASIN-4**

Pond: **P-POND-4**

WATER QUALITY CALCULATION:

Date: **10/12/2017**

Required Treatment:	0.50	INCH		
Treatment Area (Ac.) :	13.30	AC		
Req'd Treatment Vol :	0.554	AF or	24,140	CF

POND STAGE / AREA:

	Stage: (El)	Area: (Ac.)	Area: (sf)	Vol: (cf)	Cumul Vol: (cf)
				0	
Pond Top El.	130.00	1.69	73,560		247,929
				70,567	
	129.00	1.55	67,616		177,362
				64,736	
	128.00	1.42	61,898		112,626
				59,079	
	127.00	1.29	56,304		53,547
				53,547	
Pond Bottom Elev.:	126.00	1.17	50,837		0

DETERMINE WEIR CREST ELEV:

	Stage: (El)	Area: (Ac.)	Area: (sf)	Vol: (cf)	Cumul Vol: (cf)
Weir Crest Elevation (WCE):	127.50	1.357	59,101	28,848	82,396

*100 year flood used for weir crest

Provided Volume beneath weir: = **1.892** Ac.ft. Or **82,396** ft^3

Is >

Req'd Treatment Volume: = **0.554** Ac.ft. Or **24,140** ft^3

EQUIVALENT POND DIMENSIONS:

(P) effective perimeter = 1365 feet

(h) Treatment depth = 1.50 feet

(V) Treatment volume: = 24,140 ft^3

Calculated Length = **658** ft

Calculated Width = **24** ft

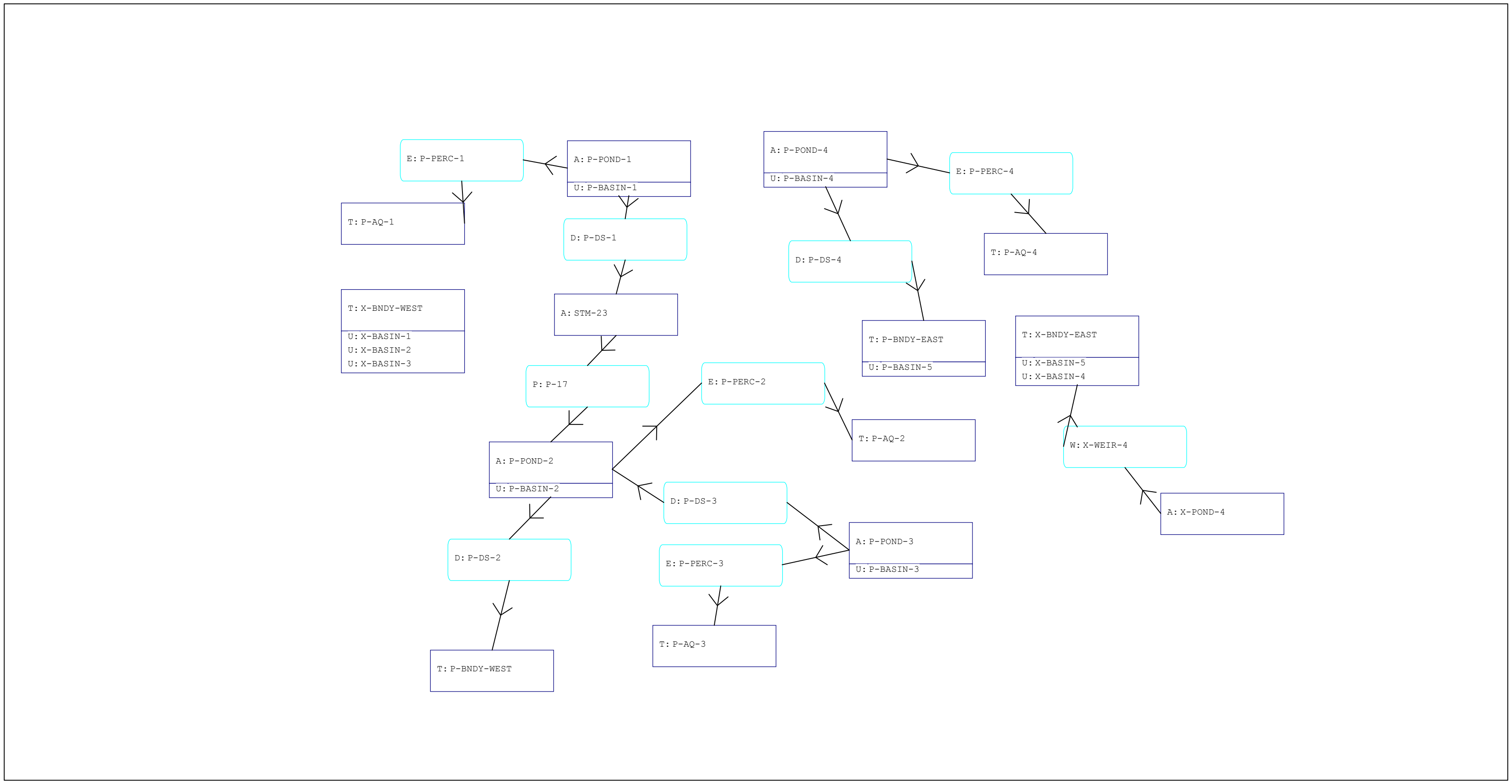
5. Water Quantity ICPR Model

Tucker Office

Nodes
A Stage/Area
V Stage/Volume
T Time/Stage
M Manhole

Basins
O Overland Flow
U SCS Unit CN
S SBUH CN
Y SCS Unit GA
Z SBUH GA

Links
P Pipe
W Weir
C Channel
D Drop Structure
B Bridge
R Rating Curve
H Breach
E Percolation
F Filter
X Exfil Trench



Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
P-AQ-1	BASE	002Y001H	0.00	100.000	0.000	0.0000	0	0.38	6.692	0.00	0.000
P-AQ-1	BASE	002Y002H	0.00	100.000	0.000	0.0000	0	0.47	5.244	0.00	0.000
P-AQ-1	BASE	002Y004H	0.00	100.000	0.000	0.0000	0	1.61	4.097	0.00	0.000
P-AQ-1	BASE	002Y008H	0.00	100.000	0.000	0.0000	0	3.25	3.913	0.00	0.000
P-AQ-1	BASE	002Y024H	0.00	100.000	0.000	0.0000	0	9.43	0.772	0.00	0.000
P-AQ-1	BASE	002Y072H	0.00	100.000	0.000	0.0000	0	12.00	0.369	0.00	0.000
P-AQ-1	BASE	005Y001H	0.00	100.000	0.000	0.0000	0	0.36	6.883	0.00	0.000
P-AQ-1	BASE	005Y002H	0.00	100.000	0.000	0.0000	0	0.38	5.779	0.00	0.000
P-AQ-1	BASE	005Y004H	0.00	100.000	0.000	0.0000	0	1.34	4.325	0.00	0.000
P-AQ-1	BASE	005Y008H	0.00	100.000	0.000	0.0000	0	3.10	3.335	0.00	0.000
P-AQ-1	BASE	005Y024H	0.00	100.000	0.000	0.0000	0	8.47	0.921	0.00	0.000
P-AQ-1	BASE	005Y072H	0.00	100.000	0.000	0.0000	0	12.00	0.533	0.00	0.000
P-AQ-1	BASE	010Y001H	0.00	100.000	0.000	0.0000	0	0.34	6.991	0.00	0.000
P-AQ-1	BASE	010Y002H	0.00	100.000	0.000	0.0000	0	0.32	5.788	0.00	0.000
P-AQ-1	BASE	010Y004H	0.00	100.000	0.000	0.0000	0	1.22	4.290	0.00	0.000
P-AQ-1	BASE	010Y008H	0.00	100.000	0.000	0.0000	0	2.42	2.891	0.00	0.000
P-AQ-1	BASE	010Y024H	0.00	100.000	0.000	0.0000	0	7.62	0.770	0.00	0.000
P-AQ-1	BASE	010Y072H	0.00	100.000	0.000	0.0000	0	12.00	0.644	0.00	0.000
P-AQ-1	BASE	025Y001H	0.00	100.000	0.000	0.0000	0	0.32	7.123	0.00	0.000
P-AQ-1	BASE	025Y002H	0.00	100.000	0.000	0.0000	0	0.33	5.903	0.00	0.000
P-AQ-1	BASE	025Y004H	0.00	100.000	0.000	0.0000	0	1.14	4.398	0.00	0.000
P-AQ-1	BASE	025Y008H	0.00	100.000	0.000	0.0000	0	2.71	2.927	0.00	0.000
P-AQ-1	BASE	025Y024H	0.00	100.000	0.000	0.0000	0	6.50	0.938	0.00	0.000
P-AQ-1	BASE	025Y072H	0.00	100.000	0.000	0.0000	0	11.50	0.816	0.00	0.000
P-AQ-1	BASE	050Y001H	0.00	100.000	0.000	0.0000	0	0.32	7.114	0.00	0.000
P-AQ-1	BASE	050Y002H	0.00	100.000	0.000	0.0000	0	0.30	6.159	0.00	0.000
P-AQ-1	BASE	050Y004H	0.00	100.000	0.000	0.0000	0	1.12	4.357	0.00	0.000
P-AQ-1	BASE	050Y008H	0.00	100.000	0.000	0.0000	0	2.14	4.144	0.00	0.000
P-AQ-1	BASE	050Y024H	0.00	100.000	0.000	0.0000	0	5.83	1.109	0.00	0.000
P-AQ-1	BASE	050Y072H	0.00	100.000	0.000	0.0000	0	10.75	0.962	0.00	0.000
P-AQ-1	BASE	100Y001H	0.00	100.000	0.000	0.0000	0	0.29	8.027	0.00	0.000
P-AQ-1	BASE	100Y002H	0.00	100.000	0.000	0.0000	0	0.28	6.224	0.00	0.000
P-AQ-1	BASE	100Y004H	0.00	100.000	0.000	0.0000	0	1.05	4.428	0.00	0.000
P-AQ-1	BASE	100Y008H	0.00	100.000	0.000	0.0000	0	2.11	3.703	0.00	0.000
P-AQ-1	BASE	100Y024H	0.00	100.000	0.000	0.0000	0	5.28	1.221	0.00	0.000
P-AQ-1	BASE	100Y072H	0.00	100.000	0.000	0.0000	0	10.15	1.123	0.00	0.000
P-AQ-1	BASE	25Y 24H SWFWMD	0.00	100.000	0.000	0.0000	0	9.88	0.838	0.00	0.000
P-AQ-2	BASE	002Y001H	0.00	100.000	0.000	-0.0394	0	0.34	3.365	0.00	0.000
P-AQ-2	BASE	002Y002H	0.00	100.000	0.000	-0.0500	0	0.34	2.927	0.00	0.000
P-AQ-2	BASE	002Y004H	0.00	100.000	0.000	-0.0500	0	1.18	2.122	0.00	0.000
P-AQ-2	BASE	002Y008H	0.00	100.000	0.000	-0.0500	0	3.09	1.791	0.00	0.000
P-AQ-2	BASE	002Y024H	0.00	100.000	0.000	-0.0500	0	8.78	0.566	0.00	0.000
P-AQ-2	BASE	002Y072H	0.00	100.000	0.000	-0.0500	0	8.88	0.293	0.00	0.000
P-AQ-2	BASE	005Y001H	0.00	100.000	0.000	-0.0394	0	0.31	3.547	0.00	0.000
P-AQ-2	BASE	005Y002H	0.00	100.000	0.000	-0.0500	0	0.30	2.996	0.00	0.000
P-AQ-2	BASE	005Y004H	0.00	100.000	0.000	-0.0500	0	1.10	2.094	0.00	0.000
P-AQ-2	BASE	005Y008H	0.00	100.000	0.000	-0.0500	0	2.58	1.819	0.00	0.000
P-AQ-2	BASE	005Y024H	0.00	100.000	0.000	-0.0500	0	7.22	0.706	0.00	0.000
P-AQ-2	BASE	005Y072H	0.00	100.000	0.000	-0.0500	0	12.35	0.406	0.00	0.000
P-AQ-2	BASE	010Y001H	0.00	100.000	0.000	-0.0394	0	0.30	3.523	0.00	0.000
P-AQ-2	BASE	010Y002H	0.00	100.000	0.000	-0.0492	0	0.27	3.101	0.00	0.000
P-AQ-2	BASE	010Y004H	0.00	100.000	0.000	-0.0500	0	1.03	2.102	0.00	0.000
P-AQ-2	BASE	010Y008H	0.00	100.000	0.000	-0.0500	0	2.42	1.822	0.00	0.000
P-AQ-2	BASE	010Y024H	0.00	100.000	0.000	-0.0500	0	6.43	0.890	0.00	0.000
P-AQ-2	BASE	010Y072H	0.00	100.000	0.000	-0.0500	0	8.87	0.479	0.00	0.000
P-AQ-2	BASE	025Y001H	0.00	100.000	0.000	-0.0394	0	0.29	3.656	0.00	0.000
P-AQ-2	BASE	025Y002H	0.00	100.000	0.000	-0.0394	0	0.25	3.240	0.00	0.000
P-AQ-2	BASE	025Y004H	0.00	100.000	0.000	-0.0500	0	0.88	2.206	0.00	0.000
P-AQ-2	BASE	025Y008H	0.00	100.000	0.000	-0.0500	0	2.17	1.856	0.00	0.000
P-AQ-2	BASE	025Y024H	0.00	100.000	0.000	-0.0500	0	5.58	0.768	0.00	0.000
P-AQ-2	BASE	025Y072H	0.00	100.000	0.000	-0.0500	0	8.87	0.599	0.00	0.000
P-AQ-2	BASE	050Y001H	0.00	100.000	0.000	-0.0394	0	0.27	3.591	0.00	0.000
P-AQ-2	BASE	050Y002H	0.00	100.000	0.000	-0.0394	0	0.22	3.249	0.00	0.000

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
P-AQ-2	BASE	050Y004H	0.00	100.000	0.000	-0.0500	0	0.80	2.313	0.00	0.000
P-AQ-2	BASE	050Y008H	0.00	100.000	0.000	-0.0500	0	2.03	1.852	0.00	0.000
P-AQ-2	BASE	050Y024H	0.00	100.000	0.000	-0.0500	0	5.02	0.864	0.00	0.000
P-AQ-2	BASE	050Y072H	0.00	100.000	0.000	-0.0500	0	9.87	0.796	0.00	0.000
P-AQ-2	BASE	100Y001H	0.00	100.000	0.000	-0.0394	0	0.27	3.528	0.00	0.000
P-AQ-2	BASE	100Y002H	0.00	100.000	0.000	-0.0394	0	0.22	3.308	0.00	0.000
P-AQ-2	BASE	100Y004H	0.00	100.000	0.000	-0.0500	0	0.75	2.379	0.00	0.000
P-AQ-2	BASE	100Y008H	0.00	100.000	0.000	-0.0500	0	1.93	1.874	0.00	0.000
P-AQ-2	BASE	100Y024H	0.00	100.000	0.000	-0.0500	0	4.45	0.932	0.00	0.000
P-AQ-2	BASE	100Y072H	0.00	100.000	0.000	-0.0500	0	9.40	0.924	0.00	0.000
P-AQ-2	BASE	25Y 24H SWFWMD	0.00	100.000	0.000	-0.0500	0	12.39	0.961	0.00	0.000
P-AQ-3	BASE	002Y001H	0.00	100.000	0.000	0.0000	0	0.35	6.584	0.00	0.000
P-AQ-3	BASE	002Y002H	0.00	100.000	0.000	0.0000	0	0.37	5.644	0.00	0.000
P-AQ-3	BASE	002Y004H	0.00	100.000	0.000	0.0000	0	1.22	4.133	0.00	0.000
P-AQ-3	BASE	002Y008H	0.00	100.000	0.000	0.0000	0	3.09	3.508	0.00	0.000
P-AQ-3	BASE	002Y024H	0.00	100.000	0.000	0.0000	0	9.00	1.201	0.00	0.000
P-AQ-3	BASE	002Y072H	0.00	100.000	0.000	0.0000	0	9.03	0.584	0.00	0.000
P-AQ-3	BASE	005Y001H	0.00	100.000	0.000	0.0000	0	0.34	6.549	0.00	0.000
P-AQ-3	BASE	005Y002H	0.00	100.000	0.000	0.0000	0	0.31	5.766	0.00	0.000
P-AQ-3	BASE	005Y004H	0.00	100.000	0.000	0.0000	0	1.12	4.125	0.00	0.000
P-AQ-3	BASE	005Y008H	0.00	100.000	0.000	0.0000	0	2.58	3.568	0.00	0.000
P-AQ-3	BASE	005Y024H	0.00	100.000	0.000	0.0000	0	8.05	1.322	0.00	0.000
P-AQ-3	BASE	005Y072H	0.00	100.000	0.000	0.0000	0	9.03	0.809	0.00	0.000
P-AQ-3	BASE	010Y001H	0.00	100.000	0.000	0.0000	0	0.32	6.698	0.00	0.000
P-AQ-3	BASE	010Y002H	0.00	100.000	0.000	0.0000	0	0.30	5.875	0.00	0.000
P-AQ-3	BASE	010Y004H	0.00	100.000	0.000	0.0000	0	1.05	4.114	0.00	0.000
P-AQ-3	BASE	010Y008H	0.00	100.000	0.000	0.0000	0	2.42	3.574	0.00	0.000
P-AQ-3	BASE	010Y024H	0.00	100.000	0.000	0.0000	0	7.40	1.097	0.00	0.000
P-AQ-3	BASE	010Y072H	0.00	100.000	0.000	0.0000	0	9.03	0.956	0.00	0.000
P-AQ-3	BASE	025Y001H	0.00	100.000	0.000	0.0000	0	0.31	6.680	0.00	0.000
P-AQ-3	BASE	025Y002H	0.00	100.000	0.000	0.0000	0	0.27	6.081	0.00	0.000
P-AQ-3	BASE	025Y004H	0.00	100.000	0.000	0.0000	0	0.92	4.282	0.00	0.000
P-AQ-3	BASE	025Y008H	0.00	100.000	0.000	0.0000	0	2.18	3.634	0.00	0.000
P-AQ-3	BASE	025Y024H	0.00	100.000	0.000	0.0000	0	6.15	1.490	0.00	0.000
P-AQ-3	BASE	025Y072H	0.00	100.000	0.000	0.0000	0	11.10	1.490	0.00	0.000
P-AQ-3	BASE	050Y001H	0.00	100.000	0.000	0.0000	0	0.30	6.868	0.00	0.000
P-AQ-3	BASE	050Y002H	0.00	100.000	0.000	0.0000	0	0.25	6.351	0.00	0.000
P-AQ-3	BASE	050Y004H	0.00	100.000	0.000	0.0000	0	0.83	4.490	0.00	0.000
P-AQ-3	BASE	050Y008H	0.00	100.000	0.000	0.0000	0	2.02	3.652	0.00	0.000
P-AQ-3	BASE	050Y024H	0.00	100.000	0.000	0.0000	0	5.53	1.587	0.00	0.000
P-AQ-3	BASE	050Y072H	0.00	100.000	0.000	0.0000	0	10.43	1.476	0.00	0.000
P-AQ-3	BASE	100Y001H	0.00	100.000	0.000	0.0000	0	0.29	7.046	0.00	0.000
P-AQ-3	BASE	100Y002H	0.00	100.000	0.000	0.0000	0	0.23	6.398	0.00	0.000
P-AQ-3	BASE	100Y004H	0.00	100.000	0.000	0.0000	0	0.78	4.588	0.00	0.000
P-AQ-3	BASE	100Y008H	0.00	100.000	0.000	0.0000	0	1.88	3.730	0.00	0.000
P-AQ-3	BASE	100Y024H	0.00	100.000	0.000	0.0000	0	5.00	1.490	0.00	0.000
P-AQ-3	BASE	100Y072H	0.00	100.000	0.000	0.0000	0	9.03	1.644	0.00	0.000
P-AQ-3	BASE	25Y 24H SWFWMD	0.00	100.000	0.000	0.0000	0	9.47	1.155	0.00	0.000
P-AQ-4	BASE	002Y001H	0.00	100.000	0.000	0.0000	0	0.34	17.200	0.00	0.000
P-AQ-4	BASE	002Y002H	0.00	100.000	0.000	0.0000	0	0.35	14.549	0.00	0.000
P-AQ-4	BASE	002Y004H	0.00	100.000	0.000	0.0000	0	1.23	10.643	0.00	0.000
P-AQ-4	BASE	002Y008H	0.00	100.000	0.000	0.0000	0	2.90	6.103	0.00	0.000
P-AQ-4	BASE	002Y024H	0.00	100.000	0.000	0.0000	0	7.53	1.803	0.00	0.000
P-AQ-4	BASE	002Y072H	0.00	100.000	0.000	0.0000	0	8.87	1.389	0.00	0.000
P-AQ-4	BASE	005Y001H	0.00	100.000	0.000	0.0000	0	0.33	16.943	0.00	0.000
P-AQ-4	BASE	005Y002H	0.00	100.000	0.000	0.0000	0	0.30	15.015	0.00	0.000
P-AQ-4	BASE	005Y004H	0.00	100.000	0.000	0.0000	0	1.12	10.657	0.00	0.000
P-AQ-4	BASE	005Y008H	0.00	100.000	0.000	0.0000	0	2.55	7.790	0.00	0.000
P-AQ-4	BASE	005Y024H	0.00	100.000	0.000	0.0000	0	6.55	2.205	0.00	0.000
P-AQ-4	BASE	005Y072H	0.00	100.000	0.000	0.0000	0	11.53	1.933	0.00	0.000
P-AQ-4	BASE	010Y001H	0.00	100.000	0.000	0.0000	0	0.31	17.366	0.00	0.000
P-AQ-4	BASE	010Y002H	0.00	100.000	0.000	0.0000	0	0.29	15.285	0.00	0.000
P-AQ-4	BASE	010Y004H	0.00	100.000	0.000	0.0000	0	1.07	10.609	0.00	0.000

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
P-AQ-4	BASE	010Y008H	0.00	100.000	0.000	0.0000	0	2.40	8.715	0.00	0.000
P-AQ-4	BASE	010Y024H	0.00	100.000	0.000	0.0000	0	5.87	2.616	0.00	0.000
P-AQ-4	BASE	010Y072H	0.00	100.000	0.000	0.0000	0	10.77	2.286	0.00	0.000
P-AQ-4	BASE	025Y001H	0.00	100.000	0.000	0.0000	0	0.29	17.352	0.00	0.000
P-AQ-4	BASE	025Y002H	0.00	100.000	0.000	0.0000	0	0.26	15.846	0.00	0.000
P-AQ-4	BASE	025Y004H	0.00	100.000	0.000	0.0000	0	0.95	10.854	0.00	0.000
P-AQ-4	BASE	025Y008H	0.00	100.000	0.000	0.0000	0	2.25	9.400	0.00	0.000
P-AQ-4	BASE	025Y024H	0.00	100.000	0.000	0.0000	0	5.10	2.656	0.00	0.000
P-AQ-4	BASE	025Y072H	0.00	100.000	0.000	0.0000	0	9.92	2.856	0.00	0.000
P-AQ-4	BASE	050Y001H	0.00	100.000	0.000	0.0000	0	0.29	17.821	0.00	0.000
P-AQ-4	BASE	050Y002H	0.00	100.000	0.000	0.0000	0	0.23	16.612	0.00	0.000
P-AQ-4	BASE	050Y004H	0.00	100.000	0.000	0.0000	0	0.83	11.451	0.00	0.000
P-AQ-4	BASE	050Y008H	0.00	100.000	0.000	0.0000	0	2.10	9.412	0.00	0.000
P-AQ-4	BASE	050Y024H	0.00	100.000	0.000	0.0000	0	4.50	2.918	0.00	0.000
P-AQ-4	BASE	050Y072H	0.00	100.000	0.000	0.0000	0	9.42	3.366	0.00	0.000
P-AQ-4	BASE	100Y001H	0.00	100.000	0.000	0.0000	0	0.27	18.591	0.00	0.000
P-AQ-4	BASE	100Y002H	0.00	100.000	0.000	0.0000	0	0.22	16.826	0.00	0.000
P-AQ-4	BASE	100Y004H	0.00	100.000	0.000	0.0000	0	0.78	11.763	0.00	0.000
P-AQ-4	BASE	100Y008H	0.00	100.000	0.000	0.0000	0	2.08	9.396	0.00	0.000
P-AQ-4	BASE	100Y024H	0.00	100.000	0.000	0.0000	0	4.02	3.416	0.00	0.000
P-AQ-4	BASE	100Y072H	0.00	100.000	0.000	0.0000	0	9.00	3.930	0.00	0.000
P-AQ-4	BASE	25Y 24H SWFWMD	0.00	100.000	0.000	0.0000	0	7.97	1.798	0.00	0.000
P-BNDY-EAST	BASE	002Y001H	0.00	127.500	127.600	0.0000	0	0.62	1.446	0.00	0.000
P-BNDY-EAST	BASE	002Y002H	0.00	127.500	127.600	0.0000	0	0.83	1.092	0.00	0.000
P-BNDY-EAST	BASE	002Y004H	0.00	127.500	127.600	0.0000	0	2.00	0.617	0.00	0.000
P-BNDY-EAST	BASE	002Y008H	0.00	127.500	127.600	0.0000	0	7.13	1.233	0.00	0.000
P-BNDY-EAST	BASE	002Y024H	0.00	127.500	127.600	0.0000	0	21.05	1.152	0.00	0.000
P-BNDY-EAST	BASE	002Y072H	0.00	127.500	127.600	0.0000	0	64.02	1.285	0.00	0.000
P-BNDY-EAST	BASE	005Y001H	0.00	127.500	127.600	0.0000	0	0.63	1.740	0.00	0.000
P-BNDY-EAST	BASE	005Y002H	0.00	127.500	127.600	0.0000	0	2.09	1.478	0.00	0.000
P-BNDY-EAST	BASE	005Y004H	0.00	127.500	127.600	0.0000	0	3.56	3.601	0.00	0.000
P-BNDY-EAST	BASE	005Y008H	0.00	127.500	127.600	0.0000	0	5.21	4.561	0.00	0.000
P-BNDY-EAST	BASE	005Y024H	0.00	127.500	127.600	0.0000	0	19.02	2.213	0.00	0.000
P-BNDY-EAST	BASE	005Y072H	0.00	127.500	127.600	0.0000	0	60.07	3.552	0.00	0.000
P-BNDY-EAST	BASE	010Y001H	0.00	127.500	127.600	0.0000	0	0.63	1.917	0.00	0.000
P-BNDY-EAST	BASE	010Y002H	0.00	127.500	127.600	0.0000	0	2.04	3.728	0.00	0.000
P-BNDY-EAST	BASE	010Y004H	0.00	127.500	127.600	0.0000	0	3.36	5.936	0.00	0.000
P-BNDY-EAST	BASE	010Y008H	0.00	127.500	127.600	0.0000	0	5.12	7.276	0.00	0.000
P-BNDY-EAST	BASE	010Y024H	0.00	127.500	127.600	0.0000	0	16.03	3.411	0.00	0.000
P-BNDY-EAST	BASE	010Y072H	0.00	127.500	127.600	0.0000	0	60.05	4.413	0.00	0.000
P-BNDY-EAST	BASE	025Y001H	0.00	127.500	127.600	0.0000	0	1.14	3.960	0.00	0.000
P-BNDY-EAST	BASE	025Y002H	0.00	127.500	127.600	0.0000	0	1.91	6.679	0.00	0.000
P-BNDY-EAST	BASE	025Y004H	0.00	127.500	127.600	0.0000	0	3.19	9.659	0.00	0.000
P-BNDY-EAST	BASE	025Y008H	0.00	127.500	127.600	0.0000	0	5.08	9.942	0.00	0.000
P-BNDY-EAST	BASE	025Y024H	0.00	127.500	127.600	0.0000	0	15.06	5.400	0.00	0.000
P-BNDY-EAST	BASE	025Y072H	0.00	127.500	127.600	0.0000	0	60.03	5.757	0.00	0.000
P-BNDY-EAST	BASE	050Y001H	0.00	127.500	127.600	0.0000	0	1.12	6.578	0.00	0.000
P-BNDY-EAST	BASE	050Y002H	0.00	127.500	127.600	0.0000	0	1.80	9.494	0.00	0.000
P-BNDY-EAST	BASE	050Y004H	0.00	127.500	127.600	0.0000	0	3.13	12.544	0.00	0.000
P-BNDY-EAST	BASE	050Y008H	0.00	127.500	127.600	0.0000	0	5.03	13.107	0.00	0.000
P-BNDY-EAST	BASE	050Y024H	0.00	127.500	127.600	0.0000	0	13.09	7.338	0.00	0.000
P-BNDY-EAST	BASE	050Y072H	0.00	127.500	127.600	0.0000	0	60.02	6.959	0.00	0.000
P-BNDY-EAST	BASE	100Y001H	0.00	127.500	127.600	0.0000	0	1.09	9.225	0.00	0.000
P-BNDY-EAST	BASE	100Y002H	0.00	127.500	127.600	0.0000	0	1.72	11.276	0.00	0.000
P-BNDY-EAST	BASE	100Y004H	0.00	127.500	127.600	0.0000	0	3.11	14.537	0.00	0.000
P-BNDY-EAST	BASE	100Y008H	0.00	127.500	127.600	0.0000	0	5.01	13.725	0.00	0.000
P-BNDY-EAST	BASE	100Y024H	0.00	127.500	127.600	0.0000	0	12.46	9.438	0.00	0.000
P-BNDY-EAST	BASE	100Y072H	0.00	127.500	127.600	0.0000	0	60.02	8.222	0.00	0.000
P-BNDY-EAST	BASE	25Y 24H SWFWMD	0.00	127.500	127.600	0.0000	0	12.63	10.013	0.00	0.000
P-BNDY-WEST	BASE	002Y001H	0.00	130.150	131.000	0.0000	0	0.00	0.000	0.00	0.000
P-BNDY-WEST	BASE	002Y002H	0.00	130.150	131.000	0.0000	0	0.00	0.000	0.00	0.000
P-BNDY-WEST	BASE	002Y004H	0.00	130.150	131.000	0.0000	0	0.00	0.000	0.00	0.000
P-BNDY-WEST	BASE	002Y008H	0.00	130.150	131.000	0.0000	0	8.14	0.766	0.00	0.000

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
P-BNDY-WEST	BASE	002Y024H	0.00	130.150	131.000	0.0000	0	21.40	0.725	0.00	0.000
P-BNDY-WEST	BASE	002Y072H	0.00	130.150	131.000	0.0000	0	64.10	1.009	0.00	0.000
P-BNDY-WEST	BASE	005Y001H	0.00	130.150	131.000	0.0000	0	0.00	0.000	0.00	0.000
P-BNDY-WEST	BASE	005Y002H	0.00	130.150	131.000	0.0000	0	4.00	0.174	0.00	0.000
P-BNDY-WEST	BASE	005Y004H	0.00	130.150	131.000	0.0000	0	4.09	2.093	0.00	0.000
P-BNDY-WEST	BASE	005Y008H	0.00	130.150	131.000	0.0000	0	5.76	3.073	0.00	0.000
P-BNDY-WEST	BASE	005Y024H	0.00	130.150	131.000	0.0000	0	19.06	1.672	0.00	0.000
P-BNDY-WEST	BASE	005Y072H	0.00	130.150	131.000	0.0000	0	60.10	2.524	0.00	0.000
P-BNDY-WEST	BASE	010Y001H	0.00	130.150	131.000	0.0000	0	0.00	0.000	0.00	0.000
P-BNDY-WEST	BASE	010Y002H	0.00	130.150	131.000	0.0000	0	2.34	2.003	0.00	0.000
P-BNDY-WEST	BASE	010Y004H	0.00	130.150	131.000	0.0000	0	3.67	3.801	0.00	0.000
P-BNDY-WEST	BASE	010Y008H	0.00	130.150	131.000	0.0000	0	5.25	4.950	0.00	0.000
P-BNDY-WEST	BASE	010Y024H	0.00	130.150	131.000	0.0000	0	16.08	2.589	0.00	0.000
P-BNDY-WEST	BASE	010Y072H	0.00	130.150	131.000	0.0000	0	60.10	3.255	0.00	0.000
P-BNDY-WEST	BASE	025Y001H	0.00	130.150	131.000	0.0000	0	1.96	1.289	0.00	0.000
P-BNDY-WEST	BASE	025Y002H	0.00	130.150	131.000	0.0000	0	2.10	4.368	0.00	0.000
P-BNDY-WEST	BASE	025Y004H	0.00	130.150	131.000	0.0000	0	3.44	6.448	0.00	0.000
P-BNDY-WEST	BASE	025Y008H	0.00	130.150	131.000	0.0000	0	5.17	7.063	0.00	0.000
P-BNDY-WEST	BASE	025Y024H	0.00	130.150	131.000	0.0000	0	15.15	4.150	0.00	0.000
P-BNDY-WEST	BASE	025Y072H	0.00	130.150	131.000	0.0000	0	60.10	4.433	0.00	0.000
P-BNDY-WEST	BASE	050Y001H	0.00	130.150	131.000	0.0000	0	1.37	3.020	0.00	0.000
P-BNDY-WEST	BASE	050Y002H	0.00	130.150	131.000	0.0000	0	2.03	6.405	0.00	0.000
P-BNDY-WEST	BASE	050Y004H	0.00	130.150	131.000	0.0000	0	3.29	8.787	0.00	0.000
P-BNDY-WEST	BASE	050Y008H	0.00	130.150	131.000	0.0000	0	5.12	9.691	0.00	0.000
P-BNDY-WEST	BASE	050Y024H	0.00	130.150	131.000	0.0000	0	15.09	5.540	0.00	0.000
P-BNDY-WEST	BASE	050Y072H	0.00	130.150	131.000	0.0000	0	60.10	5.503	0.00	0.000
P-BNDY-WEST	BASE	100Y001H	0.00	130.150	131.000	0.0000	0	1.27	4.814	0.00	0.000
P-BNDY-WEST	BASE	100Y002H	0.00	130.150	131.000	0.0000	0	1.97	7.755	0.00	0.000
P-BNDY-WEST	BASE	100Y004H	0.00	130.150	131.000	0.0000	0	3.25	10.420	0.00	0.000
P-BNDY-WEST	BASE	100Y008H	0.00	130.150	131.000	0.0000	0	5.12	10.210	0.00	0.000
P-BNDY-WEST	BASE	100Y024H	0.00	130.150	131.000	0.0000	0	13.19	7.114	0.00	0.000
P-BNDY-WEST	BASE	100Y072H	0.00	130.150	131.000	0.0000	0	60.10	6.703	0.00	0.000
P-BNDY-WEST	BASE	25Y 24H SWFWMD	0.00	130.150	131.000	0.0000	0	13.09	6.216	0.00	0.000
P-POND-1	BASE	002Y001H	1.23	134.556	136.000	0.0028	22847	0.62	13.140	0.38	6.692
P-POND-1	BASE	002Y002H	2.13	134.619	136.000	0.0026	23068	0.83	9.652	0.47	5.244
P-POND-1	BASE	002Y004H	3.67	134.788	136.000	0.0027	23654	2.00	5.304	1.61	4.097
P-POND-1	BASE	002Y008H	6.16	134.802	136.000	0.0032	23704	4.00	5.184	3.25	3.913
P-POND-1	BASE	002Y024H	19.37	134.713	136.000	0.0030	23393	12.00	1.359	9.43	0.772
P-POND-1	BASE	002Y072H	64.05	134.739	136.000	0.0017	23486	59.92	0.795	64.02	0.423
P-POND-1	BASE	005Y001H	1.21	134.782	136.000	0.0029	23633	0.62	16.095	0.36	6.883
P-POND-1	BASE	005Y002H	2.10	134.900	136.000	0.0028	24043	0.83	12.353	0.38	5.779
P-POND-1	BASE	005Y004H	3.60	135.066	136.000	0.0032	24651	2.00	6.679	1.34	4.325
P-POND-1	BASE	005Y008H	5.30	135.133	136.000	0.0032	24917	4.00	6.830	3.10	3.335
P-POND-1	BASE	005Y024H	19.11	134.866	136.000	0.0031	23928	11.99	1.696	8.47	0.921
P-POND-1	BASE	005Y072H	60.33	134.935	136.000	0.0021	24166	59.92	1.121	60.22	0.722
P-POND-1	BASE	010Y001H	1.20	134.913	136.000	0.0029	24089	0.63	17.892	0.34	6.991
P-POND-1	BASE	010Y002H	2.07	135.086	136.000	0.0029	24730	0.83	14.309	0.32	5.788
P-POND-1	BASE	010Y004H	3.54	135.234	136.000	0.0031	25312	2.00	7.578	1.22	4.290
P-POND-1	BASE	010Y008H	5.24	135.330	136.000	0.0032	25687	4.00	7.882	2.42	2.891
P-POND-1	BASE	010Y024H	16.23	135.007	136.000	0.0031	24420	12.00	2.039	16.10	0.912
P-POND-1	BASE	010Y072H	60.30	135.036	136.000	0.0024	24535	59.92	1.334	60.20	0.893
P-POND-1	BASE	025Y001H	1.19	135.124	136.000	0.0030	24879	0.63	20.904	0.32	7.123
P-POND-1	BASE	025Y002H	2.03	135.298	136.000	0.0030	25561	0.83	16.681	0.33	5.903
P-POND-1	BASE	025Y004H	3.43	135.490	136.000	0.0033	26314	2.00	9.028	1.14	4.398
P-POND-1	BASE	025Y008H	5.20	135.543	136.000	0.0033	26521	4.00	9.086	2.71	2.927
P-POND-1	BASE	025Y024H	16.03	135.227	136.000	0.0030	25285	12.00	2.598	15.21	1.319
P-POND-1	BASE	025Y072H	60.25	135.188	136.000	0.0030	25132	59.91	1.678	60.18	1.170
P-POND-1	BASE	050Y001H	1.18	135.287	136.000	0.0031	25520	0.62	23.333	0.32	7.114
P-POND-1	BASE	050Y002H	1.99	135.500	136.000	0.0030	26355	0.83	19.056	0.30	6.159
P-POND-1	BASE	050Y004H	3.35	135.703	136.000	0.0032	27149	2.00	10.303	1.12	4.357
P-POND-1	BASE	050Y008H	5.16	135.794	136.000	0.0033	27507	4.00	10.592	2.14	4.144
P-POND-1	BASE	050Y024H	15.22	135.406	136.000	0.0032	25987	12.00	3.100	15.12	1.684
P-POND-1	BASE	050Y072H	60.23	135.313	136.000	0.0034	25621	59.92	1.984	60.17	1.417

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
P-POND-1	BASE	100Y001H	1.17	135.446	136.000	0.0031	26143	0.62	25.770	0.29	8.027
P-POND-1	BASE	100Y002H	1.96	135.631	136.000	0.0031	26867	0.83	20.646	0.28	6.224
P-POND-1	BASE	100Y004H	3.32	135.850	136.000	0.0033	27725	2.00	11.214	1.05	4.428
P-POND-1	BASE	100Y008H	5.15	135.843	136.000	0.0033	27697	4.00	10.894	2.11	3.703
P-POND-1	BASE	100Y024H	15.14	135.589	136.000	0.0031	26703	12.00	3.662	15.07	2.085
P-POND-1	BASE	100Y072H	60.22	135.443	136.000	0.0034	26128	59.92	2.323	60.17	1.693
P-POND-1	BASE	25Y 24H SWFWMD	12.86	135.508	136.000	0.0033	26387	12.00	15.054	12.66	2.246
P-POND-2	BASE	002Y001H	1.22	130.004	132.000	0.0050	13175	0.62	9.713	0.34	3.365
P-POND-2	BASE	002Y002H	2.70	130.109	132.000	0.0050	13500	0.83	7.039	0.34	2.927
P-POND-2	BASE	002Y004H	6.94	130.751	132.000	0.0048	15456	2.00	3.811	1.18	2.122
P-POND-2	BASE	002Y008H	8.14	131.119	132.000	0.0040	16601	4.00	3.953	3.09	1.791
P-POND-2	BASE	002Y024H	21.40	131.115	132.000	0.0039	16582	19.00	1.272	21.28	1.008
P-POND-2	BASE	002Y072H	64.10	131.143	132.000	0.0050	16671	60.00	1.531	64.08	1.235
P-POND-2	BASE	005Y001H	2.00	130.454	132.000	0.0050	14566	0.62	11.852	0.31	3.547
P-POND-2	BASE	005Y002H	4.00	131.044	132.000	0.0050	16367	0.83	9.055	0.30	2.996
P-POND-2	BASE	005Y004H	4.09	131.233	132.000	0.0049	16968	3.00	5.533	4.06	2.711
P-POND-2	BASE	005Y008H	5.79	131.305	132.000	0.0042	17195	4.00	6.540	5.59	3.665
P-POND-2	BASE	005Y024H	19.06	131.200	132.000	0.0050	16857	16.00	2.070	19.02	1.945
P-POND-2	BASE	005Y072H	60.10	131.263	132.000	0.0050	17055	60.00	2.798	60.10	2.712
P-POND-2	BASE	010Y001H	2.00	130.782	132.000	0.0050	15578	0.63	13.274	0.30	3.523
P-POND-2	BASE	010Y002H	2.34	131.226	132.000	0.0050	16949	0.83	10.831	0.27	3.101
P-POND-2	BASE	010Y004H	3.67	131.371	132.000	0.0049	17400	3.00	7.060	3.63	4.521
P-POND-2	BASE	010Y008H	5.27	131.477	132.000	0.0050	17729	4.00	8.507	5.21	5.634
P-POND-2	BASE	010Y024H	16.08	131.268	132.000	0.0050	17074	15.00	3.038	16.03	2.919
P-POND-2	BASE	010Y072H	60.10	131.321	132.000	0.0040	17238	60.00	3.541	60.10	3.419
P-POND-2	BASE	025Y001H	1.96	131.168	132.000	0.0050	16769	0.67	16.082	0.29	3.656
P-POND-2	BASE	025Y002H	2.10	131.423	132.000	0.0050	17563	0.83	13.246	2.06	5.262
P-POND-2	BASE	025Y004H	3.45	131.616	132.000	0.0049	18051	3.00	9.670	3.37	7.257
P-POND-2	BASE	025Y008H	5.17	131.675	132.000	0.0050	18231	4.00	10.952	5.14	7.770
P-POND-2	BASE	025Y024H	15.15	131.403	132.000	0.0050	17498	15.00	4.576	15.11	4.488
P-POND-2	BASE	025Y072H	60.10	131.429	132.000	0.0050	17476	60.00	4.772	60.10	4.602
P-POND-2	BASE	050Y001H	1.37	131.301	132.000	0.0050	17189	0.67	18.536	1.26	4.515
P-POND-2	BASE	050Y002H	2.03	131.612	132.000	0.0050	18039	0.83	15.931	1.94	7.365
P-POND-2	BASE	050Y004H	3.29	131.839	132.000	0.0050	18732	2.58	12.084	3.24	9.674
P-POND-2	BASE	050Y008H	5.14	131.927	132.000	0.0050	19003	4.00	14.211	5.12	10.425
P-POND-2	BASE	050Y024H	15.09	131.531	132.000	0.0050	17791	12.00	6.068	15.09	5.867
P-POND-2	BASE	050Y072H	60.10	131.528	132.000	0.0050	17780	60.00	5.885	60.10	5.680
P-POND-2	BASE	100Y001H	1.27	131.464	132.000	0.0050	17695	0.67	21.130	1.18	6.523
P-POND-2	BASE	100Y002H	1.97	131.741	132.000	0.0050	18434	0.83	17.829	1.90	8.764
P-POND-2	BASE	100Y004H	3.25	132.001	132.000	0.0050	19228	2.56	13.866	3.22	11.345
P-POND-2	BASE	100Y008H	5.13	131.980	132.000	0.0050	19163	4.00	14.882	5.11	10.950
P-POND-2	BASE	100Y024H	13.21	131.680	132.000	0.0050	18246	12.00	7.992	13.14	7.514
P-POND-2	BASE	100Y072H	60.10	131.640	132.000	0.0050	18123	60.00	7.129	60.10	6.887
P-POND-2	BASE	25Y 24H SWFWMD	13.09	131.595	132.000	0.0049	17985	12.08	14.255	13.01	6.927
P-POND-3	BASE	002Y001H	1.07	134.956	137.000	0.0047	23350	0.62	18.254	0.35	6.584
P-POND-3	BASE	002Y002H	2.09	134.946	137.000	0.0048	23311	0.83	13.479	0.37	5.644
P-POND-3	BASE	002Y004H	3.61	135.148	137.000	0.0047	24036	2.00	7.496	1.22	4.133
P-POND-3	BASE	002Y008H	5.38	135.147	137.000	0.0043	24036	4.00	7.366	3.09	3.508
P-POND-3	BASE	002Y024H	19.20	134.984	137.000	0.0042	23459	12.00	1.920	9.00	1.201
P-POND-3	BASE	002Y072H	60.41	135.027	137.000	0.0026	23616	60.00	1.207	60.26	0.783
P-POND-3	BASE	005Y001H	1.08	135.225	137.000	0.0046	24308	0.63	22.044	0.34	6.549
P-POND-3	BASE	005Y002H	2.02	135.299	137.000	0.0048	24564	0.83	16.992	0.31	5.766
P-POND-3	BASE	005Y004H	3.44	135.501	137.000	0.0049	25267	2.00	9.308	1.12	4.125
P-POND-3	BASE	005Y008H	5.21	135.566	137.000	0.0044	25496	4.00	9.962	2.58	3.568
P-POND-3	BASE	005Y024H	16.22	135.150	137.000	0.0042	24046	11.99	2.450	8.05	1.322
P-POND-3	BASE	005Y072H	60.20	135.280	137.000	0.0030	24499	60.00	1.778	60.17	1.388
P-POND-3	BASE	010Y001H	1.09	135.385	137.000	0.0045	24864	0.63	24.413	0.32	6.698
P-POND-3	BASE	010Y002H	1.94	135.535	137.000	0.0047	25386	0.83	19.695	1.18	5.949
P-POND-3	BASE	010Y004H	3.35	135.717	137.000	0.0048	26022	2.08	10.612	1.05	4.114
P-POND-3	BASE	010Y008H	5.16	135.811	137.000	0.0043	26350	4.00	11.691	5.11	3.605
P-POND-3	BASE	010Y024H	16.03	135.320	137.000	0.0042	24638	12.00	3.009	15.25	1.633
P-POND-3	BASE	010Y072H	60.18	135.403	137.000	0.0035	24928	60.00	2.164	60.15	1.738
P-POND-3	BASE	025Y001H	1.17	135.652	137.000	0.0045	25795	0.67	28.555	0.98	7.558

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
P-POND-3	BASE	025Y002H	1.87	135.807	137.000	-0.0050	26334	0.83	23.087	1.14	6.806
P-POND-3	BASE	025Y004H	3.27	136.047	137.000	-0.0049	27192	2.08	12.815	3.18	4.750
P-POND-3	BASE	025Y008H	5.13	136.076	137.000	0.0044	27304	4.00	13.719	5.08	4.628
P-POND-3	BASE	025Y024H	15.15	135.567	137.000	0.0042	25499	12.00	3.952	15.10	2.370
P-POND-3	BASE	025Y072H	60.16	135.590	137.000	0.0043	25577	60.00	2.799	60.13	2.319
P-POND-3	BASE	050Y001H	1.16	135.866	137.000	0.0045	26541	0.67	32.009	0.99	8.401
P-POND-3	BASE	050Y002H	1.80	136.069	137.000	-0.0050	27280	0.83	26.608	1.11	7.680
P-POND-3	BASE	050Y004H	3.23	136.321	137.000	-0.0050	28267	2.08	14.815	3.17	5.922
P-POND-3	BASE	050Y008H	5.09	136.387	137.000	0.0043	28524	4.00	16.316	5.01	5.954
P-POND-3	BASE	050Y024H	15.07	135.760	137.000	0.0044	26173	12.00	4.825	13.21	3.079
P-POND-3	BASE	050Y072H	60.15	135.745	137.000	0.0050	26120	59.98	3.373	60.13	2.848
P-POND-3	BASE	100Y001H	1.16	136.076	137.000	-0.0049	27305	0.67	35.540	1.00	9.290
P-POND-3	BASE	100Y002H	1.76	136.240	137.000	-0.0050	27949	0.83	29.009	1.08	8.264
P-POND-3	BASE	100Y004H	3.22	136.510	137.000	-0.0050	29006	2.08	16.275	3.15	6.782
P-POND-3	BASE	100Y008H	5.09	136.447	137.000	-0.0043	28760	4.00	16.844	4.69	6.234
P-POND-3	BASE	100Y024H	13.19	135.986	137.000	0.0042	26959	12.00	5.826	13.11	3.926
P-POND-3	BASE	100Y072H	60.14	135.908	137.000	0.0049	26687	59.99	4.014	60.12	3.442
P-POND-3	BASE	25Y 24H SWFWMD	12.76	136.092	137.000	0.0044	27368	12.08	21.204	12.66	4.839
P-POND-4	BASE	002Y001H	1.32	127.155	129.000	0.0050	57068	0.62	48.316	0.34	17.200
P-POND-4	BASE	002Y002H	2.29	127.316	129.000	0.0050	57982	0.83	35.332	0.35	14.549
P-POND-4	BASE	002Y004H	4.10	127.635	129.000	0.0050	59788	2.00	19.342	1.23	10.643
P-POND-4	BASE	002Y008H	7.22	127.746	129.000	0.0050	60416	4.00	18.944	2.90	6.103
P-POND-4	BASE	002Y024H	21.10	127.736	129.000	0.0048	60361	12.00	4.963	7.53	1.803
P-POND-4	BASE	002Y072H	64.08	127.754	129.000	0.0028	60464	59.92	2.932	64.07	1.484
P-POND-4	BASE	005Y001H	1.34	127.515	129.000	0.0050	59108	0.62	59.069	0.33	16.943
P-POND-4	BASE	005Y002H	2.17	127.770	129.000	0.0050	60554	0.83	45.180	0.30	15.015
P-POND-4	BASE	005Y004H	3.61	128.004	129.000	0.0050	61879	2.00	24.374	1.12	10.657
P-POND-4	BASE	005Y008H	5.27	128.092	129.000	0.0050	62379	4.00	25.054	2.55	7.790
P-POND-4	BASE	005Y024H	19.07	127.867	129.000	0.0049	61100	11.99	6.211	19.04	2.500
P-POND-4	BASE	005Y072H	60.10	128.004	129.000	0.0027	61875	59.92	4.159	60.10	3.680
P-POND-4	BASE	010Y001H	1.29	127.713	129.000	0.0050	60231	0.63	65.633	0.31	17.366
P-POND-4	BASE	010Y002H	2.09	128.015	129.000	0.0050	61939	0.83	52.351	0.29	15.285
P-POND-4	BASE	010Y004H	3.43	128.207	129.000	0.0050	63030	2.00	27.681	1.07	10.609
P-POND-4	BASE	010Y008H	5.16	128.313	129.000	0.0050	63628	4.00	28.984	2.40	8.715
P-POND-4	BASE	010Y024H	16.08	127.990	129.000	0.0050	61801	12.00	7.489	16.03	3.737
P-POND-4	BASE	010Y072H	60.10	128.082	129.000	0.0031	62320	59.92	4.966	60.08	4.497
P-POND-4	BASE	025Y001H	1.22	128.012	129.000	0.0050	61920	0.63	76.676	0.29	17.352
P-POND-4	BASE	025Y002H	1.97	128.266	129.000	0.0050	63362	0.83	61.090	0.26	15.846
P-POND-4	BASE	025Y004H	3.25	128.519	129.000	0.0050	64793	2.00	33.039	0.95	10.854
P-POND-4	BASE	025Y008H	5.12	128.550	129.000	0.0050	64970	4.00	33.500	5.09	10.581
P-POND-4	BASE	025Y024H	15.10	128.167	129.000	0.0050	62804	12.00	9.583	15.06	5.670
P-POND-4	BASE	025Y072H	60.08	128.195	129.000	0.0038	62960	59.91	6.271	60.06	5.782
P-POND-4	BASE	050Y001H	1.18	128.234	129.000	0.0050	63180	0.62	85.615	0.29	17.821
P-POND-4	BASE	050Y002H	1.87	128.506	129.000	0.0050	64723	0.83	69.880	0.23	16.612
P-POND-4	BASE	050Y004H	3.21	128.785	129.000	0.0050	66299	2.00	37.777	3.17	13.351
P-POND-4	BASE	050Y008H	5.07	128.846	129.000	0.0050	66644	4.00	39.169	5.04	13.685
P-POND-4	BASE	050Y024H	13.14	128.321	129.000	0.0050	63671	12.00	11.474	13.11	7.647
P-POND-4	BASE	050Y072H	60.07	128.289	129.000	0.0043	63492	59.92	7.434	60.07	6.930
P-POND-4	BASE	100Y001H	1.16	128.448	129.000	0.0050	64394	0.62	94.607	0.27	18.591
P-POND-4	BASE	100Y002H	1.82	128.670	129.000	0.0050	65648	0.83	75.785	0.22	16.826
P-POND-4	BASE	100Y004H	3.19	128.970	129.000	0.0050	67351	2.00	41.174	3.15	15.305
P-POND-4	BASE	100Y008H	5.07	128.904	129.000	0.0050	66977	4.00	40.307	5.03	14.290
P-POND-4	BASE	100Y024H	12.56	128.506	129.000	0.0050	64720	12.00	13.599	12.41	9.728
P-POND-4	BASE	100Y072H	60.07	128.391	129.000	0.0045	64068	59.92	8.723	60.07	8.133
P-POND-4	BASE	25Y 24H SWFWMD	12.71	128.545	129.000	0.0050	64943	12.00	55.351	12.65	10.759
STM-23	BASE	002Y001H	1.28	131.240	0.000	-131.0900	216	1.23	0.125	1.25	0.124
STM-23	BASE	002Y002H	2.17	131.277	0.000	-131.0900	226	2.13	0.187	2.15	0.186
STM-23	BASE	002Y004H	3.69	131.365	0.000	-131.0900	248	3.67	0.386	3.68	0.386
STM-23	BASE	002Y008H	6.21	131.372	0.000	-131.0900	249	6.16	0.405	6.10	0.405
STM-23	BASE	002Y024H	19.30	131.327	0.000	-131.0900	239	19.37	0.291	19.30	0.291
STM-23	BASE	002Y072H	64.07	131.341	0.000	-131.0900	242	64.05	0.324	64.07	0.324
STM-23	BASE	005Y001H	1.24	131.362	0.000	-131.0900	247	1.21	0.378	1.24	0.378
STM-23	BASE	005Y002H	2.11	131.419	0.000	-131.0900	258	2.10	0.543	2.11	0.543

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
STM-23	BASE	005Y004H	3.62	131.496	0.000	-131.0900	270	3.60	0.807	3.60	0.807
STM-23	BASE	005Y008H	5.32	131.526	0.000	-131.0900	274	5.30	0.925	5.29	0.924
STM-23	BASE	005Y024H	19.16	131.403	0.000	-131.0900	255	19.11	0.495	19.06	0.495
STM-23	BASE	005Y072H	60.37	131.436	0.000	-131.0900	261	60.33	0.596	60.32	0.596
STM-23	BASE	010Y001H	1.23	131.425	0.000	-131.0900	259	1.20	0.563	1.21	0.562
STM-23	BASE	010Y002H	2.08	131.505	0.000	-131.0900	271	2.07	0.842	2.08	0.842
STM-23	BASE	010Y004H	3.58	131.570	0.000	-131.0900	280	3.54	1.108	3.52	1.108
STM-23	BASE	010Y008H	5.24	131.611	0.000	-131.0900	285	5.24	1.293	5.24	1.293
STM-23	BASE	010Y024H	16.25	131.469	0.000	-131.0900	266	16.23	0.709	16.23	0.710
STM-23	BASE	010Y072H	60.33	131.482	0.000	-131.0900	268	60.30	0.758	60.25	0.758
STM-23	BASE	025Y001H	1.33	131.522	0.000	-131.0900	241	1.19	0.908	1.19	0.907
STM-23	BASE	025Y002H	2.04	131.597	0.000	-131.0900	283	2.03	1.230	2.03	1.230
STM-23	BASE	025Y004H	3.45	131.714	0.000	-131.0900	257	3.43	1.623	3.46	1.622
STM-23	BASE	025Y008H	5.18	131.760	0.000	-131.0900	260	5.20	1.737	5.23	1.739
STM-23	BASE	025Y024H	16.03	131.567	0.000	-131.0900	280	16.03	1.096	16.03	1.096
STM-23	BASE	025Y072H	60.15	131.554	0.000	-131.0900	245	60.25	1.023	60.26	1.025
STM-23	BASE	050Y001H	1.20	131.593	0.000	-131.0900	283	1.18	1.210	1.19	1.209
STM-23	BASE	050Y002H	2.03	131.713	0.000	-131.0900	257	1.99	1.645	2.03	1.644
STM-23	BASE	050Y004H	3.31	131.903	0.000	-131.0900	266	3.35	2.098	3.39	2.101
STM-23	BASE	050Y008H	5.12	131.986	0.000	-131.0900	268	5.16	2.314	5.24	2.315
STM-23	BASE	050Y024H	15.12	131.650	0.000	-131.0900	253	15.22	1.448	15.24	1.449
STM-23	BASE	050Y072H	60.13	131.631	0.000	-131.0900	251	60.23	1.260	60.25	1.263
STM-23	BASE	100Y001H	1.19	131.660	0.000	-131.0900	290	1.17	1.530	1.18	1.530
STM-23	BASE	100Y002H	1.97	131.820	0.000	-131.0900	263	1.96	1.933	1.98	1.933
STM-23	BASE	100Y004H	3.26	132.055	0.000	-131.0900	268	3.32	2.449	3.34	2.453
STM-23	BASE	100Y008H	5.13	132.036	0.000	-131.0900	268	5.15	2.432	5.06	2.474
STM-23	BASE	100Y024H	15.07	131.768	0.000	-131.0900	260	15.14	1.839	15.16	1.840
STM-23	BASE	100Y072H	60.12	131.722	0.000	-131.0900	258	60.22	1.523	60.24	1.526
STM-23	BASE	25Y 24H SWFWMD	13.06	131.703	0.000	-131.0900	257	12.86	1.663	12.90	1.658
X-BNDY-EAST	BASE	002Y001H	0.00	127.500	127.600	0.0000	0	0.96	3.215	0.00	0.000
X-BNDY-EAST	BASE	002Y002H	0.00	127.500	127.600	0.0000	0	1.50	2.346	0.00	0.000
X-BNDY-EAST	BASE	002Y004H	0.00	127.500	127.600	0.0000	0	3.08	3.889	0.00	0.000
X-BNDY-EAST	BASE	002Y008H	0.00	127.500	127.600	0.0000	0	4.17	3.621	0.00	0.000
X-BNDY-EAST	BASE	002Y024H	0.00	127.500	127.600	0.0000	0	15.08	1.174	0.00	0.000
X-BNDY-EAST	BASE	002Y072H	0.00	127.500	127.600	0.0000	0	60.00	1.484	0.00	0.000
X-BNDY-EAST	BASE	005Y001H	0.00	127.500	127.600	0.0000	0	0.92	6.257	0.00	0.000
X-BNDY-EAST	BASE	005Y002H	0.00	127.500	127.600	0.0000	0	1.17	5.090	0.00	0.000
X-BNDY-EAST	BASE	005Y004H	0.00	127.500	127.600	0.0000	0	3.00	6.535	0.00	0.000
X-BNDY-EAST	BASE	005Y008H	0.00	127.500	127.600	0.0000	0	4.17	7.481	0.00	0.000
X-BNDY-EAST	BASE	005Y024H	0.00	127.500	127.600	0.0000	0	12.10	1.882	0.00	0.000
X-BNDY-EAST	BASE	005Y072H	0.00	127.500	127.600	0.0000	0	60.00	2.700	0.00	0.000
X-BNDY-EAST	BASE	010Y001H	0.00	127.500	127.600	0.0000	0	0.92	8.421	0.00	0.000
X-BNDY-EAST	BASE	010Y002H	0.00	127.500	127.600	0.0000	0	1.13	7.660	0.00	0.000
X-BNDY-EAST	BASE	010Y004H	0.00	127.500	127.600	0.0000	0	2.67	8.486	0.00	0.000
X-BNDY-EAST	BASE	010Y008H	0.00	127.500	127.600	0.0000	0	4.17	10.300	0.00	0.000
X-BNDY-EAST	BASE	010Y024H	0.00	127.500	127.600	0.0000	0	12.08	2.897	0.00	0.000
X-BNDY-EAST	BASE	010Y072H	0.00	127.500	127.600	0.0000	0	60.00	3.545	0.00	0.000
X-BNDY-EAST	BASE	025Y001H	0.00	127.500	127.600	0.0000	0	0.92	12.486	0.00	0.000
X-BNDY-EAST	BASE	025Y002H	0.00	127.500	127.600	0.0000	0	1.08	11.247	0.00	0.000
X-BNDY-EAST	BASE	025Y004H	0.00	127.500	127.600	0.0000	0	2.67	12.181	0.00	0.000
X-BNDY-EAST	BASE	025Y008H	0.00	127.500	127.600	0.0000	0	4.08	13.831	0.00	0.000
X-BNDY-EAST	BASE	025Y024H	0.00	127.500	127.600	0.0000	0	12.09	4.729	0.00	0.000
X-BNDY-EAST	BASE	025Y072H	0.00	127.500	127.600	0.0000	0	60.00	4.952	0.00	0.000
X-BNDY-EAST	BASE	050Y001H	0.00	127.500	127.600	0.0000	0	0.88	16.189	0.00	0.000
X-BNDY-EAST	BASE	050Y002H	0.00	127.500	127.600	0.0000	0	1.08	15.309	0.00	0.000
X-BNDY-EAST	BASE	050Y004H	0.00	127.500	127.600	0.0000	0	2.67	15.656	0.00	0.000
X-BNDY-EAST	BASE	050Y008H	0.00	127.500	127.600	0.0000	0	4.08	18.599	0.00	0.000
X-BNDY-EAST	BASE	050Y024H	0.00	127.500	127.600	0.0000	0	12.08	6.507	0.00	0.000
X-BNDY-EAST	BASE	050Y072H	0.00	127.500	127.600	0.0000	0	60.00	6.225	0.00	0.000
X-BNDY-EAST	BASE	100Y001H	0.00	127.500	127.600	0.0000	0	0.88	20.182	0.00	0.000
X-BNDY-EAST	BASE	100Y002H	0.00	127.500	127.600	0.0000	0	1.04	18.225	0.00	0.000
X-BNDY-EAST	BASE	100Y004H	0.00	127.500	127.600	0.0000	0	2.67	18.244	0.00	0.000
X-BNDY-EAST	BASE	100Y008H	0.00	127.500	127.600	0.0000	0	4.08	19.589	0.00	0.000

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
X-BNDY-EAST	BASE	100Y024H	0.00	127.500	127.600	0.0000	0	12.08	8.606	0.00	0.000
X-BNDY-EAST	BASE	100Y072H	0.00	127.500	127.600	0.0000	0	59.99	7.648	0.00	0.000
X-BNDY-EAST	BASE	25Y 24H SWFWMD	0.00	127.500	127.600	0.0000	0	12.17	17.708	0.00	0.000
X-BNDY-WEST	BASE	002Y001H	2.00	130.207	131.100	0.0004	0	0.88	1.990	0.00	0.000
X-BNDY-WEST	BASE	002Y002H	4.00	130.263	131.100	0.0005	0	1.54	1.413	0.00	0.000
X-BNDY-WEST	BASE	002Y004H	8.01	130.377	131.100	0.0005	0	3.08	2.726	0.00	0.000
X-BNDY-WEST	BASE	002Y008H	16.01	130.604	131.100	0.0005	0	4.08	2.341	0.00	0.000
X-BNDY-WEST	BASE	002Y024H	30.00	131.000	131.100	0.0005	0	15.08	0.853	0.00	0.000
X-BNDY-WEST	BASE	002Y072H	30.02	131.000	131.100	0.0005	0	60.00	1.190	0.00	0.000
X-BNDY-WEST	BASE	005Y001H	2.00	130.207	131.100	0.0004	0	0.88	4.418	0.00	0.000
X-BNDY-WEST	BASE	005Y002H	4.00	130.263	131.100	0.0005	0	1.13	3.402	0.00	0.000
X-BNDY-WEST	BASE	005Y004H	7.99	130.377	131.100	0.0005	0	3.00	5.019	0.00	0.000
X-BNDY-WEST	BASE	005Y008H	16.01	130.604	131.100	0.0005	0	4.08	5.748	0.00	0.000
X-BNDY-WEST	BASE	005Y024H	30.01	131.000	131.100	0.0005	0	15.08	1.456	0.00	0.000
X-BNDY-WEST	BASE	005Y072H	30.02	131.000	131.100	0.0005	0	60.00	2.330	0.00	0.000
X-BNDY-WEST	BASE	010Y001H	2.00	130.207	131.100	0.0004	0	0.87	6.261	0.00	0.000
X-BNDY-WEST	BASE	010Y002H	4.00	130.263	131.100	0.0005	0	1.08	5.511	0.00	0.000
X-BNDY-WEST	BASE	010Y004H	8.00	130.377	131.100	0.0005	0	3.00	6.721	0.00	0.000
X-BNDY-WEST	BASE	010Y008H	15.99	130.603	131.100	0.0005	0	4.08	8.369	0.00	0.000
X-BNDY-WEST	BASE	010Y024H	30.02	131.000	131.100	0.0005	0	12.08	2.183	0.00	0.000
X-BNDY-WEST	BASE	010Y072H	30.02	131.000	131.100	0.0005	0	60.00	3.143	0.00	0.000
X-BNDY-WEST	BASE	025Y001H	2.00	130.207	131.100	0.0004	0	0.83	9.898	0.00	0.000
X-BNDY-WEST	BASE	025Y002H	4.00	130.263	131.100	0.0004	0	1.04	8.600	0.00	0.000
X-BNDY-WEST	BASE	025Y004H	8.00	130.377	131.100	0.0005	0	2.59	9.872	0.00	0.000
X-BNDY-WEST	BASE	025Y008H	15.99	130.603	131.100	0.0005	0	4.08	11.681	0.00	0.000
X-BNDY-WEST	BASE	025Y024H	30.01	131.000	131.100	0.0005	0	12.08	3.855	0.00	0.000
X-BNDY-WEST	BASE	025Y072H	30.02	131.000	131.100	0.0005	0	60.00	4.522	0.00	0.000
X-BNDY-WEST	BASE	050Y001H	2.00	130.207	131.100	0.0004	0	0.83	13.295	0.00	0.000
X-BNDY-WEST	BASE	050Y002H	3.99	130.263	131.100	0.0004	0	1.00	12.261	0.00	0.000
X-BNDY-WEST	BASE	050Y004H	8.00	130.377	131.100	0.0005	0	2.58	13.126	0.00	0.000
X-BNDY-WEST	BASE	050Y008H	16.00	130.603	131.100	0.0005	0	4.08	16.201	0.00	0.000
X-BNDY-WEST	BASE	050Y024H	30.01	131.000	131.100	0.0005	0	12.08	5.520	0.00	0.000
X-BNDY-WEST	BASE	050Y072H	30.02	131.000	131.100	0.0005	0	59.98	5.788	0.00	0.000
X-BNDY-WEST	BASE	100Y001H	2.00	130.207	131.100	0.0004	0	0.83	17.022	0.00	0.000
X-BNDY-WEST	BASE	100Y002H	4.00	130.263	131.100	0.0004	0	1.00	14.997	0.00	0.000
X-BNDY-WEST	BASE	100Y004H	8.00	130.377	131.100	0.0005	0	2.58	15.588	0.00	0.000
X-BNDY-WEST	BASE	100Y008H	16.00	130.603	131.100	0.0005	0	4.08	17.144	0.00	0.000
X-BNDY-WEST	BASE	100Y024H	30.01	131.000	131.100	0.0005	0	12.08	7.517	0.00	0.000
X-BNDY-WEST	BASE	100Y072H	30.02	131.000	131.100	0.0005	0	59.99	7.217	0.00	0.000
X-BNDY-WEST	BASE	25Y 24H SWFWMD	30.00	131.000	131.100	0.0005	0	12.17	14.993	0.00	0.000
X-POND-4	BASE	002Y001H	0.00	142.500	145.000	0.0000	1045	0.00	0.000	0.00	0.000
X-POND-4	BASE	002Y002H	0.00	142.500	145.000	0.0000	1045	0.00	0.000	0.00	0.000
X-POND-4	BASE	002Y004H	0.00	142.500	145.000	0.0000	1045	0.00	0.000	0.00	0.000
X-POND-4	BASE	002Y008H	0.00	142.500	145.000	0.0000	1045	0.00	0.000	0.00	0.000
X-POND-4	BASE	002Y024H	0.00	142.500	145.000	0.0000	1045	0.00	0.000	0.00	0.000
X-POND-4	BASE	002Y072H	0.00	142.500	145.000	0.0000	1045	0.00	0.000	0.00	0.000
X-POND-4	BASE	005Y001H	0.00	142.500	145.000	0.0000	1045	0.00	0.000	0.00	0.000
X-POND-4	BASE	005Y002H	0.00	142.500	145.000	0.0000	1045	0.00	0.000	0.00	0.000
X-POND-4	BASE	005Y004H	0.00	142.500	145.000	0.0000	1045	0.00	0.000	0.00	0.000
X-POND-4	BASE	005Y008H	0.00	142.500	145.000	0.0000	1045	0.00	0.000	0.00	0.000
X-POND-4	BASE	005Y024H	0.00	142.500	145.000	0.0000	1045	0.00	0.000	0.00	0.000
X-POND-4	BASE	005Y072H	0.00	142.500	145.000	0.0000	1045	0.00	0.000	0.00	0.000
X-POND-4	BASE	010Y001H	0.00	142.500	145.000	0.0000	1045	0.00	0.000	0.00	0.000
X-POND-4	BASE	010Y002H	0.00	142.500	145.000	0.0000	1045	0.00	0.000	0.00	0.000
X-POND-4	BASE	010Y004H	0.00	142.500	145.000	0.0000	1045	0.00	0.000	0.00	0.000
X-POND-4	BASE	010Y008H	0.00	142.500	145.000	0.0000	1045	0.00	0.000	0.00	0.000
X-POND-4	BASE	010Y024H	0.00	142.500	145.000	0.0000	1045	0.00	0.000	0.00	0.000
X-POND-4	BASE	010Y072H	0.00	142.500	145.000	0.0000	1045	0.00	0.000	0.00	0.000
X-POND-4	BASE	025Y001H	0.00	142.500	145.000	0.0000	1045	0.00	0.000	0.00	0.000
X-POND-4	BASE	025Y002H	0.00	142.500	145.000	0.0000	1045	0.00	0.000	0.00	0.000
X-POND-4	BASE	025Y004H	0.00	142.500	145.000	0.0000	1045	0.00	0.000	0.00	0.000
X-POND-4	BASE	025Y008H	0.00	142.500	145.000	0.0000	1045	0.00	0.000	0.00	0.000
X-POND-4	BASE	025Y024H	0.00	142.500	145.000	0.0000	1045	0.00	0.000	0.00	0.000

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
X-POND-4	BASE	025Y072H	0.00	142.500	145.000	0.0000	1045	0.00	0.000	0.00	0.000
X-POND-4	BASE	050Y001H	0.00	142.500	145.000	0.0000	1045	0.00	0.000	0.00	0.000
X-POND-4	BASE	050Y002H	0.00	142.500	145.000	0.0000	1045	0.00	0.000	0.00	0.000
X-POND-4	BASE	050Y004H	0.00	142.500	145.000	0.0000	1045	0.00	0.000	0.00	0.000
X-POND-4	BASE	050Y008H	0.00	142.500	145.000	0.0000	1045	0.00	0.000	0.00	0.000
X-POND-4	BASE	050Y024H	0.00	142.500	145.000	0.0000	1045	0.00	0.000	0.00	0.000
X-POND-4	BASE	050Y072H	0.00	142.500	145.000	0.0000	1045	0.00	0.000	0.00	0.000
X-POND-4	BASE	100Y001H	0.00	142.500	145.000	0.0000	1045	0.00	0.000	0.00	0.000
X-POND-4	BASE	100Y002H	0.00	142.500	145.000	0.0000	1045	0.00	0.000	0.00	0.000
X-POND-4	BASE	100Y004H	0.00	142.500	145.000	0.0000	1045	0.00	0.000	0.00	0.000
X-POND-4	BASE	100Y008H	0.00	142.500	145.000	0.0000	1045	0.00	0.000	0.00	0.000
X-POND-4	BASE	100Y024H	0.00	142.500	145.000	0.0000	1045	0.00	0.000	0.00	0.000
X-POND-4	BASE	100Y072H	0.00	142.500	145.000	0.0000	1045	0.00	0.000	0.00	0.000
X-POND-4	BASE	25Y 24H SWFWMD	0.00	142.500	145.000	0.0000	1045	0.00	0.000	0.00	0.000

Name	Group	Simulation	Max Time Flow hrs	Max Flow cfs	Max Delta Q cfs	Max Time US Stage hrs	Max US Stage ft	Max Time DS Stage hrs	Max DS Stage ft
P-17	BASE	002Y001H	1.25	0.124	0.001	1.28	131.240	0.80	129.804
P-DS-1	BASE	002Y001H	1.23	0.125	0.001	1.23	134.556	1.28	131.240
P-DS-2	BASE	002Y001H	0.00	0.000	0.000	1.22	130.004	0.00	130.150
P-DS-3	BASE	002Y001H	1.07	0.453	-0.005	1.07	134.956	1.22	130.004
P-DS-4	BASE	002Y001H	0.00	0.000	0.000	1.32	127.155	0.00	127.500
P-PERC-1	BASE	002Y001H	0.38	6.692	-3.571	1.23	134.556	0.00	100.000
P-PERC-2	BASE	002Y001H	0.34	3.365	-0.841	1.22	130.004	0.00	100.000
P-PERC-3	BASE	002Y001H	0.35	6.584	-2.084	1.07	134.956	0.00	100.000
P-PERC-4	BASE	002Y001H	0.34	17.200	-10.385	1.32	127.155	0.00	100.000
X-WEIR-4	BASE	002Y001H	0.00	0.000	0.000	0.00	142.500	0.00	127.500
P-17	BASE	002Y002H	2.15	0.186	0.002	2.17	131.277	1.18	129.775
P-DS-1	BASE	002Y002H	2.13	0.187	0.001	2.13	134.619	2.17	131.277
P-DS-2	BASE	002Y002H	0.00	0.000	0.000	2.70	130.109	0.00	130.150
P-DS-3	BASE	002Y002H	2.09	0.434	-0.004	2.09	134.946	2.70	130.109
P-DS-4	BASE	002Y002H	0.00	0.000	0.000	2.29	127.316	0.00	127.500
P-PERC-1	BASE	002Y002H	0.47	5.244	-3.375	2.13	134.619	0.00	100.000
P-PERC-2	BASE	002Y002H	0.34	2.927	-0.854	2.70	130.109	0.00	100.000
P-PERC-3	BASE	002Y002H	0.37	5.644	-2.063	2.09	134.946	0.00	100.000
P-PERC-4	BASE	002Y002H	0.35	14.549	-8.392	2.29	127.316	0.00	100.000
X-WEIR-4	BASE	002Y002H	0.00	0.000	0.000	0.00	142.500	0.00	127.500
P-17	BASE	002Y004H	3.68	0.386	0.002	3.69	131.365	2.41	129.701
P-DS-1	BASE	002Y004H	3.67	0.386	-0.002	3.67	134.788	3.69	131.365
P-DS-2	BASE	002Y004H	0.00	0.000	0.000	6.94	130.751	0.00	130.150
P-DS-3	BASE	002Y004H	3.61	0.864	-0.006	3.61	135.148	6.94	130.751
P-DS-4	BASE	002Y004H	4.10	0.475	0.006	4.10	127.635	0.00	127.500
P-PERC-1	BASE	002Y004H	1.61	4.097	-3.101	3.67	134.788	0.00	100.000
P-PERC-2	BASE	002Y004H	1.18	2.122	-0.639	6.94	130.751	0.00	100.000
P-PERC-3	BASE	002Y004H	1.22	4.133	-1.994	3.61	135.148	0.00	100.000
P-PERC-4	BASE	002Y004H	1.23	10.643	-4.474	4.10	127.635	0.00	100.000
X-WEIR-4	BASE	002Y004H	0.00	0.000	0.000	0.00	142.500	0.00	127.500
P-17	BASE	002Y008H	6.10	0.405	0.002	6.21	131.372	11.57	131.029
P-DS-1	BASE	002Y008H	6.16	0.405	0.002	6.16	134.802	6.21	131.372
P-DS-2	BASE	002Y008H	8.14	0.766	0.017	8.14	131.119	0.00	130.150
P-DS-3	BASE	002Y008H	5.38	0.864	0.004	5.38	135.147	8.14	131.119
P-DS-4	BASE	002Y008H	7.22	1.165	-0.008	7.22	127.746	0.00	127.500
P-PERC-1	BASE	002Y008H	3.25	3.913	-3.236	6.16	134.802	0.00	100.000
P-PERC-2	BASE	002Y008H	3.09	1.791	-1.199	8.14	131.119	0.00	100.000
P-PERC-3	BASE	002Y008H	3.09	3.508	-1.166	5.38	135.147	0.00	100.000
P-PERC-4	BASE	002Y008H	2.90	6.103	-3.823	7.22	127.746	0.00	100.000
X-WEIR-4	BASE	002Y008H	0.00	0.000	0.000	0.00	142.500	0.00	127.500
P-17	BASE	002Y024H	19.30	0.291	0.002	19.30	131.327	24.97	131.058
P-DS-1	BASE	002Y024H	19.37	0.291	0.001	19.37	134.713	19.30	131.327
P-DS-2	BASE	002Y024H	21.40	0.725	0.014	21.40	131.115	0.00	130.150
P-DS-3	BASE	002Y024H	19.20	0.507	0.003	19.20	134.984	21.40	131.115
P-DS-4	BASE	002Y024H	21.10	1.097	0.006	21.10	127.736	0.00	127.500
P-PERC-1	BASE	002Y024H	9.43	0.772	0.017	19.37	134.713	0.00	100.000
P-PERC-2	BASE	002Y024H	8.78	0.566	0.408	21.40	131.115	0.00	100.000
P-PERC-3	BASE	002Y024H	9.00	1.201	0.504	19.20	134.984	0.00	100.000
P-PERC-4	BASE	002Y024H	7.53	1.803	-0.286	21.10	127.736	0.00	100.000
X-WEIR-4	BASE	002Y024H	0.00	0.000	0.000	0.00	142.500	0.00	127.500
P-17	BASE	002Y072H	64.07	0.324	0.002	64.07	131.341	68.55	131.082
P-DS-1	BASE	002Y072H	64.05	0.324	0.001	64.05	134.739	64.07	131.341
P-DS-2	BASE	002Y072H	64.10	1.009	0.018	64.10	131.143	0.00	130.150
P-DS-3	BASE	002Y072H	60.41	0.595	0.003	60.41	135.027	64.10	131.143
P-DS-4	BASE	002Y072H	64.08	1.226	0.009	64.08	127.754	0.00	127.500
P-PERC-1	BASE	002Y072H	12.00	0.369	0.043	64.05	134.739	0.00	100.000
P-PERC-2	BASE	002Y072H	8.88	0.293	-0.093	64.10	131.143	0.00	100.000
P-PERC-3	BASE	002Y072H	9.03	0.584	0.087	60.41	135.027	0.00	100.000
P-PERC-4	BASE	002Y072H	8.87	1.389	0.197	64.08	127.754	0.00	100.000
X-WEIR-4	BASE	002Y072H	0.00	0.000	0.000	0.00	142.500	0.00	127.500
P-17	BASE	005Y001H	1.24	0.378	0.002	1.24	131.362	0.69	129.807
P-DS-1	BASE	005Y001H	1.21	0.378	0.002	1.21	134.782	1.24	131.362
P-DS-2	BASE	005Y001H	0.00	0.000	0.000	2.00	130.454	0.00	130.150

Name	Group	Simulation	Max Time Flow hrs	Max Flow cfs	Max Delta Q cfs	Max Time US Stage hrs	Max US Stage ft	Max Time DS Stage hrs	Max DS Stage ft
P-DS-3	BASE	005Y001H	1.08	1.055	-0.008	1.08	135.225	2.00	130.454
P-DS-4	BASE	005Y001H	1.34	0.017	0.001	1.34	127.515	0.00	127.500
P-PERC-1	BASE	005Y001H	0.36	6.883	-3.436	1.21	134.782	0.00	100.000
P-PERC-2	BASE	005Y001H	0.31	3.547	-1.712	2.00	130.454	0.00	100.000
P-PERC-3	BASE	005Y001H	0.34	6.549	-2.100	1.08	135.225	0.00	100.000
P-PERC-4	BASE	005Y001H	0.33	16.943	-11.030	1.34	127.515	0.00	100.000
X-WEIR-4	BASE	005Y001H	0.00	0.000	0.000	0.00	142.500	0.00	127.500
P-17	BASE	005Y002H	2.11	0.543	-0.003	2.11	131.419	0.93	129.841
P-DS-1	BASE	005Y002H	2.10	0.543	-0.002	2.10	134.900	2.11	131.419
P-DS-2	BASE	005Y002H	4.00	0.174	0.005	4.00	131.044	0.00	130.150
P-DS-3	BASE	005Y002H	2.02	1.247	-0.008	2.02	135.299	4.00	131.044
P-DS-4	BASE	005Y002H	2.17	1.343	0.010	2.17	127.770	0.00	127.500
P-PERC-1	BASE	005Y002H	0.38	5.779	-3.527	2.10	134.900	0.00	100.000
P-PERC-2	BASE	005Y002H	0.30	2.996	-0.837	4.00	131.044	0.00	100.000
P-PERC-3	BASE	005Y002H	0.31	5.766	-1.940	2.02	135.299	0.00	100.000
P-PERC-4	BASE	005Y002H	0.30	15.015	-11.902	2.17	127.770	0.00	100.000
X-WEIR-4	BASE	005Y002H	0.00	0.000	0.000	0.00	142.500	0.00	127.500
P-17	BASE	005Y004H	3.60	0.807	-0.004	3.62	131.496	2.13	129.732
P-DS-1	BASE	005Y004H	3.60	0.807	-0.004	3.60	135.066	3.62	131.496
P-DS-2	BASE	005Y004H	4.09	2.093	0.028	4.09	131.233	0.00	130.150
P-DS-3	BASE	005Y004H	3.44	1.824	-0.012	3.44	135.501	4.09	131.233
P-DS-4	BASE	005Y004H	3.61	3.407	-0.027	3.61	128.004	0.00	127.500
P-PERC-1	BASE	005Y004H	1.34	4.325	-2.566	3.60	135.066	0.00	100.000
P-PERC-2	BASE	005Y004H	1.10	2.094	-0.469	4.09	131.233	0.00	100.000
P-PERC-3	BASE	005Y004H	1.12	4.125	-2.011	3.44	135.501	0.00	100.000
P-PERC-4	BASE	005Y004H	1.12	10.657	-4.501	3.61	128.004	0.00	100.000
X-WEIR-4	BASE	005Y004H	0.00	0.000	0.000	0.00	142.500	0.00	127.500
P-17	BASE	005Y008H	5.29	0.924	0.027	5.32	131.526	4.89	131.106
P-DS-1	BASE	005Y008H	5.30	0.925	0.003	5.30	135.133	5.32	131.526
P-DS-2	BASE	005Y008H	5.76	3.073	0.034	5.79	131.305	0.00	130.150
P-DS-3	BASE	005Y008H	5.21	2.027	0.008	5.21	135.566	5.79	131.305
P-DS-4	BASE	005Y008H	5.27	4.332	-0.020	5.27	128.092	0.00	127.500
P-PERC-1	BASE	005Y008H	3.10	3.335	-2.541	5.30	135.133	0.00	100.000
P-PERC-2	BASE	005Y008H	2.58	1.819	-0.711	5.79	131.305	0.00	100.000
P-PERC-3	BASE	005Y008H	2.58	3.568	-1.967	5.21	135.566	0.00	100.000
P-PERC-4	BASE	005Y008H	2.55	7.790	-5.204	5.27	128.092	0.00	100.000
X-WEIR-4	BASE	005Y008H	0.00	0.000	0.000	0.00	142.500	0.00	127.500
P-17	BASE	005Y024H	19.06	0.495	0.002	19.16	131.403	27.09	131.047
P-DS-1	BASE	005Y024H	19.11	0.495	0.002	19.11	134.866	19.16	131.403
P-DS-2	BASE	005Y024H	19.06	1.672	0.024	19.06	131.200	0.00	130.150
P-DS-3	BASE	005Y024H	16.22	0.871	0.005	16.22	135.150	19.06	131.200
P-DS-4	BASE	005Y024H	19.07	2.118	0.012	19.07	127.867	0.00	127.500
P-PERC-1	BASE	005Y024H	8.47	0.921	-0.151	19.11	134.866	0.00	100.000
P-PERC-2	BASE	005Y024H	7.22	0.706	0.243	19.06	131.200	0.00	100.000
P-PERC-3	BASE	005Y024H	8.05	1.322	0.378	16.22	135.150	0.00	100.000
P-PERC-4	BASE	005Y024H	6.55	2.205	-2.045	19.07	127.867	0.00	100.000
X-WEIR-4	BASE	005Y024H	0.00	0.000	0.000	0.00	142.500	0.00	127.500
P-17	BASE	005Y072H	60.32	0.596	0.003	60.37	131.436	58.62	131.225
P-DS-1	BASE	005Y072H	60.33	0.596	0.002	60.33	134.935	60.37	131.436
P-DS-2	BASE	005Y072H	60.10	2.524	0.030	60.10	131.263	0.00	130.150
P-DS-3	BASE	005Y072H	60.20	1.197	0.005	60.20	135.280	60.10	131.263
P-DS-4	BASE	005Y072H	60.10	3.400	0.019	60.10	128.004	0.00	127.500
P-PERC-1	BASE	005Y072H	12.00	0.533	0.300	60.33	134.935	0.00	100.000
P-PERC-2	BASE	005Y072H	12.35	0.406	-0.147	60.10	131.263	0.00	100.000
P-PERC-3	BASE	005Y072H	9.03	0.809	-0.455	60.20	135.280	0.00	100.000
P-PERC-4	BASE	005Y072H	11.53	1.933	-0.415	60.10	128.004	0.00	100.000
X-WEIR-4	BASE	005Y072H	0.00	0.000	0.000	0.00	142.500	0.00	127.500
P-17	BASE	010Y001H	1.21	0.562	0.003	1.23	131.425	0.66	129.807
P-DS-1	BASE	010Y001H	1.20	0.563	0.002	1.20	134.913	1.23	131.425
P-DS-2	BASE	010Y001H	0.00	0.000	0.000	2.00	130.782	0.00	130.150
P-DS-3	BASE	010Y001H	1.09	1.484	-0.008	1.09	135.385	2.00	130.782
P-DS-4	BASE	010Y001H	1.29	0.941	0.013	1.29	127.713	0.00	127.500
P-PERC-1	BASE	010Y001H	0.34	6.991	-3.841	1.20	134.913	0.00	100.000

Name	Group	Simulation	Max Time Flow hrs	Max Flow cfs	Max Delta Q cfs	Max Time US Stage hrs	Max US Stage ft	Max Time DS Stage hrs	Max DS Stage ft
P-PERC-2	BASE	010Y001H	0.30	3.523	-0.615	2.00	130.782	0.00	100.000
P-PERC-3	BASE	010Y001H	0.32	6.698	-3.718	1.09	135.385	0.00	100.000
P-PERC-4	BASE	010Y001H	0.31	17.366	-11.358	1.29	127.713	0.00	100.000
X-WEIR-4	BASE	010Y001H	0.00	0.000	0.000	0.00	142.500	0.00	127.500
P-17	BASE	010Y002H	2.08	0.842	0.029	2.08	131.505	1.87	131.102
P-DS-1	BASE	010Y002H	2.07	0.842	-0.003	2.07	135.086	2.08	131.505
P-DS-2	BASE	010Y002H	2.34	2.003	0.030	2.34	131.226	0.00	130.150
P-DS-3	BASE	010Y002H	1.94	1.928	-0.009	1.94	135.535	2.34	131.226
P-DS-4	BASE	010Y002H	2.09	3.515	-0.021	2.09	128.015	0.00	127.500
P-PERC-1	BASE	010Y002H	0.32	5.788	-3.622	2.07	135.086	0.00	100.000
P-PERC-2	BASE	010Y002H	0.27	3.101	-2.477	2.34	131.226	0.00	100.000
P-PERC-3	BASE	010Y002H	0.30	5.875	-1.866	1.94	135.535	0.00	100.000
P-PERC-4	BASE	010Y002H	0.29	15.285	-10.238	2.09	128.015	0.00	100.000
X-WEIR-4	BASE	010Y002H	0.00	0.000	0.000	0.00	142.500	0.00	127.500
P-17	BASE	010Y004H	3.52	1.108	0.022	3.58	131.570	3.04	131.153
P-DS-1	BASE	010Y004H	3.54	1.108	-0.004	3.54	135.234	3.58	131.570
P-DS-2	BASE	010Y004H	3.67	3.801	0.035	3.67	131.371	0.00	130.150
P-DS-3	BASE	010Y004H	3.35	2.519	-0.013	3.35	135.717	3.67	131.371
P-DS-4	BASE	010Y004H	3.43	5.641	-0.036	3.43	128.207	0.00	127.500
P-PERC-1	BASE	010Y004H	1.22	4.290	-2.672	3.54	135.234	0.00	100.000
P-PERC-2	BASE	010Y004H	1.03	2.102	-0.630	3.67	131.371	0.00	100.000
P-PERC-3	BASE	010Y004H	1.05	4.114	-1.664	3.35	135.717	0.00	100.000
P-PERC-4	BASE	010Y004H	1.07	10.609	-9.030	3.43	128.207	0.00	100.000
X-WEIR-4	BASE	010Y004H	0.00	0.000	0.000	0.00	142.500	0.00	127.500
P-17	BASE	010Y008H	5.24	1.293	0.024	5.24	131.611	4.46	131.166
P-DS-1	BASE	010Y008H	5.24	1.293	-0.004	5.24	135.330	5.24	131.611
P-DS-2	BASE	010Y008H	5.25	4.950	0.040	5.27	131.477	0.00	130.150
P-DS-3	BASE	010Y008H	5.16	2.844	-0.010	5.16	135.811	5.27	131.477
P-DS-4	BASE	010Y008H	5.16	6.935	-0.032	5.16	128.313	0.00	127.500
P-PERC-1	BASE	010Y008H	2.42	2.891	-2.289	5.24	135.330	0.00	100.000
P-PERC-2	BASE	010Y008H	2.42	1.822	-0.849	5.27	131.477	0.00	100.000
P-PERC-3	BASE	010Y008H	2.42	3.574	-1.927	5.16	135.811	0.00	100.000
P-PERC-4	BASE	010Y008H	2.40	8.715	-7.192	5.16	128.313	0.00	100.000
X-WEIR-4	BASE	010Y008H	0.00	0.000	0.000	0.00	142.500	0.00	127.500
P-17	BASE	010Y024H	16.23	0.710	0.003	16.25	131.469	28.42	131.045
P-DS-1	BASE	010Y024H	16.23	0.709	0.003	16.23	135.007	16.25	131.469
P-DS-2	BASE	010Y024H	16.08	2.589	0.029	16.08	131.268	0.00	130.150
P-DS-3	BASE	010Y024H	16.03	1.303	0.006	16.03	135.320	16.08	131.268
P-DS-4	BASE	010Y024H	16.08	3.268	0.013	16.08	127.990	0.00	127.500
P-PERC-1	BASE	010Y024H	7.62	0.770	0.021	16.23	135.007	0.00	100.000
P-PERC-2	BASE	010Y024H	6.43	0.890	-0.342	16.08	131.268	0.00	100.000
P-PERC-3	BASE	010Y024H	7.40	1.097	0.197	16.03	135.320	0.00	100.000
P-PERC-4	BASE	010Y024H	5.87	2.616	-2.371	16.08	127.990	0.00	100.000
X-WEIR-4	BASE	010Y024H	0.00	0.000	0.000	0.00	142.500	0.00	127.500
P-17	BASE	010Y072H	60.25	0.758	0.003	60.33	131.482	58.48	131.271
P-DS-1	BASE	010Y072H	60.30	0.758	0.003	60.30	135.036	60.33	131.482
P-DS-2	BASE	010Y072H	60.10	3.255	0.022	60.10	131.321	0.00	130.150
P-DS-3	BASE	010Y072H	60.18	1.536	0.007	60.18	135.403	60.10	131.321
P-DS-4	BASE	010Y072H	60.10	4.220	0.023	60.10	128.082	0.00	127.500
P-PERC-1	BASE	010Y072H	12.00	0.644	0.227	60.30	135.036	0.00	100.000
P-PERC-2	BASE	010Y072H	8.87	0.479	-0.433	60.10	131.321	0.00	100.000
P-PERC-3	BASE	010Y072H	9.03	0.956	-0.080	60.18	135.403	0.00	100.000
P-PERC-4	BASE	010Y072H	10.77	2.286	-0.768	60.10	128.082	0.00	100.000
X-WEIR-4	BASE	010Y072H	0.00	0.000	0.000	0.00	142.500	0.00	127.500
P-17	BASE	025Y001H	1.19	0.907	-0.025	1.33	131.522	1.40	131.120
P-DS-1	BASE	025Y001H	1.19	0.908	0.003	1.19	135.124	1.33	131.522
P-DS-2	BASE	025Y001H	1.96	1.289	0.021	1.96	131.168	0.00	130.150
P-DS-3	BASE	025Y001H	1.17	2.302	-0.009	1.17	135.652	1.96	131.168
P-DS-4	BASE	025Y001H	1.22	3.481	0.022	1.22	128.012	0.00	127.500
P-PERC-1	BASE	025Y001H	0.32	7.123	-3.984	1.19	135.124	0.00	100.000
P-PERC-2	BASE	025Y001H	0.29	3.656	-0.731	1.96	131.168	0.00	100.000
P-PERC-3	BASE	025Y001H	0.31	6.680	-2.088	1.17	135.652	0.00	100.000
P-PERC-4	BASE	025Y001H	0.29	17.352	-7.512	1.22	128.012	0.00	100.000

Name	Group	Simulation	Max Time Flow hrs	Max Flow cfs	Max Delta Q cfs	Max Time US Stage hrs	Max US Stage ft	Max Time DS Stage hrs	Max DS Stage ft
X-WEIR-4	BASE	025Y001H	0.00	0.000	0.000	0.00	142.500	0.00	127.500
P-17	BASE	025Y002H	2.03	1.230	0.026	2.04	131.597	1.46	131.171
P-DS-1	BASE	025Y002H	2.03	1.230	-0.005	2.03	135.298	2.04	131.597
P-DS-2	BASE	025Y002H	2.10	4.368	0.037	2.10	131.423	0.00	130.150
P-DS-3	BASE	025Y002H	1.87	2.828	-0.017	1.87	135.807	2.10	131.423
P-DS-4	BASE	025Y002H	1.97	6.349	-0.049	1.97	128.266	0.00	127.500
P-PERC-1	BASE	025Y002H	0.33	5.903	-2.648	2.03	135.298	0.00	100.000
P-PERC-2	BASE	025Y002H	0.25	3.240	-0.452	2.10	131.423	0.00	100.000
P-PERC-3	BASE	025Y002H	0.27	6.081	-3.407	1.87	135.807	0.00	100.000
P-PERC-4	BASE	025Y002H	0.26	15.846	-10.538	1.97	128.266	0.00	100.000
X-WEIR-4	BASE	025Y002H	0.00	0.000	0.000	0.00	142.500	0.00	127.500
P-17	BASE	025Y004H	3.46	1.622	0.031	3.45	131.714	3.45	131.616
P-DS-1	BASE	025Y004H	3.43	1.623	-0.005	3.43	135.490	3.45	131.714
P-DS-2	BASE	025Y004H	3.44	6.448	0.040	3.45	131.616	0.00	130.150
P-DS-3	BASE	025Y004H	3.27	3.714	-0.018	3.27	136.047	3.45	131.616
P-DS-4	BASE	025Y004H	3.25	9.166	-0.059	3.25	128.519	0.00	127.500
P-PERC-1	BASE	025Y004H	1.14	4.398	-3.161	3.43	135.490	0.00	100.000
P-PERC-2	BASE	025Y004H	0.88	2.206	-1.340	3.45	131.616	0.00	100.000
P-PERC-3	BASE	025Y004H	0.92	4.282	-2.030	3.27	136.047	0.00	100.000
P-PERC-4	BASE	025Y004H	0.95	10.854	-8.319	3.25	128.519	0.00	100.000
X-WEIR-4	BASE	025Y004H	0.00	0.000	0.000	0.00	142.500	0.00	127.500
P-17	BASE	025Y008H	5.23	1.739	0.036	5.18	131.760	5.17	131.675
P-DS-1	BASE	025Y008H	5.20	1.737	-0.005	5.20	135.543	5.18	131.760
P-DS-2	BASE	025Y008H	5.17	7.063	0.040	5.17	131.675	0.00	130.150
P-DS-3	BASE	025Y008H	5.13	3.825	-0.015	5.13	136.076	5.17	131.675
P-DS-4	BASE	025Y008H	5.12	9.488	-0.042	5.12	128.550	0.00	127.500
P-PERC-1	BASE	025Y008H	2.71	2.927	-2.153	5.20	135.543	0.00	100.000
P-PERC-2	BASE	025Y008H	2.17	1.856	-0.876	5.17	131.675	0.00	100.000
P-PERC-3	BASE	025Y008H	2.18	3.634	-1.935	5.13	136.076	0.00	100.000
P-PERC-4	BASE	025Y008H	2.25	9.400	-6.104	5.12	128.550	0.00	100.000
X-WEIR-4	BASE	025Y008H	0.00	0.000	0.000	0.00	142.500	0.00	127.500
P-17	BASE	025Y024H	16.03	1.096	0.003	16.03	131.567	29.91	131.042
P-DS-1	BASE	025Y024H	16.03	1.096	0.003	16.03	135.227	16.03	131.567
P-DS-2	BASE	025Y024H	15.15	4.150	0.035	15.15	131.403	0.00	130.150
P-DS-3	BASE	025Y024H	15.15	2.029	0.006	15.15	135.567	15.15	131.403
P-DS-4	BASE	025Y024H	15.10	5.174	0.020	15.10	128.167	0.00	127.500
P-PERC-1	BASE	025Y024H	6.50	0.938	-0.169	16.03	135.227	0.00	100.000
P-PERC-2	BASE	025Y024H	5.58	0.768	0.421	15.15	131.403	0.00	100.000
P-PERC-3	BASE	025Y024H	6.15	1.490	0.116	15.15	135.567	0.00	100.000
P-PERC-4	BASE	025Y024H	5.10	2.656	-1.137	15.10	128.167	0.00	100.000
X-WEIR-4	BASE	025Y024H	0.00	0.000	0.000	0.00	142.500	0.00	127.500
P-17	BASE	025Y072H	60.26	1.025	0.004	60.15	131.554	60.10	131.429
P-DS-1	BASE	025Y072H	60.25	1.023	0.004	60.25	135.188	60.15	131.554
P-DS-2	BASE	025Y072H	60.10	4.433	0.031	60.10	131.429	0.00	130.150
P-DS-3	BASE	025Y072H	60.16	2.100	0.010	60.16	135.590	60.10	131.429
P-DS-4	BASE	025Y072H	60.08	5.496	0.032	60.08	128.195	0.00	127.500
P-PERC-1	BASE	025Y072H	11.50	0.816	-0.363	60.25	135.188	0.00	100.000
P-PERC-2	BASE	025Y072H	8.87	0.599	-0.263	60.10	131.429	0.00	100.000
P-PERC-3	BASE	025Y072H	11.10	1.490	0.295	60.16	135.590	0.00	100.000
P-PERC-4	BASE	025Y072H	9.92	2.856	-0.692	60.08	128.195	0.00	100.000
X-WEIR-4	BASE	025Y072H	0.00	0.000	0.000	0.00	142.500	0.00	127.500
P-17	BASE	050Y001H	1.19	1.209	0.031	1.20	131.593	1.07	131.204
P-DS-1	BASE	050Y001H	1.18	1.210	-0.004	1.18	135.287	1.20	131.593
P-DS-2	BASE	050Y001H	1.37	3.020	0.033	1.37	131.301	0.00	130.150
P-DS-3	BASE	050Y001H	1.16	3.040	-0.015	1.16	135.866	1.37	131.301
P-DS-4	BASE	050Y001H	1.18	5.959	-0.034	1.18	128.234	0.00	127.500
P-PERC-1	BASE	050Y001H	0.32	7.114	-3.674	1.18	135.287	0.00	100.000
P-PERC-2	BASE	050Y001H	0.27	3.591	-0.630	1.37	131.301	0.00	100.000
P-PERC-3	BASE	050Y001H	0.30	6.868	-3.266	1.16	135.866	0.00	100.000
P-PERC-4	BASE	050Y001H	0.29	17.821	-12.223	1.18	128.234	0.00	100.000
X-WEIR-4	BASE	050Y001H	0.00	0.000	0.000	0.00	142.500	0.00	127.500
P-17	BASE	050Y002H	2.03	1.644	0.036	2.03	131.713	2.03	131.612
P-DS-1	BASE	050Y002H	1.99	1.645	-0.005	1.99	135.500	2.03	131.713

Name	Group	Simulation	Max Time Flow hrs	Max Flow cfs	Max Delta Q cfs	Max Time US Stage hrs	Max US Stage ft	Max Time DS Stage hrs	Max DS Stage ft
P-DS-2	BASE	050Y002H	2.03	6.405	0.042	2.03	131.612	0.00	130.150
P-DS-3	BASE	050Y002H	1.80	3.800	-0.019	1.80	136.069	2.03	131.612
P-DS-4	BASE	050Y002H	1.87	9.037	-0.058	1.87	128.506	0.00	127.500
P-PERC-1	BASE	050Y002H	0.30	6.159	-3.803	1.99	135.500	0.00	100.000
P-PERC-2	BASE	050Y002H	0.22	3.249	-0.531	2.03	131.612	0.00	100.000
P-PERC-3	BASE	050Y002H	0.25	6.351	-2.078	1.80	136.069	0.00	100.000
P-PERC-4	BASE	050Y002H	0.23	16.612	-5.432	1.87	128.506	0.00	100.000
X-WEIR-4	BASE	050Y002H	0.00	0.000	0.000	0.00	142.500	0.00	127.500
P-17	BASE	050Y004H	3.39	2.101	0.035	3.31	131.903	3.29	131.839
P-DS-1	BASE	050Y004H	3.35	2.098	-0.006	3.35	135.703	3.31	131.903
P-DS-2	BASE	050Y004H	3.29	8.787	0.056	3.29	131.839	0.00	130.150
P-DS-3	BASE	050Y004H	3.23	4.818	-0.019	3.23	136.321	3.29	131.839
P-DS-4	BASE	050Y004H	3.21	11.893	-0.051	3.21	128.785	0.00	127.500
P-PERC-1	BASE	050Y004H	1.12	4.357	-1.973	3.35	135.703	0.00	100.000
P-PERC-2	BASE	050Y004H	0.80	2.313	-1.975	3.29	131.839	0.00	100.000
P-PERC-3	BASE	050Y004H	0.83	4.490	-2.038	3.23	136.321	0.00	100.000
P-PERC-4	BASE	050Y004H	0.83	11.451	-5.487	3.21	128.785	0.00	100.000
X-WEIR-4	BASE	050Y004H	0.00	0.000	0.000	0.00	142.500	0.00	127.500
P-17	BASE	050Y008H	5.24	2.315	0.040	5.12	131.986	5.14	131.927
P-DS-1	BASE	050Y008H	5.16	2.314	-0.005	5.16	135.794	5.12	131.986
P-DS-2	BASE	050Y008H	5.12	9.691	0.055	5.14	131.927	0.00	130.150
P-DS-3	BASE	050Y008H	5.09	5.096	-0.014	5.09	136.387	5.14	131.927
P-DS-4	BASE	050Y008H	5.07	12.521	0.039	5.07	128.846	0.00	127.500
P-PERC-1	BASE	050Y008H	2.14	4.144	-1.745	5.16	135.794	0.00	100.000
P-PERC-2	BASE	050Y008H	2.03	1.852	-0.850	5.14	131.927	0.00	100.000
P-PERC-3	BASE	050Y008H	2.02	3.652	-1.943	5.09	136.387	0.00	100.000
P-PERC-4	BASE	050Y008H	2.10	9.412	-7.861	5.07	128.846	0.00	100.000
X-WEIR-4	BASE	050Y008H	0.00	0.000	0.000	0.00	142.500	0.00	127.500
P-17	BASE	050Y024H	15.24	1.449	0.005	15.12	131.650	15.09	131.531
P-DS-1	BASE	050Y024H	15.22	1.448	0.004	15.22	135.406	15.12	131.650
P-DS-2	BASE	050Y024H	15.09	5.540	0.043	15.09	131.531	0.00	130.150
P-DS-3	BASE	050Y024H	15.07	2.667	0.009	15.07	135.760	15.09	131.531
P-DS-4	BASE	050Y024H	13.14	7.031	0.030	13.14	128.321	0.00	127.500
P-PERC-1	BASE	050Y024H	5.83	1.109	-1.004	15.22	135.406	0.00	100.000
P-PERC-2	BASE	050Y024H	5.02	0.864	0.818	15.09	131.531	0.00	100.000
P-PERC-3	BASE	050Y024H	5.53	1.587	-0.096	15.07	135.760	0.00	100.000
P-PERC-4	BASE	050Y024H	4.50	2.918	-1.399	13.14	128.321	0.00	100.000
X-WEIR-4	BASE	050Y024H	0.00	0.000	0.000	0.00	142.500	0.00	127.500
P-17	BASE	050Y072H	60.25	1.263	0.005	60.13	131.631	60.10	131.528
P-DS-1	BASE	050Y072H	60.23	1.260	0.005	60.23	135.313	60.13	131.631
P-DS-2	BASE	050Y072H	60.10	5.503	0.040	60.10	131.528	0.00	130.150
P-DS-3	BASE	050Y072H	60.15	2.615	0.011	60.15	135.745	60.10	131.528
P-DS-4	BASE	050Y072H	60.07	6.634	0.038	60.07	128.289	0.00	127.500
P-PERC-1	BASE	050Y072H	10.75	0.962	-0.103	60.23	135.313	0.00	100.000
P-PERC-2	BASE	050Y072H	9.87	0.796	0.409	60.10	131.528	0.00	100.000
P-PERC-3	BASE	050Y072H	10.43	1.476	1.323	60.15	135.745	0.00	100.000
P-PERC-4	BASE	050Y072H	9.42	3.366	-1.847	60.07	128.289	0.00	100.000
X-WEIR-4	BASE	050Y072H	0.00	0.000	0.000	0.00	142.500	0.00	127.500
P-17	BASE	100Y001H	1.18	1.530	0.038	1.19	131.660	0.92	131.221
P-DS-1	BASE	100Y001H	1.17	1.530	-0.005	1.17	135.446	1.19	131.660
P-DS-2	BASE	100Y001H	1.27	4.814	0.039	1.27	131.464	0.00	130.150
P-DS-3	BASE	100Y001H	1.16	3.826	-0.018	1.16	136.076	1.27	131.464
P-DS-4	BASE	100Y001H	1.16	8.433	-0.051	1.16	128.448	0.00	127.500
P-PERC-1	BASE	100Y001H	0.29	8.027	-4.182	1.17	135.446	0.00	100.000
P-PERC-2	BASE	100Y001H	0.27	3.528	-0.640	1.27	131.464	0.00	100.000
P-PERC-3	BASE	100Y001H	0.29	7.046	-4.959	1.16	136.076	0.00	100.000
P-PERC-4	BASE	100Y001H	0.27	18.591	-12.556	1.16	128.448	0.00	100.000
X-WEIR-4	BASE	100Y001H	0.00	0.000	0.000	0.00	142.500	0.00	127.500
P-17	BASE	100Y002H	1.98	1.933	0.040	1.97	131.820	1.97	131.741
P-DS-1	BASE	100Y002H	1.96	1.933	-0.006	1.96	135.631	1.97	131.820
P-DS-2	BASE	100Y002H	1.97	7.755	0.038	1.97	131.741	0.00	130.150
P-DS-3	BASE	100Y002H	1.76	4.481	-0.020	1.76	136.240	1.97	131.741
P-DS-4	BASE	100Y002H	1.82	10.722	-0.051	1.82	128.670	0.00	127.500

Name	Group	Simulation	Max Time Flow hrs	Max Flow cfs	Max Delta Q cfs	Max Time US Stage hrs	Max US Stage ft	Max Time DS Stage hrs	Max DS Stage ft
P-PERC-1	BASE	100Y002H	0.28	6.224	-2.751	1.96	135.631	0.00	100.000
P-PERC-2	BASE	100Y002H	0.22	3.308	-0.750	1.97	131.741	0.00	100.000
P-PERC-3	BASE	100Y002H	0.23	6.398	-2.068	1.76	136.240	0.00	100.000
P-PERC-4	BASE	100Y002H	0.22	16.826	-6.438	1.82	128.670	0.00	100.000
X-WEIR-4	BASE	100Y002H	0.00	0.000	0.000	0.00	142.500	0.00	127.500
P-17	BASE	100Y004H	3.34	2.453	0.037	3.26	132.055	3.25	132.001
P-DS-1	BASE	100Y004H	3.32	2.449	-0.006	3.32	135.850	3.26	132.055
P-DS-2	BASE	100Y004H	3.25	10.420	0.050	3.25	132.001	0.00	130.150
P-DS-3	BASE	100Y004H	3.22	5.630	-0.021	3.22	136.510	3.25	132.001
P-DS-4	BASE	100Y004H	3.19	13.776	-0.051	3.19	128.970	0.00	127.500
P-PERC-1	BASE	100Y004H	1.05	4.428	-2.729	3.32	135.850	0.00	100.000
P-PERC-2	BASE	100Y004H	0.75	2.379	-1.795	3.25	132.001	0.00	100.000
P-PERC-3	BASE	100Y004H	0.78	4.588	-2.045	3.22	136.510	0.00	100.000
P-PERC-4	BASE	100Y004H	0.78	11.763	-8.451	3.19	128.970	0.00	100.000
X-WEIR-4	BASE	100Y004H	0.00	0.000	0.000	0.00	142.500	0.00	127.500
P-17	BASE	100Y008H	5.06	2.474	0.043	5.13	132.036	5.13	131.980
P-DS-1	BASE	100Y008H	5.15	2.432	0.006	5.15	135.843	5.13	132.036
P-DS-2	BASE	100Y008H	5.12	10.210	0.057	5.13	131.980	0.00	130.150
P-DS-3	BASE	100Y008H	5.09	5.355	-0.018	5.09	136.447	5.13	131.980
P-DS-4	BASE	100Y008H	5.07	13.111	-0.048	5.07	128.904	0.00	127.500
P-PERC-1	BASE	100Y008H	2.11	3.703	-2.869	5.15	135.843	0.00	100.000
P-PERC-2	BASE	100Y008H	1.93	1.874	-0.849	5.13	131.980	0.00	100.000
P-PERC-3	BASE	100Y008H	1.88	3.730	-3.439	5.09	136.447	0.00	100.000
P-PERC-4	BASE	100Y008H	2.08	9.396	-4.675	5.07	128.904	0.00	100.000
X-WEIR-4	BASE	100Y008H	0.00	0.000	0.000	0.00	142.500	0.00	127.500
P-17	BASE	100Y024H	15.16	1.840	0.005	15.07	131.768	13.21	131.680
P-DS-1	BASE	100Y024H	15.14	1.839	0.005	15.14	135.589	15.07	131.768
P-DS-2	BASE	100Y024H	13.19	7.114	0.041	13.21	131.680	0.00	130.150
P-DS-3	BASE	100Y024H	13.19	3.481	0.010	13.19	135.986	13.21	131.680
P-DS-4	BASE	100Y024H	12.56	9.032	0.035	12.56	128.506	0.00	127.500
P-PERC-1	BASE	100Y024H	5.28	1.221	-0.230	15.14	135.589	0.00	100.000
P-PERC-2	BASE	100Y024H	4.45	0.932	0.215	13.21	131.680	0.00	100.000
P-PERC-3	BASE	100Y024H	5.00	1.490	0.057	13.19	135.986	0.00	100.000
P-PERC-4	BASE	100Y024H	4.02	3.416	-1.896	12.56	128.506	0.00	100.000
X-WEIR-4	BASE	100Y024H	0.00	0.000	0.000	0.00	142.500	0.00	127.500
P-17	BASE	100Y072H	60.24	1.526	0.005	60.12	131.722	60.10	131.640
P-DS-1	BASE	100Y072H	60.22	1.523	0.005	60.22	135.443	60.12	131.722
P-DS-2	BASE	100Y072H	60.10	6.703	0.048	60.10	131.640	0.00	130.150
P-DS-3	BASE	100Y072H	60.14	3.192	0.012	60.14	135.908	60.10	131.640
P-DS-4	BASE	100Y072H	60.07	7.826	0.040	60.07	128.391	0.00	127.500
P-PERC-1	BASE	100Y072H	10.15	1.123	-0.505	60.22	135.443	0.00	100.000
P-PERC-2	BASE	100Y072H	9.40	0.924	0.870	60.10	131.640	0.00	100.000
P-PERC-3	BASE	100Y072H	9.03	1.644	-0.597	60.14	135.908	0.00	100.000
P-PERC-4	BASE	100Y072H	9.00	3.930	-1.654	60.07	128.391	0.00	100.000
X-WEIR-4	BASE	100Y072H	0.00	0.000	0.000	0.00	142.500	0.00	127.500
P-17	BASE	25Y 24H SWFWMD	12.90	1.658	0.048	13.06	131.703	13.09	131.595
P-DS-1	BASE	25Y 24H SWFWMD	12.86	1.663	0.004	12.86	135.508	13.06	131.703
P-DS-2	BASE	25Y 24H SWFWMD	13.09	6.216	0.042	13.09	131.595	0.00	130.150
P-DS-3	BASE	25Y 24H SWFWMD	12.76	3.888	-0.012	12.76	136.092	13.09	131.595
P-DS-4	BASE	25Y 24H SWFWMD	12.71	9.440	0.037	12.71	128.545	0.00	127.500
P-PERC-1	BASE	25Y 24H SWFWMD	9.88	0.838	-0.391	12.86	135.508	0.00	100.000
P-PERC-2	BASE	25Y 24H SWFWMD	12.39	0.961	0.369	13.09	131.595	0.00	100.000
P-PERC-3	BASE	25Y 24H SWFWMD	9.47	1.155	0.631	12.76	136.092	0.00	100.000
P-PERC-4	BASE	25Y 24H SWFWMD	7.97	1.798	-0.280	12.71	128.545	0.00	100.000
X-WEIR-4	BASE	25Y 24H SWFWMD	0.00	0.000	0.000	0.00	142.500	0.00	127.500

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         Name: P-BASIN-1                Node: P-POND-1              Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh323                   Peaking Factor: 323.0
          Rainfall File:                    Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                Time of Conc(min): 10.00
               Area(ac): 3.510                  Time Shift(hrs): 0.00
           Curve Number: 78.70             Max Allowable Q(cfs): 999999.000
                DCIA(%): 77.40


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         Name: P-BASIN-2                Node: P-POND-2              Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh323                   Peaking Factor: 323.0
          Rainfall File:                    Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                Time of Conc(min): 10.00
               Area(ac): 4.200                  Time Shift(hrs): 0.00
           Curve Number: 51.80             Max Allowable Q(cfs): 999999.000
                DCIA(%): 52.90


----------------------------------------------------------------------------------------------------
         Name: P-BASIN-3                Node: P-POND-3              Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh323                   Peaking Factor: 323.0
          Rainfall File:                    Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                Time of Conc(min): 12.00
               Area(ac): 6.600                  Time Shift(hrs): 0.00
           Curve Number: 50.50             Max Allowable Q(cfs): 999999.000
                DCIA(%): 67.20

*need to adjust cn and tc

----------------------------------------------------------------------------------------------------
         Name: P-BASIN-4                Node: P-POND-4              Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh323                   Peaking Factor: 323.0
          Rainfall File:                    Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                Time of Conc(min): 10.00
               Area(ac): 13.300                 Time Shift(hrs): 0.00
           Curve Number: 70.00             Max Allowable Q(cfs): 999999.000
                DCIA(%): 79.30


----------------------------------------------------------------------------------------------------
         Name: P-BASIN-5                Node: P-BNDY-EAST           Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                   Peaking Factor: 256.0
          Rainfall File:                    Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                Time of Conc(min): 10.00
               Area(ac): 0.750                  Time Shift(hrs): 0.00
           Curve Number: 44.00             Max Allowable Q(cfs): 999999.000
                DCIA(%): 49.20


----------------------------------------------------------------------------------------------------
         Name: X-BASIN-1                Node: X-BNDY-WEST           Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh323                   Peaking Factor: 323.0
          Rainfall File:                    Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                Time of Conc(min): 17.00
               Area(ac): 3.510                  Time Shift(hrs): 0.00
           Curve Number: 49.00             Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00


----------------------------------------------------------------------------------------------------
         Name: X-BASIN-2                Node: X-BNDY-WEST           Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh323                   Peaking Factor: 323.0
          Rainfall File:                    Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                Time of Conc(min): 17.00
               Area(ac): 4.200                  Time Shift(hrs): 0.00
```

```
           Curve Number: 61.00             Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00



----------------------------------------------------------------------------------------------------
         Name: X-BASIN-3               Node: X-BNDY-WEST            Status: Onsite
        Group: BASE                    Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                   Peaking Factor: 256.0
          Rainfall File:                    Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                Time of Conc(min): 18.00
               Area(ac): 6.600                  Time Shift(hrs): 0.00
           Curve Number: 51.00             Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00



----------------------------------------------------------------------------------------------------
         Name: X-BASIN-4               Node: X-BNDY-EAST            Status: Onsite
        Group: BASE                    Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh323                   Peaking Factor: 323.0
          Rainfall File:                    Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                Time of Conc(min): 24.00
               Area(ac): 13.300                 Time Shift(hrs): 0.00
           Curve Number: 59.00             Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00



----------------------------------------------------------------------------------------------------
         Name: X-BASIN-5               Node: X-BNDY-EAST            Status: Onsite
        Group: BASE                    Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                   Peaking Factor: 256.0
          Rainfall File:                    Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                Time of Conc(min): 19.00
               Area(ac): 0.750                  Time Shift(hrs): 0.00
           Curve Number: 53.00             Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00



==========================================================================================
==== Nodes ===============================================================================
==========================================================================================

      Name: P-AQ-1             Base Flow(cfs): 0.000          Init Stage(ft): 100.000
     Group: BASE                                              Warn Stage(ft): 0.000
      Type: Time/Stage



      Time(hrs)       Stage(ft)
--------------- ---------------
           0.00         100.000
          30.00         100.000

------------------------------------------------------------------------------------------
      Name: P-AQ-2             Base Flow(cfs): 0.000          Init Stage(ft): 100.000
     Group: BASE                                              Warn Stage(ft): 0.000
      Type: Time/Stage



      Time(hrs)       Stage(ft)
--------------- ---------------
           0.00         100.000
          30.00          10.000

------------------------------------------------------------------------------------------
      Name: P-AQ-3             Base Flow(cfs): 0.000          Init Stage(ft): 100.000
     Group: BASE                                              Warn Stage(ft): 0.000
      Type: Time/Stage



      Time(hrs)       Stage(ft)
--------------- ---------------
           0.00         100.000
          30.00         100.000

------------------------------------------------------------------------------------------
      Name: P-AQ-4             Base Flow(cfs): 0.000          Init Stage(ft): 100.000
     Group: BASE                                              Warn Stage(ft): 0.000
      Type: Time/Stage
```

Time(hrs)	Stage(ft)
0.00	100.000
30.00	100.000

Name: P-BNDY-EAST   Base Flow(cfs): 0.000   Init Stage(ft): 127.500
Group: BASE   Warn Stage(ft): 127.600
Type: Time/Stage

* 127.5 IS LATEST 100 YEAR FLOOD PER COUNTY STUDY

Time(hrs)	Stage(ft)
0.00	127.500
30.00	127.500

Name: P-BNDY-WEST   Base Flow(cfs): 0.000   Init Stage(ft): 130.150
Group: BASE   Warn Stage(ft): 131.000
Type: Time/Stage

**Ditch bottom used for initial stage
***Weir crest used for warning

Time(hrs)	Stage(ft)
0.00	130.150
30.00	130.150

Name: P-POND-1   Base Flow(cfs): 0.000   Init Stage(ft): 134.000
Group: BASE   Warn Stage(ft): 136.000
Type: Stage/Area

Stage(ft)	Area(ac)
134.000	0.4800
135.000	0.5600
136.000	0.6500
137.000	0.7300

Name: P-POND-2   Base Flow(cfs): 0.000   Init Stage(ft): 129.000
Group: BASE   Warn Stage(ft): 132.000
Type: Stage/Area

Stage(ft)	Area(ac)
129.000	0.2300
130.000	0.3000
131.000	0.3700
132.000	0.4400
133.000	0.5100

Name: P-POND-3   Base Flow(cfs): 0.000   Init Stage(ft): 134.000
Group: BASE   Warn Stage(ft): 137.000
Type: Stage/Area

Stage(ft)	Area(ac)
134.000	0.4500
135.000	0.5400
136.000	0.6200
137.000	0.7100
138.000	0.8000

Name: P-POND-4   Base Flow(cfs): 0.000   Init Stage(ft): 126.000
Group: BASE   Warn Stage(ft): 129.000
Type: Stage/Area

Stage(ft)	Area(ac)
126.000	1.1700
127.000	1.2900
128.000	1.4200
129.000	1.5500
130.000	1.6900

```
      Name: STM-23             Base Flow(cfs): 0.000          Init Stage(ft): 0.000
     Group: BASE                                              Warn Stage(ft): 0.000
      Type: Stage/Area



      Stage(ft)        Area(ac)
--------------- ---------------

------------------------------------------------------------------------------------------
      Name: X-BNDY-EAST        Base Flow(cfs): 0.000          Init Stage(ft): 127.500
     Group: BASE                                              Warn Stage(ft): 127.600
      Type: Time/Stage

* 127.5 IS LATEST 100 YEAR FLOOD PER COUNTY STUDY

      Time(hrs)       Stage(ft)
--------------- ---------------
           0.00         127.500
          30.00         127.500

------------------------------------------------------------------------------------------
      Name: X-BNDY-WEST        Base Flow(cfs): 0.000          Init Stage(ft): 130.150
     Group: BASE                                              Warn Stage(ft): 131.100
      Type: Time/Stage

**Ditch bottom used for initial stage
***Weir crest used for warning

      Time(hrs)       Stage(ft)
--------------- ---------------
           0.00         130.150
          30.00         131.000

------------------------------------------------------------------------------------------
      Name: X-POND-4           Base Flow(cfs): 0.000          Init Stage(ft): 142.500
     Group: BASE                                              Warn Stage(ft): 145.000
      Type: Stage/Area



      Stage(ft)        Area(ac)
--------------- ---------------
        142.500          0.0240
        143.000          0.0630
        144.000          0.1730
        145.000          0.3700

==========================================================================================
==== Pipes ===============================================================================
==========================================================================================

         Name: P-17               From Node: STM-23            Length(ft): 204.00
        Group: BASE                 To Node: P-POND-2               Count: 1
                                                       Friction Equation: Automatic
               UPSTREAM       DOWNSTREAM              Solution Algorithm: Most Restrictive
     Geometry: Circular       Circular                              Flow: Both
     Span(in): 24.00          24.00                   Entrance Loss Coef: 0.50
     Rise(in): 24.00          24.00                       Exit Loss Coef: 0.00
   Invert(ft): 131.090        129.000                     Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                  Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                      Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                    Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall



==========================================================================================
==== Drop Structures =====================================================================
==========================================================================================

         Name: P-DS-1             From Node: P-POND-1          Length(ft): 73.00
        Group: BASE                 To Node: STM-23                 Count: 1

               UPSTREAM       DOWNSTREAM               Friction Equation: Automatic
     Geometry: Circular       Circular                Solution Algorithm: Most Restrictive
     Span(in): 18.00          18.00                                 Flow: Both
     Rise(in): 18.00          18.00                   Entrance Loss Coef: 0.500
   Invert(ft): 132.730        132.000                     Exit Loss Coef: 0.000
  Manning's N: 0.013000       0.013000                  Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                      Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                        Solution Incs: 10
```

```
Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


*** Weir 1 of 1 for Drop Structure P-DS-1 ***
                                                                                  TABLE
                  Count: 1                        Bottom Clip(in): 0.000
                   Type: Vertical: Mavis             Top Clip(in): 0.000
                   Flow: Both                      Weir Disc Coef: 3.200
               Geometry: Rectangular            Orifice Disc Coef: 0.600

               Span(in): 5.00                          Invert(ft): 134.350
               Rise(in): 9999.00                 Control Elev(ft): 134.350

----------------------------------------------------------------------------------------------------
         Name: P-DS-2              From Node: P-POND-2          Length(ft): 45.00
        Group: BASE                  To Node: P-BNDY-WEST            Count: 1

               UPSTREAM       DOWNSTREAM                Friction Equation: Automatic
     Geometry: Horz Ellipse   Horz Ellipse             Solution Algorithm: Most Restrictive
     Span(in): 30.00          30.00                                  Flow: Both
     Rise(in): 19.00          19.00                    Entrance Loss Coef: 0.000
   Invert(ft): 130.350        130.150                      Exit Loss Coef: 0.500
  Manning's N: 0.013000       0.013000                   Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                       Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                         Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Horizontal Ellipse Concrete: Square edge with headwall

Downstream FHWA Inlet Edge Description:
Horizontal Ellipse Concrete: Square edge with headwall


*** Weir 1 of 1 for Drop Structure P-DS-2 ***
                                                                                  TABLE
                  Count: 2                        Bottom Clip(in): 0.000
                   Type: Vertical: Mavis             Top Clip(in): 0.000
                   Flow: Both                      Weir Disc Coef: 3.200
               Geometry: Rectangular            Orifice Disc Coef: 0.600

               Span(in): 35.00                         Invert(ft): 131.000
               Rise(in): 9999.00                 Control Elev(ft): 131.000

----------------------------------------------------------------------------------------------------
         Name: P-DS-3              From Node: P-POND-3          Length(ft): 75.00
        Group: BASE                  To Node: P-POND-2               Count: 1

               UPSTREAM       DOWNSTREAM                Friction Equation: Automatic
     Geometry: Circular       Circular                 Solution Algorithm: Most Restrictive
     Span(in): 24.00          24.00                                  Flow: Both
     Rise(in): 24.00          24.00                    Entrance Loss Coef: 0.000
   Invert(ft): 129.750        129.000                      Exit Loss Coef: 0.500
  Manning's N: 0.013000       0.013000                   Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                       Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                         Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


*** Weir 1 of 1 for Drop Structure P-DS-3 ***
                                                                                  TABLE
                  Count: 1                        Bottom Clip(in): 0.000
                   Type: Vertical: Mavis             Top Clip(in): 0.000
                   Flow: Both                      Weir Disc Coef: 3.200
               Geometry: Rectangular            Orifice Disc Coef: 0.600

               Span(in): 8.00                          Invert(ft): 134.600
               Rise(in): 999.00                  Control Elev(ft): 134.600

----------------------------------------------------------------------------------------------------
         Name: P-DS-4              From Node: P-POND-4          Length(ft): 33.00
        Group: BASE                  To Node: P-BNDY-EAST            Count: 1

               UPSTREAM       DOWNSTREAM                Friction Equation: Automatic
     Geometry: Circular       Circular                 Solution Algorithm: Most Restrictive
     Span(in): 24.00          24.00                                  Flow: Both
```

```
     Rise(in): 24.00          24.00                      Entrance Loss Coef: 0.000
   Invert(ft): 126.200        126.000                        Exit Loss Coef: 0.500
  Manning's N: 0.013000       0.013000                    Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                        Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                          Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall



*** Weir 1 of 1 for Drop Structure P-DS-4 ***
                                                                                    TABLE
                  Count: 1                      Bottom Clip(in): 0.000
                   Type: Vertical: Mavis           Top Clip(in): 0.000
                   Flow: Both                    Weir Disc Coef: 3.200
               Geometry: Rectangular          Orifice Disc Coef: 0.600

               Span(in): 36.00                      Invert(ft): 127.500
               Rise(in): 9999.00               Control Elev(ft): 127.500


==========================================================================================
==== Weirs ===============================================================================
==========================================================================================

         Name: X-WEIR-4           From Node: X-POND-4
        Group: BASE                 To Node: X-BNDY-EAST
         Flow: Both                   Count: 1
         Type: Vertical: Mavis     Geometry: Rectangular

                    Span(in): 3300.00
                    Rise(in): 9999.00
                  Invert(ft): 144.750
       Control Elevation(ft): 144.750
                                              TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600



==========================================================================================
==== Percolation Links ===================================================================
==========================================================================================

         Name: P-PERC-1           From Node: P-POND-1                Flow: Both
        Group: BASE                 To Node: P-AQ-1                 Count: 1

         Surface Area Option: Use 1st Point in Stage/Area Table
   Vertical Flow Termination: Horizontal Flow Algorithm
       Aquifer Base Elev(ft): 129.500                       Perimeter 1(ft): 929.000
        Water Table Elev(ft): 132.000                       Perimeter 2(ft): 1244.000
  Ann Recharge Rate(in/year): 0.000                         Perimeter 3(ft): 2710.000
  Horiz Conductivity(ft/day): 20.000                    Distance 1 to 2(ft): 50.000
   Vert Conductivity(ft/day): 13.500                    Distance 2 to 3(ft): 450.000
     Effective Porosity(dec): 0.300                        Num Cells 1 to 2: 10
            Suction Head(in): 4.170                        Num Cells 2 to 3: 45
        Layer Thickness(ft): 2.000



----------------------------------------------------------------------------------------------------
         Name: P-PERC-2           From Node: P-POND-2                Flow: Both
        Group: BASE                 To Node: P-AQ-2                 Count: 1

         Surface Area Option: Use 1st Point in Stage/Area Table
   Vertical Flow Termination: Horizontal Flow Algorithm
       Aquifer Base Elev(ft): 124.000                       Perimeter 1(ft): 810.000
        Water Table Elev(ft): 126.500                       Perimeter 2(ft): 934.000
  Ann Recharge Rate(in/year): 0.000                         Perimeter 3(ft): 1054.000
  Horiz Conductivity(ft/day): 20.000                    Distance 1 to 2(ft): 50.000
   Vert Conductivity(ft/day): 13.500                    Distance 2 to 3(ft): 450.000
     Effective Porosity(dec): 0.300                        Num Cells 1 to 2: 10
            Suction Head(in): 4.170                        Num Cells 2 to 3: 45
        Layer Thickness(ft): 2.500



----------------------------------------------------------------------------------------------------
         Name: P-PERC-3           From Node: P-POND-3                Flow: Both
        Group: BASE                 To Node: P-AQ-3                 Count: 1

         Surface Area Option: Use 1st Point in Stage/Area Table
```

```
   Vertical Flow Termination: Horizontal Flow Algorithm
       Aquifer Base Elev(ft): 128.500                    Perimeter 1(ft): 982.000
        Water Table Elev(ft): 131.000                    Perimeter 2(ft): 1075.000
  Ann Recharge Rate(in/year): 0.000                      Perimeter 3(ft): 1091.000
  Horiz Conductivity(ft/day): 20.000                 Distance 1 to 2(ft): 50.000
   Vert Conductivity(ft/day): 13.500                 Distance 2 to 3(ft): 450.000
     Effective Porosity(dec): 0.300                     Num Cells 1 to 2: 10
            Suction Head(in): 4.170                     Num Cells 2 to 3: 45
         Layer Thickness(ft): 3.000



----------------------------------------------------------------------------------------------------
         Name: P-PERC-4            From Node: P-POND-4                Flow: Both
        Group: BASE                  To Node: P-AQ-4                 Count: 1

         Surface Area Option: Use 1st Point in Stage/Area Table
   Vertical Flow Termination: Horizontal Flow Algorithm
       Aquifer Base Elev(ft): 120.000                    Perimeter 1(ft): 1377.000
        Water Table Elev(ft): 124.000                    Perimeter 2(ft): 1691.000
  Ann Recharge Rate(in/year): 0.000                      Perimeter 3(ft): 3688.000
  Horiz Conductivity(ft/day): 20.000                 Distance 1 to 2(ft): 50.000
   Vert Conductivity(ft/day): 13.500                 Distance 2 to 3(ft): 450.000
     Effective Porosity(dec): 0.300                     Num Cells 1 to 2: 10
            Suction Head(in): 4.170                     Num Cells 2 to 3: 45
         Layer Thickness(ft): 2.000



==========================================================================================
==== Hydrology Simulations ===============================================================
==========================================================================================

         Name: 002Y001H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\002Y001H.R32

      Override Defaults: Yes
    Storm Duration(hrs): 1.00
          Rainfall File: FDOT-1
    Rainfall Amount(in): 2.50

Time(hrs)       Print Inc(min)
--------------- ---------------
2.000           2.50

----------------------------------------------------------------------------------------------------
         Name: 002Y002H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\002Y002H.R32

      Override Defaults: Yes
    Storm Duration(hrs): 2.00
          Rainfall File: FDOT-2
    Rainfall Amount(in): 2.80

Time(hrs)       Print Inc(min)
--------------- ---------------
3.000           2.50

----------------------------------------------------------------------------------------------------
         Name: 002Y004H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\002Y004H.R32

      Override Defaults: Yes
    Storm Duration(hrs): 4.00
          Rainfall File: FDOT-4
    Rainfall Amount(in): 3.33

Time(hrs)       Print Inc(min)
--------------- ---------------
5.000           5.00

----------------------------------------------------------------------------------------------------
         Name: 002Y008H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\002Y008H.R32

      Override Defaults: Yes
    Storm Duration(hrs): 8.00
          Rainfall File: FDOT-8
    Rainfall Amount(in): 3.80

Time(hrs)       Print Inc(min)
--------------- ---------------
9.000           5.00

----------------------------------------------------------------------------------------------------
         Name: 002Y024H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\002Y024H.R32
```

```
      Override Defaults: Yes
    Storm Duration(hrs): 24.00
          Rainfall File: FDOT-24
    Rainfall Amount(in): 4.21

Time(hrs)       Print Inc(min)
--------------- ---------------
25.000          5.00

----------------------------------------------------------------------------------------------------
         Name: 002Y072H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\002Y072H.R32

      Override Defaults: Yes
    Storm Duration(hrs): 72.00
          Rainfall File: FDOT-72
    Rainfall Amount(in): 4.75

Time(hrs)       Print Inc(min)
--------------- ---------------
73.000          5.00

----------------------------------------------------------------------------------------------------
         Name: 005Y001H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\005Y001H.R32

      Override Defaults: Yes
    Storm Duration(hrs): 1.00
          Rainfall File: FDOT-1
    Rainfall Amount(in): 3.00

Time(hrs)       Print Inc(min)
--------------- ---------------
2.000           2.50

----------------------------------------------------------------------------------------------------
         Name: 005Y002H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\005Y002H.R32

      Override Defaults: Yes
    Storm Duration(hrs): 2.00
          Rainfall File: FDOT-2
    Rainfall Amount(in): 3.50

Time(hrs)       Print Inc(min)
--------------- ---------------
3.000           2.50

----------------------------------------------------------------------------------------------------
         Name: 005Y004H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\005Y004H.R32

      Override Defaults: Yes
    Storm Duration(hrs): 4.00
          Rainfall File: FDOT-4
    Rainfall Amount(in): 4.10

Time(hrs)       Print Inc(min)
--------------- ---------------
5.000           5.00

----------------------------------------------------------------------------------------------------
         Name: 005Y008H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\005Y008H.R32

      Override Defaults: Yes
    Storm Duration(hrs): 8.00
          Rainfall File: FDOT-8
    Rainfall Amount(in): 4.90

Time(hrs)       Print Inc(min)
--------------- ---------------
9.000           5.00

----------------------------------------------------------------------------------------------------
         Name: 005Y024H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\005Y024H.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
          Rainfall File: FDOT-24
    Rainfall Amount(in): 5.16

Time(hrs)       Print Inc(min)
--------------- ---------------
25.000          5.00

----------------------------------------------------------------------------------------------------
         Name: 005Y072H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\005Y072H.R32
```

```
      Override Defaults: Yes
    Storm Duration(hrs): 72.00
          Rainfall File: FDOT-72
    Rainfall Amount(in): 6.58

Time(hrs)       Print Inc(min)
--------------- ---------------
73.000          5.00

----------------------------------------------------------------------------------------------------
         Name: 010Y001H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\010Y001H.R32

      Override Defaults: Yes
    Storm Duration(hrs): 1.00
          Rainfall File: FDOT-1
    Rainfall Amount(in): 3.30

Time(hrs)       Print Inc(min)
--------------- ---------------
2.000           2.50

----------------------------------------------------------------------------------------------------
         Name: 010Y002H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\010Y002H.R32

      Override Defaults: Yes
    Storm Duration(hrs): 2.00
          Rainfall File: FDOT-2
    Rainfall Amount(in): 4.00

Time(hrs)       Print Inc(min)
--------------- ---------------
3.000           2.50

----------------------------------------------------------------------------------------------------
         Name: 010Y004H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\010Y004H.R32

      Override Defaults: Yes
    Storm Duration(hrs): 4.00
          Rainfall File: FDOT-4
    Rainfall Amount(in): 4.60

Time(hrs)       Print Inc(min)
--------------- ---------------
5.000           5.00

----------------------------------------------------------------------------------------------------
         Name: 010Y008H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\010Y008H.R32

      Override Defaults: Yes
    Storm Duration(hrs): 8.00
          Rainfall File: FDOT-8
    Rainfall Amount(in): 5.60

Time(hrs)       Print Inc(min)
--------------- ---------------
9.000           5.00

----------------------------------------------------------------------------------------------------
         Name: 010Y024H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\010Y024H.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
          Rainfall File: FDOT-24
    Rainfall Amount(in): 6.12

Time(hrs)       Print Inc(min)
--------------- ---------------
25.000          5.00

----------------------------------------------------------------------------------------------------
         Name: 010Y072H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\010Y072H.R32

      Override Defaults: Yes
    Storm Duration(hrs): 72.00
          Rainfall File: FDOT-72
    Rainfall Amount(in): 7.78

Time(hrs)       Print Inc(min)
--------------- ---------------
73.000          5.00

----------------------------------------------------------------------------------------------------
         Name: 025Y001H
```

```
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\025Y001H.R32

      Override Defaults: Yes
    Storm Duration(hrs): 1.00
          Rainfall File: FDOT-1
    Rainfall Amount(in): 3.80

Time(hrs)       Print Inc(min)
--------------- ---------------
2.000           2.50

----------------------------------------------------------------------------------------------------
         Name: 025Y002H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\025Y002H.R32

      Override Defaults: Yes
    Storm Duration(hrs): 2.00
          Rainfall File: FDOT-2
    Rainfall Amount(in): 4.60

Time(hrs)       Print Inc(min)
--------------- ---------------
3.000           2.50

----------------------------------------------------------------------------------------------------
         Name: 025Y004H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\025Y004H.R32

      Override Defaults: Yes
    Storm Duration(hrs): 4.00
          Rainfall File: FDOT-4
    Rainfall Amount(in): 5.40

Time(hrs)       Print Inc(min)
--------------- ---------------
5.000           5.00

----------------------------------------------------------------------------------------------------
         Name: 025Y008H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\025Y008H.R32

      Override Defaults: Yes
    Storm Duration(hrs): 8.00
          Rainfall File: FDOT-8
    Rainfall Amount(in): 6.40

Time(hrs)       Print Inc(min)
--------------- ---------------
9.000           5.00

----------------------------------------------------------------------------------------------------
         Name: 025Y024H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\025Y024H.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
          Rainfall File: FDOT-24
    Rainfall Amount(in): 7.68

Time(hrs)       Print Inc(min)
--------------- ---------------
25.000          5.00

----------------------------------------------------------------------------------------------------
         Name: 025Y072H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\025Y072H.R32

      Override Defaults: Yes
    Storm Duration(hrs): 72.00
          Rainfall File: FDOT-72
    Rainfall Amount(in): 9.72

Time(hrs)       Print Inc(min)
--------------- ---------------
73.000          5.00

----------------------------------------------------------------------------------------------------
         Name: 050Y001H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\050Y001H.R32

      Override Defaults: Yes
    Storm Duration(hrs): 1.00
          Rainfall File: FDOT-1
    Rainfall Amount(in): 4.20

Time(hrs)       Print Inc(min)
--------------- ---------------
2.000           2.50

----------------------------------------------------------------------------------------------------
```

```
         Name: 050Y002H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\050Y002H.R32

      Override Defaults: Yes
    Storm Duration(hrs): 2.00
          Rainfall File: FDOT-2
    Rainfall Amount(in): 5.20

Time(hrs)       Print Inc(min)
--------------- ---------------
3.000           2.50

----------------------------------------------------------------------------------------------------
         Name: 050Y004H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\050Y004H.R32

      Override Defaults: Yes
    Storm Duration(hrs): 4.00
          Rainfall File: FDOT-4
    Rainfall Amount(in): 6.10

Time(hrs)       Print Inc(min)
--------------- ---------------
5.000           5.00

----------------------------------------------------------------------------------------------------
         Name: 050Y008H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\050Y008H.R32

      Override Defaults: Yes
    Storm Duration(hrs): 8.00
          Rainfall File: FDOT-8
    Rainfall Amount(in): 7.40

Time(hrs)       Print Inc(min)
--------------- ---------------
9.000           5.00

----------------------------------------------------------------------------------------------------
         Name: 050Y024H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\050Y024H.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
          Rainfall File: FDOT-24
    Rainfall Amount(in): 9.08

Time(hrs)       Print Inc(min)
--------------- ---------------
25.000          5.00

----------------------------------------------------------------------------------------------------
         Name: 050Y072H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\050Y072H.R32

      Override Defaults: Yes
    Storm Duration(hrs): 72.00
          Rainfall File: FDOT-72
    Rainfall Amount(in): 11.45

Time(hrs)       Print Inc(min)
--------------- ---------------
73.000          5.00

----------------------------------------------------------------------------------------------------
         Name: 100Y001H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\100Y001H.R32

      Override Defaults: Yes
    Storm Duration(hrs): 1.00
          Rainfall File: FDOT-1
    Rainfall Amount(in): 4.60

Time(hrs)       Print Inc(min)
--------------- ---------------
2.000           2.50

----------------------------------------------------------------------------------------------------
         Name: 100Y002H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\100Y002H.R32

      Override Defaults: Yes
    Storm Duration(hrs): 2.00
          Rainfall File: FDOT-2
    Rainfall Amount(in): 5.60

Time(hrs)       Print Inc(min)
--------------- ---------------
3.000           2.50
```

```
----------------------------------------------------------------------------------------------------
         Name: 100Y004H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\100Y004H.R32

      Override Defaults: Yes
    Storm Duration(hrs): 4.00
          Rainfall File: FDOT-4
    Rainfall Amount(in): 6.60

Time(hrs)       Print Inc(min)
--------------- ---------------
5.000           5.00

----------------------------------------------------------------------------------------------------
         Name: 100Y008H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\100Y008H.R32

      Override Defaults: Yes
    Storm Duration(hrs): 8.00
          Rainfall File: FDOT-8
    Rainfall Amount(in): 7.60

Time(hrs)       Print Inc(min)
--------------- ---------------
9.000           5.00

----------------------------------------------------------------------------------------------------
         Name: 100Y024H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\100Y024H.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
          Rainfall File: FDOT-24
    Rainfall Amount(in): 10.65

Time(hrs)       Print Inc(min)
--------------- ---------------
25.000          5.00

----------------------------------------------------------------------------------------------------
         Name: 100Y072H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\100Y072H.R32

      Override Defaults: Yes
    Storm Duration(hrs): 72.00
          Rainfall File: FDOT-72
    Rainfall Amount(in): 13.37

Time(hrs)       Print Inc(min)
--------------- ---------------
73.000          5.00

----------------------------------------------------------------------------------------------------
         Name: 25Y 24H SWFWMD
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\25Y 24H SWFWMD.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
          Rainfall File: Flmod
    Rainfall Amount(in): 7.00

Time(hrs)       Print Inc(min)
--------------- ---------------
30.000          5.00

==========================================================================================
==== Routing Simulations =================================================================
==========================================================================================

         Name: 002Y001H            Hydrology Sim: 002Y001H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\002Y001H.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                      Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                      End Time(hrs): 2.00
     Min Calc Time(sec): 0.5000                Max Calc Time(sec): 60.0000
        Boundary Stages:                           Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes
```

```
----------------------------------------------------------------------------------------------------
         Name: 002Y002H           Hydrology Sim: 002Y002H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\002Y002H.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                     End Time(hrs): 4.00
     Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
        Boundary Stages:                          Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes

----------------------------------------------------------------------------------------------------
         Name: 002Y004H           Hydrology Sim: 002Y004H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\002Y004H.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                     End Time(hrs): 8.00
     Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
        Boundary Stages:                          Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes

----------------------------------------------------------------------------------------------------
         Name: 002Y008H           Hydrology Sim: 002Y008H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\002Y008H.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                     End Time(hrs): 16.00
     Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
        Boundary Stages:                          Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes

----------------------------------------------------------------------------------------------------
         Name: 002Y024H           Hydrology Sim: 002Y024H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\002Y024H.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                     End Time(hrs): 30.00
     Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
        Boundary Stages:                          Boundary Flows:


Time(hrs)       Print Inc(min)
```

```
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes


----------------------------------------------------------------------------------------------------
         Name: 002Y072H           Hydrology Sim: 002Y072H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\002Y072H.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                     End Time(hrs): 78.00
     Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
        Boundary Stages:                          Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes


----------------------------------------------------------------------------------------------------
         Name: 005Y001H           Hydrology Sim: 005Y001H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\005Y001H.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                     End Time(hrs): 2.00
     Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
        Boundary Stages:                          Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes


----------------------------------------------------------------------------------------------------
         Name: 005Y002H           Hydrology Sim: 005Y002H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\005Y002H.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                     End Time(hrs): 4.00
     Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
        Boundary Stages:                          Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes


----------------------------------------------------------------------------------------------------
         Name: 005Y004H           Hydrology Sim: 005Y004H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\005Y004H.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                     End Time(hrs): 8.00
```

```
     Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
        Boundary Stages:                          Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes

----------------------------------------------------------------------------------------------------
         Name: 005Y008H            Hydrology Sim: 005Y008H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\005Y008H.I32

      Execute: Yes         Restart: No             Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                     End Time(hrs): 16.00
     Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
        Boundary Stages:                          Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes

----------------------------------------------------------------------------------------------------
         Name: 005Y024H            Hydrology Sim: 005Y024H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\005Y024H.I32

      Execute: Yes         Restart: No             Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                     End Time(hrs): 36.00
     Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
        Boundary Stages:                          Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes

----------------------------------------------------------------------------------------------------
         Name: 005Y072H            Hydrology Sim: 005Y072H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\005Y072H.I32

      Execute: Yes         Restart: No             Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                     End Time(hrs): 84.00
     Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
        Boundary Stages:                          Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes

----------------------------------------------------------------------------------------------------
         Name: 010Y001H            Hydrology Sim: 010Y001H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\010Y001H.I32
```

```
      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                     End Time(hrs): 2.00
     Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
        Boundary Stages:                          Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes

----------------------------------------------------------------------------------------------------
         Name: 010Y002H           Hydrology Sim: 010Y002H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\010Y002H.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                     End Time(hrs): 4.00
     Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
        Boundary Stages:                          Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes

----------------------------------------------------------------------------------------------------
         Name: 010Y004H           Hydrology Sim: 010Y004H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\010Y004H.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                     End Time(hrs): 8.00
     Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
        Boundary Stages:                          Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes

----------------------------------------------------------------------------------------------------
         Name: 010Y008H           Hydrology Sim: 010Y008H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\010Y008H.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                     End Time(hrs): 16.00
     Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
        Boundary Stages:                          Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes
```

```
----------------------------------------------------------------------------------------------------
         Name: 010Y024H           Hydrology Sim: 010Y024H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\010Y024H.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                     End Time(hrs): 36.00
     Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
        Boundary Stages:                          Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes

----------------------------------------------------------------------------------------------------
         Name: 010Y072H           Hydrology Sim: 010Y072H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\010Y072H.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                     End Time(hrs): 84.00
     Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
        Boundary Stages:                          Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes

----------------------------------------------------------------------------------------------------
         Name: 025Y001H           Hydrology Sim: 025Y001H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\025Y001H.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                     End Time(hrs): 2.00
     Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
        Boundary Stages:                          Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes

----------------------------------------------------------------------------------------------------
         Name: 025Y002H           Hydrology Sim: 025Y002H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\025Y002H.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                     End Time(hrs): 4.00
     Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
        Boundary Stages:                          Boundary Flows:


Time(hrs)       Print Inc(min)
```

```
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes


----------------------------------------------------------------------------------------------------
         Name: 025Y004H           Hydrology Sim: 025Y004H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\025Y004H.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                     End Time(hrs): 8.00
     Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
        Boundary Stages:                          Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes


----------------------------------------------------------------------------------------------------
         Name: 025Y008H           Hydrology Sim: 025Y008H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\025Y008H.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                     End Time(hrs): 16.00
     Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
        Boundary Stages:                          Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes


----------------------------------------------------------------------------------------------------
         Name: 025Y024H           Hydrology Sim: 025Y024H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\025Y024H.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                     End Time(hrs): 36.00
     Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
        Boundary Stages:                          Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes


----------------------------------------------------------------------------------------------------
         Name: 025Y072H           Hydrology Sim: 025Y072H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\025Y072H.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                     End Time(hrs): 84.00
```

```
     Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
        Boundary Stages:                          Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes

----------------------------------------------------------------------------------------------------
         Name: 050Y001H           Hydrology Sim: 050Y001H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\050Y001H.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                     End Time(hrs): 2.00
     Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
        Boundary Stages:                          Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes

----------------------------------------------------------------------------------------------------
         Name: 050Y002H           Hydrology Sim: 050Y002H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\050Y002H.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                     End Time(hrs): 4.00
     Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
        Boundary Stages:                          Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes

----------------------------------------------------------------------------------------------------
         Name: 050Y004H           Hydrology Sim: 050Y004H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\050Y004H.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                     End Time(hrs): 8.00
     Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
        Boundary Stages:                          Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes

----------------------------------------------------------------------------------------------------
         Name: 050Y008H           Hydrology Sim: 050Y008H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\050Y008H.I32
```

```
      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                     End Time(hrs): 16.00
     Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
        Boundary Stages:                          Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes

----------------------------------------------------------------------------------------------------
         Name: 050Y024H           Hydrology Sim: 050Y024H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\050Y024H.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                     End Time(hrs): 36.00
     Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
        Boundary Stages:                          Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes

----------------------------------------------------------------------------------------------------
         Name: 050Y072H           Hydrology Sim: 050Y072H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\050Y072H.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                     End Time(hrs): 84.00
     Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
        Boundary Stages:                          Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes

----------------------------------------------------------------------------------------------------
         Name: 100Y001H           Hydrology Sim: 100Y001H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\100Y001H.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                     End Time(hrs): 2.00
     Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
        Boundary Stages:                          Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes
```

```
----------------------------------------------------------------------------------------------------
         Name: 100Y002H           Hydrology Sim: 100Y002H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\100Y002H.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                     End Time(hrs): 4.00
     Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
        Boundary Stages:                          Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes

----------------------------------------------------------------------------------------------------
         Name: 100Y004H           Hydrology Sim: 100Y004H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\100Y004H.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                     End Time(hrs): 8.00
     Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
        Boundary Stages:                          Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes

----------------------------------------------------------------------------------------------------
         Name: 100Y008H           Hydrology Sim: 100Y008H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\100Y008H.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                     End Time(hrs): 16.00
     Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
        Boundary Stages:                          Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes

----------------------------------------------------------------------------------------------------
         Name: 100Y024H           Hydrology Sim: 100Y024H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\100Y024H.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                     End Time(hrs): 36.00
     Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
        Boundary Stages:                          Boundary Flows:


Time(hrs)       Print Inc(min)
```

```
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes


----------------------------------------------------------------------------------------------------
         Name: 100Y072H           Hydrology Sim: 100Y072H
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\100Y072H.I32

      Execute: Yes         Restart: No           Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                    Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                    End Time(hrs): 84.00
     Min Calc Time(sec): 0.5000              Max Calc Time(sec): 60.0000
        Boundary Stages:                         Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes


----------------------------------------------------------------------------------------------------
         Name: 25Y 24H SWFWMD     Hydrology Sim: 25Y 24H SWFWMD
     Filename: N:\TUCKER\2-SATERBO SITE\DOCS\CALCS\ICPR\25Y 24H SWFWMD.I32

      Execute: Yes         Restart: No           Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                    Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                    End Time(hrs): 36.00
     Min Calc Time(sec): 0.5000              Max Calc Time(sec): 60.0000
        Boundary Stages:                         Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes
```

6. FDOT Pre-Post Flow Match Calculations

TUCKER OFFICE
PRE-DEVELOPMENT RATIONAL METHOD PRE POST MATCH CALCULATION
BASINS: X-BASIN-1, 2, 3 AND X-BASIN-4, 5

X-BASIN-1

Basin c:	0.25	
Basin Area:	3.51	acres
S (Avg Slope):	2.30%	percent
Time of Conc.	16.8	mins

	Area	c	Weighted "c"
Impervious	0	0.95	0.00
Lawns	3.51	0.25	0.88
	3.51		0.25

Frequency		Xt	c*	i	A	Q
2	Year	1	0.25	6.10	3.51	5.35
5	Year	1	0.25	7.00	3.51	6.14
10	Year	1	0.25	7.50	3.51	6.58
25	Year	1.1	0.28	8.40	3.51	8.11
50	Year	1.2	0.30	9.00	3.51	9.48
100	Year	1.25	0.31	10.00	3.51	10.97

*Pervious areas adjusted
by Design storm
Frequency Factor Xt

X-BASIN-2

Basin c:	0.25	
Basin Area:	4.20	acres
S (Avg Slope):	2.60%	percent
Time of Conc.	16.8	mins

	Area	c	Weighted "c"
Impervious	0	0.95	0.00
Lawns	4.2	0.25	1.05
	4.20		0.25

Frequency		Xt	c*	i	A	Q
2	Year	1	0.25	6.10	4.20	6.41
5	Year	1	0.25	7.00	4.20	7.35
10	Year	1	0.25	7.50	4.20	7.88
25	Year	1.1	0.28	8.40	4.20	9.70
50	Year	1.2	0.30	9.00	4.20	11.34
100	Year	1.25	0.31	10.00	4.20	13.13

*Pervious areas adjusted
by Design storm
Frequency Factor Xt

X-BASIN-3

Basin c:	0.20	
Basin Area:	6.86	acres
S (Avg Slope):	1.35%	percent
Time of Conc.	17.8	mins

	Area	c	Weighted "c"
Impervious	0	0.95	0.00
Lawns	6.86	0.2	1.37
	6.86		0.20

Frequency		Xt	c*	i	A	Q
2	Year	1	0.20	6.10	6.86	8.37
5	Year	1	0.20	7.00	6.86	9.60
10	Year	1	0.20	7.50	6.86	10.29
25	Year	1.1	0.28	8.40	6.86	15.85
50	Year	1.2	0.30	9.00	6.86	18.52
100	Year	1.25	0.31	10.00	6.86	21.44

*Pervious areas adjusted
by Design storm
Frequency Factor Xt

TUCKER OFFICE
PRE-DEVELOPMENT RATIONAL METHOD PRE POST MATCH CALCULATION
BASINS: X-BASIN-1, 2, 3 AND X-BASIN-4, 5

X-BASIN 1, 2 & 3 - PEAK Q COMPARISON:

Frequency		Pre Q	Critical Duration ICPR Post Q	Pre > Post?
2	Year	20.13	1.01	Yes
5	Year	23.10	3.07	Yes
10	Year	24.75	4.95	Yes
25	Year	33.66	7.06	Yes
50	Year	39.34	9.69	Yes
100	Year	45.53	10.42	Yes

TUCKER OFFICE

PRE-DEVELOPMENT RATIONAL METHOD PRE POST MATCH CALCULATION

BASINS: X-BASIN-1, 2, 3 AND X-BASIN-4, 5

X-BASIN-4

Basin c:	0.25	
Basin Area:	12.56	acres
S (Avg Slope):	2.70%	percent
Time of Conc.	24	mins

	Area	c	Weighted "c"
Impervious	0	0.95	0.00
Lawns	12.561	0.25	3.14
	12.56		0.25

Frequency		Xt	c*	i	A	Q
2	Year	1	0.25	6.10	12.56	19.16
5	Year	1	0.25	7.00	12.56	21.98
10	Year	1	0.25	7.50	12.56	23.55
25	Year	1.1	0.28	8.40	12.56	29.02
50	Year	1.2	0.30	9.00	12.56	33.91
100	Year	1.25	0.31	10.00	12.56	39.25

*Pervious areas adjusted by Design storm Frequency Factor Xt

X-BASIN-5

Basin c:	0.31	
Basin Area:	0.75	acres
S (Avg Slope):	2.10%	percent
Time of Conc.	18.5	mins

	Area	c	Weighted "c"
Impervious	0.066	0.95	0.06
Lawns	0.687	0.25	0.17
	0.75		0.31

Frequency		Xt	c*	i	A	Q
2	Year	1	0.31	6.10	0.75	1.43
5	Year	1	0.31	7.00	0.75	1.64
10	Year	1	0.31	7.50	0.75	1.76
25	Year	1.1	0.28	8.40	0.75	1.74
50	Year	1.2	0.30	9.00	0.75	2.03
100	Year	1.25	0.31	10.00	0.75	2.35

*Pervious areas adjusted by Design storm Frequency Factor Xt

X-BASIN 4 & 5 - PEAK Q COMPARISON:

Frequency		Pre Q	Critical Duration ICPR Post Q	Pre > Post?
2	Year	20.59	1.45	Yes
5	Year	23.62	4.56	Yes
10	Year	25.31	7.28	Yes
25	Year	30.76	9.94	Yes
50	Year	35.95	13.11	Yes
100	Year	41.61	14.54	Yes

FDOT Design High Water Level Summary

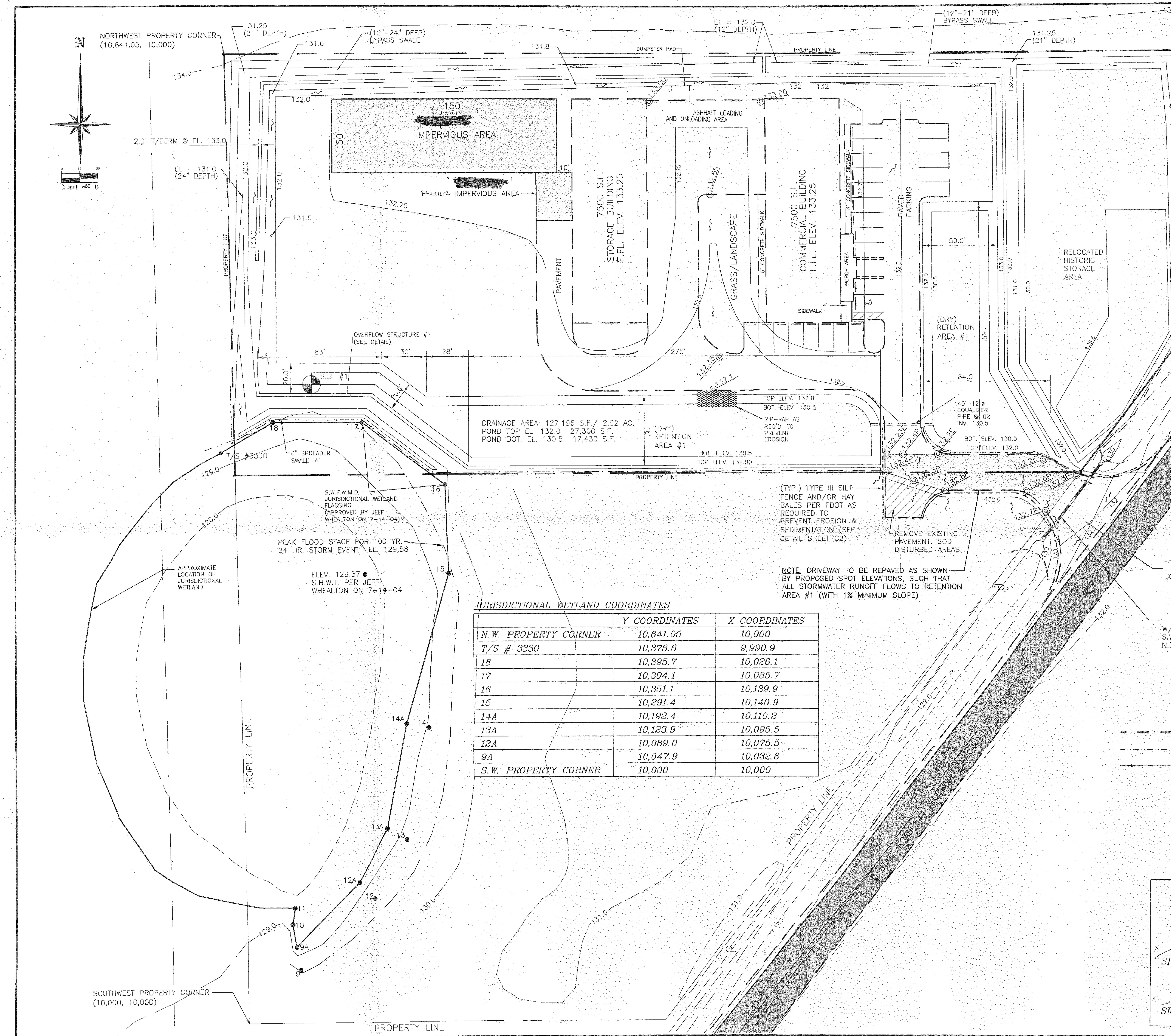
Pond	Top	Critical Duration DHWL	Freeboard
1	137.00	135.85	1.15
2	133.00	132.00	1.00
3	138.00	136.51	1.49
4	130.00	128.97	1.03

SWFWMD Pre/Post Match Calculations			
ICPR Node Name	SWFWMD STORMS		
	Pre Q	Post Q	Post < Pre?
BNDY-EAST	17.71	10.01	Yes
BNDY-WEST	14.99	6.22	Yes

SWFWMD Design High Water Level Summary			
Pond	Top	Critical Duration DHWL	Freeboard
1	137.00	135.51	1.49
2	133.00	131.60	1.41
3	138.00	136.09	1.91
4	130.00	128.55	1.46

PERMIT NO. 27164.001

Lucerne Professional



JURISDICTIONAL WETLAND COORDINATES

	Y COORDINATES	X COORDINATES
N.W. PROPERTY CORNER	10,641.05	10,000
T/S # 3330	10,376.6	9,990.9
18	10,395.7	10,026.1
17	10,394.1	10,085.7
16	10,351.1	10,139.9
15	10,291.4	10,140.9
14A	10,192.4	10,110.2
13A	10,123.9	10,095.5
12A	10,089.0	10,075.5
9A	10,047.9	10,032.6
S.W. PROPERTY CORNER	10,000	10,000

LINETYPE LEGEND

SILT SCREEN AND HAY BALES
100 YR. FLOOD LINE (ELEV. 129.58)
JURISDICTIONAL WETLAND LINE
ELEVE EXISTING SPOT ELEVATION
ELEVP PROPOSED SPOT ELEVATION

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT CONSTRUCTION DRAWINGS
APPROVED
File of Record
Permit No. 44027114.00

APPLICANT/OWNER SIGNATURE

SIGNATURE: MICHAEL R. WILLIS, SR. DATE 5-21-07

SIGNATURE: DONNA JO WILLIS DATE 5-21-07

DESIGNED BY: MSL
APPROVED BY: DRN

REVISIONS

DAVID NORRIS ENGINEERING
CERTIFICATE OF AUTHORIZATION NUMBER: 8283
COMMERCIAL PLANS • INSPECTIONS • PERMITTING
"SPECIALIZING IN CHURCH DESIGN"
112 COLEMAN ROAD
WINTER HAVEN, FLORIDA 33880
OFFICE: (863)299-1048 FAX: (863)291-4305
PE #: 32186 E-MAIL: D.NORRIS@EARTHLINK.NET

JOB NO. 07-05

LUCERNE PROFESSIONAL LEASING LLC
SITE/CONSTRUCTION MGMT. PLAN

SHEET C1 OF 2

LUCERNE Park LEASING
PONDS 1A & 1B - DRAINAGE CALCULATIONS
3-21-07

Water Quantity

Rate

Ponds 1A and 1B are designed to attenuate the stormwater runoff from their combined contributing areas so that the post-development peak discharge rate will not exceed the pre-development peak discharge rate for the 25-year, 24-hour storm event.

Basin 1 Pre-development Peak Discharge Rate	=	6.22 cfs
Basin 1A & 1B Post-development Peak Discharge Rate	=	5.30 cfs

[redacted]

[redacted]

FLORIDA WATER MANAGEMENT
Received
ABR

Southwest Florida Water Management District
MAR 2 2 2007
RECEIVED
RRD-Bartow

DAVID R. NORRIS
LICENSE
No. 32186
STATE OF FLORIDA
PROFESSIONAL ENGINEER

8-9-04

STAGE - STORAGE CALCULATION

PROJECT NAME: Lucerne Park Leasing
POND ID: Pond 1A

INPUT PARAMETERS

BOT. ELEV.	=	**130.50**	ft.		
TOP ELEV.	=	**132.00**	ft.		
TOP AREA	=	**8150**	sqft.	=	**0.19 ac.**
BOT. AREA	=	**6130**	sqft.	=	**0.14 ac.**
DEPTH INC.	=	**0.1**	ft.		

ELEVATION (ft.)	STAGE (ft.)	AREA (sqft.)	AREA (ac.)	VOLUME (cuft.)	VOLUME (ac-ft.)
130.50	0.00	6130	0.14	0	0.00
130.60	0.10	6265	0.14	620	0.01
130.70	0.20	6399	0.15	1253	0.03
130.80	0.30	6534	0.15	1900	0.04
130.90	0.40	6669	0.15	2560	0.06
131.00	0.50	6803	0.16	3233	0.07
131.10	0.60	6938	0.16	3920	0.09
131.20	0.70	7073	0.16	4621	0.11
131.30	0.80	7207	0.17	5335	0.12
131.40	0.90	7342	0.17	6062	0.14
131.50	1.00	7477	0.17	6803	0.16
131.60	1.10	7611	0.17	7558	0.17
131.70	1.20	7746	0.18	8326	0.19
131.80	1.30	7881	0.18	9107	0.21
131.90	1.40	8015	0.18	9902	0.23
132.00	1.50	8150	0.19	10710	0.25

STAGE - STORAGE CALCULATION

PROJECT NAME: Lucerne Park Leasing
POND ID: Pond 1B

INPUT PARAMETERS

BOT. ELEV.	=	130.50	ft.		
TOP ELEV.	=	132.00	ft.		
TOP AREA	=	19150	sqft.	=	0.44 ac.
BOT. AREA	=	11300	sqft.	=	0.26 ac.
DEPTH INC.	=	0.1	ft.		

ELEVATION (ft.)	STAGE (ft.)	AREA (sqft.)	AREA (ac.)	VOLUME (cuft.)	VOLUME (ac-ft.)
130.50	0.00	11300	0.26	0	0.00
130.60	0.10	11823	0.27	1156	0.03
130.70	0.20	12347	0.28	2365	0.05
130.80	0.30	12870	0.30	3626	0.08
130.90	0.40	13393	0.31	4939	0.11
131.00	0.50	13917	0.32	6304	0.14
131.10	0.60	14440	0.33	7722	0.18
131.20	0.70	14963	0.34	9192	0.21
131.30	0.80	15487	0.36	10715	0.25
131.40	0.90	16010	0.37	12290	0.28
131.50	1.00	16533	0.38	13917	0.32
131.60	1.10	17057	0.39	15596	0.36
131.70	1.20	17580	0.40	17328	0.40
131.80	1.30	18103	0.42	19112	0.44
131.90	1.40	18627	0.43	20949	0.48
132.00	1.50	19150	0.44	22838	0.52

Runoff curve number (CN)

			JOB #	
Project :	Lucerne Park Leasing - Basin 1	**By :**	BH	8/4/04
Location :	Polk County, FL	**Checked :**	BH	8/4/04

Check One : ☑ Present ☐ Developed

Runoff curve number

Soil name and hydrologic group (appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN			Area ☑ acres ☐ sq. mi. ☐ %	Product of CN x Area
		Figure 2-2	Figure 2-3	Figure 2-4		
Immokalee (B/D)	Poor condition (grass cover < 75%)	89			1.61	143
				Totals	1.61	143

CN (weighted) = total product / total area **Use CN** $\boxed{89}$

TR 55 Urban Hydrology for Small Watersheds

Runoff curve number (CN)

			JOB #	
Project :	Luceme Park Leasing - Pond 1A	**By :**	BH	8/4/04
Location :	Polk County, FL	**Checked :**	BH	8/4/04

Check One : ☐ Present ☑ Developed

Runoff curve number

Soil name and hydrologic group (appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN Figure 2-2	CN Figure 2-3	CN Figure 2-4	Area ☑ acres ☐ sq. mi. ☐ %	Product of CN x Area
N.A.	Impervious Areas	98			0.27	26
N.A.	Retention Pond	100			0.19	19
Immokalee (B/D)	Good condition (grass cover is more than 75%)	80			0.27	22
				Totals	0.73	67

CN (weighted) = total product / total area **Use CN** 92

44027164.001

TR 55 Urban Hydrology for Small Watersheds

Runoff curve number (CN)

			JOB #
Project :	Lucerne Park Leasing - Pond 1B	**By :**	BH 8/4/04
Location :	Polk County, FL	**Checked :**	BH 8/4/04

Check One : ☐ Present ☑ Developed

Runoff curve number

Soil name and hydrologic group (appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN			Area ☑ acres ☐ sq. mi. ☐ %	Product of CN x Area
		Figure 2-2	Figure 2-3	Figure 2-4		
N.A.	Impervious Areas	98			0.96	94
N.A.	Retention Pond	100			0.44	44
Immokalee (B/D)	Good condition (grass cover is more than 75%)	80			0.79	63
		Totals			2.19	201

CN (weighted) = total product / total area **Use CN** $\boxed{92}$

TR 55 Urban Hydrology for Small Watersheds

44027.064.003

WATER QUANTITY

Basin Summary.

```
           Basin Name: Pond1a
           Group Name: BASE
           Simulation: POST25
            Node Name: Pond1a
           Basin Type: SCS Unit Hydrograph

      Unit Hydrograph: UH256
       Peaking Fator: 256.0
 Spec Time Inc (min): 1.33
 Comp Time Inc (min): 1.33
        Rainfall File: Flmod
 Rainfall Amount (in): 7.000
Storm Duration (hrs): 24.00
               Status: Onsite
    Time of Conc (min): 10.00
     Time Shift (hrs): 0.00
            Area (ac): 0.730
  Vol of Unit Hyd (in): 1.000
         Curve Number: 92.000
             DCIA (%): 0.000

       Time Max (hrs): 12.04
       Flow Max (cfs): 2.928
   Runoff Volume (in): 6.053
  Runoff Volume (ft3): 16039.142
```

```
           Basin Name: Pond1b
           Group Name: BASE
           Simulation: POST25
            Node Name: Pond1b
           Basin Type: SCS Unit Hydrograph

      Unit Hydrograph: UH256
       Peaking Fator: 256.0
 Spec Time Inc (min): 1.33
 Comp Time Inc (min): 1.33
        Rainfall File: Flmod
 Rainfall Amount (in): 7.000
Storm Duration (hrs): 24.00
               Status: Onsite
    Time of Conc (min): 10.00
     Time Shift (hrs): 0.00
            Area (ac): 2.190
  Vol of Unit Hyd (in): 1.000
         Curve Number: 92.000
             DCIA (%): 0.000

       Time Max (hrs): 12.04
       Flow Max (cfs): 8.783
   Runoff Volume (in): 6.053
  Runoff Volume (ft3): 48117.425
```

~~[illegible]~~
~~Node Name: [illegible]~~
~~Basin Type: SCS Unit Hydrograph~~
~~Unit Hydrograph: UH256~~
~~Spec Time Inc (min): 1.33~~
~~[illegible] Inc (min): 1.33~~
~~Rainfall File: Flmod~~
~~Rainfall Amount (in): 7.000~~
~~Storm Duration (hrs): [illegible]~~
~~Status: Onsite~~

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
Received
MAR 26 2007
ARR
RECORDS AND DATA

Southwest Florida Water Management District
MAR 22 2007
RECEIVED
RRD-Bartow

Time of Conc (min): 10.00
Time Shift (hrs): 0.00
Area (ac): 2.290
Vol of Unit Hyd (in): 1.000
Curve Number: 96.000
DCIA (%): 0.000

Time Max (hrs): 12.04
Flow Max (cfs): 9.507
Runoff Volume (in): 6.521
Runoff Volume (ft3): 54211.072

Basin Name: Pre1
Group Name: BASE
Simulation: POST25
Node Name: Pre1
Basin Type: SCS Unit Hydrograph

Unit Hydrograph: UH256
Peaking Fator: 256.0
Spec Time Inc (min): 1.33
Comp Time Inc (min): 1.33
Rainfall File: Flmod
Rainfall Amount (in): 7.000
Storm Duration (hrs): 24.00
Status: Onsite
Time of Conc (min): 10.00
Time Shift (hrs): 0.00
Area (ac): 1.610
Vol of Unit Hyd (in): 1.000
Curve Number: 89.000
DCIA (%): 0.000

Time Max (hrs): 12.04
Flow Max (cfs): 6.221 Q (PRE)
Runoff Volume (in): 5.706
Runoff Volume (ft3): 33348.409

~~Basin Name: Pre2~~
~~Group Name: BASE~~
~~Simulation: POST25~~
~~Node Name: Pre2~~
~~Basin Type: SCS Unit Hydrograph~~

~~Unit Hydrograph: UH256~~
~~Peaking Fator: 256.0~~
~~Spec Time Inc (min): 1.33~~
~~Comp Time Inc (min): 1.33~~
~~Rainfall File: Flmod~~
~~Rainfall Amount (in): 7.000~~
~~Storm Duration (hrs): 24.00~~
~~Status: Onsite~~
~~Time of Conc (min): 10.00~~
~~Time Shift (hrs): 0.00~~
~~Area (ac): 1.600~~
~~Vol of Unit Hyd (in): 1.000~~
~~Curve Number: 89.000~~
~~DCIA (%): 0.000~~

~~Time Max (hrs): 12.04~~
~~Flow Max (cfs): 6.183~~ ~~Q (pre)~~
~~Runoff Volume (in): [illegible]~~
~~Runoff Volume (ft3): 33141.277~~

Southwest Florida Water Management District
MAR 22 2007
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DAVID R. NORRIS
LICENSE
No.
STATE OF FLORIDA
PROFESSIONAL ENGINEER

Input Report.

==== Basins ====

Name: Pond1a   Node: Pond1a   Status: Onsite
Group: BASE   Type: SCS Unit Hydrograph

Unit Hydrograph: UH256   Peaking Factor: 256.0
Rainfall File: Flmod   Storm Duration(hrs): 24.00
Rainfall Amount(in): 7.000   Time of Conc(min): 10.00
Area(ac): 0.730   Time Shift(hrs): 0.00
Curve Number: 92.00   Max Allowable Q(cfs): 999999.000
DCIA(%): 0.00

Post Development Hydrograph For Pond 1a

Name: Pond1b   Node: Pond1b   Status: Onsite
Group: BASE   Type: SCS Unit Hydrograph

Unit Hydrograph: UH256   Peaking Factor: 256.0
Rainfall File: Flmod   Storm Duration(hrs): 24.00
Rainfall Amount(in): 7.000   Time of Conc(min): 10.00
Area(ac): 2.190   Time Shift(hrs): 0.00
Curve Number: 92.00   Max Allowable Q(cfs): 999999.000
DCIA(%): 0.00

Post Development Hydrograph For Pond 1b

~~Name: Pond2   Node: Pond2   Status: Onsite~~
~~Group: BASE   Type: SCS Unit Hydrograph~~

~~Unit Hydrograph: UH256   Peaking Factor: 256.0~~
~~Rainfall File: Flmod   Storm Duration(hrs): 24.00~~
~~Rainfall Amount(in): 7.000   Time of Conc(min): 10.00~~
~~Area(ac): 2.290   Time Shift(hrs): 0.00~~
~~Curve Number: 96.00   Max Allowable Q(cfs): 999999.000~~
~~DCIA(%): 0.00~~

~~Post Development Hydrograph For Pond 2~~

Name: Pre1   Node: Pre1   Status: Onsite
Group: BASE   Type: SCS Unit Hydrograph

Unit Hydrograph: UH256   Peaking Factor: 256.0
Rainfall File: Flmod   Storm Duration(hrs): 24.00
Rainfall Amount(in): 7.000   Time of Conc(min): 10.00
Area(ac): 1.610   Time Shift(hrs): 0.00
Curve Number: 89.00   Max Allowable Q(cfs): 999999.000
DCIA(%): 0.00

PRE DEV. HYDROGRAPH FOR BASIN 1

~~Name: Pre2   Node: Pre2   Status: Onsite~~
~~Group: BASE   Type: SCS Unit Hydrograph~~

~~Unit Hydrograph: UH256   Peaking Factor: 256.0~~
~~Rainfall File: Flmod   Storm Duration(hrs): 24.00~~
~~Rainfall Amount(in): 7.000   Time of Conc(min): 10.00~~
~~Area(ac): 1.600   Time Shift(hrs): 0.00~~
~~Curve Number: 89.00   Max Allowable Q(cfs): 999999.000~~
~~DCIA(%): 0.00~~

~~Pre Development Hydrograph For Basin 2~~

==== Nodes ====

Name: BNDRY
Group: BASE
Type: Time/Stage

Base Flow(cfs): 0.000

Init Stage(ft): 129.370
Warn Stage(ft): 130.000

DUMMY BOUNDARY NODE (Receiving Wetland)

Time(hrs)	Stage(ft)
0.00	129.370
24.00	129.370

Name: Pond1a
Group: BASE
Type: Stage/Area

Base Flow(cfs): 0.000

Init Stage(ft): 130.520
Warn Stage(ft): 132.000

POND 1a

Stage(ft)	Area(ac)
130.500	0.1400
132.000	0.1900

Name: Pond1b
Group: BASE
Type: Stage/Area

Base Flow(cfs): 0.000

Init Stage(ft): 130.520
Warn Stage(ft): 132.000

POND 1b

Stage(ft)	Area(ac)
130.500	0.2600
132.000	0.4400

~~Name: Pond2~~
~~Group: BASE~~
~~Type: Stage/Area~~

~~Base Flow(cfs): 0.000~~

~~POND 2~~

Stage(ft)	Area(ac)
~~129.400~~	[illegible]
[illegible]	~~0.3200~~

==== Cross Sections ====

==== Operating Tables ====

==== Pipes ====

Name: Pipe1a-1b
Group: BASE

From Node: pond1a
To Node: pond1b

Length(ft): 40.00
Count: 1
Friction Equation: Average Conveyance
Solution Algorithm: Automatic
Flow: Both
Entrance Loss Coef: 0.25

	UPSTREAM	DOWNSTREAM
Geometry:	Circular	Circular
Span(in):	12.00	12.00

```
     Rise(in): 12.00           12.00                  Exit Loss Coef: 0.25
   Invert(ft): 130.500         130.500                Bend Loss Coef: 0.00
  Manning's N: 0.012000        0.012000            Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000           0.000                Inlet Ctrl Spec: Use dn
 Bot Clip(in): 0.000           0.000               Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular CMP: Projecting

Downstream FHWA Inlet Edge Description:
Circular CMP: Projecting

Equalizer Pipe Between Pond 1a and Pond 1b

==== Channels ====

==== Drop Strcutures ====

==== Weirs ====

~~Name: [illegible] From Node: [illegible]~~
~~Group: BASE To Node: BNDRY~~
Flow: Both Count: 1
Type: Vertical: Mavis ~~Geometry: Circular~~

1" Ø orifice

~~Span(in): 1.00~~
~~Rise(in): [illegible]~~
Invert(ft): 129.400
~~Control Elevation(ft): 129.400~~ TABLE

~~Bottom Clip(in): 0.000~~
~~Top Clip(in): 0.000~~
~~Weir Discharge Coef: [illegible]~~
Orifice Discharge Coef: 0.650

ORIFICE DISCHARGE ~~FROM POND 2~~

```
     Name: Weir1b          From Node: pond1b
    Group: BASE              To Node: bndry
     Flow: Both                Count: 1
     Type: Vertical: Mavis  Geometry: Rectangular

                 Span(in): 24.00
                 Rise(in): 999.00
               Invert(ft): 130.800
    Control Elevation(ft): 130.800           TABLE

          Bottom Clip(in): 0.000
             Top Clip(in): 0.000
       Weir Discharge Coef: 3.200
    Orifice Discharge Coef: 0.600
```

24" wide Weir #1

OUTFALL STRUCTURE FROM POND 1B

~~Name: [illegible] From Node: [illegible]~~
~~Group: [illegible] To Node: [illegible]~~
Flow: Both Count: 1
~~Type: Vertical: Mavis Geometry: [illegible]~~

Southwest Florida Water Management District Received ARR Records and Data

Southwest Florida Water Management District
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David R. Norris License No. 52136 State of Florida Professional Engineer

8-9-04

44027164.001

#2

54" Wide WEIR

[redacted] TABLE

```
================================================================================
==== Bridges ===================================================================
================================================================================

================================================================================
==== Breaches ==================================================================
================================================================================

================================================================================
==== Rating Curves =============================================================
================================================================================

================================================================================
==== Hydrology Simulations =====================================================
================================================================================

         Name: POST25
     Filename: C:\Program Files\Icpr3\Jobs\Lucern Leasing\POST25.R32

      Override Defaults: No

Time(hrs)        Print Inc(min)
---------------  ---------------
24.000           15.00

================================================================================
==== Routing Simulations =======================================================
================================================================================

         Name: POST25              Hydrology Sim: POST25
     Filename: C:\Program Files\Icpr3\Jobs\Lucern Leasing\POST25.I32

      Execute: Yes         Restart: No           Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                    Delta Z Factor: 0.01000
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                    End Time(hrs): 120.00
      Min Calc Time(sec): 1.0000             Max Calc Time(sec): 30.0000
         Boundary Stages:                        Boundary Flows:

Simulation for 25-year, 24-hour rainfall event

Time(hrs)        Print Inc(min)
---------------  ---------------
24.000           60.000

Group            Run
---------------  -----
BASE             Yes
```

Southwest Florida Water Management District

MAR 2 2 2007

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DAVID R. NORRIS LICENSE No. 52165 STATE OF FLORIDA PROFESSIONAL ENGINEER

8/7/07

44027164.001

Node Max.

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
BNDRY	BASE	POST25	0.00	129.370	130.000	0.0000	0	12.38	11.260	0.00	0.000
Pond1a	BASE	POST25	12.56	131.755	132.000	0.0100	7922	12.00	2.843	13.03	1.351
Pond1b	BASE	POST25	12.47	131.682	132.000	0.0098	17503	12.00	8.746	12.47	5.298

[redacted]

131.755 < 132.

o.k.

[redacted]

5.298 < 6.22

O.K

[redacted]

DAVID R. NORRIS LICENSE No. 32166 STATE OF FLORIDA PROFESSIONAL ENGINEER

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MAR 22 2007

Southwest Florida Water Management District

SOUTHWEST ... RECORDS

WATER QUALITY

Water Quality Treatment Volume

Basins 1A & 1B

Water Quality treatment will be provided in Ponds 1A & B for the stormwater runoff from Basins 1A & 1B through dry retention. The required treatment volume is determined by calculating the volume resulting from 1/2-inch of runoff over the combined 2.92-acre contributing area as follows:

Required Treatment Volume = 0.50 inch * 1 ft./12 inches * 2.92 ac. = 0.12 ac-ft.

From the attached stage-storage calculations for Ponds 1A & 1B it can be seen that sufficient volume is available below the overflow elevation.

~~Basins 2~~

~~Water Quality treatment will be provided in Pond 2 through wet detention of the stormwater runoff from Basin 2. The required treatment volume is determined by calculating the volume resulting from 1-inch of runoff over the 2.29-acre contributing area as follows:~~

~~Required Treatment Volume = 1 inch * 1 ft./12 inches * 2.29 acres = 0.19 ac-ft.~~

~~From the attached stage-storage calculations for the proposed Pond 2 it can be seen that sufficient storage volume is available below the overflow elevation.~~

~~Recovery~~

1.0 ϕ

~~Pond 2 will have a 1.25" bleed-down orifice. From the attached ICPR Draw Down Report it can be seen that no more than 1/2 of the detention volume will be discharged within 60 hours.~~

~~1/2 of the Detention Volume = 0.095 ac-ft.~~
~~Volume Released in 60 Hrs. = 0.080 ac-ft.~~

MODRET

SUMMARY OF UNSATURATED & SATURATED INPUT PARAMETERS

PROJECT NAME : Lucerne Leasing - Pond 1a & 1b
MANUAL RUNOFF DATA USED
UNSATURATED ANALYSIS EXCLUDED

Pond Bottom Area	17,430.00 ft²
Pond Volume between Bottom & DHWL	5,526.00 ft³
Pond Length to Width Ratio (L/W)	15.00
Elevation of Effective Aquifer Base	123.00 ft
Elevation of Seasonal High Groundwater Table	129.37 ft
Elevation of Starting Water Level	130.50 ft
Elevation of Pond Bottom	130.50 ft
Design High Water Level Elevation	130.80 ft
Avg. Effective Storage Coefficient of Soil for Unsaturated Analysis	0.10
Unsaturated Vertical Hydraulic Conductivity	12.00 ft/d
Factor of Safety	1.00
Saturated Horizontal Hydraulic Conductivity	18.00 ft/d
Avg. Effective Storage Coefficient of Soil for Saturated Analysis	0.10
Avg. Effective Storage Coefficient of Pond/Exfiltration Trench	1.00

Hydraulic Control Features:

	Top	Bottom	Left	Right
Groundwater Control Features - Y/N	N	N	N	N
Distance to Edge of Pond	0.00	0.00	0.00	0.00
Elevation of Water Level	0.00	0.00	0.00	0.00
Impervious Barrier - Y/N	N	N	N	N
Elevation of Barrier Bottom	0.00	0.00	0.00	0.00

Analysis Date: 8/7/04

MODRET

TIME - RUNOFF INPUT DATA

PROJECT NAME: LUCERNE LEASING - POND 1A & 1B

STRESS PERIOD NUMBER	INCREMENT OF TIME (hrs)	VOLUME OF RUNOFF (ft^3)
Unsat	0.00	0.00
1	0.01	5,299.00
2	11.99	0.00
3	12.00	0.00
4	12.00	0.00
5	12.00	0.00
6	12.00	0.00
7	12.00	0.00

Analysis Date: 8/7/04

MODRET

SUMMARY OF RESULTS

PROJECT NAME : Lucerne Leasing - Pond 1a & 1b

CUMULATIVE TIME (hrs)	WATER ELEVATION (feet)	INSTANTANEOUS INFILTRATION RATE (cfs)	AVERAGE INFILTRATION RATE (cfs)	CUMULATIVE OVERFLOW (ft^3)
00.00 - 0.00	129.370	0.000 *		
			0.00000	
0.00	129.370	0.35414		
			0.35391	
0.01	130.787	0.35368		0.00
			0.07709	
12.00	130.606	0.05643		0.00
			0.03574	
24.00	130.523	0.03031		0.00
			0.02487	
28.63	130.500	0.02228		0.00
			0.01969	
48.00	130.418	0.01801		0.00
			0.01632	
60.00	130.380	0.01531		0.00
			0.01429	
72.00	130.346			0.00
	< 130.5	o.k		

Maximum Water Elevation: 130.787 feet @ 0.01 hours
Recovery @ 28.630 hours < 36 * o.k.
* Time increment when there is no runoff
Maximum Infiltration Rate: 1.660 ft/day

Analysis Date: 8/7/04

Southwest Florida Water Management District
MAR 2 2 2007
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RRD-Bartow

DAVID R. NORRIS LICENSE No. [illegible] STATE OF FLORIDA PROFESSIONAL ENGINEER

8-7-04

44027164.001

PERMIT NO. 7611.000

PDQ Car Wash and Ice Cream Stand

DISABLED PARKING SIGNAGE

SIGNAGE. EACH PARKING SPACE WHICH IS RESTRICTED FOR THE USE OF PHYSICALLY DISABLED PERSONS SHALL BE IDENTIFIED, POSTED AND MAINTAINED WITH A PERMANENT SIGN MEETING THE FOLLOWING CRITERIA.

A. SHALL BEAR THE INTERNATIONAL SYMBOL OF ACCESSIBILITY, BEING A WHITE REFLECTORIZED SYMBOL WITH A BLUE REFLECTORIZED BACKGROUND, AS REFERENCED IN AMERICAN NATIONAL STANDARDS SPECIFICATIONS ANSI, A117.1-1980.
B. SHALL BEAR THE CATPION "PARKING DISABLED PERMIT ONLY" BEING A BLACK OPAQUE LEGEND ON A WHITE REFLECTORIZED BACKGROUND.
C. SHALL BEAR THE MONETARY FINE FOR PARKING VIOLATIONS.
D. ALL LETTERING SHALL BE AT LEAST ONE (1) INCH HIGH.
E. SIGN SHALL HAVE A MINIMUM WIDTH OF TWELVE (12) INCHES.
F. SIGN SHALL HAVE A MINIMUM HIEGHT OF EIGHTEEN (18) INCHES, NOT INCLUDING THAT PORTION DISPLAYING FINE AMOUNT.

NOTE: "AS-BUILTS" ARE BASED ON SURVEY BY CYPRESS LANDSURVEY INC. THE SIGN AND SEALED COPIES ARE AVAILABLE IN THE FILES.

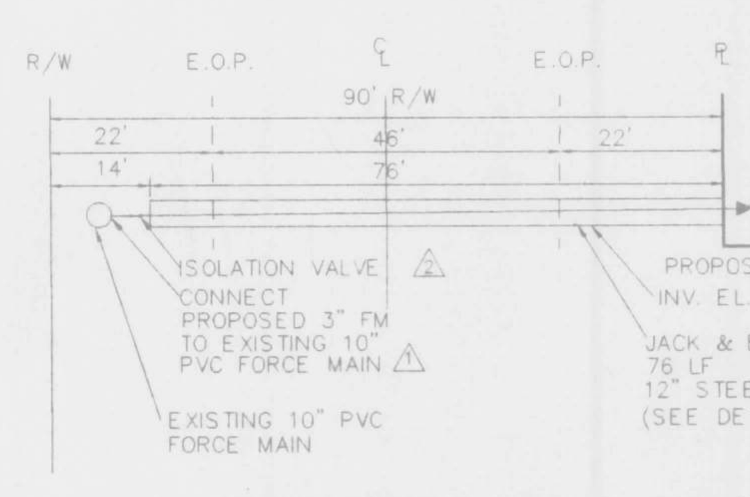
NOTE: GTE LINE LOCATIONS ARE APPROXIMATE. BE AWARE OF FIBER-OPTIC CABLE.

NOTE: BACKFLOW PREVENTORS WILL BE U.S.C. APPROVED R.P.Z. BACK FLOW PREVENTORS.

NOTE: LIFT STATION WILL BE OPERATED AND MAINTAINED AS A PRIVATE STATION.

NOTE: ALL ELEVATIONS ARE AFTER SODDING.

NOTE: OWNER IS RESPONSIBLE TO MAINTAIN S.W.M. SYSTEM UNCHANGED.



STATE ROAD 544

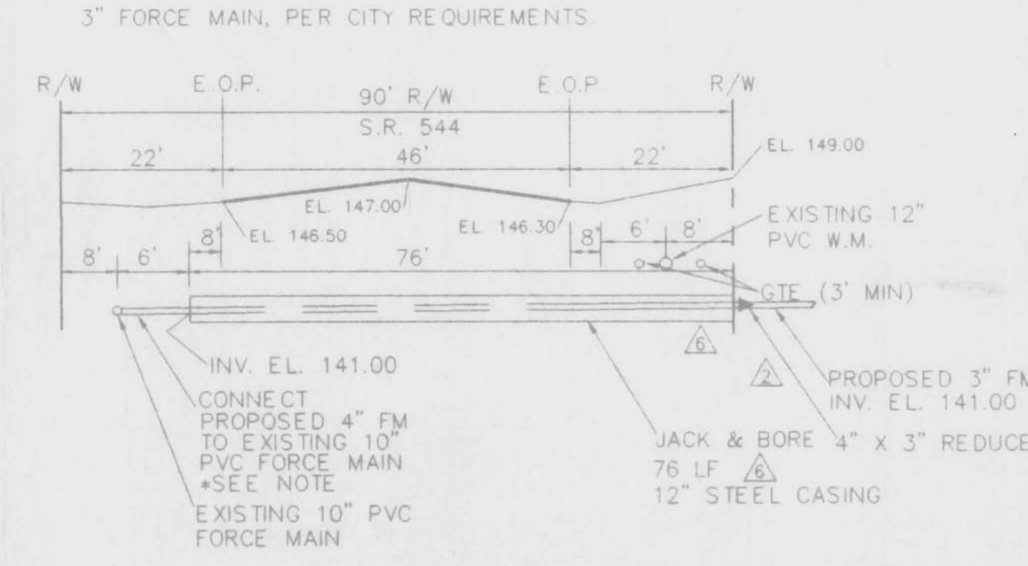
*NOTE: THERE MUST BE A MINIMUM OF 18" BETWEEN JACK * BORE AND GTE LINES AND WATER MAIN.

NOTE: THE 3" F.M. CONNECT WILL BE A WET TAP CONNECT, WHICH MUST BE SCHEDULED AND COORDINATED BY THE CITY OF WINTER HAVENUTILITIES MANAGER.

NOTE: VERTICAL SEPARATION BETWEEN THE 3' FORCE MAIN AND THE 12" WATER MAIN WILL BE A MINIMUM OF 18".

NOTE: A TRACER WIRE WILL BE PLACED FOR THE 3" FORCE MAIN, PER CITY REQUIREMENTS.

AS-BUILT CMR 5-14-99



JACK & BORE DETAIL
N.T.S.

*NOTE: ALL DISTURBED R\W AREAS MUST BE SODDED.

SEWER QUANTITIES

8" PVC	380 LF
3" FM	165 LF
4" SEWER SERVICE	81 LF
MANHOLE	1 EA.
LIFT STATION	1 EA.

WATER QUANTITIES

2" WATER SEVICE	148 L.F.
2" GATE VALVE	1 EA.
2" BACKFLOW PREVENTER	1 EA.
1" WATER SEVICE	1 EA.
1" GATE VALVE	1 EA.
1" BACKFLOW PREVENTER	1 EA.

48 HOURS BEFORE YOU DIG CALL SUNSHINE 1-800-432-4770 IT'S THE LAW IN FLORIDA

INSPECTION CONDUCTED BY DISTRICT
INSPECTION NOT CONDUCTED BY DISTRICT RIGHT RESERVED FOR FUTURE INSPECTION

ROADWAY QUANTITIES

	CAR WASH	WAREHOUSE
1" ASPHALT	3596 ~~3,539~~ 3416 S.Y.	678 S.Y.
6" LIMEROCK BASE	~~3,693~~ S.Y.	706 S.Y.
8" STAB. SUB-BASE	3,847 S.Y.	734 S.Y.
6" CONC.	90 S.Y.	30 S.Y.

DATE	REV.	DESCRIPTION	INIT.
11-16-98	9	REVISED PER CITY COMMENTS	LL
9-9-98	8	REVISED PER FDOT COMMENTS	LL
6-11-98	7	REVISED DRIVEWAY AREA	JMB
6-5-98	6	REVISED PER DOT COMMENTS	LL
6-2-98	5	REVISED PER DOT COMMENTS	LL
5-5-98	4	REVISED PER CITY COMMENTS	SA
5-5-98	3	REVISED PER CITY COMMENTS	LL
4-27-98	2	REVISED PER DOT COMMENTS	JB
4-14-98	1	REVISED PER CITY COMMENTS	SA

REVISIONS

ENGINEERS of CENTRAL FLORIDA
(941) 422-5517
FAX (941) 422-7299

SCALE: 1"=20' | APPROVED BY: | DRAWN BY: JMB
DATE: APR '98 | JOB NO.: E-1337

P.D.Q. CAR WASH

SITE, WATER, AND SEWER PLAN

SHEET NO.: E-1337-2

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT Received JUN 18 1999 RRD-BARTOW

6/16/99

AB 12-99

Imaged As Is

File of Record Permit No. 4617611.000

SITE INFORMATION

WMD PERMIT NO. 46017611.002 PERMIT ISSUE DATE: DEC. 14 2011

NOTE: SITE WAS DESIGNED AND CONSTRUCTED IN 1998 AS A CAR WASH PARCEL (1.78 ACRES) WITH TWO BUILDINGS, PARKING AND STORM WATER SYSTEM. WMD PERMIT 4617611.000. CAR WASH BUILDING WAS CONSTRUCTED AT THAT TIME. PARCEL WAS DIVIDED SINCE THEN & THE CARWASH MAINTAINED POND 100. THIS AS-BUILT CONSTRUCTION & STORM RETENTION POND IS PART OF NORTH SUBJECT PARCEL. THIS AS-BUILT IS FOR MODIFICATION OF THE NORTHWEST CORNER ON 0.20 ACRES.

PARCEL NO. 27-28-06-000000-032070
WATER USAGE = 200 GPD
CONSTRUCTED USE = CAR WASH W/ ICE CREAM SHOP
CURRENT ZONING = COMMERCIAL/INDUSTRIAL
AS-BUILT BLDG. F.F. ELEV. = 152.60
FUTURE LAND USE = AGRICULTURAL/RESIDENTIAL – RURAL

PARKING

PARKING FINAL

1 SPACE PER 300 S.F.
BUILDING IS 483 S.F.
NO SEATS IN ICE CREAM SHOP
(2) PICNIC TABLES

PARKING PROVIDED

(5) 10' REG. SPACES NORTH END
(2) HANDICAP CURRENTLY
(WITHIN ~70 FEET TO PROPOSED ICE CREAM SHOP)

POND DATA

DRY RETENTION AS-BUILT 1998
25YEAR/24HR DRY BASIN
FLOOR ELEVATION 144.00
MAX. 100YR. PEAK 148.20
POND CREST CONSTRUCTED TO 150.00

TOP OF POND WAS ADJUSTED TO MEET MINIMUM ELEV. FOR D.O.T. CREST REQUIREMENT OF 149.20 ASBUILT ELEVATION AT 150.0 MIN.

DRAINAGE AREA BASIN 100

EXISTING DESIGN/CONDITIONS

TOTAL SITE PROJECT AREA = 77,537 SF

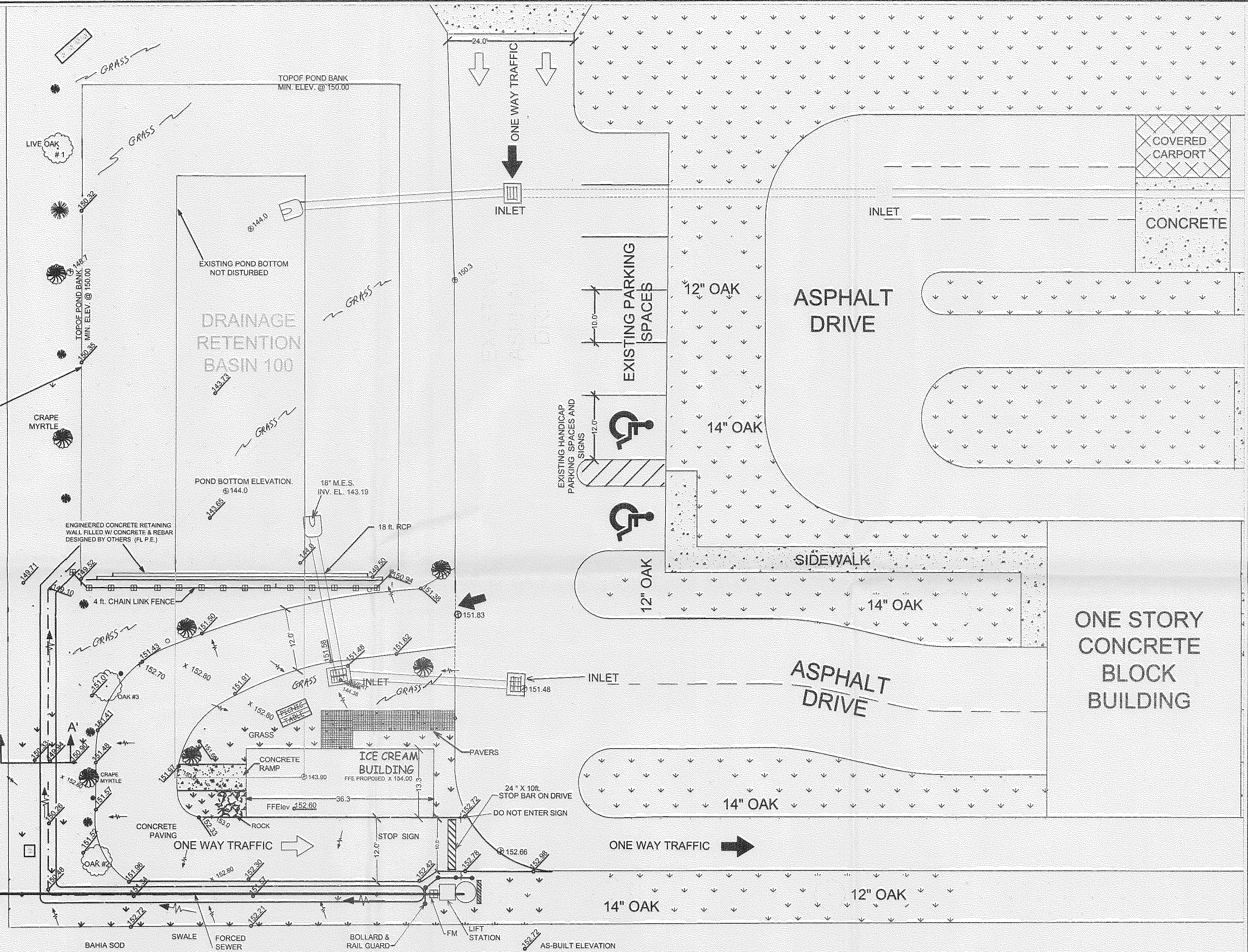
OPEN SPACE AND RETENTION PONDs= 11,761 SF
EXISTING PAVING & BUILDING = 63598 SF
EXISTING IMPERVIOUS AREA = 63,598 SF
PROPOSED PAVING & BUILDING = 2,178 SF
PROPOSED TOTAL IMPERVIOUS AREA= 65,776 SF

AS-BUILT

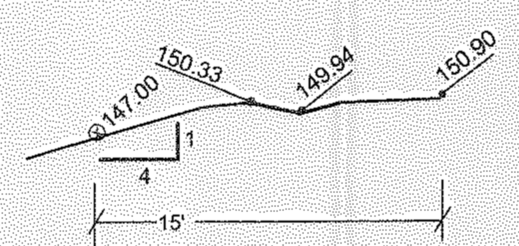
TOTAL SITE PROJECT AREA = 77,537 SF

EXISTING VEHICULAR PAVING = 59488 SF
EXISTING BUILDING = 4110 SF
AS-BUILT PAVING & BUILDING = 2386 SF
AS-BUILT IMPERVIOUS AREA = 65,984 SF

NOTE:
AS-BUILT DRIVEWAY AND BUILDING CONSTRUCTED WITH 208 SF ADDITIONAL THEN PLANNED. MINOR INCREASE WILL NOT PREVENT THE SYSTEM FROM FUNCTIONING AS DESIGNED AND PROPOSED. POND STORAGE CAPACITY WAS INCREASED WITH A FINAL TOP OF BANK @ 150.00min.– PER D.O.T. REVIEW OF CRITICAL STORM.



152.72 AS-BUILT ELEVATION
x 152.80 PROPOSED ELEVATION
DRAINAGE FLOW PATTERN
151.48 PRE EXISTING ELEVATION



SECTION A-A'

N.T.S.

N

0 5 10 SCALE, FEET

AS-BUILT RECORD DRAWING
THIS STORMWATER MNGT. SYSTEM AND SITE DESIGN HAS BEEN CONSTRUCTED SUBSTANTIALLY IN ACCORDANCE WITH APPROVED PLANS & INFORMATION. ANY MINOR DEVIATIONS WILL NOT PREVENT THE SYSTEM FROM FUNCTIONING IN COMPLIANCE WITH APPLICABLE REGULATIONS. SUBSTANTIAL DEVIATIONS ARE NOTED.

ICEcreamProject WMD_asbuiltSHT1

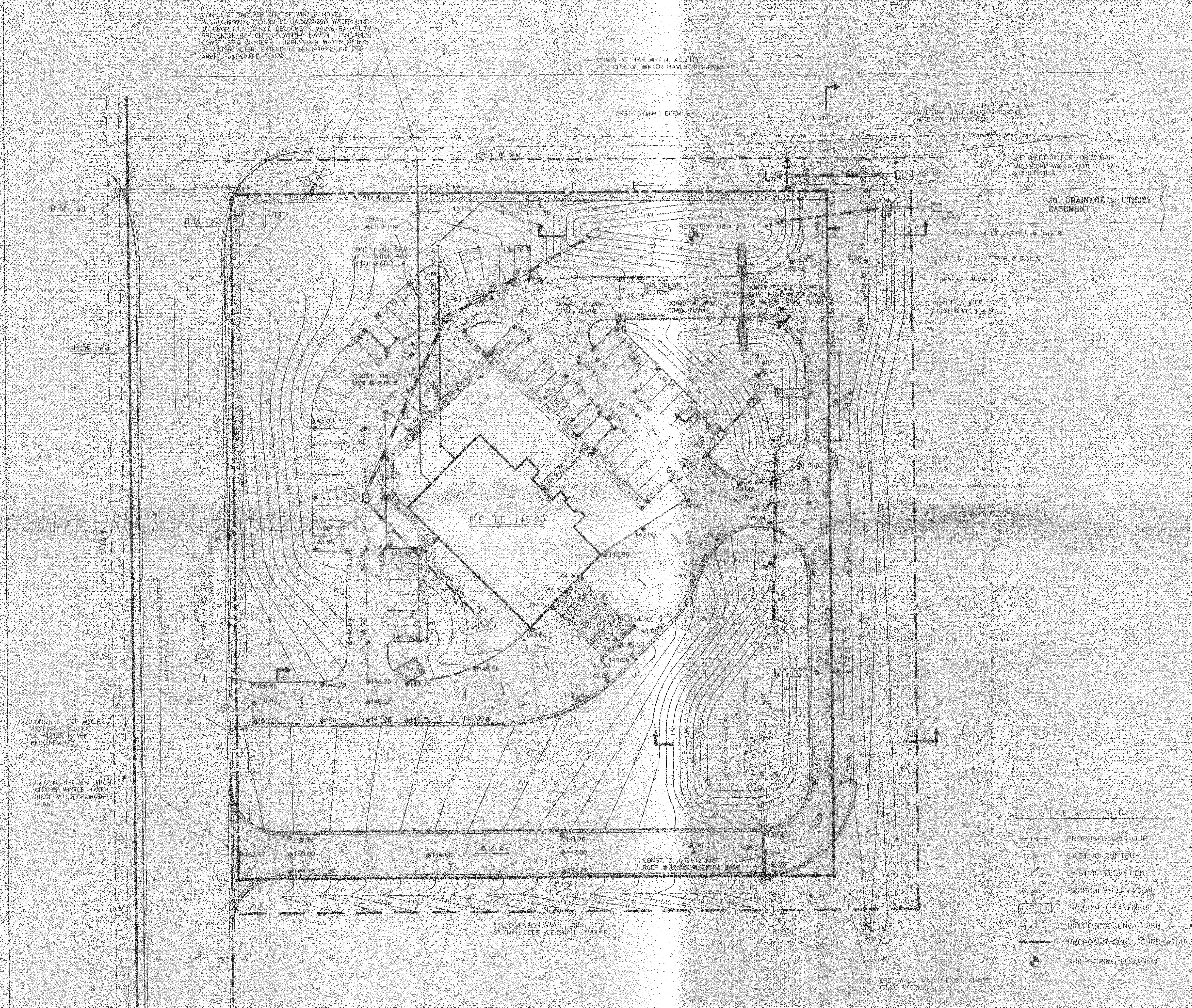
GENERAL ENVIRONMENTAL ENGINEERING, INC. 205 WEST PALMETTO ST. LAKELAND, FL 33815	**WASH ME CAR WASH ICE CREAM STAND ADDITION**	**SITE AS-BUILT RECORD PLAN INFORMATION/ DATA**	Dean Myers, P.E. 47666 7-5-2013 DATE	DRAWN: DH M APPROVED: DM DATE: 6/12/2013 SCALE: 1" = 10'	SHEET 1

DEAN HOWARD MYERS LICENSE No. 47666 STATE OF FLORIDA PROFESSIONAL ENGINEER

Southwest Florida Water Management District
JUL 10 2013
Received
BARTOW RSB

PERMIT NO. 9344.000

First National Bank



LEGEND

- PROPOSED CONTOUR
- EXISTING CONTOUR
- EXISTING ELEVATION
- PROPOSED ELEVATION
- PROPOSED PAVEMENT
- PROPOSED CONC. CURB
- PROPOSED CONC. CURB & GUTTER
- SOIL BORING LOCATION

GENERAL NOTES

1. All materials and workmanship shall conform to the Florida Department of Transportation specifications (latest edition) and City of Winter Haven regulations.
2. Locations, elevations, and dimensions of existing utilities, structures, and other features are shown according to the best information available at the time of preparation of these plans. The Contractor shall verify the locations, elevations, and dimensions of all existing utilities, structures, and other features affecting this work prior to construction.
3. The Contractor shall use extreme caution in areas of buried utilities and shall provide at least 48 hours notice to the utility companies prior to construction to obtain field locations of existing underground utilities. The Contractor shall protect and maintain operation of existing utility services during construction.
4. The Contractor shall check plans for conflicts and discrepancies prior to construction. The Contractor shall notify the engineer of any conflicts before performing any work in the affected area.
5. The Engineer (CHASTAIN-SKILLMAN, INC.) shall be notified as to where existing utility services interfere with the proposed construction.
6. The Contractor is responsible for repairing any damage to existing facilities, above or below ground, that may occur as a result of the work performed by the Contractor.
7. All underground utilities must be in place and tested or inspected prior to base and surface construction.
8. It is the Contractor's responsibility to become familiar with the permit and inspection requirements specified by the various governmental agencies and the engineer. The Contractor shall obtain all necessary permits prior to construction, and schedule inspections according to agency instructions. All work performed shall comply with the regulations and ordinances of the various governmental agencies having jurisdiction over the work.
9. The Contractor shall submit shop drawings on all pre-cast and manufactured items to the engineer for approval. Failure to obtain approval before installation may result in removal and replacement at Contractor's expense.
10. At least three (3) working days prior to construction, the Contractor shall notify the engineer and appropriate agencies and supply them with the Contractor's name, starting date, projected construction schedule, all required shop drawings, and other information as required. Any work performed prior to proper notifications may be subject to removal and replacement at the Contractor's expense.
11. All disturbed areas not included in the landscape plans shall be either sodded or seeded and mulched depending on the type of grass cover prior to construction. Minimum sodding requirements include a 10' perimeter strip around all structures, the retention area sideslopes and berms (do not sod pond bottom), the southern diversion swale, and a 2' strip along all paved areas. Contractor shall coordinate work with the landscape personnel.
12. Coordinate work within the rights-of-way with the City of Winter Haven, FDOT, and School Board of Polk County construction and maintenance authorities.
13. The site shall be initially graded such that no off-site area will be adversely affected by the stormwater runoff. Runoff to the adjacent rights-of-way shall be minimized. The existing drainage facilities within the right-of-way shall be protected at all times by the use of staked hay bales, temporary grading, revegetation, etc. Any disturbed area within the right-of-way shall be sodded. All areas shall be protected from erosion caused by stormwater runoff by vegetation, staked hay bales, temporary grading, etc.
14. Parking lot striping shall consist of white paint in accordance with the appropriate City of Winter Haven and FDOT specification.
15. Upon completion of construction activities, the retention area and stormwater piping systems shall be cleaned of all silts, debris, limerock, etc. The retention area shall be backfilled with clean coarse sand to the appropriate design elevations as required.
16. Safety:
    A. During construction and/or maintenance of this project, all safety regulations are to be enforced. The contractor or his representative shall be responsible for the control and safety of the traveling public and the safety of his personnel.
    B. Labor safety regulations shall conform to the provisions set forth by OSHA in the Federal Registry of the Department of Transportation.
    C. All trench excavation that exceeds an average depth of five (5) feet MUST conform to the requirements stated in the new "Trench Safety Act" incorporated into OSHA standards (Chapter 90-96, CS/SB 2626). The new law requires the Contractor to recognize the OSHA excavation safety standards, agree to abide by them, and identify the cost to comply.
    D. The minimum standards as set forth in the current edition of the State of Florida Roadway and Traffic Design Standards shall be followed in the design application, installation, maintenance, and removal of all traffic control devices, warning devices, and barriers necessary to protect the public and workmen from hazards within the project.
    E. All traffic control markings and devices shall conform to the provision set forth in the "Manual on Uniform Traffic Control Devices" prepared by the U.S. Department of Transportation, Federal Highway Administration.

STORMWATER MANAGEMENT SYSTEM OPERATING AND MAINTENANCE PROCEDURES

The stormwater facility must be maintained properly if it is to perform the service for which it was designed. This is intended to be a guide to the proper ways to maintain this facility. This is only a guide and should be modified as field conditions require.

1. Monthly, visually inspect inlet openings to insure that no clogging has occurred.
2. Once every three months, visually inspect all pipes for obstructions or a build-up of excessive sediments. If excessive sedimentation has occurred, have all lines properly flushed.
3. Weekly during summer months and bi-weekly during the remainder of the year, mow any grass within the collection areas and around the retention area. Grass clipping shall be collected and removed from the site for proper disposal.

STORM SEWER STRUCTURES TABULATION

S-1
Const. Type "F" DBI
T.G. Elev 138.05
Inv Elev 134.00

S-2
Const. 15" RCP U-Type Endwall with Baffles
Inv Elev 133.00

S-3
Const. 15" RCP U-Type Endwall
Inv El. 133.00

S-4
Const. Type "C" DBI
T.G. Elev 143.80
Inv Elev 139.56

S-5
Const. Type "F" DBI
T.G. Elev 143.10
Inv Elev 137.40

S-6
Const. Type "F" DBI
T.G. Elev 140.40
Inv Elev 134.90

S-7
Const. 18" RCP U-Type Endwall with Baffles
Inv Elev 133.00

S-8
Const. Control Structure
Type "C" DBI with Grease Baffle
T.G. Elev. 135.00
2' wide Slot W. Side
Slot Elev 133.85
Inv Elev 130.50

S-9
Const. Control Structure
Type "C" DBI with Grease Baffle
T.G. Elev 134.40
2' wide Slot S. Side
Slot Elev 134.10
Inv Elev 130.30

S-10
Const. 15" RCP U-Type Endwall with Baffles
Inv Elev 130.20

S-11
Const. 24" RCP Sidedrain Mitered End Section
Inv Elev 133.00

S-12
Const. 24" RCP Sidedrain Mitered End Section
Inv Elev 131.40

S-13
Const. 15" RCP U-Type Endwall
Inv. El. 133.00

S-14
Const. 12"x18" RCP "U" Type Endwall W/ Baffles
Inv El. 133.00

S-15
Const. P-4 Curb Inlet
E.O.P. El. 136.26
Inv El. 133.10

S-16
Const. P-4 Curb Inlet
E.O.P. El. 136.26
Inv El. 133.20

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
CONSTRUCTION DRAWINGS
APPROVED RSC

FILE OF RECORD
P .T NO.
SEP 03 1991

489344-01

ON SITE BENCH MARKS

B.M. #1 - Top of inlet near the Northwest corner of property, Elev = 143.61
West side of Public Road Way

B.M. #2 - Top of inlet near the Northwest corner of property, Elev = 142.45
East side of Public Road Way.

B.M. #3 - Top of P.K. Nail located 83.00 feet South of the Northwest corner of property on top of curb west side of Public Road Way. Elev = 147.36

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
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engineers–surveyors–planners
chastain skillman incorporated
lakeland sebring

SCALE	1" = 30'
DATE	
ENGINEER	CBS
SURVEYOR	
DRAWN BY	BM/LKW
CHECKED	
APPROVED	

FIRST NATIONAL BANK OF POLK COUNTY

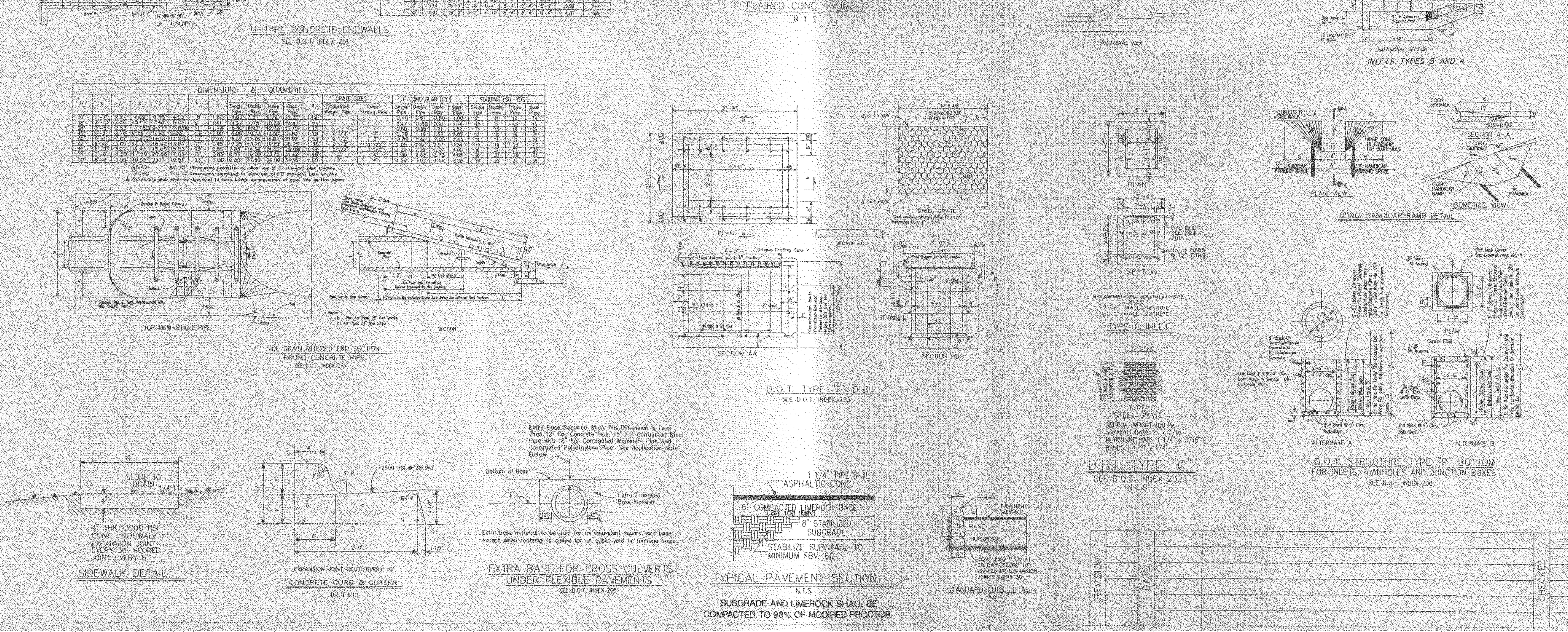
GRADING, DRAINAGE, AND UTILITIES PLAN

DATE 08/07/91 | DRWG. NO. DCL 4655.01-03 | REV. NO.

4

REVISION	DATE		CHECKED
1	08/06/91	REVISIONS PER OWNER & AGENCIES	

489344-01



SOIL BORING INFORMATION
DATE OF BORINGS: June 10, 1991

BORING NUMBER	PERC TEST RESULTS	TYPES OF SUBSOIL TO 6 FEET	CURRENT WATER TABLE ELEVATION
1	0.20 min/inch	0" - 10" Brown top soil 10" - 40" Tan semi-fine sand 40" - 72" Tan fades to very light tan/white semi-fine sand	None to 6 feet
2	0.30 min/inch	0" - 9" Brown top soil 9" - 32" Tan semi-fine sand 32" - 72" Tan fades to very light tan/white semi-fine sand	None to 6 feet
3	0.35 min/inch	0" - 9" Dark tan top soil 9" - 18" Light tan semi-fine sand 18" - 72" Tan fades to very light tan/white semi-fine sand	None to 6 feet

BORINGS PERFORMED BY: Karr's Percolation Service
77 Lake Pointe Drive
Mulberry, Florida 33860

Telephone: (813) 647-1770

FILE OF RECORD
PERMIT NO. ______
SEP 03 1991

SOUTHWEST FLORIDA WATER
MANAGEMENT DISTRICT
CONSTRUCTION
DRAWINGS
APPROVED RSC
9/3/91

489344

SOUTHWEST FLORIDA
WATER MANAGEMENT DISTRICT
AUG 21 1991

STORM SEWERS PIPING STANDARDS AND SPECIFICATIONS
REINFORCED CONCRETE PIPING MATERIALS

A. Round Concrete Pipe: Shall conform to requirements of ASTM C76-70 (Class III) except as modified in SSFR & BC Section 941-1.3.
B. Elliptical Concrete Pipe: Shall conform to requirements of ASTM C-507 except as modified in SSFR & BC Section 941.1.3. Standard elliptical pipe shall meet the requirements of Table I for Class HE-III and special elliptical pipe shall meet the requirements of Table I for Class HE-IV.
C. Gaskets: Rubber gaskets shall be used for round pipe and shall meet the requirements of Article 5.9 ASTM C-361 with the additional requirement that it shall be of sufficient volume to fill the pipe joint space in which it is used. Elliptical pipe shall use gaskets in accordance with SSFR & BC Section 942.2.

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AUG 23 1991

SCALE	N.T.S.
DATE	
ENGINEER	C.B.S.
SURVEYOR	
DRAWN BY	L.K.W.
CHECKED	
APPROVED	

engineers-surveyors-architects
chastain skillman incorporated
lakeland
sebring

FIRST NATIONAL BANK OF POLK COUNTY

6

GRADING & DRAINAGE DETAILS

DATE 489344 01 | DRWG. NO. DCL 4655.01-05 | REV. NO.

REVISION | DATE | CHECKED

489344.01

FIRST NATIONAL BANK OF POLK COUNTY -- STATE ROAD 544 SITE
STORMWATER INFORMATION AND CALCULATIONS

CSI Project Number 4655.01
August 15, 1991

engineers • scientists • surveyors

chastain skillman incorporated

8/12/91

FIRST NATIONAL BANK OF POLK COUNTY
STORM WATER INFORMATION AND CALCULATIONS

CSI #: 4655.01
DATE: 08/16/91

489344-01

GENERAL INFORMATION

The following storm water information and calculations pertain to the proposed construction of a new bank facility located on State Road 544 east of Winter Haven, Polk County. These calculations are based upon retaining and filtering the first 1/2" of runoff from the new development.

SOILS INFORMATION

The SCS Soil Survey of Polk County identifies the soils in the area of the proposed project as "Candler Sand" which is classified as a hydrologic group "A" soil with a SHW level at greater than 6.0 feet below existing grade. This SCS information also indicates a perc rate of 6 to 20 iph.

Soil borings performed in the vicinity of the retention areas indicate no groundwater to a depth of 72" (borings dated 6/10/91). The proposed retention areas will be constructed at an average depth of 3.0 feet. Therefore, the existing groundwater levels of the area should not be adversely affected. These soils tests also indicated an average perc rate of over 200 iph. The design of the storm water system is based upon a rate of 18 iph which is less than 10% of the measured value and which falls within the range determined by the SCS.

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STORM WATER INFORMATION AND CALCULATIONS

CSI #: 4655.01
DATE: 08/16/91

	BASIN #1	BASIN #2
DRAINAGE AREA -- OPEN SPACE	1.31 ac	0.08 ac
IMPERVIOUS AREA	1.55 ac	0.13 ac
RETENTION AREA	0.26 ac	0.05 ac
TOTAL AREA	3.12 ac	0.26 ac

RETENTION AREA DATA	POND #1A	POND #1B	POND #1C	
BOTTOM ELEV	133.0	133.0	133.0	133.5
BOTTOM AREA	1,370 sq.ft.	845 sq.ft.	3,400 sq.ft.	165 sq.ft.
T/B ELEV	135.0	135.0	135.0	134.5
T/B AREA	3,480 sq.ft.	2,300 sq.ft.	5,700 sq.ft.	2,400 sq.ft.
AVG SIDESLOPES	4:1	4:1	4:1	4:1
REQUIRED STORAGE		5,663 cu.ft.		472 cu.ft.
DISCHARGE ELEV.		133.85		134.10
STORAGE PROVIDED		5,756 cu.ft.		512 cu.ft.

DISCHARGE STRUCTURE INFORMATION

FROM: RETENTION AREA #1B
TO: RETENTION AREA #1A
52 LF - 15" RCP
HW INV EL 133.00
TW INV EL 133.00

FROM: RETENTION AREA #1C
TO: RETENTION AREA #1B
88 LF - 15" RCP
HW INV EL 133.00
TW INV EL 133.00

FROM: RETENTION AREA #1A
TO: OUTFALL SWALE
TYPE "C" DBI W/ GREASE BAFFLE
T.G. ELEV 135.00
2' WIDE SLOT W. SIDE
SLOT ELEV 133.85
88 LF - 15" RCP
HW INV EL 130.50
TW INV EL 130.20

FROM: RETENTION AREA #2
TO: OUTFALL SWALE
TYPE "C" DBI W/ GREASE BAFFLE
T.G. ELEV 134.40
2' WIDE SLOT S. SIDE
SLOT ELEV 134.10
24 LF - 15" RCP
HW INV EL 130.30
TW INV EL 130.20

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STORM WATER INFORMATION AND CALCULATIONS

CSI #: 4655.01
DATE: 08/16/91

489344.01

RETENTION AREA #1A -- STAGE/STORAGE RELATIONSHIP

BOTTOM AREA = 1370.00 SQ.FT.
BOTTOM ELEV = 133.00 FT
TOP AREA = 3480.00 SQ.FT.
TOP ELEV = 135.00 FT
SIDESLOPES = 4.00 FT/FT
PERC RATE = 18.00 IPH

EQUIVALENT RECTANGULAR POND
WIDTH = 102.51 FT
LENGTH = 13.36 FT

ELEV	STAGE (ft)	WIDTH (ft)	LENGTH (ft)	AREA (sq.ft)	INC. VOL (cu.ft)	VOLUME (cu.ft)	VOLUME (ac-ft)	PERC RATE (cfs)
133.00	0.00	102.51	13.36	1370	0	0	0.000	0.57
133.25	0.25	104.51	15.36	1606	372	372	0.009	0.67
133.50	0.50	106.51	17.36	1850	432	804	0.018	0.77
133.75	0.75	108.51	19.36	2101	494	1298	0.030	0.88
134.00	1.00	110.51	21.36	2361	558	1856	0.043	0.98
134.25	1.25	112.51	23.36	2629	624	2479	0.057	1.10
134.50	1.50	114.51	25.36	2905	692	3171	0.073	1.21
134.75	1.75	116.51	27.36	3188	762	3932	0.090	1.33
135.00	2.00	118.51	29.36	3480	834	4766	0.109	1.45

RETENTION AREA #1B -- STAGE/STORAGE RELATIONSHIP

BOTTOM AREA = 845.00 SQ.FT.
BOTTOM ELEV = 133.00 FT
TOP AREA = 2300.00 SQ.FT.
TOP ELEV = 135.00 FT
SIDESLOPES = 4.00 FT/FT
PERC RATE = 18.00 IPH

EQUIVALENT RECTANGULAR POND
WIDTH = 61.11 FT
LENGTH = 13.83 FT

ELEV	STAGE (ft)	WIDTH (ft)	LENGTH (ft)	AREA (sq.ft)	INC. VOL (cu.ft)	VOLUME (cu.ft)	VOLUME (ac-ft)	PERC RATE (cfs)
133.00	0.00	61.11	13.83	845	0	0	0.000	0.35
133.25	0.25	63.11	15.83	999	230	230	0.005	0.42
133.50	0.50	65.11	17.83	1161	270	500	0.011	0.48
133.75	0.75	67.11	19.83	1331	311	812	0.019	0.55
134.00	1.00	69.11	21.83	1508	355	1167	0.027	0.63
134.25	1.25	71.11	23.83	1694	400	1567	0.036	0.71
134.50	1.50	73.11	25.83	1888	448	2015	0.046	0.79
134.75	1.75	75.11	27.83	2090	497	2512	0.058	0.87
135.00	2.00	77.11	29.83	2300	549	3061	0.070	0.96

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RETENTION AREA #1C -- STAGE/STORAGE RELATIONSHIP

BOTTOM AREA = 3400.00 SQ.FT.
BOTTOM ELEV = 133.00 FT
TOP AREA = 5700.00 SQ.FT.
TOP ELEV = 135.00 FT
SIDESLOPES = 4.00 FT/FT
DEPTH INCR. = 0.25 FT
PERC RATE = 18.00 IPH

EQUIVALENT RECTANGULAR POND
WIDTH = 89.95 FT
LENGTH = 37.80 FT

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ELEV	STAGE (ft)	WIDTH (ft)	LENGTH (ft)	AREA (sq.ft)	INC. VOL (cu.ft)	VOLUME (cu.ft)	VOLUME (ac-ft)	PERC RATE (cfs)
133.00	0.00	89.95	37.80	3400	0	0	0.000	1.42
133.25	0.25	91.95	39.80	3659	882	882	0.020	1.52
133.50	0.50	93.95	41.80	3927	948	1831	0.042	1.64
133.75	0.75	95.95	43.80	4203	1016	2847	0.065	1.75
134.00	1.00	97.95	45.80	4486	1086	3933	0.090	1.87
134.25	1.25	99.95	47.80	4778	1158	5091	0.117	1.99
134.50	1.50	101.95	49.80	5077	1232	6323	0.145	2.12
134.75	1.75	103.95	51.80	5385	1308	7630	0.175	2.24
135.00	2.00	105.95	53.80	5700	1386	9016	0.207	2.38

FIRST NATIONAL BANK OF POLK COUNTY
STORM WATER INFORMATION AND CALCULATIONS

CSI #: 4655.01
DATE: 08/16/91

489344.01

RETENTION AREA #1 (COMPOSITE) -- STAGE/STORAGE RELATIONSHIP

ELEV	STAGE (ft)	#1A VOL (cu.ft)	#1B VOL (cu.ft)	#1C VOL (cu.ft)	VOLUME (cu.ft)	VOLUME (ac-ft)	PERC RATE (cfs)
133.00	0.00	0	0	0	0	0.000	2.34
133.25	0.25	372	230	882	1485	0.034	2.61
133.50	0.50	804	500	1831	3135	0.072	2.89
133.75	0.75	1298	812	2847	4957	0.114	3.18
134.00	1.00	1856	1167	3933	6955	0.160	3.48
134.25	1.25	2479	1567	5091	9137	0.210	3.79
134.50	1.50	3171	2015	6323	11509	0.264	4.11
134.75	1.75	3932	2512	7630	14075	0.323	4.44
135.00	2.00	4766	3061	9016	16843	0.387	4.78

RETENTION AREA #1 (COMPOSITE) -- DRAWDOWN ANALYSIS

INPUT PARAMETERS

INITIAL VOLUME = 5955.00 CU.FT.
NWL SURFACE AREA = 0.00 SQ.FT.
PERC RATE = 18.00 IN/HR
TIME INCR. = 0.10 HR
STAGE-STORAGE
Ks = 7496
b = 1.168

TIME (HR)	STORED VOLUME (CU.FT.)	SURFACE AREA (SQ.FT.)	PERC AREA (SQ.FT.)	PERC VOLUME (CU.FT.)
0.00	5955.00	7252.05	7252.05	1087.81
0.10	4867.19	7044.77	7044.77	1056.72
0.20	3810.48	6801.19	6801.19	1020.18
0.30	2790.30	6503.24	6503.24	975.49
0.40	1814.81	6113.25	6113.25	916.99
0.50	897.82	5525.01	5525.01	828.75
0.60	69.07	3821.19	3821.19	69.07
0.70	0.00	0.00	0.00	0.00

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STORM WATER INFORMATION AND CALCULATIONS

CSI #: 4655.01
DATE: 08/16/91

489344-0

RETENTION AREA #2 -- STAGE/STORAGE RELATIONSHIP

INPUT PARAMETERS: BOTTOM AREA = 165.00 SQ.FT.
BOTTOM ELEV = 133.50 FT
TOP AREA = 2400.00 SQ.FT.
TOP ELEV = 134.50 FT
SIDESLOPES = 4.00 FT/FT
PERC RATE = 18.00 IPH
RECTANGULAR POND: WIDTH = 270.77 FT
LENGTH = 0.61 FT

ELEV	STAGE (ft)	WIDTH (ft)	LENGTH (ft)	AREA (sq.ft)	INC. VOL (cu.ft)	VOLUME (cu.ft)	VOLUME (ac-ft)	PERC RATE (cfs)
133.50	0.00	270.77	0.61	165	0	0	0.000	0.07
133.75	0.25	272.77	2.61	712	110	110	0.003	0.30
134.00	0.50	274.77	4.61	1267	247	357	0.008	0.53
134.25	0.75	276.77	6.61	1829	387	744	0.017	0.76
134.50	1.00	278.77	8.61	2400	529	1273	0.029	1.00

RETENTION AREA #2 -- DRAWDOWN ANALYSIS

INPUT PARAMETERS
INITIAL VOLUME = 512.00 CU.FT.
NWL SURFACE AREA = 0.00 SQ.FT.
PERC RATE = 18.00 IN/HR
TIME INCR. = 0.10 HR
STAGE-STORAGE
Ks = 1273
b = 1.766

TIME (HR)	STORED VOLUME (CU.FT.)	SURFACE AREA (SQ.FT.)	PERC AREA (SQ.FT.)	PERC VOLUME (CU.FT.)
0.00	512.00	857.54	857.54	128.63
0.10	383.37	756.40	756.40	113.46
0.20	269.91	649.61	649.61	97.44
0.30	172.47	534.91	534.91	80.24
0.40	92.23	407.73	407.73	61.16
0.50	31.07	254.34	254.34	31.07
0.60	0.00	0.00	0.00	0.00

PERMIT NO. 10159.000

Century Commercial Parking (FDOT Pond Relocation)

Project Description

This project, entitled Century Commercial Vehicle Parking, consists of the construction of short and long term commercial vehicle parking areas on 13.29 acres. The site is located south of Lucerne Park Road, west of U.S. highway 27, in Section 6, Township 28 S., Range 27 E, Winter Haven, Florida. Access for the project will be through the Bretton Manor Avenue and through and existing local private roadway adjacent to CenterState Bank.

This project will modify 3 other prior ERP permit authorizations.

<u>44010159.001.</u> Entitled SR 544 & US Hwy 27 Site Grading, this project authorized a 24.00 mass grading plan on the property where this new project is located. The activities authorized under that permit, among other things, filled and removed an historic wetland and floodplain near the northern boundary of the project area. Much of the earthwork and grading for this project were completed, but not all.

<u>48009344.001.</u> Entitled First National Bank of Polk County, this authorized the construction of a bank with associated improvements and stormwater management system. This bank project had 4 designated retention ponds. One of them, Retention Area #2, appears to have been impacted and rendered ineffective by the construction of the driveway to the new RaceTrac store to the east. This RaceTrac driveway appears to have filled Retention Area #2. It is unclear if any design modifications or compensation was provided in the RaceTrac permit for this. Nevertheless, our project proposes to accept our new pond the runoff originally intended to be treated in the Bank pond.

<u>43010159.004.</u> Entitled SR 544 at US 27 was issued to FDOT for the construction of a surface water management system to serve improvements to the adjacent SR 544. Our project intends to relocate this FDOT Pond to a new location just to the south of its current location in order to accommodate our proposed development. It is clear from the narrative in the prior permit as well as the language in the FDOT Pond Easement that this pond was always intended to be relocated at a future date to accommodate future development on the Adams property. The newly proposed FDOT Pond is slightly larger than the existing FDOT Pond and much of the contributing drainage basin has been reduced and re-routed to our other proposed onsite pond. Please refer to the drainage calculations included with this report which show a reduction in the DHWL for the FDOT Pond for the 100 yr, 24 hr rainfall event. A copy of the recorded FDOT Drainage Easement is included in the Appendix of this report. This easement will be modified to reflect the revised location and recorded.

Onsite Soil Conditions

The soils located within the project area, as mapped by the NRCS, consist predominantly of Candler & Tavares Fine Sands (#3 & #15, hydrologic soil group “A”) as well as Smyrna Myakka Fine Sand (#17, HSG “B/D”). In addition, the map shows a portion of the Race Trac and FDOT Dry stormwater ponds located in Basinger Mucky Fine Sands (#36, hydrologic soil group “D”). This existing depression, and other areas of the site, have been filled as authorized under SWFWMD ERP #44010159.001. Please refer to the soils map included with this report, though the usefulness of this historic mapping is limited given the level of onsite earthwork that has taken place.

<u>Design SHWT</u>. In order to estimate a seasonal high water table for design purposes, a combination of factors were observed and applied.

1. Permitted SHWT's for existing adjacent retention ponds. The permitted SHWT for the existing FDOT is 129.30' (NGVD 29). This pond has been personally observed by the Engineer of Record for years and has never been observed holding any water for an extended period of time. The bottom is constantly dry enough to mow or drive a vehicle through and it is evident that it functions as designed. The permitted SHWT for the RaceTrac retention pond immediately to the east of the FDOT Pond and on the same parcel is 126.50' (NGVD 29). Similar to the FDOT Pond to the west, the Racetrac Pond is perpetually dry and appears to be functioning as designed.

2. Onsite soil boring in the location of the proposed pond. A single soil boring was performed and witnessed by the Engineer of Record in the location of the proposed pond. This boring was performed to a depth of 10'. No confining layer was encountered. Seasonal high water table indicators were observed at a depth of 8' below the surface. Groundwater was encountered at a depth of 9' below the surface. A SHWT at a depth of 8' at the location of the boring converts to and elevation of 128.00' (NGVD 29), which is consistent and reasonable when compared to the design SHWT elevations of the existing retention ponds. A depiction of the onsite soil boring profile is provided with this report.

Water Quality Treatment

One dry retention pond (Pond 100) is proposed to treat the stormwater runoff from the new development. The existing FDOT pond was permitted to provide no water quality treatment (only storage) and, accordingly, water quality treatment is not addressed in the relocated FDOT either.

Pond 100 Treatment Volume

Treatment Volume Required = 0.73 ac. ft.
Treatment Volume Provided = 9.70 ac. ft.

Water Quantity Storage

Rate

The project lies within a closed drainage basin. The relocated FDOT pond and Pond 100 have been designed to retain the entire stormwater runoff volume generated from the 100-year, 24-hour storm event with no discharge. The design of the relocated FDOT mirrors the permitted design. Previously permitted contributing areas and basin characteristics were utilized in the drainage calculations for the new FDOT Pond design. Only slight modifications to the reach(s) immediately upstream of the permitted pond, the pond geometric and storage characteristics, and the onsite contributing basing size, were modified to reflect the FDOT Pond's new location. An emergency overflow structure for Pond 100 has been placed in the northeast corner of the pond.

Pond 100 DHWL Elevation:	134.44 ft.
Pond 100 Top of Bank Elevation:	135.00 ft.

FDOT Pond Permitted DHWL Elevation:	134.22 ft.
FDOT Pond Proposed DHWL Elevation:	133.60 ft.

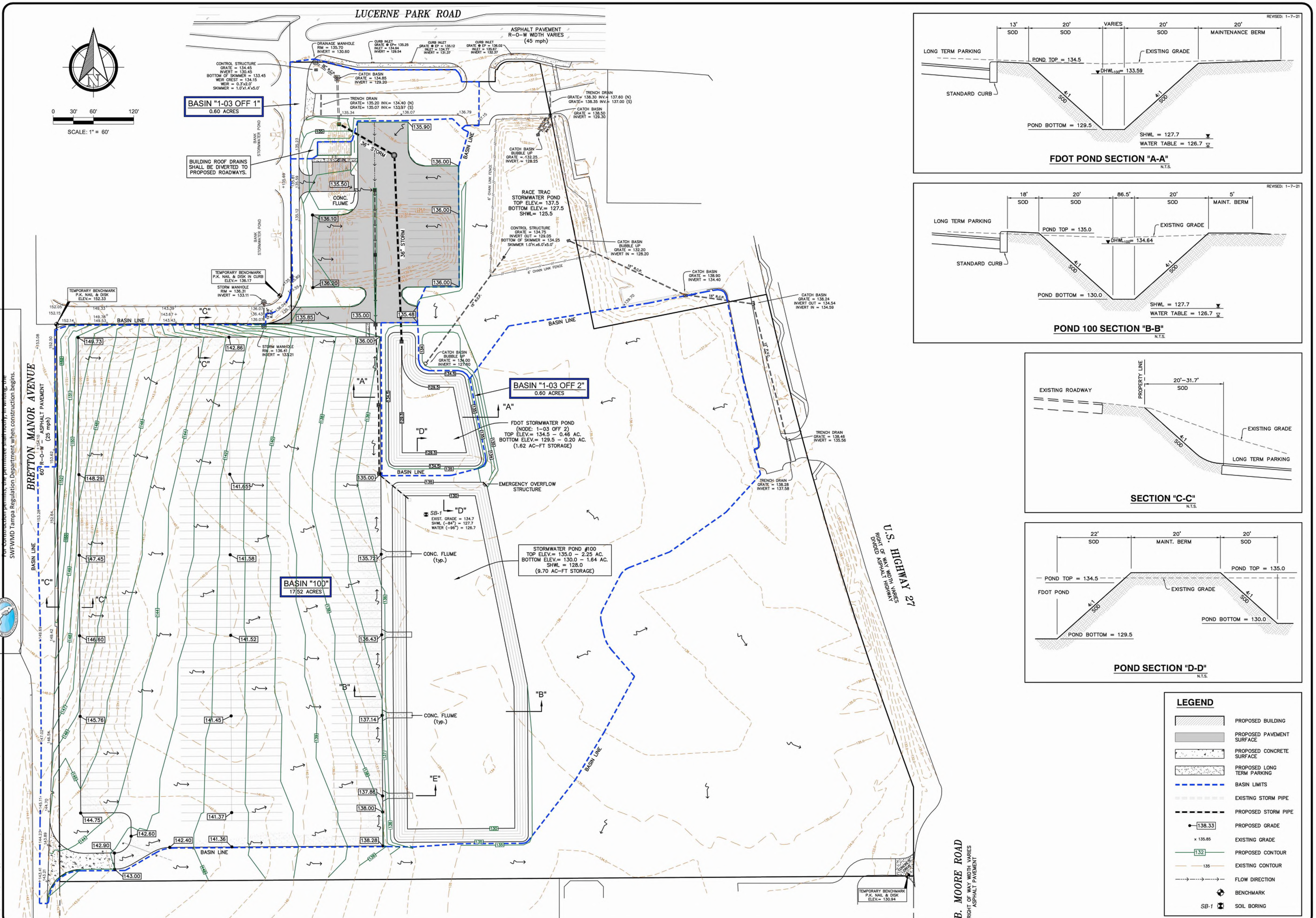
STAGE - STORAGE CALCULATION

PROJECT NAME:	Century Commercial Vehicle Parking
POND ID:	FDOTPond

INPUT PARAMETERS

BOTTOM ELEV.	=	**129.50**	ft.			
TOP ELEV.	=	**134.50**	ft.			
TOP AREA	=	**19930**	sqft.	**=**	**0.458**	ac.
BOTTOM AREA	=	**8809**	sqft.	**=**	**0.202**	ac.
DEPTH INC.	=	**1**	ft.			

ELEVATION (ft.)	STAGE (ft.)	AREA (sqft.)	AREA (ac.)	VOLUME (cuft.)	VOLUME (ac-ft.)
129.50	0.00	8809	0.20	0	0.000
130.50	1.00	10783	0.25	9796	0.225
131.50	2.00	12893	0.30	21634	0.497
132.50	3.00	15136	0.35	35649	0.818
133.50	4.00	17482	0.40	51958	1.193
134.50	5.00	19930	0.46	70664	1.622



MASTER DRAINAGE & GRADING PLAN

HUNTER ENGINEERING

4900 Dundee Road
Winter Haven, FL 33884
Telephone: 863-676-7770
Facsimile: 863-965-0181
C.A. #8394

Prepared For
CBRV-27GL, LLC
500 South Florida Avenue, Suite 700 Lakeland, Florida 33801

Construction Plans For
Century Commercial Vehicle Parking
Winter Haven, Florida

Date: November 13, 2020

Project No.: 20-008

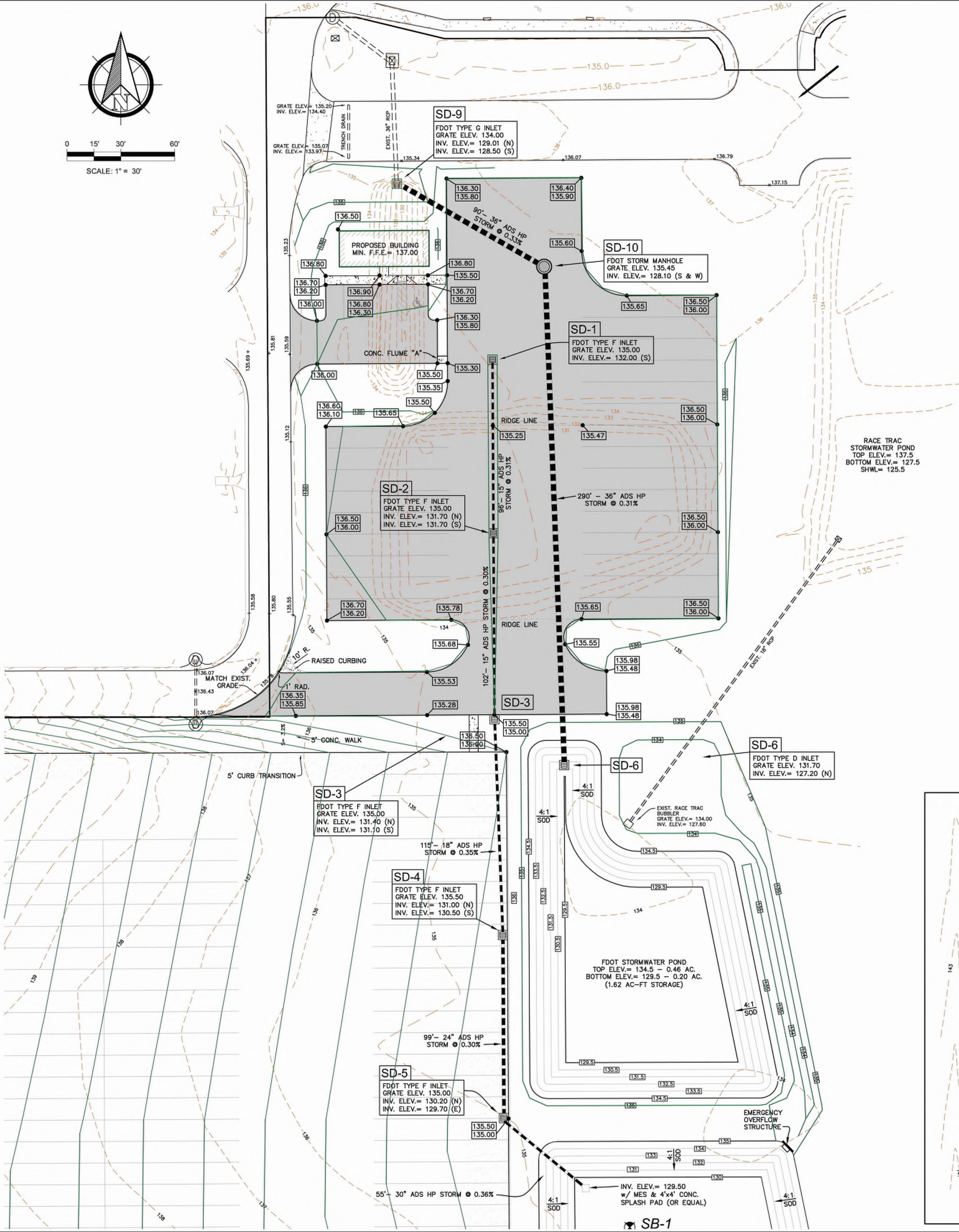
Not Valid Without Engineer's Seal

BRYAN A. HUNTER
LICENSE
No. 53168
STATE OF FLORIDA
PROFESSIONAL ENGINEER

This item has been digitally signed and sealed by Bryan A. Hunter using a digital signature on the date indicated. Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

Bryan A. Hunter, P.E.
Reg. No. 53168
C.A. #8394

C104



DRAINAGE NOTES

1. ALL STORMWATER RUNOFF FROM THIS SITE SHALL BE VISUALLY MONITORED DURING CONSTRUCTION BY THE CONTRACTOR TO ASSURE WATER QUALITY AND QUANTITY ARE GENERALLY MAINTAINED TO THE PRE-DEVELOPMENT LEVELS. THE FOLLOWING SHALL BE USED TO ACCOMPLISH MITIGATION OF ADVERSE QUANTITY AND QUALITY IMPACTS TO OFF-SITE PROPERTIES DURING CONSTRUCTION:
   A. DRAINAGE SWALES AND RETENTION SHOULD BE ROUGH CONSTRUCTED FIRST TO AVOID ANY INCREASE IN RUNOFF DUE TO THE CONSTRUCTION.
   B. TEMPORARY EROSION AND SEDIMENT CONTROL STRUCTURES SHALL BE INSTALLED TO PROTECT EXISTING DRAINAGE SYSTEMS AND WATER QUALITY DURING CONSTRUCTION.
   C. WHERE WORK IS PERFORMED IN A WATER COURSE OR WATER BODY, SILK CURTAINS AND SILT SCREENS SHALL BE USED TO CONTROL SILTATION AND TURBIDITY.
   D. DISTURBED AREAS AS A MINIMUM REQUIREMENT SHALL BE SEEDED AND MULCHED.
   E. IF SPECIAL CONDITIONS EXIST REQUIRING UNANTICIPATED MEASURES TO CONTROL STORMWATER RUNOFF, THESE MEASURES SHALL BE IMPLEMENTED AS SOON AS POSSIBLE.
2. PIPE LENGTHS ARE APPROXIMATE AND MAY REQUIRE MINOR ADJUSTMENTS IN THE FIELD.
3. THE CONTRACTOR IS TO VERIFY LOCATIONS AND ELEVATIONS OF ALL OUTFALLS BEFORE CONSTRUCTION, AND IF FOUND TO BE INADEQUATE, SHALL NOTIFY THE ENGINEER.
4. THE CONTRACTOR SHALL CONSTRUCT ALL DRAINAGE STRUCTURES IN ACCORDANCE WITH F.D.O.T. STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE DESIGN.
5. ALL REINFORCED CONCRETE PIPE SHALL BE CLASS III WITH RUBBER GASKET JOINTS.
6. OPERATION AND MAINTENANCE INSTRUCTIONS:
   A. THE STORMWATER MANAGEMENT SYSTEM SHALL BE PERIODICALLY INSPECTED DURING STORMS TO DETERMINE THAT IT IS OPERATING PROPERLY.
   B. CUTTING/MOWING BELOW NORMAL WATER LEVELS AND WITHIN THE LITTORAL ZONES (WET PONDS) SHALL BE PROHIBITIED. CHEMICALS OR GRASS CARP IN THE LITTORAL ZONES SHALL NOT BE USED.
   C. THE DETENTION AREA SHALL BE PERIODICALLY CLEANED OF DEBRIS OR SILTATION AS NECESSARY. ORIFICES/WEIRS SHALL BE CLEARED OF DEBRIS TO PREVENT CLOGGING.
   D. SWALES AND DITCHES SHALL BE CLEANED AS REQUIRED TO MAINTAIN FLOWS AND RESODDED WHEN NECESSARY.

CONSTRUCTION NOTES:

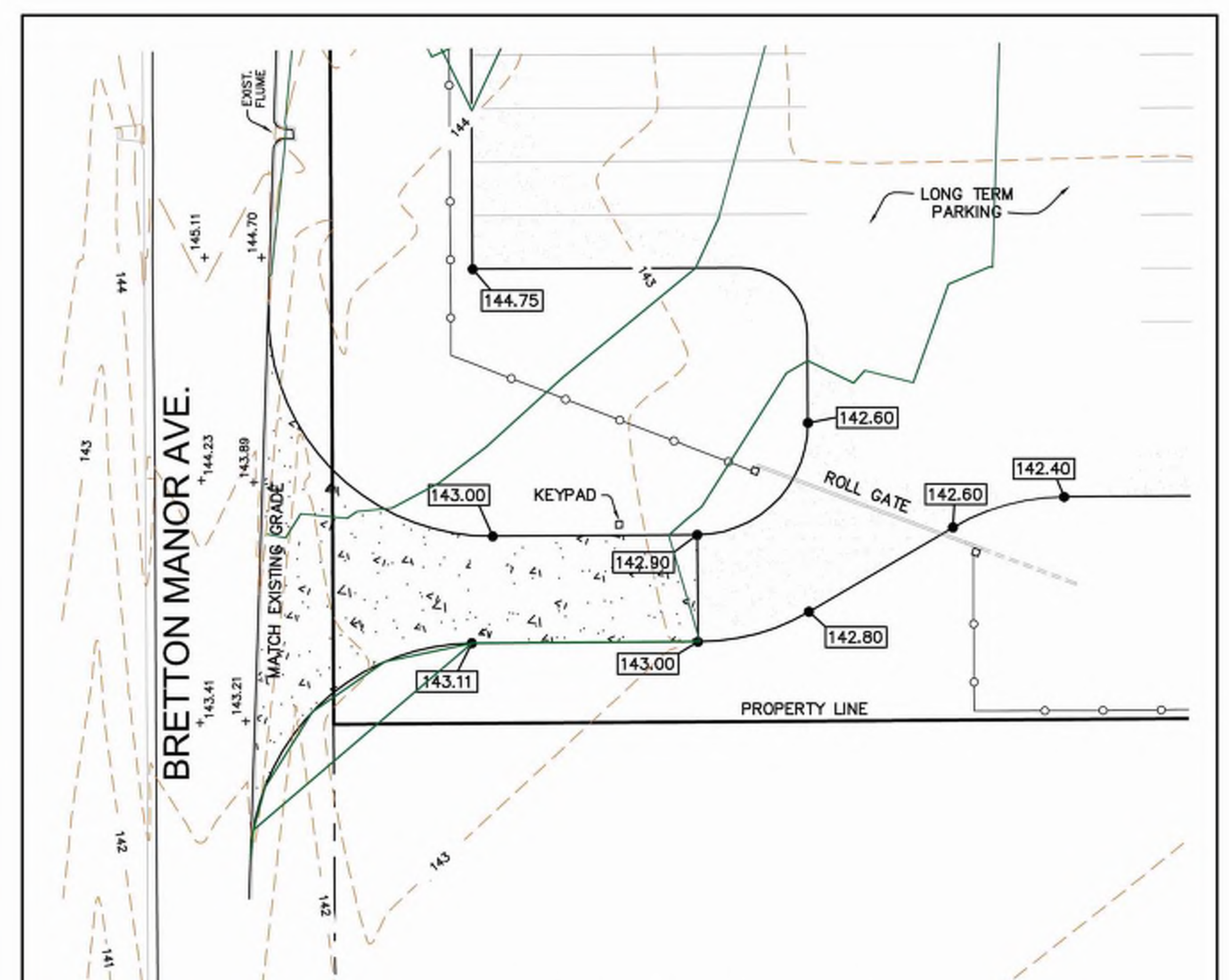
1. ANY UNSUITABLE MATERIALS SUCH AS MUCK, PEAT AND/OR PLASTIC CLAYS FOUND DURING CONSTRUCTION SHALL BE REMOVED FROM ROADBED AREAS. THE AREA SHOULD THEN BE BACKFILLED WITH SUITABLE MATERIAL AND THE SUBGRADE STABILIZED TO A MINIMUM DEPTH OF 10 INCHES (BELOW THE BASE COURSE) HAVING A MINIMUM 75-psi FLORIDA BEARING VALUE. SUITABLE MATERIALS FOR BACKFILL FOR STABILIZATION, IF NEEDED, INCLUDE HIGH-BEARING SOLID, SAND CLAY, GROUND LIME ROCK, OR ANY OTHER SUITABLE MATERIAL. MATERIAL TO BE CITY APPROVED.
2. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE CITY OF WINTER HAVEN LAND DEVELOPMENT CODE, LATEST REVISION.
3. RECORD/"AS-BUILT" DATA SHALL BE PROVIDED BY THE CONTRACTOR, SO THAT RECORD "AS-BUILT" DRAWINGS CAN BE PREPARED FOR SUBMITTAL TO VARIOUS PERMITTING AGENCIES. DRAWINGS SHALL BE IN STATE PLANE, PDF AND ACAD FORMAT.

FILL PLACEMENT

ALL FILL PLACED FOR SITE BERMING SHALL BE FREE OF ORGANICS, NON-PLASTIC GRANULAR SOIL (CLEAN SANDS). FILL SHALL BE PLACED IN MAX. OF 12" LIFTS AND COMPACTED TO A MINIMUM 95% per ASTM SPEC D-1557. TO OBTAIN BERM STABILITY, CLAY CORES MAY BE REQUIRED.

LEGEND

- PROPOSED BUILDING
- PROPOSED PAVEMENT SURFACE
- PROPOSED CONCRETE SURFACE
- PROPOSED LONG TERM PARKING
- EXISTING STORM PIPE
- PROPOSED STORM PIPE
- 138.33 PROPOSED GRADE
- × 135.65 EXISTING GRADE
- 132 PROPOSED CONTOUR
- 135 EXISTING CONTOUR
- FLOW DIRECTION



LONG TERM PARKING ENTRANCE
1" = 30'

SCALE: 1" = 30'

DETAILED GRADING PLAN

HUNTER ENGINEERING

4900 Dundee Road
Winter Haven, FL 33884
Telephone: 863-676-7770
Facsimile: 863-965-0181
C.A. #8394

Prepared For
CBRV-27GI, LLC
500 South Florida Avenue, Suite 700 Lakeland, Florida 33801

Construction Plans
For
Century Commercial Vehicle Parking
Winter Haven, Florida

Date: November 13, 2020

Project No.: 20-008

Not Valid Without Engineer's Seal

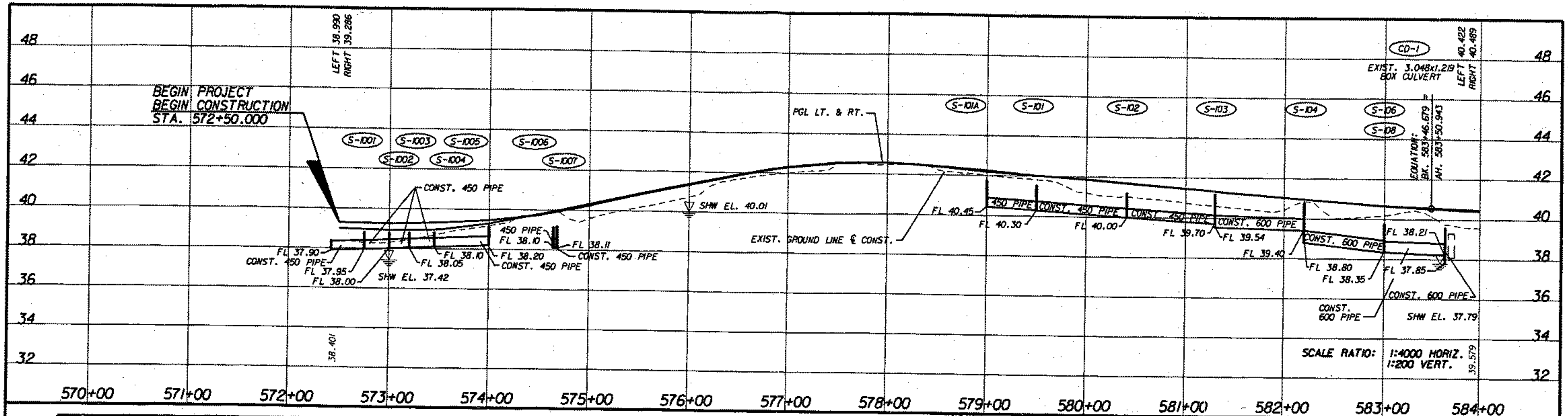
BRYAN A. HUNTER LICENSE No. 53168 STATE OF FLORIDA PROFESSIONAL ENGINEER

This item has been digitally signed and sealed by Bryan A. Hunter using a digital signature on the date indicated. Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

Bryan A. Hunter, P.E. Date
Reg. No. 53168
C.A. #8394

PERMIT NO. 23431.000

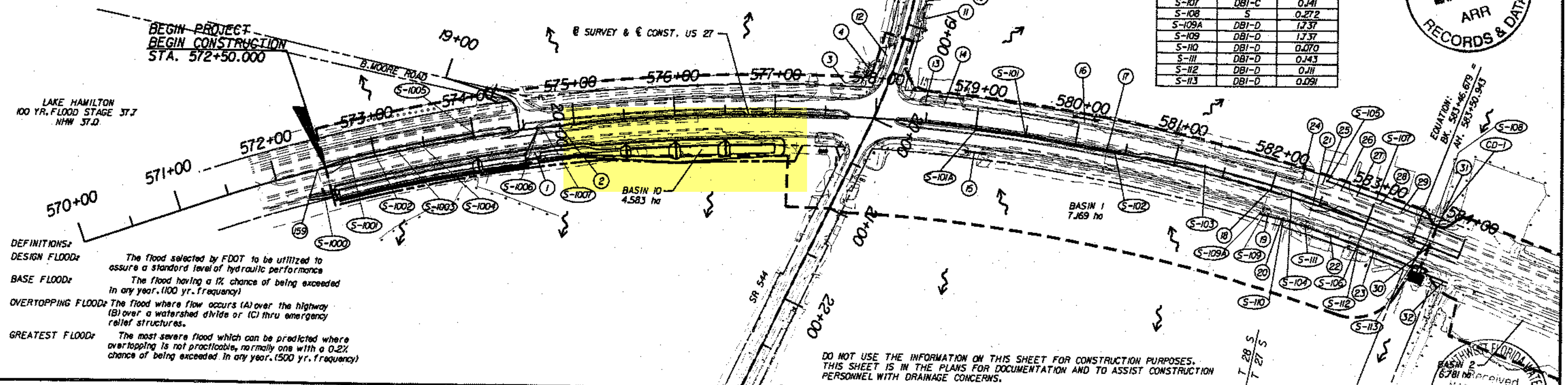
US 27



STRUCTURE NO.	STATION	DESIGN FLOOD		BASE FLOOD		GREATEST FLOOD			
		2% PROB.	50 YR FREQ.	1% PROB.	100 YR FREQ.				
		DISCHARGE	STAGE	DISCHARGE	STAGE	DISCHARGE	STAGE	PROB. %	FREQ. YR.
CD-1	583+69.652	1.407	38.76	1.614	38.80	2.218	38.95	0.2	500
CD-2	599+02.158	1.829	37.99	2.100	38.04	2.400	38.18	0.2	500
CD-3	603+44.571	0.170	37.99	0.200	38.04	0.700	38.18	0.2	500
CD-4	615+37.759	0.975	38.59	1.124	38.61	1.531	38.67	0.2	500
CD-5	622+92.049	0.901	38.38	1.030	38.45	1.407	38.63	0.2	500

NOTE: The hydraulic data is shown for informational purposes only, to indicate the flood discharges and water surface elevations which may be anticipated in any given year. This data was generated using highly variable factors determined by a study of the watershed. Many judgements and assumptions are required to establish these factors. The resultant hydraulic data is sensitive to changes, particularly of antecedent conditions, urbanization, channelization, and land use. Users of this data are cautioned against the assumption of precision which can not be attained. Discharges are in M3/S and stages are in M, NGVD-1929.

STRUCTURE NO.	STRUCTURE TYPE	AREA (HA)
S-1001	8	0.071
S-1002	8	0.043
S-1003	8	0.043
S-1004	8	0.095
S-1005	8	0.096
S-1006	DBI-C	0.317
S-1007	DBI-C	0.317
S-101A	S	0.184
S-101	S	0.137
S-102	S	0.274
S-103	P-5	0.165
S-104	P-5	0.156
S-105	DBI-C	0.647
S-106	S	0.155
S-107	DBI-C	0.141
S-108	S	0.272
S-109A	DBI-D	1.737
S-109	DBI-D	1.737
S-110	DBI-D	0.070
S-111	DBI-D	0.143
S-112	DBI-D	0.111
S-113	DBI-D	0.091



DEFINITIONS:

DESIGN FLOOD: The flood selected by FDOT to be utilized to assure a standard level of hydraulic performance.

BASE FLOOD: The flood having a 1% chance of being exceeded in any year. (100 yr. frequency)

OVERTOPPING FLOOD: The flood where flow occurs (A) over the highway (B) over a watershed divide or (C) thru emergency relief structures.

GREATEST FLOOD: The most severe flood which can be predicted where overtopping is not practicable, normally one with a 0.2% chance of being exceeded in any year. (500 yr. frequency)

DO NOT USE THE INFORMATION ON THIS SHEET FOR CONSTRUCTION PURPOSES. THIS SHEET IS IN THE PLANS FOR DOCUMENTATION AND TO ASSIST CONSTRUCTION PERSONNEL WITH DRAINAGE CONCERNS.

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

RS&H
Reynolds, Smith and Hills, Inc.
1715 N. Westshore Boulevard, Suite 500
Tampa, Florida 33607-3999
813-289-5550
FL Cert No. EB0005620
Engineer of Record: Henri V. Belrose, P.E. No. 56761
Architectural, Engineering, Planning and Environmental Services

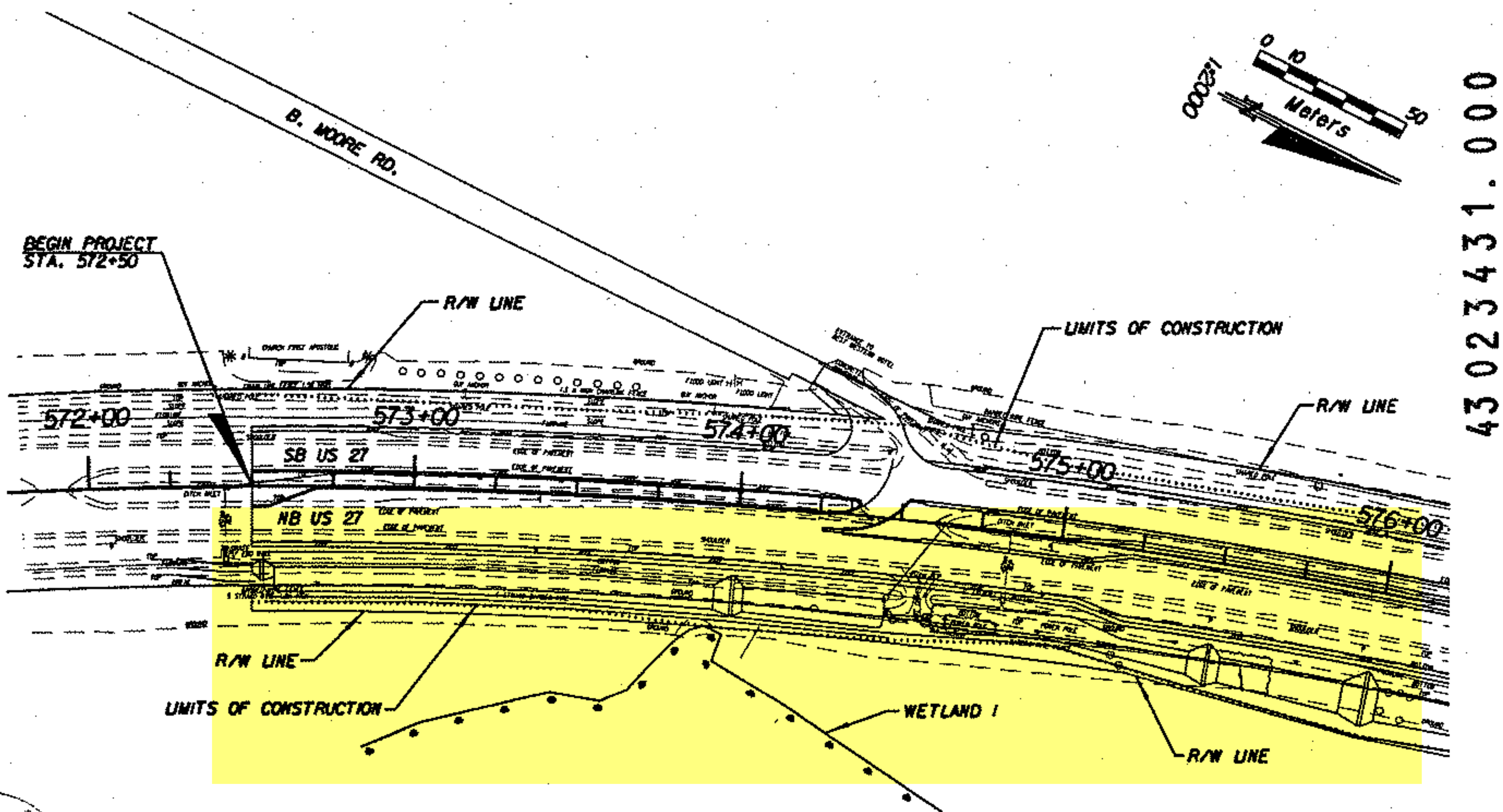
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
S.R. 25	POLK	197679-1-52-01

DRAINAGE MAP (1)

SHEET NO.

Thu Feb 21 10:15:35 2002
x:\004-9440.000\7\RDM\drmprd01.dgn



LEGEND

UMITS OF CONSTRUCTION

SWFWMD APPROVED WETLAND JURISDICTIONAL LINE

Original Poor Quality

PROJECT DESCRIPTION	FLORIDA DEPARTMENT OF TRANSPORTATION	STATE PROJECT NO. 16180-3538	
SR 25 (US 27)	NAME:	FINANCIAL PROJECT ID: 197679-1-52-01	
TWP: 28 SOUTH RNG: 27 EAST	SIGNATURE	POLK COUNTY	SHEET 2 OF 17
SEC: 6	CERTIFICATE NO. DATE:		DATE:

Fri Dec 14 15:11:24 2001
x:\04-9440.000\ROW\wetrd01.dgn

Linear Pond from Station 577+14 to Station 572+50
Basin 10 – Pond 10

The linear pond, located on the east side of US 27, flows south from Station 577+14 (south of SR 544) to the beginning of the project at Station 572+50. It was designed with a constant bottom width to treat and attenuate the runoff contributing from the roadway from the crown of SR 544 to the beginning of the project. The linear pond is divided in six sections. At the end of each section a ditch block with an orifice was designed to attenuate the water. The orifices will assure that the volume is recovered at each pond section.

The last section of the linear pond, from Station 574+00 to Station 572+50, is the only section designed to treat the required 1 inch over the total basin runoff since treatment in the other sections of the pond would result in comingling. The orifice of this section was sized to meet SWFWMD bleeddown criteria for a wet detention system.

The SWHT elevation at Station 573+00 was provided by the FDOT Geotechnical Engineer. The SHWT depth at this station varies from 0.46 meters (1.5 feet) to 0.76 meters (2.5 feet) below existing ground elevation. It was assumed that the SHWT at each cross section is the average of these two elevations (0.61 meters or 2 feet below existing ground elevation).

See Post-Development Analysis for Pond 10 for supporting documentation.

RS&H
Reynolds, Smith & Hills, Inc.

Project Name:	US 27	Prepared by:	SL
Project Number:	104-9440.000	Checked by:	MDF
Task Description:	Post-Development CN Calculations	Date:	8/22/00
		Revised:	5/23/01

SCS RUNOFF CURVE NUMBER

POST-DEVELOPMENT

DRAINAGE AREA (ac): 1.193
BASIN NAME/NO.: 577+00

Land Use Type	Hydrologic Soil Group	SCS Curve Number Value	Area Covered by CN Value	AREA*CN
Impervious	N/A	98	0.741	72.618
Pasture-Good	A	39	0.226	8.814
Pasture-Poor	A	68	0.226	15.368

$Sum_{Area*CN}$ =	96.80
Total Area =	1.193
Composite CN Value =	**81.14**

RS&H
Reynolds, Smith & Hills, Inc.

Project Name:	US 27	Prepared by:	SL
Project Number:	104-9440.000	Checked by:	MDF
Task Description:	Post-Development CN Calculations	Date:	8/22/00
		Revised:	5/23/01

SCS RUNOFF CURVE NUMBER

POST-DEVELOPMENT

DRAINAGE AREA (ac): 0.427
BASIN NAME/NO.: 576+50

Land Use Type	Hydrologic Soil Group	SCS Curve Number Value	Area Covered by CN Value	AREA*CN
Impervious	N/A	98	0.247	24.206
Pasture-Good	A	39	0.090	3.51
Pasture-Poor	A	68	0.090	6.12

$Sum_{Area*CN}$ =	33.84
Total Area =	0.427
Composite CN Value =	**79.24**

RS&H
Reynolds, Smith & Hills, Inc.

Project Name:	US 27	Prepared by:	SL
Project Number:	104-9440.000	Checked by:	MDF
Task Description:	Post-Development CN Calculations	Date:	8/22/00
		Revised:	5/23/01

SCS RUNOFF CURVE NUMBER

POST-DEVELOPMENT

DRAINAGE AREA (ac): 0.427
BASIN NAME/NO.: 576+00

Land Use Type	Hydrologic Soil Group	SCS Curve Number Value	Area Covered by CN Value	AREA*CN
Impervious	N/A	98	0.247	24.206
Pasture-Good	A	39	0.090	3.51
Pasture-Poor	A	68	0.090	6.12

$Sum_{Area*CN}$ = 33.84

Total Area = 0.427

Composite CN Value = 79.24

RS&H
Reynolds, Smith & Hills, Inc.

Project Name: US 27
Project Number: 104-9440.000
Task Description: Post-Development CN Calculations

Prepared by: SL
Checked by: MDF
Date: 8/22/00
Revised: 5/23/01

SCS RUNOFF CURVE NUMBER

POST-DEVELOPMENT

DRAINAGE AREA (ac): 0.581
BASIN NAME/NO.: 575+50

Land Use Type	Hydrologic Soil Group	SCS Curve Number Value	Area Covered by CN Value	AREA*CN
Impervious	N/A	98	0.314	30.772
Pasture-Good	A	39	0.134	5.2065
Pasture-Poor	A	68	0.134	9.078

$Sum_{Area*CN}$ =	45.06
Total Area =	0.581
Composite CN Value =	77.55

RS&H
Reynolds, Smith & Hills, Inc.

Project Name: US 27
Project Number: 104-9440.000
Task Description: Post-Development CN Calculations

Prepared by: SL
Checked by: MDF
Date: 8/22/00
Revised: 5/23/01

SCS RUNOFF CURVE NUMBER

POST-DEVELOPMENT

DRAINAGE AREA (ac): 1.972
BASIN NAME/NO.: 574+50

Land Use Type	Hydrologic Soil Group	SCS Curve Number Value	Area Covered by CN Value	AREA*CN
Impervious	N/A	98	1.295	126.91
Pasture-Good	B/D	86	0.339	29.111
Pasture-Poor	B/D	74	0.339	25.049

$Sum_{Area*CN}$ = 181.07

Total Area = 1.972

Composite CN Value = 91.82

RS&H
Reynolds, Smith & Hills, Inc.

Project Name:	US 27	Prepared by:	SL
Project Number:	104-9440.000	Checked by:	MDF
Task Description:	Post-Development CN Calculations	Date:	8/22/00
		Revised:	5/23/01

SCS RUNOFF CURVE NUMBER

POST-DEVELOPMENT

DRAINAGE AREA (ac): 1.305
BASIN NAME/NO.: 574+00

Land Use Type	Hydrologic Soil Group	SCS Curve Number Value	Area Covered by CN Value	AREA*CN
Impervious	N/A	98	0.677	66.346
Pasture-Good	B/D	86	0.314	27.004
Pasture-Poor	B/D	74	0.314	23.236

$Sum_{Area*CN}$ =	116.59
Total Area =	1.305
Composite CN Value =	**89.34**

Project Name:	US 27	Prepared by:	SL
Project Number:	104-9440.000	Checked by:	MDF
Task Description:	SWFWMD Water Quality Treatment Calculations	Date:	8/4/00
		Revised:	1/23/02

RS&H Reynolds, Smith & Hills, Inc.

Pond 10 Water Quality Treatment Calculations

Treatment Section at Pond: From STA. 577+00 to STA. 572+50, RT

This ditch will be treating the total area for the right side of the mainline. All ditches have 4:1 front slopes and 2:1 back slopes.

POST-DEVELOPMENT CONDITIONS		Area, acre
Impervious area:		3.723
Pervious area:		2.609
	Total Basin Area =	6.332

Location and length of treatment facility:

From STA. 574+50.000 To STA. 572+50.000 RT

Length at ditch top: 656 ft
Length at ditch bottom: 632 ft
Length at orifice elevation: 642 ft

Step #1: TREATMENT VOLUME REQUIRED FOR THE TOTAL BASIN AREA
Treatment volume = 1" of runoff over the total basin area

Treatment Volume = 1 inch of runoff over the total basin area
= 0.53 ac-ft

Step #2: CALCULATE WEIR ELEVATION FOR TREATMENT

Control elevation is based on the average depth of SHWL from existing ground according to geotech information at Sta. 573+00, RT. The average SWHL depth is 0.61 meters (2.00 feet).

Avg. Existing Ground Elevation = 124.49 ft
Avg. SHWL = 122.48 ft

Ditch Bottom Elevation = 123.50 ft
Top of Ditch block = 125.48 ft
Control Elevation FOR POSITIVE OUTFALL= 124.31 ft
Weir Elevation = Treatment Elevation = 125.38 ft
Avg. width @ ditch bottom = 25.00 ft
Avg. width @ control elevation = 29.87 ft
Avg. width @ top of bank = 36.88 ft

Area @ Bottom Elev.= Length * Avg. Width
= 0.363 ac

Area @ Control Elev.= Length * Avg. Width
= 0.440 ac

Area @ Top of ditch = Length * Avg. Width
= 0.556 ac

Elevation m	Elevation ft		Area acres	Volume acre-ft
37.89	124.31	Control Elev.	0.44	0.00
38.22	125.38	Treat. Elev.	0.55	0.53
38.25	125.48	Top of ditch	0.56	0.58

Note: Pond 10 is a linear pond that will treat and attenuate roadway runoff from Sta. 577+00 to Sta. 572+50. Treatment will be provided on the last section of the linear pond between Sta. 574+00 to Sta. 572+50

US 27
Stormwater Summary Table of Peak Conditions - Linear Pond 10

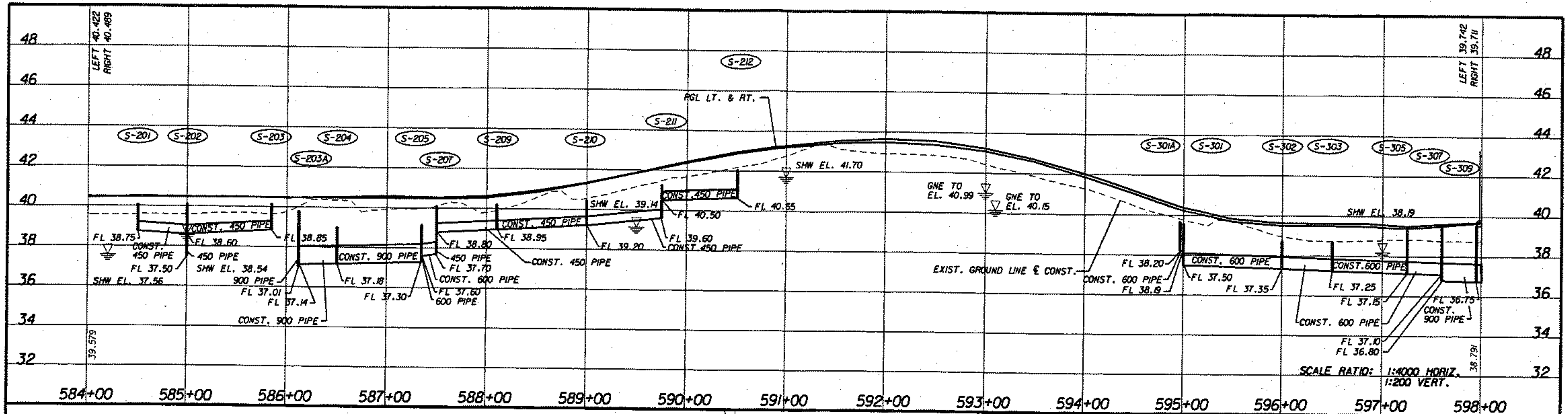
Discharge Comparison - ENGLISH										
Storm Event			Proposed Conditions			Historical Conditions			Historical vs. Proposed	
			Stage Pond 10	Outflow 57400	Total Outflow	Run-off Basin 10A	Run-off Basin 10B	Total Runoff	Diff. Runoff	% Diff. Runoff
Frequency	Duration	Rainfall				Q = ciA		Q	Q	Q
(Years)	(Hours)	(Inches)	(ft)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
100	240	18.000	125.46	3.64	3.64	22.83	25.62	48.45	44.81	92.49%
100	168	16.632	125.45	2.88	2.88	22.83	25.62	48.45	45.57	94.06%
100	72	13.824	125.46	3.93	3.93	22.83	25.62	48.45	44.52	91.89%
100	24	10.800	125.48	5.39	5.39	22.83	25.62	48.45	43.06	88.88%
100	8	8.400	125.59	14.01	14.01	22.83	25.62	48.45	34.44	71.08%
100	4	7.100	125.56	12.08	12.08	22.83	25.62	48.45	36.37	75.07%
100	2	5.920	125.64	18.95	18.95	22.83	25.62	48.45	29.50	60.89%
100	1	4.807	125.66	21.33	21.33	22.83	25.62	48.45	27.12	55.97%
50	240	15.840	125.45	3.19	3.19	20.01	22.46	42.47	39.28	92.49%
50	168	14.616	125.44	2.51	2.51	20.01	22.46	42.47	39.96	94.09%
50	72	12.096	125.45	3.02	3.02	20.01	22.46	42.47	39.45	92.89%
50	24	9.480	125.46	3.75	3.75	20.01	22.46	42.47	38.72	91.17%
50	8	7.360	125.55	10.93	10.93	20.01	22.46	42.47	31.54	74.26%
50	4	6.224	125.61	16.54	16.54	20.01	22.46	42.47	25.93	61.06%
50	2	5.190	125.60	15.62	15.62	20.01	22.46	42.47	26.85	63.22%
50	1	4.214	125.62	17.41	17.41	20.01	22.46	42.47	25.06	59.01%
25	240	13.920	125.44	2.79	2.79	17.54	19.69	37.23	34.44	92.51%
25	168	12.768	125.43	1.99	1.99	17.54	19.69	37.23	35.24	94.65%
25	72	10.584	125.44	2.31	2.31	17.54	19.69	37.23	34.92	93.80%
25	24	8.304	125.45	3.21	3.21	17.54	19.69	37.23	34.02	91.38%
25	8	6.456	125.53	9.36	9.36	17.54	19.69	37.23	27.87	74.86%
25	4	5.456	125.52	8.55	8.55	17.54	19.69	37.23	28.68	77.03%
25	2	4.550	125.57	12.54	12.54	17.54	19.69	37.23	24.69	66.32%
25	1	3.694	125.59	13.93	13.93	17.54	19.69	37.23	23.30	62.58%

US 27
Stormwater Summary Table of Peak Conditions - Linear Pond 10

Discharge Comparison - ENGLISH										
Storm Event			**Proposed Conditions**			**Historical Conditions**			**Historical vs. Proposed**	
Frequency (Years)	Duration (Hours)	Rainfall (Inches)	Stage Pond 10 (ft)	Outflow 57400 (cfs)	Total Outflow (cfs)	Run-off Basin 10A Q = ciA (cfs)	Run-off Basin 10B Q = ciA (cfs)	Total Runoff Q (cfs)	Diff. Runoff Q (cfs)	% Diff. Runoff Q (cfs)
10	240	11.520	125.43	2.12	2.12	14.74	16.54	31.28	29.16	93.22%
10	168	10.752	125.42	1.54	1.54	14.74	16.54	31.28	29.74	95.08%
10	72	8.928	125.43	1.95	1.95	14.74	16.54	31.28	29.33	93.77%
10	24	6.984	125.44	2.62	2.62	14.74	16.54	31.28	28.66	91.62%
10	8	5.424	125.51	7.59	7.59	14.74	16.54	31.28	23.69	75.74%
10	4	4.584	125.50	6.73	6.73	14.74	16.54	31.28	24.55	78.48%
10	2	3.822	125.53	8.90	8.90	14.74	16.54	31.28	22.38	71.55%
10	1	3.104	125.54	9.89	9.89	14.74	16.54	31.28	21.39	68.38%
5	240	10.080	125.43	1.65	1.65	12.92	14.50	27.42	25.77	93.98%
5	168	9.408	125.42	1.35	1.35	12.92	14.50	27.42	26.07	95.08%
5	72	7.848	125.43	1.71	1.71	12.92	14.50	27.42	25.71	93.76%
5	24	6.120	125.44	2.21	2.21	12.92	14.50	27.42	25.21	91.94%
5	8	4.752	125.49	6.46	6.46	12.92	14.50	27.42	20.96	76.44%
5	4	4.020	125.48	5.61	5.61	12.92	14.50	27.42	21.81	79.54%
5	2	3.350	125.50	6.63	6.63	12.92	14.50	27.42	20.79	75.82%
5	1	2.721	125.50	7.14	7.14	12.92	14.50	27.42	20.28	73.96%
2	240	8.640	125.42	1.42	1.42	10.86	12.18	23.04	21.62	93.84%
2	168	7.896	125.41	1.14	1.14	10.86	12.18	23.04	21.90	95.05%
2	72	6.552	125.42	1.41	1.41	10.86	12.18	23.04	21.63	93.88%
2	24	5.136	125.43	1.75	1.75	10.86	12.18	23.04	21.29	92.40%
2	8	3.992	125.48	5.17	5.17	10.86	12.18	23.04	17.87	77.56%
2	4	3.376	125.47	4.45	4.45	10.86	12.18	23.04	18.59	80.69%
2	2	2.816	125.43	3.95	3.95	10.86	12.18	23.04	19.09	82.86%
2	1	2.286	125.46	3.54	3.54	10.86	12.18	23.04	19.50	84.64%

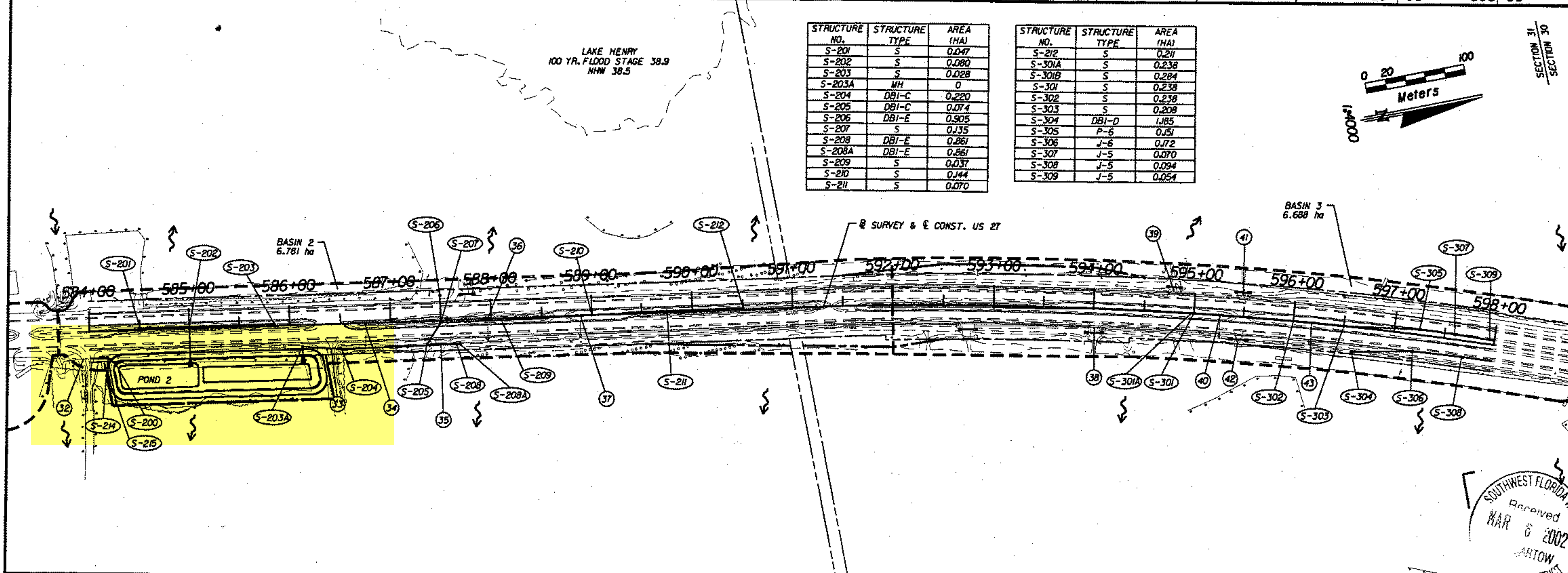
US 27
Stormwater Summary Table of Peak Conditions - Linear Pond 10

Discharge Comparison - ENGLISH										
Storm Event			Proposed Conditions			Historical Conditions			Historical vs. Proposed	
			Stage Pond 10	Outflow 57400	Total Outflow	Run-off Basin 10A	Run-off Basin 10B	Total Runoff	Diff. Runoff	% Diff. Runoff
Frequency	Duration	Rainfall				Q = ciA		Q	Q	Q
(Years)	(Hours)	(Inches)	(ft)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
25	24	FLMOD	125.59	13.87	13.87	9.86	15.45	25.31	11.44	45.20%



STRUCTURE NO.	STRUCTURE TYPE	AREA (HA)
S-201	S	0.047
S-202	S	0.080
S-203	S	0.028
S-203A	MH	0
S-204	DBI-C	0.220
S-205	DBI-C	0.074
S-206	DBI-E	0.905
S-207	S	0.135
S-208	DBI-E	0.861
S-208A	DBI-E	0.861
S-209	S	0.037
S-210	S	0.144
S-211	S	0.070

STRUCTURE NO.	STRUCTURE TYPE	AREA (HA)
S-212	S	0.211
S-301A	S	0.238
S-301B	S	0.284
S-301	S	0.238
S-302	S	0.238
S-303	S	0.208
S-304	DBI-D	1.185
S-305	P-6	0.151
S-306	J-6	0.172
S-307	J-5	0.070
S-308	J-5	0.094
S-309	J-5	0.054



REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

RS&H
Reynolds, Smith and Hills, Inc.
1115 N. Westshore Boulevard, Suite 500
Tampa, Florida 33607-3999
813-289-5550
FL Cert No. EB0005620
Engineer of Record: Henri V. Belrose, P.E. No.: 56761
Architectural, Engineering, Planning and Environmental Services

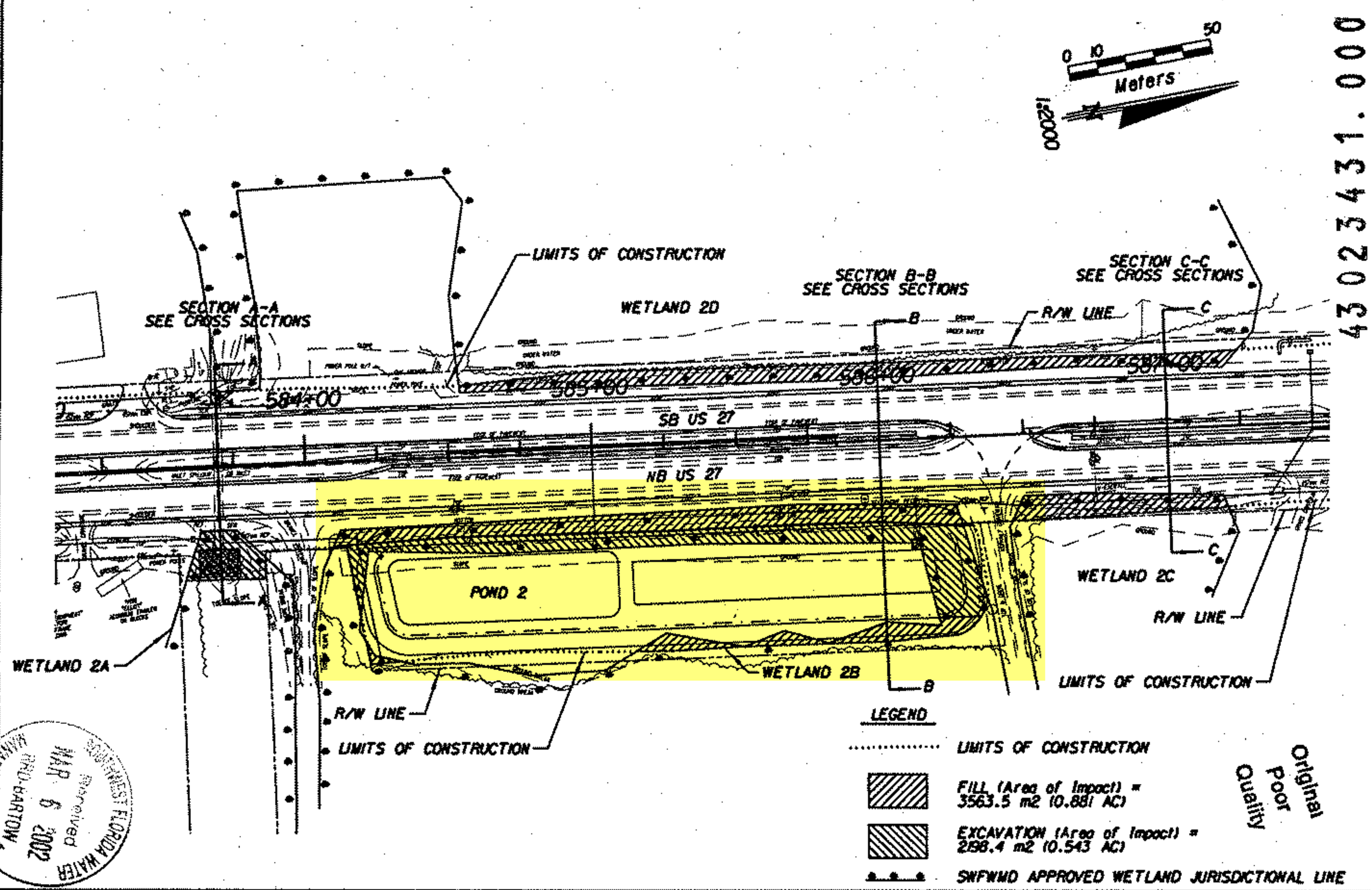
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
S.R. 25	POLK	197679-1-52-01

DRAINAGE MAP (2)

SHEET NO.

Thu Feb 21 10:15:30 2002



43023431.000

Original Poor Quality

PROJECT DESCRIPTION	FLORIDA DEPARTMENT OF TRANSPORTATION	STATE PROJECT NO. 16180-3538	
SR 25 (US 27)	NAME:	FINANCIAL PROJECT ID: 197679-1-52-01	
TWP: 27 SOUTH RNG: 27 EAST	SIGNATURE	POLK COUNTY	SHEET 3 OF 17
SEC: 31	CERTIFICATE NO. DATE:		DATE:

7.1 POND DESIGN ANALYSIS SUMMARY

This project is divided into 10 drainage basins, for a total of five (5) detention ponds and one (1) swale systems.

Basin 1

Basin 1 begins at the intersection of SR 544 and US 27, at Station 578+00, and ends at Station 583+70. A rural typical section is proposed for this portion of the roadway. The drainage system consists of conveyance ditches and a stormsewer system placed on either side of US 27 and the median. These systems carry the runoff toward cross drain CD-1. Pond 2 accommodates the treatment and attenuation of the stormwater runoff from Basin 1 through compensating treatment and attenuation in Basin 2.

Basin 2

Basin 2 begins at Station 583+70, and ends at Station 592+00. A rural typical section is proposed for this portion of the roadway. The drainage system consists of conveyance ditches and a stormsewer system placed on either side of US 27 and the median. These systems carry the runoff toward the pond, which is sized for both water quality and quantity. This pond discharges into the lateral ditch or adjacent wetland located at Station 583+70.

Pond 2

Pond 2 accommodates the treatment and attenuation of the stormwater runoff from Basin 1 through compensating treatment and attenuation in Basin 2. With the construction of this pond site, no pond will be necessary within Basin 1.

The maximum discharge in the pond at the 25-year, 24-hour event is 10.84 cfs at elev. 126.64 ft. The maximum discharge in the pond at the 100-year, 8-hour event is 16.34 cfs at elev. 127.07 ft.

US 27 (SR 25) WIDENING
FROM SR 544 TO BLUE HERON BAY BOULEVARD
Polk County, Florida

POST-DEVELOPMENT

CN CALCULATIONS AND TREATMENT CALCULATIONS
POND 2 AND CD-1

RS&H
Reynolds, Smith & Hills, Inc.

Project Name: US 27
Project Number: 104-9440.000
Task Description: Post-Development CN Calculations

Prepared by: SL
Checked by: MDF
Date: 8/22/00

SCS RUNOFF CURVE NUMBER
POST-DEVELOPMENT

DRAINAGE AREA (ac): 1.64
BASIN NAME/NO.: WETLAND

Land Use Type	Hydrologic Soil Group	SCS Curve Number Value	Area Covered by CN Value	AREA*CN
Impervious	N/A	98	1.060	103.88
Houtoon	B/D	74	0.578	42.772

$Sum_{Area*CN}$ = 146.65

Total Area = 1.638

Composite CN Value = 89.53

NOTE: This is the total area sheet flowing into wetland

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
Received
MAR 6 2002
BRD-BARTOW

x:\104-9440.000\t\drainage\cn\Pond2\PSTcn_CD1.xls - wetland

Reynolds, Smith & Hills, Inc.

Project Name:	US 27	Prepared by:	SL
Project Number:	104-9440.000	Checked by:	MDF
Task Description:	Post-Development CN Calculations	Date:	8/22/00
		Revised:	11/10/01

SCS RUNOFF CURVE NUMBER

POST-DEVELOPMENT

DRAINAGE AREA (ac): 1.95

BASIN NAME/NO.: 1

Land Use Type	Hydrologic Soil Group	SCS Curve Number Value	Area Covered by CN Value	AREA*CN
Impervious	N/A	98	0.346	33.902
Tavares	A	39	1.441	56.202
Houtoon	B/D	74	0.160	11.849

$\text{Sum}_{\text{Area*CN}}$ =	101.95
Total Area =	1.947
Composite CN Value =	**52.36**

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT Received MAR 5 2002 BRD-BARTOW

RS&H
Reynolds, Smith & Hills, Inc.

Project Name:	US 27	Prepared by:	SL
Project Number:	104-9440.000	Checked by:	MDF
Task Description:	Post-Development CN Calculations	Date:	8/22/00
		Revised:	11/10/01

SCS RUNOFF CURVE NUMBER

POST-DEVELOPMENT

DRAINAGE AREA (ac): 3.31
BASIN NAME/NO.: 1A

Land Use Type	Hydrologic Soil Group	SCS Curve Number Value	Area Covered by CN Value	AREA*CN
Impervious	N/A	98	2.338	229.081
Tavares	A	39	0.878	34.259
Houtoon	B/D	74	0.098	7.223

$\mathbf{Sum_{Area*CN}}$ =	270.56
Total Area =	3.31
Composite CN Value =	**81.65**

RS&H
Reynolds, Smith & Hills, Inc.

Project Name: US 27
Project Number: 104-9440.000
Task Description: Post-Development CN Calculations

Prepared by: SL
Checked by: MDF
Date: 8/22/00
Revised: 11/16/01

SCS RUNOFF CURVE NUMBER

POST-DEVELOPMENT

DRAINAGE AREA (ac): 9.61
BASIN NAME/NO.: 1B

Land Use Type	Hydrologic Soil Group	SCS Curve Number Value	Area Covered by CN Value	AREA*CN
Impervious	N/A	98	1.890	185.251
Tavares	A	39	6.947	270.951
Houtoon	B/D	74	0.772	57.124

$\text{Sum}_{\text{Area*CN}}$ = 513.33

Total Area = 9.610

Composite CN Value = 53.42

Reynolds, Smith & Hills, Inc.

Project Name: US 27
Project Number: 104-9440.000
Task Description: Post-Development CN Calculations

Prepared by: SL
Checked by: MDF
Date: 5/30/01
Revised: 5/24/01

SCS RUNOFF CURVE NUMBER

POST-DEVELOPMENT

DRAINAGE AREA (ac): 0.38
BASIN NAME/NO.: S-202

Land Use Type	Hydrologic Soil Group	SCS Curve Number Value	Area Covered by CN Value	AREA*CN
Impervious	N/A	98	0.146	14.287322
Houtoon	B/D	74	0.237	17.553984

$Sum_{Area*CN}$ = 31.84

Total Area = 0.38

Composite CN Value = 83.14

NOTE: This is the total area from the median ditch going into Pond 2 from Sta. 584+50 to 586+15. (See stormtab tabulations)

RS&H
Reynolds, Smith & Hills, Inc.

Project Name: US 27
Project Number: 104-9440.000
Task Description: Post-Development CN Calculations

Prepared by: SL
Checked by: MDF
Date: 1/17/02
Revised: 11/16/01

SCS RUNOFF CURVE NUMBER
POST-DEVELOPMENT

DRAINAGE AREA (ac): 8.69
BASIN NAME/NO.: S-203A

Land Use Type	Hydrologic Soil Group	SCS Curve Number Value	Area Covered by CN Value	AREA*CN
Impervious	N/A	98	4.102	401.98228
Houtoon	B/D	74	4.591	339.74273

$Sum_{Area*CN}$ = 741.73
Total Area = 8.693
Composite CN Value = 85.32

NOTE: This is the total area from the ditches going into Pond 2 from Sta. 592+00 to Sta. 586+50 (see stormtab tabulations)

RS&H Reynolds, Smith & Hills, Inc.

Project Name: US 27
Project Number: 104-9440.000
Task Description: Post-Development CN Calculations

Prepared by: SL
Checked by: MDF
Date: 8/22/00
Revised: 12/18/00

SCS RUNOFF CURVE NUMBER

POST-DEVELOPMENT

DRAINAGE AREA (ac): 3.18
BASIN NAME/NO.: BASIN2

Land Use Type	Hydrologic Soil Group	SCS Curve Number Value	Area Covered by CN Value	AREA*CN
Impervious	N/A	98	0.979	95.942
Houtoon	B/D	74	0.680	50.32
Pond 2	N/A	100	1.52	152

$Sum_{Area*CN}$ = 298.26

Total Area = 3.179

Composite CN Value = 93.82

NOTE: This is the total area sheet flowing into Pond 2 (including the pond 6m berm and Pond Area at SHWL) from Sta. 584+00 to Sta. 586+50.

Reynolds, Smith & Hills, Inc.

Project Name:	US 27	Prepared by:	SL
Project Number:	104-9440.000	Checked by:	MDF
Task Description:	Stage-Storage Treatment	Date:	8/23/00
		Revised:	1/18/02

Basin 2 - Pond 2

POST-DEVELOPMENT CONDITIONS	Area, ac	Area, ha
Impervious area:	5.23	2.115
Pond 2 Wet area:	1.52	0.616
Pervious area:	5.51	2.229
Access Road area to be treated in pond 2:	0.71	0.287
Total Basin Area =	**12.97**	**5.248**

Step #1: CALCULATE TREATMENT VOLUME TO BE PROVIDED

Treatment Volume based on the first one inch of runoff from the total basin area

Treatment Volume = Total basin Area $_{(ac)}$ * 1 in * (1 ft / 12 in)
= **1.08** ac-ft

Step #2: CALCULATE STAGE VS. STORAGE RELATIONSHIP

Calculate area at control and top of bank elevation

SHWL = Control Elevation =	124.54 ft	37.959 m
Inside top of bank elevation =	125.49 ft	38.250 m
Outside top of bank elevation =	127.95 ft	39.000 m
Area @ control elevation =	1.52 ac	0.616 ha
Area @ inside top of bank =	1.65 ac	0.669 ha
Area @ outside top of bank =	2.36 ac	0.956 ha

Step #3: CALCULATE WEIR ELEVATION

Elevation m	Elevation ft		Area acres	Volume acre-ft
37.96	124.54	Control Elev.	1.52	0.00
38.17	125.24	Treatment Elev.	1.62	1.10
38.25	125.49	Inside TOB	1.65	1.52

PERMIT NO. 33368.000

US 27

US 27 (SR 25) Widening
From CR 546 to SR 544
Polk County, Florida

AEP: 104-3472-025
FPID: 411039-1-52-01

DRAINAGE DOCUMENTATION SWFWMD PERMIT SUBMITTAL

Prepared for:

FLORIDA DEPARTMENT OF TRANSPORTATION DISTRICT ONE AND SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT

Prepared by:

REYNOLDS, SMITH AND HILLS, INC.
1715 N. Westshore Boulevard, Suite 500
Tampa, Florida 33607
(813) 289-5550

Southwest Florida Water Management District

SEP 11 2007

BRS Bartow

AUGUST 2007

8-7-07

43033369 000

EXECUTIVE SUMMARY

The Florida Department of Transportation (FDOT) District One proposes to widen US 27 (SR 25) in Polk County, from north of CR 546 (Kokomo Road) to South of SR 544 (MP 11.354 to MP 12.926). This project is approximately 1.57 miles in length and includes widening the existing four-lane, rural, divided roadway to a six-lane, rural, divided roadway. The project is identified as Financial Project Number 411039-1-52-01.

The project is located in Sections 5, 6, 7 and 8 of Township 27 South, and Range 27 East. The regulatory water management district is the Southwest Florida Water Management District (SWFWMD). This project lies within the Lake Hamilton Watershed that includes Little Lake Hamilton, Middle Lake Hamilton and Lake Hamilton.

This project is divided into two major basins and five sub-basins. The existing flow path of roadway runoff collects in roadside ditches and is conveyed from east to west by means of existing cross drains. These cross drains send water toward Lake Hamilton and Middle Lake Hamilton located on the west side of the project corridor. This project is located within an open basin—the positive outfall being Lake Hamilton. The proposed condition flow paths mimic the existing and include a collection system designed to capture the runoff from selected sub basins for treatment in proposed storm water management facilities.

This project was designed to meet current FDOT and SWFWMD standards for water quantity and water quality. The method of treatment for this project is wet detention. This design proposes the treatment volume equivalent to 1-inch of runoff from the roadway widening as well as the directly connected impervious areas, where hydraulically possible. The combined storm water management facilities will treat 0.85 acre-feet of roadway runoff.

The roadway widening will have impacts to the 100-year floodplain. The floodplain for this area encompasses the total project limits; therefore, one floodplain site is used to provide compensation. Two and a half (2.50) acre-ft of floodplain compensation is required and is provided.

TABLE OF CONTENTS

LIST OF FIGURES

FIGURE **PAGE**

LIST OF APPENDICIES

1.0 PROJECT DESCRIPTION

1.1. Purpose

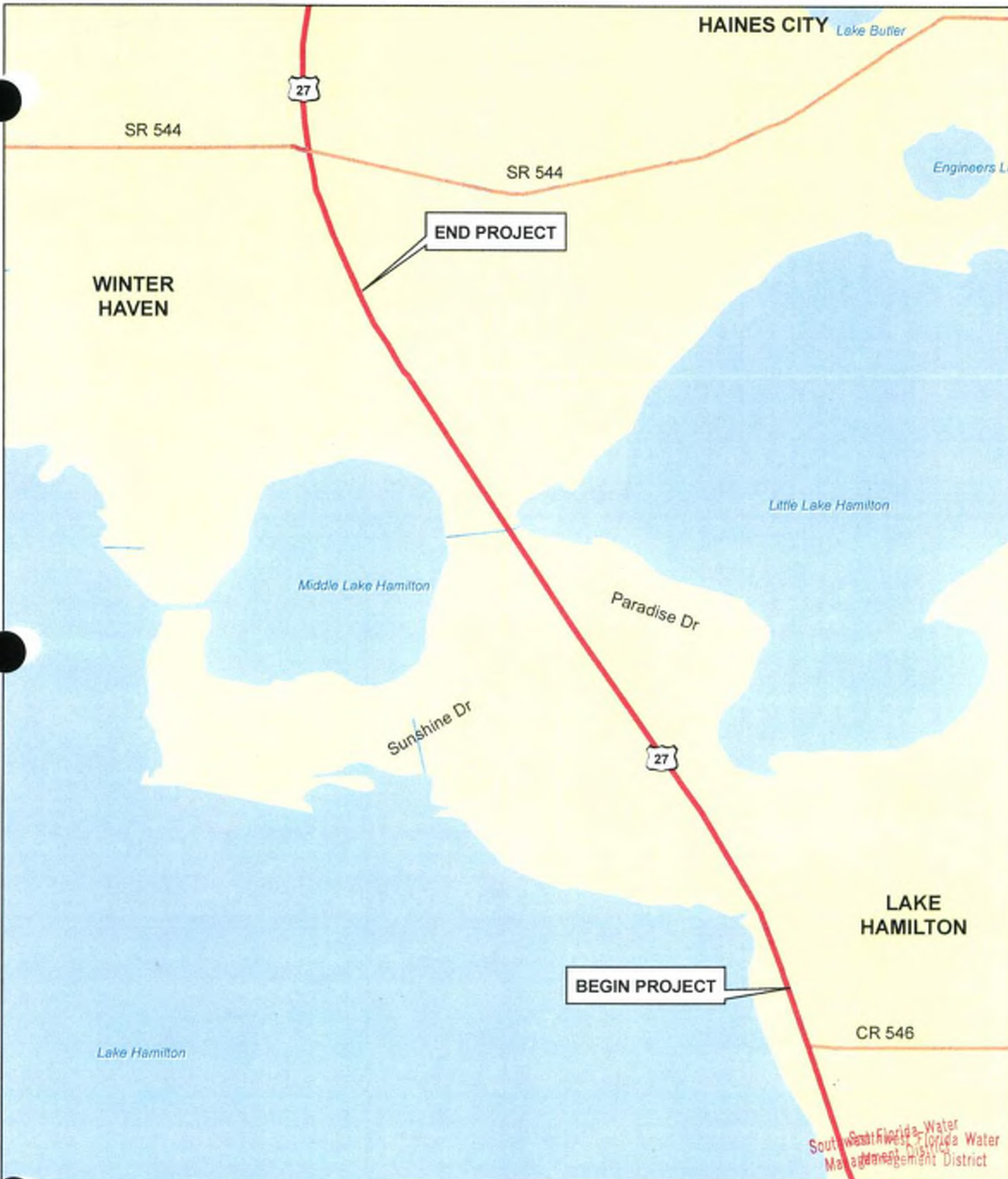
As part of the US 27 (SR 25) Widening Project this report will serve as the drainage documentation that details the proposed drainage design. The purpose of this report is to define the drainage improvements that will be made to accommodate the proposed roadway widening. This report will include existing and proposed drainage conditions, stormwater management facilities models, and floodplain encroachments and compensation.

1.2. Project Description and Location

The Florida Department of Transportation (FDOT) District One proposes to widen US 27 (SR 25) in Polk County, from north of CR 546 (Kokomo Road) to South of SR 544 (MP 11.354 to MP 12.926). This project is approximately 1.57 miles and includes of widening the existing four-lane divided roadway to a six-lane rural divided roadway. The project is identified as Financial Project Number 411039-1-52-01.

The project is located in Sections 5, 6, 7, 8 of Township 27 South, and Range 27 East. See the Location Map in Figure 1. The regulatory water management district is the Southwest Florida Water Management District (SWFWMD). This project lies within the Lake Hamilton Watershed that includes Little Lake Hamilton, Middle Lake Hamilton and Lake Hamilton. This watershed is part of the much larger Peace Creek Canal watershed, including the easternmost headwaters of the Peace River.

Figure 1 shows the project location.



US 27 from north of CR 546 to south of SR 544
Financial Project ID No. 411039-1
Polk County, FL

NTS

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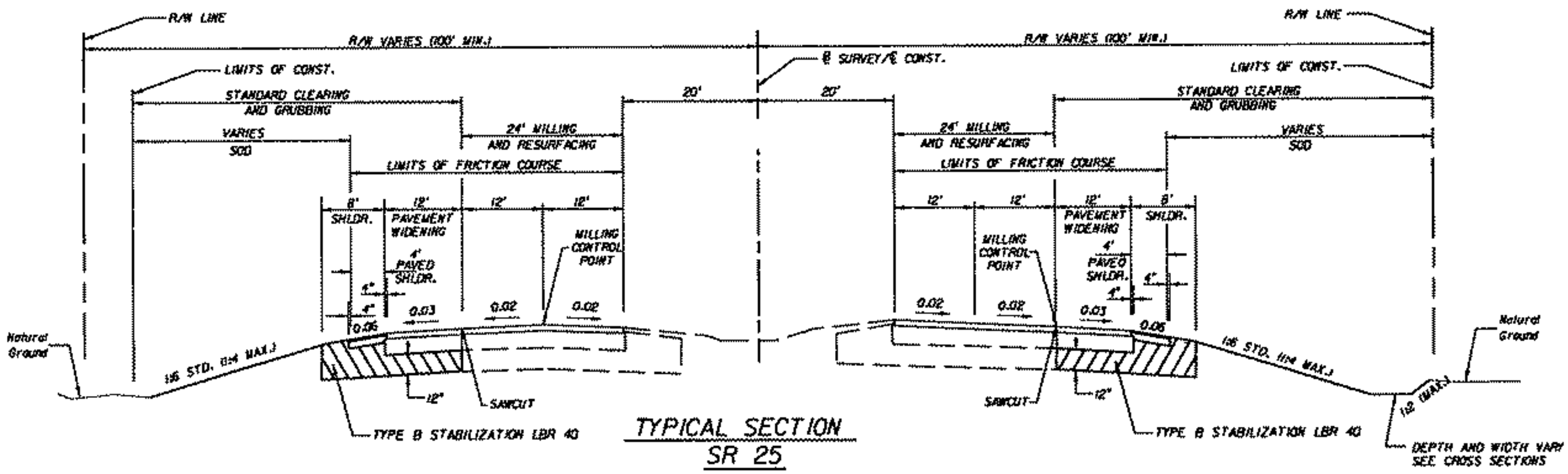
PROJECT LOCATION MAP
Figure 1

1.3. Existing Typical Section

The existing typical section is a rural 4-lane divided highway. Within the 200-foot right of way, there are four 12-foot lanes, two 4-foot shoulders, a 40-foot median and approximately 52 feet of border width on both sides. The existing corridor consists of several businesses and commercial properties, along with residential neighborhoods, a campground and a church. The existing typical section includes approximately 12.4 acres of impervious area and 22.3 acres of pervious area.

1.4. Proposed Typical Section

The proposed typical section is a rural 6-lane divided highway. This widening project includes the construction of one additional 12' lane in each direction that will be built on the outside lanes. Within the 200-foot of right of way, there will be six 12-foot lanes, two 8-foot shoulders (4 ft. paved, 4 ft. grassed), a 40-foot median and approximately 36 feet of border width on both sides. The proposed corridor will have similar land use as the existing condition, but some of areas are being developed. The proposed typical section contains approximately 12.4 acres of impervious area and 22.3 acres of pervious area. **Figure 2** shows the proposed typical section for the project.



TYPICAL SECTION
SR 25

STA. 1803+80.00 TO STA. 1875+17.55 BK.
STA. 1874+32.22 AH. TO STA. 1878+27.71

MAINLINE, CROSSOVERS, TURNLANES, AND INTERSECTIONS MILLING & RESURFACING

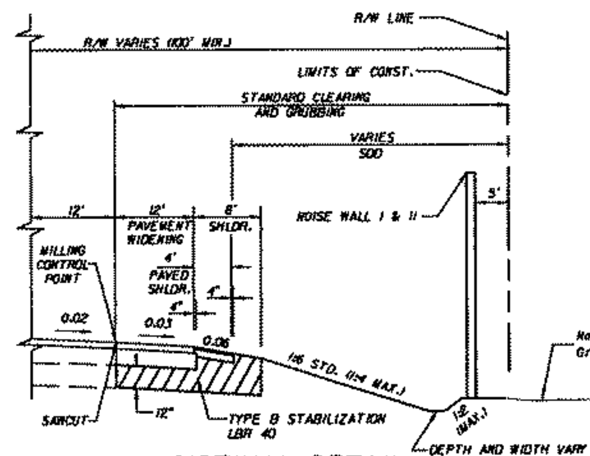
MILL EXISTING ASPHALT PAVEMENT 2 1/4" AVG. DEPTH TYPE SP STRUCTURAL COURSE (TRAFFIC D) (PG 76-22) (1 1/2"), AND FRICTION COURSE FC-5 (3/4") (PG 76-22)

WIDENING

OPTIONAL BASE GROUP 09 WITH TYPE SP STRUCTURAL COURSE (TRAFFIC D) (PG 76-22) (3") AND FRICTION COURSE FC-5 (3/4") (PG 76-22)

SHOULDER PAVEMENT

OPTIONAL BASE GROUP 1 WITH TYPE SP STRUCTURAL COURSE (TRAFFIC D) (PG 76-22) (2") AND FRICTION COURSE FC-5 (3/4") (PG 76-22)



NOISEWALL DETAIL

NOISE WALL I - HEIGHT = 15'
STA. 1829+60 TO STA. 1838+80
NOISE WALL II - HEIGHT = 11'
STA. 1842+00 TO STA. 1851+20

TRAFFIC DATA

CURRENT YEAR ESTIMATE = 2006 AADT = 32800
OPENING YEAR ESTIMATE = 2012 AADT = 37000
DESIGN YEAR ESTIMATE = 2032 AADT = 51000
K = 8.3% D = 51.2% T = 20.0% (24 HOUR)
DESIGN HOUR T = 10.0%
DESIGN SPEED = 60 MPH
POSTED SPEED = 60 MPH

NTS

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

ENGINEER OF RECORD:
MARK L. PERONTO
P.E. LICENSE NUMBER 54845
FLORIDA DEPARTMENT OF TRANSPORTATION
801 N. BROADWAY AVENUE
BARTOW, FL 33830-3809

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
25	POLK	411039-1-52-01

TYPICAL SECTION

SHEET NO. 8

NOTICE: THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE SIGNED AND SEALED UNDER RULE 61G15-23.003, F.A.C.

RS&H

4

430336 8·0 FIGURE 2

2.0 DRAINAGE BASINS

The drainage basins were defined using SWFWMD aerials, USGS Quad maps, and the topographic survey. A field review was also conducted to verify these divides and to better understand existing drainage patterns.

The project that encompasses 1.57 miles of rural divided highway can be divided into two major basins and five sub-basins: Basin 1 (A, B) and Basin 2 (A, B, C). The main flow path of roadway runoff collects in roadside ditches and is conveyed from east to west by means of existing cross drains. These cross drains send water toward Lake Hamilton and Middle Lake Hamilton located on the west side of the project corridor. It is these cross drains that separate the two main basins into their prospective sub-basins. This project can be defined as an open basin—the positive outfall being Lake Hamilton. Lake Hamilton is part of the Lakes Region Lakes Management District (LRLMD) and discharges to the south through a control structure; and ultimately into the Peace Creek Drainage Canal.

Basin Limits are shown in the attached Quad Map in **Figure 3**.

2.1. Basin 1

Basin 1 extends from the beginning of the project, Sta. 1796+13.5 north to Paradise Drive, Sta. 1841+40. The cross drain, (2) 48-inch pipes, is located at station 1809+10 and separates Basin 1 into Sub-Basin 1A and Sub-Basin 1B.

Sub-Basin 1A

Sub-Basin 1A is defined from Sta. 1800+22 to 1809+10. A portion of the project limits (Sta. 1796+13.5 to Sta. 1800+22) is included in a separate project FPID 197707-1-32-01 and will not be part of this drainage design. Sub-basin 1A conveys roadway runoff into roadside ditches north towards the existing cross drain at 1809+10. The existing double 48-inch cross drain sends this runoff west to Lake Hamilton. This area of the project will not be routed to the pond and will be treated and attenuated by compensation in sub-basin 1B.

Sub-Basin 1B

Sub-Basin 1B is defined from Sta. 1809+10 to 1841+40. A small portion of this basin (Sta.

1815+10 to Sta. 1809+10) will convey water south to the existing cross drain and will not be routed to the pond. The majority of this basin (Sta. 1841+40 to 1815+00) will convey all runoff to the stormwater management facility (Pond 1) by means of roadside ditches, side drains, and a collection system comprised of ditch bottom inlets. Pond 1 will discharge to the Flood Plain Compensation Site which is hydraulically connected to Lake Hamilton.

2.2. Basin 2

Basin 2 extends from Paradise Drive, Sta. 1841+40 north to the end of the project, Sta. 1878+27.71. There are two cross drains in Basin 2: a 10-foot by 12-foot concrete box culvert at Sta. 1854+35, and a double 10-foot by 12-foot bridge culvert at Sta. 1867+00. These cross drains separate Basin 2 into Sub-Basin 2A, Sub-Basin 2B and Sub-Basin 2C.

Sub-Basin 2A

Sub-Basin 1A is defined from Sta. 1841+40 to Sta. 1854+35. Sub-basin 2A conveys roadway runoff into roadside ditches north towards the existing cross drain at 1854+35. The existing 10-foot by 12-foot concrete box culvert sends runoff west to Middle Lake Hamilton. This area of the project will not be routed to the pond and will be treated and attenuated by compensation in sub-basin 2B.

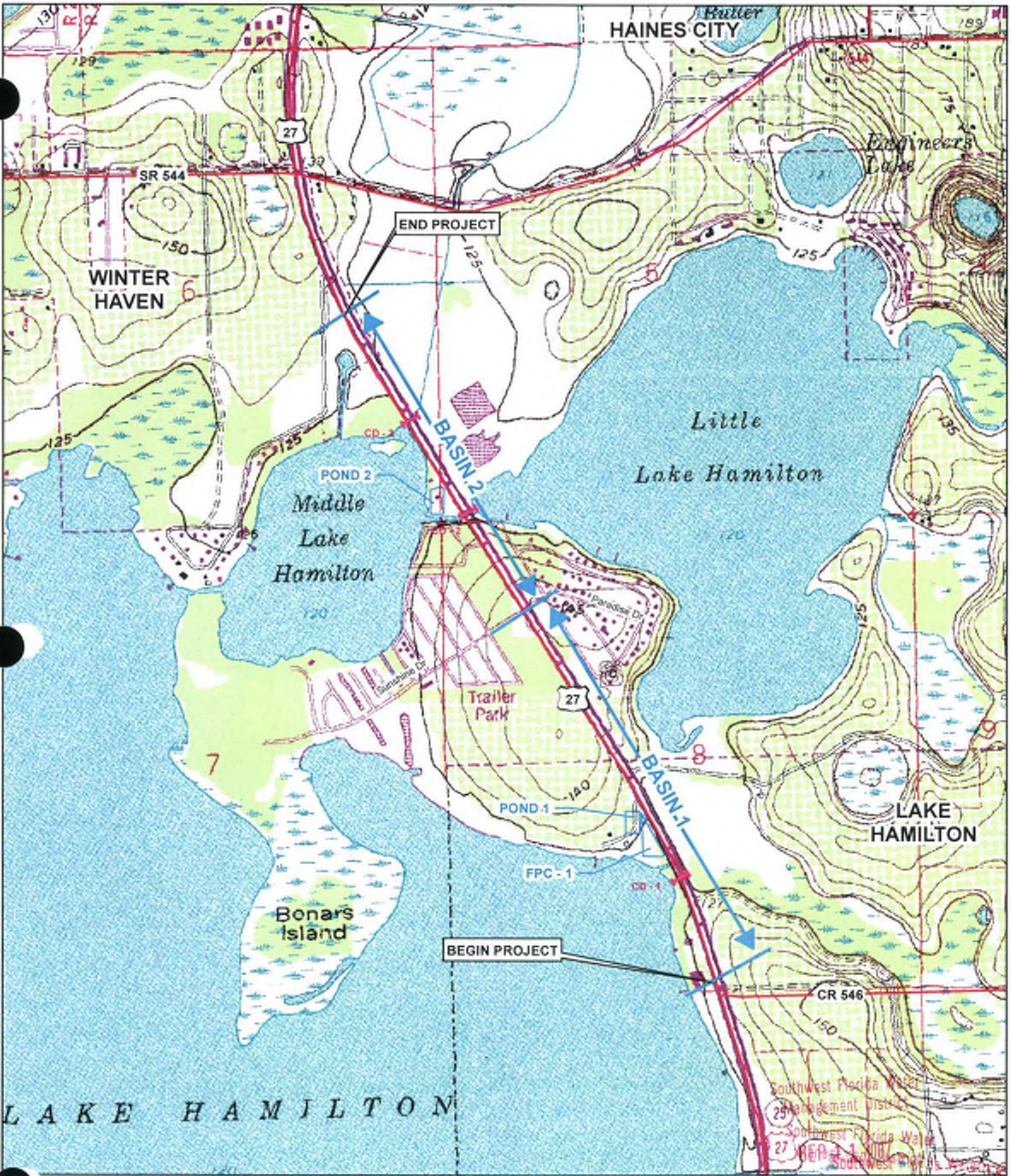
Sub-Basin 2B

Sub-Basin 2B is defined from Sta. 1854+35to 1867+00. The entire basin will convey all runoff to the stormwater management facility (Pond 2) by means of roadside ditches, side drains, and a collection system comprised of ditch bottom inlets. Pond 2 will discharge to Middle Lake Hamilton.

Sub-Basin 2C

Sub-Basin 2C is defined from Sta. 1867+00 to Sta. 1878+27.71. Sub-basin 2C conveys roadway runoff into roadside ditches south towards the existing cross drain at 1867+00. The existing (2) 10-foot by 12-foot concrete box culvert sends runoff west to Middle Lake Hamilton. This area of the project will not be routed to the pond and will be treated and attenuated by compensation in sub-basin 2B.

Sub Basins are defined in attached Drainage Maps, **Figure 4**.

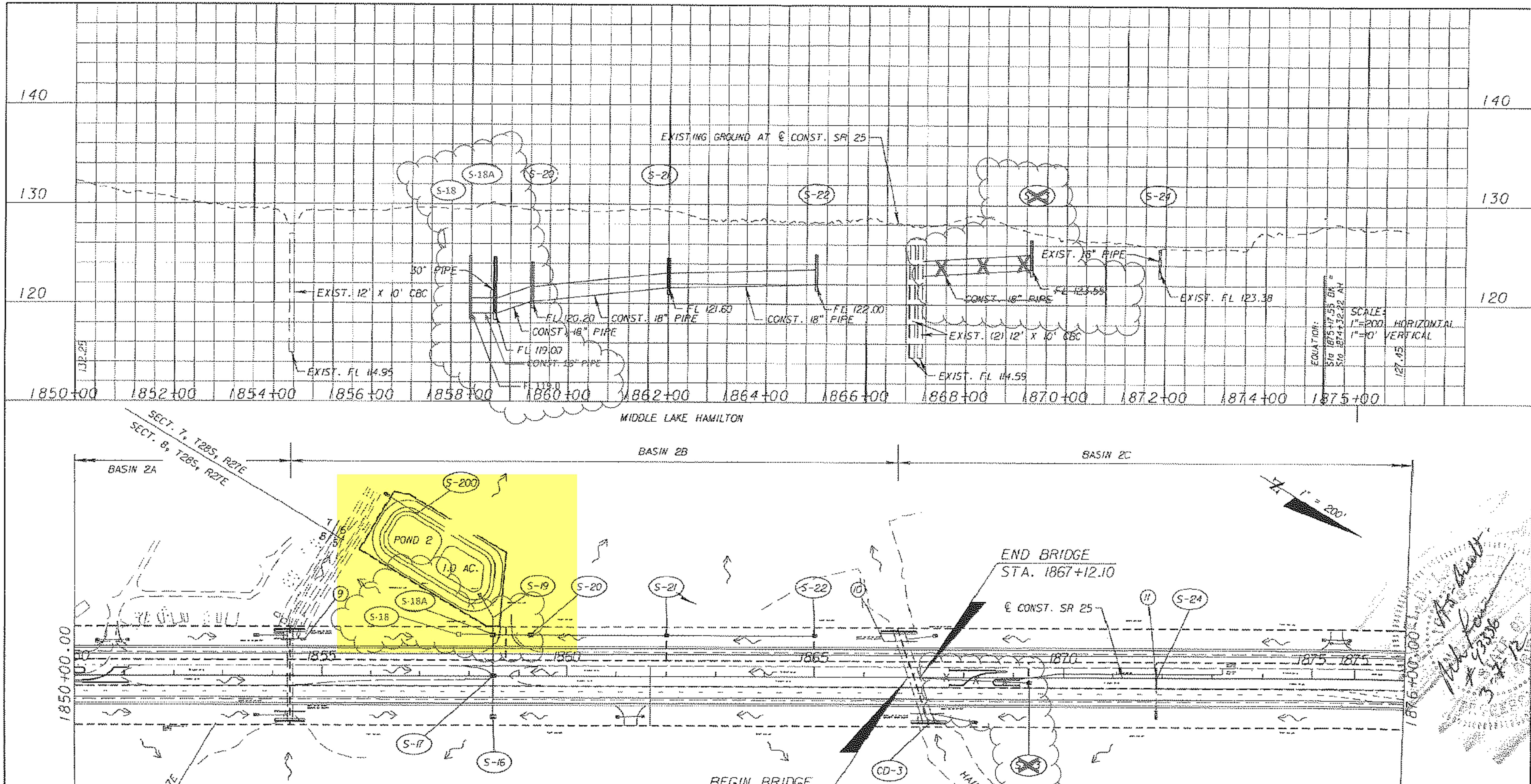


US 27 from north of CR 546 to south of SR 544
Financial Project ID No. 411039-1
Polk County, FL

N
NTS

RS&H
IMPROVING YOUR WORLD

USGS
QUADRANGLE
MAP
Figure 3



LITTLE LAKE HAMILTON

SECT. 8, T28S, R27E
SECT. 5, T28S, R27E

(9) CBC, DBI
10' X 12' CBC
FL 114.96' (W)
FL 114.93' (E)
GRATE 127.87' (S)
GRATE 127.86' (N)

(10) CBC, DBI
2 - 10' X 12' CBC
FL 114.87' (W)
FL 114.59' (E)
GRATE 127.86' (S)
GRATE 127.90' (N)

STRUCTURE TYPE	STRUCTURE NO.	AREA ac.
DBI D	S-16	2.28
DBI D	S-17	1.49
DBI C	S-18	0.61
MH	S-19	n/a
DBI D	S-20	0.54
DBI C	S-21	0.47
DBI C	S-22	0.31
DBI C	S-23	0.31
DBI C	S-24	1.13
DBI D	S-200	n/a

SECT. 6, T28S, R27E
SECT. 5, T28S, R27E

(11) DBI, PIPE, EDWL
18" RCP
GRATE 125.62'
FL 123.38' (W)

LEGEND
BASIN BOUNDARY
EXISTING STRUCTURE
PROPOSED STRUCTURE

DO NOT USE THE INFORMATION ON THIS SHEET FOR CONSTRUCTION PURPOSES.
THIS SHEET IS IN THE PLANS FOR DOCUMENTATION AND TO ASSIST CONSTRUCTION PERSONNEL WITH DRAINAGE CONCERNS.

NOTICE: THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE SIGNED AND SEALED UNDER RULE 61G15-23.003, F.A.C.

Southwest Florida Water Management District
SEP 1 1 2007
RECEIVED
RRD Bartow

Southwest Florida Water Management District
MAR 2 1 2012
RECEIVED
RRD Bartow

6.8.07

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

RS&H
Reynolds, Smith and Hills, Inc.
815 N. Westshore Boulevard, Suite 500
Tampa, Florida 33609-3999
813-289-5550
FL Cert No. EB0005620
Engineer of Record: Jason W. Dunn, P.E. No. 65039
Architectural, Engineering, Planning and Environmental Services

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
25	POLK	411039-1-52-01

DRAINAGE MAP

SHEET NO. 5

APPENDIX G

Cultural Resources Desktop Analysis

CULTURAL RESOURCE ASSESSMENT SURVEY
PROJECT DEVELOPMENT AND ENVIRONMENT (PD&E) STUDY

STATE ROAD (SR) 544 (LUCERNE PARK ROAD)
FROM MARTIN LUTHER KING BOULEVARD TO SR 17
POLK COUNTY, FLORIDA

Financial Project ID No.: 440273-1-22-01
Federal Aid Project Number: D119-048-B
ETDM No. 5873

Florida Department of Transportation
District One
801 North Broadway Avenue
Bartow, Florida 33830

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.

July 2023

CULTURAL RESOURCE ASSESSMENT SURVEY
PROJECT DEVELOPMENT AND ENVIRONMENT (PD&E) STUDY

STATE ROAD (SR) 544 (LUCERNE PARK ROAD)
FROM MARTIN LUTHER KING BOULEVARD TO SR 17
POLK COUNTY, FLORIDA

Financial Project ID No.: 440273-1-22-01
Federal Aid Project Number: D119-048-B
ETDM No. 5873

Florida Department of Transportation
District One
801 North Broadway Avenue
Bartow, Florida 33830

Prepared for:

Florida Department of Transportation
District One
801 North Broadway Avenue
Bartow, Florida 33830

By:

Archaeological Consultants, Inc.
8110 Blaikie Court, Suite A
Sarasota, Florida 34240

Marion Almy - Project Manager
Lee Hutchinson - Project Archaeologist
Justin Winkler and Crystal Wright - Archaeologist
Kimberly M. Irby – Project Architectural Historian
Savannah Y. Finch – Architectural Historian

July 2023

EXECUTIVE SUMMARY

The Florida Department of Transportation (FDOT), District One, is proposing roadway improvements to State Road (SR) 544 (Lucerne Park Road) from Martin Luther King Boulevard to SR 17 in Winter Haven, Polk County, Florida, a length of 7.96 miles. The purpose of this project is to address roadway capacity deficiency along SR 544 (Lucerne Park Road) to accommodate future travel demand as a result of projected population and employment growth in the area. Other goals of the project include enhancing mobility options and multi-modal access as well as supporting local economic development initiatives. The proposed improvements include widening from two to four lanes, paved shoulders/marked bicycle lanes, sidewalks, and pond/swales/Floodplain Compensation (FPC) sites (hereinafter referred to as pond sites). Also along SR 544, five roundabouts are proposed throughout the project limits at the intersections of Avenue Y NE, Vista Del Lago Drive, Lucerne Loop Road NE, Old Lucerne Park Road, and Benton Manor Avenue. Furthermore, additional right-of-way (ROW) will be required in some areas for the roadway widening and roundabouts. In addition, a single point urban interchange will be constructed at the US 27 intersection. The project was evaluated through FDOT's Efficient Transportation Decision Making (ETDM) process as project No. 5873. This is a federally funded project.

The purpose of this Cultural Resource Assessment Survey (CRAS) was to locate and identify any cultural resources within the project Area of Potential Effects (APE) and to assess their significance in terms of eligibility for listing in the National Register of Historic Places (NRHP). As defined in 36 CFR Part § 800.16(d), the APE is the "geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist." The archaeological APE was defined as the footprint of construction including pond sites. The historical APE includes the footprint of construction and immediately adjacent parcels where resources within 200-feet (ft) of the existing ROW were surveyed. In addition, the historical APE included resources within 100-ft of the proposed pond sites. The archaeological and historical/architectural field surveys were conducted between March and June 2023.

All work was conducted to comply with Section 106 of the *National Historic Preservation Act* of 1966 (Public Law 89-655, as amended), as implemented by 36 CFR 800 (*Protection of Historic Properties*, effective August 2004), as well as Chapters 267 and 373, *Florida Statutes* (FS), Chapter 1A-46, *Florida Administrative Code* (FAC). All work was carried out in conformity with the standards outlined in Part 2, Chapter 8 ("Archaeological and Historical Resources") of the FDOT's *Project Development and Environment (PD&E) Manual* (FDOT 2020), and the standards and guidelines contained in the *Cultural Resource Management Standards and Operational Manual*: *Module 3* (Florida Division of Historical Resources [FDHR] 2003). The Principal Investigators meet the *Secretary of the Interior's Professional Qualification Standards* (48 FR 44716) for archaeology, history, architecture, architectural history, or historic architecture.

Research methods included a review of the ETDM Report No. 5873, Florida Master Site File (FMSF) database, and the NRHP. In September 2019, ACI prepared a Research Methodology Report for District One to review (ACI 2019). The report provided details on the APE, project Methodology, and potential for cultural resources in the project area.

Archaeological background research indicated that three archaeological sites have been recorded within the APE and four within one-half mile. Sites within the APE include 8PO04797 (Homer's Grove Site), a single artifact site (today referred to as an archaeological occurrence [AO]), 8PO05426 (Whittaker Site) a low-density Pre-Contact artifact scatter, and 8PO05407 (Lake Tracey Canal), a historic earthwork dating to the American Boom Times (1921-1929). Sites within one-half mile include 8PO04798 (Hochberg Hammock) a single artifact site, 8PO07085 (Chris' Last Site) a lithic scatter, 8PO08107 (Bellaviva C Site) a lithic scatter, and 8PO06533 (Lake Rochelle Site). The two single artifact sites have not been evaluated by the State Historic Preservation Officer (SHPO), but the five other archaeological sites were determined ineligible for listing in the NRHP by the SHPO. Based on a review of the relevant site information for environmentally similar areas within Polk County and the surrounding region, the archeological APE was considered to have variable archaeological potential. As a result of the survey, including the excavation of 84 shovel tests placed in the pond sites and 134 shovel tests within the project corridor, no Pre-Contact period or historic archaeological sites were discovered and no evidence of 8PO04797 (Homer's Grove Site) or 8PO05426 (Whittaker Site) were found within the APE. The Lake Tracey Canal (8PO05407) is within the APE, but no testing was deemed necessary given that it is a canal. However, one AO was found; it is not considered a site and is not NRHP eligible.

Historical/architectural background research, including a review of the FMSF database and NRHP, indicated that nine (9) historic resources (8PO03077, 8PO03079, 8PO03084, 8PO03085, 8PO05399, 8PO08599, 8PO08600, 8PO08601, and 8PO08606) were previously recorded within the APE. These include eight (8) buildings (8PO03077, 8PO03079, 8PO03084, 8PO03085, 8PO05399, 8PO08599, 8PO08600, and 8PO08601) and one (1) bridge (8PO08606). Of these, six buildings (8PO03084, 8PO03085, 8PO05399, 8PO08599, 8PO08600, and 8PO08601) and the bridge (8PO08606) were determined ineligible for listing in the NRHP by the SHPO. One building (8PO03077) has not been evaluated and the SHPO found building (8PO03079) to have insufficient information to make a determination of NRHP eligibility. In addition, an unrecorded segment of the Peace Creek Drainage Canal (8PO05391) is located within Pond 5. Various segments of the Canal (8PO05391) have been previously recorded outside of the APE and were determined ineligible for listing in the NRHP by the SHPO. A review of relevant historic United States Geological Survey (USGS) quadrangle maps, historic aerial photographs, and the Polk County Property Appraiser's data revealed the potential for 99 new historic resources 46 years of age or older (constructed in 1977 or earlier) within the APE (Faux 2023).

Historical/Architectural field survey resulted in the identification of 108 historic resources within the APE. This includes 100 newly identified historic resources (8PO09983, 8PO09999 – 8PO10095, 8PO10132, 8PO10133), seven (7) extant previously recorded historic resources (8PO03077, 8PO03079, 8PO03084, 8PO03085, 8PO08599, 8PO08601, and 8PO08606), and an unrecorded segment of the Peace Creek Drainage Canal (8PO05391). These 108 historic resources include: 98 buildings (8PO03077, 8PO03079, 8PO03084, 8PO03085, 8PO08599, 8PO08601, 8PO09999 – 8PO10055, 8PO10057 – 8PO10060, 8PO10062 – 8PO10064, 8PO10066 – 8PO10068, 8PO10071 – 8PO10086, 8PO10088 – 8PO10092, 8PO10094, 8PO10095, 8PO10132, 8PO10133) constructed between ca. 1895 and 1977, three building complex resource groups (8PO10056, 8PO10070, 8PO10093), one historic district (8PO09983), and one designed historic landscape (8PO10065), three linear resources (8PO05391, 8PO10061, 8PO10069), and two bridges (8PO08606 and 8PO10087). Of the seven (7) extant previously recorded historic resources located within the APE, two (8PO03077 and 8PO03079) were updated and re-evaluated and five (8PO03084, 8PO03085, 8PO08599, 8PO08601, and 8PO08606) were not updated because they were previously evaluated by the SHPO as ineligible for listing in the NRHP and no changes were observed during the field survey. Of these, 104 historic resources are within the mainline corridor APE and three historic resources (8PO05391, 8PO10054, and 8PO10075) are located within the pond site APE. These three resources include the Peace Creek Drainage Canal (8PO05391) located within Pond 5, a ca. 1966 Frame Vernacular style building (8PO10054) located immediately adjacent to Pond 5, and ca. 1974 Masonry Vernacular style building (8PO10075) located immediately adjacent to Pond 6. Furthermore, the field survey revealed that two previously recorded historic resources (8PO05399 and 8PO08600) are no longer extant. A new FMSF form was prepared for the 100 newly identified resources, and an updated FMSF form was prepared for the two previously recorded buildings and the unrecorded canal segment.

Of the 108 extant historic resources identified within the APE, 102 appear ineligible for listing in the NRHP (8PO03084, 8PO03085, 8PO05391, 8PO08599, 8PO08601, 8PO08606, 8PO09999 - 8PO10092; 8PO10132, 8PO10133), five appear eligible (8PO03077, 8PO03079, 8PO10093, 8PO10094, and 8PO10095), and the newly identified historic district (8PO09983) has insufficient information to make a determination. The ineligible resources include 94 buildings (8PO03084, 8PO03085, 8PO08599, 8PO08601, 8PO09999 – 8PO10055, 8PO10057 – 8PO10060, 8PO10062 – 8PO10064, 8PO10066 – 8PO10068, 8PO10071 – 8PO10086, 8PO10088 – 8PO10092, 8PO10132, 8PO10133) constructed between circa (ca.) 1895 and 1977, two building complex resource groups (8PO10056 and 8PO10070), one designed historic landscape (8PO10065), three linear resources (8PO05391, 8PO10061, 8PO10069), and two bridges (FDOT Bridge No. 160021/8PO08606 and FDOT Bridge No. 160147/8PO10087). The buildings are common examples of their respective architectural style that have been altered and lack significant historical associations with persons or events. In addition, four (8PO03084, 8PO03085, 8PO08599, 8PO08601) of these were previously recorded and evaluated by the SHPO as ineligible. The two (2) building complexes, both of which are mobile home parks (8PO10056 and 8PO10070), and one designed historic landscape – a golf course (8PO10065) lack significant features and have no known historic associations with significant persons and/or events. The linear resources are of common design and construction that lack unique design features and characteristics. The concrete slab bridge (8PO08606) was previously recorded and evaluated by the SHPO as ineligible for listing in the NRHP. The newly identified concrete box culvert (8PO10087) does not possess any notable engineering features or design elements that would differentiate it from dozens of similar examples built throughout Florida during the same time period. In addition, background research did not reveal any historic associations with significant persons and/or events; therefore, none appear individually eligible for listing in the NRHP.

In addition, the Florence Citrus Growers Association Historic District (8PO09983) was newly identified during the survey. The proposed historic district within the APE spans approximately 200 ft from either side of SR 544 (Lucerne Park Road) from Martin Luther King Boulevard in the south to 2nd Street NE to the north. This portion of the proposed district is comprised of 29 contributing resources (8PO09999 through 8PO10027) that were constructed between circa (ca.) 1918 – 1974. Six non-contributing resources, as contained within the APE, are located within the historic district, and were not recorded as they are considered non-historic (constructed after 1977). It was beyond the scope of this CRAS to record the entire Florence Citrus Growers Association Historic District (8PO09983) and only historic resources within the current APE were evaluated. For the purposes of this survey, all resources recorded within the APE are considered contributing resources; however, this may be refined following the establishment of a period of significance for the proposed district. None of the contributing resources appear individually eligible for listing in the NRHP. Further in-depth research is needed to determine whether the subdivision was developed for the employees of the Florence Citrus Growers Association and identify a period of significance. As such, there is insufficient information for evaluating the NRHP eligibility of the historic district.

A total of five historic resources within the APE appear eligible for listing in the NRHP. Of these, two buildings (8PO03077 and 8PO03079) were previously recorded but 8PO03077 has not been evaluated by the SHPO and 8PO03079 was found to have insufficient information. The Alta Vista Elementary School (8PO10093) building complex resource group with two contributing resources (8PO10094 and 8PO10095) were newly identified. The Colonial Revival style building located at 2208 Peninsular Drive (8PO03077) and the Craftsman style building located at 128 Scenic Highway (8PO03079) appear individually eligible for listing in the NRHP under Criterion C in the area of Architecture as a minimally altered example of its respective architectural style in Haines City. In addition, 8PO03077 and 8PO03077 appear to be contributing resources to the NRHP-listed *Historic and Architectural Resources of Haines City MPL* under Property Type F.3 – Residential Buildings. The Alta Vista Elementary Resource Group (8PO10093) appears eligible for listing in the NRHP under Criteria A and C in the areas of Education and Architecture as the first air-conditioned school in Polk County. Although the overall design of Alta Vista Elementary is typical of this era, the approval and construction of this campus set the precedent for future construction of air-conditioned schools throughout Polk County from 1962 onward. The resource demonstrates the importance of architectural design and the application of new technology in improving the learning environment – and resulting success – of students.

Given the results of archaeological background research and field survey, including the excavation of 84 shovel tests placed in the pond sites and 134 shovel tests within the project corridor, no Pre-Contact period or historic archaeological sites were discovered and no evidence of 8PO04797 (Homer's Grove Site) or 8PO05426 (Whittaker Site) were found within the APE. However, one AO was found; it is not considered a site and not considered NRHP eligible. As such, no prehistoric or historic archaeological sites that are listed, eligible for listing, or that appear potentially eligible for listing in the NRHP were located within the APE. However, of the 108 extant historic resources identified within the APE, five historic resources (8PO03077, 8PO03079, 8PO10093, 8PO10094, 8PO10095) appear eligible for listing in the NRHP and one resource, the Florence Citrus Growers Association Historic District (8PO09983), has insufficient information for evaluating the NRHP eligibility.

The proposed work being conducted within the APE includes ROW acquisition for the road widening and construction of a sidewalk, as well as the installation of traffic separators. In addition, to these improvements, work within the proposed district includes one pond site (Pond 1A) along 1st Street N between Avenue U NW and Avenue V NW. The proposed new ROW will be approximately 20-ft from the two residential buildings (8PO03077 and 8PO03079) and approximately 140-ft from the school (8PO10093). These resources are located between Myrtle Avenue and S 10th Street where the road widening will occur to the south of SR 544. Of the five potentially eligible resources, the Craftsman style building located at 128 Scenic Highway (8PO03079) is on the south side of SR 544 and the remaining properties are on the north side. Furthermore, ROW acquisition within the district will impact two contributing resources (8PO10001 and 8PO10003); however, both of these resources appear individually ineligible for listing in the NRHP. Based on these results, further coordination may be required.

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1.0 INTRODUCTION

The Florida Department of Transportation (FDOT), District One, is proposing capacity and multi-modal improvements to State Road (SR) 544 (Lucerne Park Road) from Martin Luther King Boulevard to SR 17 in Winter Haven, Polk County, Florida, a length of 7.96 miles (**Figures 1.1 – 1.5**). The proposed improvements include widening from two to four lanes, paved shoulders/marked bicycle lanes, sidewalks, and pond/swales/Floodplain Compensation (FPC) sites (hereinafter referred to as pond sites). Also along SR 544, five roundabouts are proposed throughout the project limits at the intersections of Avenue Y NE, Vista Del Lago Drive, Lucerne Loop Road NE, Old Lucerne Park Road, and Benton Manor Avenue. Furthermore, additional right-of-way (ROW) will be required in some areas for the roadway widening and roundabouts. In addition, a single point urban interchange will be constructed at the US 27 intersection. The project was evaluated through FDOT's Efficient Transportation Decision Making (ETDM) process as project No. 5873. This is a federally funded project.

1.1 Project Description

The project corridor traverses three jurisdictions: the City of Winter Haven, Polk County, and Haines City. SR 544 (Lucerne Park Road) plays an important role in the regional network by providing east-west access for a growing area of east-central Polk County. It links two north-south principal arterials of Polk County (US 17 and US 27), US 27 being part of Florida's Strategic Intermodal System (SIS) and connects the cities of Winter Haven and Haines City, the second and third most populated cities within Polk County, respectively.

SR 544 (Lucerne Park Road) is classified as a two-lane urban minor arterial from Martin Luther King Boulevard to US 27 and as an urban collector from US 27 to SR 17. The roadway features two twelve-foot travel lanes with center and right turn lanes dispersed throughout the length of the corridor. The roadway also features an open drainage system; however, curbs and gutters exist from Martin Luther King Boulevard to Avenue Y and from La Vista Drive to SR 17 and in other areas where sidewalks are present.

Paved shoulders are present for the majority of the corridor and marked bicycle lanes exist on both sides of the roadway from 0.10 mile west of Brenton Manor Avenue to 0.2 mile east of US 27. The posted speed limit along the corridor ranges from 35 miles per hour to 55 miles per hour. Citrus Connection Route #60 (Winter Haven Northeast) operates along the eastern portion of the project corridor. Existing ROW along SR 544 (Lucerne Park Road) ranges from 50-feet (ft) to 85-ft from Martin Luther King Boulevard to Avenue Y, 90-ft to 170-ft from Avenue Y to US 27, and 60-ft to 140-ft from US 27 to SR 17.

In addition to widening from two to four lanes, the proposed improvements include paved shoulders/marked bicycle lanes, sidewalks, and/or a shared-use path to provide safe bicycle and pedestrian mobility and meet objectives of the Polk Transportation Planning Organization (TPO) in transforming this corridor into a Complete Street. Additional ROW may be required depending on the proposed improvements and specific ROW requirements will be determined during this Project Development and Environment (PD&E) Study.

Figure 1.1. Location of the SR 544 project, Polk County, Florida.

Figure 1.2. Location of the SR 544 project, Polk County, Florida.

Figure 1.3. Location of the SR 544 project, Polk County, Florida.

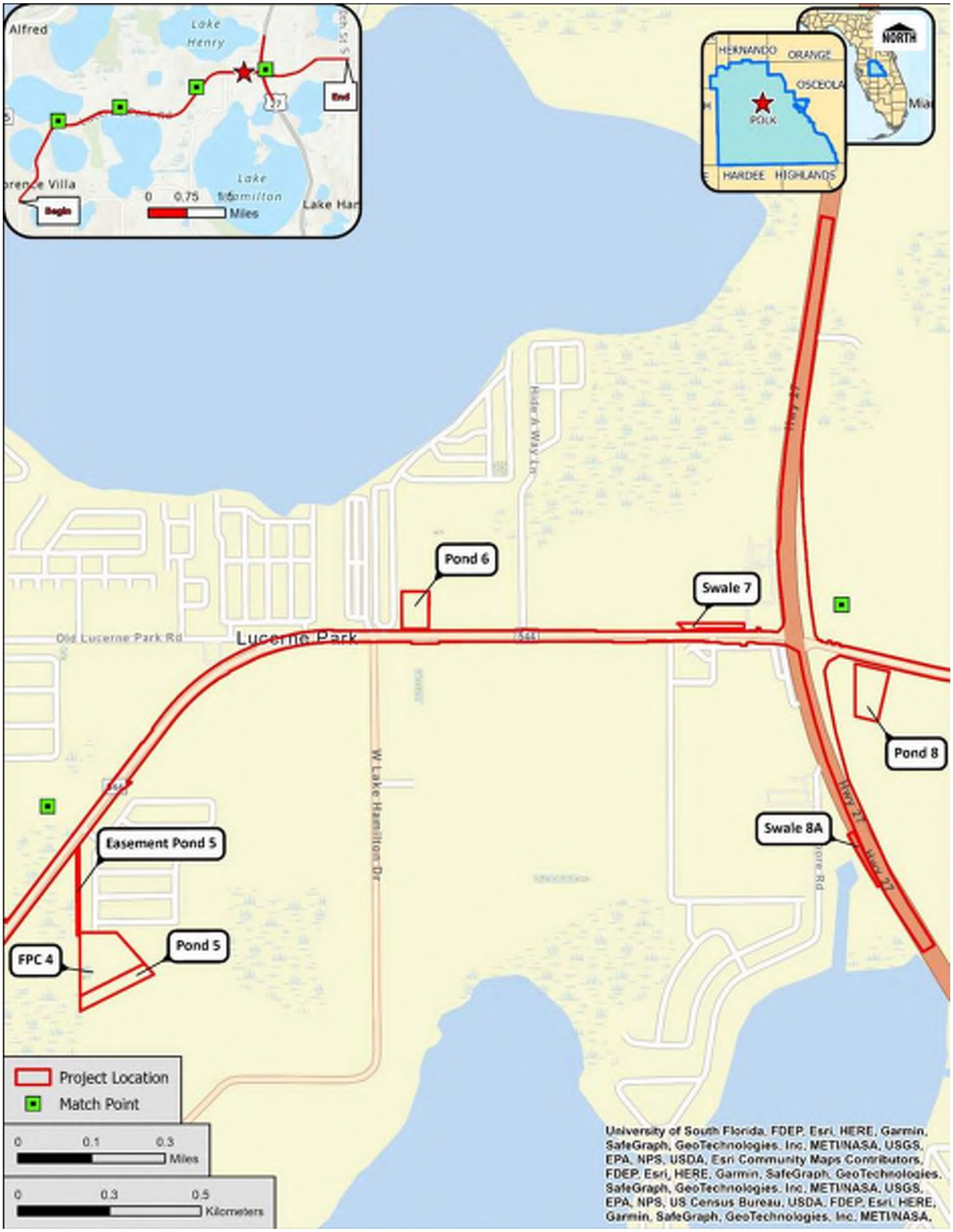

Figure 1.4. Location of the SR 544 project, Polk County, Florida.

Figure 1.5. Location of the SR 544 project, Polk County, Florida.

1.6 Report Purpose

The purpose of this Cultural Resource Assessment Survey (CRAS) was to locate and identify any cultural resources within the Area of Potential Effects (APE), and to assess their significance in terms of eligibility for listing in the National Register of Historic Places (NRHP). This CRAS was initiated to comply with Section 106 of the National Historic Preservation Act of 1966, as amended by Public Law 89-665; the Archaeological and Historic Preservation Act, as amended by Public Law 93-291; Executive Order 11593; and Chapter 267, Florida Statutes (FS). All work was carried out in conformity with Part 2, Chapter 8 ("Archaeological and Historical Resources") of the FDOT's Project Development and Environment (PD&E) Manual (FDOT 2020), and the Florida Division of Historical Resources' (FDHR) standards contained in the Cultural Resource Management Standards and Operational Manual (FDHR 2003), as well as with the provisions contained in the Chapter 1A-46, Florida Administrative Code (FAC). Principal Investigators meet the Secretary of the Interior's Professional Qualification Standards (48 FR 44716) for archaeology, history, architecture, architectural history, or historic architecture.

1.7 Area of Potential Effects (APE)

As defined in 36 CFR Part § 800.16(d), the APE is the "geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist." The archaeological APE was defined as the footprint of construction including pond sites. The historical APE includes the footprint of construction and immediately adjacent parcels where resources within 200-ft of the existing ROW were surveyed. In addition, the historical APE included resources within 100-ft of the proposed ponds. The archaeological and historical/architectural field surveys were conducted between March and June 2023.

2.0 ENVIRONMENTAL SETTING

Environmental factors such as geology, topography, relative elevation, soils, vegetation, and water resources are important in determining where prehistoric and historic period archaeological sites are likely to be located. These variables influenced what types of resources were available for utilization in a given area. This, in turn, affected decisions regarding settlement location and land-use patterns. Because of the influence of the local environmental factors upon the aboriginal inhabitants, a discussion of the effective environment is included.

2.1 Project Location and Physical Setting

The APE is located in Sections 32-33, Township 27 South, Range 27 East; Sections 1-3, 9-12, and 16-17, Township 28 South, Range 26 East; and Sections 4-6, Township 28 South, Range 27 East (United States Geological Survey [USGS] Winter Haven 1959, 2021 and Dundee 1953, 2021) (**Figures 2.1-2.5**). The SR 544 APE extends approximately from Martin Luther King Boulevard to SR 17, with. Proceeding northeast from the beginning of the project, the SR 544 ROW expansion is surrounded by urban residential blocks until reaching Avenue Y. From here, the ROW transitions to semi-urban subdivisions and mobile home parks flanked by Lakes Connie, Smart, and Rochelle. The project corridor eventually curves east approaching Lake Fannie to the south and large industrial distribution centers to the north. As the corridor approaches US 27, the environment gradually becomes urbanized with long established residential and retail developments. Further east of US 27, the project ROW converts back to rural residential neighborhoods mixed with relict citrus groves until terminating at SR 17. The environment of the preferred ponds APE varied between improved and woodland pastures, vacant residential lots, relict citrus groves, and wetlands, with easements around the pastures and residential lots.

The SR 544 project occupies disturbed lands throughout its APE. Specific examples include existing sidewalks underpinned by storm sewer lines followed by assorted buried utilities such as cable, electric, fiber-optic, gas, water, and sewer lines. Additional disturbances include concrete culverts, deep swales, new high voltage transmission line construction, and residential/commercial development. In the proposed pond APE, disturbances in the area consists of urban land development, including fixed and temporary residential buildings, infrastructure improvements, and partial land clearing efforts that affect each retention pond location. Photos of the environment and related disturbances within the SR 544 corridor and proposed pond locations are included in **Appendix A**.

2.2 Physiography and Geology

The project area is contained within the Polk Uplands, Winter Haven Ridge, and Lake Wales Ridge physiographic zones (White 1970). The project area contains clayey sand underlain by reworked Cypresshead sediments, Pliocene Cypresshead formation, and Plio-Pleistocene sediments (Scott 2001; Scott et al. 2001). The APE is on an elevation range of 125- to 215-ft above mean sea level (amsl) with an approximate acreage of 152 acres for the corridor and pond sites.

Figure 2.1. Environmental setting of the SR 544 project.

Figure 2.2. Environmental setting of the SR 544 project.

Figure 2.3. Environmental setting of the SR 544 project.

Figure 2.4. Environmental setting of the SR 544 project.

Figure 2.5. Environmental setting of the SR 544 project.

2.3 Soils and Vegetation

Vegetation within the APE is comprised of forests of longleaf pine and xerophytic oaks, with pine flatwood. According to the U.S. Department of Agriculture (USDA), the APE is specifically within three soil associations. The Candler-Tavares-Apopka soil association is characterized by nearly level to moderately sloping, excessively drained, moderately well-drained, and well-drained sandy soils on uplands (USDA 1990). Some are underlain by loamy or clayey material. The natural vegetation consists of turkey oak, longleaf pine, slash pine, and live oak. The APE also contains soils from the Pomona-Myakka-Smyrna soil association, which is characterized by nearly level, poorly drained, sandy soils on flatwoods interspersed with wet depressions, swamps, and poorly defined drainageways. Some are underlain by loamy material. The natural vegetation consists of South Florida slash pine, longleaf pine, saw palmetto, water oak, running oak, gallberry, wax myrtle, ground blueberry, pineland threeawn, and scattered fetterbush lyonia. In depressional areas, the dominant vegetation comprises of bay, cypress, maple and gum trees with a ground cover of fern, sawgrass, greenbrier, lilies, reeds, and other aquatic plants. The Samsula-Hontoon soil association is characterized by nearly level, very poorly drained organic soils, some of which are underlain by sand, in swamps, marshes, and drainageways. The natural vegetation consists of bay, cypress, maple, gum, and pine trees with a ground cover of sawgrass, greenbrier, fern lilies, reeds, and ither aquatic plants. Soil types, and their characteristics, specific to the project APE, are listed in **Table 2.1** and shown on **Figures 2.6-2.10** are the drainage characteristics of the soils (USDA 1990).

Table 2.1. Soil types within the project area.

Name	Drainage	Location
Adamsville-Urban land complex	Somewhat poor	Urban land
Adamsville fs, 0-2%	Somewhat poor	On low ridges on flatwoods and low areas on uplands
Arents-Urban land complex, 0-5%	Somewhat poor	Urban land
Basinger mucky fs, frequently ponded, 0-1%	Very poor	Wet depressions on flatwoods
Candler-Urban, 0-5%	Excessive	Urban land
Candler sand. 0-5%	Excessive	Uplands and knolls on flatwoods
Felda fs	Poor	Sloughs or low hammocks on flatwoods
Hontoon muck, frequently ponded, 0-1%	Very poor	Swamps and marshes
Immokalee sand	Poor	On broad areas of flatwoods
Kaliga muck, frequently ponded, 0-1%	Very poor	Marshes and swamps
Lochloosa fs	Somewhat poor	Lower positions on uplands and on low ridges on flatwoods
Millhopper fs, 0-5%	Moderately well	Upland ridges and on knolls in flatwoods
Ona-Ona, wet, fs, 0-2%	Poor	On broad areas of the flatwoods
Placid and Myakka fs, depressional	Very poor	Flatwoods
Pomona fs	Poor	Broad areas on flatwoods
Pompano fs	Poor	On broad, low flatwoods
Samsula muck, frequently ponded, 0-1%	Very poor	Swamps and marshes
Smyrna and Myakka fs	Poor	On broad areas of flatwoods
Sparr sand, 0-5%	Somewhat poor	Seasonally wet uplands and knolls
Tavares fs	Moderately well	Uplands and knolls on flatwoods
Tavares-Urban	Moderately well	Urban land
Wauchula fs	Poor	Low broad areas on flatwoods
Zolfo fs	Somewhat poor	Low broad ridges and on knolls on flatwoods

The soils support different vegetative regimes, which in turn provide habitats for the local animal population, and thus provide essential food resources. These soils have variable suitability for openland, woodland, and wetland habitats. The habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The wildlife attracted to these areas include bobwhite quail, dove, meadowlark, field sparrow, cottontail, and red fox. Felda, Lochloosa, Millhopper, Myakka, Ona, Smyrna, Sparr, and Tavares soils are rated as fair for openland wildlife habitat. Woodland wildlife habitat includes areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include turkey, thrushes, woodpeckers, squirrels, gray fox, raccoon, and deer. Adamsville, Millhopper, Ona, Smyrna, Sparr, and Tavares soils are rated fair while Lochloosa fine sands are rated good for the woodland habitat. The habitat for wetland wildlife includes areas of open, marshy, or swampy, shallow water areas. Wildlife in these areas include ducks, egrets, herons, alligators, and otters. The depressional and muck soils are well suited for wetland habitat; the Felda, Ona, and Smyrna sands are rated fair for this habitat type (Ford et al. 1990).

2.4 Paleoenvironmental Considerations

The early environment of the region was different from that seen today. Sea levels were lower, the climate was arid, and fresh water was scarce. An understanding of human ecology during the earliest periods of human occupation in Florida cannot be based on observations of the modern environment because of changes in water availability, botanical communities, and faunal resources. Aboriginal inhabitants would have developed cultural adaptations in response to the environmental changes taking place, which were then reflected in settlement patterns, site types, artifact forms, and subsistence economies.

Due to the arid conditions between 16,500 and 12,500 years ago, the perched water aquifer and potable water supplies were absent. Palynological studies conducted in Florida and Georgia suggest that between 13,000 and 5000 years ago, this area was covered with an upland vegetation community of scrub oak and prairie (Watts 1969, 1971, 1975). However, the environment was not static. Evidence recovered from the inundated Page-Ladson Site in north Florida has clearly demonstrated that there were two periods of low water tables and dry climatic conditions and two episodes of elevated water tables and wet conditions (Dunbar 2006). The rise of sea level reduced xeric habitats over the next several millennia.

By 5000 years ago, a climatic event marking a brief return to Pleistocene climatic conditions induced a change toward more open vegetation. Southern pine forests replaced the oak savannahs. Extensive marshes and swamps developed along the coasts and subtropical hardwood forests became established along the southern tip of Florida (Delcourt and Delcourt 1981). Northern Florida saw an increase in oak species, grasses, and sedges (Carbone 1983). At Lake Annie, in south central Florida, pollen cores were dominated by wax myrtle and pine. The assemblage suggests that by this time, a forest dominated by longleaf pine along with cypress swamps and bayheads existed in the area (Watts 1971, 1975). About 5000 years ago, surface water was plentiful in karst terrains and the level of the Floridan aquifer rose to 5 ft above present levels. With the establishment of warmer winters and cooler summers than in the preceding early Holocene, the fire-adapted pine communities prevailed. These depend on the high summer precipitation caused by the thunderstorms and the accompanying lightning strikes to spark the fires (Watts et al. 1996; Watts and Hansen 1994). The increased precipitation also resulted in the formation of the large swamp systems such as the Okefenokee and Everglades (Gleason and Stone 1994). After this time, modern floral, climatic, and environmental conditions began to be established.

Figure 2.6. Soil types within the SR 544 project.

Figure 2.7. Soil types within the SR 544 project.

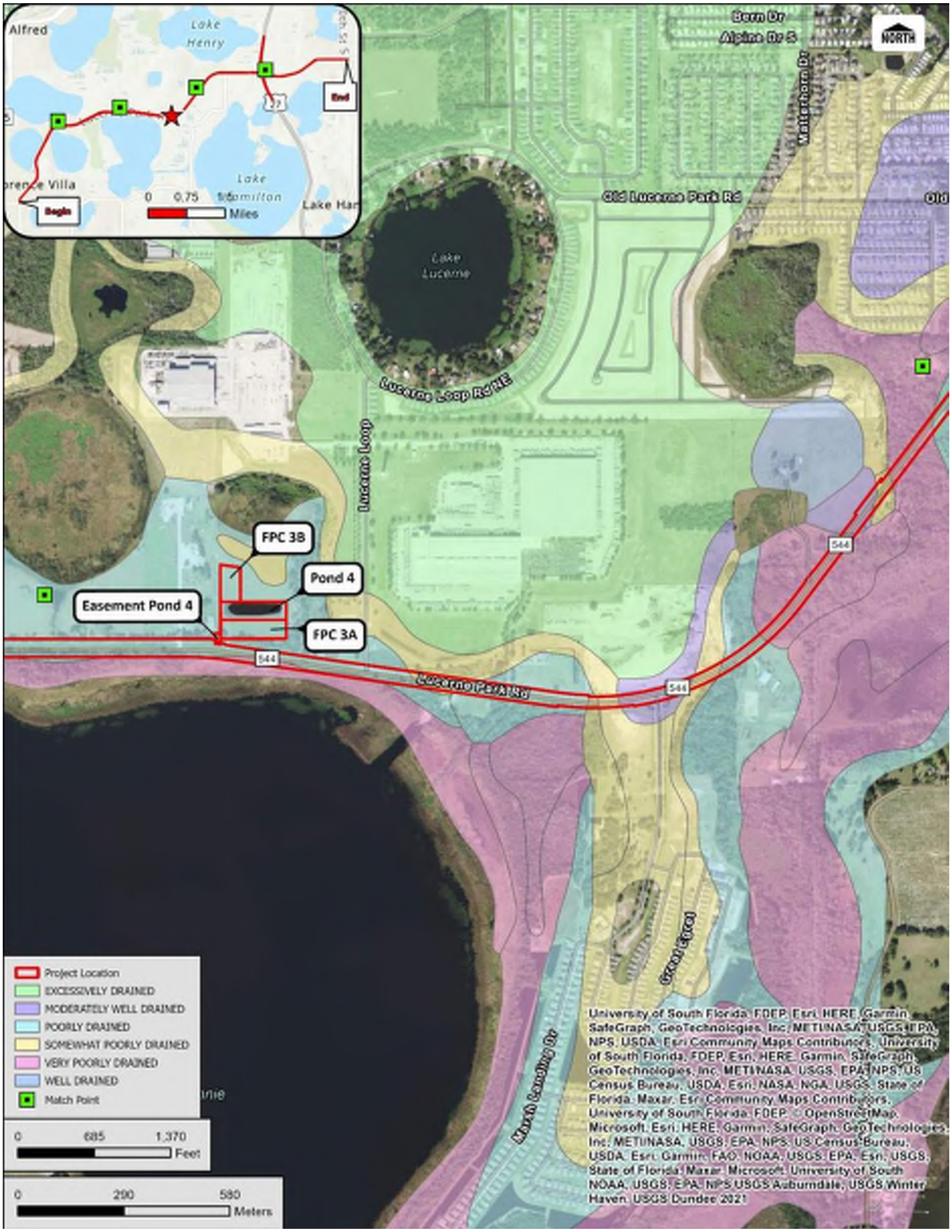

Figure 2.8. Soil types within the SR 544 project.

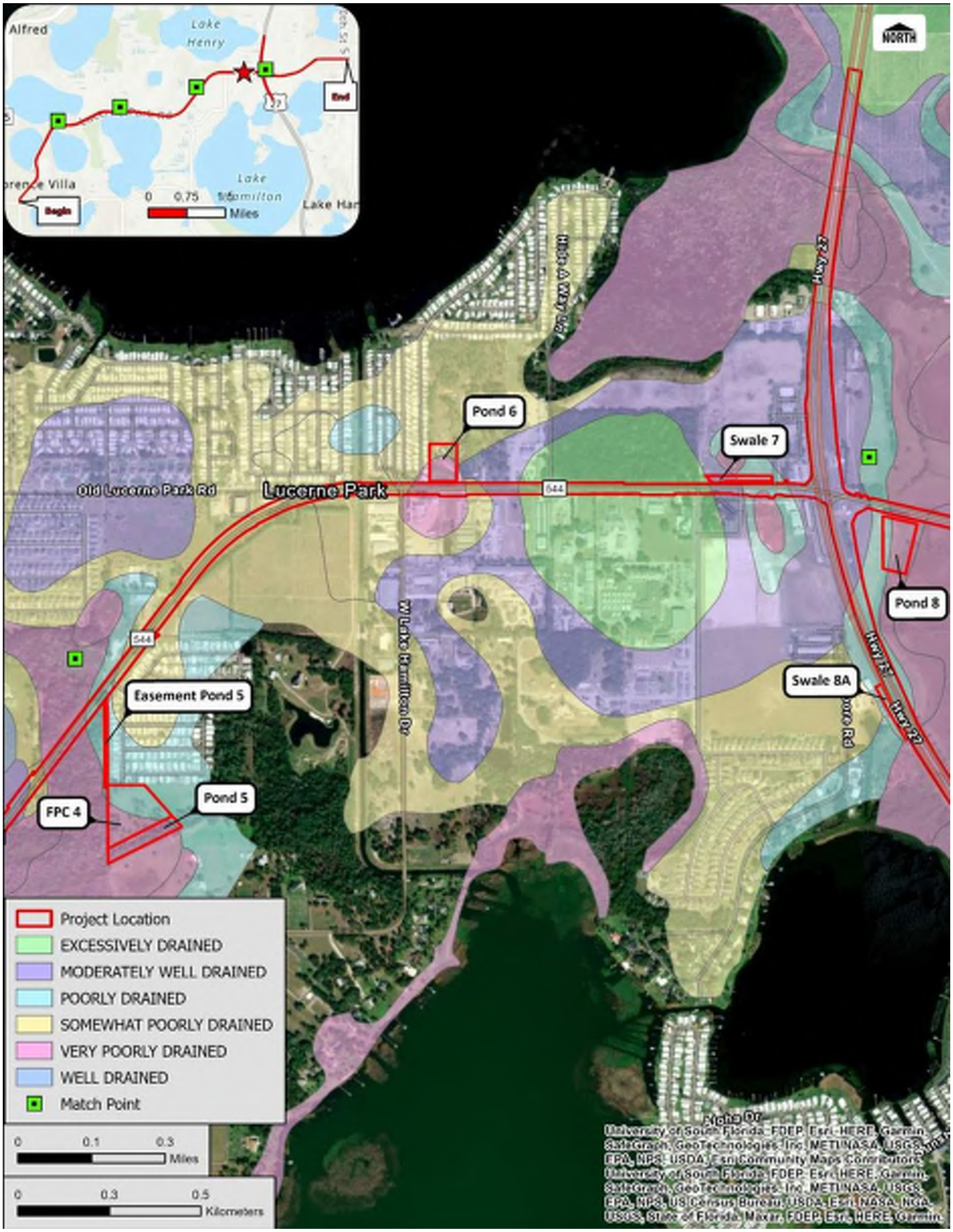

Figure 2.9. Soil types within the SR 544 project.

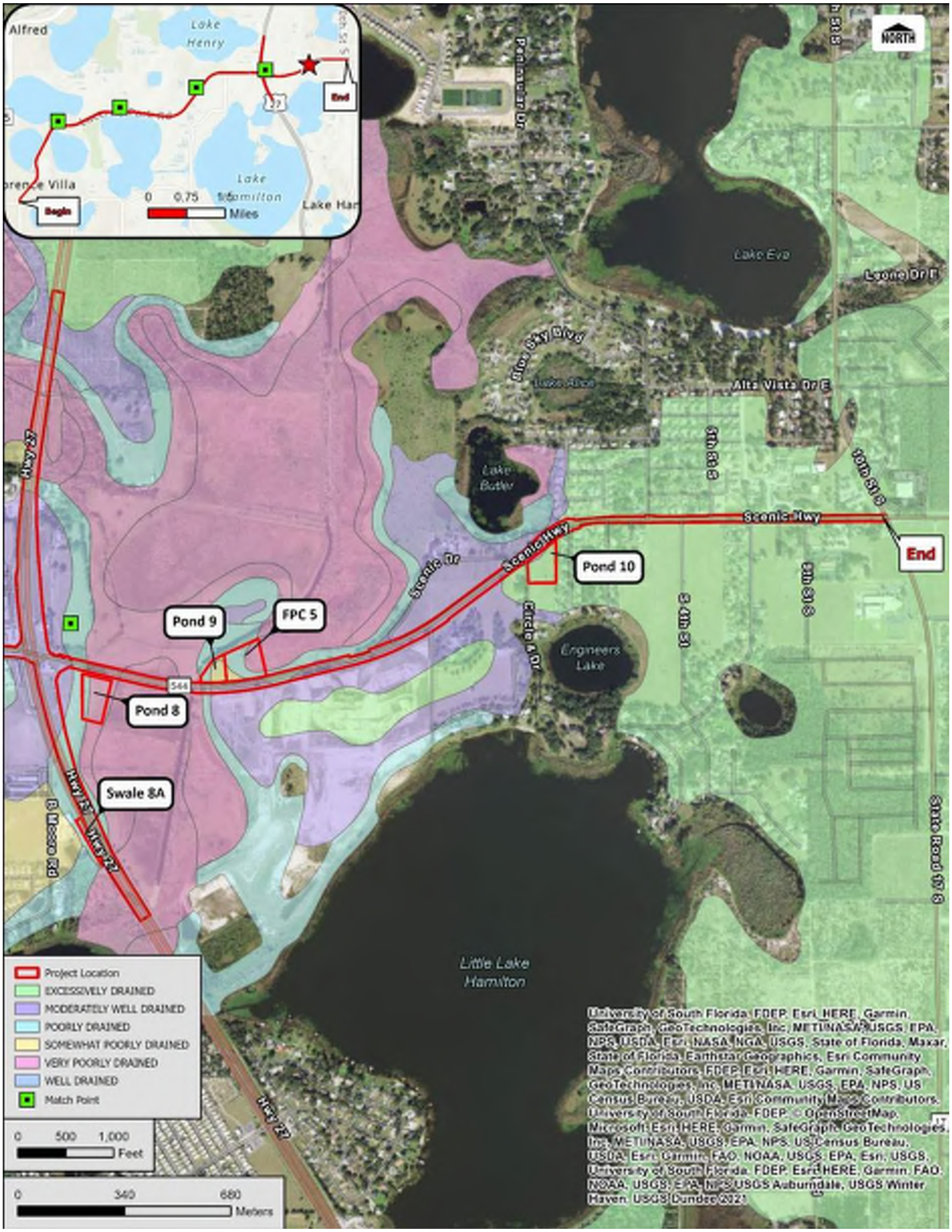

Figure 2.10. Soil types within the SR 544 project.

3.0 CULTURAL CHRONOLOGY

A discussion of the regional prehistory is included in cultural resource assessment reports to provide a framework within which the local archaeological record can be examined. Archaeological sites are not individual entities, but rather are part of once dynamic cultural systems. As a result, individual sites cannot be adequately examined, interpreted, or evaluated without reference to other sites and resources in the general area.

Archaeologists summarize the culture history of an area (i.e., an archaeological region) by outlining the sequence of archaeological cultures through time. These are defined largely in geographical terms but also reflect shared environmental and cultural factors. The project APE is located within the in Florida's East and Central region (Milanich and Fairbanks This region extends from the northern portions of Indian River, Osceola, and Polk counties up to Nassau County, and includes eastern portions of Marion and Sumter counties (**Figure 3.1**). Within this zone the Paleoindian, Archaic, Woodland and Mississippian stages have been defined based on unique sets of material culture traits such as stone tools and ceramics as well as subsistence, settlement, and burial patterns. These broad temporal units are further subdivided into culture phases or periods.

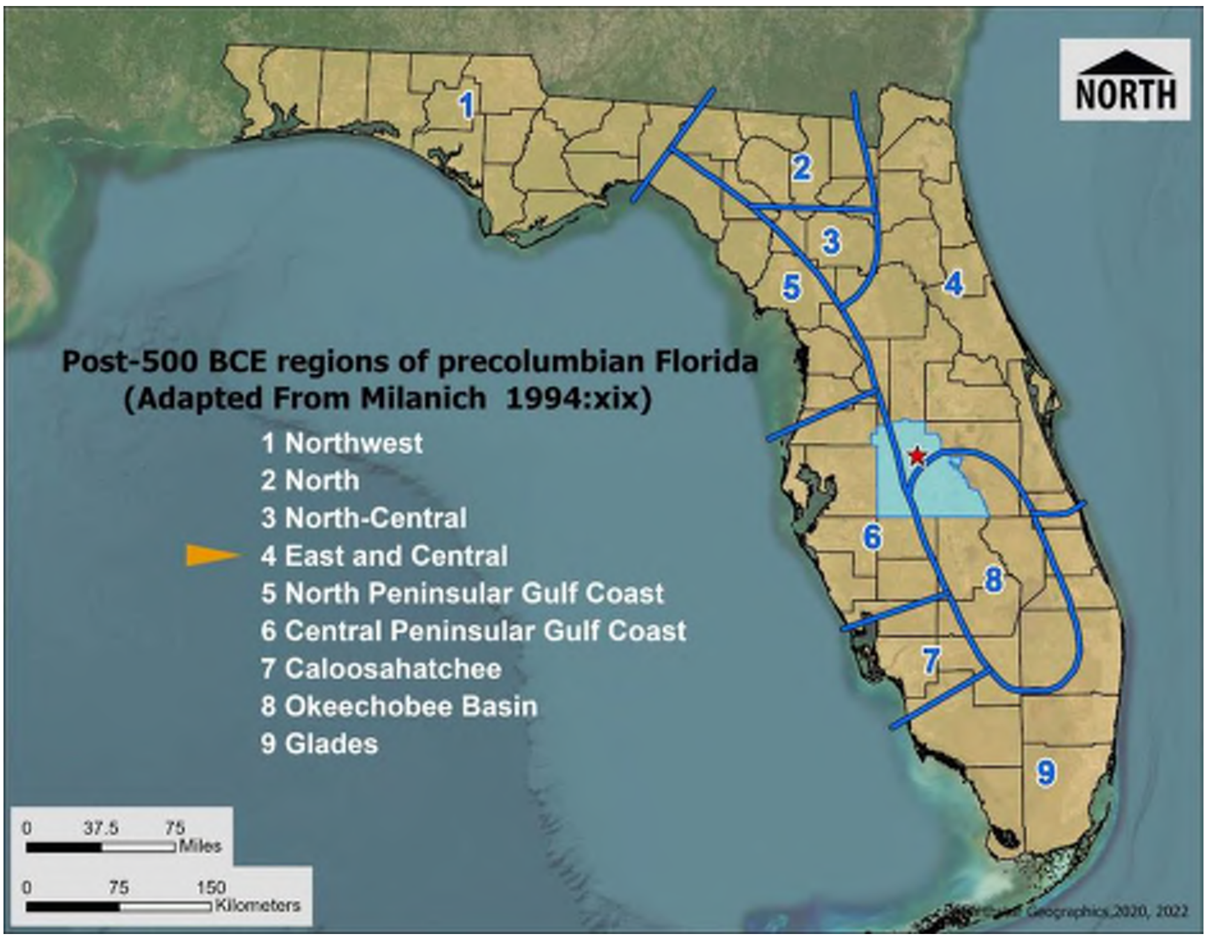

Figure 3.1. Florida Archaeological Regions.

The local history of the region is divided into four broad periods based initially upon the major governmental powers. The first period, Colonialism, occurred during the exploration and control of Florida by the Spanish and British from around 1513 until 1821. At that time, Florida became a territory of the U.S. and 21 years later became a State (Territorial and Statehood, 1842-1860). The Civil War and Aftermath (1861-1899) period deals with the Civil War, the period of Reconstruction following the war, and the late 1800s, when the transportation systems were dramatically increased and development throughout the state expanded. The Twentieth Century includes subperiods defined by important historic events such as the World Wars, the Boom of the 1920s, and the Depression. Each of these periods evidenced differential development and utilization of the region, thus affecting the historic site distribution.

The following culture history provides a general overview for this project area, certain sections may be expanded based on research questions and findings related to this project.

Table 3.1. Cultural chronology and traits.

Cultural Period Time Frame	Cultural Traits
Paleo-Indian 11,000-8,000 B.C.E.	Migratory hunters and gatherers; Clovis, Suwannee and Simpson projectile points; unifacial scrapers.
Early Archaic 8000-6000 B.C.E.	Hunters and gatherers; less nomadic; increased utilization of coastal resources; Greenbriar, Bolen, Arredondo, Hamilton and Kirk Serrated points; increase in population size and density.
Mount Taylor 6000-2000 B.C.E.	First occupation of the St. Johns River valley; evidenced by large freshwater shell middens; burials in wet environment cemeteries and middens; increased sedentism; shellfish is an increasingly important part of the diet; more evidence for coastal occupation; stemmed, broad bladed projectile points, Newnan points most common; steatite; fired clay objects.
Orange 2000-500 B.C.E.	Appearance of ceramics; Orange series is fiber tempered and molded; plain ceramics early on, incising during later periods; increase occupation of the coastal lagoons; cultigens may be utilized; toward end of period increased use of sand as a tempering agent and an apparent increase in population size, socio-political complexity, and territorial range.
St. Johns I 500 B.C.E.-100 C.E.	Plain and incised varieties of St. Johns ceramics; ceramics coiled, not molded; some pottery has fiber and quartz sand tempering; first use of burial mounds.
St. Johns Ia 100-500 C.E.	Village pottery was primarily plain; larger burial mounds, some containing log tombs; trade evidenced by exotic materials within the burial mounds; Dunns Creek Red ceramics are common.
St. Johns Ib 500-750 C.E.	Village pottery is plain; increased influence of Weeden Island populations; central pit burials within the mounds; some pottery caches in mounds
St. Johns IIa 750-1050 C.E.	St. Johns check stamped ceramics appear; increased use of burial mounds; mound burial seems to be saved for higher status individuals; pottery caches found in mounds; increase in size and number of villages; increase in the variety of burial patterns.
St. Johns IIb 1050-1513 C.E.	Evidence of Mississippian influence seen; continued use of plain and check stamped ceramics; platform mound make their appearance at some of the ceremonial complexes.
St. Johns IIc 1513-1565 C.E.	European artifacts occasionally found in the burial mounds and middens; Timucuan speaking groups; disease beginning to decimate the aboriginal populations.

3.1 Paleo-Indian

The Paleo-Indian stage is the earliest cultural manifestation in Florida, dating from roughly 11,000 to 8000 B.C.E. (Before Common Era) (Austin 2001; Milanich 1994). Archaeological evidence for Paleo-Indians consists primarily of scattered finds of diagnostic lanceolate-shaped projectile points.

Clovis points characterize the Clovis horizon (c. 11,000-10,000 B.C.E.), Suwannee and Simpson points are the diagnostic forms for the Suwannee horizon (10,000-9,000 B.C.E.), and the Dalton horizon (9000-8000 B.C.E.), which is poorly understood in the state, is identified by the presence of Dalton points. During this late Paleo-Indian period, the large lanceolate-shaped Suwannee and Simpson points may have been replaced by the smaller Tallahassee, Santa Fe, and Beaver Lake types (Milanich 1994:53). However, more often than not, these latter point types are most often recovered from Late Archaic or Early Woodland period components as opposed to Paleo-Indian ones (Austin 2001; Farr 2006).

The majority of Paleo-Indian sites are associated with the rivers in the north-central portion of Florida (Dunbar and Waller 1983). At that time, the climate was cooler and drier. Vegetation was typified by xerophytic species with scrub oak, pine, open grassy prairies, and savannas being the most common (Milanich 1994:40). Sea levels were as much as 115 ft below present levels and the coastal regions extended miles beyond present-day shorelines (Milliman and Emery 1968). Miller (1998) suggests that around 10,000 years ago, along the Atlantic coast, the shoreline may have been 62 mi to the east and sea level roughly 269 ft below present levels. It is probable that many of the sites dating from this time period have been inundated (Clausen et al. 1979; Dunbar 1997; Ruppé 1980; Scholl et al. 1969).

Some of the information about the Paleo-Indian period is derived from underwater excavations at two inland spring sites in Sarasota County: Little Salt and Warm Mineral Springs (Clausen et al. 1979). Traditionally, this time was characterized by small nomadic bands of hunters and gatherers. Daniel (1985) has proposed a model of early hunter-gatherer settlement that suggests that some Paleo-Indian groups may have practiced a more sedentary lifestyle than previously believed. Since the climate was cooler and much drier, it is likely that these nomadic bands traveled between permanent and semi-permanent sources of water, exploiting seasonally available resources. This has been referred to as the Oasis hypothesis (Dunbar 1991). These watering holes would have attracted the animals upon which the Native Americans hunted, thus providing food and drink. In addition to being tied to the water resources, most Paleo-Indian sites are also located proximate to sources of good quality lithic raw materials (Daniel 1985; Daniel and Wisenbaker 1987; Dunbar 1991; Goodyear et al. 1983). Given these parameters, Miller (1998:54-57) suggests a higher probability for Paleo-Indian occurrence around or near Salt Springs, Silver Glen Springs, and Fern Hammock Springs. In addition to these specific locales, he considers the Crescent Ridge, located between the St. Johns River and Crescent Lake, and areas of surficial exposure of Hawthorn and Avon Park Formations to have higher probabilities for Paleo-Indian occupations.

Excavations at the Harney Flats Site in Hillsborough County (8HI00507) has provided a rich body of data concerning Paleo-Indian lifeways (Daniel and Wisenbaker 1987). It has been suggested that Paleo-Indian settlement may "not have been related as much to seasonal changes as generally postulated for the succeeding Archaic period," but instead movement was perhaps related to the scheduling of "tool-kit replacement, social needs, and the availability of water," among other factors (Daniel and Wisenbaker 1987:175). The excavations at the Colorado Site in Hernando County revealed a Paleo-Indian lithic workshop and encampment where the manufacture of blanks appears to have been a major site function (Horvath et al. 1998). The numerous expedient flake tools and the relative lack of formal tool forms may suggest that this site dates from the later Paleo-Indian period when foraging adaptations characterized by high residential mobility and expedient technologies became more prominent (Anderson 1996; Cable 1996).

Evidence for Paleo-Indian occupation within the East and Central region is limited. This area is, however, outside of the Suwannee/Simpson macroband area postulated by Anderson (1996:38). A few of the sites recorded had possible Paleo-Indian artifacts including unifaces and patinated materials

(Johnson 1998). The Nalcrest Site located on Lake Weohyakapka in southeastern Polk County has yielded a distinctive microlithic tool assemblage that may be datable to the Late Paleo-Indian and/or succeeding Early Archaic time (Bullen and Beilman 1973). However, more recent research suggests the microlithic technology is associated with Middle to Late Archaic period components (ACI/Janus 2001; Thomas and Campbell 1991).

3.2 Archaic

The beginning of the Archaic is denoted by interrelated environmental and cultural changes. The environmental changes associated with the end of the Pleistocene necessitated modification of the extant prehistoric settlement patterns and subsistence strategies. Whereas the Paleo-Indians depended more heavily upon the Pleistocene megafauna and the relatively limited number of freshwater sources, Archaic populations hunted smaller game and learned to effectively exploit their changing environment. The gradual environmental changes led in part to the extinction of the Pleistocene fauna as well as resulted in the change in composition and distribution of various vegetative communities (Miller 1998). The adaptive changes of the Indigenous populations resulted in an increase in the number and types of archeological sites, such as marine and freshwater shell middens. The effects of the changing environment can also be seen in the variation in site locations. Although Early Archaic materials are often found in association with Paleo-Indian deposits, especially around water sources, other Early Archaic sites are located in areas devoid of Paleo-Indian components.

Early Archaic sites are recognized by the presence of Greenbriar and Bolen points as well as Kirk, Hardee Beveled, Hamilton, Arredondo, Sumter, and Thonotosassa varieties (Bullen 1975). Milanich (1994:64) notes that there are no well-documented Early Archaic coastal or riverine shell midden sites. This may be due to sea level rise as opposed to avoidance of these areas. Discoveries at Little Salt Spring in Sarasota County (Clausen et al. 1979) and the Windover Site (Doran 2002) in Brevard County indicate that bone and wood tools, as well as fabric and cordage, were an important part of the material culture. The archaeological record suggests a pattern of exploiting both coastal and interior resources. Most Early Archaic sites are small, seasonal campsites. This type of site may suggest that small bands moved seasonally in search of food. The Early Archaic tool assemblages are more diverse than the preceding Paleo-Indian tool kits and include specialized stone tools for performing a variety of tasks (Milanich and Fairbanks 1980).

During the Middle Archaic, wetter conditions prevailed, sea levels began to rise, and pine forests and swamps began to emerge (Watts et al. 1996). The climate was changed to one of more pronounced seasonality with warmer summers and colder winters. Although by 4000 B.C.E. the climate became essentially the same as that of today (Watts et al. 1996:29). Settlement became focused within coastal and riverine locales (Milanich 1994:64). The Mount Taylor period has been identified for the time between roughly 5000-2000 B.C.E. (Milanich 1994). Subsistence was based on hunting, fishing, shellfish collecting, and plant gathering. Sites are generally located along the Atlantic coast or along the upper reaches of the St. Johns River and the Ocklawaha and Wekiva Rivers (Ste. Claire 1990; Weisman 1993; Wheeler et al. 2000).

About 4000 B.C.E., present-day vegetation patterns became established; hammocks of broad-leafed mesic trees, pine forests on uplands, and bayhead and cypress swamps became significant plant communities (Watts 1971). The archaeobotanical research at the Groves' Orange Midden (4260-2130 B.C. [Common Era]) and the Lake Monroe Outlet Midden (4040-3090 B.C.E.) confirms an environment similar to that which is present today (ACI/Janus 2001; Newsom 1994; Purdy 1994). Most of the botanical remains were from wetland species, including trees and shrubs common along the lake margin, river swamp, and backwaters. Upland species were also utilized. It is believed that populations combined hunting and gathering into a productive subsistence strategy, and as a result, occupation became more sedentary and village life began (Milanich and Fairbanks 1980:147-152). Middens of mystery snail, apple snail, and mussel provide evidence of occupation and resource exploitation along the rivers of east and central Florida (Cumbaa 1976; Ellis et al. 1994; Fryman et al. 1978). The Lake Monroe Outlet Midden is somewhat anomalous in that the mystery snail was not a major portion of the subsistence economy, rather apple snail and mussel were much more important (ACI/Janus 2001).

According to Milanich and Fairbanks (1980:151), one of the most interesting aspects of the Mount Taylor culture is evidence for mass burial interments in specially prepared areas within shell middens. Such burials were found at Tick Island along the St. Johns River (Aten 1999; Bullen 1962; Jahn and Bullen 1978). Milanich (1994:81) suggests that Early and Middle Archaic peoples used aquatic environments for burial. The Early Archaic Windover Site, located near Titusville, contained primary and flexed burials within a peat pond. These were held in place with wooden stakes and the interments included grave goods such as textiles and worked bone, shell, and wood (Adovasio et al. 2002; Andrews et al. 2002; Dickel 2002; Doran 2002; Penders 2002). Underwater interments have also been recovered from the Middle Archaic Bay West Site near Naples, Republic Groves Site in Hardee County, and Nona's Site in southeast Sarasota County (Beriault et al. 1981; Luer 2002; Wharton et al. 1981). Each site, like Windover, had an adjacent land component evidenced by a midden. The Gauthier Cemetery, dating from the Middle to Late Archaic, was situated on a palm island within a slough between a pond and Lake Poinsett, and contained primary and flexed burials (Carr and Jones 1981). The burial mound at Tomoka (8VO00051) is one of the earliest in Florida (Piatek 1994). Russo (1996:284) suggests though that the Archaic burials mounds of Florida (Tomoka and Horr's Island) were not the precursors to the extensive burial mound use seen in the more recent past, rather, they were short-lived, dead-end traditions.

The Middle to Late Archaic/Mount Taylor sites recorded throughout the state include large base camps, smaller special-use campsites, quarries, and burial areas and, within East Florida, extensive shell middens. The large, stemmed projectile points, especially the Newnan type, are diagnostic of Middle and Late preceramic Archaic period sites. Other common point types include Hillsborough, Levy, Putnam, Alachua, and Marion (Bullen 1975). In addition, silicified coral was more prevalent as a lithic tool raw material (Milanich 1994) and thermal alteration of the stone became more common (Ste. Claire 1987). Interior sites include the smaller lithic scatter campsites that were most likely used for hunting or served as special use extractive sites for such activities as gathering nuts or other botanical materials (Ste. Claire 1989, 1990). Evidence for canoes from this time period is well documented, and in fact, many of the canoes recovered from Florida waters have dated to the Archaic (Newsom and Purdy 1990; Purdy 1988; Wheeler et al. 2003). The earliest canoe comes from DeLeon Springs and is roughly 6000 years old (Newsom and Purdy 1990).

By about 2000 B.C.E., the firing of clay pottery made its appearance in Florida. The first ceramic types had fibers (Spanish moss or palmetto) as the tempering agents within the clay. These wares are referred to as the Orange series. The Orange period was divided into subperiods based on a variety of ceramic attributes (Bullen 1955b, 1972; Milanich 1994). However, recent research has called the entire Orange chronology into question (Sassaman 2003) and all the various Orange ceramic types occur within the time span of roughly 3600-4100 years ago. In addition, research by Cordell (2004) has documented the presence of sponge spicules in the Orange ceramic paste (the diagnostic trait of St. Johns wares) which suggest that the St. Johns ceramic tradition extends back to the beginning of the ceramic technology in the region (Sassaman 2003:11).

Milanich (1994) and Miller (1998) indicate that there is little difference between Middle/Late Archaic and Orange populations except that there are more Orange Period sites and the density of sites is higher. Orange settlements were primarily located near wetland locales. The abundance of resources located in and near the wetlands permitted larger settlements. This change in settlement patterns may be related to environmental changes resulting from the establishment of current sea levels. By the end of the Middle Archaic, the climate closely resembles that of today's vegetation changed from those species that preferred moist conditions to pines and mixed forests (Watts and Hansen 1988). Sea levels rose, inundating sites located along the coastal and riverine shorelines (McGee and Wheeler 1994; Ruppé 1988). The adaptation to this environment allowed for a wider variety of resources to be exploited and greater variability in settlement patterns. Shellfish, fish, and other food sources were now available from coastal and freshwater wetlands resulting in an increase in population size. Other evidence suggests that at least some of the sites were being occupied on a year-round basis (Russo 1992; Russo et al. 1993; Russo et al. 1992). Russo and Ste. Claire (1992) suggest that the occupations in these two major environmental locales were, in fact, separate cultural entities, not one group migrating back and forth. Although there is a similarity in ceramic types, settlement and subsistence patterns are quite different between the two (Russo 1988).

Bridging the close of the Archaic stage and the beginning of the Formative is the Florida Transitional period, circa 1200 to 500 B.C.E., as defined by Bullen (1959). Milanich (1994), Miller (1991), Russo et al. (1993), Shannon (1986), and others suggest that assemblages from this "period" cannot be discerned with any accuracy from the preceding or following periods. In general, this time was characterized by increased regionalism, population growth, and socio-cultural complexity (Bullen 1959, 1970). Exploitation of shellfish, fish and wild plants, as well as a reliance on hunting, was continued (Bullen 1959, 1970; Bullen et al. 1978), and Indigenous groups may have engaged in limited horticulture (Milanich and Fairbanks 1980). Russo (1992:114) however, notes that there is no known evidence in this area for horticulture during this time. The Florida Transitional period is identified by the presence of St. Johns Incised ceramics (Bullen 1955b, 1972; Milanich 1994; Miller 1998). Bullen hypothesized that during the Florida Transitional period, the diffusion of culture traits, resulting from the movements of small groups of people, led to the spread of several ceramic and tool traditions (Bullen 1959). "The major changes in post-Transitional cultures cannot be attributed to environmental changes but rather appear to be the result of social, political, religious, and technological innovations introduced from elsewhere in the eastern United States" (Miller 1998:76).

In the East and Central region, fiber-tempered pottery was slowly replaced by temperless wares (St. Johns series) and by sand-tempered ceramics. Among the sites in the region dating from this time are Bluffton in Volusia County (Bullen 1955b; Wheeler and Newman 1997), the Lake Jennie Jewel and Zellwood (Bullen et al. 1974) sites in Orange County, and the Zabski Site (Atkins and MacMahan 1967; Bullen 1972) on Merritt Island in Brevard County. Dickinson and Wayne (1996) report a Transitional period component at the Sligh Site (8SE01332) based upon the recovery of Orange Simple Stamped and St. Johns Incised and Punctated sherds.

3.3 Formative/Acculturative

The period from about 500 B.C.E. until 750 C.E. in the East and Central Lake region is referred to as St. Johns I, which has been divided into three temporal sub-periods: St. Johns I (500 B.C.E.-100 C.E.), St. Johns Ia (100-500 C.E.), and St. Johns Ib (500-750 C.E.) based primarily on characteristic ceramic types (Milanich 1994:247).

There are regional variants of this basic cultural tradition: the St. Marys to the north and the Indian River to the south. The St. Marys Region is located at the mouth of the St. Johns and extends northward into Georgia (see Ashley and Rolland 2002; Russo 1992). Sites in this area contain a mixture of Georgia ceramics as well as St. Johns ceramics. At the southern end of the East and Central Region is the Indian River Region which was first defined by Rouse (1951). There is a much higher prevalence of sand-tempered wares in this region.

Settlement patterns during this time were virtually the same as seen for the earlier Mount Taylor and Orange periods, i.e., along the coastal estuaries and larger rivers. The faunal analysis conducted at the Twin Mounds Site (8OR00459) along the Wekiva River suggests that there was a slight decrease in the dependence on freshwater shellfish during the St. Johns periods as opposed to the preceding Orange period (Weisman 1993). Based on that analysis, there was an increase in the use of reptilian resources. There was also a tremendous increase in the number of archaeological sites during this time. An apparent trend from St. Johns I through Ib times was a population shift into the northern part of the St. Johns River valley, possibly due to the need for more arable land (Milanich and Fairbanks 1980:158).

Village wares were almost all St. Johns Plain throughout this period. St. Johns Incised is associated with the early St. Johns I period. Deptford and Swift Creek pottery or copies are occasionally present in St. Johns I and Ia subperiods. St. Johns Cordmarked ceramics are associated with the St. Johns Ia period while Dunns Creek Red is associated with the St. Johns Ia and Ib periods.

Evidence of the continuous use of burial mounds begins at this time. Many of the burials were found in large central pits, probably the result of secondary interments. Some changes in the burial practices include the possible use of log tombs during the St. Johns Ia period as well as inclusion of Hopewellian-Yent complex exotic trade items (Milanich 1994:261). Much of the information on St. Johns I period burial practices have been obtained from the Ross Hammock Site in Volusia County (Bullen et al. 1967). This site complex consists of two large burial mounds and an extensive village midden located on the west shore of Mosquito Lagoon. A large, polished stone celt was recovered from Mound 1, and this artifact type was reportedly common in Weeden Island burial mounds on the Florida Gulf Coast (Bullen et al. 1967:16).

Year-round occupation of the coast and along the rivers occurred with special use-activity sites located in other locales and short-term campsites on the coast as well. Excavations at the Sligh Site (8SE01332) and the Lake Jessup South Site (8SE00580), located on the south shore of Lake Jessup, suggest that these sites served as villages or long-term encampments (Dickinson and Wayne 1996; Wayne and Dickinson 1993). There was a wide variety of tools and an abundance of ceramics suggesting a relatively sedentary group. Hunting, food preparation, and tool making were common site activities. The site pattern "consists of small, probably individual household midden deposits with structural evidence limited to arcs of shallow post holes, often shell-filled, and firepits" (Dickinson and Wayne 1996:108). The Hontoon Island Site (8VO00202) located within the St. Johns River southwest of Lake Beresford, has provided a wealth of data due to the preservation of many classes of artifacts within the inundated midden deposits. Evidence of an extensive wood-working tradition is noted by the numerous carved items recovered from the river around the site as well as the debitage remaining from the carving activities (Bullen 1955a; Purdy 1987). The analysis of the faunal and botanical remains suggested that the site was occupied on a year-round basis and that most of the resources were collected within 5-10 km (3-6 miles) of the site (Newsom 1987; Wing and McKean 1987).

The St. Johns II period has also been sub-divided into three sub-periods: St. Johns IIa (750-1050 C.E.), St. Johns IIb (1050-1513 C.E.), and St. Johns IIc (1513-1565 C.E.). The St. Johns IIa-c periods are marked by the presence of St. Johns Check Stamped pottery. "St. Johns II carries on the tradition and is marked only by the introduction of check-stamped pottery" (Goggin 1952:70). Occupation of riverine and coastal shell middens continued, although Miller (1998:80) notes that there is a relative increase in the number of non-riverine and non-coastal sites, perhaps as the result of locating sites in more agriculturally suited locales. Such sites are quite numerous, suggesting the possibility of an increase in population.

Milanich and Fairbanks (1980) suggest that hunting and gathering remained important but the dependence upon cultivated crops such as maize, squash, and gourds increased. The use of gourds as domesticates is still being studied as there is no evidence for cultivation even though gourds and squashes have been around for thousands of years prior to this period (Newsom et al. 1993). Sigler-Eisenberg and her colleagues (1985), however, suggest that in the upper St. Johns basin, the practice of horticulture was not adopted. Russo (1984) and Sigler-Eisenberg (1984a) further indicate that the wetland ecology and subsistence strategies were different. At the Gauthier Site, fish and aquatic turtles were the primary subsistence items, with relatively little reliance upon terrestrial game or freshwater shellfish (Sigler-Eisenberg 1984b). Seasonal utilization of the various coastal resources continued. The species exploited were dependent upon micro-environmental factors such as salinity and hardness of the lagoon bottom. The faunal remains recovered from the Castle Windy Site were indicative of a winter occupation (Bullen and Sleight 1959). However, other St. Johns II sites such as Palmer and Fletcher were occupied during the fall (Miller 1980).

There was an increase in the number and size of villages during the St. Johns IIa period suggesting population expansion. A ranked society evolved as evidenced by the differential burial customs. No longer were all people interred in burial mounds. Deagan (1978:109) notes that around 1000 C.E. a population shift from the more southern and southwestern areas into the northern areas is evidenced by changes in relative frequencies of burial mounds in the areas over time. The Thursby Mound on the St. Johns River in Volusia County as well as two smaller habitation sites on the south shore of Lake Mizell in Orange County (Swindell et al. 1977:14), among others, date to this period. Excavations at the Burns, Ormond Beach, and Fuller Mounds A and D revealed a new burial pattern in that the burials were placed on their backs with their heads or feet pointing toward the center of the mound (Jennings et al. 1957; Willey 1954).

The St. Johns IIb period is characterized by the adoption of some Mississippian traits into the ceremonial system as well as the presence of St. Johns Simple Stamped ceramics. The Mississippian lifestyle, however, never became dominant, possibly because the soils were not suitable for full agricultural pursuits. A more complex socio-political organization is suggested by the presence of platform mounds at the ceremonial centers. These include the Shields Mound, Mount Royal, and the Thursby Mound, all of which were excavated by C. B. Moore (Moore 1894a, 1894b). Copper beads and ornaments as well as greenstone celts have been recovered from several sites and suggest contact with cultures to the north and northwest of Florida.

The St. Johns IIc period is marked by the introduction of European artifacts in some of the mounds. The historic aboriginal occupants of the region were the Timucua, Mayaca, and possibly the Ais. The Timucuans shared a common language but cannot be considered as a specific cultural group because the range of the Timucuan speakers "... was crosscut by dialect, techno-environmental, ceremonial, political and geographical differences" (Deagan 1978:89). The project area lies within the territory of the Jororo, who were south of Mayaca and west of the Ais, in Orange, Polk, and Highlands Counties (Milanich 1995). Although these Native Americans apparently continued the St. Johns tradition, they did not share the same Timucuan language as many of the other St. Johns historic counterparts (Milanich 1995). Excavations at Hontoon Island suggest that these people pursued a hunting-gathering-fishing economy without any major agricultural pursuits (Newsom 1987). Missionization of the Jororo began in the late seventeenth century (Hann 2003).

The arrival of the Europeans in the 1500s began a period of extensive social and cultural upheaval. Many of the traditional ways of life were destroyed or abandoned. Warfare and European diseases brought an end to the Indigenous inhabitants and their cultures. Missionization of the Jororo and Myaca began in the late 1600s, and in 1728 Joseph de Bullones wrote to the king that the Jororo were "gone" (Hann 2003:132). Evidence of European contact with the central Florida natives is seen at the Phillip Mound, west of Saint Cloud, and in the Goodnow Mound, near Sebring (Milanich 1995). Due to the attempts of the Spanish military and missionaries to alter the traditional lifeways, by the end of the seventeenth century these aboriginal populations were virtually extinct. Raids in the early eighteenth century by Indigenous groups allied with the English drove many of the Mayaca and Timucuans to seek refuge near St. Augustine where most perished in warfare or because of epidemics (Hann 1993:133; Milanich 1995). By the first half of the eighteenth century, the native populations had all but vanished (Neill 1968), and groups of Creek natives, who came to be known as Seminoles, moved into Florida. Archaeologically, Seminole sites are poorly understood. A number of Seminole period sites are recorded within Polk County, but none of them have received sufficient archaeological investigations (Carr and Steele 1993).

3.4 Colonialism

The cultural traditions of the native Floridians ended with the European expeditions to the New World. The initial events, authorized by the Spanish Crown in the 1500s, ushered in devastating European contact. After Ponce de Leon's landing in northeast Florida and circumnavigation of the peninsula in 1513, official Spanish explorations were confined to the west coast of Florida until 1565. Florida's east coast, lacking deep water harbors like Tampa Bay and Charlotte Harbor, was left to a few shipwrecked sailors from treasure ships which, by 1551, sailed through the Straits of Florida on their way to Spain.

Between 1513 and 1558, Spain launched several expeditions of exploration and ultimately failed colonization of *La Florida*. Archaeological evidence of contact can be found in the form of European trade goods such as glass beads, bells, and trinkets recovered from village sites.

Prior to the settlement of St. Augustine in 1565, European contact with the Indigenous peoples was sporadic and brief; however, the repercussions were devastating. The southeastern Native American population of 1500 has been estimated to be between 1.5 to 2 million (Dobyns 1983). Following exposure to Old World diseases such as bubonic plague, dysentery, influenza, and smallpox, epidemics to which they had no immunity, the Native American population of the New World was reduced by as much as 90% (Ramenofsky 1987). The social consequences of such a swift and merciless depopulation were staggering. Within 87 years of Ponce de Leon's landing, the Mississippian cultures of the Southeast had collapsed (Smith 1987).

In northern Florida, much of the surviving Native American population was converted by Jesuit and Franciscan missions (cf., McEwan 1993). However similar efforts in peninsular Florida met with mixed success because the remaining peninsular populations were intractable (Hann 1991, 2003). The Philip Mound Site in eastern Polk County has produced evidence of a Spanish mission to the Jororo of the region. A 1693 priest's account describes the Jororo, "On the whole [they] do not work at plantings. They are able to sustain themselves solely with the abundance of fish they catch and some wild fruits" (Fray Juan de Carmenatri 1693 in Hann 1991:111).

During the two centuries following the settlement of St. Augustine, the Spanish widened their Florida holdings to include the settlement at Pensacola and a garrison at Saint Marks. With the English to the north, the French to the west, and surviving portions of the Muskogean Creek, Yamassee, and Oconee moving into interior Florida, the Spanish colony of *La Florida* was extremely fragile. The Treaty of Paris (1763) reallocated the English, French, and Spanish holdings in the New World. As a result, Florida was ceded to the English. The ensuing decades witnessed the American Revolution during which English loyalists immigrated to Florida. Following the Revolution, the Treaty of Paris (1783) returned Florida to Spain; however, Spanish influence was nominal during this second period of ownership. For the next 36 years, Spain, from the vantage of Florida, watched with growing concern as the infant American Nation to the north gained momentum. When the United States acquired the Louisiana Purchase from France in 1803, Spain was hemmed in by the aggressive young nation. When Andrew Jackson conducted cross border raids into Florida under the pretext of suppressing Native American hostilities, he set in motion the chain of events that culminated in the cession of Spanish Florida to the United States in exchange for lands west of the Sabine River, which separates Louisiana and Texas.

During the political machinations between 1763 and 1819, Native Americans continued to move into the uncharted lands of Florida. These migrating groups became known to English speakers as Seminioles or Seminoles. This term is thought to be either a corruption of the Creek *ishti semoli* (wild men) or the Spanish c*imarron* (wild or unruly). Their presence curtailed settlement of the region and hostilities increased. The conflict between the Americans and the Seminoles over Florida came to a head in 1818 and was subsequently known as the First Seminole War.

3.5 Territorial and Statehood

As a result of the First Seminole War and the Adams-Onis Treaty of 1819, Florida became a United States territory in 1821. Andrew Jackson, named provisional governor, divided the territory into St. Johns and Escambia Counties. At that time, St. Johns County encompassed all of Florida lying east of the Suwannee River, and Escambia County included the land lying to the west. Settlement was slow and scattered during the early years. In the first territorial census in 1825, some 317 persons reportedly lived in South Florida; by 1830 that number had risen to 517 (Tebeau 1980:134).

Although the First Seminole War was fought in north Florida, the Treaty of Moultrie Creek in 1823, at the end of the war, was to affect the settlement of south Florida. In exchange for occupancy of an approximately four-million-acre reservation south of Ocala and north of Charlotte Harbor, the Seminoles relinquished their claim to the remainder of the peninsula (Covington 1958; Mahon 1985). The treaty satisfied neither the Native Americans nor the settlers. The inadequacy of the reservation, the desperate situation of the Seminoles, and the mounting demand of the whites for their removal, spawned the Indian Removal Act of 1830, and soon produced another conflict. By 1835, the Second Seminole War was underway.

During the Second Seminole War, Fort Gardiner, lying within present-day Polk County, was established at the headwaters of the Kissimmee. Military and civilian suppliers passed through the region traveling to reach Seminole villages and an increasing number of military fortifications. A major military strategy during the war was developed to ensure that the Seminoles would remain on the lands south of Ocala. General Zachary Taylor established a line of posts or forts across the state from Fort Brooke, on the west, to around New Smyrna on the east coast. The line of forts included Fort Fraser in Polk County. The Second Seminole War lasted until 1842, when the federal government decided to end the conflict by withdrawing troops from Florida. Some of the battle-weary Seminoles were persuaded to emigrate west where the federal government had set aside land for a reservation. However, those who wished to remain were allowed to do so but were pushed further south into the Everglades and Big Cypress Swamp. This area became the last stronghold for the Seminoles (Tebeau 1980).

Encouraged by the passage of the Armed Occupation Act in 1842, designed to promote settlement and to protect the Florida frontier, families moved south through the state. The Act made available 200,000 acres outside the already developed regions south of Gainesville to the Peace River, barring coastal lands and those within a two-mile radius of a fort. The Armed Occupation Act stipulated that any family or single man over 18, able to bear arms, could earn title to 160 acres by erecting a habitable dwelling, cultivating at least five acres of land, and living on it for five years (Covington 1961a:48). During the nine-month period the law was in effect, 1184 permits were issued totaling some 189,440 acres (Covington 1961a:48).

In 1845, the State of Florida was admitted to the Union with Tallahassee selected as the state capital. During the same year, Hillsborough County, which was established in 1834, was enlarged to include parts of Mosquito County, including the area that later became Polk County. Federal surveys were initiated by the U.S. Government in the 1840s, following the Second Seminole War and the Armed Occupation Act. **Table 3.2** notes the surveyors and their observations of the environment in the vicinity of the CR 557 project. The federal surveyors Plats (State of Florida 1848, 1849, 1850, 1853) did not show any trails, homesteads or other historic features (**Figures 3.2, 3.3, 3.4**).

Table 3.2. Federal surveys and notes.

Township/Range/Section	*Exterior or Subdivision/Year*	*Surveyor*	*Volume and Page*	*Notes*
27/27/32-33	Exterior/1843 Subdivision/1848	H. Washington F.R. Loring	74:573-575 92:83-85	Exterior: Bay and swamp with open pine woods, water oak, and live oak; ponds and hilly 3rd rate pine land, poor 3rd rate pine, grassy ponds, bay swamps, open pine woods, and gum; open deep grassy pond, hilly, and pine land
28/26/1-3, 9-12, 16-17	Exterior/1850 Subdivision/1850	J. Westcott	132:35 144: 577, 584, 588-590	Exterior: Pine on the margins of swamp Interior: Swamp, lake, 1st, 2nd, and 3rd rate pine
28/27/4-6	Exterior/1843 & 1850 Subdivision/1853	H. Washington	74:573-575 92:83-85	Exterior (north line): Bay and swamp with open pine woods, water oak, and live oak; ponds and hilly 3rd rate Pine land; poor 3rd rate pine; grassy ponds, bay swamps, and gum; open deep grassy pond, hilly, and Pine land
		J. Westcott	132:35	Exterior (west line): Pine on the margin of swamp
		H.H. Floyd	127:68-70	Interior: 3rd rate high and rolling pine, marsh, and swamp, and lake

By 1851, there were not more than a dozen Anglo-American families, along with a garrison of soldiers and a hundred or so Indians, in what was to become Polk County. The earliest settlements were established along the Peace River, west of the project area. Pioneer homesteaders included the Blounts, Raulersons, and Summerlins, most of who were from northeast Florida. Many of the families tended to concentrate around the communities of Medulla, Bartow, Socrum, and Fort Meade.

Military trails crisscrossed present-day Polk County. As more homesteaders settled further south on the peninsula, difficulties with the Seminoles increased, eventually resulting in the Third Seminole War (1855-1858) (McNeely 1961:7). For example, in 1849 an "Indian Scare" began with several attacks, one occurring near a trading post at Payne's Creek. There, white settlers employed at the post, were attacked by a few young Seminoles. Two settlers were killed, and others escaped to alert surrounding settlements (Frisbie 1976:16). The possibility of repeat events such as this made military installations necessary (Covington 1961b).

Fortifications built after this incident included Fort Chokonikla, erected in 1849 on the west bank of the Peace River, near present-day Bowling Green (Miller and Schene 1978). Fort Hartsuff and Fort Green were established in the surrounding area in the 1850s after the withdrawal of federal troops from Ft. Chokonikla in the spring of 1850 (Miller and Schene 1978). Fort Gibson, established c. 1850, was erected as a civilian fort to provide protection against Indian attacks because no military forts were located in the near vicinity. In addition, Fort Hartsuff was established in 1851 in the area that later became Wauchula. It served as a haven for settlers and proved to be the center from which the town of English (now Wauchula) developed. Fort Hartsuff was occupied on two separate occasions: 1851 and again in 1856 during the Third Seminole War. Fort Green, a non-military fortified homestead, was built between 1854 and 1856 (Plowden 1929).

In December 1855, the Third Seminole War, or Billy Bowlegs War, began as a result of pressure placed on the Seminoles remaining in Florida to emigrate west (Covington 1982). The war began in present-day Collier County when Seminole Chief Holatter-Micco, or Billy Bowlegs, and 30 warriors attacked an army camp killing four soldiers and wounding four others. The attack was in retaliation for damage done by several artillerymen to property belonging to Billy Bowlegs. This hostile action renewed state and federal interest in the final removal of the Seminoles from Florida (Tebeau 1966).

Polk County was witness to some hostile action during the Third Seminole War. The Battle of Peace River occurred in the summer of 1856, as a result of a Seminole war party attack on the Tillis family home near Fort Meade (Matthews 1983:232). Reinforcements were sent from Fort Fraser to Fort Meade and a bloody battle ensued with the settlers withdrawing to a position south of Fort Meade. Captain William B. Hooker, commander of militia forces in the area, arrived and searched for the Seminole group up and down the banks of the Peace River with no success. The battle was over. It was not until two years later in February of 1858, that the final Seminole War ended when Chief Billy Bowlegs, along with 165 Seminoles, accepted monetary persuasion to migrate west. On May 8, 1858, the Third Seminole War was declared officially over (Brown 1991:112-115; Covington 1982:78-80).

Following the Third Seminole War, the area that currently comprises Polk County experienced its first land boom. More soldiers settled in the area and civilians finally felt the land was sufficiently safe to inhabit. Several settlements sprang up and others grew. Communities developed during the Mid-Nineteenth Century as families settled near forts for protection. By 1860, the total population of Hillsborough County, which included present-day Polk County, was 2,979. Nineteen percent of the total population was slaves, with only 120 slave owners in the entire county. One year later, Readding Blount, James Hamilton, George Hamilton, Francis A. Hendry, Louis Lanier, John C. Oats, Henry Seward, and Frederick Varn owned 55 percent of the slaves in Polk County. The slaves located in Fort Fraser and Fort Blount held a value of $81,450, almost as much as cattle in the same year (Brown 1991:137-138).

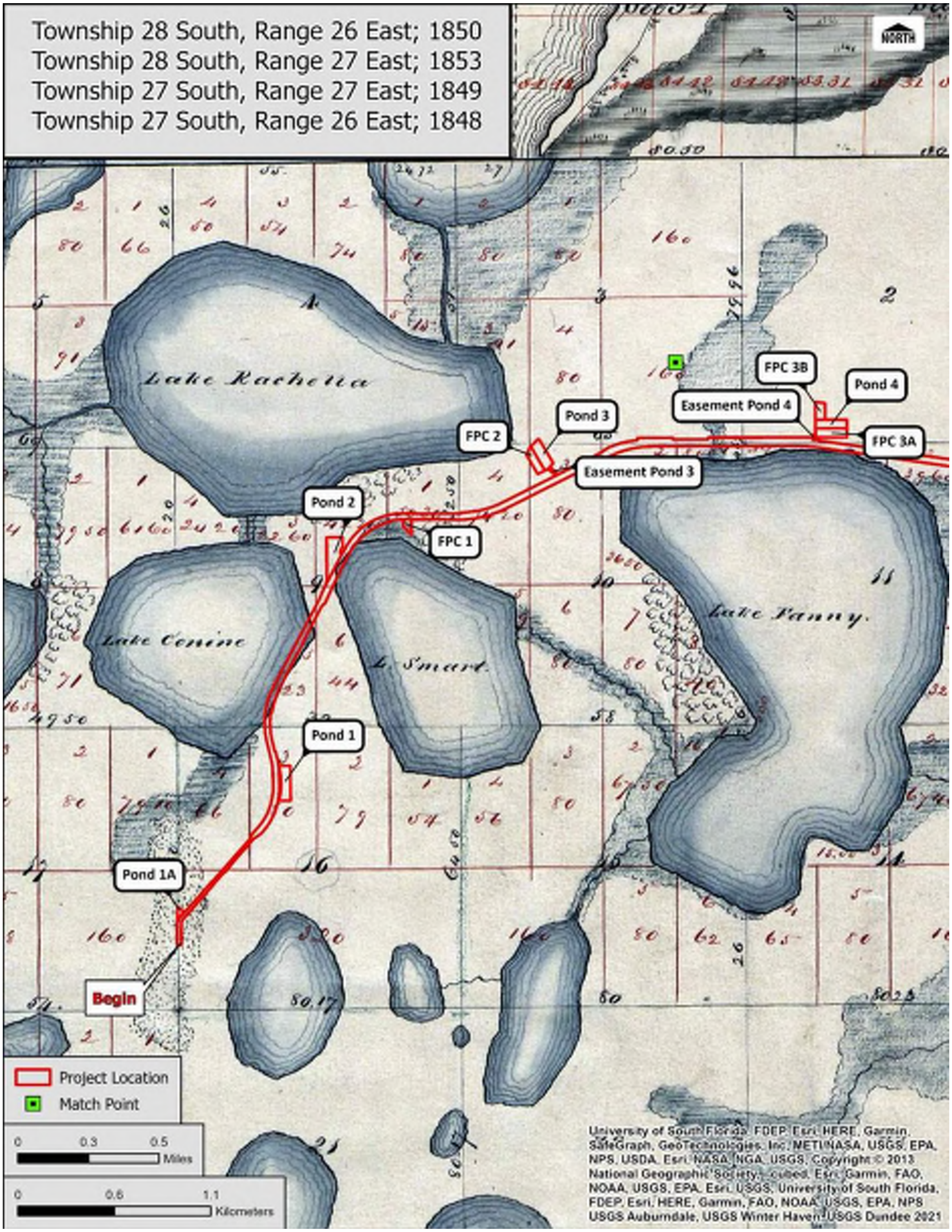

Figure 3.2. Historic plat of the SR 544 project.

Figure 3.3. Historic plat of the SR 544 project.

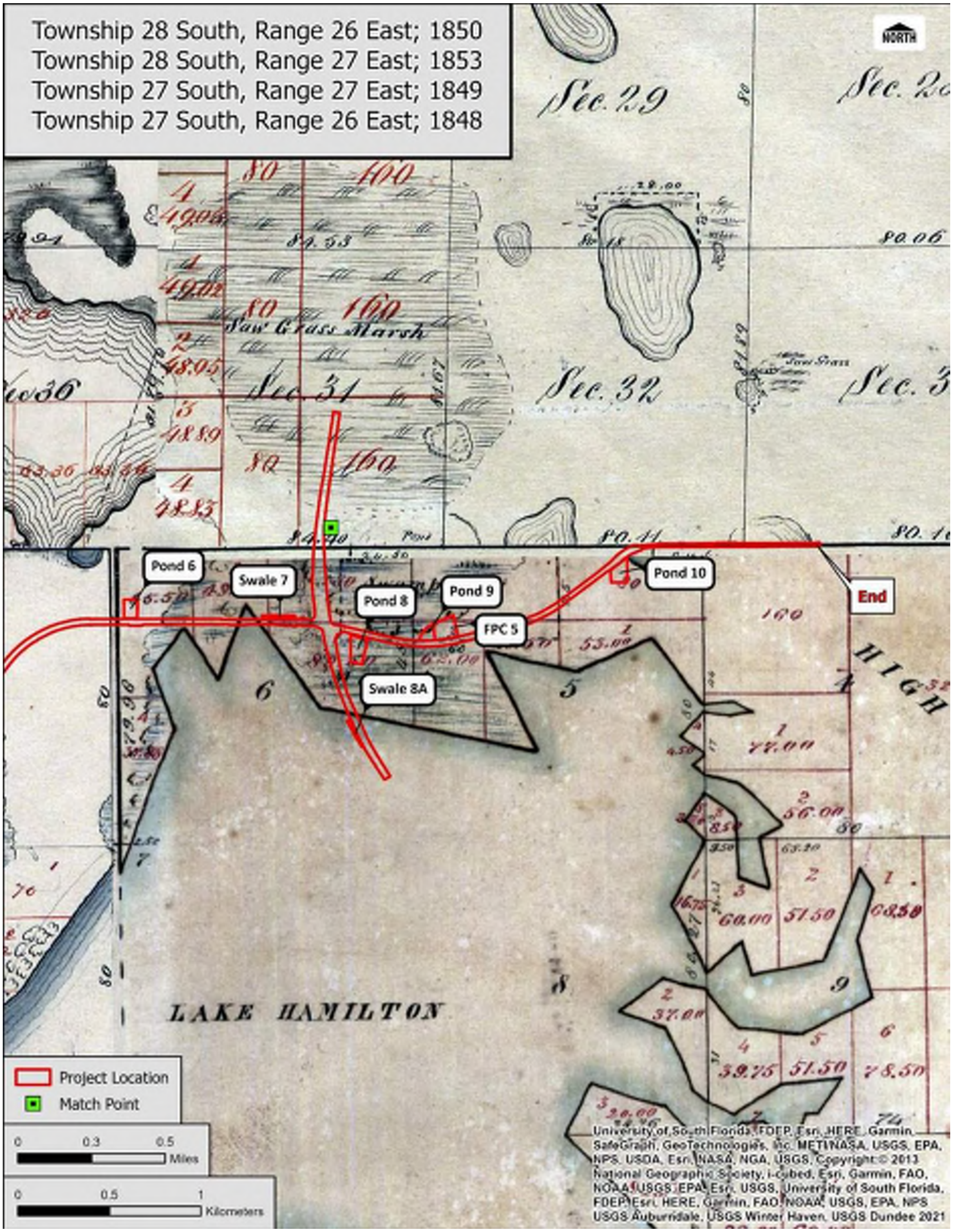

Figure 3.4. Historic plat of the SR 544 project.

3.6 Civil War and Aftermath

On February 8, 1861, the state legislature created Polk County out of portions of Hillsborough and Brevard Counties and named it in honor of President James K. Polk (Frisbie 1976:32). That same year, Florida followed South Carolina's lead and seceded from the Union as a prelude to the American Civil War. Although homesteaders and settlers clustered around the drainage and supply systems of Peas Creek (Peace River), occupation was still scattered and isolated throughout the years of the War Between the States (Davis 1856). Many male residents abandoned their farms and settlements to join the Union Army at one of the coastal areas retained by the United States government or joined the Confederate Cow Cavalry. The Confederate Cow Cavalry provided one of the major contributions to the Confederate war effort by supplying and protecting the transportation of beef to the government (Akerman 1976:93-95). There was little military activity in Polk County during the ensuing four years of the Civil War.

Immediately following the war, the South underwent a period of "Reconstruction" to prepare the Confederate States for readmission to the Union. The program was administered by the U.S. Congress, and on July 25, 1868, Florida officially returned to the Union (Tebeau 1980:251). During the early post-war years, the highly publicized 1862 Homestead Act, passed by the U.S. Congress as wartime legislation, enticed more settlers into Florida to establish farms and rescue the rebel state. Civilian activity slowly resumed a normal pace after recovery from wartime depressions. Subsistence agriculture, citrus, and cattle remained the primary economic sources in Polk County. The county seat was established in 1867 on land at Fort Blount given by Jacob Summerlin. The settlement was named Bartow, for Gen. Francis S. Bartow of Georgia, a wartime casualty (Frisbie 1976:32). Travel between Tampa, Fort Meade, and Bartow, a 48-mile trip requiring twelve hours, was completed weekly by stagecoach (Pizzo 1968:77). During the early 1870s, there were less than 150 people residing within an area of 50 square miles surrounding the county seat of Bartow (Frisbie 1976:32). The unstable economy following the war hampered any noticeable development in central and south Florida until the 1880s, when railroads extended tracks through the area (Historic Property Associates [HPA] 1992).

During the Reconstruction period following the Civil War, Florida's financial crisis, born of pre-Civil War railroad bonded indebtedness, led Governor Bloxham to search for a buyer for an immense amount of state lands. Bloxham's task was to raise adequate capital in one sale to free from litigation the remainder of state lands for desperately needed revenue. In 1881, Hamilton Disston, a Philadelphia investor and friend of Governor Bloxham, purchased four million acres from the State of Florida, in order to clear the state's debt. This transaction, known as the Disston Purchase, enabled the distribution of large land subsidies to railroad companies, allowing them to begin extensive construction programs for new lines throughout the state (Harner 1973; Tebeau 1980). Disston's land holding company was the Florida Land and Improvement Company. He and his associates also formed the Atlantic and Gulf Coast Canal and Okeechobee Land Company on July 20, 1881 (Davis 1939:205). This company was established as part of the drainage contract established with the State. This contract provided Disston and his associates one-half of the acreage that they could drain, reclaim, and make fit for cultivation.

Coupled with Disston's project and the arrival of the railroads in the 1880s, economic development and progress began to increase (Frisbie 1976). In addition to the introduction of the railroad in the 1880s, natural resources were discovered, fostering growth in the area. Established communities in Polk County, such as Bartow and Fort Meade, witnessed a population growth as new settlers came in search of cheap land on which to establish homesteads. Other communities such as Avon Park and Kissimmee were established at this time primarily due to investors who purchased large tracts of land from Disston. Settlers in the area first planted tomatoes and grapes but by the turn of the century, the majority of the area was involved in the citrus industry. Settlements continued to extend further south, increasing the population and number of citrus groves in South Florida.

Studies were conducted by the U.S. Army Corps of Engineers in 1881 to determine the feasibility of opening a navigable waterway from the St. Johns River to Charlotte Harbor. During these studies, valuable pebble rock phosphate deposits were discovered along the Peace River. Subsequent massive land acquisitions began and continued for decades. Mining towns, refineries, and shipping facilities were soon to change the face of the lands in which deposits were found (Blakey 1974; Brown 1991; Driver 1992; Historic Tampa/Hillsborough County Preservation Board [HT/HCPB] 1980).

Polk County began witnessing major growth following the discovery of phosphate and the construction of the railroad throughout the county. In 1883, Henry Plant's South Florida Railway entered Polk County and passed through what would become Winter Haven, extending from Tampa northeast to Kissimmee where it linked up with the Sanford Line. Winter Haven was platted by Bartow realtors J.O. Blount and W.T. Whitledge the same year (Johnston 1997). The town plan of Winter Haven was comprised of a grid system of blocks and tiers that was divided into commercial, residential, and farmland with a centrally located park surrounding the railroad tracks. The settlement, originally called Harris Corner after F.A.K. Harris, the operator and builder of the first building in the downtown area, was later named Winter Haven to convey its future potential as a winter resort for northerners (City of Winter Haven 2018; Johnston 1997). An early subdivision – the East College Addition, located to the east of downtown – was platted by Earnest Johnson in 1888 (Johnston 1998). Other settlers who bought land in the APE, between 1881 and 1891, are shown on **Table 3.3.**

In late 1889, the DeSoto Phosphate Mining Company erected a phosphate processing plant on the bank of the Peace River (Brown 1991:314). From its beginnings at Zolfo and Arcadia, the phosphate craze spread through the Peace River Valley. The Pharr Phosphate Company and the Florida Phosphate Company established mines near Bartow in 1890. However, the pebble phosphate boom was short lived. A drop in prices, decreased demand, increasing production costs, the effects of the great Panic of 1893, and competition from hard rock and land pebble mine, ultimately combined to close the production of pebble phosphate (Brown 1991:316). Nonetheless, land mining for phosphate continued, and in 1919 there were 17 phosphate companies in Polk County (United States Environmental Protection Agency [USEPA] 1978). By 1938, extensive consolidation of the various phosphate companies across the state resulted in a total of three hardrock phosphate companies and six land pebble phosphate companies (Blakey 1974:159).

By 1895, only a decade after incorporation, the population of nearby Lakeland had nearly doubled to 1,000. Much of this was because Lakeland had become an important rail yard and shipping site in Polk County; by 1893, there were 20 daily train arrivals and departures at the local station. Essential to the economic success of Lakeland, the railroad facilitated the shipment of citrus, strawberries and phosphate, three of the county's key industries, to markets worldwide (Hetherington 1928:10; McNeely 1961:5, 10-11). This placed the town among the top 15 cities in Florida at the time. Although the national financial Panic of 1893, and the Great Freeze of 1894-95, devastated capital investment and much of the Florida citrus industry, including that in Polk County, groves were replanted and prospered again within the next decade (Hetherington 1928).

Table 3.3. Tract Book Records.

Township 27 South, Range 27 East				
Section	*¼ Section*	*Deed Entry*	*Year*	*Volume and Page*
32	SE	A.W. Barro (NE ¼); William T. Whittedge (NW ¼); S. J. Drawdy (S ½)	1884; 1885; 1884	23:297
33	SW	Hubbard & McDuff (N ½); S. J. Drawdy (S ½)	1884	
Township 28 South, Range 26 East				
Section	*¼ Section*	*Deed Entry*	*Year*	*Volume and Page*
1	NW & SW	Florida Land Navigation Company (W ½); Florida Southern Rail Company (E ½)	1883; 1887	22: 285
2	SW	Florida Land Navigation Company (E ½); The Plant Investment Company (W ½)	1883; 1884	
3	SE	Ashley D. Hurt; Florida Southern Rail Company (E ½)	1883; 1887	
9	NE & S ½	Brantley A. Weathers (NE ¼); James A. Harris (S ½)	1882	22:286
10	N ½	Arredondo Claim; E.S. Daws Giod, and Thomsen A. Norris	1881	
11	N ½	Melliva (?) J. Reynolds; Florida Southern Rail Company	1883;1887	
12	NW	The Plant Investment Company	1883	22:287
16	W ½	Duncan M. Neal and Archibald Gray Trustees for NM McKinnon	1881	
17	SE	Sillah B. Sawyer (NE ½); Florida Land Management Company (W ½); David W. Gwynn (SE ¼)	1884; 1888; 1891	22:288
Township 28 South, Range 27 East				
Section	*¼ Section*	*Deed Entry*	*Year*	*Volume and Page*
4	NW	Edwyn Landys Daives, George Augustus Thomson, and Anthony Norris (Trustees of the Florida Land and Colonization Company)	1883	24:1
5	N ½	Florida Land and Improvement Company	1883	
6	N ½	Charles D. Owens; The Plant Investment Company	1883;1884	24:2

3.7 Twentieth Century

In 1900, the main industries remained phosphate mining, citrus, and strawberry farming (Hetherington 1928). Between 1900 and the 1920s, Winter Haven experienced renewed residential, commercial, and industrial development with the population increasing from 429 in 1900 to 1,436 in 1910 (Johnston 1998). The Florida Citrus Exchange was established by Frederick W. Inman – the founder of the nearby settlement and future neighborhood of Winter Haven, Florence Villa – in 1909 with a Polk County sub-exchange headquartered in Bartow. The town of Winter Haven was incorporated in 1911 and by 1919 Downtown Winter Haven had been filled with commercial buildings along the centrally located park (City of Winter Haven 2018; Johnston 1997). Several other packinghouses and a juice plant were constructed by 1916, primarily located along the railroad tracks, northwest of downtown. By the late 1910s, the naval stores industry, which produced turpentine, lumber, and rosin, joined the citrus and phosphate industries as a prime economic resource in Polk County. New roads were constructed in the 1910s, allowing greater mobility bringing in newcomers to larger cities like Lakeland (McNeely 1961). In addition to the road systems, the Peace Creek Drainage District was established in 1915 which involved the draining approximately 48,000 acres within the area, constructing canals between the regions lakes, and equalizing the level of the lakes (Johnston 1998). This large-scale project made it possible to travel throughout the county lake by lake via recreational boats. New land for development was provided through the platting of new subdivisions or redividing existing areas within the original town plan from the early Twentieth Century onward into the Florida land boom. One of the first residential subdivisions platted during this time was the Winter Haven Heights neighborhood established by Walter W. Taylor – a New York City developer – in 1907 (Johnston and Shiver 2000). The neighborhood is located two blocks to the east of the original Winter Haven town plan's original eastern boundary.

The Florida land boom of the 1920s saw widespread development of towns and highways. Hundreds of citrus growers promoted crops and land simultaneously. Around this time, many roads were constructed throughout the county, connecting various communities. Polk County boasted 326 miles of "velvet asphalt" highways "winding through 50,000 acres of orange groves" and "hundreds of lakes" (Barber 1975:324-325). This period of prosperity was witness to a revival of the phosphate mining business and to new towns like Polk City. Over thirty-one subdivisions were platted in Winter Haven between 1920 and 1928 (Johnston 1997). During the 1920s, several subdivisions were platted along 1st Street in the vicinity of lake Silver, including Silver Shores, Silvercrest Addition, and Lake Silver Terrace (Tampa Tribune 1925a, 1925b; Orlando Sentinel 1937). As a result, infrastructure and other necessities to serve the new residents of the city were required. In 1926, a charter was adopted to establish the Winter Haven Hospital in a small, wood frame duplex located on Avenue C Northeast (Tampa Times 1926; Johnston 1967). By 1928, the hospital had outgrown the original location and was relocated to the former Groveland Hotel on Seventh Street Southwest where it remained until 1938 (Johnston 1967). In May 1938, the first iteration of the Winter Haven Hospital located at 200 Avenue F Northeast was opened (Tampa Tribune 1938). The 27-bed, one-story, tile-and-steel building was constructed for $75,000 on land donated by the Frierson-Nichols post of the American Legion (Tampa Tribune 1938). Since its construction, the c. 1938 facility has received several additions, including a large-scale, eight-story Swann Building addition in c. 1967 and a 100-bed, three-story addition opened in c. 1972 (Johnston 1967; Tampa Tribune 1972). The most recent additions to the hospital were constructed from the c. 1990s and 2018 (Google Earth 2023).

The Great Depression began early in Florida with the collapse of the real estate market in 1927. The following decade saw the closing of mines, mills, and citrus packing plants, and widespread unemployment (Burr 1974:156). Exacerbating the economic downturn was the compulsory cattle dipping law that forced cattle owners to dip their stock every two weeks for two years. This law was enforced in an effort to eradicate cattle fever tick, the arthropod vector organism responsible for transmission of tick fever. This disease, which although debilitating to the nation's southern stock, was fatal to northern herds (Black 1998). Although the program was subsidized by the state, until the correct arsenical, DDT, and/or Toxaphene "dip recipe" was discovered, numerous cattle were lost to overdosing, at the expense of the private ranchers (Black 1998). In addition, where cattle were scattered over vast distances, bi-monthly dipping required constant hours in the saddle for the roundups (Akerman 1976). Despite the short-term economic burden placed on ranchers, many see the cattle dipping program as the birth of the cattle industry in Florida (Carlton 1997). Prior to this, herds were allowed to roam freely. The legislation made ranchers accountable for their herds, a responsibility, which, practically translated, resulted in fenced ranches and branded cattle (Carlton 1997).

By the mid-1930s, federal programs implemented by the Roosevelt administration began employing large numbers of construction workers helping to revive the economy. These projects included federal building of parks, bridges, and public buildings. In addition to projects such as these, the Work Program Administration (WPA) occasionally assisted local entrepreneurs. One such local businessperson was Dick Pope who developed the swampland on the north bank of Lake Eloise into Cypress Gardens, located in Winter Haven. On January 2, 1936, Cypress Gardens opened to the public and became Florida's first theme park show-placing thousands of types of flowers from countries around the world (Brown 2001:312). Eventually the park expanded to include rides and water-skiing shows.

In addition to Pope, Winter Haven became associated with Floridian entrepreneur, George W. Jenkins. Publix Super Markets Inc. got its start in 1930, when Jenkins, who had recently quit his job as a manager for the Piggly Wiggly store in Winter Haven, rented the empty building next door, and opened his own grocery store. While it was a typical grocery store for the time period, "Jenkins emphasized pleasing the customer and providing a clean, well-stocked store" (Hinder 2001). Despite the Great Depression, his store and concept proved successful, and by 1935, Jenkins had opened a second store across town (Hinder 2001; Watters 1980a). In 1940, Jenkins opened his "dream store" at the edge of downtown Winter Haven. This $25,000 Streamline Moderne style structure incorporated "the best from the new phenomenon of supermarketing, avoided that about it which appalled him [Jenkins], held onto good things he had found in old-fashioned stores, and applied what he had learned from 10 years in his own two conventional, small markets" (Watters 1980a). The store included the latest equipment and technology, such as air conditioning, fluorescent lighting, open dairy cases (built to Jenkins' specifications) frozen food cases, and electric-eye doors; it was the first time many of these features had been used in a supermarket (Watters 1980a; Hinder 2001).

Following the Depression, World War II (WWII) and federal efforts to package and transport food resulted in innovative changes. Rapid expansion occurred in the citrus canning field (HT/HCPB 1980:13). In addition, federal road building and airfield construction for the wartime defense effort brought unparalleled numbers of residents into Florida and the project area during the postwar years. Phosphate operations continued. The 1940s saw an industry-wide rebound as wartime and post-wartime demands for modern agricultural production created economic market incentives worldwide. Conglomerate corporations entered the market as technology evolved and small-scale operations began to disappear (HT/HCPB 1980:17-18). Post-WWII growth led to the destruction of several older residential and commercial areas and the construction of new subdivisions and businesses along major transportation routes to accommodate the returning veterans and retirees (Johnston 1998). Citrus remained a significant industry and source of jobs in Winter Haven following the war with the Florence Citrus Growers Association constructing a frozen concentrate facility in 1949 (Johnston 1998). During the following decade, the 1956 Highway Act funded a plan for 41,500 miles of interstate highway nationwide. Interstate 4 (I-4) was part of that plan and was constructed during the late 1950s and early 1960s. Today, I-4 is the major automobile transportation link between Tampa and Orlando through Polk County. In addition, the original route between the vicinity of Lake Smart and Lake Henry – now Old Lucerne Park Road – was widened by the State Road Department in ca. 1964 and was maintained although it would soon be bypassed by the newly constructed section of SR 544 to the south (Tampa Tribune 1963). Construction on the improved SR 544 segment was well underway by January 1965 (Johnston 1965). The ca. 1965 portion of SR 544 within the APE begins at Old Lucerne Park Road (north of Lake Smart) and runs eastward along the northern shore of Lake Fannie, merging with Old Lucerne Park Road just west of Lake Hamilton Canal. This new segment was constructed to decrease the number of turns and sharp curves on the road and also create a wider route, improving safety and the overall driving experience.

In addition to agricultural success, Winter Haven's local company – Publix – continued to flourish within the state and overall southeastern United States. Between 1963 and 1979, Publix continued to expand throughout Florida. During this time, 119 new Publix stores opened throughout the state, as did 69 additional shopping centers (Watters 1980b). During the 1980s, Publix continued to expand and introduce new services. By the end of the decade, there were 367 stores throughout Florida. In 1991, Publix opened its first out-of-state market in Savannah, Georgia, and subsequently established an Atlanta division. By 2014, Publix had expanded into South Carolina, Tennessee, and North Carolina (Publix 2014).

Economically, the county continues to rely on the industries that have historically supported it, such as phosphate mining, agriculture, and tourism (Polk County Board of County Commissioners 2011). In addition, trade, transportation, and utilities made up over 20% of all the industries in Polk County in 2021, followed by professional and business services (EDR 2023). The population of Polk County has steadily increased at a rate of approximately 20% each decade since 1980 – the 1980 population of roughly 320,000 had increased to roughly 720,000 by 2020 (EDR 2023).

3.7.1 Florence Villa

In 1884, the community of Florence Villa was settled, as well as Winter Haven approximately 1.5 miles to the south. The community of Florence Villa, originally called Wahneta, was settled by Frederick W. Inman and his wife Florence Jewett Inman, for whom it was named, in 1904. Inman experimented with the agricultural potential of the area, including a citrus grove on 100 acres of his large property. Inman and his wife constructed a large residence on Spring Lake which they eventually developed into the Florence Villa Hotel, welcoming guests such as Henry B. Plant (Johnston 1997). The community of Florence Villa, which thrived in its early years due to the citrus and hospitality businesses of the Inmans, was incorporated in 1917 and in 1923 merged with the city of Winter Haven (Gernert Jr. 2014).

Frederick Inman became a pioneer of the citrus industry, which was prominent in the economy of the Winter Haven area. Inman was a leader in the establishment of the Florida Citrus Exchange in 1909, serving on the statewide organizational committee and as the Florida Citrus Exchange's first president. During the same year, Inman also established the Florence Citrus Growers Association which was located at 303 Avenue T NW. The original wood frame packing house was supplemented by a large masonry building – one of the largest buildings constructed in Winter Haven during the Great Depression. The facility was expanded in 1949 and 1953 by the addition of a concentrate factory and a cold storage facility, respectively. The overall facility, which included a frozen orange juice plant, fresh fruit packing house, warehouse, and icehouse, was sold to General Foods-Birdseye Corporation in 1959 (Johnston 1997). Multiple small areas of development were located around the Florence Citrus Growers Association packing house, including directly east of the property, south, southeast, and to the northeast in 1941; however, the area was largely filled in with development to the east between 1952 and 1971 (USDA 1941, 1952; FDOT 1971).

Florence Inman's sister, Mary B. Jewett, purchased and subdivided land bounded by Avenue T to the north, Avenue O to the south, and 1st Street and 8th Street to the east and west during the late 1800s. This area was intended as an African American community, including the Lake Maude Cemetery (Kelly 2005). By the mid-twentieth century, however, the whole community of Florence Villa was a segregated Black neighborhood of the Winter Haven area (Vickers 2010). An area of Florence Villa, referred to as "Boggy Bottom," is located along Avenue Y NE and bordered by Lake Conine (Maxwell 1987). Pughsville, located south of Winter Haven, was also a segregated Black neighborhood of the city (Cribb 1961). Unlike Florence Villa, Pughsville began as a Black community that was established following the emancipation of slaves in 1865 (Ferguson 2017). The Pughsville community included a school, grocery stores, restaurants, and social halls from the early twentieth century until the 1960s; however, the community no longer exists due to new development (Ferguson

2017). An annual May Day Festival is hosted by the nonprofit Historic Pughsville Association to celebrate the heritage of Pughsville and a historical marker commemorating the historic Pughsville community is located on Avenue O SE immediately east of US 17.

3.8 Project Specifics

Although the central portion of Winter Haven was well-established with residential and commercial development by the early 1940s, a review of historic aerial photographs reveals that the majority of the area with the SR 544 corridor was rural with undeveloped wetland and citrus groves (USDA 1941a-d) (**Figures 3.5 – 3.9**). Development within the corridor at this time was limited to the Florence Villa community in the southwest portion of the APE and minimal residential development at the eastern end of the APE. The Lucerne Park Branch of the Atlantic Coast Line (ACL) Railroad loosely followed what is now SR 544. In the eastern portion of the APE, US 27 appears to have been under construction; however, construction had not progressed significantly between ca. 1941 and 1952 (USDA 1941d and 1952c). By ca. 1952, residential development in Florence Villa and the eastern terminus of the APE had expanded but the area remained dominated by agricultural land and the adjacent lakes (USDA 1952 a-d). The original route between the vicinity of Lake Smart and Lake Henry – now called Old Lucerne Park Road – was located to the north of the APE and was bypassed the current section of SR 544 to the south which was under construction by 1965 (Tampa Tribune 1963; Johnston 1965). The ca. 1965 portion of SR 544 within the APE begins at Old Lucerne Park Road (north of Lake Smart) and runs eastward along the northern shore of Lake Fannie, merging with Old Lucerne Park Road just west of Lake Hamilton Canal. By ca. 1968, development within the corridor had expanded again, including additional residential and commercial buildings, mobile home parks, the Alta Vista Elementary School, and the construction of the Willow Brook Golf Course (USDA 1968a). In addition, the Lake Hamilton Canal was constructed by this time and US 27 was complete (USDA 1968b) (**Figures 3.5 – 3.9**). Development along the corridor remained steady over the next few decades with additional mobile home parks being constructed by the 1980s, multi-family residential developments from the 1980s into the 1990s, and industrial development within the central portion of the APE by the late 1990s (FDOT 1980a, 1980b; Google Earth 2023). Since the early 2000s, changes within the APE have been limited to the occasional demolition and construction of residential and commercial buildings along the corridor and newly constructed subdivisions (Google Earth 2023).

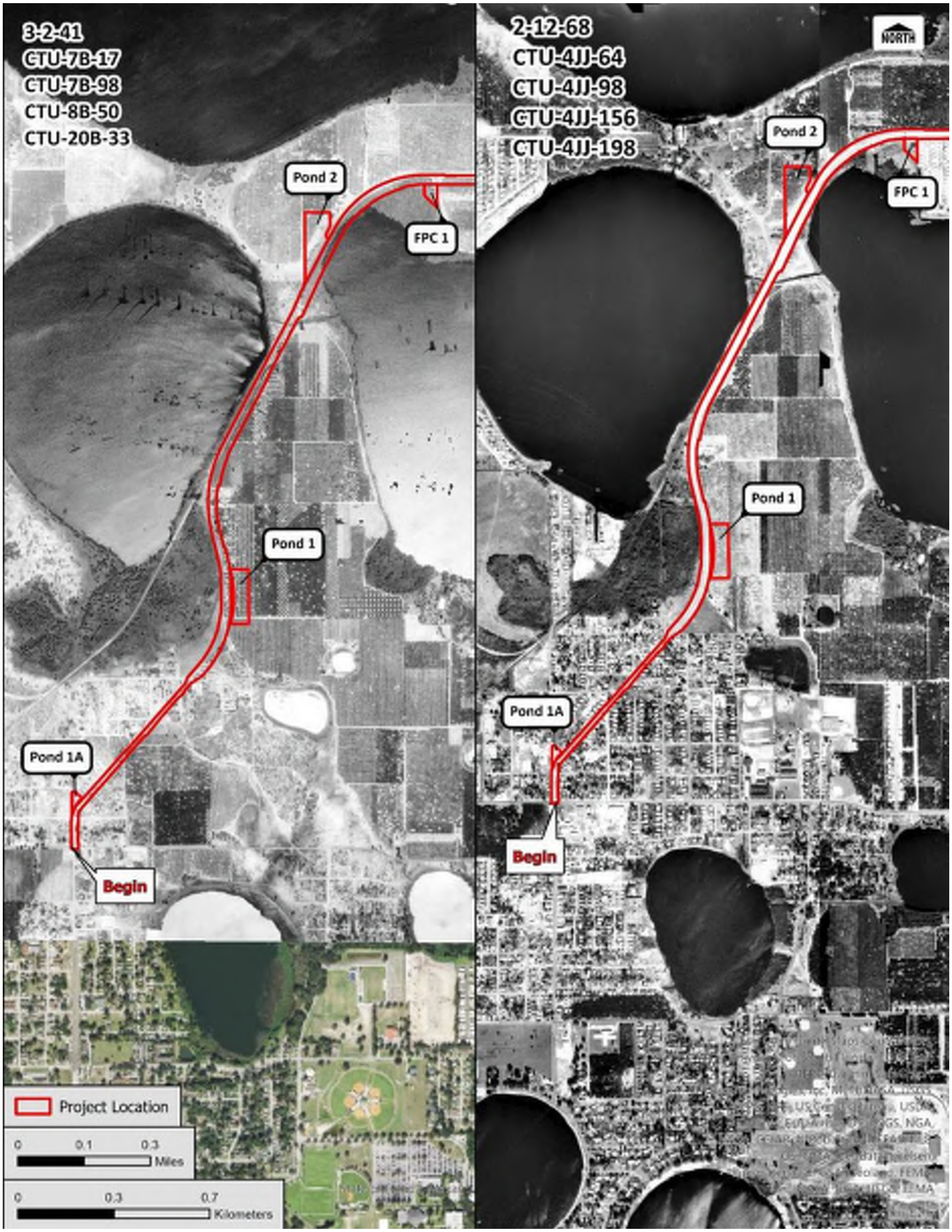

Figure 3.5. 1941 and 1968 aerial photographs of the SR 544 project.

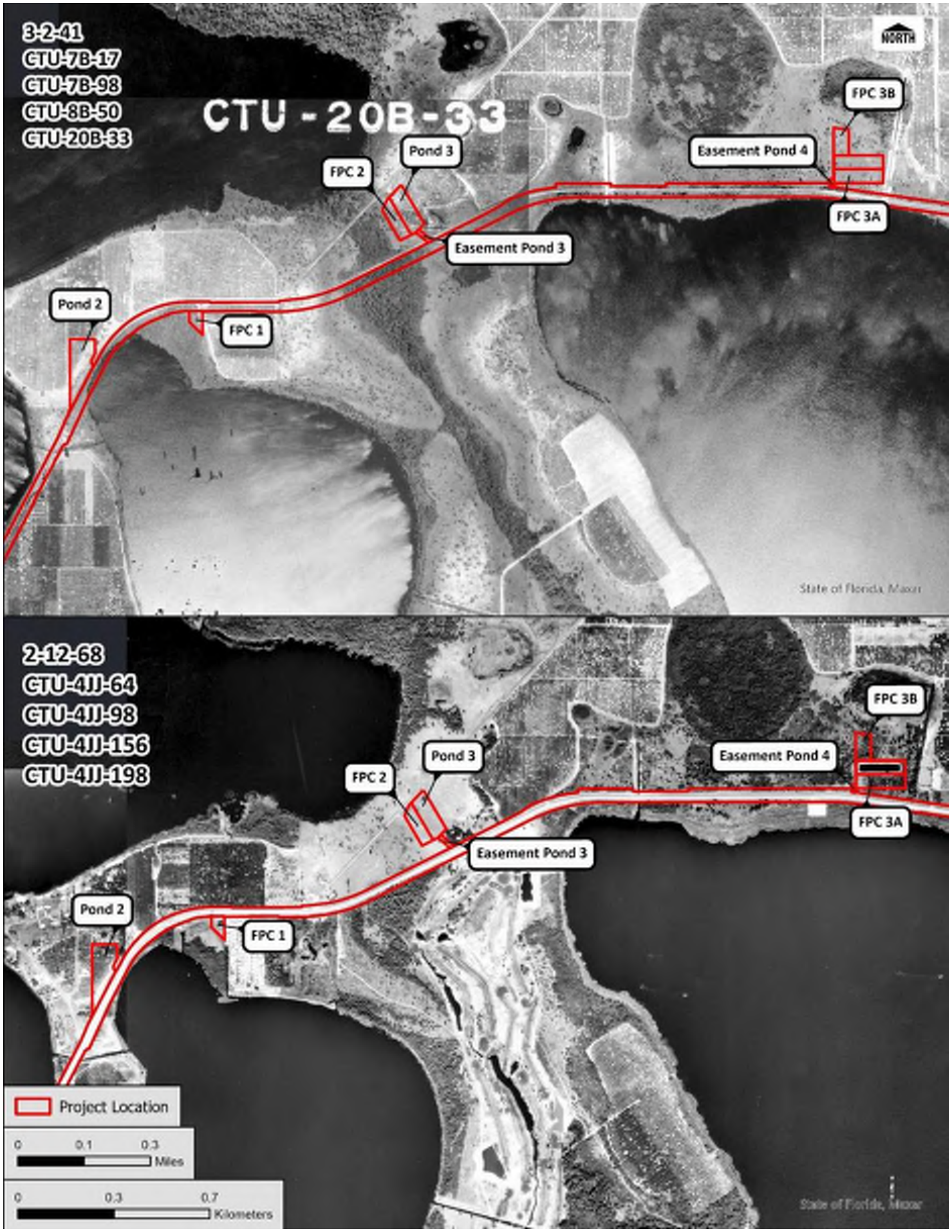

Figure 3.6. 1941 and 1968 aerial photographs of the SR 544 project.

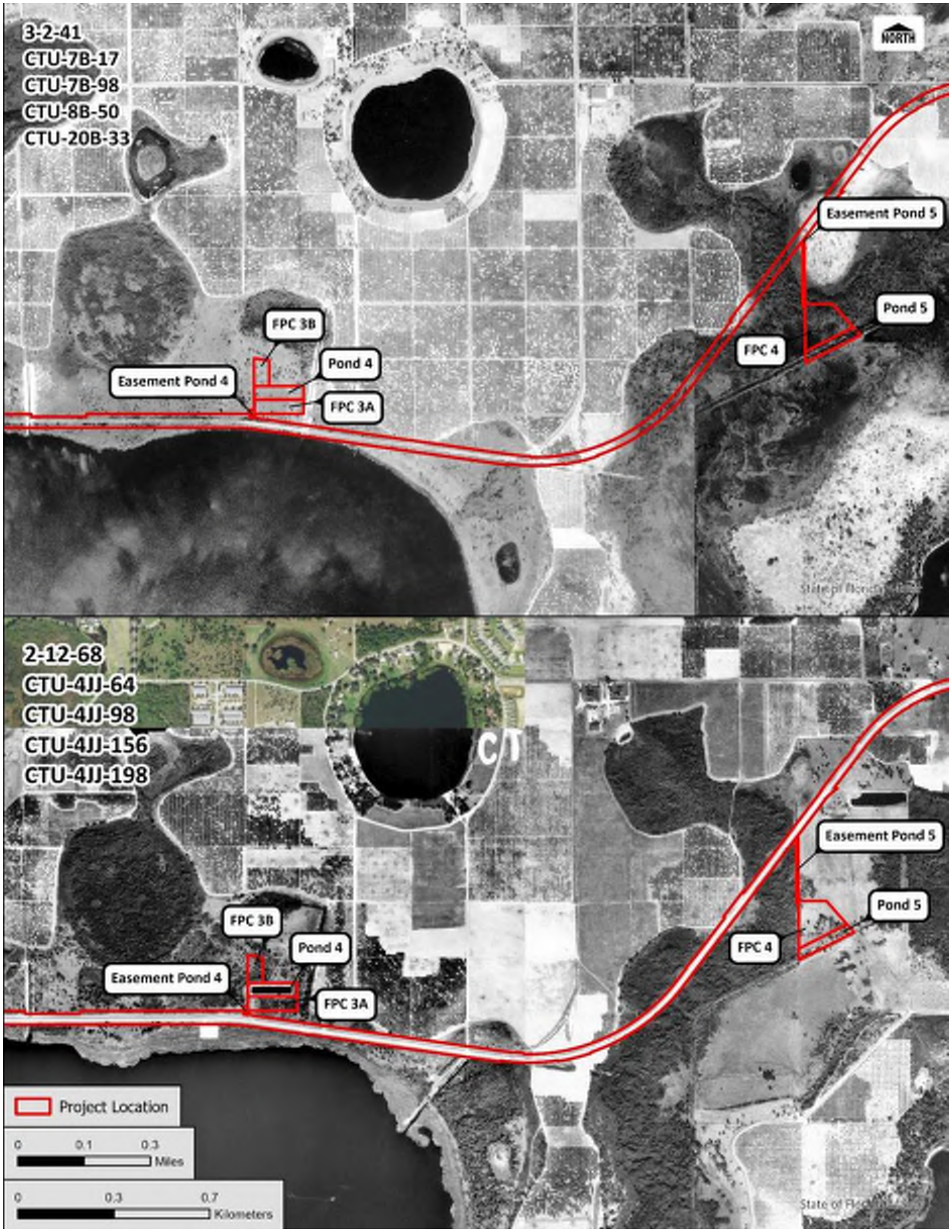

Figure 3.7. 1941 and 1968 aerial photographs of the SR 544 project.

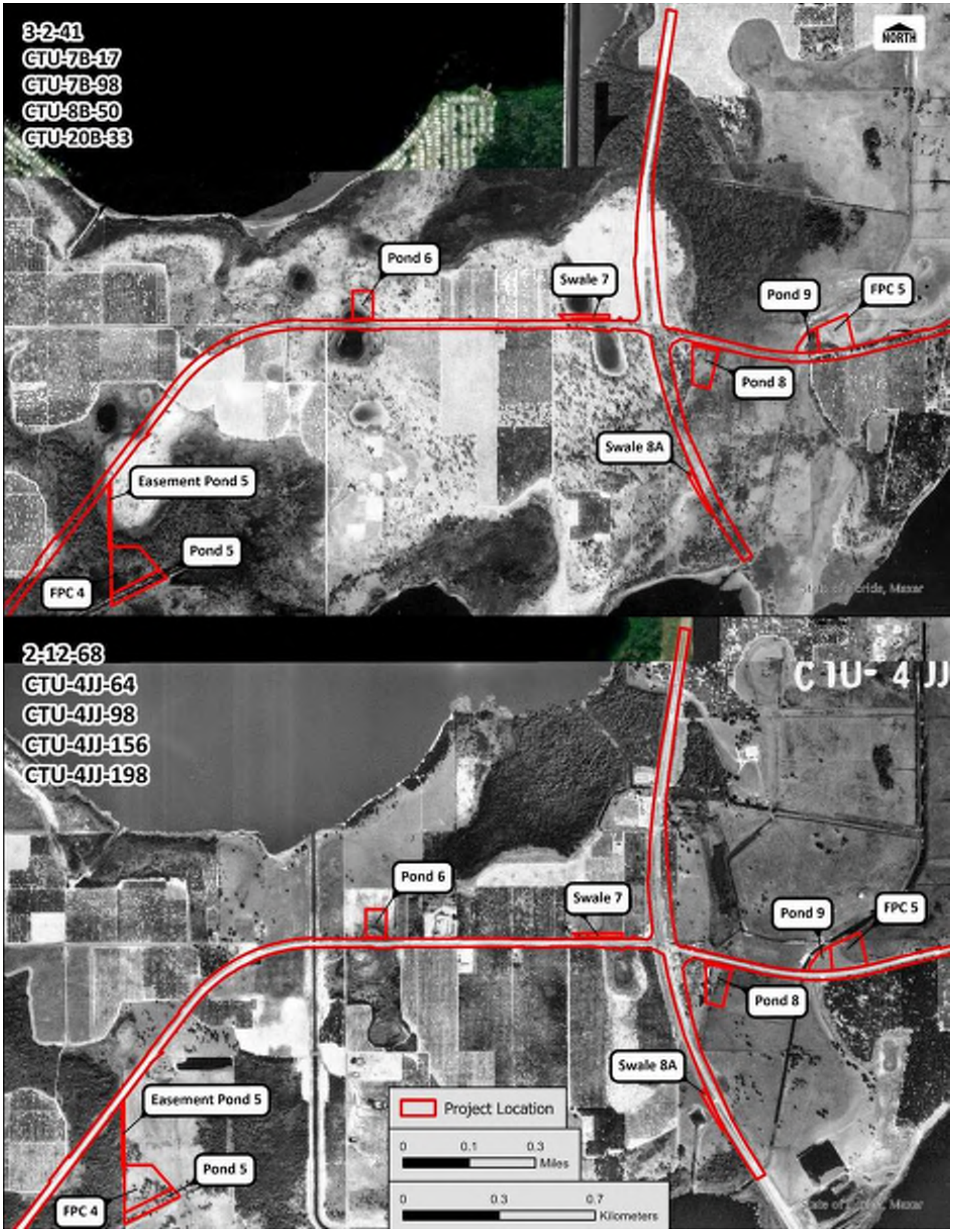

Figure 3.8. 1941 and 1968 aerial photographs of the SR 544 project.

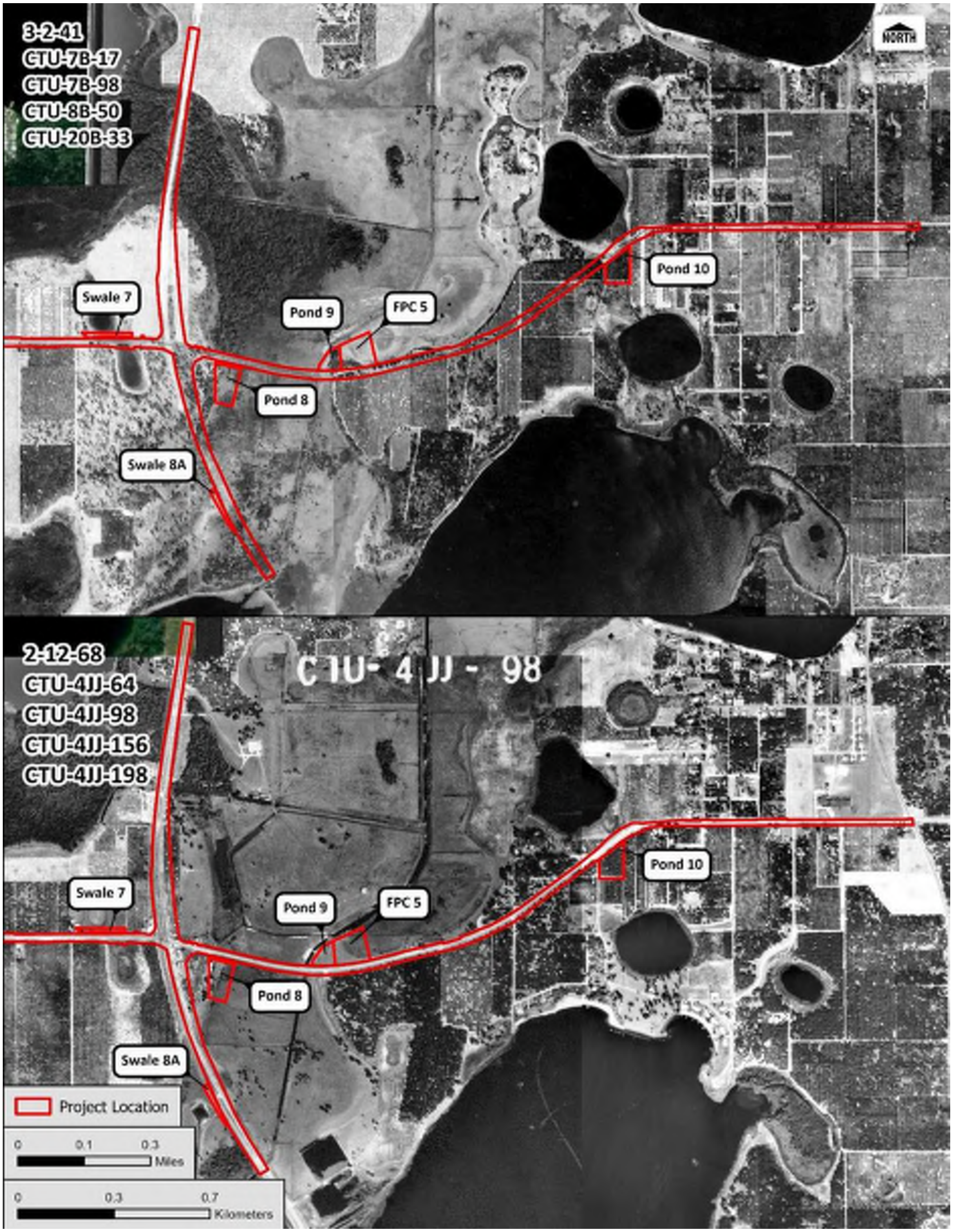

Figure 3.9. 1941 and 1968 aerial photographs of the SR 544 project.

4.0 RESEARCH CONSIDERATIONS AND METHODOLOGY

4.1 Background Research and Literature Review

A review of archaeological and historical literature, records and other documents and data pertaining to the project area was conducted. The focus of this research was to ascertain the types of cultural resources known in the project area and vicinity, their temporal/cultural affiliations, site location information, and other relevant data. This included Efficient Transportation Decision Making (ETDM) report No. 5873, Research Methodology Report (ACI 2019), a review of sites listed in the NRHP, the Florida Master Site File (FMSF), cultural resource survey reports, published books and articles, unpublished manuscripts, and maps. The FMSF information in this report was obtained December 2022 and updated in May 2023, which is the most recent edition. However, according to FMSF staff, input may be a month or more behind receipt of reports and site files. An informal discussion was conducted with a current rancher to obtain information about the past activities on the property.

4.1.1 Archaeological Considerations

Archaeological background research, including a review of the FMSF and the NRHP, indicated that three archaeological sites have been recorded within the APE and four within one-half mile. Sites within the APE include 8PO04797 (Homer's Grove Site), a single artifact site (today referred to as an archaeological occurrence [AO]) (FMSF), 8PO05426 (Whittaker Site) a low-density Pre-Contact artifact scatter, and 8PO05407 (Lake Tracey Canal), a historic earthwork dating to the American Boom Times (1921-1929). The Lake Tracey Canal, 8PO05407 was recorded during a survey of US 27 (Janus Research 1997) and updated during private surveys (Carty 2007; Alleman et al. 2021). The Whittaker Site, 8PO05426, was also recorded during a US 27 survey (Janus Research 1997b). Sites within one-half mile include 8PO04798 (Hochberg Hammock) a single artifact site (FMSF); 8PO07085 (Chris' Last Site) (Dickinson et al. 2007); 8PO08107 (Bellaviva C Site) (ACI 2017); and 8PO06533 (Lake Rochelle Site) (Whitaker 2002); the latter three are lithic scatters. The two single artifact sites have not been evaluated by the State Historic Preservation Officer (SHPO), but the five other archaeological sites were determined ineligible for listing in the NRHP by the SHPO (**Table 4.1; Figures 4.1-4.5**). Other surveys conducted in the vicinity of the APE did not yield cultural resources in close proximity of the APE and are listed, along with previously mentioned surveys, in **Table 4.2**.

Table 4.1. Previously recorded archaeological sites located within one half mile of the APE.

FMSF No.	Site Name	Site Type	Culture	SHPO Evaluation
8PO04797	Homer's Grove	Single artifact/isolated find	Pre-Contact	Not evaluated
8PO04798	Hochberg Hammock	Single artifact/isolated find	Pre-Contact	Not evaluated
8PO05407	Lake Tracey Canal	Historic earthworks	20th Century American, 1900 – present; Boom Times, 1921-1929	Ineligible
8PO05426	Whittaker	Artifact scatter	Pre-Contact	Ineligible
8PO06533	Lake Rochelle	Lithic scatter	Pre-Contact	Ineligible
8PO07085	Chris' Last	Lithic scatter	Archaic (BCE 8500-1000	Ineligible
8PO08107	Bellaviva C	Lithic scatter	Middle-Late Archaic	Ineligible

Table 4.2. Previous surveys conducted within one half mile of the APE.

Survey No.	Title	Reference
2976	Historic Properties Survey of Haines City, Florida	HPA 1991
5247	Cultural Resource Assessment Survey for US Highway 27 (State Road 25) from SR 544 to CR 547 and from CR 547 to SR 400 I-4 in Polk County, Florida	Janus Research 1997b
5259	Cultural Resource Assessment Survey for US Highway 27 (State Road 25) from SR 60 to SR 540 and from SR 540 to SR 544 in Polk County, Florida	Janus Research 1997a
5801	Cultural Resource Assessment Survey SR 544 at Lake Henry/Hamilton Canal	Fillman-Richards and Richards 1998
6211	CRAS. Technical Memorandum, US 27, Pond Siting from SR 544 to Blue Heron Bay Blvd, Polk County, Florida	ACI 2000
8161	Archaeological Resource Survey: Proposed Cell Tower #015720, Lucerne Park, Polk County, Florida	Carlson 2001
8216	Cultural Resource Assessment Survey of the Winter Haven Tract, Lakes at Lucerne Park Polk County, Florida	Whitaker 2002
11964	An Archaeological and Historical Survey of the Willowbrook Project Area in Polk County, Florida	Driscoll 2005
12176	Cultural Resource Assessment, Technical Memorandum US 27 from North of CR 546 to South of SR 544 in Polk County, Florida	ACI 2006
14725	Cultural Resource Survey and Assessment, Winter Haven Industrial Site, Polk County, Florida	Dickinson et al. 2007
17674	Section 106 Assessment (FCC Form 620) of the Diamon Mini Storage Telecommunications Tower Site (Tech Tower Properties), Polk County, Florida	FACI 2007
23682	A Cultural Resource Assessment Survey of the Proposed Cellular Communications Collocation Project, A2B0160B Caribbean Distillers, Polk County, Florida	Mikell 2016
24999	Cultural Resource Assessment Survey of the Bellaviva Property, Polk County, Florida	ACI 2017
27607	Cultural Resources Assessment Survey, SR 549 (First Street) from Central Avenue to Avenue O, Polk County, Florida; FPID: 440349-1-52-01	ACI 2021
27714	Cultural Resource Assessment Survey, Osprey to Haines City Transmission Line, Polk County, Florida	Alleman et al. 2021

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. In addition to freshwater availability, relative elevation, and better-drained soils, proximity to food and other resources including stone and clay were important site selection criteria. Based on environmental setting of the APE, there was a variable probability (despite the development in the area) for archaeological sites due to the presence of several lakes situated along the corridor and the presence of excessively draining soil within the APE. In addition, the ETDM report gave the project a minimal to moderate potential for finding historic and archaeological sites (FDOT 2019).

Figure 4.1. Previously recorded resources in close proximity to the SR 544 project.

Figure 4.2. Previously recorded resources in close proximity to the SR 544 project.

Figure 4.3. Previously recorded resources in close proximity to the SR 544 project.

Figure 4.4. Previously recorded resources in close proximity to the SR 544 project.

Figure 4.5. Previously recorded resources in close proximity to the SR 544 project.

4.1.2 Historical Considerations

Historical/architectural background research, including a review of the FMSF database and the NRHP, that nine (9) historic resources (8PO03077, 8PO03079, 8PO03084, 8PO03085, 8PO05399, 8PO08599, 8PO08600, 8PO08601, 8PO08606) were previously recorded within the APE (**Figures 4.1 – 4.5; Table 4.3**). These include eight (8) buildings (8PO03077, 8PO03079, 8PO03084, 8PO03085, 8PO05399, 8PO08599, 8PO08600, and 8PO08601) and one (1) bridge (8PO08606). Of these, seven resources were updated (8PO03079, 8PO03084, 8PO03085) or newly identified (8PO08599, 8PO08600, 8PO08601, 8PO08606) during the *Cultural Resource Assessment Survey, Osprey to Haines City Transmission Line, Polk County, Florida* conducted in 2021 (Alleman et al. 2021; Survey No. 27714). As a result of the survey, six resources (8PO03084, 8PO03085, 8PO05399, 8PO08599, 8PO08600, and 8PO08601) were determined ineligible for listing in the NRHP and the SHPO found building (8PO03079) to have insufficient information to make a determination of NRHP eligibility.

A ca. 1915 Georgian Revival style building located at 2208 Peninsular Drive (8PO03077) was previously recorded during the *Historic Properties Survey of Haines City* in 1991 (Historic Property Associates (HPA); Survey No. 2976). The resource has not been evaluated by the SHPO. Furthermore, a ca. 1925 Frame Vernacular style building (8PO05399) was previously recorded within the APE during the *Cultural Resource Assessment Survey for US Highway 27 (State Road 25) from SR 544 to CR 547 and from CR 547 to SR 400 I-4 in Polk County, Florida* conducted by Janus Research in 1997 (Survey No. 05247). The resource was determined ineligible for listing in the NRHP by the SHPO in 1998. In addition, an unrecorded segment of the Peace Creek Drainage Canal (8PO05391) is located within the APE. The canal was constructed in order to drain land around the lakes in the Winter Haven area to support citrus and other agricultural productions. Various segments of the Canal (8PO05391) have been previously recorded outside of the APE and were determined ineligible for listing in the NRHP by the SHPO.

Table 4.3. Previously recorded historic resources within the SR 544 APE.

FMSF No.	Address/Site Name	Build Date	Style/Type	SHPO Evaluation
Structures				
8PO03077	2208 Peninsular Drive	ca. 1915	Colonial Revival	Not Evaluated
8PO03079	128 Scenic Highway	ca. 1925	Frame Vernacular	Insufficient Information
8PO03084	509 Scenic Highway	ca. 1925	Frame Vernacular	Ineligible
8PO03085	501 Scenic Highway	ca. 1926	Frame Vernacular	Ineligible
8PO05399	1501 US 27	ca. 1925	Frame Vernacular	Ineligible
8PO08599	124 Scenic Highway	ca. 1953	No Style	Ineligible
8PO08600	908 Scenic Highway	ca. 1950	No Style	Ineligible
8PO08601	1203 Scenic Highway	ca. 1925	Frame Vernacular	Ineligible
Bridges				
8PO08606	Lucerne Park Road over Lake Hamilton Canal (FDOT No. 160021)	ca. 1964	Bridge	Ineligible

Two previously recorded historic resources are located adjacent to, but outside of, the APE (8PO05737 and 8PO08069). The ca. 1930 Todhunter International (8PO05737) building, also known as the Florence Citrus Growers Association Packing House, is a Masonry Vernacular style packing house that was first recorded during the *Historic Properties Survey of Winter Haven, Florida* conducted by Historic Property Associates, Inc. in 1997 (Survey No. 04998). The resource has not been evaluated by the SHPO. In addition, the ca. 1955 Florence Citrus Growers Association Water Tower (8PO08069) was recorded during *A Cultural Resource Assessment Survey of the Proposed Cellular Communications Collocation Project, A2B0160B Caribbean Distillers, Polk County, Florida* and determined ineligible for listing in the NRHP by the SHPO in 2016 (Mikell 2016; Survey No. 23682).

In 1991, Historic Property Associates (HPA), Inc. conducted the *Historic Properties Survey of Haines City* which documented resources constructed in or prior to 1941 throughout Haines City, satisfying the fifty-year criteria used by the NRHP (Survey No. 02976). As a result of the *Survey of Haines City*, the *Historic and Architectural Resources of Haines City MPL [Multiple Property Listing]* was prepared by HPA and in 1993 the FDHR converted the form into a manuscript (Shiver 1993; Survey No. 06287). The MPL was officially listed in the NRHP in 1994. The survey summarizes the historic resources constructed within the city limits of Haines City, including three contexts: I. Founding and Early Development of Haines City: 1883 – 1909; II. Progressive Era Development: 1910 – 1920; III. Florida Land Boom and Depression: 1921 – 1941. The survey identified 354 buildings and one structure within these limits. There are three property types that contribute to the multiple property nomination, including, F.1 – Commercial Buildings; F.2 – Religious and Public Buildings; F.3 – Residential Buildings.

In 1997, Historic Property Associates, Inc. conducted the *Historic Properties Survey of Winter Haven, FL* which documented historic resources constructed in or prior to 1950 throughout the urban core of Winter Haven (Johnston 1997). Following the 1997 survey, the *Historic Architectural Resources of Winter Haven Multiple Property Listing (MPL)* was submitted in 1998 (Johnston 1998). The MPL was added to the NRHP in 2000 and "fulfills Criteria A, B, and C for listing in the NRHP" with resources significant for their "association with events and persons locally significant in the areas of architecture, agriculture, exploration/settlement, community planning and development, engineering, ethnic heritage: Black, entertainment/recreation, commerce, industry, politics/government, religion, military, social history, transportation, and education" (Johnston 1998). The *Historic Architectural Resources of Winter Haven MPL* covers the development of Winter Haven from its founding in 1883 to 1949, including four contexts: I. Disston Era and Founding of Winter Haven, 1883 – 1895; II. Progressive Era, 1896 – 1919; III. Florida Land Boom, 1920 – 1928; IV. Great Depression to Post-World War II, 1929 – 1949. The listing includes the following property types: F.1 – Residential Buildings, F.2 – Commercial Buildings, F.3 – Public Buildings, and F.4 – Agriculture-related Buildings.

A review of relevant historic USGS quadrangle maps, historic aerial photographs, and the Polk County Property Appraiser's data revealed the potential for 100 new historic resources 46 years of age or older (constructed in 1977 or earlier) within the APE (Faux 2023). The APE traverses through the Winter Haven community of Florence Villa. Although Florence Villa is currently a predominantly Black community within Winter Haven, the area was established as a resort and citrus center by Frederick W. Inman in 1884, and gradually developed into the community it is today. Multiple subdivisions located within the community of Florence Villa are located within the APE, including the Florence Citrus Growers Association subdivision (1920), Booker Subdivision (1925), Unit 3 of the Eula Vista subdivision (1957), and the Lincoln subdivision (1925) (Polk County 1920, 1925a, 1925b, 1957). Limited area of the Booker, Lincoln, and Eula Vista subdivisions are located within the APE and as such, few potential resources associated with each subdivision are located within the APE; as such, it is beyond the scope of work to establish if the subdivisions would be considered a historic district. However, the Florence Citrus Growers Association subdivision accounts for approximately 29 of the potential 100 new historic resources within the APE. As such, the Florence Citrus Growers Association subdivision will be recorded as a proposed historic district.

4.2 Field Methodology

The FDHR's Module Three, *Guidelines for Use by Historic Professionals*, indicates that the first stage of archaeological field survey is a reconnaissance of the project area to "ground truth," or ascertain the validity of the predictive model (FDHR 2003). During this part of the survey, the researcher assesses whether the initial predictive model needs adjustment based on disturbance or conditions such as constructed features (i.e., parking lots, buildings, etc.), underground utilities, landscape alterations (i.e., ditches and swales, mined land, dredged and filled land, agricultural fields), or other constraints that may affect the archaeological potential. Additionally, these Guidelines indicate that non-systematic "judgmental" testing may be appropriate in urbanized environments where pavement, utilities, and constructed features make systematic testing unfeasible; in geographically restricted areas such as proposed pond sites; or within project areas that have limited high and moderate probability zones, but where a larger subsurface testing sample may be desired. While predictive models are useful in determining preliminary testing strategies in a broad context, it is understood that testing intervals may be altered due to conditions encountered by the field crew at the time of survey.

Archaeological field survey methods consisted of surface reconnaissance combined with systematic shovel tests placed at 25-meter (m) in high probability zones, 50-m in moderate probability zones, and 100-m intervals in low probability zones in addition to judgmental testing. High interval testing occurred on sandy upland slopes adjacent to previously recorded sites and freshwater sources. Moderate testing focused on upland plateaus overlooking water features, and low to judgmental testing focused on remaining lowlands and urban areas. Shovel tests were circular and measured approximately 50 centimeters (cm) in diameter by at least 100 cm in depth unless precluded by road fill, presence of utilities, water at shallow depths, and impenetrable clay. All soil removed from the shovel tests was screened through a 0.64 cm mesh hardware cloth to maximize the recovery of artifacts. The locations of all shovel tests were recorded using a Juno 5d Series/Terrasync mobile mapping application and following the recording of relevant data such as stratigraphic profile and artifact finds, all test pits were refilled.

Historic/architectural field methodology consisted of a field survey of the APE to determine and verify the location of all buildings and other historic resources (i.e., bridges, roads, cemeteries) that are 46 years of age or older (constructed in or prior to 1977), and to establish if any such resources could be determined eligible for listing in the NRHP. The field survey focused on the assessment of existing conditions for all previously recorded historic resources located within the project APE, and the presence of unrecorded historic resources within the project area. For each property, photographs were taken, and information needed for the completion of FMSF forms was gathered. In addition to architectural descriptions, each historic resource was reviewed to assess style, historic context, condition, and potential NRHP eligibility. Also, informant interviews would have been conducted, if possible, with knowledgeable persons to obtain site-specific building construction dates and/or possible associations with individuals or events significant to local or regional history.

4.3 Inadvertent/Unexpected Discovery of Cultural Materials

Occasionally, archaeological deposits, subsurface features or ancestral remains are encountered during development, even though the project area may have previously received a thorough and professionally adequate cultural resources assessment. Such events are rare, but they do occur. In the event pre-contact or historic period artifacts, such as pottery or ceramics, projectile points, shell or bone tools, dugout canoes, metal implements, historic building materials, or any other physical remains that could be associated with Native American, early European, or American settlement are encountered or observed during development activities at any time within the project site, the permitted project shall cease all activities involving subsurface disturbance in the immediate vicinity of the discovery and a professional archaeologist will be contacted to evaluate the importance of the discovery. The area will be examined by the archaeologist, who, in consultation with the staff of the Florida SHPO, will determine if the discovery is significant or potentially significant.

In the event the discovery is found to be not significant, the work may immediately resume. If, on the other hand, the discovery is found to be significant or potentially significant, then development activities in the immediate vicinity of the discovery will continue to be suspended until a mitigation plan, acceptable to the SHPO, is developed and implemented. Development activities may then resume within the discovery area, but only when conducted in accordance with the guidelines and conditions of the approved mitigation plan. If ancestral remains are encountered during development, the procedures outlined in Chapter 872.05 FS must be followed, all activities in the vicinity of the discovery must cease and the local Medical Examiner and State Archaeologist should be notified.

4.4 Laboratory Methods and Curation

All recovered cultural materials were initially cleaned and sorted by artifact class. Only two small lithic flakes were found. The flakes (i.e., lithic debitage) were subjected to a limited technological analysis focused on ascertaining the stages of stone tool production. Flakes were classified into four types (primary decortication, secondary decortication, non-decortication, and shatter) based on the amount of cortex on the dorsal surface and the shape (White 1963). No ceramics or other artifact types were found.

The project related documents (field notes, maps, photos, etc.) will be maintained at Archaeological Consultants, Inc. in Sarasota (Project File No. P19097), unless the client requests otherwise.

5.0 SURVEY RESULTS AND RECOMMENDATIONS

5.1 Archaeological Results

Archaeological field survey included surface reconnaissance, systematic and judgmental subsurface testing. Systematic testing was conducted at 25-m in high probability zones, 50-m in moderate probability zones, and 100-m intervals in low probability zones in addition to judgmental testing. High interval testing occurred on sandy upland slopes adjacent to previously recorded sites and freshwater sources. Moderate testing focused on upland plateaus overlooking water features, and low to judgmental testing focused on remaining lowlands and urban areas. This resulted in the excavation of 84 shovel tests placed in the pond sites and 134 shovel tests within the project corridor (**Figures 5.1-5.10**). As a result, no archaeological sites were identified and no evidence of two of the sites located within the APE were found: 8PO04797 (Homer's Grove Site) or 8PO05426 (Whittaker Site). The Lake Tracey Canal (8PO05407) is within a portion of the APE, but no testing was deemed necessary given that it is a canal. Although there were negative results for the two Pre-Contact period archaeological sites, the FMSF forms were still updated. The Lake Tracey Canal MSF form was not updated due to it having recently been updated in 2021 (Alleman et al. 2021), the fact that nothing has changed about the canal, and the SHPO determined it not eligible for listing in the NRHP.

However, one Archaeological Occurrence (AO) was found; it is not considered a site and not considered NRHP eligible. An AO is defined by the FMSF as "the presence of one or two nondiagnostic artifacts, not known to be distant from their original context which fit within a hypothetical cylinder of 30 meters diameter regardless of depth below surface." Thus, occurrences are not recorded as a site, but the presence of the artifact indicated Pre-Contact period activity in the area. A reasonable and good faith effort was made per the regulations laid out in 36 CFR § 800.4(b)(1) (Advisory Council on Historic Preservation n.d.) to test all areas of the APE.

Stratigraphy in the corridor APE differed between the upland and the lowland environments. The stratigraphy in the upland environments consisted of 0-20 centimeters below surface (cmbs) of gray gravelly sand and 20-100 cmbs of yellowish-brown gravelly sand. The stratigraphy in the lowland environments consisted of 0-20 cmbs of gray gravelly sand and 20-100 cmbs of light gray gravelly sand. Pond stratigraphy is noted in **Table 5.1**. Sample stratigraphy of the corridor and ponds sites are shown in **Appendix B**.

Table 5.1. Summary of archaeological survey results.

Pond #	No. of STs	Stratigraphy
Pond 1A (0.37 acres)	3	0-100 cmbs grayish-brown gravelly sand
Pond 1 (2.83 acres)	9	0-20 cmbs gray sand; 20-100 cmbs yellowish-brown sand
Pond 2 (3.83 acres)	13	0-20 cmbs gray sand; 20-100 cmbs yellowish-brown sand
FPC 1 (0.74 acres)	4	0-100 grayish-brown gravelly sand
FPC 2 (1.62 acres)	3	0-20 cmbs dark gray sand; 20-100 cmbs gray sand
Pond 3 (2.50 acres) + easement	4	0-100 cmbs gray sand
Pond 4 (2.21 acres) + easement	1	Existing pond; test pit was placed in the easement: 0-20 cmbs dark gray sand; 20-40 cmbs gray sand; 40-60 dark brown hardpan; 60-100 light brown sand
FPC 3A (2.29 acres)	3	0-20 cmbs dark gray sand; 20-40 cmbs gray sand; 40-60 dark brown hardpan; 60-100 cmbs light brown sand

Pond #	No. of STs	Stratigraphy
FPC 3B (1.33 acres)	2	0-20 cmbs dark gray sand; 20-40 cmbs gray sand; 40-60 dark brown hardpan; 60-100 light brown sand
FPC 4 (4.84 acres)	4	0-20 cmbs dark gray sand; 20-100 gray sand
Pond 5 (1.95 acres) + easement	5	0-100 cmbs dark gray clay
Pond 6 (1.96 acres)	4	0-100 cmbs grayish-brown gravelly sand
Swale 7 (0.62 acres)	3	0-30 cmbs gray sand; 30-100 cmbs light brown sand
Pond 8 (0.68 acres)	7	0-20 cmbs gray sand; 20-100 cmbs pale brown sand
Swale 8 (0.50 acres)	3	0-100 cm with mottled grey, brown, and orange soil with fill, utilities, and asphalt.
Pond 9 (1.25 acres)	3	0-30 cmbs gray sand; 30-100 yellowish brown sand
FPC 5 (1.56 ac)	2	0-100 cmbs gray sand; wetland in eastern part of FPC
Pond 10 (2.34 acres – Dry)	11	0-20 cmbs gray sand; 20-100 cmbs yellowish brown sand

* Zone of Archaeological Potential

8PO04797: Homer's Grove is in the northeast quarter of Section 11 in Township 28 South, Range 26 East located within the northern ROW of SR 544, 365-m east of SR 544 (USGS Winter Haven; Dundee) (**Figure 5.6; Photo 5.1**). 8PO04797 was previously recorded in 1995 by Janus Research and was described as a land site that recovered a single whole prehistoric lithic flake. The site has not been evaluated by the SHPO for NRHP eligibility. Homer's Grove occurs on Sparr sand with 0-5% slopes, a somewhat poorly drained soil on seasonally wet uplands and knolls (USDA 1990). The stratigraphy in this area was 0-20 cmbs of gray gravelly sand and 20-100 cmbs of yellowish-brown gravelly sand. The elevation is approximately 130 ft amsl. The current investigations within the SR 544 corridor APE consisted of five shovel tests placed at 25-m intervals and judgmentally adjacent to the site. No positive shovel tests were encountered during the present survey and no evidence of the Homer's Grove Site was recovered. In addition, site 8PO04797 appears potentially destroyed by disturbance from the distribution center and driveway development. Therefore, 8PO04797 is considered ineligible for listing in the NRHP given the lack of recovered evidence of the site.

Photo 5.1. View of 8PO04797 (Homer's Grove) adjacent to north side of SR 544, facing north. Note disturbance from distribution center facility and driveway.

8PO05407: The Lake Tracey Canal Site runs from Lake Tracy to the north in the southwest quarter of Section 20 in Township 27 South Range 27 East and terminates at the northeastern edge of Middle Lake Hamilton in the southeastern corner of Section 6 in Township 28 South Range 27 East (USGS Winter Haven; Dundee). The canal also runs through Sections 19 and 30-31 in Township 27 South Range 27 East and through Section 5 in Township 28 South, Range 26 East (**Figures 5.8, 5.9; Photos 5.2-5.4**). The elevation is approximately 125-ft amsl. The Lake Tracey Canal was previously recorded during a survey of US 27 in 1997 by Janus Research. They described the site as a land-based earthwork from the American Twentieth Century used to drain wetlands for development. The canal is not navigable and does not exhibit any significant engineering features nor does it hold significant historical associations. During this survey, no cultural material was recovered from the canal and in 1998, the SHPO determined the canal to be ineligible for NRHP listing (FMSF). The Lake Tracey Canal was reviewed in a literature search by Carty in 2007 for a separate survey of the Crossings Project Area and a recent survey for the Osprey-Haines City Transmission Line (Alleman et al. 2021), but its eligibility status did not change since it was previously determined that the canal was ineligible for NRHP listing (FMSF). In the present survey, no additional information was obtained about the Lake Tracey Canal, which continues to lack engineering features and significant historical associations, therefore continuing to be ineligible for listing in the NRHP.

Photo 5.2. View of 8PO05407 (Lake Tracy Canal) facing south.

Photo 5.3. View of 8PO05407 (Lake Tracy Canal) facing west.

Photo 5.4. View of 8PO05047 (Lake Tracy Canal) facing northwest.

8PO05426: The Whittaker Site is in the southeast quarter of Section 6 in Township 28 South, Range 27 East located south of SR 544 along both sides of US 27 as well as in Swale 8A (USGS Winter Haven; Dundee) (**Figures 5.8, 5.9; Photos 5.5, 5.6**). This site was previously recorded in 1997 during a survey of US 27 (Janus Research 1997b) and was described as an artifact scatter that contained sand tempered plain and St. Johns pottery sherds as well as 15 lithic flakes found in 14 shovel tests. The site occurs on Tavares fine sand with 0-5% slopes, a well-drained soil. The elevation is approximately 120-130-ft amsl. The current investigations within the SR 544 corridor APE consisted of eight shovel tests placed within and adjacent to the site at 25-5-m intervals. No positive shovel tests were encountered during the present survey and no evidence of the site was recovered. The stratigraphy was disturbed from 0-100 cm with mottled grey, brown, and orange soil with fill, utilities, and asphalt. In addition, site 8PO05426 appears to have been destroyed by the construction of US 27. The site was determined not eligible for listing in the NRHP by the SHPO in 1998 and ACI concurs with this evaluation..

Photo 5.5. Looking south at the west portion site 8PO05426.

Photo 5.6. Looking north at east portion of site 8PO05426.

AO #1 is located in the extreme northeast corner of Pond 2 in the southeast quarter of Section 9 in Township 28 South, Range 26 East (USGS Winter Haven; Dundee). The pond occurs on both somewhat poorly drained Adamsville fine sand with 0-2% slopes and excessively drained Candler-Urban Land complex with 0-5% slopes at an elevation of approximately 135-140-ft amsl (USDA 1990) (**Figures 5.2, 5.3**). One positive shovel test produced two very small chert non-decortication flakes between 30-50 cmbs. The general stratigraphy of the single positive test consists of 0-20 cmbs gray sand and 20-100 cmbs yellowish-brown sand. The area is forested with live oak and has been disturbed by residential lots, although they are abandoned (**Photo 5.7**). The AO was found during 25-m interval testing. Two small, non-decortication waste flakes (non-thermally altered) were recovered from 30-50 cmbs below surface. No artifacts were found in the additional four tests at 10-m intervals west and south around the positive test; no shovel tests were able to be placed north or east due to the limits of the pond boundaries. Due to its low research potential, it is not considered eligible for listing in the NRHP.

Photo 5.7. View of AO #1 and surrounding environmental conditions at the extreme northeast corner of proposed Pond 2.

Figure 5.1. Approximate location of the shovel tests within the APE.

Figure 5.2. Approximate location of the shovel tests within the APE and the AO.

Figure 5.3. Approximate location of the shovel tests within the APE and the AO.

Figure 5.4. Approximate location of the shovel tests within the APE.

Figure 5.5. Approximate location of the shovel tests within the APE and previously recorded site.

Figure 5.6. Approximate location of the shovel tests within the APE and previously recorded site.

Figure 5.7. Approximate location of the shovel tests within the APE.

Figure 5.8. Approximate location of the shovel tests within the APE and previously recorded sites.

Figure 5.9. Approximate location of the shovel tests within the APE and previously recorded sites.

Figure 5.10. Approximate location of the shovel tests within the APE.

5.2 Historical/Architectural Results

Historical/architectural background research indicated that nine (9) historic resources (8PO03077, 8PO03079, 8PO03084, 8PO03085, 8PO05399, 8PO08599, 8PO08600, 8PO08601, and 8PO08606) were previously recorded within the APE. These include eight (8) buildings (8PO03077, 8PO03079, 8PO03084, 8PO03085, 8PO05399, 8PO08599, 8PO08600, and 8PO08601) and one (1) bridge (8PO08606). Of these, six buildings (8PO03084, 8PO03085, 8PO05399, 8PO08599, 8PO08600, and 8PO08601) and the bridge (FDOT No. 160021/8PO08606) were determined ineligible for listing in the NRHP by the SHPO. One building (8PO03077) has not been evaluated and the SHPO found building (8PO03079) to have insufficient information to make a determination of NRHP eligibility. In addition, an unrecorded segment of the Peace Creek Drainage Canal (8PO05391) is located within Pond 5. Various segments of the Canal (8PO05391) have been previously recorded outside of the APE and were determined ineligible for listing in the NRHP by the SHPO.

The Historical/Architectural field survey resulted in the identification of 108 historic resources within the APE (**Tables 5.2 – 5.4; Appendix C**). Of these, 100 were newly identified, recorded, and evaluated (8PO09983, 8PO09999 – 8PO10095, 8PO10132, 8PO10133), two previously recorded historic resources (8PO03077 and 8PO03079) were identified and re-evaluated, and an unrecorded segment of linear resource, the Peace Creek Drainage Canal (8PO05391), was identified, recorded, and evaluated (8PO05391) within the APE. In addition, five (5) previously recorded historic resources (8PO03084, 8PO03085, 8PO08599, 8PO08601, 8PO08606) were identified but have not been significantly altered since determined ineligible for listing in the NRHP by the SHPO and as such, were not updated during this survey. Of these, 104 historic resources are within the mainline SR 544 corridor APE and three historic resources (8PO05391, 8PO10054, and 8PO10075) are located within the pond site APE. These three resources include the Peace Creek Drainage Canal (8PO05391) located within Pond 5, a ca. 1966 Frame Vernacular style building (8PO10054) located immediately adjacent to Pond 5, and ca. 1974 Masonry Vernacular style building (8PO10075) located immediately adjacent to Pond 6. Furthermore, the field survey revealed that two previously recorded historic resources (8PO05399 and 8PO08600) are no longer extant.

Table 5.2. Summary of Previously Recorded Historic Resources within the APE.

Resource Type	Number of Resources Identified	Number of Resources with Updated FMSF Forms	Number of Resources Determined National Register Eligible*
Structures	6	2	2
Resource Groups/ Linear Resources	1	1	0
Cemeteries	0	0	0
Bridges	1	0	0
Total Number of Resources	8	3	2

*The determination of eligibility is based on the current FMSF data. These evaluations may change.

Table 5.3. Previously Recorded Historic Resources within the APE.

FMSF No.	Address/Site Name	Build Date	Style/Type	NRHP Eligibility Recommendation
Structures				
8PO03077	2208 Peninsular Drive	ca. 1915	Colonial Revival	Eligible
8PO03079	128 Scenic Highway	ca. 1925	Craftsman	Eligible
*8PO03084	509 Scenic Highway	ca. 1925	Frame Vernacular	Ineligible (SHPO 8/27/2021)
*8PO03085	501 Scenic Highway	ca. 1926	Frame Vernacular	Ineligible (SHPO 8/27/2021)
8PO05399	1501 US 27	ca. 1925	Frame Vernacular	Ineligible (SHPO 6/11/1998)
*8PO08599	124 Scenic Highway	ca. 1953	No Style	Ineligible (SHPO 8/27/2021)
8PO08600	908 Scenic Highway	ca. 1950	No Style	Ineligible (SHPO 8/27/2021)
*8PO08601	1203 Scenic Highway	ca. 1925	Frame Vernacular	Ineligible (SHPO 8/27/2021)
Linear Resources				
8PO05391	Peace Creek Drainage Canal	ca. 1915	Linear Resource	Ineligible
Bridges				
*8PO08606	Lucerne Park Road over Lake Hamilton Canal (FDOT No. 160021)	ca. 1964	Bridge (Slab)	Ineligible (SHPO 8/27/2021)

*Indicates previously recorded resources that have not been updated; red text indicates resources that identified as demolished during the field survey.

Table 5.4. Summary of Newly Identified Historic Resources within the APE.

Resource Type	Number of Resources Identified	Number of Resources with FMSF Forms	Number of Resources Recommended National Register Eligible
Structures	92	92	2
Resource Groups/ Linear Resources	7	7	1
Cemeteries	0	0	0
Bridges	1	1	0
Total Number of Resources	100	100	3

Table 5.5. Newly Identified Historic Resources within the APE.

FMSF No.	Address/Site Name	Build Date	Style/Type	NRHP Eligibility Recommendation
Structures				
8PO09999	130 Avenue U NE	ca. 1918	Frame Vernacular	Individually Ineligible; Contributing to 8PO09983
8PO10000	131 Martin Luther King Blvd NE	ca. 1920	Frame Vernacular	Individually Ineligible; Contributing to 8PO09983
8PO10001	105 Martin Luther King Blvd NW	ca. 1960	Commercial	Individually Ineligible; Contributing to 8PO09983
8PO10002	125 Martin Luther King Blvd NW	ca. 1930	Frame Vernacular	Individually Ineligible; Contributing to 8PO09983

FMSF No.	Address/Site Name	Build Date	Style/Type	NRHP Eligibility Recommendation
8PO10003	2106 NE 1st Street	ca. 1935	Frame Vernacular	Individually Ineligible; Contributing to 8PO09983
8PO10004	2114 Lucerne Park Road	ca. 1935	Frame Vernacular	Individually Ineligible; Contributing to 8PO09983
8PO10005	2101 1st Street N	ca. 1958	Industrial Vernacular	Individually Ineligible; Contributing to 8PO09983
8PO10006	2130 Lucerne Park Road	ca. 1963	Masonry Vernacular	Individually Ineligible; Contributing to 8PO09983
8PO10007	2206 Lucerne Park Road (Building 1)	ca. 1952	Masonry Vernacular	Individually Ineligible; Contributing to 8PO09983
8PO10008	2206 Lucerne Park Road (Building 2)	ca. 1952	Masonry Vernacular	Individually Ineligible; Contributing to 8PO09983
8PO10009	2208 Lucerne Park Road	ca. 1947	Masonry Vernacular	Individually Ineligible; Contributing to 8PO09983
8PO10010	2220 Lucerne Park Road	ca. 1952	Masonry Vernacular	Individually Ineligible; Contributing to 8PO09983
8PO10011	2222 Lucerne Park Road	ca. 1952	Masonry Vernacular	Individually Ineligible; Contributing to 8PO09983
8PO10012	2244 Lucerne Park Road	ca. 1952	Masonry Vernacular	Individually Ineligible; Contributing to 8PO09983
8PO10013	2250 Lucerne Park Road/Pentecostal Church of God	ca. 1968	Masonry Vernacular	Individually Ineligible; Contributing to 8PO09983
8PO10014	2137 Lucerne Park Road	ca. 1925	Frame Vernacular	Individually Ineligible; Contributing to 8PO09983
8PO10015	0 Lucerne Park Road	ca. 1953	Masonry Vernacular	Individually Ineligible; Contributing to 8PO09983
8PO10016	101 Avenue V NW	ca. 1930	Frame Vernacular	Individually Ineligible; Contributing to 8PO09983
8PO10017	2255 1st Street N	ca. 1969	Ranch	Individually Ineligible; Contributing to 8PO09983
8PO10018	2207 Lucerne Park Road	ca. 1965	Masonry Vernacular	Individually Ineligible; Contributing to 8PO09983
8PO10019	2219 Lucerne Park Road	ca. 1935	Masonry Vernacular	Individually Ineligible; Contributing to 8PO09983
8PO10020	2221 Lucerne Park Road (Building 1)	ca. 1974	Masonry Vernacular	Individually Ineligible; Contributing to 8PO09983
8PO10021	2221 Lucerne Park Road (Building 2)	ca. 1974	Masonry Vernacular	Individually Ineligible; Contributing to 8PO09983
8PO10022	2245 Lucerne Park Road	ca. 1964	Masonry Vernacular	Individually Ineligible; Contributing to 8PO09983
8PO10023	2247 Lucerne Park Road	ca. 1963	Masonry Vernacular	Individually Ineligible; Contributing to 8PO09983
8PO10024	2209 Lucerne Park Road	ca. 1965	Masonry Vernacular	Individually Ineligible; Contributing to 8PO09983
8PO10025	2211 Lucerne Park Road	ca. 1965	Masonry Vernacular	Individually Ineligible; Contributing to 8PO09983
8PO10026	2213 Lucerne Park Road	ca. 1965	Masonry Vernacular	Individually Ineligible; Contributing to 8PO09983
8PO10027	244 Ware Avenue NE	ca. 1965	Masonry Vernacular	Individually Ineligible; Contributing to 8PO09983
8PO10028	2202 2nd Street NE	ca. 1963	Masonry Vernacular	Ineligible

FMSF No.	Address/Site Name	Build Date	Style/Type	NRHP Eligibility Recommendation
8PO10029	2204 2nd Street NE	ca. 1963	Masonry Vernacular	Ineligible
8PO10030	2206 2nd Street NE	ca. 1964	Masonry Vernacular	Ineligible
8PO10031	2208 2nd Street NE	ca. 1963	Masonry Vernacular	Ineligible
8PO10132	2310 Lucerne Park Road/ St. James Free Will Baptist Church	ca. 1968	Masonry Vernacular	Ineligible
8PO10032	2285 3rd Street NE	ca. 1959	Masonry Vernacular	Ineligible
8PO10033	2400 Lucerne Park Road	ca. 1956	Masonry Vernacular	Ineligible
8PO10034	2402 Lucerne Park Road	ca. 1969	Masonry Vernacular	Ineligible
8PO10035	2410 Lucerne Park Road	ca. 1934	Masonry Vernacular	Ineligible
8PO10036	2413 Cedie Street NE	ca. 1953	Masonry Vernacular	Ineligible
8PO10037	2415 Cedie Street NE	ca. 1963	Masonry Vernacular	Ineligible
8PO10038	317-319 Avenue X NE	ca. 1958	Masonry Vernacular	Ineligible
8PO10039	313 Avenue X NE	ca. 1950	Masonry Vernacular	Ineligible
8PO10133	307 Avenue X NE	ca. 1950	Frame Vernacular	Ineligible
8PO10040	309 Avenue X NE	ca. 1950	Masonry Vernacular	Ineligible
8PO10041	2416 Lucerne Park Road	ca. 1946	Frame Vernacular	Ineligible
8PO10042	2426 Lucerne Park Road	ca. 1968	Masonry Vernacular	Ineligible
8PO10043	2456 Lucerne Park Road	ca. 1968	Frame Vernacular	Ineligible
8PO10044	408 Avenue Y NE	ca. 1977	Masonry Vernacular	Ineligible
8PO10045	402 Avenue Y NE (Building 1)	ca. 1942	Frame Vernacular	Ineligible
8PO10046	402 Avenue Y NE (Building 2)	ca. 1952	Masonry Vernacular	Ineligible
8PO10047	406 Avenue Y NE	ca. 1968	Frame Vernacular	Ineligible
8PO10048	2443 5th Street NE	ca. 1932	Masonry Vernacular	Ineligible
8PO10049	369 Avenue Y NE	ca. 1961	Masonry Vernacular	Ineligible
8PO10050	2507 Bishop James Cochran Way	ca. 1970	No Style	Ineligible
8PO10051	2513 Bishop James Cochran Way	ca. 1970	No Style	Ineligible
8PO10052	2515 Bishop James Cochran Way	ca. 1970	Frame Vernacular	Ineligible
8PO10053	96 Hilltop Drive	ca. 1972	Ranch	Ineligible
8PO10054	100 Hilltop Drive	ca. 1966	Frame Vernacular	Ineligible
8PO10055	2950 Lucerne Park Road	ca. 1959	Masonry Vernacular	Ineligible

FMSF No.	Address/Site Name	Build Date	Style/Type	NRHP Eligibility Recommendation
8PO10057	39 Azalea Drive/Lucerne Lakeside MHP (Clubhouse)	ca. 1964	Masonry Vernacular	Ineligible
8PO10058	74 Hibiscus Drive/Lucerne Lakeside MHP (Mobile Home 1)	ca. 1968	No Style	Ineligible
8PO10059	Ixora Drive/Lucerne Lakeside MHP (Mobile Home 2)	ca. 1971	No Style	Ineligible
8PO10060	119 Ixora Drive/Lucerne Lakeside MHP (Mobile Home 3)	ca. 1971	No Style	Ineligible
8PO10062	3001 Old Lucerne Park Road	ca. 1954	Masonry Vernacular	Ineligible
8PO10063	3005 Old Lucerne Park Road	ca. 1972	Masonry Vernacular	Ineligible
8PO10064	3010 Lucerne Park Road	ca. 1954	Masonry Vernacular	Ineligible
8PO10066	3200 Old Lucerne Park Road	ca. 1895	Frame Vernacular	Ineligible
8PO10067	5825 Old Lucerne Park Road	ca. 1953	Masonry Vernacular	Ineligible
8PO10068	5900 Lucerne Park Road	ca. 1965	Masonry Vernacular	Ineligible
8PO10071	885 Lakeside Ranch Court/Lakeside Ranch (Mobile Home 1)	ca. 1972	No Style	Ineligible
8PO10072	109 Lakeside Ranch Drive/Lakeside Ranch (Mobile Home 2)	ca. 1971	No Style	Ineligible
8PO10073	100 Lakeside Ranch Drive/Lakeside Ranch (Mobile Home 3)	ca. 1972	No Style	Ineligible
8PO10074	104 Lakeside Ranch Drive/Lakeside Ranch (Mobile Home 4)	ca. 1976	No Style	Ineligible
8PO10075	7423 Lucerne Park Road	ca. 1974	Masonry Vernacular	Ineligible
8PO10076	33230 US 27	ca. 1969	Masonry Vernacular	Ineligible
8PO10077	33224 US 27/Stay Plus Inn (Office)	ca. 1973	Masonry Vernacular	Ineligible
8PO10078	33224 US 27/Stay Plus Inn (Pool House)	ca. 1973	Masonry Vernacular	Ineligible
8PO10079	33224 US 27/Stay Plus Inn (Building 1)	ca. 1973	Masonry Vernacular	Ineligible
8PO10080	33224 US 27/Stay Plus Inn (Building 2)	ca. 1973	Masonry Vernacular	Ineligible
8PO10081	33224 US 27/Stay Plus Inn (Building 3)	ca. 1973	Masonry Vernacular	Ineligible
8PO10082	33224 US 27/Stay Plus Inn (Building 4)	ca. 1973	Masonry Vernacular	Ineligible
8PO10083	33224 US 27/Stay Plus Inn (Building 5)	ca. 1973	Masonry Vernacular	Ineligible
8PO10084	1499 US 27 N	ca. 1970	No Style	Ineligible
8PO10085	33231 US 27 (Warehouse)	ca. 1946	Masonry Vernacular	Ineligible

FMSF No.	Address/Site Name	Build Date	Style/Type	NRHP Eligibility Recommendation
8PO10086	33231 US 27 (Residence)	ca. 1952	Frame Vernacular	Ineligible
8PO10088	80 Circle Four Drive	ca. 1948	Frame Vernacular	Ineligible
8PO10089	120 Scenic Drive	ca. 1970	Masonry Vernacular	Ineligible
8PO10090	100 Scenic Highway	ca. 1930	Frame Vernacular	Ineligible
8PO10091	2305 Myrtle Street	ca. 1936	Frame Vernacular	Ineligible
8PO10092	2310 S 9th Street	ca. 1952	Frame Vernacular	Ineligible
8PO10094	801 Scenic Highway S/Alta Vista Elementary School (Building 1)	ca. 1962	International	Individually Ineligible; Contributing to 8PO10093
8PO10095	801 Scenic Highway S/Alta Vista Elementary School (Building 2)	ca. 1962	International	Individually Ineligible; Contributing to 8PO10093
Resource Groups / Linear Resources				
8PO09983	Florence Citrus Growers Association Historic District	n/a	Historic District	Insufficient Information
8PO10056	1 Gardenia Drive NE/Lucerne Lakeside MHP	ca. 1964	Resource Group (Building Complex)	Ineligible
8PO10061	Lucerne Park Road/SR 544	ca. 1917	Linear Resource	Ineligible
8PO10065	4200 Lucerne Park Road/Willow Brook Golf Course	ca. 1967	Designed Historic Landscape	Ineligible
8PO10069	Lake Hamilton Canal	ca. 1964	Linear Resource	Ineligible
8PO10070	271 Lakeside Ranch Circle/Lakeside Ranch MHP	ca. 1970	Resource Group (Building Complex)	Ineligible
8PO10093	801 Scenic Highway S/Alta Vista Elementary School	ca. 1962	Resource Group (Building Complex)	Eligible
Bridges				
8PO10087	SR 544 over Lake Hamilton Creek (FDOT No. 160147)	ca. 1965	Box Culvert	Ineligible

The 108 extant historic resources include: 98 buildings (8PO03077, 8PO03079, 8PO03084, 8PO03085, 8PO08599, 8PO08601, 8PO09999 – 8PO10055, 8PO10057 – 8PO10060, 8PO10062 – 8PO10064, 8PO10066 – 8PO10068, 8PO10071 – 8PO10086, 8PO10088 – 8PO10092, 8PO10094, 8PO10095, 8PO10132, 8PO10133) constructed between ca. 1895 and 1977, three building complex resource groups (8PO10056, 8PO10070, 8PO10093), one historic district (8PO09983), and one designed historic landscape (8PO10065), three linear resources (8PO05391, 8PO10061, 8PO10069), and two bridges (8PO08606 and 8PO10087).

Of the 108 extant historic resources identified within the APE, 102 appear ineligible for listing in the NRHP (8PO03084, 8PO03085, 8PO05391, 8PO08599, 8PO08601, 8PO08606, 8PO09999 - 8PO10092; 8PO10132, 8PO10133), five appear eligible (8PO03077, 8PO03079, 8PO10093, 8PO10094, and 8PO10095), and the newly identified historic district (8PO09983) has insufficient information to make a determination. The ineligible resources include 94 buildings (8PO03084, 8PO03085, 8PO08599, 8PO08601, 8PO09999 – 8PO10055, 8PO10057 – 8PO10060, 8PO10062 – 8PO10064, 8PO10066 – 8PO10068, 8PO10071 – 8PO10086, 8PO10088 – 8PO10092, 8PO10132, 8PO10133) constructed between circa (ca.) 1895 and 1977, two building complex resource groups (8PO10056 and 8PO10070), one designed historic landscape (8PO10065), three linear resources

(8PO05391, 8PO10061, 8PO10069), and two bridges (FDOT Bridge No. 160021/8PO08606 and FDOT Bridge No. 160147/8PO10087). A total of five historic resources within the APE appear eligible for listing in the NRHP. Of these, two buildings (8PO03077 and 8PO03079) were previously recorded but 8PO03077 has not been evaluated by the SHPO and 8PO03079 was found to have insufficient information. The Alta Vista Elementary School (8PO10093) building complex resource group with two contributing resources (8PO10094 and 8PO10095) were newly identified. Furthermore, the Florence Citrus Growers Association Historic District (8PO09983) has insufficient information for evaluating the NRHP eligibility of the historic district.

Below are descriptions and photographs of the five NRHP eligible resources, the historic district, as well as general descriptions and selected examples of the architectural styles and resource types represented within the APE. A new FMSF form was prepared for the 100 newly identified resources and an updated FMSF form was prepared for the three previously recorded resources (**Appendix D**). A letter was prepared to notify the FMSF of the two demolished buildings and is contained in **Appendix E**.

NRHP-Listed, Eligible, or Potentially Eligible Historic Resources

Within the APE, five historic resources appear eligible for listing in the NRHP. These include one Colonial Revival style building (8PO03077), one Craftsman style building (8PO03079), and the newly identified Alta Vista Elementary School (8PO10093) building complex resource group with two contributing resources (8PO10094 and 8PO10095). The Colonial Revival style building located at 2208 Peninsular Drive (8PO03077) and the Craftsman style building located at 128 Scenic Highway (8PO03079) appear individually eligible for listing in the NRHP under Criterion C in the area of Architecture as a minimally altered example of its respective architectural style in Haines City. In addition, 8PO03077 and 8PO03077 appear to be contributing resources to the NRHP-listed *Historic and Architectural Resources of Haines City MPL* under Property Type F.3 – Residential Buildings. The Alta Vista Elementary Resource Group (8PO10093) appears eligible for listing in the NRHP under Criteria A and C in the areas of Education and Architecture as the first air-conditioned school in Polk County. Although the overall design of Alta Vista Elementary is typical of this era, the approval and construction of this campus set the precedent for future construction of air-conditioned schools throughout Polk County from 1962 onward. The resource demonstrates the importance of architectural design and the application of new technology in improving the learning environment – and resulting success – of students.

Photo 5.8. 2208 Peninsular Drive (8PO03077), looking west.

8PO03077: The Colonial Revival style building at 2208 Peninsular Drive was constructed in ca. 1915 (**Photo 5.8**). The 2.5-story, irregular plan building rests on a rusticated concrete pier foundation and has a wood frame structural system clad in weatherboard. The complex roof line comprised of a primary hip roof with hip dormers, hip extensions, and half-hip porches is covered with composition shingles. A brick chimney is located within the slope of the primary hip roof on the west elevation. The main entryway is on the east elevation through a single door with an inset rectangular light and screen door within a wrap-around open porch beneath a half hip roof with squared column supports and balustrade. The segment of the porch that extends to the south elevation has been enclosed. Visible windows include a mixture of individual and paired, one-over-one wood double-hung sash units, and an individual wood picture window comprised of a central fixed pane flanked with one-over-one single-hung-sash units. Distinguishing architectural features include wide, overhanging eaves with boxed rafter tails, corner pilasters, wooden trim around the windows and doors, and wooden foundation lattice. Alterations include replacement roofing and the segment of enclosed porch on the south elevation. A non-historic detached garage is located to the northwest of the building. Overall, the building has minimal material alterations, and the enclosed segment of the wrap-around porch does not significantly detract from the overall design and massing of the residence. As such, 8PO03077 appears individually eligible for listing in the NRHP under Criterion C in the area of Architecture as a minimally altered example of a Colonial Revival style residence in Haines City. In addition, the resource appears to be a contributing resource to the NRHP-listed *Historic and Architectural Resources of Haines City MPL* under Property Type F.3 – Residential Buildings (Shiver 1993; Survey No. 06287).

Photo 5.9. 128 Scenic Highway (8PO03079), looking south.

8PO03079: The Craftsman style building at 128 Scenic Highway was constructed in ca. 1925 (**Photo 5.9**). The two-story, irregular plan building rests on a continuous brick foundation and has a wood frame structural system clad in novelty siding. The clipped gable roofs are covered with composition shingles, as well as the gable roof porte-cochere. A brick chimney is located on the eave end of the west elevation. The main entryway is on the north elevation through a single wooden door with nine inset lights and a screen door within a partial width open porch beneath a clipped gable roof. The porch is supported by squared wooden porch supports on brick piers and lined with brick half walls. Visible windows include a mixture of individual, paired, and grouped (3), one-over-one, three-over-one, six-over-one, and eight-over-one wood double-hung sash units. Distinguishing architectural features include overhanging eaves with exposed rafter tails, wooden brackets, wood trim around the windows and doors, rectangular gable vents, and wood porch supports on brick piers. A gable roof porte-cochere is located on the east elevation of the building with a second story room located above the driveway. Alterations include replacement roofing. A historic detached garage is located to the south of the building but is not visible from the public right-of-way. Overall, the resource has not been significantly altered and appears to retain most of the original materials and character defining features. As such, 8PO03079 appears individually eligible for listing in the NRHP under Criterion C in the area of Architecture as a minimally altered example of a Craftsman style residence in Haines City. In addition, the resource appears to be a contributing resource to the NRHP-listed *Historic and Architectural Resources of Haines City MPL* under Property Type F.3 – Residential Buildings (Shiver 1993; Survey No. 06287).

Photo 5.10. 801 Scenic Highway S/Alta Vista Elementary School (8PO10093; 8PO10094 and 8PO10095), looking northeast.

8PO10093: Alta Vista Elementary School is a building complex resource group located at 801 Scenic Highway S (**Photo 5.10**). Alta Vista Elementary School was one of three air-conditioned elementary schools opened in Polk County in 1962 (Tampa Tribune 1962). Within the boundaries of the resource group, as contained within the APE, there are two contributing resources. These include two International style buildings (8PO10094 & 8PO10095), constructed in ca. 1962. It was beyond the scope of work for this CRAS to identify all resources within the entire resource group, and only permanent structures within the APE visible from the right-of-way were evaluated.

In 1961, the Polk County School Board introduced plans for the county's first climate-controlled school in Mulberry (Dobert 1961). The proposition led to significant controversy amongst the public as it was feared the costs would be high, therefore increasing taxes, and at the time there was little evidence that climate-controlled environments were more conducive to learning. Many believed the school board should wait for more detailed information from "an experimental air-conditioned school" located in Pinellas County (Dobert 1961). Those in favor argued that the costs would not be significant and that criminals are provided air-conditioned jail cells – the children should be afforded the same amenities. The issue of climate-controlled schools was a topic of debate in several surrounding counties in 1961, including Hillsborough County, Sarasota County, and Pinellas County (Tampa Tribune 1961a). A major opponent of the Polk County efforts – the Polk County Property Owners League – referred to the efforts to construct climate-controlled schools as an "unsubstantiated expenditure of our school funds for an experiment which no one has proven will aid our children's education" (Tampa Tribune 1961b). Plans were not limited to one school, however, as a total of three were planned for opening in time for the 1962-1963 school year – Kingsford Elementary in Mulberry, Lake Elbert Elementary in Winter Haven, and Alta Vista Elementary in Haines City (Tampa Tribune 1961b). The approval of these schools set the precedent for future school construction in Polk County, ending the nearly yearlong controversy, with two additional "compact, full air-conditioned" elementary schools approved and planned for construction in 1962 (Orlando Sentinel 1961).

Alta Vista Elementary was the first set to be completed in February 1962 at an approximate cost of $255,000 (Orlando Sentinel 1961). The original design was equipped to handle 360 elementary students with a total of 12 classrooms, office space, and a cafetorium (a combined cafeteria and auditorium space) and could be expanded with an additional 12 classrooms in future without destroying the original design (Orlando Sentinel 1961). To decrease construction costs and improve the efficiency of the air-conditioning, a compact version of the "finger-type" school design was utilized at Alta Vista, as well as Lake Elbert and Kingsford (Tampa Tribune 1961c). This school design was prominent throughout the United States following World War II. In order to accommodate the post-WWII "baby boom" and building boom, school design became more lightweight in construction compared to previous multi-story, grand brick buildings. Similar to the Ranch style houses popular at the time, schools became more spread out in plan with flat roofs, decreased ornamentation, and often used brick or concrete with glass or metal window wall systems often in the International style (ICON Architecture, Inc. 2003; Baker 2012). The popular "finger plan" often had an E-shaped footprint with rows of classrooms (the "fingers") along covered, open air corridors separated by grassy courts (Icon Architecture, Inc. 2003). With this design, classrooms were provided direct access to the school grounds with entrances along covered walkways, as well as maximum circulation of fresh air and natural light (Baker 2012). In addition, the segmented design allowed for the schools to be expanded as needed without significantly altering the design of the campus – an important feature during a time of increasing population growth.

Overall, the Alta Vista Elementary Resource Group (8PO10093) appears eligible for listing in the NRHP under Criteria A and C in the areas of Education and Architecture as the first air-conditioned school in Polk County. Although the overall design of Alta Vista Elementary is typical of this era, the approval and construction of this campus set the precedent for future construction of air-conditioned schools throughout Polk County from 1962 onward. The resource demonstrates the importance of architectural design and the application of new technology in improving the learning environment – and resulting success – of students.

Ineligible Historic Resources

Of the 108 historic resources identified within the APE, 102 appear ineligible for listing in the NRHP (8PO03084, 8PO03085, 8PO05391, 8PO08599, 8PO08601, 8PO08606, 8PO09999 - 8PO10092; 8PO10132, 8PO10133). The ineligible resources include 94 buildings (8PO03084, 8PO03085, 8PO08599, 8PO08601, 8PO09999 – 8PO10055, 8PO10057 – 8PO10060, 8PO10062 – 8PO10064, 8PO10066 – 8PO10068, 8PO10071 – 8PO10086, 8PO10088 – 8PO10092, 8PO10132, 8PO10133), two building complex resource groups (8PO10056 and 8PO10070), one designed historic landscape (8PO10065), three linear resources (8PO05391, 8PO10061, 8PO10069), and two bridges (8PO08606 and 8PO10087). The architectural styles represented are Masonry Vernacular (56), Frame Vernacular (23), No Style (11), Ranch (2), Commercial (1), and Industrial Vernacular (1). In general, the historic resources are associated with the residential development of the unincorporated areas of Winter Haven and Haines City in Polk County between 1895 – 1977. The buildings are common examples of their respective architectural style that have been altered and lack significant historical associations with persons or events. In addition, four (8PO03084, 8PO03085, 8PO08599, 8PO08601) of these were previously recorded and evaluated by the SHPO as ineligible. The two (2) building complexes, both of which are mobile home parks (8PO10056 and 8PO10070), and one designed historic landscape – a golf course (8PO10065) lack significant features and have no known historic associations with significant persons and/or events. The linear resources are of common design and construction that lack unique design features and characteristics. The concrete slab bridge (8PO08606) was previously recorded and evaluated by the SHPO as ineligible for listing in the NRHP. The newly identified concrete box culvert (8PO10087) does not possess any notable engineering features or design elements that would differentiate it from dozens of similar examples built throughout Florida during the same time period. In addition, background research did not reveal any historic associations with significant persons and/or events; therefore, none appear individually eligible for listing in the NRHP.

Photo 5.11. Masonry Vernacular style building (8PO10024) located at 2209 Lucerne Park Road, looking northwest.

Photo 5.12. Masonry Vernacular style building (8PO10068) located at 5900 Lucerne Park Road, looking west.

Masonry Vernacular: A total of 56 historic resources (8PO10006 – 8PO10013, 8PO10015, 8PO10018 – 8PO10040, 8PO10042, 8PO10044, 8PO10046, 8PO10048, 8PO10049, 8PO10055, 8PO10057, 8PO10062 – 8PO10064, 8PO10067, 8PO10068, 8PO10075 – 8PO10083, 8PO10085, 8PO10089) within the APE are of the Masonry Vernacular style (**Photos 5.11 and 5.12; Appendix C**). The majority of these resources are single or multi-family residences; however, commercial properties and churches are also present. These resources have construction dates that range from ca. 1932 to ca.

1977. Masonry Vernacular style buildings reflect the local customs, environment, and building materials, and do not rely on academic architectural vocabulary for their design and ornament. Within the APE, the resources generally have a concrete slab or continuous concrete block foundations and concrete block walls, and the windows are typically a mixture of single-hung sash, awning, picture, or fixed. Roof types commonly consist of gable or hip, most of which are clad with composition shingles. The exterior cladding often consists of painted concrete block, stucco, and artificial masonry or brick veneer. Most display replacement windows and roofs, fenestration changes, and additions. Of these, 19 Masonry Vernacular style buildings (8PO10006 – 8PO10013, 8PO10015, 8PO10018 – 8PO10027), are contributing resources to the Florence Citrus Growers Association Historic District (8PO09983).

Photo 5.13. Frame Vernacular style building (8PO10016) located at 101 Avenue V NW, looking north.

Photo 5.14. Frame Vernacular style building (8PO10066) located at 3200 Old Lucerne Park Road, looking southeast.

Frame Vernacular: A total of 23 historic resources (8PO03084, 8PO03085, 8PO08601, 8PO09999, 8PO10000, 8PO10002 – 8PO10004, 8PO10014, 8PO10016, 8PO10041, 8PO10043, 8PO10045, 8PO10047, 8PO10052, 8PO10054, 8PO10066, 8PO10086, 8PO10088, 8PO10090 – 8PO10092, 8PO10133) within the APE are of the Frame Vernacular style (**Photos 5.13 and 5.14;**

Appendix C) and have construction dates that range from ca. 1895 to 1970. Of these, three (8PO03084, 8PO03085, 8PO08601) were previously recorded during the *Cultural Resource Assessment Survey, Osprey to Haines City Transmission Line, Polk County, Florida* and determined ineligible for listing in the NRHP by the SHPO in 2021 (Alleman et al. 2021; Survey No. 27714). The resources have not been significantly altered since this determination and as such, were not updated during this survey. The majority of the resources represented in this style are single-family residences. Frame Vernacular style buildings are simple structures built with available local materials and boasting little ornamentation (McAlester 2013). They are often built by developers, contractors, master carpenters, or the building's occupants. These buildings are decidedly practical structures. Within the APE, this building type has pier, continuous, or slab foundations. Gable roofs are most common, and the majority of the roofs are clad with composition shingles or sheet metal. The majority of these buildings are clad in wood siding, vinyl, or stucco. Fenestration typically includes single-hung sash windows, but awning and fixed windows are also present. Exterior ornamentation is minimal, and typically consists of wood window and door surrounds, corner boards, gable vents, and overhanging eaves with boxed rafter tails. The majority display alterations or additions, such as replacement siding and windows and living-space additions. Of these, seven Frame Vernacular style buildings (8PO09999, 8PO10000, 8PO10002 – 8PO10004, 8PO10014, 8PO10016), are contributing resources to the Florence Citrus Growers Association Historic District (8PO09983).

Photo 5.15. Mobile home with no style (8PO10060) located at 119 Ixora Drive, looking northeast.

Photo 5.16. Mobile home with no style (8PO10084) located at 1499 US 27 N, looking northeast.

No Style: Eleven (11) historic resources within the APE are buildings with no style (8PO08599, 8PO10050, 8PO10051, 8PO10058, 8PO10059, 8PO10060, 8PO10071 – 8PO10074, 8PO10084) and have construction dates that range from ca. 1968 to ca. 1976 (**Photos 5.15 and 5.16; Appendix C**). Of these, one (8PO08599) was previously recorded during the *Cultural Resource Assessment Survey, Osprey to Haines City Transmission Line, Polk County, Florida* and determined ineligible for listing in the NRHP by the SHPO in 2021 (Alleman et al. 2021; Survey No. 27714). The resource has not been significantly altered since this determination and as such, was not updated during this survey. The newly identified historic resources with no style are mobile homes of the single-wide and double-wide variety, and all display alterations or additions. This building type usually rests on a pier foundation that is covered by metal skirt panels. Metal awning or single-hung sash windows with clamshell hurricane awnings are most common, and exterior ornamentation is minimal. These manufactured buildings have no style and are simply built in a factory with a steel chassis to allow for the ability to be moved.

Photo 5.17. Ranch style building (8PO10017) located at 2255 1st Street N, looking east.

Photo 5.18. Ranch style building (8PO10053) located at 96 Hilltop Drive, looking east.

Ranch: Two historic resources (8PO10017 and 8PO10053) within the APE are of the Ranch style (**Photos 5.17 and 5.18; Appendix C**). These are residential buildings that were constructed in ca. 1969 and ca. 1972, respectively. The style, which gained popularity after World War II, features low-slung buildings and a low-pitched roof with large windows (McAlester 2013). Within the APE, this building type has continuous concrete block foundations. The gable roofs are clad with composition shingles, while the buildings are clad in a mixture of painted concrete block, stucco, brick veneer, and wood siding. Fenestrations include metal awning and single-hung sash windows. Exterior ornamentation is minimal, and consists of wide roof overhangs, shutters, and concrete windowsills. The resources display alterations or additions, such as replacement roofing, siding, and windows, as well as living space additions and enclosed carports. One Ranch style building (8PO10017) is a contributing resource to the Florence Citrus Growers Association Historic District (8PO09983).

Photo 5.19. Industrial Vernacular style building (8PO10005) located at 2101 1st Street N, looking west.

Industrial Vernacular: One Industrial Vernacular style building (8PO10005) is located within the APE (**Photo 5.19; Appendix C**). The building was constructed in ca. 1958 and has a continuous concrete block foundation with a steel skeleton structural system and a gable roof with two shed roof segments. The building exterior, as well as the roof, are clad with metal; however, some patches of vinyl and plywood siding are present. Similar to Masonry Vernacular and Frame Vernacular style buildings, Industrial Vernacular style structures are simply built with available local materials and display little ornamentation. The building is a contributing resource to the Florence Citrus Growers Association Historic District (8PO09983).

Photo 5.20. Commercial style building (8PO10001) located at 105 Martin Luther King Blvd NW, looking north.

Commercial: One Commercial style building (8PO10001) is located within the APE (**Photo 5.20; Appendix C**). The building was constructed in ca. 1960 and consists of a single retail unit beneath a flat roof and crenelated parapet. The entrance is through double metal frame doors with full-view glass panels. The building exterior is clad with stucco scored with a grid pattern and circles. Full-length, fixed pane windows with metal frames line the south elevation, and exterior ornamentation is minimal. The Commercial style building within the APE display's fenestration alterations, as well as new roofing and siding, and the removal of a covered walkway. The building is a contributing resource to the Florence Citrus Growers Association Historic District (8PO09983).

Photo 5.21. SR 544 over Lake Hamilton Creek (FDOT 160147) (8PO10087), looking northwest.

Bridges & Culverts: One bridge (8PO08606) and one culvert (8PO10087) are located within the APE. These include the ca. 1964 Lucerne Park Road over Lake Hamilton Canal (FDOT No. 160021/8PO08608) bridge and the ca. 1965 SR 544 over Lake Hamilton Creek (FDOT No. 160147/8PO10087) culvert. The Lucerne Park Road over Lake Hamilton Canal (FDOT No. 160021/8PO08608) is a concrete slab bridge that was updated during the *Cultural Resource Assessment Survey, Osprey to Haines City Transmission Line, Polk County, Florida* and determined ineligible for listing in the NRHP by the SHPO in 2021 (Alleman et al. 2021; Survey No. 27714). The resource has not been significantly altered since this determination and as such, was not updated during this survey.

The SR 544 over Lake Hamilton Creek (FDOT No. 160147/8PO10087) is a concrete box culvert constructed in ca. 1965 in order to carry SR 544 over Lake Hamilton Creek, also known as the Lake Tracey Canal (**Photo 5.21**). The overall dimension of the culvert measures approximately 10-ft long and 62-ft wide with a roadway width of approximately 32-ft. The structure consists of two squared concrete barrels with straight concrete wing walls. Metal guardrails are located along the north and south edge of the roadway. The culvert is a typical example of a common Post-1945 concrete culvert found throughout Florida. This type of culvert was constructed as part of the massive expansion of the State's road system in the decades following the end of World War II (Parsons Brinckerhoff 2005). The culvert within the APE does not possess any notable engineering features or design elements that would differentiate it from dozens of similar examples built throughout Florida during the same time period. Furthermore, the culvert falls under the ordnance with the Advisory Council on Historic Preservation (ACHP) Program Comment for Streamlining Section 106 Review for Actions Affecting Post-1945 Concrete and Steel Bridges/culverts issued in November 2012, and is excluded from individual Section 106 consideration by the Program Comment for Common Post-1945 Concrete and Steel Bridges (Federal Register 2012:68793). Background research did not reveal any historic associations with significant persons and/or events. Thus, due to the commonality of design and lack of significant attributes or association, 8PO10087 does not appear eligible for listing in the NRHP, either individually or as part of a historic district.

Resource Groups: There are three (3) resource groups within the APE (8PO10056, 8PO10065, 8PO10070) (**Table 5.6; Appendix C**). These include two (2) building complexes, both of which are mobile home parks (8PO10056 and 8PO10070), and one designed historic landscape – a golf course (8PO10065). Only the portions of the resource groups that are located within the APE were recorded, as a survey of the entire resource groups is beyond the scope of work for this project. No contributing resources for the Willow Brook Golf Course (8PO10065) are located within the APE. The historic buildings that contribute to the mobile home parks are mostly mobile homes or associated facilities such as offices or community centers. All contributing buildings listed below are typical examples of their respective styles and construction.

Table 5.6. Historic Resource Groups within APE.

FMSF No.	Address/ Name	No. Contrib. Buildings	Build Dates	Style(s)
8PO10056	1 Gardenia Drive NE/Lucerne Lakeside MHP	4 (8PO10057, 8PO10058, 8PO10059, 8PO10060)	ca. 1964 to ca. 1971	Masonry Vernacular (8PO10057); Mobile Home/No Style (8PO10058, 8PO10059, 8PO10060)
8PO10065	4200 Lucerne Park Road/Willow Brook Golf Course	None within the APE	ca. 1967	N/A
8PO10070	271 Lakeside Ranch Circle/Lakeside Ranch MHP	4 (8PO10071 – 8PO10074)	ca. 1971 to ca. 1976	Mobile Home/No Style (8PO10071 – 8PO10074)

Linear Resources: There are three (3) linear resources within the APE (8PO05391, 8PO10061, 8PO10069) (**Table 5.7; Appendix C**). The Peace Creek Drainage Canal (8PO05391) and Lake Hamilton Canal (8PO10069) are common examples of canals found throughout Polk County and the State of Florida, lack unique design and/or engineering features, and background research did not reveal any historic associations with significant persons and/or events. Similarly, the surveyed segment of Lucerne Park Road/SR 544 (8PO10061) is a common two-lane roadway found throughout Polk County, without historic paving or markers. It lacks specific design features or characteristics that would differentiate it from other similar roads and was realigned during the 1960s. Its setting within the APE has been greatly altered with the construction of residential subdivisions and the introduction of modern traffic signage along the road. As a result, the linear resources (8PO05391, 8PO10061, 8PO10069) within the APE do not appear eligible for listing in the NRHP, individually or as part of a district.

Table 5.7. Linear Resources within the APE.

FMSF No.	Name / Address	Build Date	Type
8PO05391	Peace Creek Drainage Canal	ca. 1915	Canal
8PO10061	Lucerne Park Road/SR 544	ca. 1917	Road
8PO10069	Lake Hamilton Canal	ca. 1964	Canal

Insufficient Information

8PO09983: The Florence Citrus Growers Association Historic District is located in Sections 16 and 17 of Township 28 South, Range 26 East in the Florence Villa community of Winter Haven, Florida (USGS 1959). The proposed boundary for the Florence Citrus Growers Association Historic District was loosely set in order to determine where the project improvements entered and left the historic district within the project APE. The proposed boundary for the district is bounded by Martin Luther King Boulevard to the south, Ware Avenue NE to the north, 2nd Street NE to the east, and the former Atlantic Coast Line (ACL) Railroad to the west (**Figure 5.11**). Within the APE, the historic district spans approximately 200 ft from either side of SR 544 (Lucerne Park Road) from Martin Luther King Boulevard in the south to 2nd Street NE to the north. Within the proposed boundaries, as contained within the APE for the corridor and ponds, there are 29 contributing resources (8PO09999 through 8PO10027). These include 19 Masonry Vernacular style buildings (8PO10006 – 8PO10013, 8PO10015, 8PO10018 – 8PO10027), seven Frame Vernacular style buildings (8PO09999, 8PO10000, 8PO10002 – 8PO10004, 8PO10014, 8PO10016), one Commercial style building (8PO10001), one Industrial Vernacular style building (8PO10005), and one Ranch style building (8PO10017), constructed between circa (ca.) 1918 – 1974. Six non-contributing resources are located within the historic district, as contained within the APE, and were not recorded as they are considered non-historic (constructed after 1977) for the purposes of this Cultural Resource Assessment Survey (CRAS).

The community of Florence Villa, originally called "Wahneta," was settled in 1884. The community was settled by Frederick W. Inman and his wife, Florence Jewett Inman, and was renamed in honor of Mrs. Inman in 1904 (Johnston 1997). Inman experimented with the agricultural potential of the area, including a citrus grove on 100 acres of his large property. Inman and his wife constructed a large residence on Spring Lake which they eventually developed into the Florence Villa Hotel, welcoming guests such as Henry B. Plant (Johnston 1997). The community of Florence Villa, which thrived in its early years due to the citrus and hospitality businesses of the Inmans, was incorporated in 1917 and in 1923 merged with the city of Winter Haven (Gernert Jr. 2014).

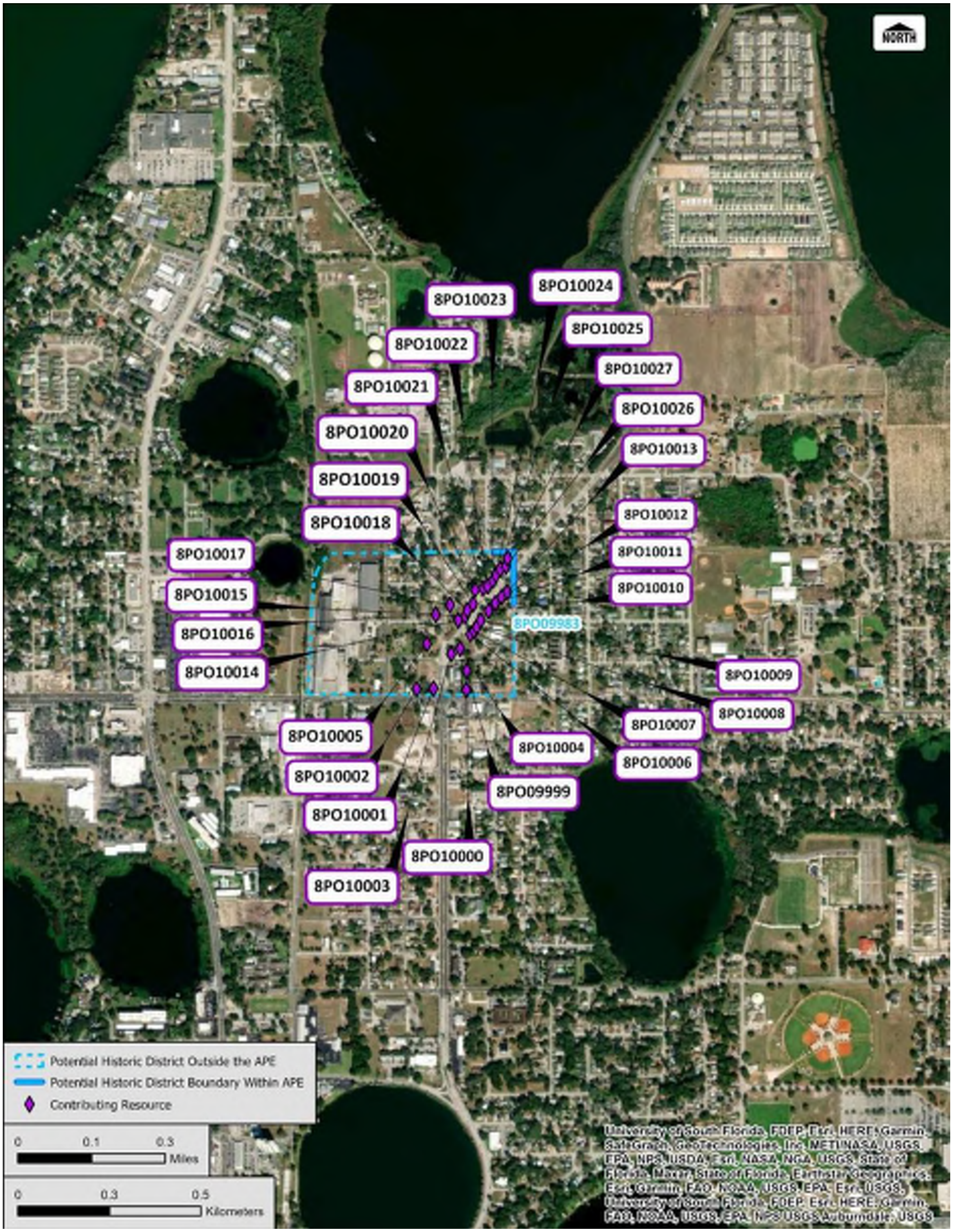

Figure 5.11. Approximate location of the shovel tests within the APE.

Frederick Inman became a pioneer of the citrus industry, which was prominent in the economy of the Winter Haven area. Inman was a leader in the establishment of the Florida Citrus Exchange in 1909, serving on the statewide organizational committee and as the Florida Citrus Exchange's first president. During the same year, Inman also established the Florence Citrus Growers Association, which was located at 303 Avenue T NW, adjacent to the ACL Railroad. The original wood frame packing house was replaced by a large masonry building – one of the largest buildings constructed in Winter Haven during the Great Depression – which remains extant (8PO05737). The facility was expanded in 1949 and 1953 by the addition of a concentrate factory and a cold storage facility, respectively. The overall facility, which included a frozen orange juice plant, fresh fruit packing house, warehouse, and icehouse, was sold to General Foods-Birdseye Corporation in 1959 (Johnston 1997). In 1920, the Florence Citrus Growers Association was platted to the north and east of the packinghouse (Polk County 1920). The subdivision is believed to have been platted as a neighborhood for packing house workers; however, this could not be confirmed (Burr 1974).

It was beyond the scope of this CRAS to record the entire Florence Citrus Growers Association Historic District (8PO09983) and only historic resources within the current APE were evaluated. Further in-depth research is needed to determine whether the subdivision was developed for the employees of the Florence Citrus Growers Association and identify a period of significance. For the purposes of this survey, all resources recorded within the APE are considered contributing resources; however, this may be refined following the establishment of a period of significance for the proposed district. Limited information regarding the Florence Citrus Growers Association subdivision was found during historic background research, as such, there is insufficient information for evaluating the NRHP eligibility of the historic district.

5.3 Conclusions

The FDOT, District One, is proposing roadway improvements to SR 544 (Lucerne Park Road) from Martin Luther King Boulevard to SR 17 in Winter Haven, Polk County, Florida, a length of 7.96 miles. The proposed improvements include widening from two to four lanes, paved shoulders/marked bicycle lanes, sidewalks, and pond/swales/FPC sites (hereinafter referred to as pond sites). Also along SR 544, five roundabouts are proposed throughout the project limits at the intersections of Avenue Y NE, Vista Del Lago Drive, Lucerne Loop Road NE, Old Lucerne Park Road, and Benton Manor Avenue. Furthermore, additional ROW will be required in some areas for the roadway widening and roundabouts. In addition, a single point urban interchange will be constructed at the US 27 intersection. The project was evaluated through FDOT’s Efficient Transportation Decision Making (ETDM) process as project No. 5873. This is a federally funded project.

The results of background research and archaeological field survey, including a visual reconnaissance and excavation of 84 shovel tests placed in the pond sites and 134 shovel tests within the project corridor. As a result, no archaeological sites were identified and no evidence of the two previously identified sites located within the APE was found: 8PO04797 (Homer’s Grove Site) or 8PO05426 (Whittaker Site). Homer’s Grove Site (8PO04797) appears potentially destroyed by disturbance from the distribution center and driveway development; therefore, is considered ineligible for listing in the NRHP given the lack of recovered evidence of the site. The Whittaker Site (8PO05426) was determined not eligible for listing in the NRHP by the SHPO in 1998 and ACI concurs with this evaluation. In addition, the Lake Tracey Canal (8PO05407) is within a portion of the APE, but no testing was deemed necessary given that it is a canal and the SHPO determined it not eligible for listing in the NRHP. One AO was found; AO’s are not sites and are not considered eligible for listing in the NRHP. As such, no archaeological sites that are listed, determined eligible for listing, or that appear potentially eligible for listing in the NRHP were located within the archaeological APE.

Historical/Architectural field survey resulted in the identification of 108 historic resources within the APE. This includes 100 newly identified historic resources (8PO09983, 8PO09999 –

8PO10095, 8PO10132, 8PO10133), seven (7) extant previously recorded historic resources (8PO03077, 8PO03079, 8PO03084, 8PO03085, 8PO08599, 8PO08601, and 8PO08606), and an unrecorded segment of the Peace Creek Drainage Canal (8PO05391). Of the seven (7) extant previously recorded historic resources located within the APE, two (8PO03077 and 8PO03079) were updated and re-evaluated and five (8PO03084, 8PO03085, 8PO08599, 8PO08601, and 8PO08606) were not updated because they were previously evaluated by the SHPO as ineligible for listing in the NRHP and no changes were observed during the field survey. Of these, 104 historic resources are within the mainline corridor APE and three historic resources (8PO05391, 8PO10054, and 8PO10075) are located within the pond site APE. These three resources include the Peace Creek Drainage Canal (8PO05391) located within Pond 5, a ca. 1966 Frame Vernacular style building (8PO10054) located immediately adjacent to Pond 5, and ca. 1974 Masonry Vernacular style building (8PO10075) located immediately adjacent to Pond 6. Furthermore, the field survey revealed that two previously recorded historic resources (8PO05399 and 8PO08600) are no longer extant.

Of the 108 extant historic resources identified within the APE, 102 appear ineligible for individual listing in the NRHP. This total includes 94 buildings constructed between circa (ca.) 1895 and 1977 (8PO03084, 8PO03085, 8PO08599, 8PO08601, 8PO09999 – 8PO10055, 8PO10057 – 8PO10060, 8PO10062 – 8PO10064, 8PO10066 – 8PO10068, 8PO10071 – 8PO10086, 8PO10088 – 8PO10092, 8PO10132, 8PO10133), two building complex resource groups (8PO10056 and 8PO10070), one designed historic landscape (8PO10065), three linear resources (8PO05391, 8PO10061, 8PO10069), and two bridges (FDOT Bridge No. 160021/8PO08606 and FDOT Bridge No. 160147/8PO10087). The buildings are common examples of their respective architectural style that have been altered and lack significant historical associations with persons or events. In addition, four (8PO03084, 8PO03085, 8PO08599, 8PO08601) of these were previously recorded and evaluated by the SHPO as ineligible. The two (2) building complexes, both of which are mobile home parks (8PO10056 and 8PO10070), and one designed historic landscape – a golf course (8PO10065) lack significant features and have no known historic associations with significant persons and/or events. The linear resources are of common design and construction that lack unique design features and characteristics. The concrete slab bridge (8PO08606) was previously recorded and evaluated by the SHPO as ineligible for listing in the NRHP. The newly identified concrete box culvert (8PO10087) does not possess any notable engineering features or design elements that would differentiate it from dozens of similar examples built throughout Florida during the same time period. In addition, background research did not reveal any historic associations with significant persons and/or events; therefore, none appear individually eligible for listing in the NRHP.

Five historic resources within the APE appear eligible for listing in the NRHP. These include one Colonial Revival style building (8PO03077), one Craftsman style building (8PO03079), and the newly identified Alta Vista Elementary School (8PO10093) building complex resource group with two contributing resources (8PO10094 and 8PO10095). The Colonial Revival style building located at 2208 Peninsular Drive (8PO03077) and the Craftsman style building located at 128 Scenic Highway (8PO03079) appear individually eligible for listing in the NRHP under Criterion C in the area of Architecture as a minimally altered example of its respective architectural style in Haines City. In addition, 8PO03077 and 8PO03077 appear to be contributing resources to the NRHP-listed *Historic and Architectural Resources of Haines City MPL* under Property Type F.3 – Residential Buildings. The Alta Vista Elementary Resource Group (8PO10093) appears eligible for listing in the NRHP under Criteria A and C in the areas of Education and Architecture as the first air-conditioned school in Polk County. Although the overall design of Alta Vista Elementary is typical of this era, the approval and construction of this campus set the precedent for future construction of air-conditioned schools throughout Polk County from 1962 onward. The resource demonstrates the importance of architectural design and the application of new technology in improving the learning environment – and resulting success – of students.

In addition, the Florence Citrus Growers Association Historic District (8PO09983) is located within the APE. The historic district spans approximately 200-ft from either side of SR 544 (Lucerne Park Road) from Martin Luther King Boulevard in the south to 2nd Street NE to the north. This portion of the historic district is comprised of 29 contributing resources (8PO09999 through 8PO10027) that were constructed between ca. 1918 – 1974. Six non-contributing resources, as contained within the APE, are located within the historic district, and were not recorded as they are considered non-historic (constructed after 1977) for the purposes of this CRAS. It was beyond the scope of this CRAS to record the entire Florence Citrus Growers Association Historic District (8PO09983) and only historic resources within the current APE were evaluated. Further in-depth research is needed to determine whether the subdivision was developed for the employees of the Florence Citrus Growers Association and identify a period of significance. For the purposes of this survey, all resources recorded within the APE are considered contributing resources; however, this may be refined following the establishment of a period of significance for the proposed district. Limited information regarding the Florence Citrus Growers Association subdivision was found during historic background research, as such, there is insufficient information for evaluating the NRHP eligibility of the historic district.

The proposed work being conducted within the APE includes ROW acquisition for the road widening and construction of a sidewalk, as well as the installation of traffic separators. The proposed new ROW will be approximately 20-ft from the two residential buildings (8PO03077 and 8PO03079) and approximately 140-ft from the school (8PO10093). These resources are located between Myrtle Avenue and S 10th Street where the road widening will occur to the south of SR 544. Of the five potentially eligible resources, the Craftsman style building located at 128 Scenic Highway (8PO03079) is on the south side of SR 544 and the remaining properties are on the north side. In addition, to these improvements, work within the proposed district includes one pond site (Pond 1A) along 1st Street N between Avenue U NW and Avenue V NW. Furthermore, ROW widening will impact two contributing resources (8PO10001 and 8PO10003); however, both of these resources appear individually ineligible for listing in the NRHP. Based on these results, further coordination may be required.

APPENDIX H

Natural Resources Evaluation Report

NATURAL RESOURCES EVALUATION

Florida Department of Transportation

District One

State Road 544 (Lucerne Park Road) Project Development and Environment Study

From Martin Luther King Boulevard to State Road 17

Polk County, Florida

Financial Management Number: 440273-1-22-01

ETDM Number: 5873

Date: July 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.

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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 State Road (SR) 544 (Lucerne Park Road) from Martin Luther King Boulevard (Avenue T) to SR 17 in Polk County, a length of approximately 7.96 miles. This project involves the widening of SR 544 from two lanes to four lanes to meet future travel demands, improving safety and providing for bicycle and pedestrian features, such as a shared use path.

This Natural Resources Evaluation (NRE) has been prepared as part of the PD&E Study to assess the widening alternatives and identify potential impacts to natural resources throughout the SR 544 corridor. The purpose of this NRE is to document protected species and habitat and identify the location of wetlands and surface waters within the project corridor in order to determine potential impacts to these resources, provide rationale to support species effect determinations, identify avoidance and minimization measures, and quantify mitigation necessary for the recommended preferred alternative. This NRE has been prepared in accordance with the *Wetlands and Other Surface Waters* and *Protected Species and Habitat* chapters of the FDOT's *PD&E Manual* (FDOT 2020) and the current Natural Resources Evaluation Outline and Guidance (FDOT 2022).

The Preferred Alternative is located within the US Fish and Wildlife Service (USFWS) Consultation Area (CA) of the Audubon's crested caracara (*Polyborus plancus audubonii*), Everglade snail kite (*Rostrhamus sociabilis plumbeus*), Florida bonneted bat (*Eumops floridanus*), Florida grasshopper sparrow (*Ammodramus savannarum floridanus*), Florida scrub-jay (*Aphelocoma coerulescens*), sand skink (*Neoseps reynoldsi)* and blue-tailed mole skink (*Eumeces egregious lividus*), and Lake Wales Ridge plants. The Preferred Alternative falls within the Core Foraging Area (CFA) for five wood stork (*Mycertia americana*) colonies. The existing habitats in the study area may also support other federally protected species, as well as many state protected species. Effect determinations were based on the results of general wildlife and species-specific surveys, data collection, and USFWS' effect determination keys. **Table ES-1** identifies protected species evaluated in this document, their regulatory status, and the effect determination under the Preferred Alternative.

Table ES-1: Effect Determinations for Protected Species

Scientific Name	Common Name	Status	Effect Determination
Birds			
Ammodramus savannarum floridanus	Florida Grasshopper Sparrow	FE	NO EFFECT
Aphelocoma coerulescens	Florida Scrub-jay	FT	NO EFFECT
Athene cunicularia floridana	Burrowing Owl	ST	NAEA
Egretta caerulea	Little Blue Heron	ST	NAEA
Egretta tricolor	Tricolored Heron	ST	NAEA
Falco sparverius paulus	Southeastern American Kestrel	ST	NAEA
Grus canadensis pratensis	Florida Sandhill Crane	ST	NAEA
Haliaeetus leucocephalus	Bald Eagle	BGEPA/MGTA	--
Laterallus jamaicensis jamaicensis	Eastern Black Rail	FT	MANLAA
Mycteria americana	Wood Stork	FT	MANLAA
Platalea ajaja	Roseate Spoonbill	ST	NAEA
Polyborus plancus audubonii	Audubon's Crested Caracara	FT	MANLAA
Rostrhamus sociabilis plumbeus	Everglade Snail Kite	FE	MANLAA
Mammals			
Eumops floridanus	Florida Bonneted Bat	FE	NO EFFECT
Perimyotis subflavus	Tricolored Bat	C	--
Sciurus niger niger	Southern Fox Squirrel	M	--
Ursus americanus floridanus	Florida Black Bear	M	--
Reptiles			
Drymarchon corais couperi	Eastern Indigo Snake	FT	MANLAA
Eumeces egregious lividus	Blue-tailed Mole Skink	FT	MANLAA
Gopherus polyphemus	Gopher Tortoise	ST	NAEA
Pituophis melanoleucus mugitis	Florida Pine Snake	ST	NAEA
Neoseps reynoldsi	Sand Skink	FT	MALAA
Plants			
Bonamia grandiflora	Florida Bonamia	FT/SE	MANLAA
Calamintha ashei	Ashe's Savory	ST	NAEA
Calopogon mutliflorus	Many-flowered Grass-pink	ST	NAEA
Carex chapmanni	Chapman’s sedge	ST	NAEA
Centosema Arenicola	Sand Butterfly Pea	SE	NAEA
Chionanthus pygmaeus	Pygmy Fringe-tree	FE	MANLAA
Clitoria fragrans	Pigeon Wings	FT/SE	MANLAA
Coelorachis tuberculosa	Piedmont Jointgrass	ST	NAEA
Coleataenia abscissa	Cutthroatgrass	SE	NAEA
Conradia brevifolia	Short-leaved Rosemary	FE	MANLAA
Crotalaria avonensis	Avon Park Harebells	FE	MANLAA
Dicerandra frutescens	Scrub Mint	FE	MANLAA
Eriogonum longifolium	Scrub Buckwheat	FT/SE	MANLAA

Scientific Name	Common Name	Status	Effect Determination
Plants (continued)			
Hartwrightia floridana	Hartwrightia	ST	NAEA
Hypericum cumulicola	Highlands Scrub Hypericum	FE	MANLAA
Illicium parviflorum	Star Anise	SE	NAEA
Lechea cernua	Nodding Pinweed	ST	NAEA
Liatris ohlingerae	Florida Blazing Star	FE	MANLAA
Lupinus aridorum	Scrub Lupine	FE	MANLAA
Matelea floridana	Florida Spiny-pod	SE	NAEA
Nemasylis floridana	Celestial Lily	SE	NAEA
Nolina atopocarpa	Florida Beargrass	ST	NAEA
Nolina brittoniana	Britton's Beargrass	FE	MANLAA
Paronychia chartacea	Papery Witlow-wort	FT/SE	MANLAA
Polygala lewtonii	Lewton's Polygala	FE	MANLAA
Polygonella basiramia	Wireweed (Florida Jointweed)	FE	MANLAA
Polygonella myriophylla	Sandlace (Small's Jointweed)	FE	MANLAA
Prunus geniculate	Scrub Plum	FE	MANLAA
Pteroglossaspis ecristata	Giant Orchid	ST	NAEA
Salix floridana	Florida Willow	SE	NAEA
Warea amplexifolia	Clasping Warea	FE	MANLAA
Warea carteri	Carter's Mustard (Cater's Warea)	FE	MANLAA
Ziziphus celata	Florida Ziziphus	FE	MANLAA
MANLAA = May Affect, Not Likely to Adversely Affect **MALAA** = May Affect, Likely to Adversely Affect **NAEA** = No Adverse Effect Anticipated **NEA** = No Effect Anticipated **FE** = Federally Endangered **FT** = Federally Threatened **SE** = State Endangered **ST** = State Threatened **M** = Managed **C** = Candidate **BGEPA** = Bald and Golden Eagle Protection Act **MGTA** = Migratory Bird Treaty Act			

Wetlands and other surface waters with potential to be affected by the proposed project were identified within the study area. A wetland assessment was performed for wetlands and other surface waters in accordance with the Uniform Mitigation Assessment Method (UMAM), pursuant to Chapter 62-345, Florida Administrative Code (F.A.C.), to determine the functional value provided by the wetlands and other surface waters and determine the amount of mitigation required to offset adverse impacts. Other surface waters classified as upland cut ditches and permitted reservoirs were not included in the assessment as mitigation will not be required for impacts to these surface waters. Direct impacts to jurisdictional wetlands associated with the Preferred Alternative and preferred pond/floodplain compensation sites are approximately 12.52 acres. Secondary impacts to adjacent wetlands are approximately 10.62 acres. The total project impacts result in a functional loss of 9.726 units for state and federal jurisdictional wetlands. Mitigation for unavoidable wetland impacts will be provided to satisfy all mitigation requirements of Part IV, Chapter 373 Florida Statutes (F.S.), and United States Code (U.S.C.) 1344.

In accordance with the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), Section 7 of the Endangered Species Act (ESA), and the FDOT's PD&E Manual, the proposed project was evaluated for potential Essential Fish Habitat (EFH). No EFH is located within or adjacent to the project area. Therefore, an EFH Assessment is not required.

The proposed project was evaluated for the occurrence of Critical Habitat as defined by the ESA of 1973, as amended and 50 CFR Part 424. This analysis is consistent with the Protected Species and Habitat chapter of the PD&E Manual. No Critical Habitat occurs within the project corridor; therefore, no impacts to Critical Habitat are anticipated as a result of the proposed project.

1.5 Proposed Drainage

The stormwater runoff from the project limits will be collected and conveyed via curb and gutter to the proposed offsite detention ponds. The ponds will discharge at or near the same cross drains that carry the roadway runoff in the existing condition, or directly into canals or wetlands where appropriate. Potential ponds have been sized and located along the project limits for this PD&E study. The analysis estimates right-of-way needs using a volumetric analysis, which accounts for water quality treatment and water quantity for runoff attenuation. Please note that the estimated right-of-way areas for the ponds were based on pond sizes determined from preliminary data calculations, reasonable engineering judgment, and assumptions. Pond sizes and configurations may change during final design as more detailed information on Seasonal High-Water Table (SHWT), wetland normal pool elevation, final roadway profile design, etc. become available.

There are currently twelve (12) proposed drainage basins within the project limits. One (1) pond site alternative has been identified and analyzed for each basin.

The onsite roadway basin areas draining to the ponds were determined to be the areas within the proposed right-of-way limits. The limits of the proposed basins begin and end at the same locations as the existing condition, except for Basin 1 which was split into two smaller basins, Basin 1A and Basin 1. Additionally, another basin (Basin 8A) was added to provide a pond alternative for the quadrant roadway intersection concept that is under consideration at US 27. Attenuation in the proposed ponds is provided in all basins.

Six (6) Floodplain Impact Areas (FIAs) have been identified within the project limits. Each FIA consists of a floodplain or multiple floodplain areas that are hydraulically connected. One (1) Floodplain Compensation Site (FPC) has been identified for each FIA, except for the FIA located just west of the US 27 intersection. All the proposed FPCs are offsite scraped down areas adjacent to or hydraulically connected to the 100-year floodplain. Compensation is provided between the SHWT of the pond and the lowest of either the pond top of bank or the 100-year floodplain elevation. Most of the floodplains within the project limits are Zone AE floodplains with Base Flood Elevations (BFEs) ranging from 124.20 FT to 131.10 FT NAVD across the project limits and are associated with various lakes. A few areas of Zone A floodplains are present, mainly associated with roadside ditches or existing detention ponds. Elevations for these floodplain areas have been estimated from LIDAR data or adjacent Zone AE BFEs.

Detailed information about the proposed drainage is provided in the Pond Siting Report.

The preferred pond alternatives are shown on **Table 1-1**.

Table 1-1: Preferred Pond Alternatives

Pond Site	Pond Size (ac)
Pond 1A	0.12
Pond 1	2.83
Pond 2	3.83
Pond 3	2.73
Pond 4	2.32
Pond 5	2.22
Pond 6	1.69
Swale 7	0.70
Pond 8	2.75
Swale 8A	0.57
Pond 9	1.25
Pond 10	1.32

1.6 Existing Conditions

Prior to field surveys, staff ecologists reviewed the most currently available information to determine location and extent of habitats and land uses within the vicinity of the project area and whether protected species occur or have the potential to occur in these habitats and land uses. This information included land use maps provided by the Southwest Florida Water Management District (SWFWMD). The land use descriptions were based on the Florida Land Use, Cover and Forms Classification System (FLUCFCS) (FDOT 1999). Other information included but was not limited to:

- U.S. Geographic Survey (USGS) Topographic Maps (https://viewer.nationalmap.gov/launch/)
- Natural Resources Conservation Service (NRCS) Soil Maps (https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm)
- Florida Natural Areas Inventory (FNAI) Cooperative Land Cover Maps
- (http://www.fnai.org/landcover.cfm)
- FNAI Biodiversity Matrix Map Server (https://www.fnai.org/biodiversity-matrix-intro)
- U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) Maps (https://www.fws.gov/wetlands/data/mapper.html)
- USFWS CA and Critical Habitats Maps (https://crithab.fws.gov/)
- USFWS Wood Stork Nesting Colonies and CFA Maps
- National Marine Fisheries Service (NMFS) Essential Fish Habitat (EFH) Maps

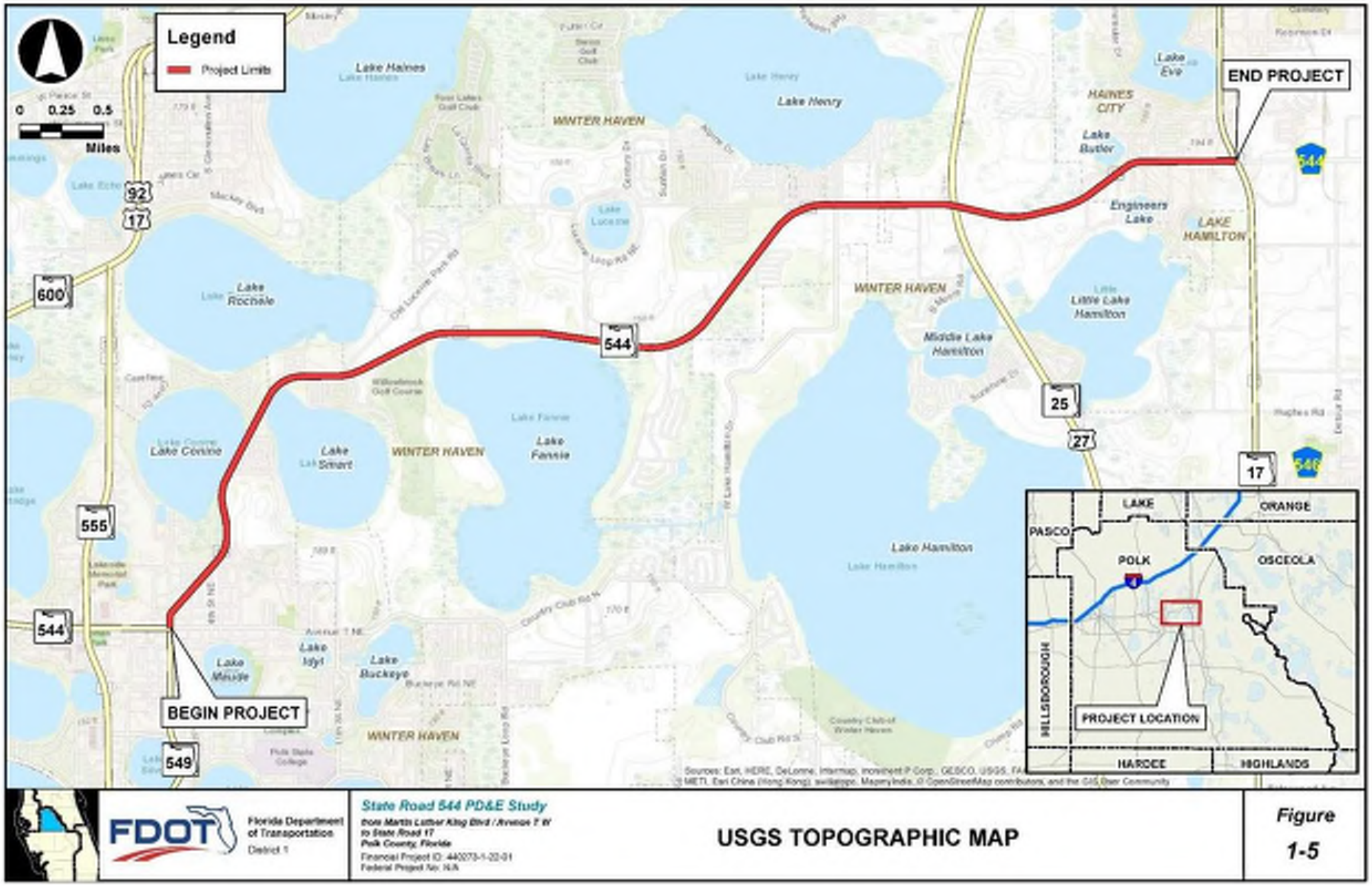
(https://www.habitat.noaa.gov/protection/efh/habitatmapper.html)

- Florida Fish and Wildlife Conservation Commission (FWC) Scrub-Jay Observation Maps (http://myfwc.com/research/gis/)
- FWC Bald Eagle Nesting Territory Maps (https://publictemp.myfwc.com/FWRI/EagleNests/nestlocator.aspx)
- Audubon Florida EagleWatch Nest Website (https://cbop.audubon.org/conservation/about-eaglewatch-program)
- FWC Red-Cockaded Woodpecker Observation Maps (http://geodata.myfwc.com/datasets/red-cockaded-woodpecker-observation-locations)
- FWC Wildlife Occurrence Maps (http://geodata.myfwc.com/datasets)
- FWC Species Action Plans (http://myfwc.com/wildlifehabitats/imperiled/species-action-plans/)
- FDOT Efficient Transportation Decision Making (ETDM) Summary Report #5873 (https://etdmpub.fla-etat.org/est/#)
- University of Florida GeoPlan Center Highest Priority eBird Data in Florida (eBird)

1.6.1 Topography

The SR 544 study area lies within the Northern Lake Wales Ridge region of Florida (Griffith et al. 1997). According to the USGS, elevations within the SR 544 Study Area vary from approximately 125 feet above sea level to approximately 175 feet above sea level (**Figure 1-5**). These elevations fluctuate throughout the corridor.

Figure 1-5: USGS TOPOGRAPHIC MAP



1.6.2 Vegetative Communities and Land Use

The land uses within the SR 544 Study Area were first characterized by SWFWMD online resources and later modified or delineated by ecologists to reflect field observations made at the time of the study. The SR 544 Study Area contains a mixture of several FLUCFCS types including urban and built-up, agriculture, rangeland, upland forests, water, wetland, barren land, and transportation or other linear utilities (**Figure 1-6**). A detailed list of the land uses within the study area is provided in **Table 1-2** along with additional descriptions of the land uses in **Appendix A**. Photographs of representative habitats in the study area are provided in **Appendix B**.

Table 1-2: FLUCFCS within the SR 544 Study Area

FLUCFCS Code	FLUCFCS Description	Area (ac.)
110	Residential Low Density	150
119	Low Density Under Construction	78
120	Residential Medium Density	447
130	Residential High Density	255
140	Commercial and Services	109
150	Industrial	289
170	Institutional	126
180	Recreational	3
182	Golf Courses	53
190	Open Land	169
210	Cropland and Pastureland	511
220	Tree Crops	149
260	Other Open Lands (Rural)	95
320	Shrub and Brushland	32
411	Pine Flatwoods	15
434	Hardwood Conifer Mixed	96
438	Mixed Hardwoods	18
440	Tree Plantations	84
510	Streams and Waterways	8
520	Lakes	645
530	Reservoirs	12
615	Streams and Lake Swamps (Bottomland)	77
618	Willow and Elderberry	2
620	Wetland Coniferous Forests	10
630	Wetland Forested Mixed	180
641	Freshwater Marshes	168

FLUCFCS Code	FLUCFCS Description	Area (ac.)
643	Wet Prairies	110
644	Emergent Aquatic Vegetation	84
653	Intermittent Ponds	14
740	Disturbed Land	26
810	Transportation	103
814	Roads and Highways	14
830	Utilities	23

Figure 1-6: FLUCFCS Map

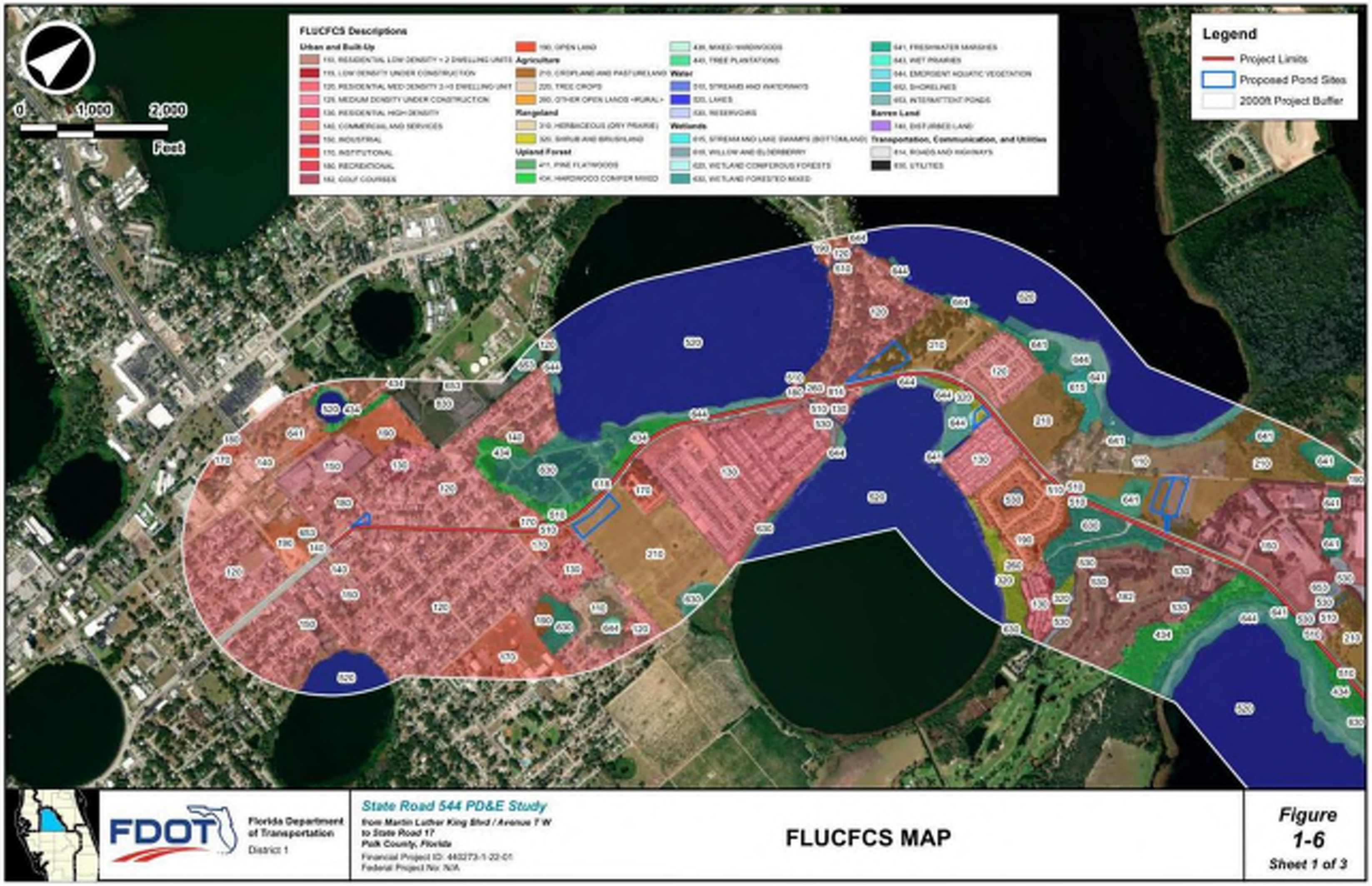


Figure 1-6: FLUCFCS Map

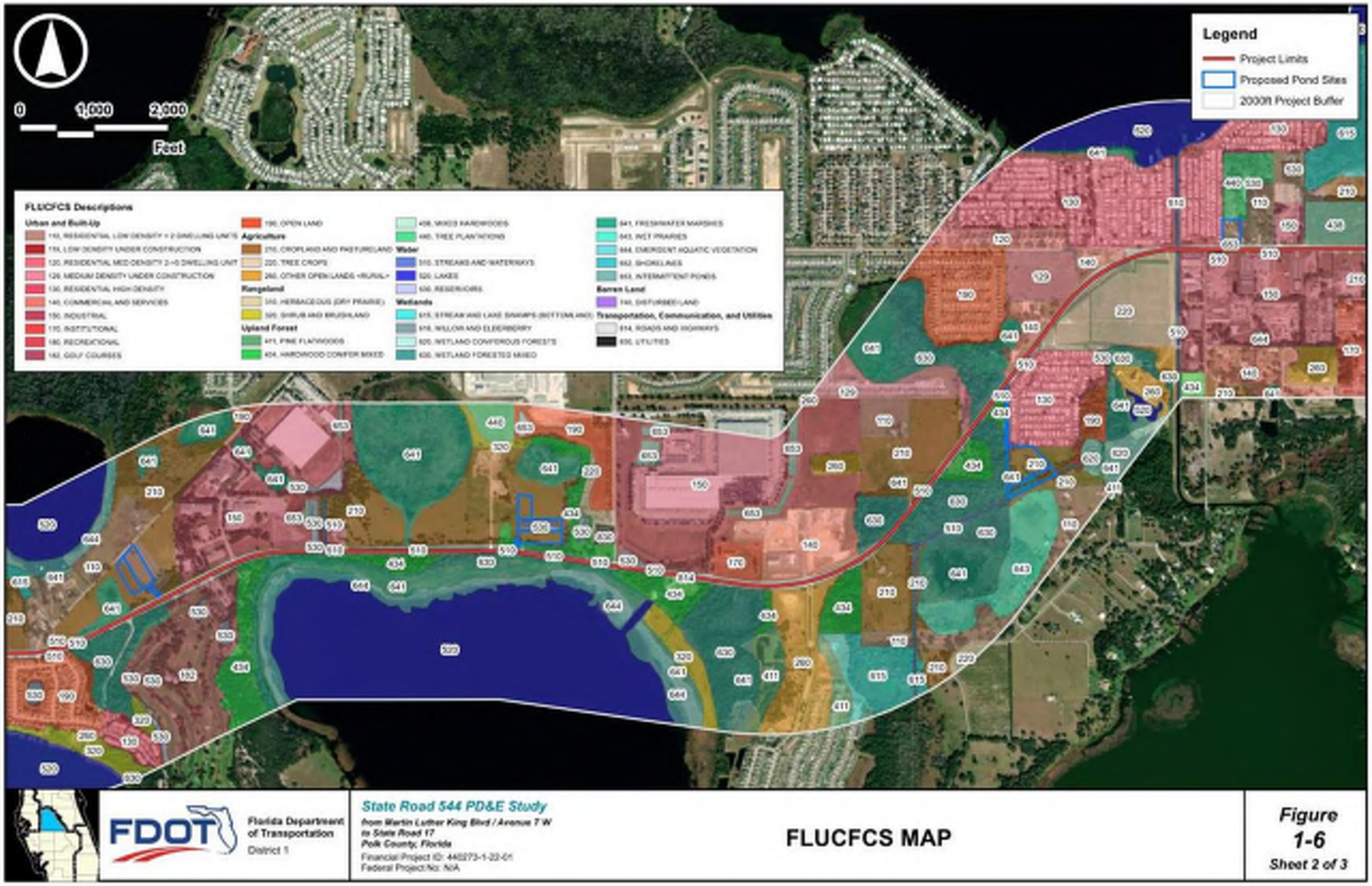
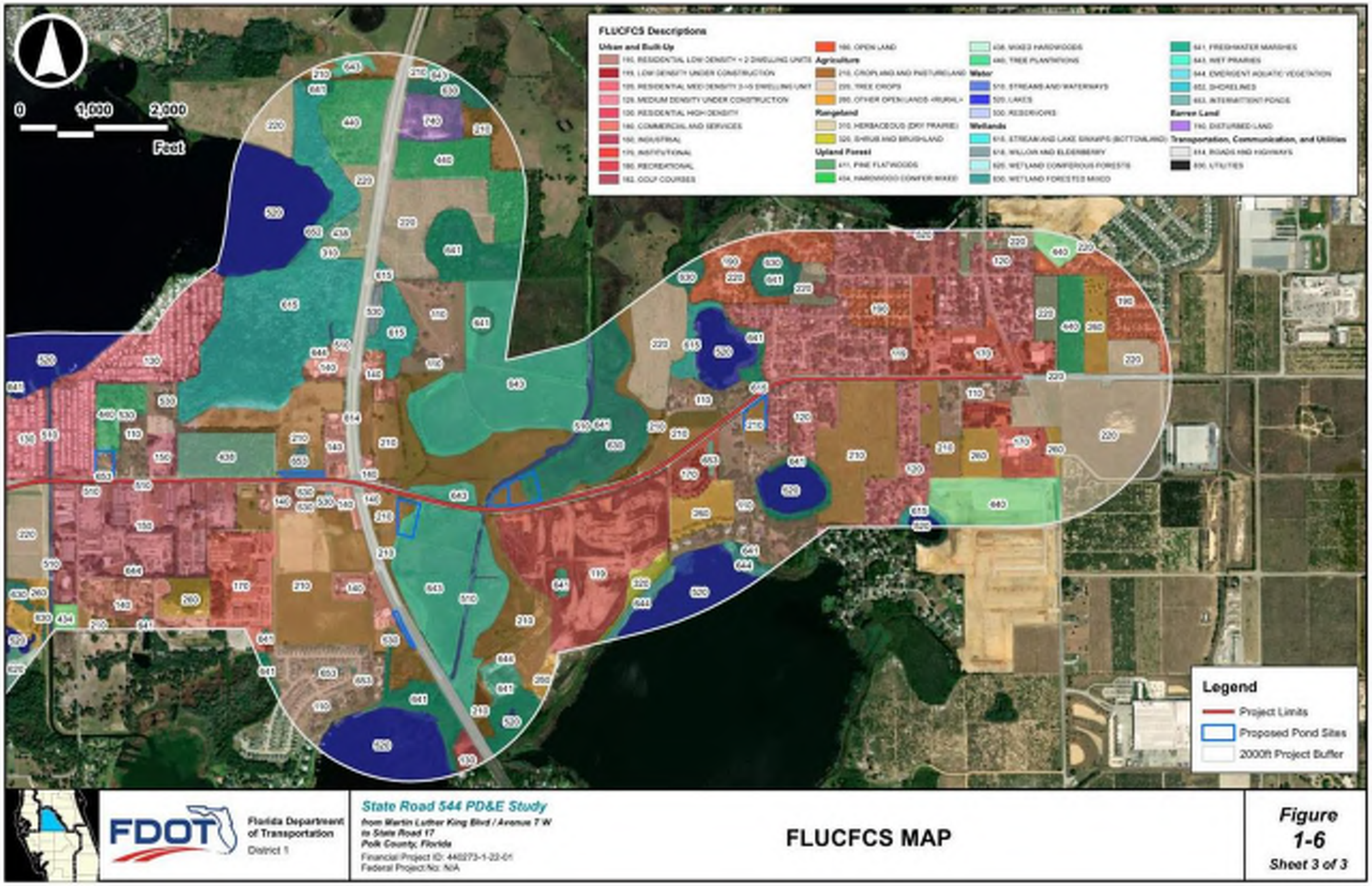


Figure 1-6: FLUCFCS Map



1.6.3 Soils

The soil survey of Polk County, Florida (NRCS 1985) and GIS data provided by NRCS were reviewed to determine the soil types and characteristics within the SR 544 Study Area (**Appendix C**). The soils encountered along the project limits include Hydrologic Soil Group (HSG) A, A/D, B/D, C/D and D. HSG A consists of deep, well to excessively well-drained sand or gravel soils. HSG C consists of moderately fine to fine-textured soil that restricts percolation of water. HSG D consists of soils with permanently high-water tables and often indicative of wetlands or depressions. According to the soil surveys, there are 32 different soil types within the SR 544 Study Area. The soil types are depicted in **Figure 1-7.**

Figure 1-7: NRCS Soils Map

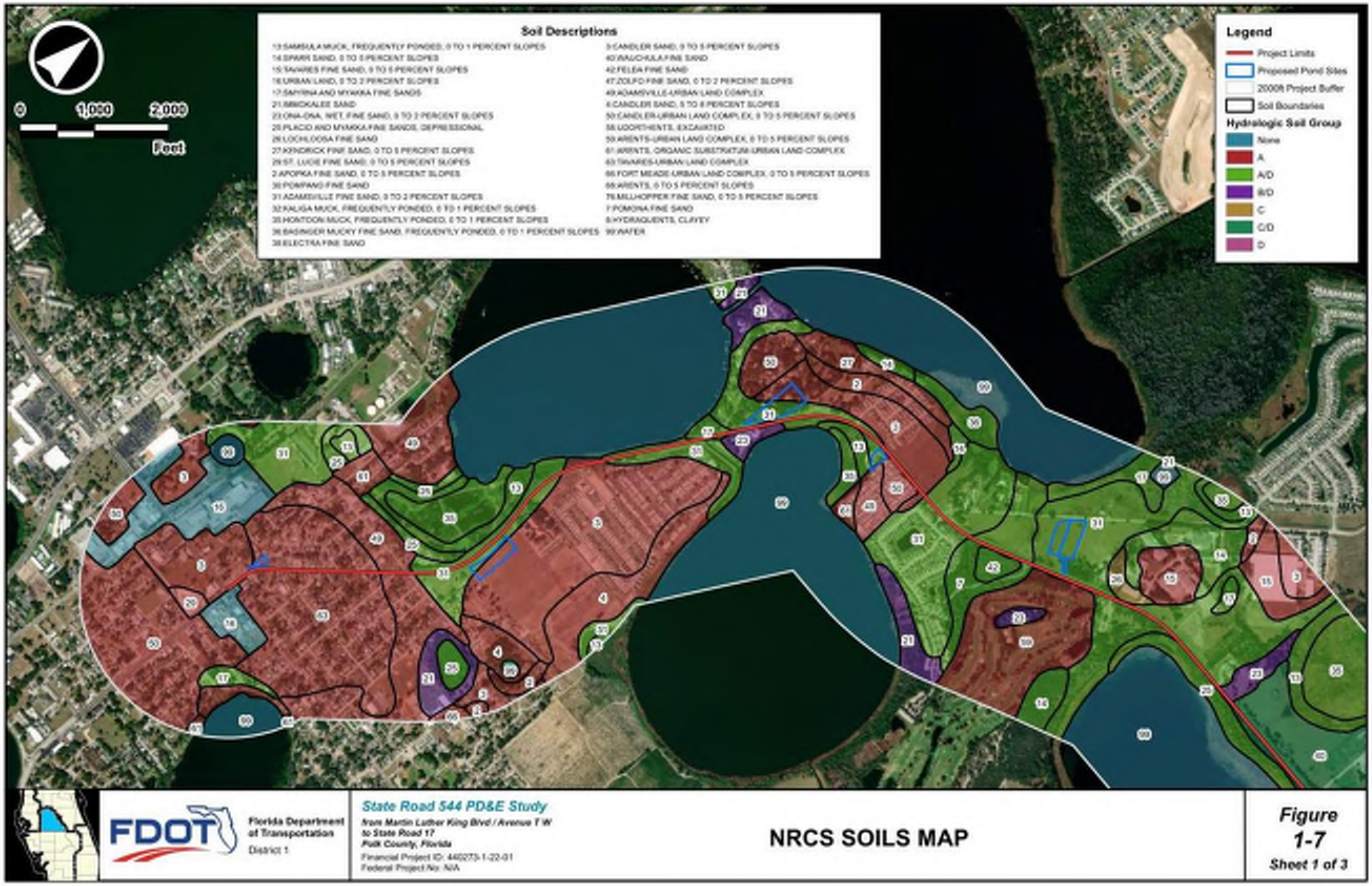


Figure 1-7: NRCS Soils Map

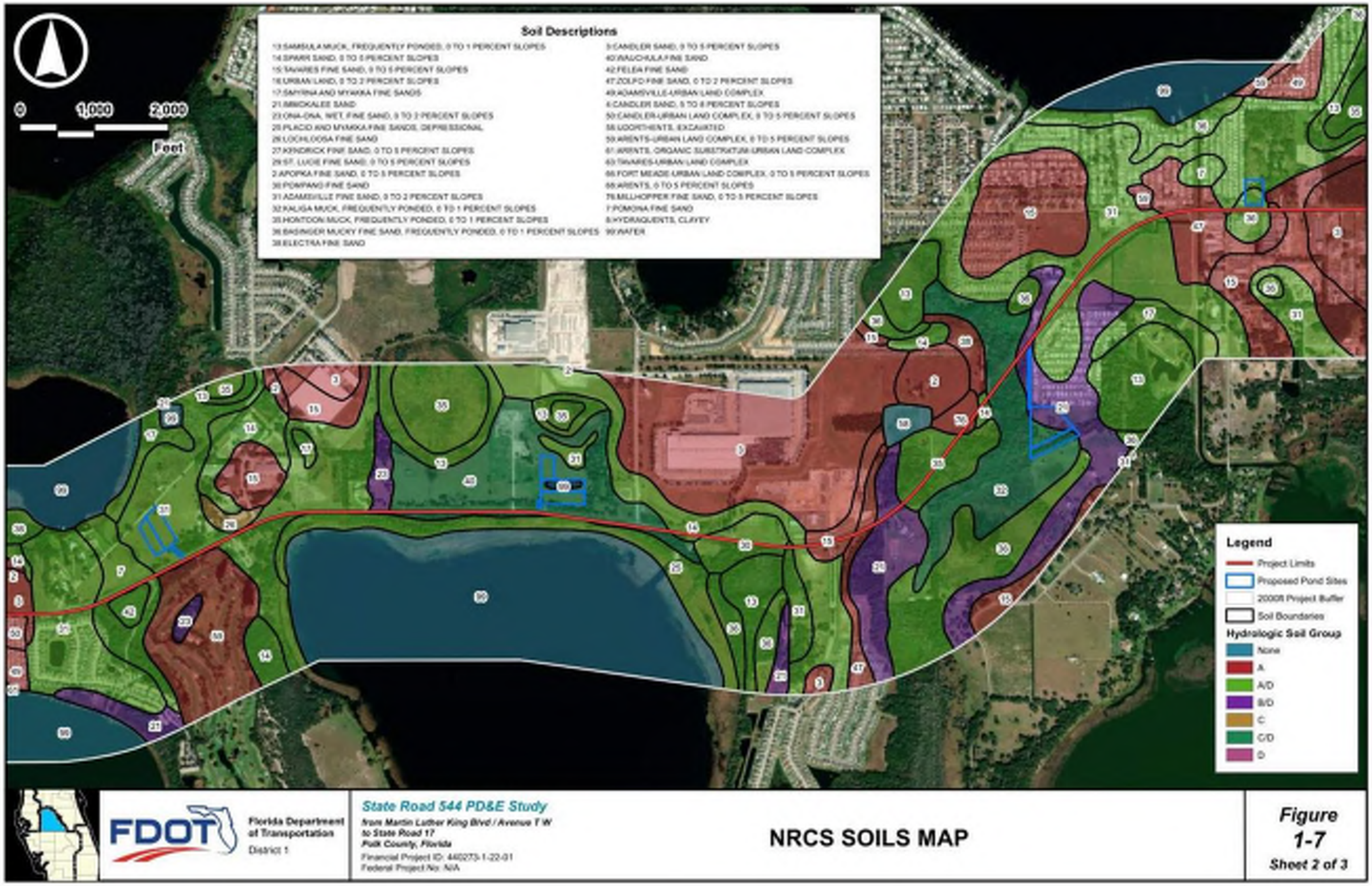
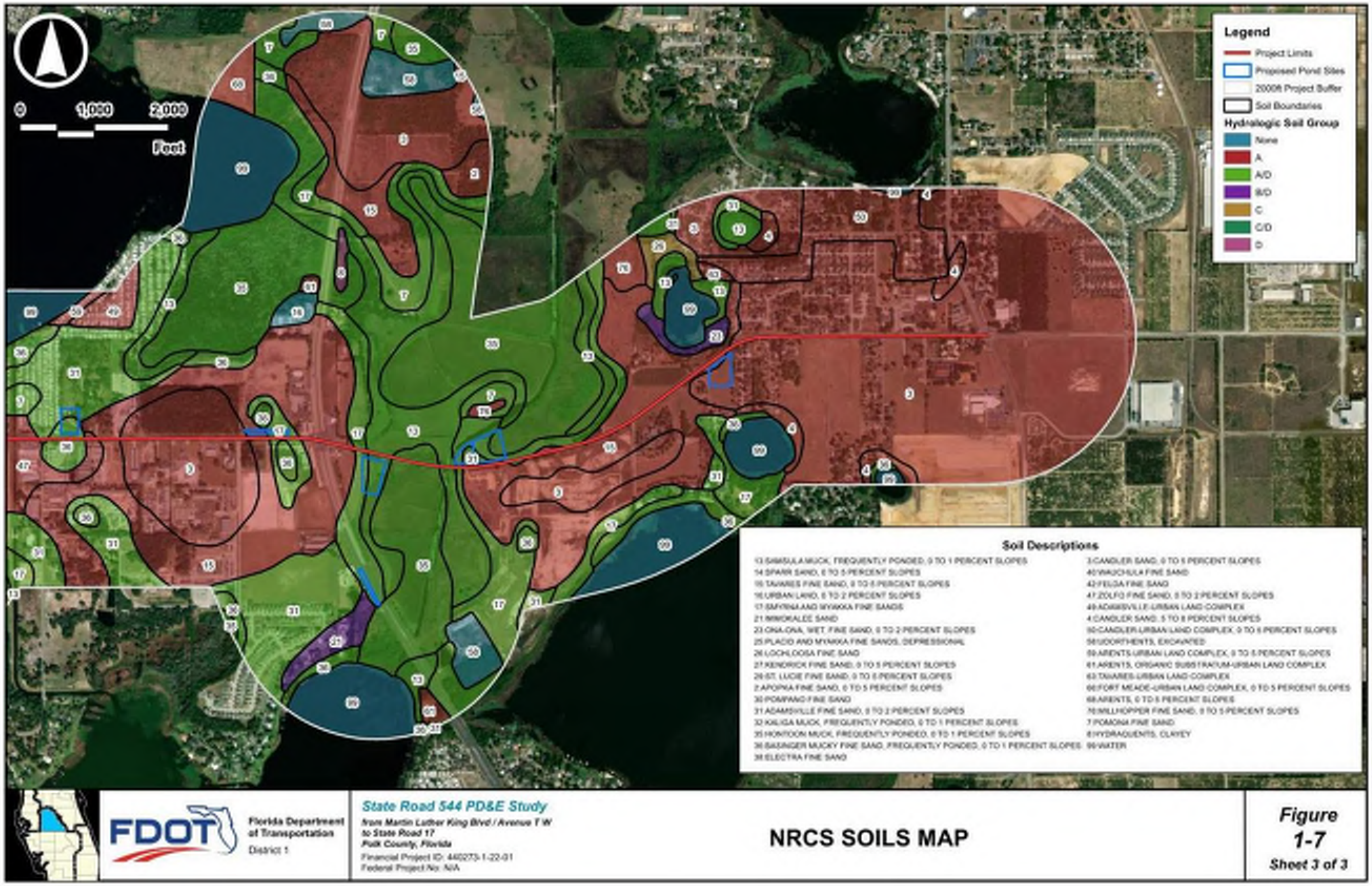


Figure 1-7: NRCS Soils Map



1.6.4 Natural Features

No other significant natural features were identified within the limits of the SR 544 Study Area including special aquatic sites, sanctuaries, and refuges, Wild and Scenic Rivers, Aquatic Preserves, and Outstanding Florida Waters; nor does the project provide designated Critical Habitat or Essential Fish Habitat to federally protected or managed species.

SECTION 2 PROTECTED SPECIES AND HABITAT

Ecologists used online resources and multiple field surveys to determine whether protected species occur or have the potential to occur in the SR 544 Study Area. The term protected species refers to those species that are protected by law, regulation, or rule. Specifically, the term protected species refers to those species listed under the Endangered Species Act (ESA) of 1973, as amended; those species listed under Florida's Endangered and Threatened Species List, Chapter 68A-27, F.A.C.; or those species listed under the Preservation of Native Flora of Florida, Chapter 5B-40, F.A.C. Florida also affords protection to federally-listed species, thus all federally-listed species are also state listed, pursuant to Chapter 68A-27.003(1)(b). The study area was also evaluated for the occurrence of Critical Habitat as defined by the ESA of 1973, as amended and 50 CFR Part 424. This analysis is consistent with the Protected Species and Habitat chapter of the PD&E Manual.

2.1 Efficient Transportation Decision Making

According to the ETDM Summary Report No. 5873, dated May 22, 2020, the FWC, SWFWMD, and USFWS indicated the project alternatives may create a "Minimal" to "Moderate" Degree of Effect (DOE) on wildlife and habitat resources. The primary issues were the direct loss of wetland habitats, potential adverse effects to a moderate number of state and federal listed species, potential increase in wildlife roadkill, and potential water quality degradation from the additional stormwater runoff from the expanded roadway surface draining into adjacent lakes and wetlands. Avoidance and minimization measures will be implemented for the noted species to the greatest extent practicable. In order to minimize the effect of the proposed project on protected species, FDOT will provide commitments that will be tracked through the design process. FDOT will coordinate with the USFWS and FWC to obtain concurrence with the effect determinations listed below and address potential impacts to each species.

2.2 Data Collection and Methodology

The study methodology included GIS analysis, ETAT comments review, agency coordination, agency database searches, general wildlife surveys, and species-specific surveys. The Existing Conditions Section, Section 1.3 lists the data sources utilized for review.

Ecologists familiar with Florida's protected species and natural habitats conducted general field surveys and species-specific surveys from October 2019 through December 2022 as part of the Study. The field surveys were performed utilizing pedestrian surveys conducted during daylight hours over multiple seasons to document the presence or evidence of protected species utilizing the study area. Species-specific surveys included the Audubon's crested caracara, Everglade snail kite, Florida bonneted bat, and sand skink and blue-tailed mole skink. The species-specific surveys were conducted in accordance with the survey protocols outlined by the USFWS. Species-specific survey methodologies were submitted to USFWS for approval before the surveys were conducted.

Agency coordination is included in **Appendix D**. The ecologists also documented habitat types and predominant plant species, including general wetland limits, during the field reviews. Listed species occurrences and habitat within the SR 544 Study Area are shown on **Figure 2-1**.

A total of 55 protected species have the potential to occur in the SR 544 Study Area, according to the information obtained during the preliminary data collection. These include the 13 avian, four (4) mammal, five (5) reptile, and 33 plant species shown on **Table 2-1**. Ecologists determined a species' potential occurrence in the study area based on its habitat preferences and distributions, existing site conditions, historical data, and field survey results. The likelihood of occurrence was rated as no, low, moderate, high, or observed. Definitions for the likelihood of occurrence are provided below:

- No – Species with a no likelihood of occurrence are those species that are known to occur in Polk County but have specialized habitat requirements that do not occur in the project area.
- Low – Species with a low likelihood of occurrence are those species that are known to occur in Polk County, limited habitat occurs within the project site, but there are no known adjacent populations, limited dispersal abilities, and the species has not been observed or documented within the site.
- Moderate – Species with a moderate likelihood of occurrence are those species that are known to occur in Polk County, for which suitable habitat occurs within the project site, but there are no positive indications to verify presence, and the species has not been observed in or documented within the site.
- High – Species with a high likelihood of occurrence are those species that are known to occur in Polk County, are suspected in the project area based on the existence of suitable habitat within the project site, are known to occur adjacent to the site, or have been previously documented in the project vicinity.
- Observed – the species has been observed during this evaluation.

Table 2-1: Protected Species with Potential to Occur in the SR 544 Study Area

Scientific Name	Common Name	Status	Potential Occurence
Birds			
Ammodramus savannarum floridanus	Florida Grasshopper Sparrow	FE	No
Aphelocoma coerulescens	Florida Scrub-jay	FT	No
Athene cunicularia floridana	Florida Burrowing Owl	ST	Moderate
Egretta caerulea	Little Blue Heron	ST	Observed
Egretta tricolor	Tricolored Heron	ST	Observed
Falco sparverius paulus	Southeastern American Kestrel	ST	Observed
Grus canadensis pratensis	Florida Sandhill Crane	ST	Observed
Haliaeetus leucocephalus	Bald Eagle	BGEMA/MGTA	Observed
Laterallus jamaicensis jamaicensis	Eastern Black Rail	FT	Low
Mycteria americana	Wood Stork	FT	Observed
Platalea ajaja	Roseate Spoonbill	ST	Observed
Polyborus plancus audubonii	Audubon's Crested Caracara	FT	Moderate
Rostrhamus sociabilis plumbeus	Everglade Snail Kite	FE	High
Mammals			
Eumops floridanus	Florida Bonneted Bat	FE	Moderate
Perimyotis subflavus	Tricolored Bat	C	Observed
Sciurus niger niger	Southern Fox Squirrel	M	High
Ursus americanus floridanus	Florida Black Bear	M	Moderate
Reptiles			
Drymarchon corais couperi	Eastern Indigo Snake	FT	High
Eumeces egregious lividus	Blue-tailed Mole Skink	FT	Moderate
Gopherus polyphemus	Gopher Tortoise	ST	Observed
Pituophis melanoleucus mugitis	Florida Pine Snake	ST	Moderate
Neoseps reynoldsi	Sand Skink	FT	Moderate
Plants			
*Bonamia grandiflora**	Florida Bonamia	FT/SE	Low
Calamintha ashei	Ashe's Savory	ST	Low
Calopogon mutliflorus	Many-flowered Grass-pink	ST	Low
Carex chapmanni	Chapman's sedge	ST	Low
Centosema Arenicola	Sand Butterfly Pea	SE	Low
*Chionanthus pygmaeus**	Pygmy Fringe-tree	FE	Low
*Clitoria fragrans**	Pigeon Wings	FT/SE	Low
Coelorachis tuberculosa	Piedmont Jointgrass	ST	Low
Coleataenia abscissa	Cutthroatgrass	SE	Low
*Conradia brevifolia**	Short-leaved Rosemary	FE	Low
*Crotalaria avonensis**	Avon Park Harebells	FE	Low
*Dicerandra frutescens**	Scrub Mint	FE	Low
*Eriogonum longifolium**	Scrub Buckwheat	FT/SE	Low
Hartwrightia floridana	Hartwrightia	ST	Low

Scientific Name	Common Name	Status	Potential Occurence
*Hypericum cumulicola**	Highlands Scrub Hypericum	FE	Low
Illicium parviflorum	Star Anise	SE	Low
Lechea cernua	Nodding Pinweed	ST	Low
*Liatris ohlingerae**	Florida Blazing Star	FE	Low
*Lupinus aridorum**	Scrub Lupine	FE	Low
Matelea floridana	Florida Spiny-pod	SE	Low
Nemasylis floridana	Celestial Lily	SE	Low
Nolina atopocarpa	Florida Beargrass	ST	Low
*Nolina brittoniana**	Britton's Beargrass	FE	Low
*Paronychia chartacea**	Papery Whitlow-wort	FT/SE	Low
*Polygala lewtonii**	Lewton's Polygala	FE	Low
*Polygonella basiramia**	Wireweed (Florida Jointweed)	FE	Low
*Polygonella myriophylla**	Sandlace (Small's Jointweed)	FE	Low
*Prunus geniculate**	Scrub Plum	FE	Low
Pteroglossaspis ecristata	Giant Orchid	ST	Low
Salix floridana	Florida Willow	SE	Low
*Warea amplexifolia**	Clasping Warea	FE	Low
*Warea carteri**	Carter's Mustard (Cater’s Warea)	FE	Low
Ziziphus celata	Florida Ziziphus	FE	Low

FE = Federally Endangered **FT** = Federally Threatened
SE = State Endangered **ST** = State Threatened
M = Managed **C** = Candidate

***** Indicates Lake Wales Ridge plants

Figure 2-1: Protected Species and Habitat

2.3 Federally Listed Species and Designated Critical Habitat

The study area is located within or partially within the USFWS CA of the Audubon's crested caracara, Everglade snail kite, Florida bonneted bat, Florida grasshopper sparrow, Florida scrub-jay, sand skink and blue- tailed mole skink, and Lake Wales Ridge Plants. A consultation area is intended to identify the geographical landscape where each federally listed species is most likely to occur. Portions of the study area also fall within five wood stork CFAs, which include suitable foraging areas important to the reproductive success of known wood stork nesting colonies. The existing habitats in the study area may also support other federally protected and ESA candidate species including the eastern black rail, eastern indigo snake, and tricolored bat (a candidate species). No Critical Habitat designated for listed species occurs within the SR 544 study area.

2.3.1 Audubon's Crested Caracara

The entire study area occurs within the USFWS Audubon's crested caracara CA. It is a resident, non-migratory species in Florida that prefers grasslands and pastures in the south-central region of the state, particularly in Glades, Desoto, Highlands, Okeechobee, and Osceola Counties (USFWS 1999). Historically, caracara have inhabited dry or wet prairies with scattered cabbage palms (*Sabal palmetto*) and occasionally used lightly wooded areas next to those prairies. Many of those areas were converted and frequently replaced by pastures with non-native sod-forming grasses that still support caracaras. The caracara is classified as threatened due to habitat loss and population decline (Layne 1996). No Critical Habitat has been designated for the Audubon's crested caracara.

Species-specific caracara surveys were conducted in accordance with the caracara survey methodology developed by Morrison (2001), supplemental information established by the USFWS (2004a), and additional survey guidance prepared by the USFWS (2015, 2016). A survey was conducted January through March 2020, but was halted due to the Covid-19 pandemic. The survey was repeated January through April 2021. Prior to the start of the 2020 survey, ecologists conducted site visits to determine the best vantage points to observe caracara activity along the corridor and up to 1,500 meters from the project boundary. Based on the preliminary field analysis, an *Audubon's Crested Caracara Survey Methodology* memorandum for the SR 544 PD&E Study was submitted to and approved by the USFWS on October 9, 2019 (**Appendix D**). Surveys were conducted by qualified ecologists at least 15 minutes prior to sunrise for at least three hours per survey block. Ecologists spent the entire three-hour survey session in the bed of a pick-up truck observing and recording caracara activity with the assistance of binoculars and a Nikon PROSTAFF 5 scope with 16-48 power. A total of five survey sessions were conducted for each survey block. No caracara were observed during the 2020 survey.

The subsequent caracara survey conducted January through April 2021 consisted of nine survey sessions conducted in accordance with the approved methodology obtained October 9, 2019. The

2021 caracara survey was conducted utilizing the same protocol as the 2020 survey detailed above. No caracara were observed during the 2021 caracara survey. Survey maps depicting the overall project area, survey blocks, and 1,500-meter buffer; data sheets; caracara activity maps; and photographs are included in **Appendix E**.

No Audubon's crested caracara were observed during the 2020 and 2021 caracara surveys. According to FNAI's Biodiversity Matrix Query Report (FNAI) and eBird, no individuals have been documented within the study area. As a result, the proposed project "**may affect, but is not likely to adversely affect**" the Audubon's crested caracara.

2.3.2 Eastern Black Rail

The eastern black rail is listed by the USFWS as threatened due to habitat loss, destruction, and modification; sea level rise and tidal flooding, and incompatible land management. They are wetland-dependent birds and are primarily associated with herbaceous, persistent emergent plant cover (USFWS 2019). They require dense overhead perennial herbaceous cover with underlying moist to saturated soils with or adjacent to very shallow water (Flores and Eddelman 1995; Legare and Eddleman 2001; Haverland 2019). No Critical Habitat has been designated.

Suitable habitat for the eastern black rail was observed within the study area. No eastern black rails were observed during the field reviews. Based on the best available information, there is no evidence that the eastern black rail occurs within the project area. According FNAI and eBird, no individuals have been documented in the project area. As part of this project, wetland impacts will be mitigated to prevent loss of wetland functions and values. Based on the lack of occurrence data in the project's vicinity and mitigation of wetland impacts will be provided by FDOT, the proposed project "**may affect, but is not likely to adversely affect**" the eastern black rail.

2.3.3 Eastern Indigo Snake

The eastern indigo snake is a large, stout-bodied, shiny black snake with a red throat and chin. The eastern indigo snake is listed by the USFWS as threatened due to over-collecting for the pet trade as well as habitat loss and fragmentation (USFWS 1999) and is widely distributed throughout central and south Florida. They occur in a broad range of habitats, from scrub and sandhill to wet prairies and mangrove swamps. Indigo snakes are most closely associated with habitats occupied by gopher tortoises whose burrows provide refugia from cold or desiccating conditions (USFWS 1999). No Critical Habitat has been designated for the eastern indigo snake.

Suitable habitat for the indigo snake was observed within the study area. No indigo snakes were observed during the field reviews. Suitable habitat for the gopher tortoise was also observed within the study area with one direct observation of a gopher tortoise burrow. A 100% gopher tortoise survey was not conducted during this PD&E Study but will be required before construction activities commence. To address any potential effects to the eastern indigo snake, all potentially occupied gopher tortoise burrows within the limits of construction will be excavated and the *Standard Protection Measures for the Indigo Snake* (USFWS 2013; **Appendix F**) will be implemented during construction activities. According to the *Eastern Indigo Snake Effect Determination Key* (**Appendix G**), the proposed project will result in the following sequential determination: A>B>C>D>E = "**may affect, but is not likely to adversely affect**" the eastern indigo snake.

2.3.4 Everglade Snail Kite

The entire study area occurs within the USFWS Everglade snail kite CA. The Everglade snail kite is a medium-sized hawk, with a slender and very hooked beak. The Everglade snail kite is classified as endangered due to a "very small population and increasingly limited amount of fresh marsh with sufficient water to ensure an adequate supply of snails" (Bureau of Sport Fisheries and Wildlife 1973, p. 120). It is a non-migratory subspecies only found in Florida, particularly near large watersheds (e.g., Everglades, Lake Okeechobee) and the shallow vegetated edges of lakes that support apple snails, the primary component of the snail kite's diet. Suitable habitat includes habitats for both foraging and nesting. Foraging habitat can be described as being relatively shallow vegetated wetland systems, often in either expansive marsh systems or within the littoral zones of lakes. Ideal vegetation within these areas includes bulrushes, spike rushes, and maidencane as these create ideal habitat for the apple snail. Suitable nesting habitat for the snail kite almost always occurs over open water (0.2-1.3 meters deep) and greater than 150 meters from uplands. Vegetation in nesting habitat can include native and exotic species of both trees and shrubs, including but not limited to willow (*Salix spp*.), cypress (*Taxodium spp*.), melaleuca (*Melaleuca quinquenervia),* sweetbay (*Magnolia virginiana)*, Brazilian pepper (*Schinus terebinthifolia)*, button bush (*Cephalanthus occidentalis)*, and elderberry (*Sambucus nigra*). Nesting can also occur in herbaceous vegetation consisting of bulrush (*Scirpus spp*.) and cattail (*Typha spp*.). The USFWS has designated Critical Habitat for snail kites, which consists mostly in marshes in south Florida. No Critical Habitat occurs within the project corridor.

Suitable foraging and nesting habitat for the snail kite was observed within the project corridor. Ecologists conducted species-specific surveys for the presence of snail kites in these habitats during the 2020 and 2021 survey season.

Everglade snail kite surveys were conducted in accordance with the USFWS Snail Kite Survey Guidelines. Prior to the start of the 2020 survey, ecologists conducted site visits to determine the best vantage points to observe snail activity along the corridor. Based on the preliminary field analysis, an *Everglade Snail Kite Survey Methodology for the SR 544 PD&E Study* memorandum was developed and submitted to the USFWS on January 8, 2020, and subsequently approved on January 14, 2020 (**Appendix D**). Due to the linear nature of the project and suitable snail kite habitat occurring within the lake shorelines near the adjacent SR 544 right-of-way, observation stations were established along the roadway corridor and proposed pond sites. A buffer of 300-meters was utilized in order to accommodate both the roadway and potential pond site locations. A total of three survey events were conducted at each observation location. The visual surveys were conducted in January 2020, February 2020, and April 2021. No Everglade snail kites were observed during the surveys. Survey maps, data sheets, and photographs are included in **Appendix H**.

According to eBird, five sightings have been documented within the study area between 2015 through 2022. The most recent eBird sighting occurred in January 2022, but no data, including photographs or field notes, were provided. No Everglade snail kites were observed during the 2020 or 2021 species-specific surveys. No evidence of snail kite nesting within the project area was observed. As a result, the proposed project "**may affect, but is not likely to adversely affect**" the Everglade snail kite.

2.3.5 Florida Bonneted Bat

The entire study area is within USFWS Florida bonneted bat CA. The Florida bonneted bat is classified as endangered due habitat loss, degradation, and modification, as well as other manmade and natural factors including a small population size with few colonies, restricted range, slow reproductivity, and low fecundity (USFWS 2013). It has short glossy fur consisting of bicolored hairs and large broad ears that project over the eyes and are joined at the midline of the head. This identifying characteristic, along with its larger size distinguishes it from the Brazilian free-tailed bat (*Tadarida brasiliensis*). The Florida bonneted bat is a subtropical species that does not hibernate and is active year-round. Habitat consists of foraging areas and roosting sites, including artificial structures. Foraging habitat consists of relatively open areas that provide sources of prey and drinking water, including open fresh water, permanent or seasonal freshwater wetlands, wetland and upland forests, wetland and upland shrub, and agricultural areas. In urban areas, suitable foraging can be found at golf courses, parking lots, and parks. Potential roosting habitats include forests or other areas with tall or mature trees or other areas with potential roost structures, including utility poles and artificial roosts. This includes habitat in which suitable structural features for breeding and sheltering are present. Roosting habitat contains one or more of the following structures: tree snags, and trees with cavities, hollows, deformities, decay, crevices, or loose bark. The project corridor is located between residential development as well as open fields, upland and wetland habitats, and open water associated with the Winter Haven Chain of Lakes. There is proposed Critical Habitat for this species; however, the proposed project is not within the Critical Habitat.

Inwood conducted two full acoustic and roost surveys in 2020/2021 and 2022 to determine Florida bonneted bat activity within the study corridor. The survey methodologies were submitted and approved by the USFWS prior to the commencement of the surveys (**Appendix D**). The acoustic and roost surveys were conducted by qualified ecologists with the required acoustic survey course training and experience. The 2020/2021 acoustic survey was conducted from November 16, 2020, through January 3, 2021. The 100% roost survey was conducted in December 2020. Due to the addition of a quadrant roadway alternative and updated pond site locations, a supplemental acoustic and roost survey was conducted in October 2022. The results of the surveys showed no Florida bonneted bat activity within the study area. *The Florida Bonneted Bat Survey Report* and *Supplemental Florida Bonneted Bat Survey Report* can be found in **Appendix I**.

Based on the results of the acoustic and roost surveys, no evidence of roosting or foraging by the Florida bonneted bat within the project corridor was detected. Due to the absence of FBB activity, this project is anticipated to have "**no effect**" on the Florida bonneted bat. This effect determination was by using the following sequence from the Florida Bonneted Bat Consultation Key (**Appendix J**): 1a>2a>3b>6b = "**no effect**".

2.3.6 Florida Grasshopper Sparrow

The entire study area occurs within the USFWS Florida grasshopper sparrow CA. The Florida grasshopper sparrow was listed as endangered because of habitat loss and degradation resulting from conversion of native vegetation to improved pasture and agriculture (51 FR 27492). It is a subspecies of grasshopper sparrow that is endemic to the dry prairie region of central and south Florida. This subspecies is extremely habitat specific and relies on fire every two or three years to maintain its habitat (USFWS 1999). The primary habitat consists of large (>50 hectares), treeless (less than one tree per acre), and relatively poorly drained prairies dominated by saw palmetto and dwarf oaks (Delany et al. 1985). It is known to occur only in Highlands, Okeechobee, Osceola, and Polk counties (Robertson & Woolfenden 1992; Delany, 1996). No Critical Habitat has been designated for the Florida grasshopper sparrow.

The project corridor does not contain large, treeless prairie habitats required by the grasshopper sparrow. No suitable habitat and no individuals were observed during the field reviews. Due to the lack of suitable habitat, the proposed project will have "**no effect**" on the Florida grasshopper sparrow.

2.3.7 Florida Scrub-Jay

The entire study area occurs within the USFWS Florida scrub-jay CA. The scrub-jay is classified as threatened due to habitat loss, degradation, and fragmentation (USFWS 1987). They are restricted to xeric scrub habitats with optimal habitat consisting of fire-dominated, low-growing oak scrub found on well-drained sandy soils with patches of bare sandy soil. No Critical Habitat has been designated for the Florida scrub-jay.

The study area includes a mix of residential, commercial, and agricultural lands that do not contain the xeric scrub habitats required by the Florida scrub-jay. According to FNAI, eBird, and FWC's statewide occurrence data, there are no documented occurrences within the study area. No individuals or suitable scrub-jay habitat was observed within the project area. Due to the lack of suitable habitat, the proposed project will have "**no effect**" for the Florida scrub-jay.

2.3.8 Sand Skink and Blue-tailed Mole Skink

The entire study area occurs within the USFWS sand skink and blue-tailed mole skink (skinks) CAs. These species are highly adapted to life in sand, spending most of their time "swimming" though loose sand in search of food, shelter, and mates. They are rarely seen above ground. Their motion leaves sinusoidal ("S"-shaped) tracks in the soil surface that can be identified through visual pedestrian surveys. Both the sand skink and the blue-tailed mole skink are classified as threatened due to habitat loss, degradation, and fragmentation.

The geographic range of these skinks is limited to sandy ridges and ancient dunes of the Central Highlands, particularly the Lakes Wales Ridge, the Winter Haven Ridge, and the Mount Dora Ridge. These areas contain excessively drained, well-drained, and moderately well-drained sandy soils that usually support scrub habitats like sand pine scrub, xeric oak scrub, rosemary scrub, and scrubby flatwoods; high pine habitats like sandhills, longleaf pine-turkey oak, turkey oak barrens, and xeric hammock; and managed lands, such as citrus groves, pine plantations and pastures Skinks prefer habitats with open canopies, scattered shrubby vegetation, and patches of bare sand (Christman 1992). According to criteria defined by the USFWS, suitable habitat is considered to be "skink soils" located within the CA at elevations at or above 82 feet above sea level. No Critical Habitat has been designated for the skinks.

Portions of the study area contain suitable skink habitat based on the location, soil types, and elevation criteria in the *Peninsular Florida Species Conservation Guidelines for Sand and Blue-tailed Mole Skink* (**Appendix K**). Atkins North America, Inc. (Atkins) conducted a soils investigation in order to identify areas within the project that are suitable for skinks. A Skink Soils Investigation Report was developed by Atkins and included in **Appendix L**. As a result of this investigation, four areas of potential suitable soils were identified and a skink coverboard survey was performed within these areas in March through April 2021. Survey blocks were established using the maximum typical section widths for both north and south alignments. UWSFWS coordination regarding the sank skink survey is included in **Appendix D**. Coverboards were installed within each block at a minimum of 40 coverboards per acre. Prior to being placed, the vegetation and roots were removed so the coverboard would sit flush with the soil surface. Once installed, the coverboards were located via GPS and monitored weekly for four consecutive weeks. Each monitoring event consisted of lifting the coverboard, inspecting for tracks and skink activity, leveling the soil underneath the board, and placing the board flush against the soil surface. Areas of exposed soil were visually inspected via pedestrian transects for evidence of skink activity. Survey maps, data sheets, and photographs are included in **Appendix M**. No skink tracks or evidence of skink activity was observed during the coverboard and pedestrian surveys.

The proposed pond and FPC sites were not surveyed during the March 2021 coverboard surveys. These areas contain suitable habitat for skinks based on location, soil types, and elevation criteria. A coverboard survey will be required for these areas to determine a presumed absence conclusion. The USFWS maintains presumptive criteria for skinks; meaning, the project "**may affect and is likely to adversely affect**" sand and blue-tailed mole skinks until a species-specific survey has been completed. FDOT commits to conduct a skink coverboard survey in suitable habitats during the design phase of the project. FDOT will consult with the USFWS once the survey is completed, and the results are known.

2.3.9 Tricolored Bat

The tricolored bat is a candidate species for federal listing. It is Florida's smallest bat and distinguished by its unique tricolored fur and pink forearms that contrast their black wings. This wide-ranging species is found throughout the central and eastern United States, and portions of Canada, Mexico, and Central America. Typically hibernating in caves and mines during the winter, tricolored bats in the southern U.S. have an increased utilization of culverts as hibernacula, with shorter hibernation durations and increased winter activity. The tricolored bat is mostly associated with forested habitats and requires habitat suitable for roosting, foraging, and commuting between winter and summer habitats. Roosting singly or in small groups, the tricolored bat prefers to roost in caves, tree foliage, tree cavities, Spanish moss, and man-made structures such as buildings and culverts. They form summer colonies in forested habitats, utilizing cavities, bark, and foliage. The maternity season in Florida is May - June. They forage most commonly over water courses and along forest edges.

Suitable roosting and foraging habitat was observed throughout the study corridor. Acoustic and roost surveys were conducted in 2020/2021 and 2022 in accordance with the Florida bonneted bat survey guidelines. While the data analysis and manual vetting focused on low frequency calls and the Florida bonneted bat, the results of the acoustic survey identified the presence of tricolored bats in the study area. Tricolored bats were recorded at 13 of the 16 survey stations; however, activity appears low throughout the corridor with the majority of the stations only recording one call per night, but not each night of the survey. The roost survey focused on cavities and roosts preferred by the Florida bonneted bat; however, no evidence of bat roosting was observed within the study area during the roost survey or general wildlife surveys. Impacts to forested habitats within the project area are minimal, leaving the larger forested communities intact. FDOT will continue consultation with the USFWS regarding the tricolored bat listing status and potential impacts to this species during the design and permitting phase as needed.

2.3.10 Wood Stork

The wood stork is listed by the USFWS as threatened due to the reduction in food base attributed to the loss of suitable foraging habitat (SFH). Wood storks are associated with freshwater and estuarine wetlands that are used for nesting, roosting, and foraging. Nesting typically occurs in medium to tall trees that occur in stands located in swamps or islands surrounded by open water (Odgen 1991; Rodgers et al. 1996). Because of their specialized feeding behavior, they forage most effectively in shallow water with highly concentrated prey. The USFWS defines suitable foraging habitat as shallow-open water areas that are relatively calm and have a permanent or seasonal water depth between two to fifteen inches. SFH includes freshwater marshes, swamps, lagoons, tidal creeks and pools, ponds, ditches, and flooded pastures. No Critical Habitat has been designated for the wood stork.

According to the USFWS South Florida Ecological Service Office, the habitats within 18.6 miles of a wood stork breeding colony are considered to be wood stork CFAs. The proposed project site is within the CFA of five wood stork colonies: Lake Rosalie, Lake Russell, Lake Somerset, Lone Palm, and Mulberry Northeast. Wood storks were observed flying and foraging within the project area and adjacent habitats during the field reviews. SFH is located throughout the project corridor. The proposed project will impact approximately 2.66 acres of SFH. This acreage was calculated based on direct impacts to surface waters which provide SFH for wood storks. According to the *South Florida Programmatic Concurrence Key for the Wood Stork* (USFWS 2010) (**Appendix N**), the proposed project will result in the following sequential determination: A>B>C>E= "**may affect, but is not likely to adversely affect**" the wood stork. Based on the current design, the project will impact over 5 acres of wetlands, and therefore, a foraging prey base analysis is required. The final impacts will be calculated during the design phase and any mitigation will adhere to the requirements of the USACE and USFWS Effect Determination Key.

2.3.11 Federally Listed Plants

The Lake Wales Ridge is the remnant of an ancient dune system that runs north and south through Florida's peninsula. The entire study area occurs within the USFWS Lake Wales Ridge Plants CA. According to the Florida Natural Areas Inventory (FNAI) and USFWS, 19 federally listed plants have the potential to occur within the study area (**Table 2-1**). These include the endangered Avon Park harebells, Britton's beargrass, Carter's mustard, clasping warea, Florida ziziphus, Highlands scrub hypericum, Lewton's polygala, pygmy fringe tree, sandlace, scrub blazingstar, scrub lupine, scrub mint, scrub plum, short-leaved rosemary, and wireweed; and the threatened Florida bonamia, scrub pigeon wings, scrub buckwheat, and papery Whitlow-wort. These species are restricted to sandy habitats with specific fire regime requirements. This suite of species share a narrow geographic range on the paleo-dunes of Central Florida, where they occur in xeric scrub an sandhill vegetation and face the same general threats. These species were listed due to habitat destruction, modification, and curtailment of habitat range, primarily as result of development and lack of prescribed fire (USFWS 2019).

The Lake Wales Ridge Plants are restricted to sandy habitats maintained by periodic fire, such as scrub, high pine, turkey oak barrens, and sandhill. These habitats do not occur within the project area impacted by the Preferred Alternative, including pond sites. The right-of-way is mowed and maintained, minimizing the ability for these species to grow in these areas. The proposed pond sites do not contain the scrub habitats to support these species. According to FNAI, none of these species have been documented within the project area. No federally listed plants were observed during the field surveys, however FDOT will conduct appropriately timed surveys for listed plant species during design and permitting. Based on the lack of habitat and documented occurrences, and the commitment to complete a plant survey during the design phase, the proposed project "**may affect, but it not likely to adversely affect”** federally listed plants.

2.5 State Listed Species

The FWC maintains the list of animals designated as federally endangered, federally threatened, state threatened, or species of special concern. While the USFWS has primary responsibility for federally endangered or threatened species in Florida, the FWC works as a cooperating agency to help conserve these species and other imperiled species found in the state. Some listed and non-listed species are considered 'managed species' because of the well-developed programs that address their species' conservation, management, or recovery. The FWC has developed a comprehensive management plan and species action plans for the state's 57 state-listed species (FWC 2016).

2.5.1 Florida Burrowing Owl

The FWC listed the Florida burrowing owl as threatened due to loss of native habitat, dependence on altered habitat, and lack of regulatory protections (FWC 2013a). The burrowing owl is a non-migratory resident of Florida and maintains home ranges and territories while nesting. Burrowing owls inhabit upland areas that are sparsely vegetated. Natural habitats include dry prairie and sandhill, but they will make use of ruderal areas such as pastures, airports, parks, and road rights-of-way because much of their native habitat has been altered or converted to other uses.

Suitable habitat was observed throughout the study area. No burrowing owls were observed during the general wildlife surveys or species-specific surveys. Burrowing owls usually dig their own burrows but are known to utilize gopher tortoise burrows and armadillo burrows as well. Gopher tortoise and mammal burrows were observed within the study area. Pre-construction surveys will be conducted to adhere to the components of the Imperiled Species Management Plan (ISMP) and permitting guidelines and the necessary FWC coordination and permitting will be required if burrows are found prior to construction; therefore, "**no adverse effect is anticipated**" for the burrowing owl resulting from the proposed project.

2.5.2 Florida Pine Snake

The Florida pine snake is listed by the FWC as threatened due to habitat loss, fragmentation, and degradation to upland habitats from development and fire suppression (FWC 2013b). They inhabit areas that feature well-drained sandy soils with a moderate to open canopy (Franz 1992, Ernst and Ernst 2003). Preferred habitats include sandhill and former sandhill, including old fields and pastures, sand pine scrub, and scrubby flatwoods. The pine snake often coexists with gopher tortoise and pocket gophers, spending the majority of its time underground.

No pine snakes were observed during the field surveys. Suitable habitat was observed within the site. Gopher tortoise, mammal burrows and pocket gopher mounds were observed. All gopher tortoise burrows within the construction limits will be excavated. Current FWC guidelines for the relocation of the Florida pine snake state that any incidentally captured pine snake should be released on-site or allowed to escape unharmed if habitat will remain post-development. Based on existing conservation measures, "**no adverse effect is anticipated**" for the Florida pine snake resulting from the proposed project.

2.5.3 Florida Sandhill Crane

The FWC listed the Florida sandhill crane as threatened due to the loss and degradation to nesting and foraging habitat from development and hydrologic alteration to their potential nesting habitat (FWC 2013c). The Florida sandhill crane is a heavy-bodied gray bird, with a long neck and long legs. It is widely distributed throughout most of peninsular Florida. Sandhill cranes rely on shallow marshes for roosting and nesting and open upland and wetland habitats for foraging (Wood and Nesbitt 2001).

Florida sandhill cranes were observed foraging or flying on multiple occasions throughout the study area. The marshes and wet prairies within the study area provide potential nesting habitat for the sandhill crane. While the mainline of the roadway has minimal nesting habitat, some of the proposed pond site locations are within or adjacent to suitable nesting habitat. The pastures and other open uplands, including the roadway right-of-way, provide foraging habitat. Ecologists observed sandhill cranes, including juveniles, foraging in these areas and roadside ditches during numerous field surveys. Pre-construction surveys will be conducted to adhere to the components of the ISMP; therefore, "**no adverse effect is anticipated**" for the Florida sandhill crane resulting from the proposed project.

2.5.4 Gopher Tortoise

The gopher tortoise is listed at threatened by the FWC. They occur in the southeastern Coastal Plain from Louisiana to South Carolina; the largest portion of the population is located in Florida (FWC 2012). Gopher tortoises require well-drained, sandy soils for burrowing and nest construction, with a generally open canopy and an abundance of herbaceous groundcover, particularly broadleaf grasses, wiregrass (*Aristida stricta*), legumes and fruits for foraging. Gopher tortoises can be found in most types of upland communities including disturbed areas and pastures.

Suitable gopher tortoise habitat was observed throughout the study corridor, including proposed pond sites. Gopher tortoises and gopher tortoise burrows were observed during the field reviews; however, a 100% gopher tortoise survey was not conducted. A relocation permit from FWC will be required if tortoises are present within any permanent or temporary construction area. FDOT will conduct a 100% pre-construction survey for the gopher tortoise in accordance with 68A-27.003 and the current FWC Gopher Tortoise Permitting Guidelines and coordinate with FWC to receive necessary permit authorizations prior to construction. Based on the information provided above, "**no adverse effect is anticipated**" for the gopher tortoise.

2.5.5 Short-Tailed Snake

The FWC listed the short-tailed snake as threatened because it is a Florida endemic with a restricted geographic range, 57% of its potential habitat is privately owned, it inhabits xeric upland habitats that are in great demand for development. The short-tailed snake is endemic to Florida and is only found from the Suwannee River south to Highlands County (FNAI 2001). Short-tailed snakes are rarely seen above ground as they spend most of the time burrowed in sandy soils. They primarily inhabit areas with well drained sandy soils, particularly longleaf pine and xeric oak habitats, but may also be found in scrub and xeric hammock habitats (Van Duyn 1939; Carr 1940; Campbell and Moler 1992; Enge 1997).

Limited habitat for the short-tailed snake occurs within the study area. No individuals were observed during the field surveys. The project will have minimal impacts to xeric habitats where this cryptic species is found; therefore, "**no adverse effect is anticipated**" for the short-tailed snake.

2.5.6 Southeastern American Kestrel

The southeastern American kestrel is listed by the FWC as threatened due to habitat loss, degradation and fragmentation, as well as lack of regulatory protection (FWC 2013d). The southeastern American kestrel is the only non-migratory, permanent resident kestrel in Florida. However, the seasonal occurrence of a migratory subspecies of the northern American kestrel (*Falco sparverius sparverius*) occurs from September through March in Florida. Confident identification of southeastern American kestrels can only be made during the portion of the breeding season when migratory species are not present (FWC 2013d). Preferred habitat consists of fire-maintained sandhill and open pine savannah. They utilize open pine habitats, woodland edges, prairies, pastures, and other agricultural lands. The southeastern American kestrel is a secondary cavity nester, typically nesting in tall trees or utility poles.

Suitable nesting and foraging habitat for kestrels were observed throughout the study area, including proposed pond site locations. Individuals were observed on multiple occasions during field surveys. Activities within the 492 feet (150 meter) buffer of an active nest are considered to cause take. Pre-construction surveys will be conducted to adhere to the components of the ISMP; therefore, "**no adverse effect is anticipated**" for the southeastern American kestrel resulting from the proposed project.

2.5.7 Imperiled Wading Birds

Three wading birds have the potential to occur in the study area. These species are the little blue heron, roseate spoonbill, and tricolored heron. All three are listed by the FWC as threatened due to habitat loss and degradation, particularly from hydrologic alterations to their essential foraging areas (FWC 2013e). These species are widely distributed throughout peninsular Florida. Wading birds depend on healthy wetlands and vegetated areas suitable for resting and breeding which are near foraging areas (FWC 2013e). They forage in freshwater, brackish, and saltwater habitats. They tend to nest in multi-species colonies of a variety of woody vegetation types including cypress, willow, maple, black mangrove, and cabbage palm (FNAI 2001).

Ecologists observed suitable foraging and minimal nesting habitat for wading birds throughout the study area, including proposed pond sites. All three species were observed throughout the study area. These observations include flyovers and foraging in roadside ditches. No nesting activity was observed during the field reviews. According to FNAI and the FWC Wading Bird Rookery Database, no active wading bird rookeries are located within the project area. Impacts to wetlands will be mitigated. Based on the information provided, "**no adverse effect is anticipated**" for wading birds resulting from the proposed project.

2.5.8 State Listed Plants

Through regulation by the FDACS Division of Plant Industry, Florida protects plant species native to the state that are endangered, threatened, or commercially exploited. The Florida Regulated Plant Index includes all plants listed as endangered, threatened, or commercially exploited as defined in Chapter 5B-40.0055, F.A.C. According to the FNAI, and FDACS 14 state protected plant species have the potential to occur in the project area (**Table 2-1**). However, FNAI listed no occurrences of protected plants within the study area. Many of these plant species are endemic to the Lake Wales Ridge or otherwise occur in open sandy habitats maintained by periodic fire, such as sandhill, oak scrub, and scrubby flatwoods and include Ashe's savory, Florida beargrass, Florida spiny-pod, giant orchid, nodding pinweed, and sand butterfly pea. These species are listed due to habitat destruction and modification, primarily as a result of development and fire suppression. The remaining listed plant species include celestial lily, Chapman's sedge, cutthroatgrass, Florida willow, hartwrightia, many-flowered grass-pink, Piedmont jointgrass, and star anise, and require mesic or wetland habitats. These species are listed due to habitat destruction and modification as a result of water quality degradation, hydrologic disturbances, and lack of fire.

The scrub habitats required to support many of these species do not occur within the project area impacted by the Preferred Alternative, including pond sites. Mesic and wetland habitats were observed throughout the corridor. The majority of the areas within or immediately adjacent to the project footprint have been disturbed or developed and the right-of-way is mowed and maintained, minimizing the ability for these species to grow in these areas. No listed plant species were observed during the field surveys. FDOT will conduct appropriately timed surveys for listed plant species during design and permitting. Based on the information provided, "**no adverse effect is anticipated**" for state listed plant species resulting from the proposed project.

2.6 Other Protected Species or Habitats

2.6.1 Bald Eagle

The bald eagle was removed from the ESA in 2007 and Florida's Endangered and Threatened Species list in 2008; however, it remains protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. Bald eagles tend to nest in the tops of very tall trees that provide unobstructed lines of sight to nearby habitats, particularly lakes and other open waters. Because eagles are piscivorous (fish-eating) raptors, nearly all eagles' nests occur within 1.8 miles of water (Wood et at. 1989). No Critical Habitat has been designated for the bald eagle.

Suitable habitat for the bald eagle was observed throughout the study area. Several bald eagles were observed during the field reviews. According to the FWC's Eagle Nest locator and the Audubon Florida EagleWatch Nest website (EagleWatch), there are seven (7) nests located within one mile of the study area. All the documented nests are located outside the 660-foot eagle nest protection zone except Nest PO149. The location of Nest PO149 was documented by Inwood staff via submeter GPS and found to be approximately 550 feet northwest of the FWC/EagleWatch location. Ecologists surveyed the area to identify the correct location of Nest PO149 and ensure there were no other nests in the area. Nest PO149 was located approximately 95 feet from the existing roadway and was observed during multiple field visits (**Figure 2-1**). Ecologists documented the status of the nest tree during the course of the study. In 2019, the tree was observed to be dying and had dropped most of its limbs, with the nest at the top of the tree with little structural support. The nest was still observed to be active. Similar conditions were observed and documented in 2020 and 2021 with increasing evidence of decay. EagleWatch documented the status of Nest PO149 as active and successful for the 2022 nesting season. Hurricane Ian struck Florida on September 28, 2022. Ecologists conducted a field review on October 10, 2022, and observed the nest had been destroyed. Only a snag remained of the tree and the nest had fallen to the ground. FDOT will conduct an eagle nest survey during design and permitting. Based on the current nest status, it is anticipated that the proposed project will have no impact on the bald eagle since the proposed activities are outside the 660-ft eagle nest protection buffer.

2.6.2 Florida Black Bear

The Florida black bear was removed from Florida's Endangered and Threatened Species list in 2012; however, it remains protected under Chapter 68A-4.009 F.A.C., the Florida Black Bear Conservation Plan. The study area is located in the occasional range of the South Central Bear Management Unit (BMU).

The black bear requires large amounts of space for its home range and a variety of forested habitats, including flatwoods, swamps, scrub oak ridges, bayheads, and hammocks. Self-sustaining populations of bears are generally found on large tracks of contiguous forests with understories of berry producing shrubs or trees. The corridor primarily consists of residential and agricultural land uses with a number of lakes throughout the corridor. Additionally, the project corridor continues to be developed and site clearing and construction was observed during the field reviews. The mobility of bears throughout the study area is limited by the surrounding development and lakes as evidenced by the FWC data. The most current FWC data for the Florida black bear was reviewed and documents only four (4) historical occurrences within a one-mile buffer of the SR 544 roadway (**Figure 2-1**). No recent bear activity has been recorded in the corridor. No impacts to the Florida black bear are anticipated as a result of this project based on the lack of suitable habitat, including connectivity to suitable habitat, and bear utilization within the project area.

2.6.3 Southern Fox Squirrel

The southern fox squirrel was removed from Florida's Endangered and Threatened Species list in 2018; however, it remains protected under Chapter 68A-4.001, 68A-1.004. and 68A-29.002(1)c F.A.C. The southern fox squirrel can be found throughout the Florida peninsula and up to central Georgia. They inhabit open, fire-maintained longleaf pine, turkey oak, sandhills, and flatwoods (FNAI 2001). They will also utilize mixed hardwood – conifer forest, open areas with pines and oaks, cypress swamps, pastures, and other agricultural lands including the ecotones between these habitats.

Ecologists observed suitable habitat for the southern fox squirrel which primarily occurs within the proposed pond sites and adjacent pastures containing pines and oaks. No individuals or nests were observed during the field survey. Pre-construction surveys will be conducted to adhere to the components of the ISMP and permitting guidelines; therefore, the project will have no impact on the southern fox squirrel.

2.6.4 Strategic Habitat Conservation Areas

Strategic Habitat Conservation Areas (SHCA) are lands in need of protection to maintain natural communities and viable populations of many species that are indicators of the state's biological diversity. In 1994, FWC completed a project entitled *Closing the Gaps in Florida's Wildlife Habitat Conservation System* (Cox et al. 1994), which assessed the security of rare and imperiled species on existing conservation lands in Florida. This research identified important habitat areas in Florida with no conservation protection. These SHCA serve as a foundation for conservation planning for species protection through habitat conservation.

FWC designated SHCA occur throughout the study area for the sand skink, snail kite, and Cooper's hawk (**Figure 2-1**). No regulatory action is required for impacts to SHCA.

2.7 Conceptual Mitigation for Protected Species

The proposed ponds, and FPC sites contain suitable habitat for skinks and were not surveyed during the March 2021 coverboard surveys. Species-specific surveys for sand skinks will be conducted in suitable habitat during the design and permitting phases to determine presence or absence of skinks, and whether and to what extent mitigation may be required. If skinks are determined to be present and mitigation is required, mitigation for unavoidable impacts to occupied skink habitat will be provided through the purchase of credits from an USFWS-approved conservation bank.

The project is within the CFA of five wood stork colonies. Mitigation will be required for impacts to SFH. Any unavoidable impacts to SFH may be compensated in accordance with the South Florida Programmatic Concurrence Key for the Wood Stork (USFWS 2010). Mitigation for impacts to wood stork SFH will be provided within the Service area of an USFWS-approved wetland mitigation bank or wood stork conservation bank.

Multiple gopher tortoise burrows were observed within the project area. Mitigation contributions for the gopher tortoise will be calculated and provided to FWC during the gopher tortoise relocation permitting process.

SECTION 3 WETLAND EVALUATION

Ecologists performed a wetland evaluation of the study area. The wetland evaluation relied on literature reviews and field surveys to identify the location, extent, and functional value of wetlands in the study area; the potential direct, indirect, or cumulative effects of the project's actions to those wetlands; and available mitigation options to satisfy permit requirements from regulatory agencies. This wetland evaluation was performed in accordance with the Presidential Executive Order (EO) 11990 ("Protection of Wetlands"); U.S. Department of Transportation Order 5660.1A ("Preservation of the Nation's Wetlands"); Federal Highway Administration Technical Advisory T6640.8A regarding the preparation of environmental documents; the *Wetlands and Other Surface Waters* chapter of the FDOT's PD&E Manual.

3.1 Efficient Transportation Decision Making

According to their ETDM Summary Report No. 5873, dated May 22, 2020, the U.S. Environmental Protection Agency (EPA), SWFWMD, and USACE indicated the project alternatives may create a "moderate" DOE to wetlands and surface waters; while the Florida Department of Environmental Protection (FDEP) indicated a DOE of “minimal.” The primary issues were the potential loss of wetland functions; loss of wildlife habitat; degradation of water quality in wetlands and surface waters; and reduction in flood storage and capacity. In order to provide reasonable assurances that direct, indirect, or cumulative impacts from construction, alteration and intended or reasonably expected uses of the proposed alternatives will not contribute to violations of water quality standards or adverse impacts to the functions of wetlands or other surface waters, the FDOT will calculate the appropriate mitigation during the design and permitting phase to satisfy the requirements of 33 United States Code (U.S.C.) § 1344 and Part IV of Chapter 373, Florida Statutes (F.S.)

3.2 Data Collection and Methodology

The wetland evaluation included GIS analysis, agency database search, and field reviews. Existing Conditions Section lists the data sources utilized for review. Ecologists familiar with Florida's natural plant communities performed an assessment of the study area to identify wetland vegetation, wetland hydrology, and hydrologic indicators to determine the presence of wetlands and other surface waters within the study area. Field reviews were conducted from October 2019 through December 2022. A formal wetland delineation to determine jurisdictional boundaries was not performed; however, the general limits of wetlands and other surface waters were identified in the field using the criteria established in Rule 62-340, F.A.C. The wetland limits have not been reviewed by the agencies. Wetlands and surface waters were classified per the FLUCFCS (FDOT 1999), and the Classification of Wetlands and Deepwater Habitats of the US (NWI) (Cowardin et al. 1979). The Uniform Mitigation Assessment Method (UMAM) was utilized, per Chapter 62-345, F.A.C., for the functional assessment of wetlands within the SR 544 Study Area. Additionally, a

Sovereign Submerged Lands (SSL) determination was obtained from the FDEP (**Appendix D**) regarding Lake Conine, Lake Smart, Lake Fannie, the canal between Lake Conine and Lake Smart, the canal between Lake Henry and Lake Hamilton, and the unnamed canal in S5, 28S, 27E.

3.3 Wetlands and Surface Waters

Wetlands and other surface waters with potential to be affected by the proposed project were identified within the study area (**Figure 3-1**). The following section includes a brief description of each wetland type and other surface water within the study area. **Table 3-1** provides details identifying each wetland including the wetland number, NWI and FLUCFCS classification, and a brief description.

Figure 3-1: Wetlands and Other Surface Waters

Figure 3-1: Wetlands and Other Surface Waters

Figure 3-1: Wetlands and Other Surface Waters

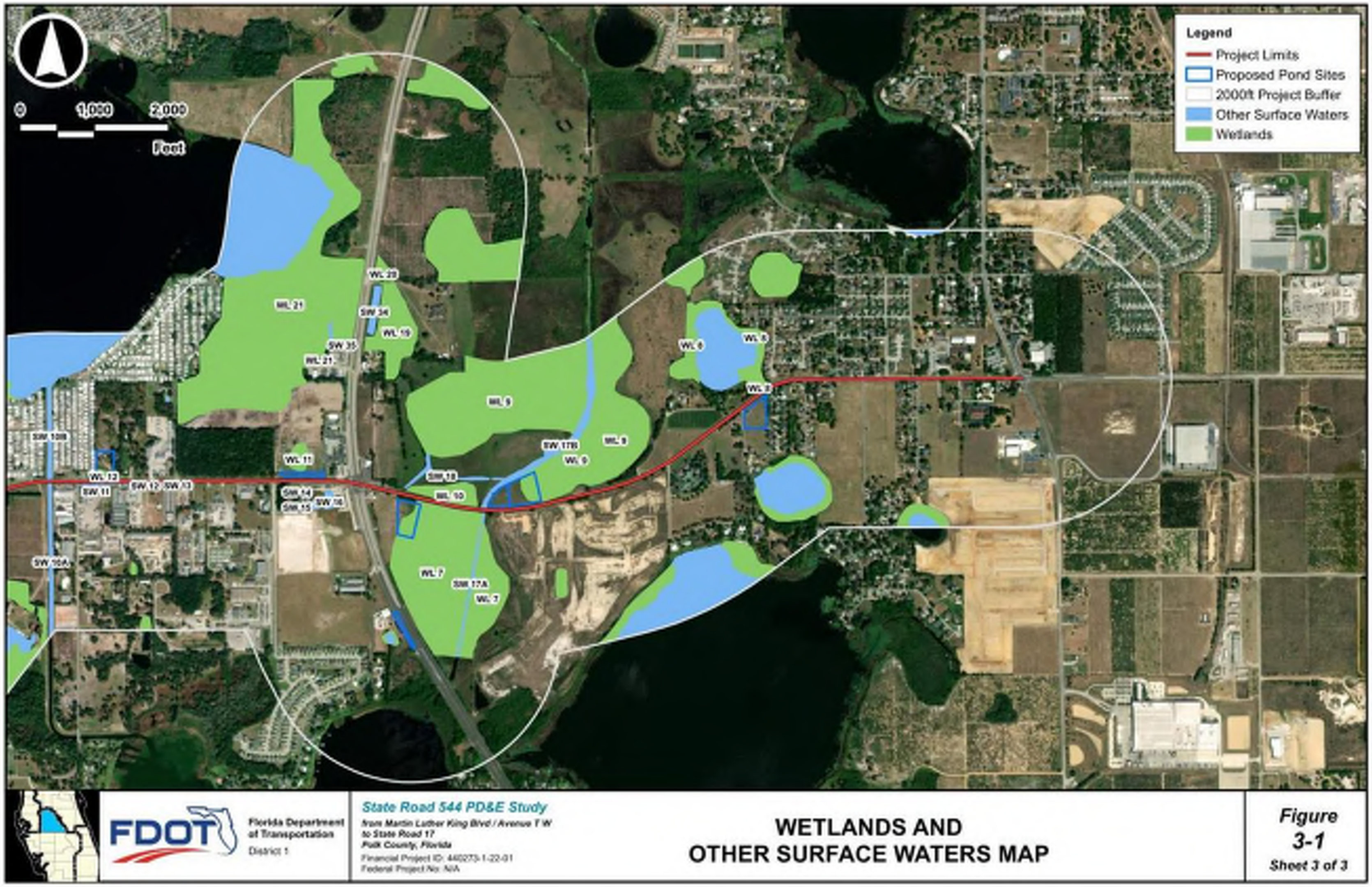


Table 3-1: Wetlands and Other Surface Waters in the SR 544 Study Area

WETLAND ID	FLUCFCS	NWI	DESCRIPTION
WL 1	644	PEM1C	Emergent Aquatic Vegetation
WL 2	630	PFO7C/ PSS3B	Wetland Forested Mixed
WL 3	630	PFO7C/ PSS3B	Wetland Forested Mixed
WL 4	630/641/ 644	PEM1F/PEM1G	Wetland Forested Mixed/Freshwater Marshes/Emergent Aquatic Vegetation
WL 5	630/641/ 644	PFO6F/PFO7F/PEM1F	Wetland Forested Mixed/Freshwater Marshes/Emergent Aquatic Vegetation
WL 6	630/640/ 643	PFO7B/PFO1C/PAB4Hx/PSS1F	Wetland Forested Mixed/Freshwater Marshes/Wet Prairies
WL 7	643	PEM1Cd	Wet Prairies
WL 8	615/641	PEM1F	Stream and Lake Swamps/Freshwater Marshes
WL 9	630/641/ 643	PEM1Cd/PFO2F	Wetland Forested Mixes/Freshwater Marshes/Wet Prairies
WL 10	643	PEM1Cd	Wet Prairies
WL11	653	PEM1F	Intermittent Ponds
WL 12	653	PUBHx	Intermittent Ponds
WL 13	630/641	PFO7B/PEM1F	Wetland Forested Mixed/Freshwater Marshes
WL 14	630	PFO7C/PFO6F	Wetland Forested Mixed
WL 15	641	PFO6F/PSSF	Freshwater Marshes
WL 16	615/641	PEM1C	Freshwater Marshes
WL 17	644	L1UBH	Emergent Aquatic Vegetation
WL 18	618/630	PFO3A	Willow and Elderberry/Wetland Forested Mixed
WL 19	615	PFO1/3C	Stream and Lake Swamps
WL 20	615	PFO1/3C	Stream and Lake Swamps
WL 21	615/644	PFO1/3C/PEM1F/PFO6F/PFO7C	Stream and Lake Swamps/Emergent Aquatic Vegetation
SW 1	510	R5UBFx	Streams and Waterways
SW 2	530	N/A	Reservoirs
SW 3A	510	L1UBHx	Streams and Waterways
SW 3B	510	L1UBHx	Streams and Waterways
SW 4	520	L1UBH	Lakes
SW 5	510	PUBCx	Streams and Waterways
SW 6	520	L1UBH	Lakes
SW 7	510	R5UBFx	Streams and Waterways
SW 8	510	PUBCx	Streams and Waterways

WETLAND ID	FLUCFCS	NWI	DESCRIPTION
SW 9	510	PUBCx	Streams and Waterways
SW 10A	510	R2UBHx	Streams and Waterways
SW 10B	510	R2UBHx	Streams and Waterways
SW 11	510	PUBCx	Streams and Waterways
SW 12	510	PUBCx	Streams and Waterways
SW 13	510	PUBCx	Streams and Waterways
SW 14	530	PUBCx	Reservoirs
SW 15	530	PUBCx	Reservoirs
SW 16	530	PEM1F	Reservoirs
SW 17A	510	R2UBHx	Streams and Waterways
SW 17B	510	R2UBHx	Streams and Waterways
SW 18	510	R5UBFx	Streams and Waterways
SW 19	510	PUBCx	Streams and Waterways
SW 20	510	PUBCx	Streams and Waterways
SW 21	530	PUBCx	Reservoirs
SW 22	510	R5UBFx	Streams and Waterways
SW 23	510	R5UBFx	Streams and Waterways
SW 24	530	PUBHx	Reservoirs
SW 25	510	R5UBFx	Streams and Waterways
SW 26	510	R5UBFx	Streams and Waterways
SW 27	510	R5UBFx	Streams and Waterways
SW 28	530	PUBHx	Reservoirs
SW 29	510	PUBCx	Streams and Waterways
SW 30	510	PUBCx	Streams and Waterways
SW 31	510	PUBCx	Streams and Waterways
SW 32	520	L1UBH	Lakes
SW 33	510	R5UBH	Streams and Waterways
SW 34	530	PEM1Cx	Reservoirs
SW 35	510	R5UBFx	Streams and Waterways

3.3.1 Stream and Lake Swamps (Bottomland)

FLUCFCS: 615
USFWS: PFO7C, PPFO1/3C, PEM1F
Wetlands: WL 8, WL 19, WL 20, WL 21

Streams and Lake Swamps (Bottomland) usually occur in floodplain or overflow areas. This wetland type occurs within the project area along northern and eastern project termini. Observed canopy species include red maple (*Acer rubrum*). Shrub species observed include immature canopy species, Carolina willow (*Salix caroliniana*), elderberry (*Sambucus nigra*), and Peruvian primrose willow (*Ludwigia peruviana*). Groundcover includes pickerelweed (*Pontederia cordata*).

3.3.2 Willow and Elderberry

FLUCFCS: 618
USFWS: PFO3A
Wetlands: WL 18

The willow and elderberry classification consists of a vegetative community that is dominated by Carolina willow. The portion of WL 18 that abuts SR 544 is classified as Willow and Elderberry. Vegetative species within this portion of WL 18 include red maple, Carolina willow, elderberry, Brazilian pepper (*Schinus terebinthifolia*), and lantana.

3.3.3 Wetland Forested Mixed

FLUCFCS: 630
USFWS: PFO7C, PSS3B
Wetlands: WL 2, WL 3, WL 4, WL 5, WL 6, W L9, WL 13, WL 14, WL 18

Wetland Forested Mixed wetlands contain communities in which neither hardwoods nor conifers achieve 66 percent canopy composition. This type of forested wetland occurs throughout the project area. Vegetative species observed in these communities include a canopy of red maple, sweet bay (*Magnolia virginiana*), black gum (*Nyssa sylvatica),* bald cypress (*Taxodium distichum*), slash pine (*Pinus Elliotti*), and laurel oak (*Quercus laurifolia*). Understory species observed include Brazilian pepper, Peruvian primrose willow, immature canopy species, Carolina willow, elderberry, salt bush *(Baccharis halimifolia*), and wax myrtle (*Myrica cerifera*). Groundcover species observed include various rush *(Juncus* spp.), torpedograss (*Panicum repens*), cinnamon fern (*Osmunda cinnamomea*), beggar ticks (*Bidens alba*), and swamp fern *(Blechnum serrulatum*).

3.3.4 Freshwater Marshes

FLUCFCS: 641
USFWS: PEM1G, PEM1CD, PEM1F,
Wetlands: WL 4, WL 5, WL 13, WL 15, WL 16

Freshwater Marshes are non-forested wetlands that are usually confined to relatively low-lying areas. This type of non-forested wetland occurs multiple times throughout the project area. Vegetative species observed in these communities are comprised of Peruvian primrose willow, saltbush, Carolina willow, and red maple saplings, cinnamon fern, torpedograss, soft rush, various sedges (*Adropogon* spp.), arrowhead (*Sagitaria latifolia*), lizards' tail (*Saururus cernuus*), and cattails (*Typha* spp.)

3.3.5 Wet Prairies

FLUCFCS: 643
USFWS: PEM1CD
Wetlands: WL 6, WL 7, WL 9, WL 10

Wet Prairies are non-forested wetlands composed predominantly of grassy vegetation and usually distinguished from marshes by having less water and shorter herbage. Wet prairies occur throughout the study area. Vegetative species observed within these communities include St. Johns wort (*Hypericum* spp.), Peruvian primrose willow, cordgrass (*Spartina bakeri*), yellow-eyed grass (*Xyris* spp.), maidencane *(Panicum hemitomon*), smartweed (*Polygonum hydropiperoides*), dollarweed *(Hydrocotyle* spp.), and torpedograss.

3.3.6 Emergent Aquatic Vegetation

FLUCFCS: 644
USFWS: PEM1C, L2AB3H
Wetlands: WL 1, WL 4, WL 5, WL 17, WL 21

Emergent Aquatic Vegetation wetlands are non-forested wetlands comprised of both floating vegetation and vegetation which is found either partially or completely above the surface of water. These wetland communities are associated with the lakes within the project corridor. Vegetative species observed within these communities include spatterdock (*Nuphar* spp.), smartweed (*Persicari hydropiperoides*), duck weed (*Lemna* spp.), pickerel week, Peruvian primrose willow, and cattails.

3.3.7 Intermittent Ponds

FLUCFCS: 652
USFWS: PEM1F, PUBHx
Wetlands: WL 11, WL 12

Intermittent Ponds is a category of wetland defined as a waterbody which exists for only a portion of the year. These land use types occur in WL 11 and WL 12. Water levels were observed to fluctuate throughout the year, with WL 11 almost completely drying up. Observed vegetation within WL 12 includes soft rush, Peruvian primrose willow, torpedo grass, and maidencane.

3.3.8 Streams and Waterways

FLUCFCS: 510
USFWS: R2UBSx, R5UBFx, L1UBHx
Surface Water: SW 1, SW 3A, SW 3B, SW 5, SW 7, SW 8, SW 9, SW 10A, SW 10B, SW 11, SW 12, SW 13, SW 17A, SW 17B, SW 18, SW 19, SW 20, SW 22, SW 23, SW 25, SW 26, SW 27, SW 29, SW 30, SW 31, SW 33, SW 35

Streams and Waterways include rivers, creeks, canals, and other linear bodies of water. The surface waters within the study area consists of canals, agricultural ditches, and roadside ditches. These ditches generally contain standing water during the rainy season and are shallow or dry during the dry season. Many of these systems support hydrophytic vegetation. Typical vegetation observed in these surface waters include red maple, water oak (*Quercus nigra*), duck potato (*sagitaria lancifolia*), pickerel weed, smart weed, Carolina willow, and Peruvian primrose willow.

3.3.9 Lakes

FLUCFCS:	520
USFWS:	L1UBH
Surface Water:	SW 4, SW 6, SW 32

Lakes include extensive inland water bodies, excluding man-made reservoirs. Three lakes occur immediately adjacent to the SR 544 roadway. These lakes include Lake Conine, Lake Smart, and Lake Fannie.

3.3.10 Reservoirs

FLUCFCS:	530
USFWS:	PUBHX, PEM1F
Surface Water:	SW 2, SW 14, SW 15, SW 16, SW 21, SW 24, SW 28, SW 34

Reservoirs are artificial impoundments of water used for irrigation, flood control, and municipal and rural water supplies. Reservoirs occur throughout the study area. Many of the reservoirs are permitted stormwater ponds.

3.4 Wetland and Surface Water Impacts

Data collected during the literature review, previous permit history, and field survey were used to evaluate the potential adverse direct and secondary impacts of the project to wetlands and the potential cumulative impacts to those wetlands and surface waters in the project limits. Practicable measures to avoid or minimize impacts to wetlands and surface waters were considered during the SR 544 Study. The unavoidable adverse impacts will be mitigated pursuant to Section 373.4137, F.S., to satisfy all mitigation requirements of Part IV of Chapter 373, F.S., and U.S.C. §1344. **Table 3-2** details the proposed wetland and surface water impacts.

3.4.1 Direct Impacts

The Preferred Alternative will result in 12.52 acres of direct impacts to wetlands and 2.66 acres of direct impacts to other surface waters. Final direct impacts will be determined during design and permitting and will be assessed accordingly.

3.4.2 Secondary Impacts

Secondary impacts were assessed at a distance of 25 feet beyond any direct wetland impacts. The proposed project will result in approximately 8.45 acres of secondary impacts to wetlands. Final secondary impacts will be determined during design and permitting and will be assessed accordingly.

Table 3-2: Potential Wetland and Other Surface Water Impacts from the Preferred Alternative and Pond Site Alternatives

Wetland ID	FLUCFCS	Description	Impact Type	Impact Area (ac.)
WL 1	644	Emergent Aquatic Vegetation	Right-of-Way	0.32
			FPC 1	0.09
WL 2	630	Wetland Forested Mixed	Right-of-Way	0.53
WL 3	630	Wetland Forested Mixed	Right-of-Way	0.17
WL 4	630	Wetland Forested Mixed	Right-of-Way	0.89
	641	Freshwater Marshes	Right-of-Way	1.19
WL 5	630	Wetland Forested Mixed	Right-of-Way	0.08
WL 6	630	Wetland Forested Mixed	Right-of-Way	0.47
			Pond 5	1.05
			FPC 4	0.45
	641	Freshwater Marshes	FPC 4	0.28
WL 7	643	Wet Prairies	Right-of-Way	0.75
WL 8	615	Stream and Lake Swamps (Bottomland)	Right-of-Way	0.16
WL 9	641	Freshwater Marshes	Right-of-Way	0.04
			FPC 5	1.66
WL 10	643	Wet Prairies	Right-of-Way	0.18
WL 12	653	Intermittent Ponds	Right-of-Way	0.10
			Pond 6	0.33
WL 13	630	Wetland Forested Mixed	Right-of-Way	0.24
WL 14	630	Wetland Forested Mixed	Right-of-Way	0.41
WL 16	641	Freshwater Marshes	Right-of-Way	1.16
WL 17	644	Emergent Aquatic Vegetation	Right-of-Way	0.48
WL 18	618	Willow and Elderberry	Right-of-Way	0.14
WL 21	615	Stream and Lake Swamps (Bottomland)	Right-of-Way	1.35
SW 1	510	Streams and Waterways	Right-of-Way	0.18
SW 3A	510	Streams and Waterways	Right-of-Way	0.02
SW 3B	510	Streams and Waterways	Right-of-Way	0.02
SW 5	510	Streams and Waterways	Right-of-Way	0.07
SW 8	510	Streams and Waterways	Right-of-Way	0.09
SW 9	510	Streams and Waterways	Right-of-Way	0.08

Wetland ID	FLUCFCS	Description	Impact Type	Impact Area (ac.)
SW 10A	510	Streams and Waterways	Right-of-Way	0.03
SW 10B	510	Streams and Waterways	Right-of-Way	0.04
SW 11	510	Streams and Waterways	Right-of-Way	0.08
SW 12	510	Streams and Waterways	Right-of-Way	0.09
SW 13	510	Streams and Waterways	Right-of-Way	0.01
SW 17A	510	Streams and Waterways	Right-of-Way	0.02
SW 17B	510	Streams and Waterways	Right-of-Way	0.04
SW 19	510	Streams and Waterways	Right-of-Way	0.14
SW 20	510	Streams and Waterways	Right-of-Way	0.21
SW 21	530	Reservoirs	Right-of-Way	0.20
SW 22	510	Streams and Waterways	Right-of-Way	0.13
SW 23	510	Streams and Waterways	Right-of-Way	0.33
SW 25	510	Streams and Waterways	Right-of-Way	0.06
SW 26	510	Streams and Waterways	Right-of-Way	0.48
SW 27	510	Streams and Waterways	Right-of-Way	0.06
SW 29	510	Streams and Waterways	Right-of-Way	0.02
SW 30	510	Streams and Waterways	Right-of-Way	0.05
SW 31	510	Streams and Waterways	Right-of-Way	0.05
SW 33	510	Streams and Waterways	Right-of-Way	0.04
SW 35	510	Streams and Waterways	Right-of-Way	0.12
Total Impacts				
Total Right-of-Way Wetland Impacts (ac.)		**Total Pond and FPC Wetland Impacts (ac.)**	**Secondary Wetland Impacts (ac.)**	
8.66		**3.86**	**8.45**	
			Total Direct Wetland Impacts	**12.52**
			Total Other Surface Water Impacts	**2.66**
			Total Proposed Impacts	**15.18**

3.4.3 Cumulative Impacts

Cumulative impacts can result from incremental but collectively significant impacts within the basin over time. In order to provide reasonable assurances that the project will not cause unacceptable cumulative impacts, mitigation will be provided from within the same drainage basin as the anticipated impacts or the project will utilize a regional mitigation plan pursuant to Section 373.4137, F.S.

3.5 Avoidance and Minimization

The No-Build Alternative, in which no roadway improvements would occur aside from routine maintenance, will not result in direct or indirect impacts to wetlands or other surface waters in the project area; however, this alternative is not consistent with existing long-range transportation plans and does not meet the stated purpose and need for the SR 544 Study. Several alternatives described above were considered to reduce overall impacts to wetlands to the greatest extent practicable. Within Segment 1 (Martin Luther King Boulevard to North of Avenue Y), four alternative typical sections were considered including two-lane urban typical, a three-lane urban typical, a four-lane undivided rural typical, and a five-lane urban typical. Within Segments 2-7 (North of Avenue Y to La Vista Drive) a four-lane divided typical section with north and south widenings was considered. Segment 8 (LaVista Drive to SR 17) considered a four-lane divided typical section with north, south, and center widenings. Complete avoidance of impacts was not feasible due to the nature of the roadway widening project and the occurrence of wetland habitats immediately adjacent to the proposed project. Avoidance and minimization measures utilized by the proposed project include pond siting to minimize or completely avoid impacts to wetlands and protected species occurring within the project area. The Alternatives Analysis can be found in Section 5 of the Preliminary Engineering Report (PER).

3.6 Wetland Assessment

A wetland assessment was performed for wetlands and other surface waters in the SR 544 Study Area. The wetland assessment was conducted in accordance with UMAM, as described in Chapter 62-345, F.A.C. The UMAM is the state-wide methodology for determining the functional value provided by wetlands and other surface waters and the amount of mitigation required to offset adverse impacts to those areas for regulatory permits. The results of the UMAM assessment are provided in **Table 3-3**. UMAM summary sheets can be found in **Appendix O**. These values may be refined during the design and permitting phases of the project.

Table 3-3: Proposed Wetland Functional Loss Due to Impacts from the Preferred Alternative

Wetland ID	Wetland Type	Impact Type	UMAM Delta	Impact Area (ac.)	Functional Loss
WL 1	Herbaceous	Direct	0.43	0.41	0.178
		Secondary	0.07	0.57	0.038
WL 2	Forested	Direct	0.40	0.53	0.212
		Secondary	0.07	0.59	0.039
WL 3	Forested	Direct	0.40	0.17	0.068
		Secondary	0.07	0.14	0.009
WL 4	Forested and Herbaceous	Direct	0.40	2.08	0.832
		Secondary	0.07	1.77	0.118
WL 5	Forested	Direct	0.57	0.08	0.045
		Secondary	0.07	0.31	0.021
WL 6	Forested and Herbaceous	Direct	0.57	2.25	1.275
		Secondary	0.07	1.39	0.093
WL 7	Herbaceous	Direct	0.40	0.75	0.30
		Secondary	0.07	0.88	0.059
WL 8	Forested	Direct	0.40	0.16	0.064
		Secondary	0.07	0.11	0.007
WL 9	Herbaceous	Direct	0.40	1.70	0.680
		Secondary	0.07	0.47	0.031
WL 10	Herbaceous	Direct	0.40	0.18	0.072
		Secondary	0.07	0.36	0.024
WL 12	Herbaceous	Direct	0.40	0.43	0.143
		Secondary	0.00	0.00	0.00
WL 13	Forested	Direct	0.40	0.24	0.136
		Secondary	0.07	0.44	0.029
WL 14	Forested	Direct	0.40	0.41	0.232
		Secondary	0.07	0.59	0.039
WL 16	Herbaceous	Direct	0.40	1.16	0.464
		Secondary	0.07	0.89	0.059
WL 17	Herbaceous	Direct	0.40	0.48	0.208
		Secondary	0.07	0.71	0.047
WL 18	Herbaceous	Direct	0.40	0.14	0.061
		Secondary	0.07	0.24	0.016
WL 21	Forested	Direct	0.40	1.35	0.765
		Secondary	0.07	0.57	0.323
				Total Direct Functional Loss	**5.735**
				Total Secondary Functional Loss	**0.991**
				Total Functional Loss	**6.726**

3.7 Wetlands Finding

The Preferred Alternative was evaluated for impacts to wetlands in accordance with EO 11990 and USDOT Order 5560.1A. The Preferred Alternative will be constructed almost entirely within the existing right-of-way to avoid impacts to wetlands. Unavoidable impacts to wetlands and surface waters outside of the existing right-of-way include impacts to unnamed systems immediately abutting the existing right-of-way that, due to the horizontal geometry of the preferred roadway build alternative or the establishment of FPC sites, cannot be avoided. In order to minimize impacts to wetlands, the roadway preferred build alternative is located within the existing right-of-way as much as is practicable and proposed stormwater ponds are located in upland areas wherever practicable.

Based on the above considerations, it is determined that there is no practicable alternative to the proposed construction in wetlands and the proposed action includes all practicable measures to minimize harm to wetlands which may result from such use.

3.8 – Conceptual Mitigation

Wetland impacts which will result from the construction of this project will be mitigated pursuant to Section 373.4137, F.S., to satisfy all mitigation requirements of Part IV of Chapter 373, F.S., and U.S.C. §1344. Compensatory mitigation for this project will be completed through the use of mitigation banks and any other mitigation options that satisfy state and federal requirements.

The study area is located within the Peace River Regulatory Basin. Currently, this basin has two mitigation banks (Peace River Mitigation Bank and Horse Creek Mitigation Bank) with forested and herbaceous credits available for both state and federal mitigation. Boran Ranch Mitigation Bank, which is also within the same basin, currently has herbaceous credits for both state and federal mitigation, and forested credits for state mitigation.

SECTION 4 ESSENTIAL FISH HABITAT

The National Marine Fisheries Service (NMFS) is the regulatory agency responsible for the nation's living marine resources and their habitats, including essential fish habitat (EFH). This authority is designated by the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), as amended. The MSFCMA defines EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity" (16 U.S.C. § 1802(10)].

In accordance with the MSFCMA, Section 7 of the ESA, and Part 2, Chapter 17, Essential Fish Habitat, of the FDOT's PD&E Manual, the Malabar Road Study Area was evaluated for potential EFH. According to their ETDM Summary Report No. 5873, dated May 28, 2020, NMFS staff concluded that the project will not impact EFH; therefore, an EFH assessment is not required.

SECTION 5 ANTICIPATED PERMITS

FDOT construction and maintenance activities are regulated by numerous environmental laws and regulations administered by state and federal agencies. These agencies have established environmental programs to conserve, protect, manage, and control the air, land, water and natural resources of the state or U.S. The following is a list of anticipated permits needed from the state and federal agencies for the proposed project.

5.1 State 404 Permit

Section 404 of the CWA established a program to regulate the discharge of dredge or fill material into the waters of the United States, including wetlands. Responsibility for Section 404 was previously administered by the USACE. However, the State of Florida requested and was granted authority on December 22, 2020 (85 FR 83553), to operate the Section 404 Program for work in most non-tidal waters in the state. The State 404 Program is administered by the FDEP. All waters of the United States with potential to be impacted by the proposed project are not retained by the USACE and are therefore assumed by FDEP. Based on the amount of wetland and surface water impacts, a State 404 Individual Permit is anticipated.

5.2 Biological Opinion/Incidental Take Permit

The ESA of 1973, as amended, requires all Federal agencies to work to conserve endangered and threatened species and to use their authorities to further the purposes of the ESA. Section 7(a)(2) of the ESA is the mechanism by which Federal agencies ensure the action they take, including those they fund or authorize (i.e., Federal permit), do not jeopardize the existence of any listed species. When a federal action "may affect and is likely to adversely affect" a listed endangered or threatened species, the lead Federal agency submits a request to the USFWS for formal consultation. Then the USFWS prepares a Biological Opinion (BO) on whether the proposed activity will jeopardize the continued existence of a listed species. This process would occur during Clean Water Act § 404 Dredge and Fill permitting if jurisdictional wetlands to waters of the U.S. would be impacted by the proposed project. Otherwise, an incidental take permit (ITP) would be necessary under Section 10(a)(1)(B) of the ESA for impacts to federally listed species without nexus to a federal action. A Habitat Conservation Plan is required as part of an ITP from the USFWS. As the project does include federal funds, the Federal action used to initiate ESA Section 7 consultation will be Clean Water Act § 404 Dredge and Fill permitting review by the FDEP with the FWC being responsible for the federal wildlife review, following the assumption of a portion of the CEA 404 program from the USACE in December 2020.

Due to the presence of suitable sand skink habitat, the project "**may affect**" the sand skink and blue-tailed mole skink. A BO would be required if survey results found them to be present within the project area.

5.3 NPDES Permit

As authorized by the CWA, the National Pollutant Discharge Elimination System (NPDES) permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States. The Environmental Protection Agency (EPA) delegated its authority to implement the NPDES program to the FDEP. This permit is required because the proposed project will disturb more than one acre of land, and the stormwater runoff will discharge to waters of the state. A Stormwater Pollution Prevention Plan (SWPPP) is required to be developed as part of the NPDES and implemented during construction. The objectives of the SWPPP are to prevent erosion where construction activities occur, prevent pollutants from mixing with stormwater, and prevent pollutants from being discharged by trapping them on-site, before they can affect the receiving waters. The applicant must submit a Notice of Intent with the FDEP at least two days prior to the commencement of construction.

5.4 Environmental Resource Permit

FDEP and Florida's five Water Management Districts implemented Chapter 62-330, F.A.C, Environmental Resource Permitting (ERP) to govern certain regulated activities, such as works in waters of the state, including wetlands, and construction of stormwater management systems. The proposed project is located within the jurisdiction of the SWFWMD. The proposed project is expected to require an ERP for a stormwater management plan and impacts to wetlands and other surface waters. Additionally, according to the SSL determination, title to the submerged lands below the ordinary high water line of Lake Conine, Lake Smart, and Lake Fannie is held by the Board of Trustees. Any work performed below the ordinary high water line in these areas may require an SSL easement. In the event additional SSL easements are needed, this will be addressed during the permitting phase.

5.5 Gopher Tortoise Relocation Permit

Gopher tortoises and their burrows are protected by Chapter 68A-27.003, F.A.C. A gopher tortoise relocation permit must be obtained from the FWC before disturbing burrows or if construction activities occur within 25 feet of a gopher tortoise burrow. The number of gopher tortoise burrows located within 25 feet of the project footprint will determine the type of gopher tortoise relocation permit that is needed. A 100% gopher tortoise survey should be completed during the design of the project to finalize potential permit needs. Surveys, permitting, excavation, and relocation must be performed by an FWC Authorized Gopher Tortoise Agent.

SECTION 6 CONCLUSIONS

The Preferred Alternative will provide additional capacity on SR 544, consistent with existing long-range transportation plans for the roadway and region and the stated purpose and need for this PD&E Study. The Preferred Alternative will avoid and minimize impacts to wetlands, protected species, and their habitats to the greatest extent practicable. Additional coordination with the appropriate agencies during the design and permitting phase and additional surveys may be required prior to or during construction.

The Preferred Alternative will result in unavoidable wetland and other surface water impacts. During the design phase, the final impacts will be determined, and the appropriate mitigation will be calculated to satisfy the requirements of 33 U.S.C. § 1344 and Part IV of Chapter 373, F.S.

6.1 Implementation Measures/Design Considerations

To ensure the project will not adversely affect protected species or contribute to water quality degradation, the following measures will be implemented:

- Surveys for gopher tortoise burrows, as well as commensal species, will be conducted during the design phase in accordance with 68A-27.003 and the current FWC *Gopher Tortoise Permitting Guidelines*. Permits to relocate tortoises and commensals as appropriate will be obtained from the FWC.
- Surveys for the Florida burrowing owl will be conducted in accordance with 68A-27.003(a), 68A-27.001(4), F.A.C. and the current FWC *Florida Burrowing Owl Species Conservation and Permitting Guidelines* during the design phase. Coordination with FWC will take place as necessary to determine appropriate avoidance and minimization measures to apply during construction.
- Surveys for Florida sandhill crane nest sites will be conducted during the design phase in accordance with 68A-27.003 F.A.C and the Florida Sandhill Crane Conservation Measures and Permitting Guidelines. FDOT will coordinate with FWC to receive the necessary authorizations and implement the appropriate conservation measures as needed prior to construction.
- Surveys for the Southeastern American kestrel will be conducted during the nesting season (May through August) in the design phase in accordance with 68A-27.003(2)(a), 68A-27.001(4), F.A.C. and the current FWC *Southeastern American Kestrel Species Conservation Measures and Permitting Guidelines*. FDOT will coordinate with FWC to receive the necessary authorizations and implement appropriate conservation measures as needed prior to construction.
- Surveys for the Southern fox squirrel will be conducted during the design phase and in accordance with the current FWC *Southern Fox Squirrel Species Conservation Measures and Permitting Guidelines*. FDOT will coordinate with FWC to receive the necessary authorizations and implement appropriate conservation measures as needed prior to construction.

- FDOT will provide mitigation for wetland impacts resulting from project design and construction per 373.4137, F.S. and 33 U.S.C. § 1344.
- Apply erosion and sediment controls and other best management practices prior to and throughout construction to prevent adverse impacts to wetland and aquatic resources adjacent to the project area.
- A survey to update the location of bald eagle nest sites will be conducted during the design phase, and permits will be acquired if there will be unavoidable impacts during construction. Coordination with USFWS will take place as necessary.

6.2 Commitments

To ensure the project will not adversely affect protected species and their habitats, the following commitments will be implemented:

- A survey will be conducted for sand skinks in suitable sand skink habitat per USFWS protocol during the design phase. Consultation with USFWS will be reinitiated at this time.
- The most recent version of the USFWS *Standard Protection Measures for the Eastern Indigo Snake* will be utilized during project construction.
- The FDOT will provide mitigation for impacts to suitable wood stork SFH within the Service Area of the USFWS-approved wetland mitigation bank or wood stork conservation bank.
- A survey for listed plants will be performed during the design phase and coordination prior to construction with the appropriate agency will occur as needed if listed plants are observed within the project area.

6.3 Agency Coordination

6.3.1 Prior Coordination

Comments from the ETAT were provided in the ETDM Summary Report No. 5873, dated May 22, 2020. ETAT members submitted comments related to protected species and their habitats, noting the need for protected species surveys and coordination during the PD&E Study, and implementation of protection measures during construction. ETAT members also commented on potential impacts to wetlands and surface waters, noting the need to avoid and/or minimize impacts to wetlands, document cumulative impact criteria, meet water quality and quantity requirements, and implement proper best management practices during construction. Through the PD&E process, the FDOT has continued to meet with and address the concerns from the commenting agencies as documented in this report.

Species-specific surveys were conducted for the Audubon's crested caracara, Everglade snail kite, Florida bonneted bat, and skinks. Coordination with the USFWS was conducted for survey requirements and methodology approval. Agency coordination documentation is included in **Appendix D**.

6.3.2 Continuing Coordination

The final NRE report will be provided to the relevant resource agencies for review and concurrence with the proposed effect determinations for listed species and potential impacts to wetland resources. Agency coordination will continue during and throughout the design phase of the project when environmental permitting typically occurs. Environmental permits will be required from the FDEP and SWFWMD for the proposed project. Permit applications will be reviewed by the regulatory agencies for potential impacts to environmental resources. During the permitting process, the regulatory agencies will likely request input from the commenting agencies to ensure consistency with regulatory criteria under their purview. Consultation with, or technical assistance by the USFWS shall be required for potential impacts to federally protected species, particularly skinks and wood stork.

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APPENDIX I

Contamination Screening Evaluation Report

DRAFT

Contamination Screening Evaluation Report

Florida Department of Transportation
District One

SR 544 (Lucerne Park Road)
Project Development and Environment Study

from Martin Luther King Blvd to SR 17
Polk County, Florida

Financial Management Number: 440273-1-22-01
ETDM No.: 5873

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.

September 2023

EXECUTIVE SUMMARY

The Florida Department of Transportation (FDOT), District One is conducting a Project Development and Environment (PD&E) study for State Road (SR) 544 (Lucerne Park Road) in Polk County to determine alternative roadway improvements along the corridor. The study limits are from Martin Luther King Blvd. to SR 17, a distance of approximately 8 miles. The purpose of the PD&E Study is to document the need for additional capacity within the study corridor and to evaluate the costs and impacts associated with providing this additional capacity.

The purpose of this Contamination Screening Evaluation Report (CSER) is to present findings of a contamination screening evaluation for SR 544 (Lucerne Park Road) within the study limits. This report identifies and evaluates known or potential contamination problems, presents testing or remedial recommendations concerning these problems, and discusses possible project impacts or impacts to the proposed project including the associated floodplain compensation and stormwater management sites.

This report has been prepared using the FDOT PD&E Manual, Part 2, Chapter 20 (July 1, 2023) reporting format and standard environmental assessment practices of reviewing records of regulatory agencies, site reconnaissance, literature review and when necessary, personal interviews of individuals and business owners within the limits of the project.

Thirty-nine (39) sites were investigated for facilities or operations that may present the potential for finding petroleum contamination or hazardous materials, and therefore may impact the proposed improvements for this project. Specific details for each site are outlined in **Section 7.0** and their locations are presented in **Appendix A**.

For the purpose of this report, the project study area includes the limits of the project with associated Floodplain Compensation and Stormwater Management sites and the following buffer distances as recommended on FDOT projects extending beyond those boundaries: 500 feet from the right-of-way line for petroleum, drycleaners, and non-petroleum sites; 1,000 feet from the right-of-way line for non-landfill solid waste sites; and ½ mile from the right-of-way line for Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), known also as Superfund, National Priority List (NPL), or landfill sites. This report evaluated the alternative roadway improvements. Of the 39 sites investigated, the following risk ratings have been applied: **3 "High" rating sites, 6 "Medium" rating sites and 30 "Low/No" rating sites for potential contamination concerns.**

Table i: Sites Recommended for Additional Evaluation

Site	Facility Name	Risk Rating
2	Big M Mart	High
6	CastelGas LLC/ Pronto Station LLC (Winter Haven Chevron)	Medium
7	Washington Garage	Medium
8	BP #610 Twin Brothers Food Mart	Medium
20	Giant Oil #121	High
28	RaceTrac #2343/ Star Enterprise/ Texaco #242031370	Medium
29	Marathon-Lucern #136	High
38 A-B	Bridges	Medium
39 A-K	Adjacent Agricultural Lands	Medium

For the sites rated “No” for potential contamination, no further action is planned. These sites/facilities have been evaluated and determined not to have any potential environmental risk to the study area at this time.

For sites rated “Low” for potential contamination, no further action is required at this time. These sites/facilities have potential to impact the study area but based on select variables have been determined to have low risk to the corridor at this time. Variables that may change the risk rating include a facility’s non-compliance with environmental regulations, new discharges to the soil or groundwater, and modifications to current permits. Should any of these variables change an additional assessment of the facilities would be conducted.

For those sites with a risk rating of “Medium” or “High”, the Project Manager (PM) and the District Contamination Impact Coordinator (DCIC) will coordinate on further actions that must be taken to best address the contamination issue. This may include determining if the Florida Department of Environmental Protection (FDEP)/FDOT Memorandum of Understanding (MOU) applies to any sites, conducting Level II activities or recommending Level III or remedial activities, notes on the plans, design modifications and/or special provisions prior to or during construction.

Additional information may become available or site-specific conditions may change from the time this report was prepared and should be considered prior to acquiring right-of-way and/or proceeding with roadway construction.

DEFINITIONS

Contamination – The presence of any contaminant in surface water, groundwater, soil, sediment, or upon the land, in concentrations that exceed the applicable Cleanup Target Levels (CTLs) specified in **Chapter 62-777, F.A.C.**, or water quality standards in **Chapter 62-302 or 62-520, F.A.C.**, or in concentrations that may result in contaminated sediment.

Contaminant – Any physical, chemical, biological, or radiological substance present in any medium which may result in adverse effects to human health or the environment or which creates an adverse nuisance, organoleptic, or aesthetic condition in groundwater.

Contaminated Site – Any site with hazardous substances, pollutants, or contaminants that are harmful or likely to be harmful to human health or the environment.

Hazardous Material – A general term that includes all materials and substances which are now designated or defined as hazardous by federal or state law or by the rules or regulations of the state or any federal agency: **40 CFR § 261.30, 40 CFR § 261.4**, **40 CFR §§ 261.21-261.24**, **Section 376.301, F.S.**, and **Section 403.74, F.S.**

Hazardous Waste Site – Site at which wastes as defined in **Rule Chapter 62-730, F.A.C., and 40 CFR §§ 260-272**, have been disposed, treated, or stored.

Level of Investigation – To standardize contamination evaluations on transportation projects, FDOT broadly uses the following levels of contamination investigation:

> **Level I** – A contamination screening evaluation consisting of a desktop review of current and historical records and site reconnaissance to identify past and present activities that have the potential to impact areas in, or immediately adjacent to, project construction. It is used to determine the need and scope of further assessments. Level I evaluation is completed as early as feasible in the project process, typically during the PD&E phase or during preparation of Phase I (30%) design plans for projects which do not have a PD&E Study.
>
> **Level II** – Level II assessment [also known as Impact to Construction Assessment (ICA)] consists of a detailed evaluation of potential contaminated sites based on the findings of Level I evaluation. When applicable, a Level II assessment includes soil sampling, laboratory testing and/or installation of groundwater monitoring wells for sites with known or potentially contaminated materials. This is done to assess the type and extent of contamination in potentially contaminated sites, identify impacts to construction and associated costs for remediation, and to develop recommendations for Level III activities or avoidance measures as warranted. Level II assessment is typically performed during the Design phase and prior to right-of-way acquisition and Construction. However, it may be performed during the PD&E phase for projects with advanced design activities or when it is required to substantiate the impact of potentially contaminated sites on the Preferred Alternative.

Level III – Level III refers to additional evaluation of contamination identified or suspected based on the Level II assessment and any requisite remediation or abatement of contamination or hazardous materials. It includes a detailed plan for the removal and disposal of contaminated media, storage tanks, and/or other hazardous materials that may directly impact construction activities or right-of-way acquisition and clearance. Level III activities can occur during design and right-of-way acquisition, or during or prior to construction to avoid impacts to construction and project delays.

National Pollutant Discharge Elimination System (NPDES) – The NPDES Stormwater Program is a comprehensive two-phased national program (established by the **Clean Water Act**) for addressing the non-agricultural sources of stormwater discharges which adversely affect the quality of our nation's waters. The program uses the NPDES permitting mechanism to require the implementation of controls designed to prevent harmful pollutants from being discharged by stormwater runoff into local water bodies.

Potentially Contaminated Site – A site, within or adjacent to the project limits, suspected to have existing contamination based on past or current activities on or near the site as evidenced by records review, historical land use evaluation, or field reconnaissance.

Remediation – Those activities necessary to remove, treat, or otherwise reduce contamination to a level acceptable to the regulatory agency having jurisdiction in accordance with **Chapter 62- 780, F.A.C**., or applicable federal programs e.g., **Resource Conservation and Recovery Act (RCRA**).

Solid Waste – **RCRA** defines a solid waste as: “any garbage, refuse, sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility and other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial or mining and agricultural operations, and from community activities . . . [excluding] . . . solid or dissolved materials in domestic sewage, or solid or dissolved materials in irrigation return flows, or industrial discharges which are point sources subject to permits under **Section 402 of the Federal Water Pollution Control Act**.”

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SECTION 1.0 INTRODUCTION

The Florida Department of Transportation (FDOT), District One is conducting a Project Development and Environment (PD&E) study for State Road (SR) 544 in Polk County to determine alternative roadway improvements along the corridor. The study limits are from Martin Luther King Boulevard to SR 17, a distance of approximately 8 miles and is illustrated in **Figure 1-1**. The purpose of the PD&E study is to document the need for additional capacity within the study corridor and to evaluate the costs and impacts associated with providing this additional capacity. The purpose of this Contamination Screening Evaluation Report (CSER) is to present findings of a contamination screening evaluation for SR 544. The study area for this project includes the mainline corridor and associated floodplain compensation and stormwater management sites, as identified in **Appendix A**. This report identifies and evaluates known or potential contamination problems, presents testing or remedial recommendations concerning these problems, and discusses possible project impacts or impacts to the proposed project.

This report has been prepared using the FDOT PD&E Manual, Part 2, Chapter 20 (July 1, 2023) reporting format and standard environmental assessment practices of reviewing records of regulatory agencies, site reconnaissance, literature review and when necessary, personal interviews of individuals and business owners within the limits of the project.

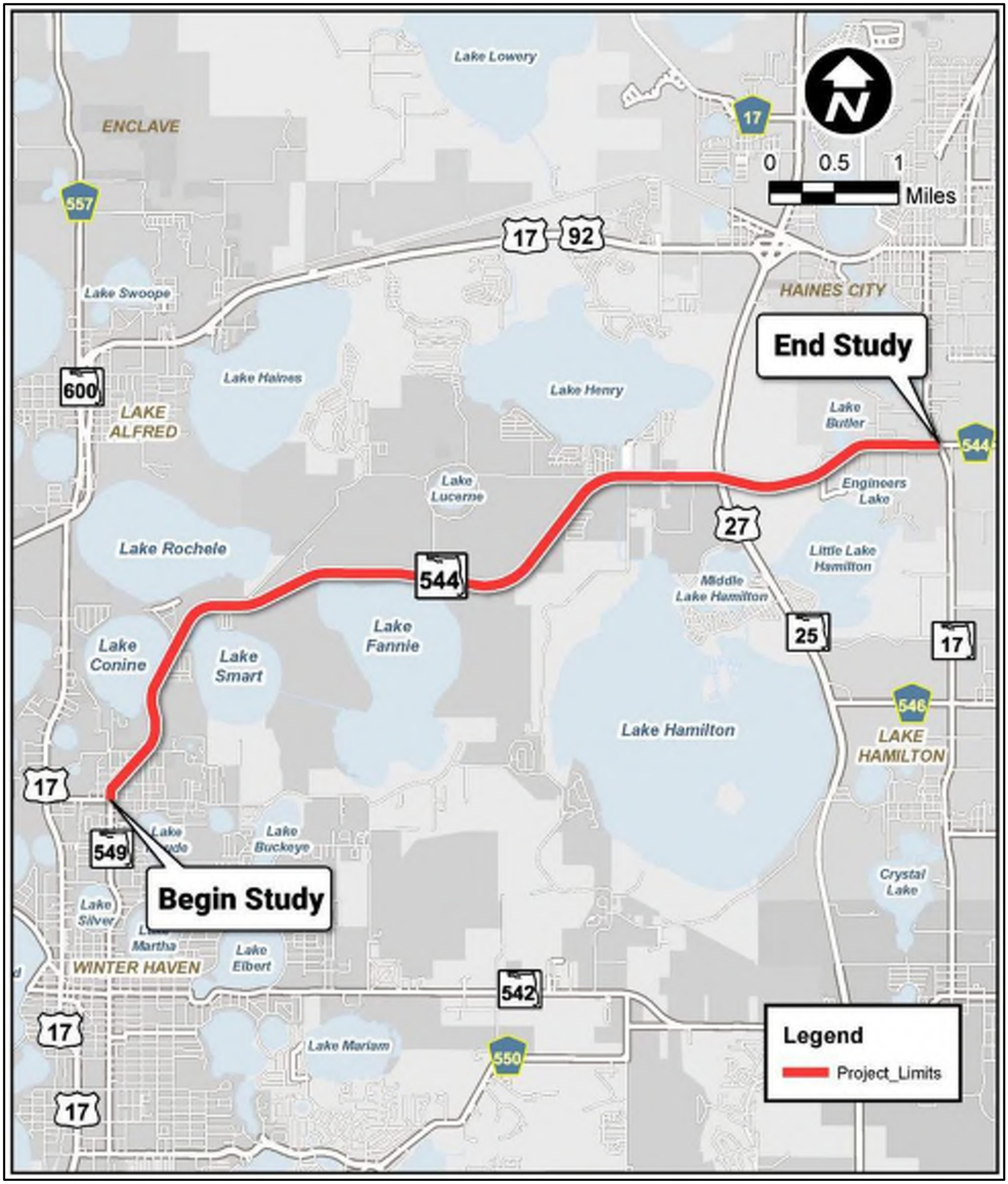


Figure 1-1 Project Location Map

SECTION 4.0 METHODOLOGY

A preliminary evaluation of SR 544 (Lucerne Park Road) was conducted to determine potential contamination issues within the proposed project limits from properties or operations located within the vicinity of the project. The evaluation consisted of the following tasks:

- Document review using Polk County Property Appraiser's website,
- A regulatory review of governmental databases for permits and or violations associated with environmental issues,
- Obtaining and evaluating historical aerial photographs, topographic maps, and soil surveys in an effort to determine potential contamination problem areas,
- Conducting site visits to verify information provided and to identify other potential concerns within the vicinity of the project, and
- Determining the contamination potential and assigning a risk rating for each potential contamination site within the proposed project limits.

4.1 Regulatory Review

An environmental database search using Environmental Data Management, Inc. (EDM) was conducted on April 13, 2020, and updated on March 10, 2022, to identify sites within one-half mile of the project corridor containing documented or suspected petroleum contamination or other hazardous materials. The regulatory review of federal and state environmental records utilizes an integrated geographic information system database. The search was conducted as a preliminary screening tool to identify facilities that are registered with various county, state, and federal agencies.

The following buffer distances are recommended on FDOT projects:

1. 500 feet from the right-of-way line for petroleum, drycleaners, and non-petroleum sites.
2. 1,000 feet from the right-of-way line for non-landfill solid waste sites.
3. One-half mile from the right-of-way line for Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), known also as Superfund, National Priority List (NPL), or landfill sites.

All database listings were reviewed for potential impacts to the corridor. Many of the sites/facilities are listed in more than one database. The listings were located and identified within the study area and discussed further in **Section 7.0**.

The reviewed records include information compiled by the Environmental Protection Agency (EPA), Florida Department of Environmental Protection (FDEP) and other various reporting programs. The following list is a typical summary of searchable databases. A complete list of all environmental record databases searched is included in the database search report.

Federal Databases:

- National Priorities List (NPL)
- Comprehensive Env Response, Compensation & Liability Information System List (CERCLIS)
- Archived CERCLIS Sites (NFRAP)
- Emergency Response Notification System List (ERNS)
- Resource Conservation and Recovery Information System (RCRIS) Handlers with Corrective Action (CORRACTS)
- Resource Conservation and Recovery Act (RCRA)-Treatment, Storage and/or Disposal Sites (TSD)
- RCRA-Large Quantity Generator (LQG), Small Quantity Generator (SQG), (Conditionally-Exempt Small Quantity Generator (CESQG) and Transporters (NONTSD)
- Tribal Tanks List (TRIBLTANKS)
- Tribal Lust List (TRIBLLUST)
- Brownfields Management System (USBRWNFLDS)
- Institutional and/or Engineering Controls (USINSTENG)

State Databases:

- State NPL Equivalent (STNPL)
- State CERCLIS Equivalent (STCERC)
- Solid Waste Facilities List (SLDWST)
- Leaking Underground Storage Tanks List (LUST)
- Underground/Aboveground Storage Tanks (TANKS)
- State Designated Brownfields (BRWNFLDS)
- Voluntary Cleanup List (VOLCLNUP)
- Institutional and/or Engineering Controls (INSTENG)
- Dry Cleaners List (DRY)

Other Ascertainable Records, including but not limited to:

• DOT OPS	Incident and Accident Data
• DOD	Department of Defense Sites
• FUDS	Formerly Used Defense Sites
• CONSENT	Superfund (CERCLA) Consent Decrees
• ROD	Records of Decision
• US MINES	Mines Master Index File
• TRIS	Toxic Chemical Release Inventory System
• TSCA	Toxic Substances Control Act
• ICIS	Integrated Compliance Information System
• PADS	PCB Activity Database System
• FINDS	Facility Index System/Facility Registry System
• UIC	Underground Injection Wells Database Listing
• DEDB	Ethylene Dibromide Database Results
• NPDES	National Pollution Discharge Elimination System, the Wastewater Facility Regulation Database
• FL Cattle Dip Vats	Cattle Dipping Vats
• TIER 2	Tier 2 Facility Listing
• INDIAN RESERV	Indian Reservations
• PRP	Potentially Responsible Parties
• 2020 COR ACTION	2020 Corrective Action Program List
• EPA WATCH LIST	EPA WATCH LIST
• PCB TRANSFORMER	PCB Transformer Registration Database
• COAL ASH DOE	Steam-Electric Plant Operation Data
• COAL ASH EPA	Coal Combustion Residues Surface Impoundments
• Financial Assurance	Financial Assurance Information Listing

4.2 Supplemental Regulatory Information

In addition to the EDM database search report, additional regulatory records review was based on readily available information from various online sources, including those listed below, which were reviewed in June 2023. Other information that may be provided by the client is also reviewed, verified, and utilized if applicable. Copies of applicable documentation are included, as necessary, in **Appendix C**.

- FDEP Map Direct GIS Application
- FDEP's Document Management System (OCULUS) Electronic Document Management System
- FDEP's Nexus Information Portal
- EPA EnviroMapper for Envirofacts Multi-system Search

Interviews with present and past owners, operators, and/or occupants of the properties with contamination concerns, and local government officials, may be used to verify or supplement the results of desktop and field reviews. Efforts to conduct interviews with agency or local officials were directed to various online resources including OCULUS, Map Direct, and the County's Property Appraiser websites for the latest updated information. Property owners, occupants or managers were not available for interview.

4.3 Site Reconnaissance

Site visits were conducted in March 2022 to evaluate each property along the project corridor for potential contamination. The reconnaissance included a systematic inspection of each parcel adjoining the project corridor looking for signs of potential contamination. This was achieved by first driving the main roadway several times in both directions to get generalized information on the study area, then walking specific parcels of interest fronting the right-of-way to gain specific information regarding the usage and condition of the parcel. Photographs of parcels were obtained during the site inspection and select images are included in **Appendix D**.

Some of the typical physical indicators for contamination include: underground and/or aboveground storage tank (UST/AST) fill ports and vent pipes; oil/petroleum staining; drums; chemical containers; refuse; illicit dumping; solid waste; stressed vegetation; dry cleaning facilities; materials handling from adjacent businesses; petroleum dispensers; excavated areas; agricultural use areas; chemical mix/load areas; storm water outfall areas; surface water indicators; and other property uses that may present environmental concerns.

The site reconnaissance in conjunction with the review of historical aerial photography, soil maps and topographic maps, allows the site to be rated as to the degree of environmental concerns as discussed in **Section 7.0**.

SECTION 5.0 LAND USES

5.1 Project Limits

The study limits are SR 544 (Lucerne Park Road) from Martin Luther King Boulevard to SR 17 in Polk County, a distance of approximately 8 miles. For purposes of this report, the project study area includes the limits of the mainline project, stormwater management facilities, floodplain compensation sites, and the search buffer distances outlined in the PD&E Manual and listed in **Section 4**.

5.2 Existing Land Uses

Land use is an important factor when evaluating historical and current environmental conditions. Evaluating the past use of properties can assist in determining possible chemical constituents that may have been used or associated with a particular parcel. Current land use records, typically supplied by the local county or municipality, also provide environmental professionals additional information for identification of target areas for potential contaminants.

The existing land use and land cover data from Southwest Florida Water Management District (SWFWMD) was reviewed for this project. The majority of current land uses along the SR 544 (Lucerne Park Road) corridor includes 100: Urban & Built-up – 640 acres, 200: Agriculture – 244 acres and 600: Wetlands – 298 acres. Minor land uses along the project corridor consist of 400: Upland Forest – 4 acres, 500: Water – 56 acres, 700: Barren – 19 acres and 800: Transportation & Utilities – 7 acres. Typically, land uses that include utilities, industrial and some commercial purposes are considered to be of potential environmental concern. The general land uses along the project corridor are illustrated in **Figure 5-1**.

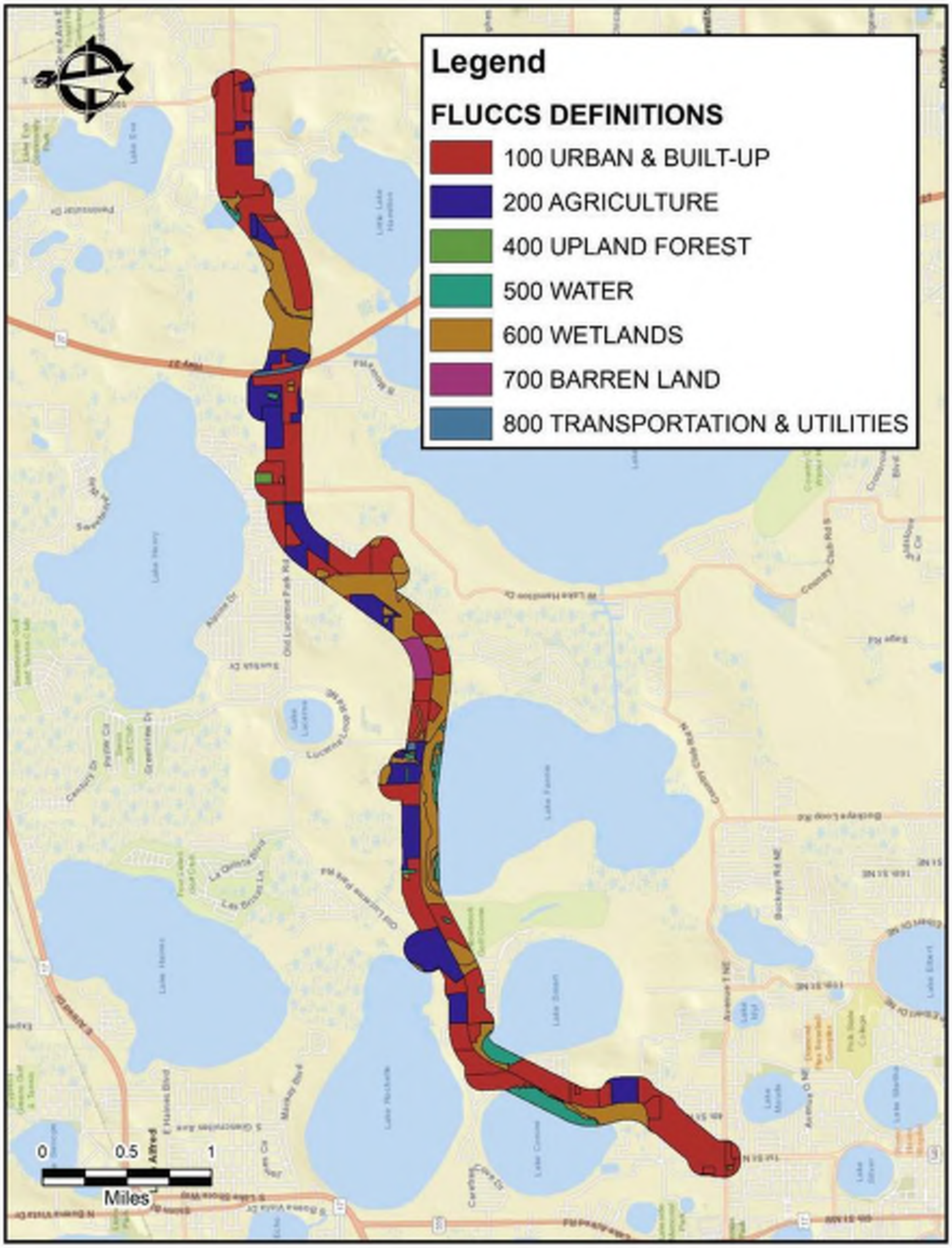


Figure 5-1 Existing Land Use Map

5.3 Historical Land Uses

City Directories can be useful tools for identifying gas stations prior to registration. A review of the R. L. Polk City Directories for the SR 544 PD&E Study was unavailable at the time of this report.

Historical aerial photographs were reviewed as part of the Level I CSER to develop a history of the previous land uses along the project corridor and to identify any areas which pose potential environmental concerns. The review of historical aerial photographs suggests that areas of potential environmental concern may exist within the project corridor. The types of agricultural, commercial, and industrial site development identified in the review are a concern due to the potential association with petroleum storage tanks, commercial operations, and agricultural processes. They typically store and use petroleum products, chemical fluids, solvents, and pesticides, and produce hazardous wastes as part of their daily business operations. Due to the rural and agricultural nature of the project area, each historical aerial was reviewed for any pesticide mix/load areas or indications of irrigation pump sheds that may contain diesel pumps and fuel ASTs.

Historical aerial photographs were obtained from the FDOT Aerial Photograph Look Up System (APLUS), the Publication of Archival Library & Museum Materials (PALMM) from the University of Florida, FDEP's Land Boundary Information System (LABINS), and Historical Aerial Photograph Report provided by EDM for the years 1941, 1952, 1957/58, 1968, 1971, 1980, 1993, 2005, and 2017; which are provided in **Appendix E**. Historical areas were divided into four "areas". Area 1 starts at Martin Luther King Boulevard., the western end of the project limits, to Connie Canal between Lake Connie and Lake Smart, Area 2 covers from Conine Canal to Lucerne Loop Road., north of Lake Fannie, Area 3 covers Lucerne Loop Road. to US 27, and Area 4 covers from US 27 to SR 17, the eastern end of the project.

1941 Aerial Photographs

AREA 1: The 1941 aerial shows a mix of urban (commercial and residential) development with agricultural (pasture and citrus groves) development between Avenue T and Avenue Y. North of Avenue Y is predominantly Lake Conine west of SR 544 and citrus groves east of SR 544.The railroad grade for the Atlantic Coast Line merges with and runs adjacent to the west side of SR 544 between Lake Conine and Lake Smart.

AREA 2: The 1941 aerial shows this portion of the project area is predominately agricultural, citrus groves and pastures. SR 544 diverges from the Atlantic Coast Line. SR 544 angles off to the northeast following what is today called Old Lucerne Park Road. The SR 544 project area angles east following the path of the Atlantic Coast Line.

AREA 3: The 1941 aerial shows the area is largely agricultural, predominantly citrus groves and pasture. The Atlantic Coast Line turns due north just east of Lake Fannie. The SR 544 project area angles northeast thru an undeveloped wetland area until merging with Lucerne Park Road south of Lake Henry. US 27 is not fully constructed in the 1941 aerial.

AREA 4: The 1941 aerial shows the project area is largely agricultural, predominantly citrus groves and pasture. US 27 is not fully constructed in the 1941 aerial. The eastern end of the SR 544 project area is predominantly citrus groves with scattered residences. SR 17 is constructed.

1952 Aerial Photographs

AREA 1: The 1952 aerial shows an increase in urban (commercial and residential) development between Avenue T and Avenue Y. North of Avenue Y is predominantly Lake Conine west of SR 544 and citrus groves east of SR 544.The railroad grade for the Atlantic Coast Line merges with and runs adjacent to the west side of SR 544 between Lake Conine and Lake Smart.

AREA 2: The 1952 aerial shows this portion of the project area is still predominately agricultural, citrus groves and pastures. SR 544 diverges from the Atlantic Coast Line. SR 544 angles off to the northeast following what is today called Old Lucerne Park Road. The SR 544 project area angles east following the path of the Atlantic Coast Line.

AREA 3: The 1952 aerial shows the area is largely agricultural, predominantly citrus groves and pasture. The Atlantic Coast Line turns due north just east of Lake Fannie. The SR 544 project area angles northeast thru an undeveloped wetland area until merging with Lucerne Park Road south of Lake Henry. US 27 is not fully constructed in the 1952 aerial.

AREA 4: The 1952 aerial shows the project area is largely agricultural, predominantly citrus groves and pasture. US 27 is not fully constructed in the 1952 aerial. The eastern end of the SR 544 project area is predominantly citrus groves with scattered residences. SR 17 is visible on the 1952 aerial.

1957/58 Aerial Photographs

AREA 1: The 1958 aerial shows an increase in urban (commercial and residential) development between Avenue T and Avenue Y. North of Avenue Y is predominantly Lake Conine west of SR 544 and citrus groves east of SR 544.The railroad grade for the Atlantic Coast Line merges with and runs adjacent to the west side of SR 544 between Lake Conine and Lake Smart.

AREA 2: The 1958 aerial shows this portion of the project area is still predominately agricultural, citrus groves and pastures. SR 544 diverges from the Atlantic Coast Line. SR 544 angles off to the northeast following what is today called Old Lucerne Park Road. The SR 544 project area angles east following the path of the Atlantic Coast Line.

AREA 3: The 1958 aerial shows the area is largely agricultural, predominantly citrus groves and pasture. The Atlantic Coast Line turns due north just east of Lake Fannie. The SR 544 project area angles northeast thru an undeveloped wetland area until merging with Lucerne Park Road south of Lake Henry. US 27 is visible on the 1958 aerial.

AREA 4: The 1957 aerial show the project area is largely agricultural, predominantly citrus groves and pasture. US 27 is visible in the 1957 aerial. The eastern end of the SR 544 project area is predominantly citrus groves with scattered residences.

1968 Aerial Photograph

AREA 1: The 1968 aerial, between Avenue T and Avenue Y, is predominantly urban (commercial and residential) development. The retail fuel stations at the intersection of Martin Luther King Boulevard and SR 544 are visible. North of Avenue Y is predominantly Lake Conine west of SR

544 and citrus groves east of SR 544. SR 544 appears to have widened and taken over the railroad grade for the Atlantic Coast Line where the two merge between Lake Conine and Lake Smart.

AREA 2: The 1968 aerial shows this portion of the project area is still predominately agricultural, citrus groves and pastures, but with an increase in residential developments including mobile home park and golf courses. SR 544 occupies the former Atlantic Coast Line.

AREA 3: The 1968 aerial shows the project area remains largely agricultural, predominantly citrus groves and pasture. SR 544 follows its current path in the 1968 aerial. The Lake Hamilton Canal is visible.

AREA 4: The 1968 aerial shows the project area is largely agricultural, predominantly citrus groves and pasture. SR 544 follows its current path in the 1968 aerial. The eastern end of the SR 544 project is a mix of residential developments and remaining citrus groves. The Alta Vista School is visible at eastern end.

1971 Aerial Photograph

AREA 1: The 1971 aerial shows little significant change from the 1968 aerial in this area.

AREA 2: The 1971 aerial shows little significant change from the 1968 aerial in this area. The retail fuel station is visible at the intersection of SR 544 and Old Lucerne Park Road.

AREA 3: The 1971 aerial shows little significant change from the 1968 aerial in this area. The retail fuel stations are visible at the intersection of SR 544 and US 27.

AREA 4: The 1971 aerial shows little significant change from the 1968 aerial in this area.

1980 Aerial Photograph

AREA 1: The 1980 aerial shows little significant change from the 1971 aerial in this area. The Washington Garage facility and its junk vehicles are visible.

AREA 2: The 1980 aerial shows little significant change from the 1971 aerial in this area. The Willowbrook Golf Course is visible.

AREA 3: The 1980 aerial shows little significant change from the 1971 aerial in this area. The Lake n Golf Estates, Fairview and Hidden Cove mobile home park developments are visible between SR 544 and Lake Henry.

AREA 4: The 1980 aerial shows little significant change from the 1971 aerial in this area.

1993 Aerial Photograph

AREA 1: The 1993 aerial shows little significant change from the 1980 aerial in this area. The retail fuel facility south of Avenue Y is visible. The Winter Ridge residential development is visible between Lake Conine and Lake Smart.

AREA 2: The 1993 aerial shows little significant change from the 1980 aerial in this area. The Sherwin Williams Distribution Center is visible.

AREA 3: The 1993 aerial shows an increase in residential and commercial development at the eastern end of this area closer to US 27. Three retail fueling stations are visible at the intersection of US 27.

AREA 4: The 1993 aerial shows an increase in residential and commercial development at the eastern end of this area closer to SR 17.

2005 Aerial Photograph

AREA 1: The 2005 aerial shows an increase in residential and commercial development.

AREA 2: The 2005 aerial shows an increase in residential and commercial development. The Walmart Distribution Center is visible.

AREA 3: The 2005 aerial shows little significant change from the 1993 aerial in this area.

AREA 4: The 2005 aerial shows an increase in residential development.

2017 Aerial Photographs

AREA 1: The 2017 aerial shows little significant change from the 2005 aerial or from the current site conditions in this area.

AREA 2: The 2017 aerial shows little significant change from the 2005 aerial or from the current site conditions in this area.

AREA 3: The 2017 aerial shows little significant change from the 2005 aerial or from the current site conditions in this area.

AREA 4: The 2017 aerial shows an increase in residential development.

SECTION 6.0 HYDROLOGIC FEATURES

Hydrologic features can be indicators of possible environmental concerns; therefore, they are reviewed as part of the CSER process. The hydrologic features such as rivers, artesian wells, creeks, sinks, mines, well fields, etc. provided on governmental maps and identified in regional soils and geology literature are reviewed for the noted items which fall within the project limits. The features are evaluated to determine if there are any known areas, or other regional environmental concerns that may contribute to environmental influences within the project limits.

6.1 Regional Physiography

Polk County is in the Southern Florida Flatwoods and South Central Florida Ridge Major Land Resource Areas (MLRA's). The Southern Florida Flatwoods MLRA consists mainly of nearly level, poorly drained soils. These soils are used generally as pasture, rangeland, or woodland. The South Central Florida Ridge MLRA consists of nearly level to moderately sloping, sandy soils that range from excessively drained to very poorly drained. These soils are used mainly as pasture, rangeland, cropland, or woodland. Most of the citrus in the county grows on these soils. Polk County is in the Central Highlands physiographic province, mainly on the Polk and Lake Uplands The eastern part of the county is part of the Osceola Plain, and a small area in the northwestern corner is in the Western Valley. The elevation ranges from 50 to 305 feet above National Geodetic Vertical Datum (NGVD). The lowest elevation is in the Kissimmee River Valley, and the highest elevation is along the crest of the Lake Wales Ridge near Lake Wales and Babson Park.

The SR 544 (Lucerne Park Road) project area is located across portions of the Winter Haven Ridge to the west, the Lake Wales Ridge to the east and the Polk Upland in the middle.

Most of Polk County is in the Polk and Lake Upland areas. Several ridges rise above the Polk Upland surface. The most prominent is the Lake Wales Ridge. Others include the Lakeland, Winter Haven, and Lake Henry Ridges, which appear to be remnants of a previous widespread upland. The elevation of the Polk Upland generally ranges between 100 to 130 feet above NGVD. It is higher on the ridges. In the northern part of the county, the Polk Upland merges with the Lake Upland. The two uplands do not have a distinct topographic distinction; therefore, the boundary is drawn arbitrarily. The Lake Wales Ridge is the most prominent topographic feature in peninsular Florida. It is the distal remnant of a much longer ridge that at one time may have included the Trail Ridge in northeastern Florida. The elevation is from 150 to 305 feet above NGVD and is highest at Lake Wales and Babson Park. The ridge is made up mainly of coarse elastic material that has been dissected by streams and karst activity. It has been straightened on its flanks by coastal erosion to produce its present western bounding scarp and a probable buried former eastern bounding scarp.

The preservation of the Lake Wales Ridge as a present day highland is thought to be the result of the clayey, gravelly, coarse quartz sand having limited but not completely prevented dissolution of the underlying limestone.

6.2 Regional Hydrogeology

In Polk County, water is used for municipal, industrial, and agricultural purposes. In most of the county, the water supply is adequate for domestic use, irrigation of crops, and the watering of livestock late in spring, in summer, and early in autumn. Low rainfall, however, causes a shortage of water in most winters.

The development of land for agriculture and mining has decreased the supply of water from surface and ground water storage. Agriculture consumptive use of water has placed a higher demand on water for irrigation. High value crops are now routinely irrigated. Mining companies also use a great deal of water in processing minerals extracted from the earth. In Polk County, water resources are managed by the Southwest Florida, South Florida, and St. Johns River Water Management Districts.

The water in Polk County comes mainly from the Floridan Aquifer, which is an artesian aquifer throughout much of the county. The Surficial Aquifer and Intermediate Aquifer System are also in the county. The Surficial Aquifer consists primarily of quartz sand and includes surficial sand and clay. The top of the Surficial Aquifer is ground water that is virtually unconfined. The Intermediate Aquifer System is in the western part of the county south of Polk City. It is a confined aquifer made up of limestone and clayey sediments. The base of the Intermediate Aquifer System is in direct contact with the Floridan Aquifer. The major permanent streams and surface drainage systems are the Withlacoochee River, North Prong Alafia River, and the Peace River. The Withlacoochee River drains the northern part of the county, the North Prong Alafia River drains the western part, and the Peace River drains the central part to the Highlands County line. The Kissimmee River drains a large area in the southeastern part of the county. The many branches and creeks are interconnected to complete the drainage of the county. Groundwater flow direction can vary significantly depending on localized subsurface conditions.

According to United States Geological Survey (USGS) maps, SWFWMD drainage basin data and aerial topographic maps, the project lies within four drainage basins, (from west to east), LAKE FANNIE OUTLET 03100101-01107000, LAKE HAMILTON OUTLET 03100101-01109900, CHANNELIZED STREAM 03100101-01108099, and LAKE EVA OUTLET 03100101-01108040. A series of mad-made channels connecting the region's lakes, drainage ditches and drainage ponds influence the depth of the seasonal highwater table and specific direction of surficial flows. Fluctuations in the groundwater level will occur with the variations in rainfall, evaporation, surface water run-off, and man-made features.

6.3 USGS Quadrangle Map

Topographic maps are reviewed to develop an understanding of previous land uses in the project corridor and to identify any areas that may show historical, natural, and manmade features, which aid in determining potential environmental concerns.

The USGS 7.5-Minute Winter Haven and Dundee Quadrangle topographic maps, dated 1953, 1959, 1970, 1980, 1983, 1987 and 2015 Copies of the topographic maps are provided in **Appendix F**.

6.4 USDA Soil Survey

Soil surveys provide indications of what a soil may be useful for and can provide clues as to possible uses and potential environmental issues. Additionally, maps of the soil units provided in the surveys often show historical land features such as mines, borrow pits, railroads, etc. These can also be indications of areas of concern. The United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) "Soil Survey of Polk County, Florida" issued in 1990 was reviewed for near surface soil information.

According to the Soil Survey, the mean annual rainfall for the county is approximately 54 inches with 70 percent falling April through September. In winter the average temperature is 62 degrees F, and the average minimum temperature is 50 degrees. In summer the average temperature is 82 degrees, and the average daily maximum temperature is 92 degrees.

The NRCS Soil Survey indicates that there are 31 soil-mapping units within the project area. Their general engineering properties are summarized in **Table 6-1** and their locations are indicated on the soil map for the project area, shown in **Figure 6-1**.

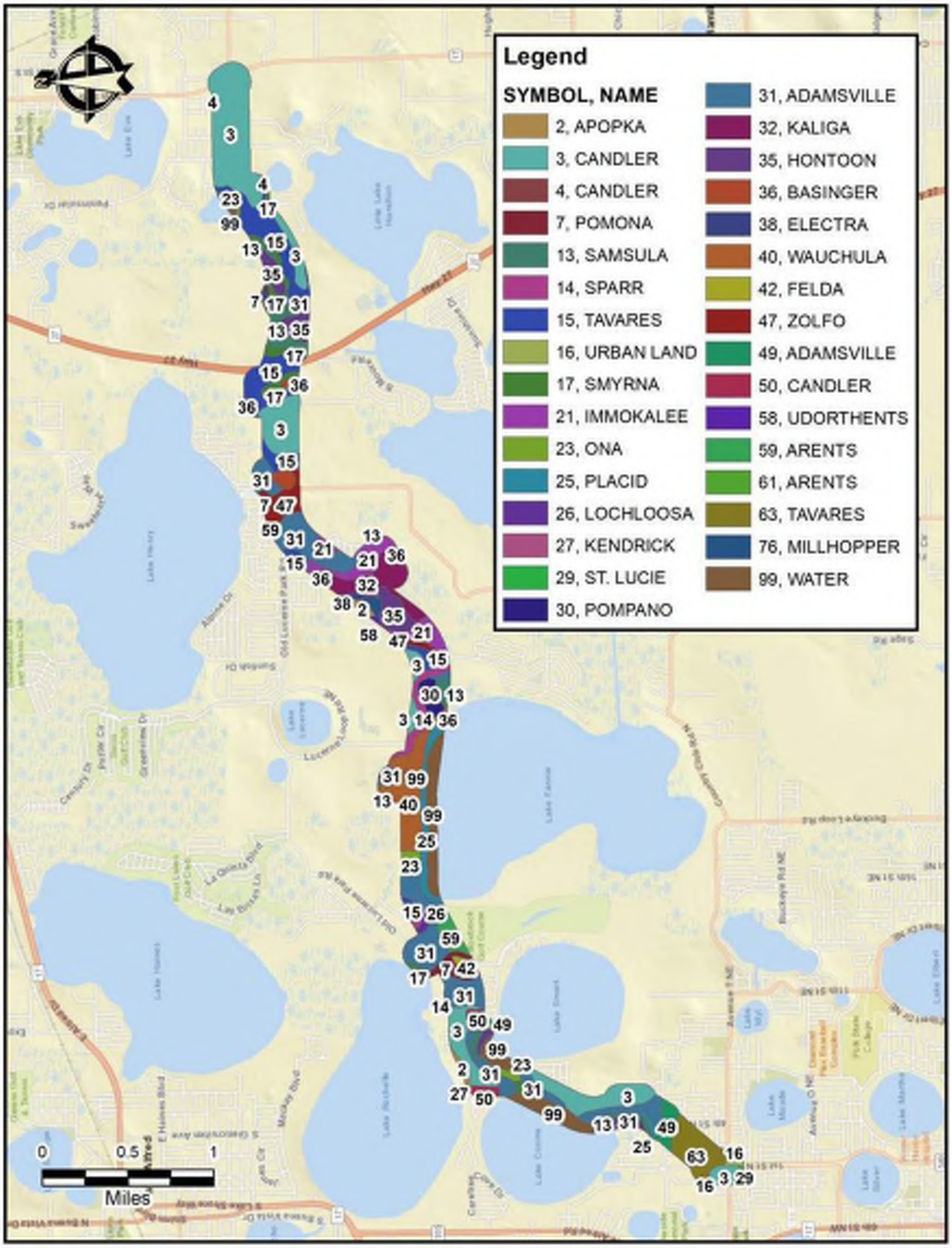


Figure 6-1 NRSC Soil Survey Map

Table 6-1 Summary of NRCS Soil Survey of Polk County

MUSYM	MUNAME	ACRES	TEXTURE	HYDRIC RATING	DRAINAGE CLASS	HYDRO GROUP	CORROSION	
							CONCRETE	STEEL
2	APOPKA FINE SAND, 0 TO 5 PERCENT SLOPES	8.68	FS	NO	WELL DRAINED	A	MODERATE	LOW
3	CANDLER SAND, 0 TO 5 PERCENT SLOPES	274.40	S	NO	EXCESSIVELY DRAINED	A	HIGH	LOW
7	POMONA FINE SAND	22.24	FS	NO	POORLY DRAINED	A/D	HIGH	HIGH
13	SAMSULA MUCK, FREQUENTLY PONDED, 0 TO 1 PERCENT SLOPES	46.80	MUCK	YES	VERY POORLY DRAINED	A/D	HIGH	HIGH
14	SPARR SAND, 0 TO 5 PERCENT SLOPES	26.75	S	NO	SOMEWHAT POORLY DRAINED	A/D	HIGH	HIGH
15	TAVARES FINE SAND, 0 TO 5 PERCENT SLOPES	124.91	FS	NO	MODERATELY WELL DRAINED	A	HIGH	LOW
16	URBAN LAND, 0 TO 2 PERCENT SLOPES	5.23	CEM-MAT	UNRANKED				
17	SMYRNA AND MYAKKA FINE SANDS	34.88	FS	NO	POORLY DRAINED	A/D	HIGH	HIGH
21	IMMOKALEE SAND	51.27	S	NO	POORLY DRAINED	B/D	HIGH	HIGH
23	ONA-ONA, WET, FINE SAND, 0 TO 2 PERCENT SLOPES	12.85	FS	NO	POORLY DRAINED	B/D	HIGH	MODERATE
25	PLACID AND MYAKKA FINE SANDS, DEPRESSIONAL	31.08	FS	YES	VERY POORLY DRAINED	A/D	HIGH	HIGH
26	LOCHLOOSA FINE SAND	4.22	FS	NO	SOMEWHAT POORLY DRAINED	C	HIGH	MODERATE
27	KENDRICK FINE SAND, 0 TO 5 PERCENT SLOPES	0.03	FS	NO	WELL DRAINED	A	HIGH	LOW
29	ST. LUCIE FINE SAND, 0 TO 5 PERCENT SLOPES	0.86	FS	NO	EXCESSIVELY DRAINED	A	HIGH	LOW
30	POMPANO FINE SAND	14.36	FS	YES	POORLY DRAINED	A/D	MODERATE	HIGH
31	ADAMSVILLE FINE SAND, 0 TO 2 PERCENT SLOPES	198.94	FS	NO	SOMEWHAT POORLY DRAINED	A/D	MODERATE	HIGH
32	KALIGA MUCK, FREQUENTLY PONDED, 0 TO 1 PERCENT SLOPES	44.63	MUCK	YES	VERY POORLY DRAINED	C/D	HIGH	HIGH
35	HONTOON MUCK, FREQUENTLY PONDED, 0 TO 1 PERCENT SLOPES	61.48	MUCK	YES	VERY POORLY DRAINED	A/D	HIGH	HIGH

MUSYM	MUNAME	ACRES	TEXTURE	HYDRIC RATING	DRAINAGE CLASS	HYDRO GROUP	CORROSION	
							CONCRETE	STEEL
36	BASINGER MUCKY FINE SAND, DEPRESSIONAL	19.41	MK-FS	YES	VERY POORLY DRAINED	A/D	HIGH	HIGH
38	ELECTRA FINE SAND	3.28	FS	NO	SOMEWHAT POORLY DRAINED	A	HIGH	MODERATE
40	WAUCHULA FINE SAND	63.99	FS	NO	POORLY DRAINED	C/D	HIGH	HIGH
42	FELDA FINE SAND	4.47	FS	YES	POORLY DRAINED	A/D	MODERATE	HIGH
47	ZOLFO FINE SAND, 0 TO 2 PERCENT SLOPES	29.20	FS	NO	SOMEWHAT POORLY DRAINED	A	HIGH	HIGH
49	ADAMSVILLE-URBAN LAND COMPLEX	19.35	FS	NO	SOMEWHAT POORLY DRAINED	A	MODERATE	LOW
50	CANDLER-URBAN LAND COMPLEX, 0 TO 5 PERCENT SLOPES	12.09	S	NO	EXCESSIVELY DRAINED	A	HIGH	LOW
58	UDORTHENTS, EXCAVATED	1.25		NO				
59	ARENTS-URBAN LAND COMPLEX, 0 TO 5 PERCENT SLOPES	15.69	S	NO	SOMEWHAT POORLY DRAINED	A	LOW	HIGH
61	ARENTS, ORGANIC SUBSTRATUM-URBAN LAND COMPLEX	0.82	S	NO	SOMEWHAT POORLY DRAINED	A	MODERATE	HIGH
63	TAVARES-URBAN LAND COMPLEX	45.12	FS	NO	MODERATELY WELL DRAINED	A	HIGH	LOW
76	MILLHOPPER FINE SAND, 0 TO 5 PERCENT SLOPES	6.76	FS	NO	MODERATELY WELL DRAINED	A	HIGH	MODERATE
99	WATER	81.87		UNRANKED				

SECTION 7.0 PROJECT IMPACTS

7.1 Potential Contamination Sites

After gathering and reviewing all readily available public information and conducting site reconnaissance, contamination risk ratings were assigned to sites of potential concern. The rating system is divided into four categories of risk as defined by the FDOT in Chapter 20 of the PD&E Manual (July 1, 2023). These four degrees of risk are “No”, “Low”, “Medium” and “High”. This system expresses the degree of concern for potential contamination problems. Known problems may not necessarily present a high cause for concern if the regulatory agencies are aware of the situation and actions, where necessary, are either complete or are underway, and these actions will not have an adverse impact on the proposed project.

Each property is evaluated for potential contamination-related impacts to the project and assigned a contamination rating. These ratings are as follows:

1. No – A review of available information on the property and a review of the conceptual or design plans indicates there is no potential contamination impact to the project. It is possible that contaminants have been handled on the property. However, findings from the contamination screening evaluation or sampling and testing results indicate that contamination impacts are not expected.

2. Low – A review of available information indicates that past or current activities on the property have an ongoing contamination issue; the site has a hazardous waste generator identification (ID) number, or the site stores, handles, or manufactures hazardous materials. However, based on the review of conceptual or design plans and/or findings from the Level I evaluation, it is not likely that there would be any contamination impacts to the project.

3. Medium – After a review of conceptual or design plans and findings from a Level I evaluation, a potential contamination impact to the project has been identified. If there is insufficient information (such as regulatory records or site historical documents) to make a determination as to the potential for contamination impact, and there is reasonable suspicion that contamination may exist, the property should be rated at least as a “Medium”. Properties used historically as gasoline stations and which have not been evaluated or assessed by regulatory agencies, sites with abandoned in place underground petroleum storage tanks or currently operating gasoline stations should receive this rating.

4. High – After a review of all available information and conceptual or design plans, there is appropriate analytical data that shows contamination will substantially impact construction activities, have implications to right-of-way acquisition or have other potential transfer of contamination related liability to the FDOT.

The rating can change based on changes in design, construction activities, construction methods, right-of-way needs or other factors when the project progresses from design to construction. Where anticipated involvement with right-of-way acquisition exists, the District Contamination

Impact Coordinator (DCIC) will inform and coordinate further related activities with the Project Manager (PM), the assigned right-of-way agent and/or the Office of General Counsel as appropriate. If construction involvement is anticipated, further delineation during final design, remediation, or a Modified Special Provision (MSP) may be needed.

Additionally, The District One Environmental Management Office requests that any site within 500 feet of the project limits that has an "open" discharge or "active" documented contamination be assigned a risk rating of "Medium" (at least) because the presence of documented contamination is anticipated to affect the permitting process for National Pollutant Discharge Elimination System (NPDES) dewatering. The FDEP may also require effluent treatment and monitoring for NPDES discharges within 500 feet of these sites. The latest information on the "open" or "active" sites of concern can be found on the FDEP's Contamination Locator Map (CLM).

The regulatory database search report, provided by EDM, identified 66 mapped facilities, located within the buffer distance (one-half mile) of the study area requested for the report. Out of the 66 mapped facilities, 36 were within or appeared to be within the appropriate search buffer distances as recommended by FDOT in the PD&E Manual. An additional three (3) facilities were included in the analysis which were identified during site reviews. Historical research, review of environmental record databases, site reconnaissance, and detailed file reviews were performed for a total of 39 sites located within the study area. These sites may present the potential for finding petroleum contamination or hazardous materials and therefore may impact the proposed improvements for this project. Specific details for each site are outlined in **Table 7-1**, and their locations are presented on **Figure 7-1** and aerial photographs located in **Appendix A**. The regulatory database search report provided by EDM is presented in **Appendix B**. Supplemental regulatory data is provided in **Appendix C**.

Of the 39 sites investigated, the following risk ratings have been applied: **3 "High" rating sites, 6 "Medium" rating sites and 30 "Low/No" rating sites for potential contamination concerns.** The following paragraphs provide details of each MEDIUM/HIGH site, as well as the factors in determining their assigned rating.

Table 7-1 Potential Contamination Sites

Site	Facility ID	Facility Name	Address or Location	Distance (ft)	Type of Concern(s)	Regulatory Database	Risk Rating	Site History, Regulatory Status and Comments
1	8628299	GROWERS SERVICE CO INC	1950 1ST ST N WINTER HAVEN, FL 33881	278 S	Petroleum	TANKS	NO	FUEL USER/NON-RETAIL FAC STATUS: Closed This facility previously consisted of four USTs containing leaded and unleaded gasoline. The USTs were removed from the facility on December 31, 1989. There were no evidence of contaminated soils or groundwater at the time of removal. Four ASTs were closed in place on December 06, 2012. The FDEP performed a closure inspection of the facility's tanks on December 20, 2012, where no violations were found. No currently regulated tanks exist on site. Due to the facility status and lack of contamination history, no contamination impacts are anticipated.
2	8840952	BIG M MART	128 AVE "T" NE WINTER HAVEN, FL 33881	120 SE	Petroleum	LUST/TANKS	HIGH	GASOLINE RETAIL STATION FAC STATUS: Open This is an active gasoline retail station with one 10,000-gallon UST holding unleaded gasoline, one 12,000-gallon holding unleaded gasoline, and one 12,000-gallon UST holding diesel. Discharges have been reported at this facility; therefore, the potential for contaminants is high. Full site discussion is located after Table 7-1.
3 (2)	8840952	CITGO-NORTHEAST (FORMER) [see #2 BIG M MART]	1916 1ST ST N WINTER HAVEN, FL 33881	423 S	Petroleum	LUST	NO	Mapped location is an error. See facility detail in #2 BIG M MART.
4	9100384	IVAHS TIRE STORE	101 AVENUE T NE WINTER HAVEN, FL 33881	80 E	Petroleum	TANKS	LOW	GASOLINE RETAIL STATION FAC STATUS: Closed Four USTs containing unleaded gasoline were removed from the facility on August 31, 1990. At the time of removal, no evidence of contaminated soils or groundwater were observed. There is no contamination history at the facility. Due to the facility status, contamination impacts from this facility are low.

Site	Facility ID	Facility Name	Address or Location	Distance (ft)	Type of Concern(s)	Regulatory Database	Risk Rating	Site History, Regulatory Status and Comments
5	8630555	SOLO FUEL & FOOD #4	205 AVENUE T NW WINTER HAVEN, FL 33881	492 W	Petroleum	TANKS	NO	GASOLINE RETAIL STATION FAC STATUS: Closed Five USTs containing leaded and unleaded gasoline were removed from the facility on July 1, 1992. At the time of removal, no evidence of contaminated soils or groundwater were observed. There is no contamination history at the facility. Due to the facility status and distance from the project, no contamination impacts are anticipated.
6	9807255	CASTELGAS LLC/ PRONTO STATION LLC (Winter Haven Chevron)	2100 1ST ST N WINTER HAVEN, FL 33881	20 E	Petroleum	TANKS	MEDIUM	GASOLINE RETAIL STATION FAC STATUS: Open This facility is an open gasoline retail station with one compartmentalized 24,000-gallon UST holding unleaded gasoline. There is no contamination history at the facility; however, due to the facility's status as an open gasoline station, the site is rated medium. Full site discussion is located after Table 7-1.
7	ERIC_13415/ FLR000098426	WASHINGTON GARAGE	2101 1ST ST N WINTER HAVEN, FL 33881	135 W	Petroleum	VOLCLNUP/ NONTSD	MEDIUM	AUTOMOTIVE TRANSMISSION REPAIR SHOP GENERAL AUTOMOTIVE REPAIR STATUS: Closed This facility is a former automotive repair site used for towing and vehicle storage. In addition to cars and trucks, other wastes included used batteries, tires, and contaminated gasoline. Visible contaminants such as areas of oil-stained soil were present during an FDEP inspection in 2003, and were oberserved through soil samples taken in 2006. Currently, the facility is an undeveloped lot. Full site discussion is located after Table 7-1.
8	8945035	BP #610 TWIN BROTHERS FOOD MART	2433 LUCERNE PARK RD WINTER HAVEN, FL 33881	35 NW	Petroleum	LUST/TANKS	MEDIUM	GASOLINE RETAIL STATION FAC STATUS: Open This facility is an open gasoline retail station with one compartmentalized 20,000-gallon UST holding unleaded gasoline and diesel. There are discharges reported at the facility; however, there are no open or active cleanup efforts on-going. Due to the facility's status as an open gasoline station, the site is rated medium. Full site discussion is located after Table 7-1.

Site	Facility ID	Facility Name	Address or Location	Distance (ft)	Type of Concern(s)	Regulatory Database	Risk Rating	Site History, Regulatory Status and Comments
9	1007211	ROADWAY	LUCERNE PARK RD @ 4TH ST NE WINTER HAVEN, FL	0	Hazardous Waste	ERNS	NO	INCIDENTAL SPILL FAC STATUS: Closed On March 29, 2012, ten gallons of ethylene glycol spilled into the roadway as a result of a motor vehicle collision. An environmental contractor was dispatched to the site for cleanup activities, which occurred the same day. The material was removed from the roadway and an impacted catch basin adjacent to the incident location. Based on the limited impact and lapsed time of incident, no contamination impacts are anticipated.
10	110032782031	ST PAUL'S HOLINESS CHURCH OF WINTER HAVEN	2520 4th St NE WINTER HAVEN, FL 33881	151 W	Hazardous Waste	FRS/ NPDES	NO	NPDES facilities that register with these systems do not necessarily indicate involvement with hazardous materials. This site obtained a general stormwater permit May 6, 2007. No contamination impacts are anticipated.
11	110015729489	SR 544	SR 544 WINTER HAVEN, FL 33881	0	Hazardous Waste	FRS/ NPDES	NO	NPDES facilities that register with these systems do not necessarily indicate involvement with hazardous materials. This site obtained a general stormwater permit August 9, 2008. No contamination impacts are anticipated.
12	110032797098	LAKE SMART ESTATES	IXORA DR WINTER HAVEN, FL 33881	257 S	Hazardous Waste	FRS/ NPDES	NO	NPDES facilities that register with these systems do not necessarily indicate involvement with hazardous materials. This site obtained a general permit March 10, 2007. No contamination impacts are anticipated.
13	110024817279/ 110054138401	LAKE SMART ESTATES	S OF LUCERNE PARK RD WINTER HAVEN, FL 33881	267 S	Hazardous Waste	FRS/ NPDES	NO	NPDES facilities that register with these systems do not necessarily indicate involvement with hazardous materials. This site obtained a general permit July 29, 2012. No contamination impacts are anticipated.
14	110025343732/ 110028299188	LAKES AT LUCERNE PARK PHASES 1 & 2	OLD LUCERNE PARK RD & LUCERNE PARK RD WINTER HAVEN, FL 33881	10 S	Hazardous Waste	FRS/ NPDES	NO	NPDES facilities that register with these systems do not necessarily indicate involvement with hazardous materials. This site obtained a general permit August 16, 2006. No contamination impacts are anticipated.
15	9601302	DANIEL PROPERTY	3009 OLD LUCERNE PARK RD WINTER HAVEN, FL 33881	180 N	Petroleum	LUST/TANKS	LOW	FUEL USER/NON-RETAIL (Residential) FAC STATUS: Closed This closed facility previously consisted of one UST holding leaded gasoline. A Discharge Report Form (DRF) was filed on June 28, 1996, after discovery of contamination during closure activities. The extent of contamination did not extend into the project limits. Subsequently, the tank was removed on July 1, 1996. Cleanup activities were completed on August 15, 2003, when an NFA Proposal was submitted to the FDEP. A Site Rehabilitation Order (SRCO) was issued on October 1, 2003. Due to the facility status, contamination impacts from this facility are low.

Site	Facility ID	Facility Name	Address or Location	Distance (ft)	Type of Concern(s)	Regulatory Database	Risk Rating	Site History, Regulatory Status and Comments
16	110024821077	DRY STORAGE OF WINTER HAVEN	SR 544 LUCERNE PARK RD WINTER HAVEN, FL 33881	153 N	Hazardous Waste	FRS/ NPDES	NO	NPDES facilities that register with these systems do not necessarily indicate involvement with hazardous materials. This site obtained a stormwater construction permit April 1, 2011. No contamination impacts are anticipated.
17	8624474	RUBUSH GROVE SERVICE	5520 LUCERNE PARK RD WINTER HAVEN, FL 33881	2,700 NW	Petroleum	TANKS	NO	FUEL USER/NON-RETAIL (Agricultural) FAC STATUS: Closed The mapped location for this facility is an error. The actual location of this facility is located on Old Lucerne Park Road, approximately 2,700 feet northwest of the project limits. Currently, there are no regulated tanks at the facility. Due to the distance from the project, no contamination impacts are anticipated. The database location for this facility is shown on the aerials in Appendix A, however; the actual location of the facility is north of the project outside of the project limits and not shown.
18	110021033344	LUCERNE PROFESSIONAL LEASING	W SIDE LUCERNE PARK RD WINTER HAVEN, FL 33880	155 N	Hazardous Waste	FRS/ NPDES	NO	NPDES facilities that register with these systems do not necessarily indicate involvement with hazardous materials. This site obtained a stormwater construction permit February 11, 2005. No contamination impacts are anticipated.
19	110064750498	FAMILY DOLLAR STORE	5880 LUCERNE PARK RD WINTER HAVEN, FL 33881	115 N	Hazardous Waste	FRS/ NPDES	NO	NPDES facilities that register with these systems do not necessarily indicate involvement with hazardous materials. This site obtained a stormwater construction permit May 15, 2015. No contamination impacts are anticipated.
20	8624284	GIANT OIL #121	5900 LUCERNE PARK RD WINTER HAVEN, FL 33881	0 N	Petroleum	LUST/TANKS	HIGH	GASOLINE RETAIL STATION FAC STATUS: Open This facility is an open gasoline retail station consisting of two 15,000-gallon USTs holding unleaded gasoline and diesel. Discharges have been reported on site; however, there are no active or open cleanup efforts on-going. Due to the anticipated full take of the property and removal of an entire UST system, the facility is rated high. Full site discussion is located after Table 7-1.
21	8736730	K J TRANSPORTATION INC (Truck Maintenance Inc)/ LITTLE GIANT PUMP COMPANY	6200 HWY 544 N (LUCERNE PARK ROAD) WINTER HAVEN, FL 33881	150 S	Petroleum	LUST/TANKS	LOW	FUEL USER/NON-RETAIL FAC STATUS: Closed This closed facility previously consisted of one 20,000-gallon UST, which was removed on June 30, 1991. A discharge occurred on August 15, 1991; however, the extent of contamination did not reach the project limits. The facility was granted a No Cleanup Required status on August 23, 2009. Due to the facility staus, contamination impacts from this facility are low.

Site	Facility ID	Facility Name	Address or Location	Distance (ft)	Type of Concern(s)	Regulatory Database	Risk Rating	Site History, Regulatory Status and Comments
22	8736037/ 8732697	KATROS GROVES/ KEEN FRUIT	LAKE HOWARD TERR CONDOS WINTER HAVEN, FL 33881	330 N	Petroleum	TANKS	LOW	FUEL USER/NON-RETAIL (Agricultural) FAC STATUS: Open This facility consists of one 200-gallon AST, which is in service as of March 2022. Previously, the facility also contained three 1,000 gallon USTs which were removed in June 1986 and October 1991. Both removals resulted in a "clean closure". There is no contamination history at the facility. Due to the facility status and lack of contamination history, the contamination impacts from this facility are low.
23	8736867	MOORE FRUIT CO	6600 LUCERNE PARK AVE DR WINTER HAVEN, FL 33881	123 S	Petroleum	LUST/TANKS	LOW	FUEL USER/NON-RETAIL (Agricultural) FAC STATUS: Closed This facility previously consisted of one 1,000-gallon UST and one 2,000-gallon UST, both of which were removed on July 31, 1990. Two DRFs are on record at this facility, one from the time of removal and the second from January 9, 1991. Site assessments were performed in August/September of 2000, and September 2001, where no contaminants above clean up target levels (CTLs) were identified. The FDEP granted an SRCO for both discharges on March 7, 2002. Due to facility status, contamination impacts from this facility are low.
24	8628253	GUARANTEED TRANSPORT SERVICE	7400 STATE ROAD 544 WINTER HAVEN, FL 33881	306 S	Petroleum	TANKS	LOW	FUEL USER/NON-RETAIL FAC STATUS: Closed This facility consists of one 20,000-gallon AST and one 5,000-gallon AST, both of which were closed in place on November 26, 2018. Previously, the facility consisted of two USTs, both of which were removed from the facility in June 1989 and resulted in a "clean closure". There is no contamination history at the facility. Due to facility status, contamination impacts from this facility are low.
25	110063610141	DOLLAR GENERAL - LUCERNE PARK ROAD	WINTER HAVEN, FL 33881	142 S	Hazardous Waste	FRS NPDES	NO	NPDES facilities that register with these systems do not necessarily indicate involvement with hazardous materials. This site obtained a stormwater construction permit February 8, 2015. No contamination impacts are anticipated.
26	9103318	LAKE SMART GROVES	HWY 544 W OF HWY 27 WINTER HAVEN, FL	500 N	Petroleum	TANKS	LOW	FUEL USER/NON-RETAIL (Agricultural) FAC STATUS: Deleted According to the FDEP's Nexus Information Portal, historical registration records for the facility indicate one AST was present at the facility in September 1989. There are no documents available to identify its current status or condition. Due to the distance from the project, contamination impacts from this facility are low.

Site	Facility ID	Facility Name	Address or Location	Distance (ft)	Type of Concern(s)	Regulatory Database	Risk Rating	Site History, Regulatory Status and Comments
27	110032803063	SR 544 & US HWY 27 SITE/ JOHN P ADAMS PROPERTIES INC	SWC OF SR 544 & US HWY 27 WINTER HAVEN, FL 33880	283 S	Hazardous Waste	FRS NPDES	NO	NPDES facilities that register with these systems do not necessarily indicate involvement with hazardous materials. This site obtained a stormwater construction permit September 20, 2007. No contamination impacts are anticipated.
28	8735196	RACETRAC #2343/ STAR ENTERPRISE/ TEXACO #242031370	32886 HWY 27 (1602 US HWY 27 S) HAINES CITY, FL 33844	0 S	Petroleum	LUST/TANKS	MEDIUM	GASOLINE RETAIL STATION FAC STATUS: Open This facility is an open gasoline retail station consisting of three 20,000-gallon USTs holding unleaded gasoline, non-ethanol gasoline, and diesel. Discharges have been reported on site; however, there are no active or open cleanup efforts on-going. Due to the facility's status as an open gasoline station, the facility is rated as medium. Full site discussion is located after Table 7-1.
29	8628429	MARATHON-LUCERN #136	32940 US HWY 27 HAINES CITY, FL 33844	0 N	Petroleum	LUST/TANKS	HIGH	GASOLINE RETAIL STATION FAC STATUS: Open This facility is an open gasoline retail station consisting of two 10,000-gallon USTs holding unleaded gasoline and diesel. Discharges have been reported on site where active contamination cleanup is on-going. Therefore, the facility is rated as high. Full site discussion is located after Table 7-1.
30	FLD984201111/ FLTMP9002502/ 106965	JARRETT FORD HAINES CITY/ HAINES CITY FORD/ BARGAIN CARTS	33026 US HWY 27 S (1550 US HIGHWAY 27 S) HAINES CITY, FL 33844	411 N	Hazardous Waste	RCRA/ NONTSD/ SLDWST	LOW	MOTOR VEHICLE DEALER/GENERAL AUTOMOTIVE REPAIR FAC STATUS: Non-generator/transporter This facility was formerly registered as a small quantity generator (less than 1,000 kilograms per month) of hazardous waste. The facility was verified as not a generator or transporter on November 7, 2000. One violation was recorded in June 3, 1996. The facility returned to compliance and violation completed on June 24, 1996. There is no other contamination history at the facility. The facility is currently registered as a Waste Tire Collector. Contamination impacts from this facility are low.
31	110040330353	FDOT T1334 US 27	32876 HWY 27 HAINES CITY, FL 33844	196 S	Hazardous Waste	FRS/ NPDES	NO	NPDES facilities that register with these systems do not necessarily indicate involvement with hazardous materials. This site obtained a stormwater construction permit November 20, 2009. No contamination impacts are anticipated.

Site	Facility ID	Facility Name	Address or Location	Distance (ft)	Type of Concern(s)	Regulatory Database	Risk Rating	Site History, Regulatory Status and Comments
32	8628415	SAMS CORNER	1601 US HWY 27 S HAINES CITY, FL 33844	20 S	Petroleum	LUST/TANKS	LOW	GASOLINE RETAIL STATION FAC STATUS: Closed This closed facility previously consisted of five USTs holding unleaded gasoline and vehicular diesel. A discharge of generic gasoline occurred on March 21, 1991. The cleanup work status for the discharge was completed when a No Further Action (NFA) request was approved on November 6, 1997. The five USTs were removed from the site on April 1, 2000; however, a second discharge was recorded on December 6, 2005. The Polk County Health Department Petroleum Cleanup Program reviewed the Source Removal (SR) Report dated April 1, 2006, and Addendum dated July 13, 2006, and confirmed contaminated soils were successfully removed. Polk County concurred with the NFA Proposal and prepared an SRCO. Due to the current facility status, contamination impacts from this facility are low.
33	110015730271	SR 544 // 1972242	EAST OF US 27 TO SR 17 DUNDEE, FL 33838	0	Hazardous Waste	FRS/ NPDES	NO	NPDES facilities that register with these systems do not necessarily indicate involvement with hazardous materials. This site obtained a stormwater construction permit August 9, 2008. No contamination impacts are anticipated.
34	N/A	ABOVEGROUND STORAGE TANK #1	SCENIC DR, HAINES CITY, FL 33844	435 N	Petroleum	None	LOW	A large AST was identified during the field review and site insections. The tank appears to be in good condition and no evidence of contamination was identified. Contamination impacts from this site are low.
35	110015618401	ESTATES AT LAKE BUTLER	N.W QUADRANT PENINSULAR DR. & SR 544 HAINES CITY, FL 33845	487 N	Hazardous Waste	FRS/ NPDES	NO	NPDES facilities that register with these systems do not necessarily indicate involvement with hazardous materials. This site obtained a stormwater construction permit May 7, 2003. No contamination impacts are anticipated.
36	110032756854	PENINSULAR RIDGE	NE CORNER 5TH ST & SR-544 HAINES CITY, FL 33844	120 N	Hazardous Waste	FRS/ NPDES	NO	NPDES facilities that register with these systems do not necessarily indicate involvement with hazardous materials. This site obtained a stormwater construction permit August 24, 2006. No contamination impacts are anticipated.
37	110058924552	ALTA VISTA ELEMENTARY SCHOOL	801 SCENIC HIGHWAY HAINES CITY, FL 33844	297 N	Hazardous Waste	FRS/ NPDES	NO	NPDES facilities that register with these systems do not necessarily indicate involvement with hazardous materials. This site obtained a stormwater construction permit March 29, 2014. No contamination impacts are anticipated.

Site	Facility ID	Facility Name	Address or Location	Distance (ft)	Type of Concern(s)	Regulatory Database	Risk Rating	Site History, Regulatory Status and Comments
38 A & B	N/A	BRIDGE NO. 160021 AND BRIDGE NO. 106147	BRIDGE NO. 160021: BETWEEN BRENTWOOD DR AND W LAKE HAMILTON DR BRIDGE NO. 106147: EAST OF US HWY 27	0	Asbestos/Lead	None	MEDIUM	These bridges present the risk of contamination involvement through the potential presence of asbestos containing materials (ACM) and/or RCRA-regulated metals in the paints or metals-based coatings (MBCs). Therefore, these bridges and/or bridge culverts present a medium risk for contamination impacts and will require additional testing. Full site discussion is located after Table 7-1.
39 A-K	N/A	ADJACENT AGRICULTURAL LANDS	NUMEROUS LOCATIONS	0	Agricultural Chemicals	None	MEDIUM	The agricultural lands immediately adjacent to the project present the risk of contamination involvement through the potential presence of residual contaminants including herbicides, pesticides, and insecticides. Full site discussion is located after Table 7-1.

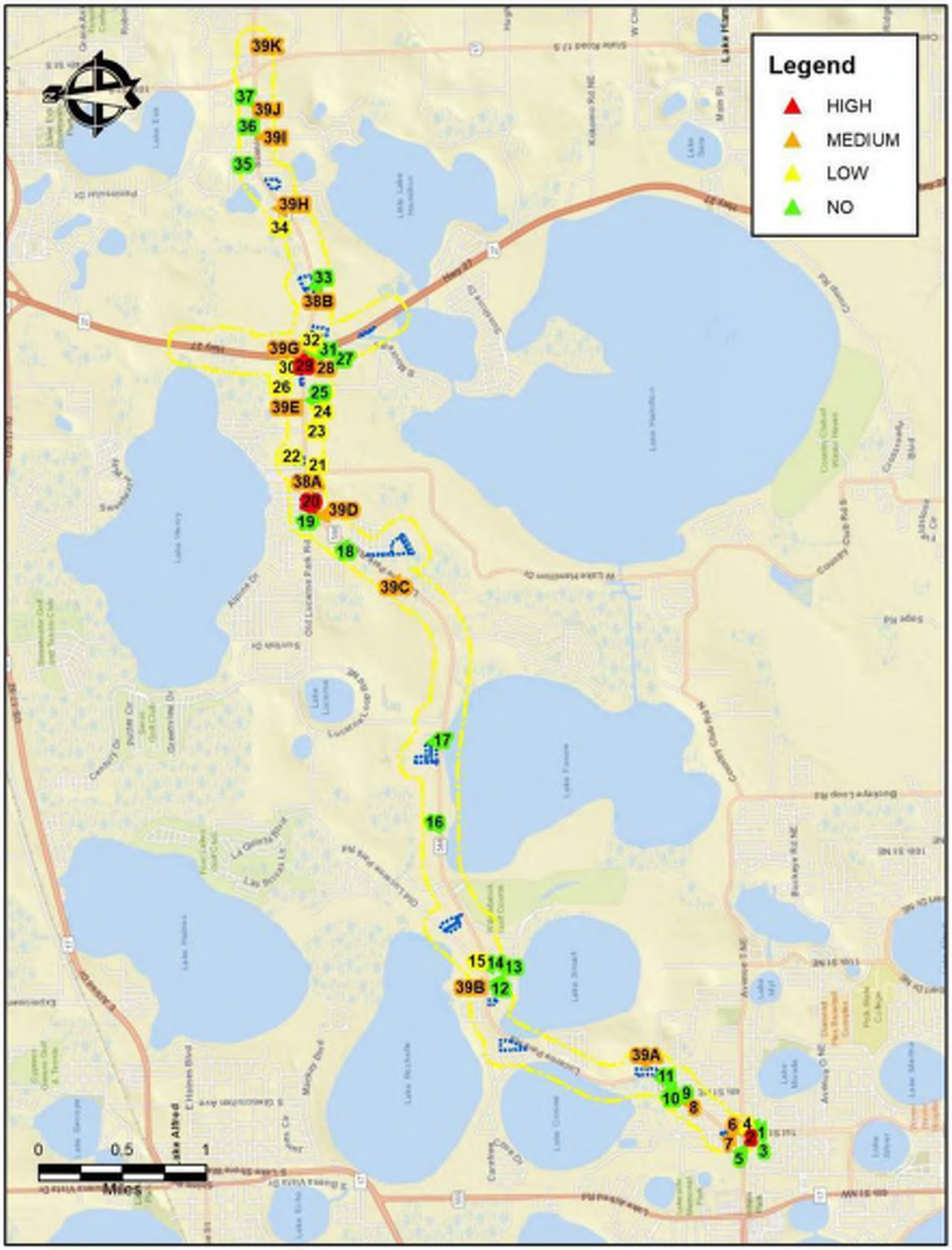


Figure 7-1 Potential Contamination Sites

SITE 2: BIG M MART (CITGO)

LOCATION: 128 AVENUE "T" NE, WINTER HAVEN, FLORIDA 33881

FAC ID: 8840952 LUST

Risk Rating: HIGH

The subject site is a retail gasoline station located at 128 Avenue T Northeast on the southeast corner of the intersection of Avenue T Northeast and 1st Street North in Winter Haven, Polk County, Florida. The facility layout consists of a single-story building, situated on the east side of the property, which operates as a convenience store. A canopy exists west of the facility building and covers three, typical, dispenser islands. The current tank field is located south of the canopy and consists of one 10,000-gallon and one 12,000-gallon unleaded gasoline and diesel USTs.

The former petroleum storage systems consisted of two 3,000-gallon unleaded gasoline USTs, which were installed in July and December 1978 and were removed from the site in October 1995 and three 6,000-gallon unleaded gasoline USTs, which were installed in April 1988 and were removed from the site in October 1995. The current tank field is located south of the canopy and consists of one 10,000-gallon and one 12,000-gallon unleaded gasoline fiberglass clad steel USTs installed in October 1995. Access to the property is via the main entrances on the north side of the site from Avenue T Northeast and on the west side of the site from First Street North.

According to the FDEP, Data Management System (OCULUS), only one of the discharges filed for the site was eligible for state-funded cleanup. An application was filed on December 28, 1988, in response to an unleaded gasoline leak from a loose connection on a pipe fitting. The number of gallons discharged is listed as unknown. The incident was approved for participation in Florida's Early Detection Incentive (EDI) Program for the discharge. No previous assessment or remediation has been completed for this discharge. After this incident, the site had one other DRF filed October 18, 2010. This DRF was submitted in response to a spill bucket closure assessment. Soil sampling was conducted which documented adsorbed-phase hydrocarbon concentrations above standards in the eastern spill bucket. An unknown number of gallons of gasoline was discharged due to an overfill of the spill bucket. No other DRFs have been filed for this site.

As documented in the March 2018 Templated Site Assessment Report (TSAR), EnviroTrac was onsite on October 4 and 5, 2017, to investigate any potential existing soil impacts. Sixteen soil borings (SB-1 through SB-16) were attempted to be advanced onsite, approximately around the tank farm and dispenser area. Three soil samples were recovered for laboratory analysis. From December 4 through 6, 2017, EnviroTrac personnel oversaw the installation of seven groundwater monitoring wells (MW-1 through MW-7). Further soil assessment was conducted July 30-31, 2018; soil borings SB-17 thru SB-21 and SB-26 thru SB-29 were advanced and screened for vapor analysis. Thirteen soil samples (SB-17@8' thru SB-29@8') were collected at eight feet bls in the vadose zone for laboratory analysis. Three shallow monitoring wells (MW-8 thru MW-10) were installed on July 31,2018. Further dissolved phase delineation was completed with wells MW-11 thru MW-16, DMW-1 and DMW-2 and MW-17 on June 17-19, 2019, and September 3, 2019. Recently completed assessment at the site indicates petroleum compounds remain in the groundwater at this facility.

Laboratory analyses of the groundwater samples indicated contaminants of concern (COC) exceeded both Natural Attenuation Default Concentration (NADCs) and groundwater cleanup target levels (GCTLs). No separate phase petroleum (free product) has been documented at the monitoring wells. Select soil samples were collected for laboratory analysis and indicate soil tested below CTLs as defined by Residential Direct Exposure and Leachability Based on Groundwater Criteria. Analytical results reported petroleum compounds exceeded CTLs at MW-1, MW-7, MW-8, MW-9, MW-10, and MW-18.

EnviroTrac completed an air sparge/soil vapor extraction (AS/SVE) pilot test in August 2020. Due to the success of the AS/SVE pilot test described in the October 2020 Pilot Test Report submitted by EnviroTrac, AS/SVE technology was recommended to remediate this site.

FDEP Petroleum Restoration Program selected EnviroTrac to perform the Remedial Action Plan (RAP) at the Big M Mart. FDEP received the latest groundwater sampling results in March 2023. Based on these results, it does not appear the existing plume of contaminants has extended beyond the limits of FDOT right-of-way and monitoring wells are limited to the subject property, as well as the northeast and southwest corners of the intersection at Martin Luther King Boulevard (outside of FDOT right-of-way).

Groundwater impacts are documented in the western portion and northwest corner of the property. Contaminant(s) of Concern: Groundwater: Semi-volatiles, TRPH, volatile organics target compound list. Assessment data did not reveal soil or groundwater contamination within the FDOT right-of-way. Based on the results of the most recent site assessments and ongoing remedial actions, the impacted groundwater is located within 120 feet southeast of the proposed SR 544 project. Contact with contaminated groundwater during construction is not anticipated. However, this site may affect any NPDES dewatering efforts within 500 feet. Treatment or monitoring will depend on the contamination levels and sampling data at the time of construction. Based on the current regulatory status, this facility is given a risk rating of HIGH for potential contamination to impact the project corridor.

Site 6: CASTELGAS LLC/ PRONTO STATION LLC (Winter Haven Chevron)

Location: 2100 1ST STREET N, WINTER HAVEN, FLORIDA 33881

Fac ID: 9807255 TANKS

Risk Rating: MEDIUM

The subject site is a retail gasoline station located at 2100 1st Street North, on the northeast corner of the intersection of Avenue T Northeast and 1st Street North in Winter Haven, Polk County, Florida. The facility layout consists of a single-story building, situated on the east side of the property, which operates as a convenience store. A canopy exists west of the facility building and covers four typical dispenser islands. The current tank field is located south of the building and consists of one 24,000-gallon unleaded gasoline in service since April 2005.

No discharges have been reported. No contamination has been documented. However, based on the FDOT in Chapter 20 of the PD&E Manual (July 1, 2023), properties used historically as gasoline stations and which have not been evaluated or assessed by regulatory agencies, sites with abandoned in place underground petroleum storage tanks or currently operating gasoline stations should receive a MEDIUM rating.

SITE 7: WASHINGTON GARAGE

LOCATION: 2101 1ST STREET N, WINTER HAVEN, FLORIDA 33881

FAC ID: ERIC_13415/ FLR000098426

Risk Rating: MEDIUM

The property was a former auto repair site located at 2101 1st Street N. The site covers multiple parcels located west of SR 544 (Lucerne Park Road) and 1st Street N north of Avenue U NW and south of Avenue V NW in Winter Haven, Polk County, Florida.

FDEP inspected the Washington Garage site on April 16, 2003. The site inspection was conducted following a request by the City of Winter Haven's Office of Code Enforcement. Mr. Lonnie Washington operated a towing and vehicle repair business from his property. The majority of the site was used for storage of inoperable and damaged cars and trucks. In addition to the cars and trucks on the property, other waste included used batteries, construction and demolition (C&D) debris, tires, car and truck parts (engines, transmissions, and fuel tanks) and contaminated gasoline. Throughout the property were numerous areas of oil-stained soil.

Mr. Washington made no efforts to address the violations that existed on the property; the FDEP filed a suit against Mr. Washington to compel him to cleanup his property. A Summary Judgment ordered to remove the hazardous waste from the site and to do a Site Assessment on April 29, 2005. Mr. Washington passed away on January 6, 2006.

On September 12, 2006, during an inspection of the subject property, the FDEP conducted a very limited soil assessment which indicated that total recoverable petroleum hydrocarbons (TRPH) and lead concentrations exceeded the residential soil cleanup target level (RSCTL) established in Chapter 62-777, F.A.C. FDEP issued a letter on January 28, 2008, requesting that a Site Assessment be initiated within 60 days of contamination discovery, based on the laboratory analysis of soil samples taken by FDEP on September 12, 2006. On March 25, 2013, the FDEP referred the site to Office of General Counsel (OGC). Staff from the FDEP visited the site on July 1, 2013, and found a vacant, undeveloped lot. Upon further consideration related to the limited nature of the preliminary shallow soil assessment and because the property is currently a vacant, undeveloped lot, FDEP determined that no further assessment will be required under Chapter 62-780, F.A.C., at this time. Therefore, the FDEP closed the files on this case on September 10, 2013. However, it is noted in the letter that if the property changes ownership, due diligence may require Mrs. Washington to notify the new owner of the property's history of potential environmental issues. The FDEP may then be presented with sufficient facts to consider the property owner at that time to be a Person Responsible for Site Rehabilitation, as defined in Rule 62-780.200(32), F.A.C., and require achievement of a Risk Management Option under Rule 62-

780.680, F.A.C., to address the existing contamination left in place on the subject property. Sell or other dispossession of the property does not release you from future potential financial liability for contamination that may exist at the property.

There are previously documented petroleum and hazardous waste related impacts to this site's soil. No further site assessments have been conducted and no additional information is available. Based on the results of the 2006 site assessment, contact with contaminated soils and groundwater during construction is anticipated. This facility is given a risk rating of MEDIUM for potential contamination to impact the project corridor.

Site 8: BP #610 TWIN BROTHERS FOOD MART

Location: 2433 LUCERNE PARK ROAD, WINTER HAVEN, FLORIDA 33881

Fac ID: 8945035 LUST

Risk Rating: MEDIUM

The subject site is a retail gasoline station located at 2433 Lucerne Park Road, northwest of SR 544 (Lucerne Park Road) and east of Cedie Street NE in Winter Haven, Polk County, Florida. The facility layout consists of a single-story building, situated on the north end of the property, which operates as a convenience store. A canopy exists south of the facility building and covers two, typical, dispenser islands. The current tank field is located south of the canopy and consists of one compartmentalized 20,000-gallon UST holding unleaded gasoline and diesel installed and in service since December 2007.

A discharge was reported in May 2006. The source of the discharge was reported to be related to the former USTs. The Closure Assessment Report indicated that laboratory analysis conducted on soil and groundwater samples collected at the site verified the presence of petroleum constituents in the groundwater samples. The concentrations exceeded cleanup target levels. The volume of petroleum product discharged was unknown.

A Limited Site Assessment Report (LSAR) was submitted in October 2008. The LSAR indicated that laboratory analysis of the soil and groundwater samples were below selected CTLs. An LSAR Addendum (LSARA) was submitted February 2009. The LSARA indicated that groundwater samples collected were not impacted. Based on the laboratory analysis, none of the analities were present in detectable concentrations for any of the monitoring wells sampled. Analytical results indicated all four groundwater samples were consistent with the previous sampling event and are below the selected GCTL. The discharge and contaminants did not extend into the project limits.

The Polk County Health Department Petroleum Cleanup Program reviewed the LSAR and LSARA and issued an SRCO on April 16, 2009.

Based on the LSAR, LSARA and the SRCO; the soil and groundwater investigation showed no indication of petroleum hydrocarbon impacted groundwater or soil at the site. However, based on by the FDOT in Chapter 20 of the PD&E Manual (July 1, 2023), properties used historically as gasoline stations and which have not been evaluated or assessed by regulatory agencies, sites with abandoned in place underground petroleum storage tanks or currently operating gasoline stations should receive a MEDIUM rating.

Site 20: GIANT OIL #121

Location: 5900 LUCERNE PARK ROAD, WINTER HAVEN, FLORIDA 33881

Fac ID: 8624284 LUST

Risk Rating: HIGH

The subject site is a retail gasoline station located at 2433 Lucerne Park Road, west of SR 544 (Lucerne Park Road) and Old Lucerne Park Road in Winter Haven, Polk County, Florida. The facility layout consists of a single-story building, situated on the west end of the property, which operates as a convenience store. A canopy exists east of the facility building and covers three typical dispenser islands. The current tank field is located east of the canopy, situated in the same area as the former tank field, and consists of two 15,000-gallon USTs holding unleaded gasoline and diesel installed and in service since July 2009.

FDEP records show that a discharge was reported in October 1993. The discharge was eligible for the FDEP Petroleum Liability Insurance and Restoration Program (PLIRP). Site assessment activities were conducted in 1996 and 1997. In 1998, a RAP was submitted and approved. Operation and Maintenance activities were conducted in 1998 and monitoring activities conducted from 1998 to 2002. An SRCO was issued on December 11, 2002. The site historically had five USTs installed in 1984, consisting of four unleaded gasoline and one diesel. The USTs were removed in June of 2009. Two current USTs exist at the facility, a compartmented tank contains diesel and premium unleaded gasoline and the other contains regular unleaded gasoline. During the June 2009 tank closure assessment, soil and groundwater samples were collected for laboratory analysis. Based on the analysis, groundwater concentrations exceeded the GCTL. A DRF was filed.

The 2002 SRCO was rescinded in 2010 and the site was returned to the State Cleanup Program. In 2010, Site Assessment Report (SAR) activities were conducted. The extent of contamination and monitoring well network did not extend into the project limits. Based on the laboratory analysis of the soil and groundwater samples collected, NFA was recommended. The Polk County Health Department approved the SAR but requested additional soil assessment. Supplemental SAR (SSAR) activities were conducted in January 2011. Based on the soil and groundwater data obtained in the SAR and the SSAR, impacted soil was not encountered and groundwater impacts were not present. NFA was recommended.

The Polk County Health Department Petroleum Cleanup Program reviewed the SAR and NFAP dated January 21, 2011 and issued a SRCO on April 1, 2011.

Based on the SAR, SSAR and the SRCO; the soil and groundwater investigation showed no indication of petroleum hydrocarbon impacted groundwater or soil at the site. Based on by the FDOT in Chapter 20 of the PD&E Manual (July 1, 2023), properties used historically as gasoline stations and which have not been evaluated or assessed by regulatory agencies, sites with abandoned in place underground petroleum storage tanks or currently operating gasoline stations should receive a MEDIUM rating. However, due to the anticipated alternative alignment and full take of the property with documented historical contamination presence, as well as removal of an entire UST system, the facility is given a risk rating of HIGH.

Site 28: RACETRAC #2343/ STAR ENTERPRISE/ TEXACO #242031370

Location: 32886 US 27 (1602 US 27 S) HAINES CITY, FLORIDA 33844

Fac ID: 8735196 LUST

Risk Rating: MEDIUM

The former Sunshine Food Mart No. 199 was a retail gas station and convenience store. The original set of USTs was installed in 1987 and removed in 2004. A new set of USTs was installed in 2004 in the same location as the original set of USTs. The USTs installed in 2004 consisted of one, 16,000-gallon double wall regular unleaded gasoline UST and one, 16,000-gallon double wall compartmented UST containing diesel fuel and premium unleaded gasoline. The 16,000-gallon USTs were removed on December 8, 2015.

There were two prior reported petroleum discharges at this site; one on December 30, 1988 and one on January 6, 2004. An SRCO was issued by the FDEP on April 18, 2000 for the 1988 discharge and an SRCO was issued by the FDEP on April 19, 2006 for the 2004 discharge. For these two discharges, the extent of contamination did not extend into the limits of the project.

In 2014, site demolition activities and storage tank system removal were conducted including removal of the site building, canopy, canopy footers, concrete pump islands, asphalt paving, and the concrete overlying the USTs. Demolition activities were completed by November 21, 2014. Storage tank system removal activities were conducted in December 2014. Site redevelopment for the new RaceTrac gas station and convenience store began in June 2016 with the facility opening in November 2016. Three 20,000-gallon USTs were installed in July 2016.

A petroleum discharge was discovered during tank closure activities on December 8, 2014. The discharge occurred as a result of petroleum product that leaked from damaged product lines during site demolition activities in November 2014 and tank closure activities on December 8, 2014. The estimated volume of petroleum product in the product lines was 80 gallons. Of the 80 gallons, approximately 42 gallons were discharged to the subsurface and approximately 38 gallons were recovered and properly disposed.

Source removal of vadose zone hydrocarbon-impacted soil was conducted in January 2015 with approximately 429 tons of hydrocarbon-impacted soil removed from the site and properly disposed. The vadose zone was estimated from land surface to 12 feet below ground surface (BGS). Laboratory analyses of confirmation sidewall and bottom soil samples collected from the excavations indicated no Chapter 62-777, F.A.C., Table II, Soil Cleanup Target Level exceedances for benzene, toluene, ethylbenzene, total xylenes (BTEX), methyl tert-butyl ether (MTBE), polycyclic aromatic hydrocarbons (PAHs), and TRPH.

Prior groundwater sampling of former temporary wells in 2015 indicated a dissolved hydrocarbon plume located between the former tank pit and former dispenser. Prior to tank installation activities in July 2016, groundwater sampling was conducted on March 28, 2016, which indicated dissolved hydrocarbons exceeding GCTLs only at the former dispenser area. The extent of the contaminants did not extend into the limits of the project; however, two monitoring wells appear to be located within FDOT right-of-way on the southwest corner of the intersection at US Hwy 27 and SR 544.

In July 2016, RaceTrac installed a new set of USTs with the north side of the new tank pit encompassing the area around the former tank pit and former dispenser. For installation of the new USTs, short term dewatering of the new tank pit was conducted with approximately 192,000 gallons of groundwater pumped from the tank pit, treated, and discharged to a drainage ditch on the FDOT west right-of-way of US 27. Soil sampling was conducted during the tank pit excavation with minimal organic vapor readings and no petroleum odors observed with the exception of two locations at the 15 to 16 foot depth at the north side of the tank pit near the former dispenser location. Based on this data, 78.75 tons (approximately 56 cubic yards) of hydrocarbon-impacted soil was excavated and properly disposed. During the tank installation activities, four monitoring wells were installed at the north side of the tank pit.

Based on the SSAR, dated December 14, 2018, groundwater sampling at the former tank pit and former dispenser areas (prior dissolved hydrocarbon impacted areas) indicated no GCTL exceedances. The SSAR recommended additional sampling. If the next sampling event has no GCTL exceedances, a NFA Request will be submitted.

A Confirmatory Sampling Report and NFA Proposal, dated March 3, 2021, indicated groundwater samples were collected and analyzed by EPA Method 8260B for BTEXMTBE, EPA Method 8270D for PAHs and the FL-PRO Method for TRPHs. All tested compounds were found at concentrations below the GCTLs. The Florida Department of Health in Polk County (FDOH-Polk) Petroleum Cleanup Program, on behalf of the FDEP, reviewed the NFA Proposal dated March 3, 2021 – FDOH-Polk approved an SRCO on April 2, 2021.

Based on the SSAR and the SRCO, the soil and groundwater investigation showed no indication of petroleum hydrocarbon impacted groundwater or soil at the site. However, based on Chapter 20 of the PD&E Manual (July 1, 2023), properties used historically as gasoline stations and which have not been evaluated or assessed by regulatory agencies, sites with abandoned in place underground petroleum storage tanks or currently operating gasoline stations should receive a MEDIUM rating.

SITE 29: MARATHON-LUCERN #136

LOCATION: 32940 US 27, HAINES CITY, FLORIDA 33844

FAC ID: 8628429 LUST

Risk Rating: HIGH

The subject site is a retail gasoline station and convenience store located at 32940 US 27 on the northwest corner of SR 544 (Lucerne Park Road) and US 27 in Haines City, Polk County, Florida. The fuel dispensers are located east of the building and the UST area is located east of the two southern most dispensers. The site is paved with asphalt and concrete, and the dispensers are covered by a canopy.

The site formally had six USTs. One 10,000-gallon, two 3,000-gallon, and two 4,000-gallon unleaded gasoline tanks; and one 10,000-gallon vehicular diesel tank. Tanks were installed in 1979 and 1988. The USTs were removed in 1995. The FDEP databased reports that the site has two 10,000-gallon USTs which store unleaded gasoline, but it is known that diesel fuel is dispensed at the site. The current USTs were installed in 1995.

A DRF was filed for the site on July 19, 1995, when petroleum impacts were discovered during the UST closure assessment activities. Site assessment activities were performed in 2002 and 2003 and a RAP and RAP Addendum was developed in 2004. The RAP AS/SVE was implemented in January 2006 and the system operated until April 2008. Post active remediation monitoring (PARM) was conducted in August 2008.

A DRF was filed in September 2008, after response to discovery of free product in monitoring well and a failed product line test. Petroleum-stained soil was observed, organic vapor analyzer/flame ionization detectors (OVA/FID) measurements indicated significant petroleum impacts. Free product was removed and site assessment activities were conducted in late 2008. A RAP was prepared and was approved on May 25, 2011. The remediation system was installed in June 2013 and started in August 2013. The system was modified in August 2016 and is currently in operation. Based on current monitoring of the system conducted in August 2021, analytical data indicated monitoring well 14 remains the most impacted and lies within the right-of-way of US 27.

Groundwater impacts are documented in the southeastern portion of the property. Assessment data did reveal groundwater contamination within the FDOT right-of-way. Based on the results of the most recent site assessments and ongoing remedial actions, contact with contaminated groundwater during construction is anticipated. This site may affect any NPDES dewatering efforts within 500 feet. Treatment and/or monitoring will depend on the contamination levels and sampling data at the time of construction. Based on the current regulatory status, this facility is given a risk rating of HIGH for potential contamination to impact the project corridor.

SITE 38 A & B: BRIDGE NO. 160021 AND BRIDGE NO. 106147

LOCATION: 3 INDIVIDUAL LOCATIONS

FAC ID: N/A

Risk Rating: MEDIUM

There are two numbered bridges along the project corridor: Bridge No. 160021 (Lake Henry/Hamilton Canal) located between Brentwood Drive and W Lake Hamilton Drive (28.080799, -81.662323); and Bridge No. 106147 (SR 544 Over Lake Hamilton) east of US Hwy 27 (28.079705, -81.644214). These bridges present the risk of contamination involvement through the potential presence of ACMs and/or RCRA-regulated metals in the paints or MBCs. Therefore, these bridges and/or bridge culverts present a medium risk for contamination impacts and will require additional testing. One bridge culvert is located over the Conine-Smart Canal; however, is not recommended for testing.

SITE 39 A-K: ADJACENT AGRICULTURAL LANDS

LOCATION: SEVERAL LOCATIONS

FAC ID: N/A

Risk Rating: MEDIUM

The agricultural lands immediately adjacent to the project present the risk of contamination involvement through the potential presence of residual contaminants including herbicides, pesticides, and insecticides. Agricultural lands adjacent to DOT projects have been known to pose a challenge during construction phase due to unidentified residual contaminants during the planning and development phase. Therefore, the agricultural lands located adjacent to the project pose a medium risk for contamination impacts.

These lands were identified by reviewing the historic aerials to determine which currently undeveloped/open parcels may have had a history of agricultural use. Several tracts of land were identified throughout the project which all have a similar apparent historical use as citrus groves and/or row crops. The numbering for these lands is under Site 39 for their similarity and separated alphabetically for individual parcels or groups of parcels depending on their relatively close geographic location or adjoining boundaries. The individual or grouped parcels as identified in **Table 7-2** below are mapped on the aerials provided in **Appendix A**. The sites are listed below:

Table 7-2 Adjacent Agricultural Lands

Site	Approximate Location	Parcel Number(s)
39 A	East of SR 544, to the north of Ave Y NE	26-28-16-000000-032040
		26-28-16-000000-013020
		26-28-16-000000-031060
		26-28-16-000000-031050
39 B	North of SR 544, to the west of Old Lucerne Park Road	26-28-09-530000-000011
39 C	North/west of SR 544, to the south of Jacaranda Ave	26-28-01-521000-332001
		26-28-01-521000-331002
39 D	North and south of SR 544, at Old Lucerne Park Road	26-28-01-521000-203002
		26-28-01-521000-203003
		26-28-01-521000-182003
		26-28-01-521000-181001
		26-28-01-521000-180001
		26-28-01-521000-203001
		26-28-01-521000-182001
39 E	North of SR 544, west of Brenton Manor Ave	27-28-06-821500-000010
		27-28-06-821500-000040
		27-28-06-821000-005010
		27-28-06-821500-000050
		27-28-06-821000-006010
39 F	West of US Hwy 27, to the north of SR 544	27-27-31-000000-042020
39 G	East of US Hwy 27, to the north of SR 544	27-28-06-000000-013070
39 H	North and south of SR 544, between Scenic Drive and La Vista Drive	27-28-05-000000-031030
		27-28-05-000000-013070
		27-28-05-817000-002010

		27-28-05-000000-013010
		27-28-05-820517-000010
39 I	South of SR 544, at 4th Street	27-28-05-819000-000010
		27-28-04-814000-000010
39 J	South of SR 544, between Crest Drive and 8th Street S	27-28-04-815000-000070
		27-28-04-812500-000010
39 K	Adjacent to SR 544 at SR 17	27-28-04-815032-000011
		27-28-04-815032-000012
		27-27-32-800000-000051
		27-27-32-800000-000041
		27-27-32-800000-000061

7.2 Involvement with Floodplain Compensation and Stormwater Management Sites

The preferred floodplain compensation and stormwater management sites have been screened for potential contamination involvement. This section provides a risk rating determination for the potential contamination involvement in each site based on the proposed improvements. The potential risk for each pond site was determined by several factors including the proximity to potential contamination sites, the risk rating for each contamination site, and field review observations. A summary of each pond site is provided in **Table 7-3**.

There are four floodplain compensation and/or stormwater management sites with a “Medium” rating based on their proximity to identified potential contamination sites.

Pond 1A is 0.37 acres and approximately 135 feet from potential contamination Site 7, a property with documented contamination history on site. Although the FDEP recommended NFA for the facility, the subject property poses a risk to Pond 1A due to the relatively close proximity; therefore, a Medium risk rating was assigned.

Pond 1 is 2.83 acres and located on potential contamination Site 39A (adjacent agricultural lands). The presence of residual contaminants from the property’s history of agricultural use poses a risk of contamination involvement with Pond 1; therefore, a Medium risk rating was assigned.

Pond 7 (swale) is 0.70 acres and approximately 245 feet from potential contamination Site 29, a property with active groundwater contamination monitoring efforts. The plume and monitoring well network have not extended into the limits of Pond 7; however, there are four other identified potential contamination sites within 500 feet, two of which are rated medium. Therefore, Pond 7 is assigned a risk rating of Medium.

Pond 10 (dry) is 2.28 acres and is located on potential contamination Site 39H (adjacent agricultural lands). The presence of residual contaminants from the property’s history of agricultural use poses a risk of contamination involvement with Pond 10; therefore, a Medium risk rating was assigned.

Table 7-3 Pond Site Risk Ratings

Preferred FPC or SMF	Risk Rating	Adjacent Potential Contamination Sites	Approximate Distance to Pond Location (in feet)
Pond 1A	MEDIUM	Site 4 – Low risk Site 6 – Medium risk Site 7 – Medium risk	330 250 135
Pond 1	MEDIUM	Site 11 – No risk Site 39A – Medium risk	150 0
Pond 2	NO	--	--
FPC 1	NO	--	--
FPC 2	NO	--	--
Pond 3	NO	--	--
Pond 4	NO	--	--
FPC 3A	NO	--	--
FPC 3B	NO	--	--
Pond 5	NO	--	--
FPC 4	NO	--	--
Pond 6	LOW	Site 21 – Low risk Site 22 – Low risk	250 0
Pond 7 (swale)	MEDIUM	Site 27 – No risk Site 28 – Medium risk Site 29 – High risk Site 30 – Low risk Site 39E – Medium risk	425 375 245 365 50
Pond 8	LOW	Site 32 – Low risk	350
Pond 8A (swale)	NO	--	--
Pond 9	NO	Site 33 – No risk Site 38B – Medium risk*	70 70
FPC 5	NO	Site 33 – No risk Site 38B – Medium risk*	50 350
Pond 10 (dry)	MEDIUM	Site 39H – Medium risk	0

*Site 38B is Bridge No. 106147 (SR 544 Over Lake Hamilton), which does not present an impact risk to the soils at the pond locations.

SECTION 8.0 CONCLUSIONS AND RECOMMENDATIONS

Of the 39 sites investigated, the following risk ratings have been applied: **3 "High" rating sites, 6 "Medium" rating sites and 30 "Low/No" rating sites for potential contamination concerns.** The sites rated as "High" and "Medium" are listed below in **Table 8-1**.

Table 8-1: Sites Recommended for Additional Evaluation

Site	Facility Name	Risk Rating
2	Big M Mart	High
6	CastelGas LLC/ Pronto Station LLC (Winter Haven Chevron)	Medium
7	Washington Garage	Medium
8	BP #610 Twin Brothers Food Mart	Medium
20	Giant Oil #121	High
28	RaceTrac #2343/ Star Enterprise/ Texaco #242031370	Medium
29	Marathon-Lucern #136	High
38 A-B	Bridges	Medium
39 A-K	Adjacent Agricultural Lands	Medium

Based on the findings of the study and the risk ratings noted above, the following conclusions are being made:

For the sites rated "No" for potential contamination, no further action is planned. These sites/facilities have been evaluated and determined not to have any potential environmental risk to the study area at this time.

For sites rated "Low" for potential contamination, no further action is required at this time. These sites/facilities have the potential to impact the study area but based on select variables have been determined to have low risk to the corridor at this time. Variables that may change the risk rating include a facility's non-compliance with environmental regulations, new discharges to the soil or groundwater, and modifications to current permits. Should any of these variables change additional assessment of the facilities would be conducted.

For those locations with a risk rating of "Medium" or "High", the PM and the DCIC will coordinate on further actions that must be taken to best address the contamination issue. This may include determining if the FDEP/FDOT Memorandum of Understanding (MOU) applies to any sites, conducting Level II activities or recommending Level III or remedial activities, notes on the plans, design modifications and/or special provisions prior to or during construction. A rough cost estimate for additional testing was calculated using an average cost of $7,500 for petroleum sites and agricultural lands and $12,500 for the bridges – amounting to a total of $160,000.

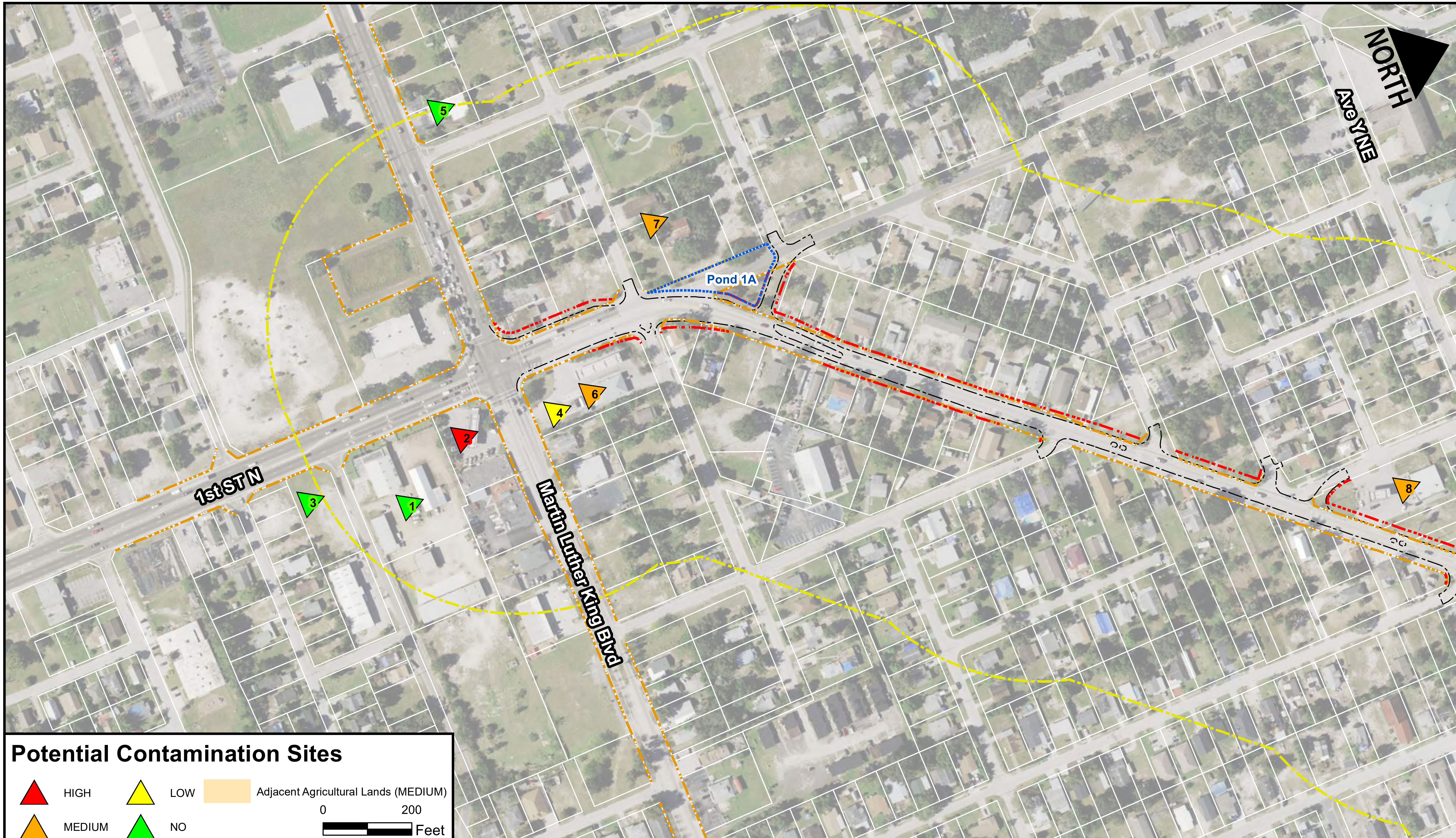
After a review of all available information, indications are found that identify known soil and groundwater contamination. Construction activities may require dewatering. Dewatering operations must obtain an NPDES Generic Permit for Discharge of Groundwater. Dewatering operations seeking coverage under the NPDES Generic Permit for Stormwater Discharges from Large and Small Construction Activities under subsection 62-621.300(4), F.A.C, are not required to obtain separate coverage under subsection 62-621.300(2), F.A.C.

Contamination issues must be screened within 500 feet of the dewatering area before applying for a permit application. Any pollutants of concern (i.e., contamination) present in groundwater at the dewatering site at concentrations equal to or exceeding the surface water criteria under subsection 62-302.530 F.A.C must be remediated; otherwise, the dewatering operation will not qualify for a permit under subsection 62-621.300(2), F.A.C. Therefore, dewatering operations in areas identified with contamination issues require treatment of effluent to limits and requirements specified in the NPDES Generic Permit.

Additional information may become available and site-specific conditions may change from the time this report was prepared and should be considered prior to acquiring right-of-way and/or proceeding with roadway construction.

APPENDIX A

Project Aerial Maps



Florida Department of Transportation
District 1

SR 544 (LUCERNE PARK ROAD) PD&E STUDY

from Martin Luther King Blvd. to SR 17

Polk County, Florida

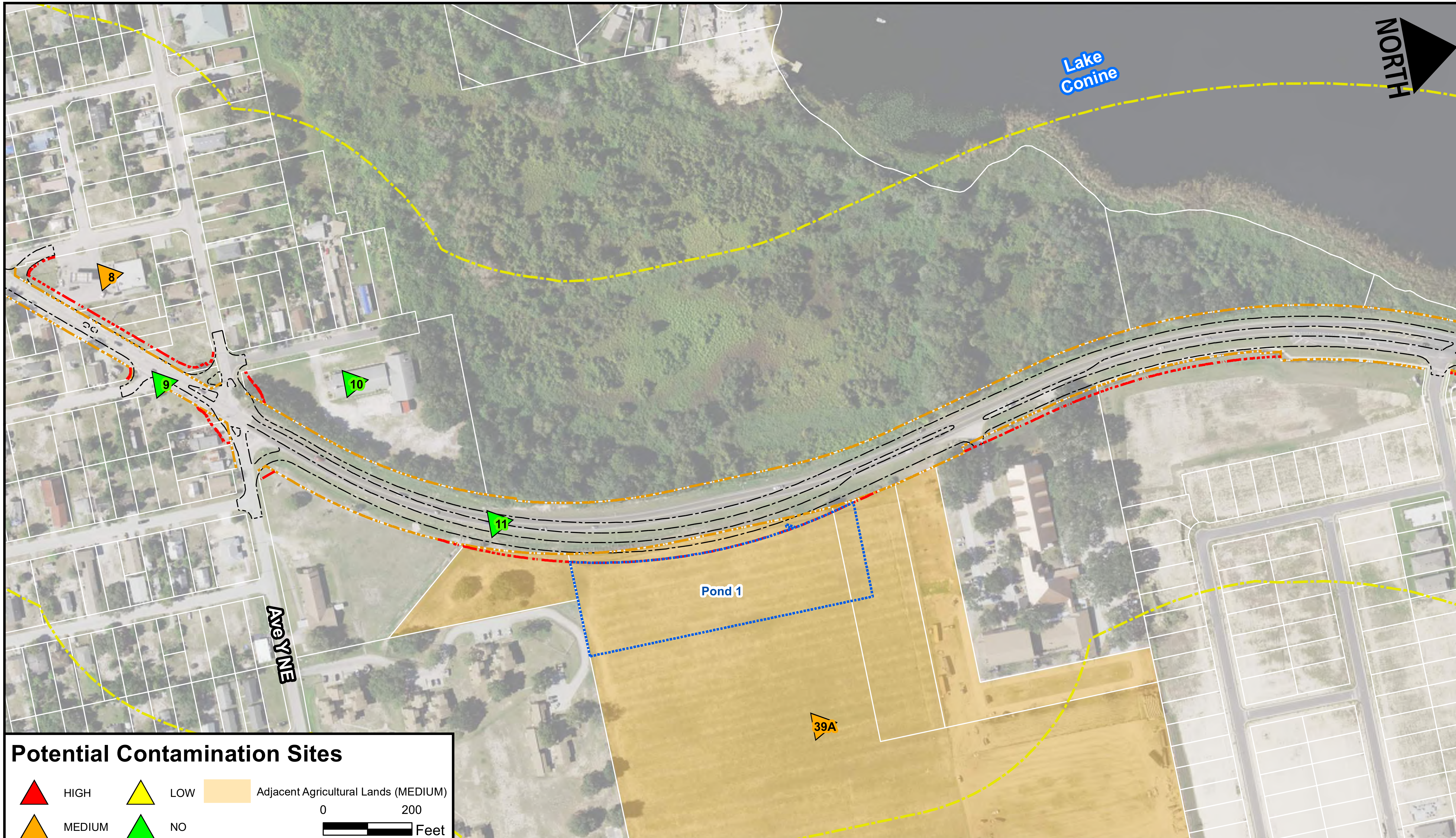
Financial Project ID: 440273-1-22-01

Federal Project No: N/A

Legend

- Study Limits Buffer
- SR 544 Proposed Ponds
- SR 544 Proposed Right-of-Way
- SR 544 Existing Right-of-Way

Project Aerial Maps with Potential Contamination Sites



Florida Department of Transportation

District 1

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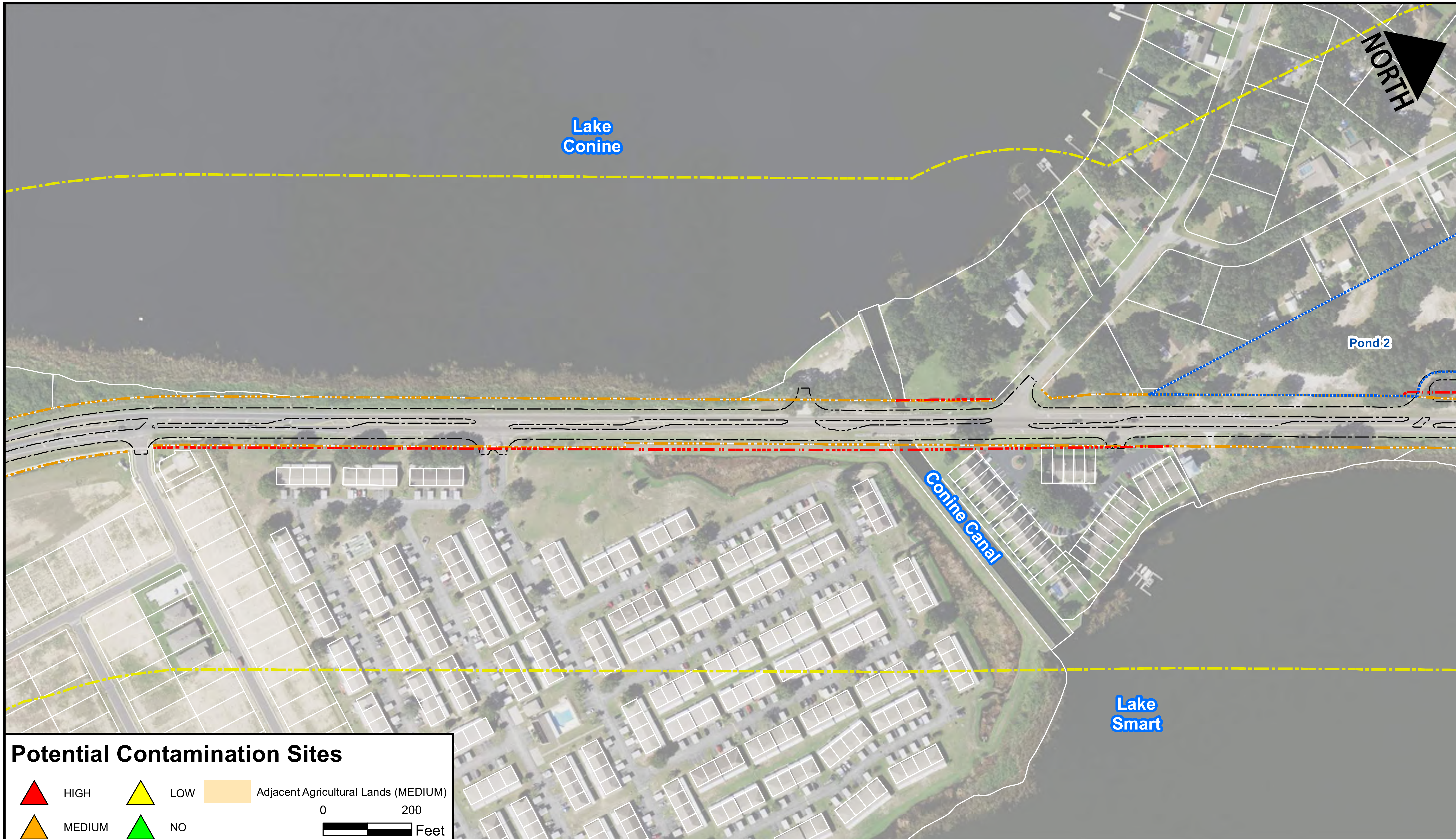
- SR 544 Existing Right-of-Way

Project Aerial Maps with Potential Contamination Sites

SHEET 2 of 16



Florida Department of Transportation
District 1

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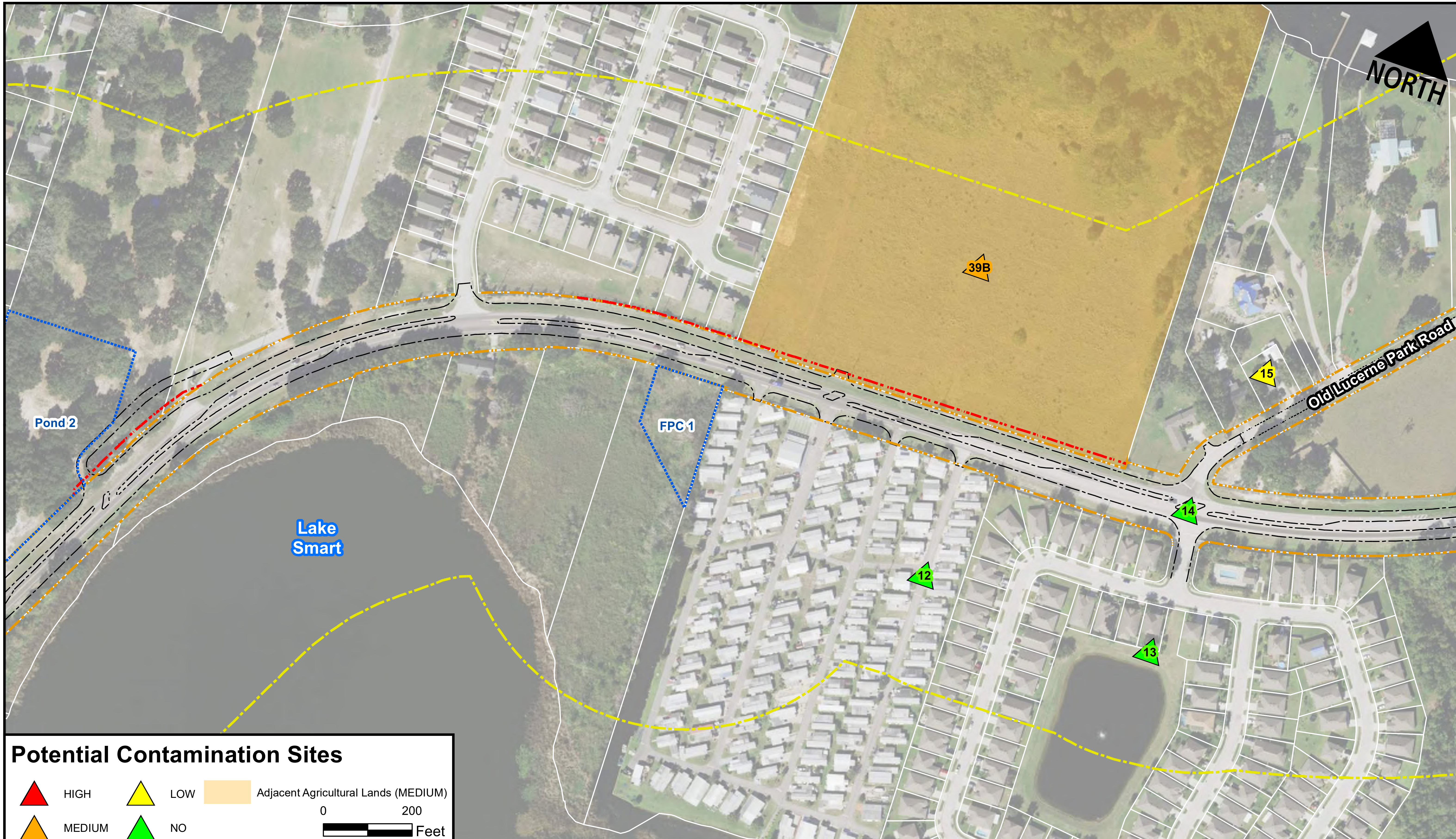
Project Aerial Maps with Potential Contamination Sites

SHEET 3 of 16



Florida Department of Transportation
District 1

SR 544 (LUCERNE PARK ROAD) PD&E STUDY
from Martin Luther King Blvd. to SR 17
Polk County, Florida
Financial Project ID: 440273-1-22-01
Federal Project No: N/A

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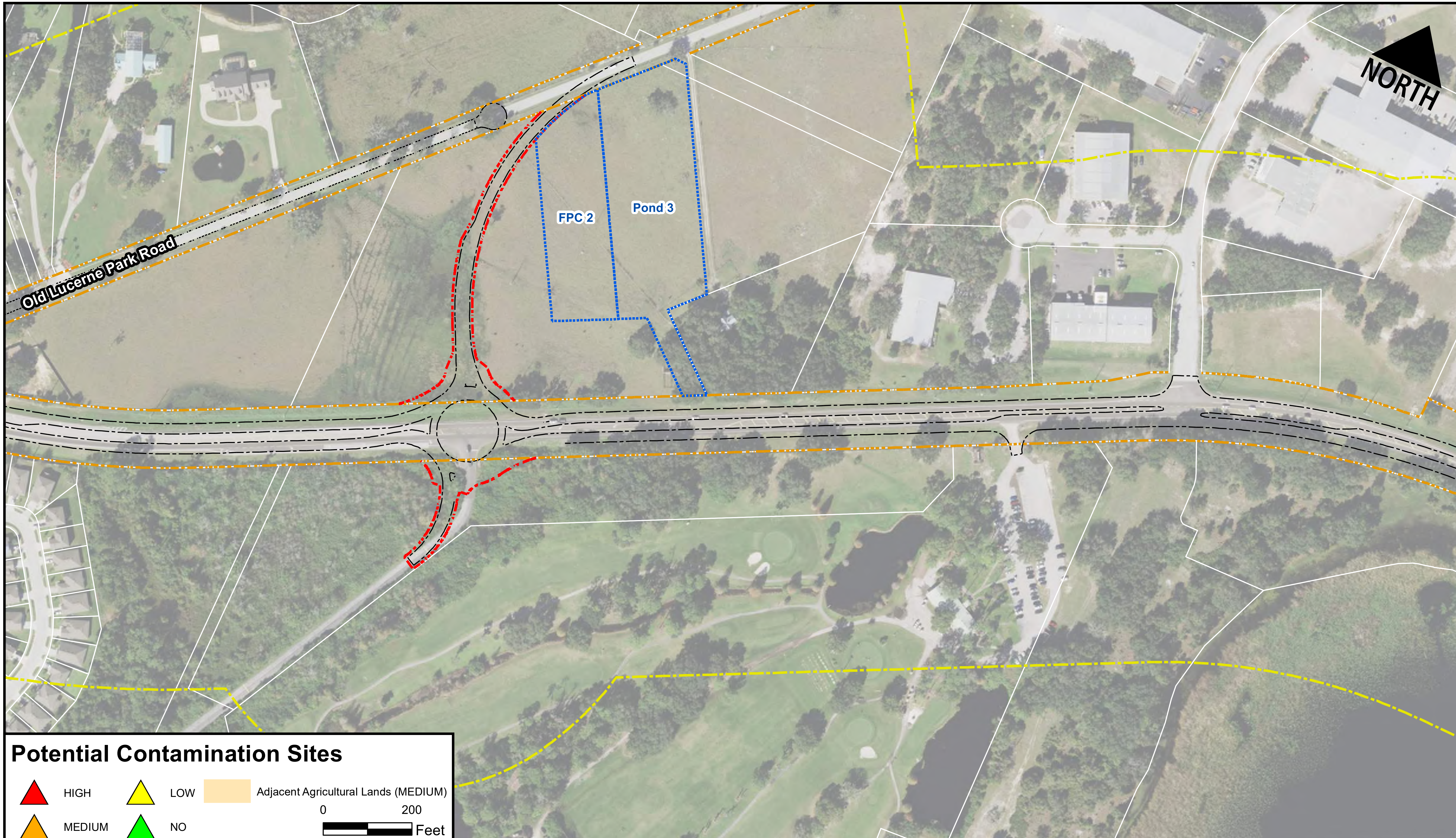
- SR 544 Existing Right-of-Way

Project Aerial Maps with Potential Contamination Sites

SHEET 4 of 16



Potential Contamination Sites

- HIGH
- MEDIUM
- LOW
- NO
- Adjacent Agricultural Lands (MEDIUM)

0 200 Feet

Florida Department of Transportation
District 1

SR 544 (LUCERNE PARK ROAD) PD&E STUDY
from Martin Luther King Blvd. to SR 17
Polk County, Florida
Financial Project ID: 440273-1-22-01
Federal Project No: N/A

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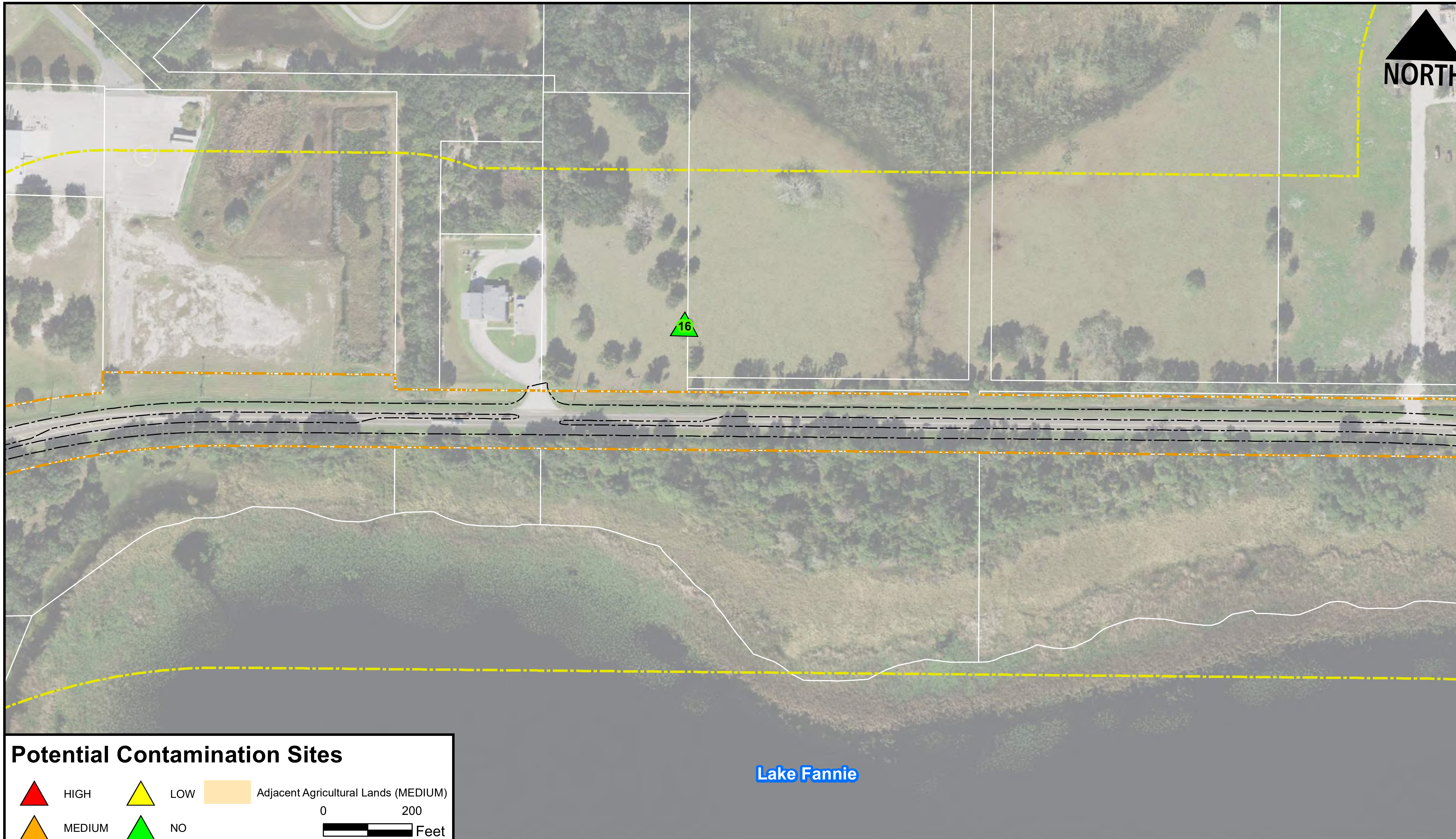
- SR 544 Proposed Right-of-Way
- SR 544 Existing Right-of-Way

Project Aerial Maps with Potential Contamination Sites



Florida Department of Transportation
District 1

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SR 544 Proposed Ponds
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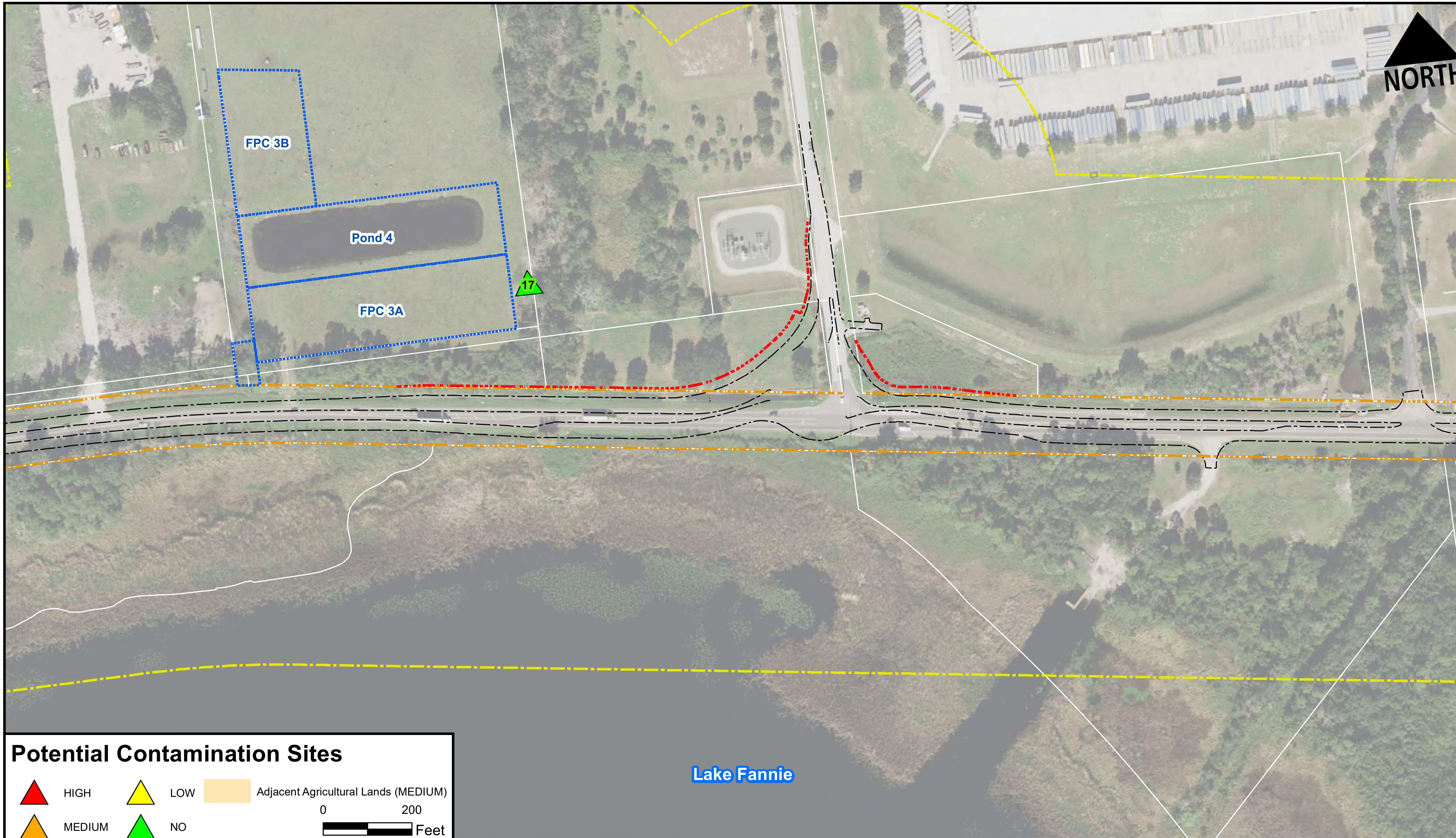
SR 544 Existing Right-of-Way

Project Aerial Maps with Potential Contamination Sites



Potential Contamination Sites

HIGH
LOW
Adjacent Agricultural Lands (MEDIUM)
MEDIUM
NO

0 200 Feet

Florida Department of Transportation
District 1

SR 544 (LUCERNE PARK ROAD) PD&E STUDY
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Polk County, Florida
Financial Project ID: 440273-1-22-01
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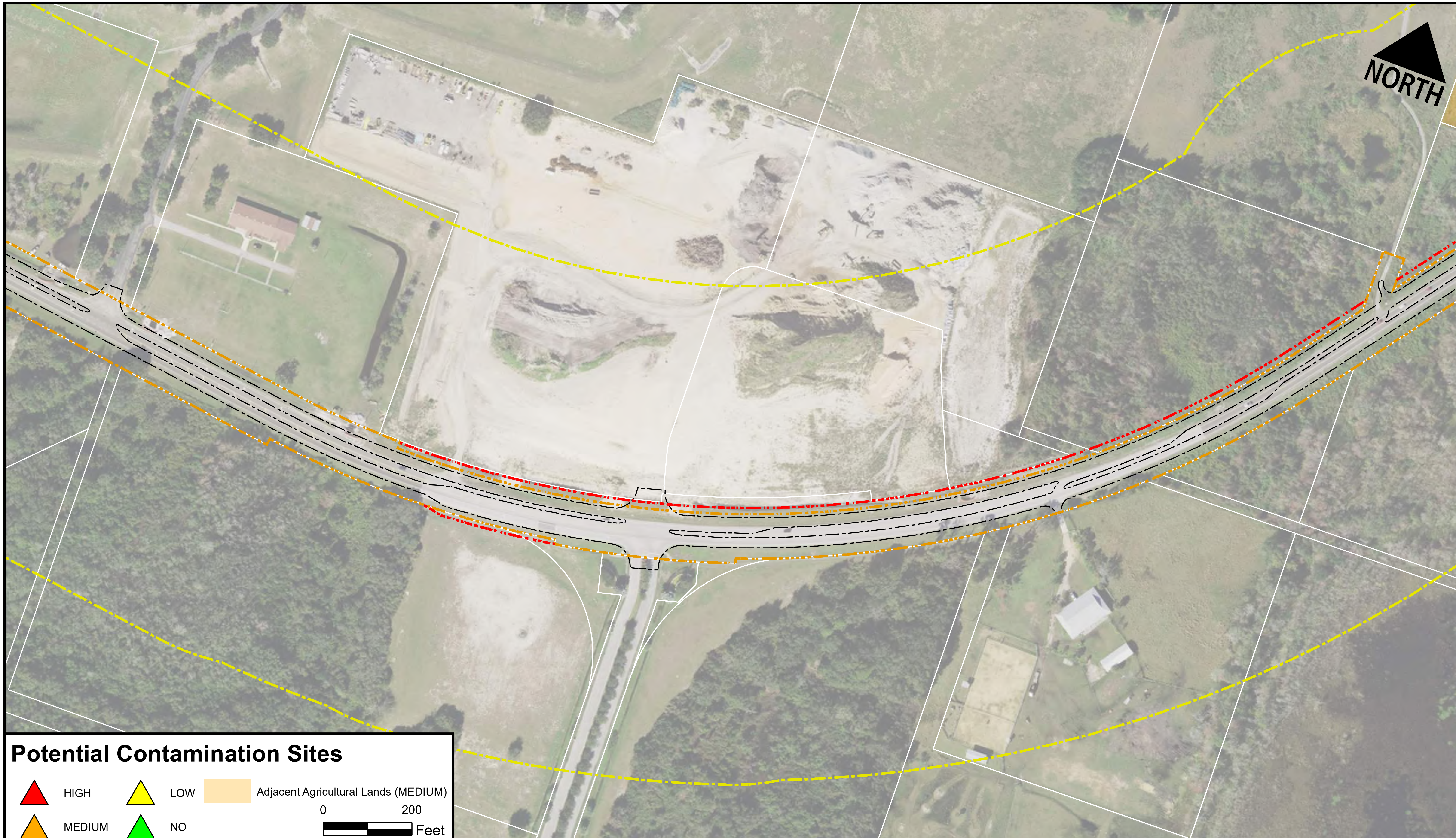
SR 544 Proposed Right-of-Way
SR 544 Existing Right-of-Way

Project Aerial Maps with Potential Contamination Sites



Florida Department of Transportation
District 1

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Polk County, Florida
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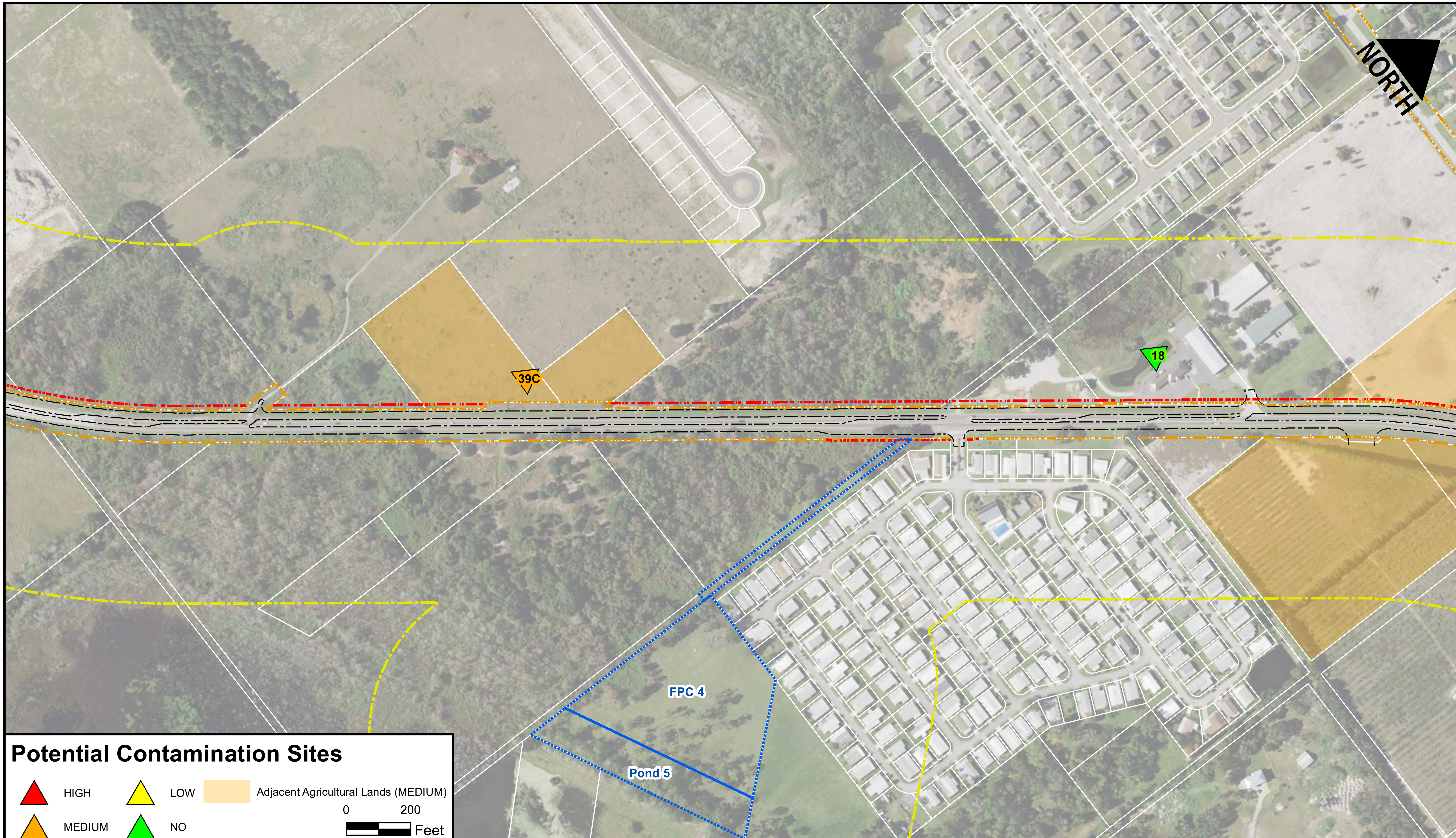
SR 544 Proposed Right-of-Way
SR 544 Existing Right-of-Way

Project Aerial Maps with Potential Contamination Sites



Potential Contamination Sites

HIGH
LOW
Adjacent Agricultural Lands (MEDIUM)
MEDIUM
NO
0 200 Feet

FDOT Florida Department of Transportation District 1

SR 544 (LUCERNE PARK ROAD) PD&E STUDY
from Martin Luther King Blvd. to SR 17
Polk County, Florida
Financial Project ID: 440273-1-22-01
Federal Project No: N/A

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Project Aerial Maps with Potential Contamination Sites

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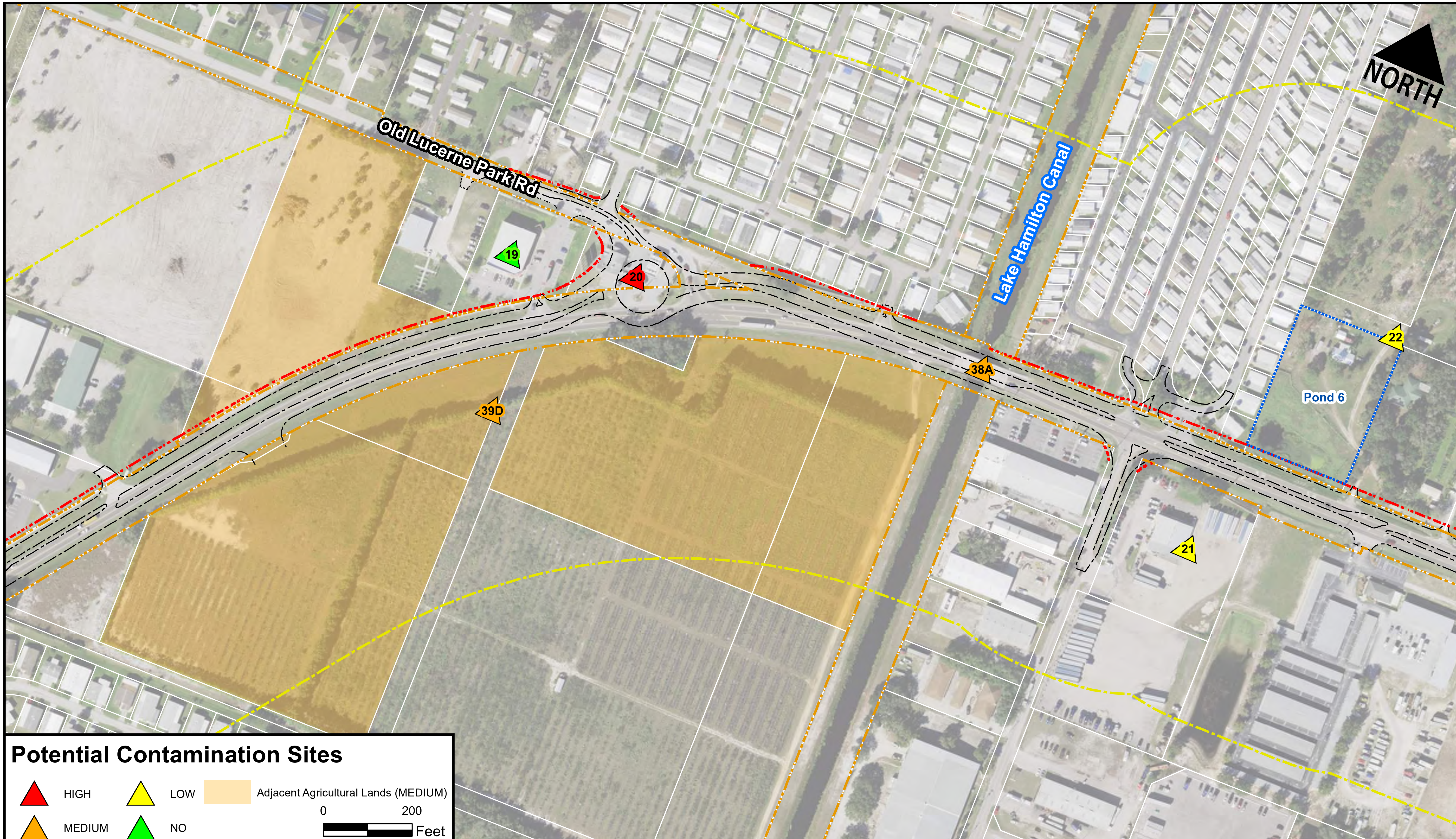

Florida Department of Transportation
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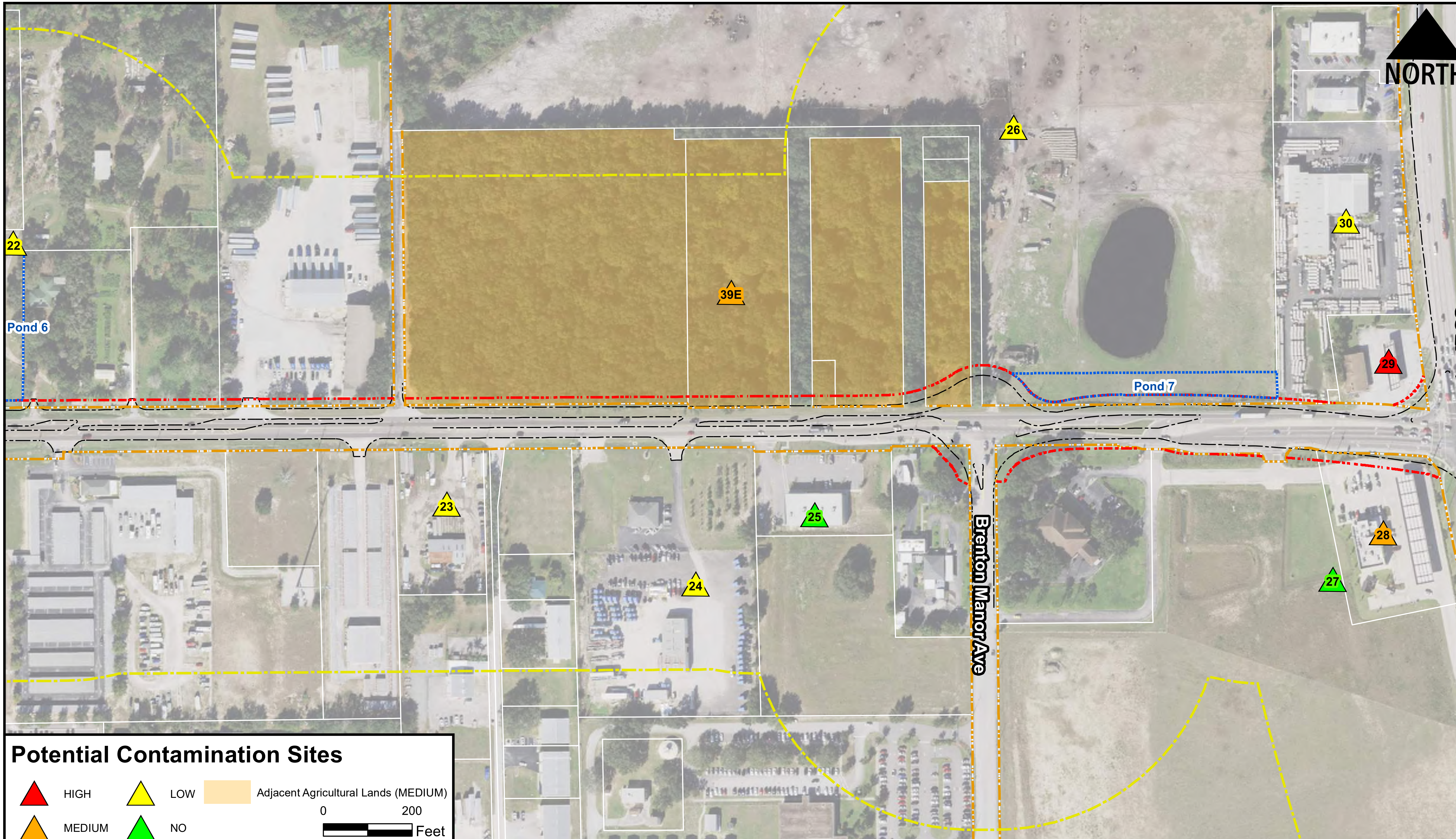
SR 544 Existing Right-of-Way

Project Aerial Maps with Potential Contamination Sites

SHEET 10 of 16



Florida Department of Transportation
District 1

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Legend
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Project Aerial Maps with Potential Contamination Sites

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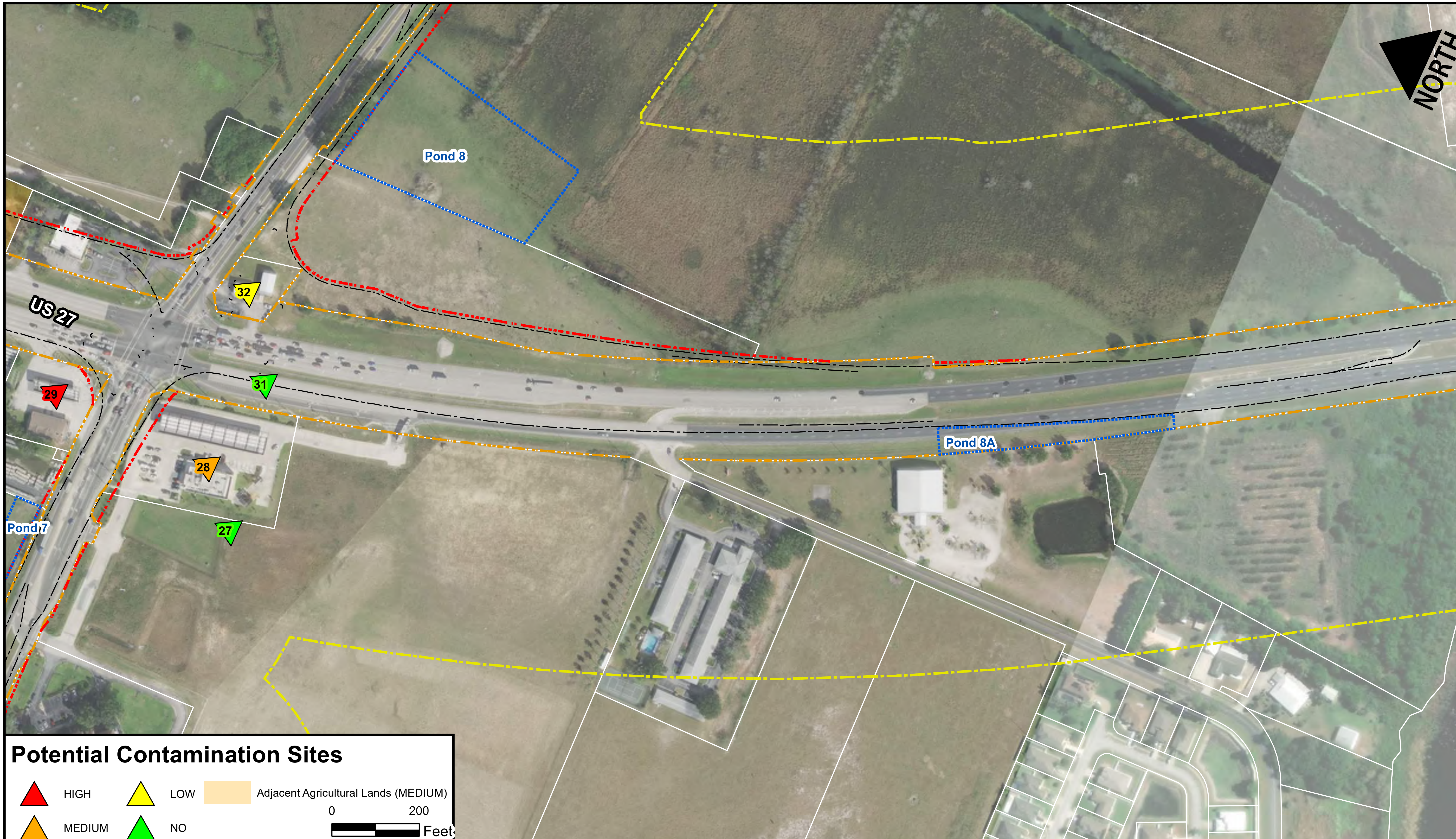

Florida Department of Transportation
District 1

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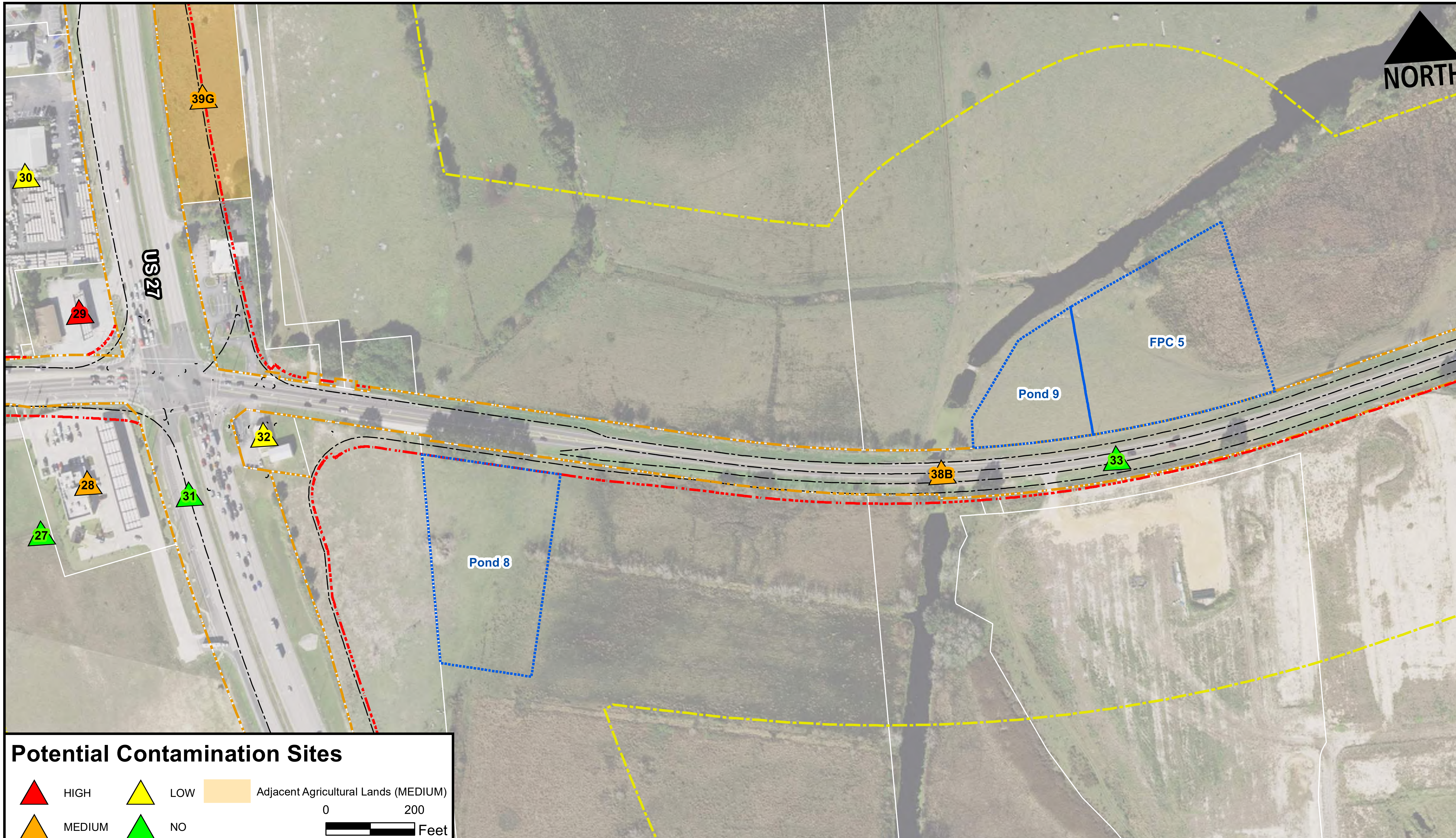

Florida Department of Transportation

District 1

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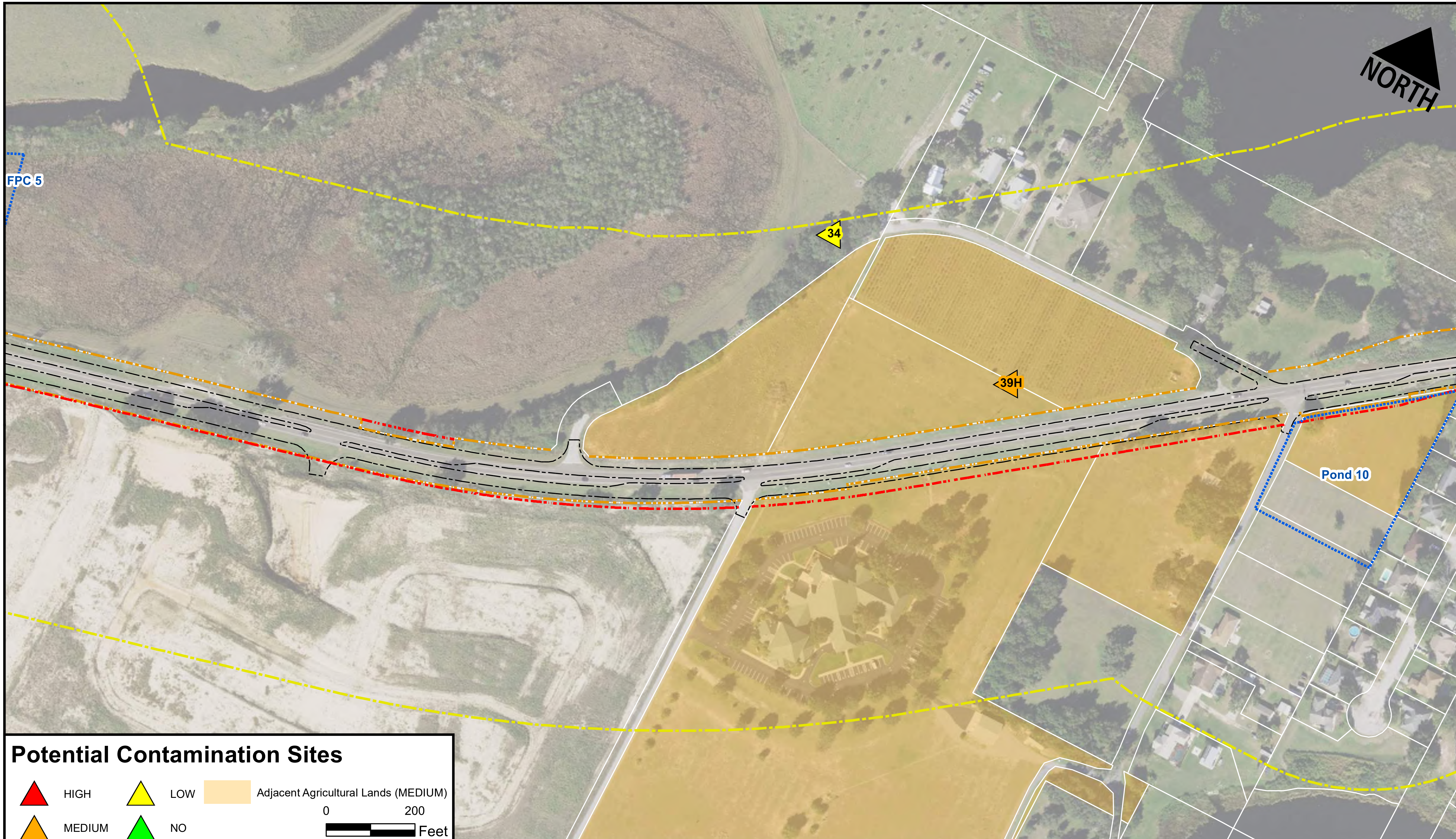
Project Aerial Maps with Potential Contamination Sites

SHEET 13 of 16



Florida Department of Transportation
District 1

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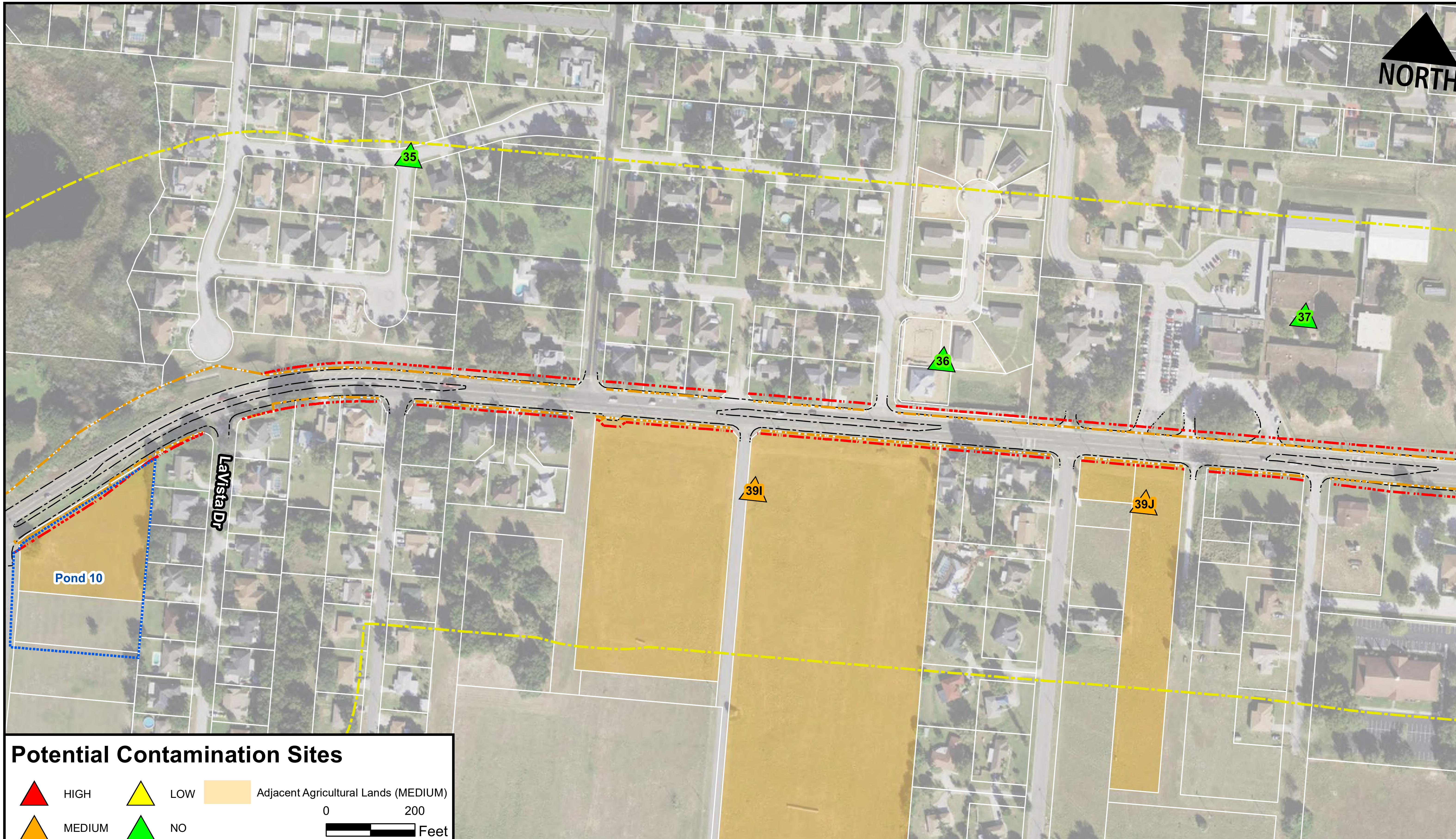
Project Aerial Maps with Potential Contamination Sites

SHEET 14 of 16



Florida Department of Transportation
District 1

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Polk County, Florida
Financial Project ID: 440273-1-22-01
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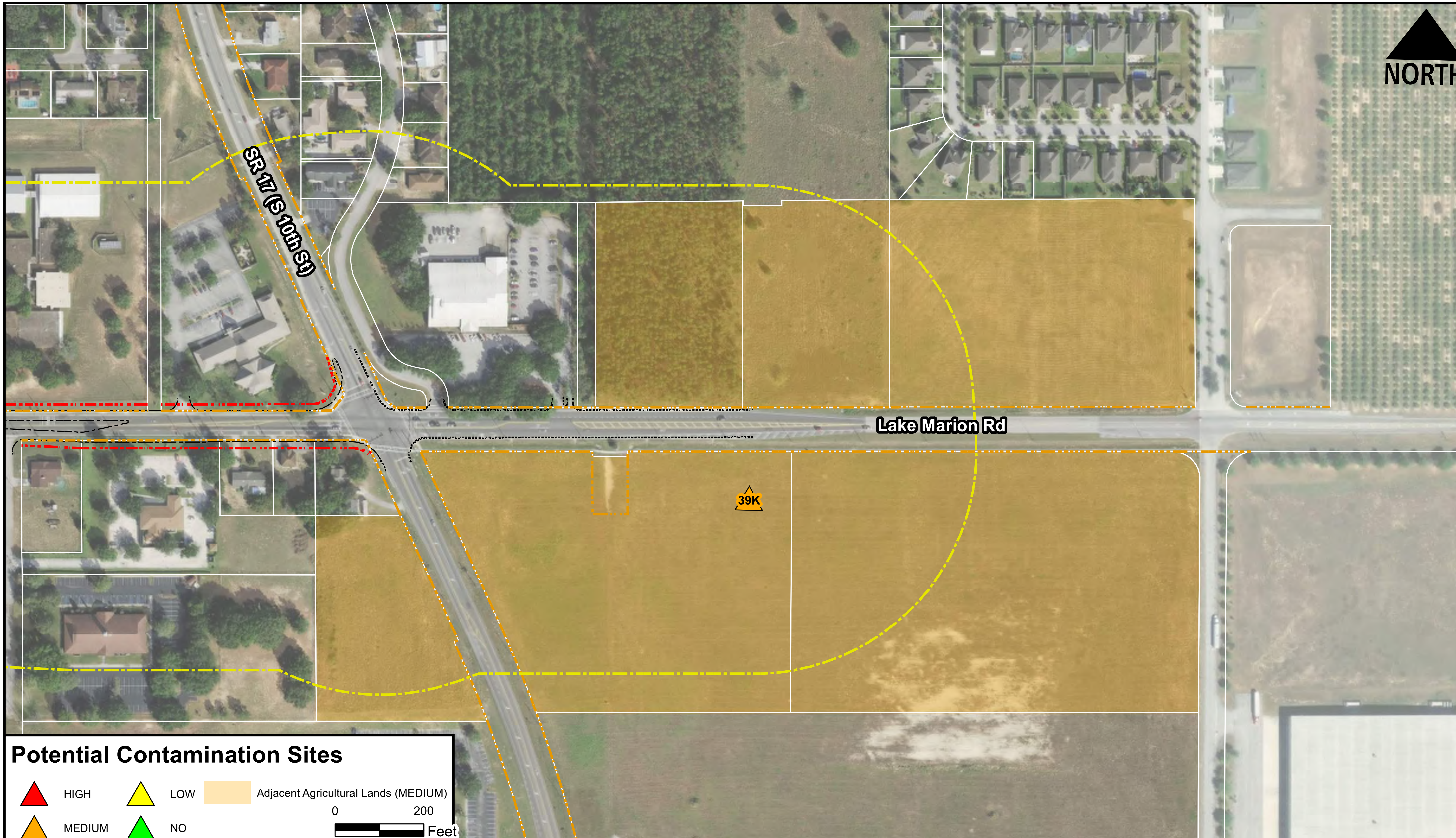
Project Aerial Maps with Potential Contamination Sites

SHEET 15 of 16



Florida Department of Transportation
District 1

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Federal Project No: N/A

Legend
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SR 544 Proposed Ponds
SR 544 Proposed Right-of-Way
SR 544 Existing Right-of-Way

Project Aerial Maps with Potential Contamination Sites

APPENDIX J

Geotechnical Report

Geotechnical Technical Memorandum

SR 544 (Lucerne Park Rd) from Ave T NW to SR 17

Polk County, Florida

Financial Project ID: 440273-1-22-01
FAP NO: D119 048 B

Project Development and Environment Study

Florida Department of Transportation
District 1

April 2022

TIERRA, Inc.
7351 Temple Terrace Highway • Tampa, Florida 33637
Phone (813) 989-1354 • Fax (813) 989-1355

April 13, 2022

Inwood Consulting Engineers
3000 Dovera Drive, Suite 200
Oviedo, FL 32765

Attn: Mr. David S. Dangel, P.E.

RE: Geotechnical Technical Memorandum
Project Development and Environment (PD&E) Soil Survey Study
SR 544 (Lucerne Park Rd) from Ave T NW to SR 17
Polk County, Florida
FPID: 440273-1-22-01
Tierra Project No. 6511-19-056

Mr. Dangel:

Tierra, Inc. (Tierra) has completed Geotechnical Engineering Services for the referenced project. The results of the study are enclosed herein.

Tierra appreciates the opportunity to provide our services to Inwood Consulting Engineers (Inwood) and the Florida Department of Transportation (FDOT) on this project. If you have any questions regarding this report, please contact us at (813) 989-1354.

Respectfully Submitted,

TIERRA, INC.

Susan E. Fries

Susan E. Fries, P.E.
Geotechnical Engineer
Florida License No. 93751

Larry Moore

Lawrence P. Moore, P.E.
Principal Geotechnical Engineer
Florida License No. 47673

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Appendix A

1.0 PROJECT SUMMARY

1.1 Project Description

This project involves the potential widening of SR 544 (Lucerne Park Road) from two to four lanes from Martin Luther King Boulevard (Avenue T) to SR 17 in Polk County, a length of 7.96 miles. The project location map is provided as **Figure 1-1**. The project corridor traverses three jurisdictions: the City of Winter Haven, Polk County, and Haines City. SR 544 (Lucerne Park Road) plays an important role in the regional network by providing east-west access for a growing area of east-central Polk County. It links two north-south principal arterials of Polk County (US 17 and US 27), US 27 being part of Florida's Strategic Intermodal System (SIS) and connects the cities of Winter Haven and Haines City, the second and third most populated cities within Polk County, respectively.

SR 544 (Lucerne Park Road) is classified as a two-lane urban minor arterial from Martin Luther King Boulevard to US 27 and as an urban collector from US 27 to SR 17. The roadway features two twelve-foot travel lanes with center and right turn lanes dispersed throughout the length of the corridor. The roadway also features an open drainage system, however, curbs and gutters exist from Martin Luther King Boulevard to Avenue Y and from La Vista Drive to SR 17 and in other areas where sidewalks are present.

Paved shoulders are present for the majority of the corridor and marked bicycle lanes exist on both sides of the roadway from 0.10 mile west of Brenton Manor Avenue to 0.2 mile east of US 27. The posted speed limit along the corridor ranges from 35 miles per hour to 55 miles per hour. Citrus Connection Route #60 (Winter Haven Northeast) operates along the eastern portion of the project corridor. Existing right-of-way along SR 544 (Lucerne Park Road) ranges from 50 feet to 85 feet from Martin Luther King Boulevard to Avenue Y, 90 feet to 170 feet from Avenue Y to US 27, and 60 feet to 140 feet from US 27 to SR 17.

The proposed improvements may include paved shoulders/marked bicycle lanes, sidewalks, and/or a shared-use path to provide safe bicycle and pedestrian mobility and meet objectives of the Polk Transportation Planning Organization (TPO) in transforming this corridor into a Complete Street. Additional right-of-way may be required depending on the proposed improvements and specific right-of-way requirements will be determined during this Project Development and Environment (PD&E) Study.

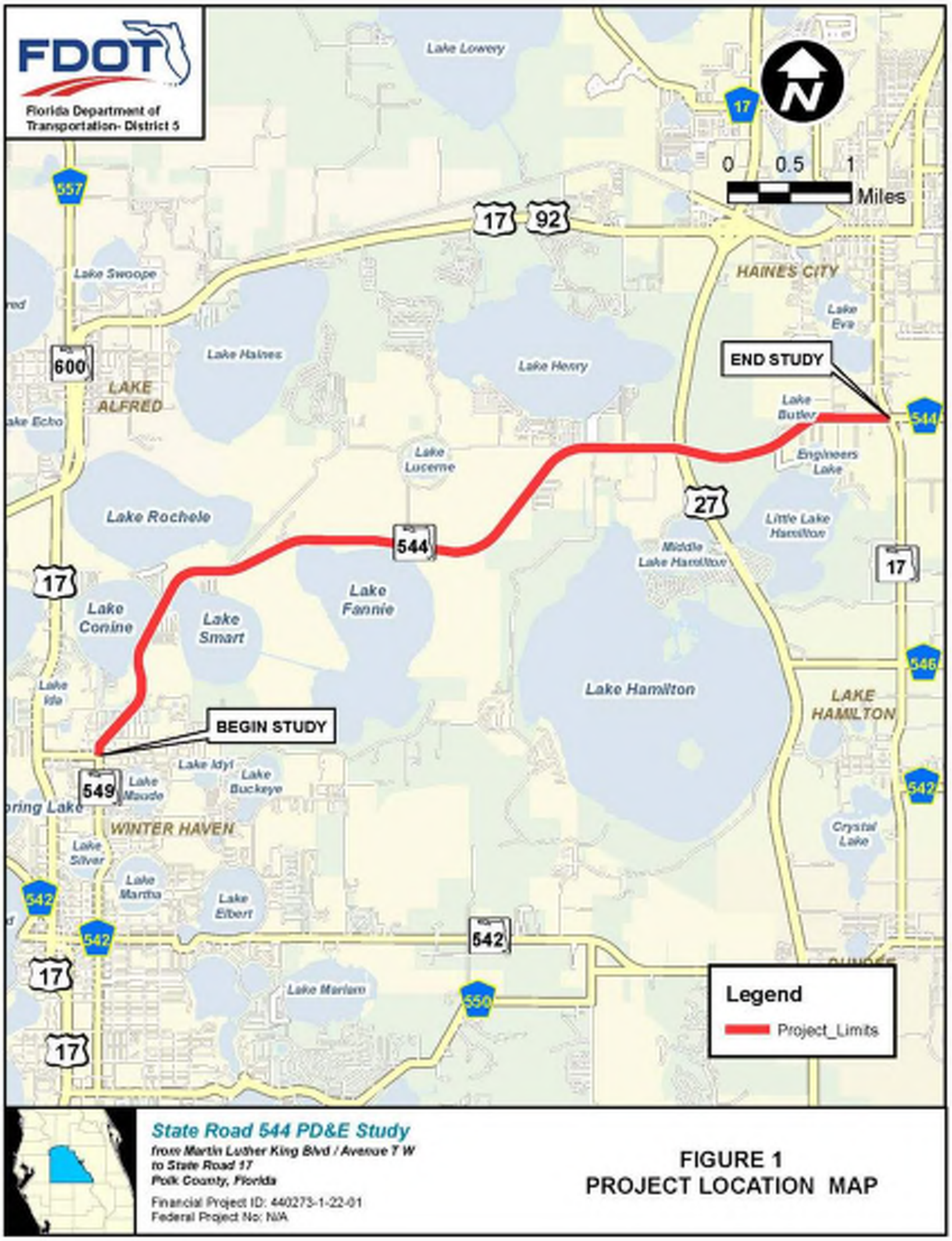


Figure 1-1: Project Location Map

2.0 SCOPE OF SERVICES

The purpose of the geotechnical portion of the PD&E study is to review published information regarding the existing subsurface conditions along the project alignment and within the limits of the pond alternative sites to assist in the preparation of the PD&E Report for the project. The following services were provided to achieve the preceding objective:

1. Reviewed published topographic information. This published information was obtained from the "Winter Haven, Florida" Quadrangle Map published by the USGS.

2. Reviewed published regional geological information. This published information was obtained from the Florida Geological Survey for Polk County.

3. Reviewed published soils information. This published information was obtained from the Web Soil Survey of Polk County, Florida published by the USDA – NRCS.

4. Prepared this Geotechnical Technical Memorandum for the project.

3.0 REVIEW OF USGS QUADRANGLE MAPS

Based on a review of "Winter Haven, Florida" Quadrangle Map, it appears that the project site elevations are on the order of approximately +120 to +215 feet, National Geodetic Vertical Datum of 1929 (NGVD 29). The **USGS Quadrangle Map** of the project area is illustrated in **Appendix A**.

4.0 REVIEW OF REGIONAL GEOLOGY OF POLK COUNY

Polk County Geology was paraphrased from the Florida Geological Survey, Open-File Report 80, 2001 and other geologic references.

The near surface geologic deposits and formations from youngest to oldest in Polk County include: Holocene Sediment (Qh), Undifferentiated sediments (Qu), reworked Cypresshead (TQuc), dunes (TQd), Cypresshead Formation (Tc), the Hawthorn Group Peace River Formation Bone Valley Member (Thpb), the Hawthorn Group Arcadia Formation Tampa Member (That), the Suwannee Limestone (Ts), and Ocala Limestone (To).

The Holocene sediments generally occur within lakes and river flood plains and includes quartz sands, carbonate sand and muds with organics. The Undifferentiated sediments are siliciclastics that are light gray, tan, brown to black, unconsolidated to poorly consolidated, clean to clayey silty, unfossiliferous, variably organic-bearing sands to blue green to olive green, poorly to moderately consolidated, sandy, silty clays. The dune sediments are at elevations greater than 100 feet and are fine to medium quartz sand with varying amounts of organic matter.

The undifferentiated reworked Cypresshead Formation is generally fine to coarse quartz sands with scattered quartz gravel and varying amounts of clay matrix. The Cypresshead Formation occurs above 100 feet msl and consists of reddish brown to reddish orange, unconsolidated to poorly consolidated, fine to very coarse grained, clean to clayey sands.

The Peace River Formation Bone Valley Member occurs in southwest Polk County and is a clastic unit consisting of sand-sized and larger phosphate grains in a matrix of quartz sand, silt and clay. The lithology is highly variable ranging from sandy, silty, phosphatic clays and relatively pure clays to clayey, phosphatic sand to sandy, clayey phosphorites. The Arcadia Formation Tampa member is only found in western Polk County from elevations of 50 to -50 mean sea level (msl) and consist of a white to yellowish gray, fossiliferous and variably sandy and clayey mudstones, wackestone and packstone with minor to no phosphate grains.

The Suwannee Limestone only occurs near the surface in the northwest corner of Polk County and consists of a white to cream, poorly to well indurated, fossiliferous, vuggy to moldic limestone (grainstone and packstone). The dolomitized parts are gray, tan, light brown to moderate brown, moderately to well indurated, finely to coarsely crystalline, dolostone with limited occurrences of fossiliferous beds of mollusks, foraminifers, corals and echinoids.

The Ocala Limestone occurs near the surface in the northwest corner of Polk County and underlies the entire County. The Ocala Limestone is generally a white to poorly to well indurated, poorly sorted, very fossiliferous limestone (grainstone, packstone and wackestone). Chert is common in the upper facies. The permeable and highly transmissive carbonates of the Ocala Limestone form the upper part of the Floridan Aquifer System.

5.0 REVIEW OF USDA-NRCS SOIL SURVEY

5.1 Polk County Soil Survey

Based on a review of the Polk County Soil Survey published by the USDA-NRCS, it appears that there are twenty-four (24) soil-mapping units noted within the project limits. A detailed soil survey map is shown on the **USDA Soil Survey** sheets in **Appendix A**. The general soil descriptions are presented in the sub-sections below, as described in the Web Soil Survey.

5.1.1 Candler Sand (Unit 3)

The Candler component makes up 90 percent of the map unit. Slopes are 0 to 5 percent. This component is on ridges on marine terraces on coastal plains, knolls on marine terraces on coastal plains. The parent material consists of eolian deposits and/or sandy and loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is excessively drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches (or restricted depth) is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent.

5.1.2 Pomona Fine Sand (Unit 7)

The Pomona, non-hydric component makes up 70 percent of the map unit. Slopes are 0 to 2 percent. This component is on flatwoods on marine terraces on coastal plains. The parent material consists of sandy and loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 12 inches during June, July, August, September, and October. Organic matter content in the surface horizon is about 3 percent.

The Pomona, hydric component makes up 20 percent of the map unit. Slopes are 0 to 2 percent. This component is on flats on marine terraces on coastal plains. The parent material consists of sandy and loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 6 inches during June, July, August, September, and October. Organic matter content in the surface horizon is about 3 percent.

5.1.3 Samsula Muck (Unit 13)

The Samsula component makes up 85 percent of the map unit. Slopes are 0 to 1 percent. This component is on depressions on marine terraces on coastal plains. The parent material consists of herbaceous organic material over sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is very poorly drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches (or restricted depth) is very high. Shrink-swell potential is low. This soil is not flooded. It is frequently ponded. A seasonal zone of water saturation is at or above the natural ground surface during January, June, July, August, September, October, November, and December. Organic matter content in the surface horizon is about 75 percent.

5.1.4 Sparr Sand (Unit 14)

The Sparr component makes up 85 percent of the map unit. Slopes are 0 to 5 percent. This component is on rises on marine terraces on coastal plains. The parent material consists of sandy marine deposits and/or loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 23 inches during July, August, September, and October. Organic matter content in the surface horizon is about 2 percent.

5.1.5 Tavares Fine Sand (Unit 15)

The Winder component makes up 85 percent of the map unit. Slopes are 0 to 2 percent. This component is on flats on marine terraces on coastal plains. The parent material consists of sandy and loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restrictive depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 6 inches during July, August, September, and October. Organic matter content in the surface horizon is about 2 percent.

5.1.6 Urban Land (Unit 16)

The Urban land component consists of areas where most of the surface is covered with impervious materials, such as buildings and paved areas. This land type consists of areas where the original soil has been modified through cutting, grading, filling and shaping or has been generally altered for urban development.

5.1.7 Smyrna and Myakka Fine Sands (Unit 17)

The Smyrna, non-hydric component makes up 41 percent of the map unit. Slopes are 0 to 2 percent. This component is on flats on marine terraces on coastal plains. The parent material consists of sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 12 inches during June, July, August, September, and October. Organic matter content in the surface horizon is about 3 percent.

The Myakka component makes up 39 percent of the map unit. Slopes are 0 to 2 percent. This component is on flatwoods on marine terraces on coastal plains. The parent material consists of sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 12 inches during June, July, August, September, and October. Organic matter content in the surface horizon is about 4 percent.

The Smyrna, hydric component makes up 15 percent of the map unit. Slopes are 0 to 2 percent. This component is on flats on marine terraces on coastal plains. The parent material consists of sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 6 inches during June, July, August, September, and October. Organic matter content in the surface horizon is about 3 percent.

5.1.8 Immokalee Sand (Unit 21)

The Immokalee, non-hydric component makes up 75 percent of the map unit. Slopes are 0 to 2 percent. This component is on flatwoods on marine terraces on coastal plains. The parent material consists of sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 12 inches during June, July, August, September, and October. Organic matter content in the surface horizon is about 2 percent.

The Immokalee, hydric component makes up 10 percent of the map unit. Slopes are 0 to 2 percent. This component is on flats on marine terraces, coastal plains. The parent material consists of sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 6 inches during June, July, August, September, and October. Organic matter content in the surface horizon is about 2 percent.

5.1.9 Ona-Ona, wet, Fine Sand (Unit 23)

The Ona component makes up 75 percent of the map unit. Slopes are 0 to 2 percent. This component is on flatwoods on marine terraces on coastal plains. The parent material consists of sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 12 inches during January, February, March, April, May, June, July, August, September, October, November, and December. Organic matter content in the surface horizon is about 3 percent.

The Ona, wet component makes up 12 percent of the map unit. Slopes are 0 to 2 percent. This component is on sloughs on marine terraces on coastal plains. The parent material consists of sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 8 inches during July, August, and September. Organic matter content in the surface horizon is about 3 percent.

5.1.10 Placid and Myakka Fine Sands (Unit 25)

The Placid, depressional component makes up 60 percent of the map unit. Slopes are 0 to 2 percent. This component is on depressions on marine terraces on coastal plains. The parent material consists of sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is very poorly drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is frequently ponded. A seasonal zone of water saturation is at or above the natural ground surface during January, February, March, June, July, August, September, October, November, and December. Organic matter content in the surface horizon is about 6 percent.

The Myakka, depressional component makes up 30 percent of the map unit. Slopes are 0 to 2 percent. This component is on depressions on marine terraces on coastal plains. The parent material consists of sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is very poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is frequently ponded. A seasonal zone of water saturation is at or above the natural ground surface during January, February, June, July, August, September, October, November, and December. Organic matter content in the surface horizon is about 5 percent.

5.1.11 Lochloosa Fine Sand (Unit 26)

The Lochloosa component makes up 90 percent of the map unit. Slopes are 0 to 2 percent. This component is on flats on marine terraces on coastal plains, rises on marine terraces on coastal plains. The parent material consists of sandy and loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 45 inches during July, August, September, and October. Organic matter content in the surface horizon is about 3 percent.

5.1.12 Pompano Fine Sand (Unit 30)

The Pompano component makes up 85 percent of the map unit. Slopes are 0 to 2 percent. This component is on drainageways on marine terraces on coastal plains, flats on marine terraces on coastal plains. The parent material consists of sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches (or restricted depth) is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 3 inches during June, July, August, September, October, and November. Organic matter content in the surface horizon is about 3 percent.

5.1.13 Adamsville Fine Sand (Unit 31)

The Adamsville component makes up 95 percent of the map unit. Slopes are 0 to 2 percent. This component is on rises, coastal plains. The parent material consists of sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches (or restricted depth) is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 20 inches during June, July, August, September, October, and November. Organic matter content in the surface horizon is about 1 percent.

5.1.14 Kaliga Muck (Unit 32)

The Kaliga component makes up 80 percent of the map unit. Slopes are 0 to 1 percent. This component is on depressions, marine terraces on coastal plains. The parent material consists of herbaceous organic material over loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is very poorly drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is very high. Shrink-swell potential is low. This soil is not flooded. It is frequently ponded. A seasonal zone of water saturation is at or above the natural ground surface during January, June, July, August, September, October, November, and December. Organic matter content in the surface horizon is about 75 percent.

5.1.15 Hontoon Muck (Unit 35)

The Hontoon component makes up 85 percent of the map unit. Slopes are 0 to 1 percent. This component is on depressions on marine terraces on coastal plains. The parent material consists of herbaceous organic material. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is very poorly drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches (or restricted depth) is very high. Shrink-swell potential is low. This soil is not flooded. It is frequently ponded. A seasonal zone of water saturation is at or above the natural ground surface during January, June, July, August, September, October, November, and December. Organic matter content in the surface horizon is about 75 percent.

5.1.16 Basinger mucky Fine Sand (Unit 36)

The Basinger component makes up 85 percent of the map unit. Slopes are 0 to 1 percent. This component is on depressions on marine terraces on coastal plains. The parent material consists of sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is very poorly drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is frequently ponded. A seasonal zone of water saturation is at or above the natural ground surface during July, August, September, and October. Organic matter content in the surface horizon is about 12 percent.

5.1.17 Wauchula Fine Sand (Unit 40)

The Wauchula, non-hydric component makes up 65 percent of the map unit. Slopes are 0 to 2 percent. This component is on flats on marine terraces on coastal plains. The parent material consists of sandy and loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 12 inches during June, July, August, September, and October. Organic matter content in the surface horizon is about 2 percent.

The Wauchula, hydric component makes up 15 percent of the map unit. Slopes are 0 to 2 percent. This component is on flats on marine terraces on coastal plains. The parent material consists of sandy and loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 6 inches during June, July, August, September, and October. Organic matter content in the surface horizon is about 2 percent.

5.1.18 Felda Fine Sand (Unit 42)

The Felda component makes up 80 percent of the map unit. Slopes are 0 to 2 percent. This component is on drainageways on marine terraces on coastal plains. The parent material consists of sandy and loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 6 inches during January, February, March, July, August, September, October, November, and December. Organic matter content in the surface horizon is about 3 percent.

5.1.19 Zolfo Fine Sand (Unit 47)

The Zolfo component makes up 85 percent of the map unit. Slopes are 0 to 2 percent. This component is on flatwoods on marine terraces on coastal plains. The parent material consists of sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 30 inches during June, July, August, September, October, and November. Organic matter content in the surface horizon is about 1 percent.

5.1.20 Adamsville-Urban Land Complex (Unit 49)

The Adamsville component makes up 60 percent of the map unit. Slopes are 0 to 2 percent. This component is on rises on marine terraces on coastal plains. The parent material consists of sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 33 inches during June, July, August, September, October, and November. Organic matter content in the surface horizon is about 1 percent.

The Urban land component consists of areas where most of the surface is covered with impervious materials, such as buildings and paved areas. This land type consists of areas where the original soil has been modified through cutting, grading, filling and shaping or has been generally altered for urban development.

5.1.21 Candler-Urban Land Complex (Unit 50)

The Candler component makes up 55 percent of the map unit. Slopes are 0 to 5 percent. This component is on ridges on marine terraces on coastal plains. The parent material consists of eolian deposits and/or sandy and loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is excessively drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches (or restricted depth) is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent.

The Urban land component consists of areas where most of the surface is covered with impervious materials, such as buildings and paved areas. This land type consists of areas where the original soil has been modified through cutting, grading, filling and shaping or has been generally altered for urban development.

5.1.22 Arents-Urban Land Complex (Unit 59)

The Arents component makes up 55 percent of the map unit. Slopes are 0 to 5 percent. This component is on fills, rises on marine terraces on coastal plains. The parent material consists of altered marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches (or restricted depth) is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 27 inches during June, July, August, September, October, and November.

The Urban land component consists of areas where most of the surface is covered with impervious materials, such as buildings and paved areas. This land type consists of areas where the original soil has been modified through cutting, grading, filling and shaping or has been generally altered for urban development.

5.1.23 Tavares-Urban Land Complex (Unit 63)

The Tavares component makes up 75 percent of the map unit. Slopes are 0 to 2 percent. This component is on flats on marine terraces on coastal plains. The parent material consists of eolian or sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches (or restricted depth) is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 57 inches during June, July, August, September, October, November, and December. Organic matter content in the surface horizon is about 1 percent.

The Urban land component consists of areas where most of the surface is covered with impervious materials, such as buildings and paved areas. This land type consists of areas where the original soil has been modified through cutting, grading, filling and shaping or has been generally altered for urban development.

5.1.24 Millhopper Fine Sand (Unit 76)

The Millhopper component makes up 85 percent of the map unit. Slopes are 0 to 5 percent. This component is on ridges on marine terraces on coastal plains. The parent material consists of sandy and loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 51 inches during January, February, July, August, September, October, November, and December. Organic matter content in the surface horizon is about 1 percent.

5.2 General Soil Properties Presented in USDA Soil Survey

Additional information regarding the soils and groundwater conditions for the above soil mapping units was obtained from the Polk County Soil Surveys published by USDA-NRCS and the Web Soil Survey and is presented in **Tables 5-1** and **5-2** as follows:

Table 5-1
Polk County USDA NRCS Soil Survey Information

Map No.	Soil Name	Hydrologic Soil Group	Depth to High Water Table (ft)*	Typical Soil Types (Profile from Ground Surface to depth of approximately 80 inches)
3	Candler Sand	A	> 6.0	Sand
7	Pomona Fine Sand	A/D	0.5-1.5, 0.0-1.0	Fine Sand to Sand to Fine Sand to Fine Sandy Loam to Loamy Sand
13	Samsula Muck	A/D	+2.0-0.0	Muck to Sand
14	Sparr Sand	A/D	1.5-3.5	Sand to Sandy Clay Loam
15	Tavares Fine Sand	A	3.5-6.0	Fine Sand
16	Urban Land	Data not provided for Urban Land		
17	Smyrna and Myakka Fine Sands	A/D	0.5-1.5, 0.0-1.0	Fine Sand
21	Immokalee Sand	B/D	0.5-1.5, 0.0-1.0	Sand
23	Ona-Ona, wet, Fine Sand	B/D	0.5-1.5,0.0-1.5	Fine Sand
25	Placid and Myakka Fine Sands	A/D	+2.0-0.0	Fine Sand
26	Lochloosa Fine Sand	C	2.5-5.0	Fine Sand to Sandy Clay Loam
30	Pompano Fine Sand	A/D	0.0-0.5	Fine sand
31	Adamsville Fine Sand	A/D	1.5-3.5	Fine Sand
32	Kaliga Muck	C/D	+2.0-0.0	Muck to Fine Sandy Loam to Sandy Clay Loam
35	Hontoon Muck	A/D	+2.0-0.0	Muck to Sandy Loam
36	Basinger mucky Fine Sand	A/D	+2.0-0.0	Mucky Fine Sand to Fine Sand
40	Wauchula Fine Sand	C/D	0.5-1.5, 0.0-1.0	Fine Sand to Sandy Clay Loam to Fine Sandy Loam
42	Felda Fine Sand	A/D	0.0-1.0	Fine Sand to Sandy Clay Loam to Sandy Loam
47	Zolfo Fine Sand	A	1.5-3.5	Fine Sand
49	Adamsville-Urban Land Complex	A	2.0-3.5	Fine Sand
*Depth to High Water Table is also commonly known as the depth to the Seasonal High Groundwater Table.				

Table 5-1 (Cont.)
Polk County USDA NRCS Soil Survey Information

Map No.	Soil Name	Hydrologic Soil Group	Depth to High Water Table (ft)*	Typical Soil Types (Profile from Ground Surface to depth of approximately 80 inches)
50	Candler-Urban Land Complex	A	>6.0	Sand
59	Arents-Urban Land Complex	A	1.5-3.0	Sand
63	Tavares-Urban Land Complex	A	3.5-6.0	Fine Sand
76	Millhopper Fine Sand	A	3.5-6.5	Fine Sand to Sandy Clay Loam
*Depth to High Water Table is also commonly known as the depth to the Seasonal High Groundwater Table.				

Table 5-2
Polk County USDA NRCS Soil Survey Information

USDA Map Symbol and Soil Name	Soil Classification			
	Depth (in)	USCS	AASHTO	Permeability (in/hr)
(3) Candler	0-6	SP-SM, SP	A-3	6.0-50.0
	6-63	SP-SM, SP	A-2-4, A-3	6.0-50.0
	63-80	SP-SM	A-2-4, A-3	6.0-20.0
(7) Pomona, non-hydric - Pomona, hydric	0-6	SP-SM, SP	A-2-4, A-3	6.0-20.0
	6-21	SP-SM, SP	A-2-4, A-3	6.0-20.0
	21-26	SP-SM, SM	A-2-4, A-3	0.6-6.0
	26-48	SP-SM, SP	A-2-4, A-3	2.0-20.0
	48-73	SC-SM, SC, SM	A-2, A-4, A-6	0.2-2.0
	73-80	SP-SM, SM	A-2-4, A-3	0.6-6.0
	0-6	SP-SM, SP	A-2-4, A-3	6.0-20.0
	6-21	SP-SM, SP	A-2-4, A-3	6.0-20.0
	21-26	SP-SM, SM	A-2-4, A-3	0.6-6.0
	26-48	SP-SM, SP	A-2-4, A-3	2.0-20.0
	48-73	SC-SM, SC, SM	A-2, A-4, A-6	0.2-2.0
	73-80	SP-SM, SM	A-2-4, A-3	0.6-6.0

Table 5-2 (Cont.)
Polk County USDA NRCS Soil Survey Information

USDA Map Symbol and Soil Name	Soil Classification			
	Depth (in)	USCS	AASHTO	Permeability (in/hr)
(13) Samsula	0-24	PT	A-8	6.0-20.0
	24-32	PT	A-8	6.0-20.0
	32-35	SP-SM, SM	A-2-4, A-3	6.0-20.0
	35-44	SP-SM, SM	A-2-4, A-3	6.0-20.0
	44-80	SP-SM, SM	A-2-4, A-3	6.0-20.0
(14) Sparr	0-8	SP-SM, SM	A-2-4, A-3	6.0-20.0
	8-57	SP-SM, SM	A-2-4, A-3	6.0-20.0
	57-80	SC-SM, SC	A-2-4, A-2-6, A-7-6	0.6-2.0
(15) Tavares	0-5	SP-SM, SP	A-2-4, A-3	6.0-20.0
	5-80	SP-SM, SP, SM	A-2-4, A-3	6.0-20.0
(16) Urban Land	Data not provided for Urban Land			
(17) Myakka – Smyrna, non-hydric – Smyrna, hydric	0-7	SP-SM, SP	A-3	6.0-20.0
	7-25	SP-SM, SP	A-3	6.0-20.0
	25-36	SP-SM, SM	A-2-4, A-3	0.6-6.0
	36-80	SP-SM, SP	A-3	6.0-20.0
	0-4	SP-SM, SP	A-2-4, A-3	6.0-20.0
	4-12	SP-SM, SP	A-2-4, A-3	6.0-20.0
	12-25	SP-SM, SM	A-2-4, A-3	0.6-6.0
	25-42	SP-SM, SP	A-3	6.0-20.0
	42-48	SP-SM, SM	A-2-4, A-3	0.6-6.0
	48-80	SP-SM, SM	A-2-4, A-3	6.0-20.0
	0-4	SP-SM, SP	A-2-4, A-3	6.0-20.0
	4-12	SP-SM, SP	A-2-4, A-3	6.0-20.0
	12-25	SP-SM, SM	A-2-4, A-3	0.6-6.0
	25-42	SP-SM, SP	A-3	6.0-20.0
	42-48	SP-SM, SM	A-2-4, A-3	0.6-6.0
	48-80	SP-SM, SM	A-2-4, A-3	6.0-20.0

Table 5-2 (Cont.)
Polk County USDA NRCS Soil Survey Information

USDA Map Symbol and Soil Name	Soil Classification			
	Depth (in)	USCS	AASHTO	Permeability (in/hr)
(21) Immokalee, non-hydric - Immokalee, hydric	0-7	SP-SM, SP	A-3	6.0-20.0
	7-39	SP-SM, SP	A-3	6.0-20.0
	39-58	SP-SM, SM	A-2-4, A-3	0.6-2.0
	58-66	SP-SM, SP	A-3	6.0-20.0
	66-80	SP-SM, SM	A-2-4, A-3	0.6-2.0
	0-7	SP-SM, SP	A-3	6.0-20.0
	7-39	SP-SM, SP	A-3	6.0-20.0
	39-58	SP-SM, SM	A-2-4, A-3	0.6-2.0
	58-66	SP-SM, SP	A-3	6.0-20.0
	66-80	SP-SM, SM	A-2-4, A-3	0.6-2.0
(23) Ona, - Ona, wet	0-9	SP-SM, SM	A-2-4	6.0-20.0
	9-16	SP-SM, SM	A-2-4	0.6-2.0
	16-80	SP-SM, SM	A-2-4, A-3	6.0-20.0
	0-9	SP-SM, SM	A-2-4	6.0-20.0
	9-16	SP-SM, SM	A-2-4	0.6-2.0
	16-80	SP-SM, SM	A-2-4, A-3	6.0-20.0
(25) Placid, depressional - Myakka, depressional	0-18	SP-SM, SM, SP	A-2-4, A-3	6.0-20.0
	18-80	SP-SM, SM, SP	A-2-4, A-3	6.0-20.0
	0-3	SP-SM, SP	A-3	6.0-20.0
	3-25	SP-SM, SP	A-3	6.0-20.0
	25-35	SP-SM, SM	A-2-4, A-3	0.6-6.0
	35-80	SP-SM, SP	A-3	6.0-20.0
(26) Lochloosa	0-6	SP-SM, SM	A-2-4, A-3	2.0-20.0
	6-36	SP-SM, SM	A-2-4, A-3	2.0-20.0
	36-65	SC-SM, SC	A-2-6, A-4, A-6	0.1-0.2
	65-80	SC-SM, SC	A-2-6, A-4, A-6	0.1-0.2
(30) Pompano	0-15	SP-SM, SP	A-3	6.0-20.0
	15-80	SP-SM, SP	A-3	6.0-20.0
(31) Adamsville	0-7	SP-SM, SM, SP	A-2-4, A-3	6.0-20.0
	7-20	SP-SM, SM, SP	A-2-4, A-3	6.0-20.0
	20-80	SP-SM, SM, SP	A-2-4, A-3	6.0-20.0
(32) Kaliga	0-25	PT	A-8	6.0-20.0
	25-35	SC, SM	A-2-4, A-4, A-7-6	0.6-6.0
	35-60	CL, SC-SM	A-4, A-6	0.1-0.2
	60-80	CL, SC, SM	A-4, A-6	2.0-20.0

Table 5-2 (Cont.)
Polk County USDA NRCS Soil Survey Information

USDA Map Symbol and Soil Name	Soil Classification			
	Depth (in)	USCS	AASHTO	Permeability (in/hr)
(35) Hontoon	0-75	PT	A-8	6.0-20.0
	75-80	SC-SM, SC, SM	A-2-4, A-6	6.0-20.0
(36) Basinger	0-7	SP-SM, SM	A-2-4, A-3	6.0-20.0
	7-19	SP-SM, SM	A-2-4, A-3	6.0-20.0
	19-39	SP-SM, SM	A-2-4, A-3	6.0-20.0
	39-80	SP-SM, SM	A-2-4, A-3	6.0-20.0
(40) Wauchula, non-hydric - Wauchula, hydric	0-7	SP-SM	A-2-4, A-3	6.0-20.0
	7-18	SP-SM	A-3, A-2-4	6.0-20.0
	18-26	SP-SM, SM	A-2-4, A-3	0.2-6.0
	26-33	SP-SM, SM	A-2-4, A-3	2.0-6.0
	33-70	SC-SM, SC, SM	A-2-4, A-2-6, A-4, A-6	0.1-0.2
	70-80	SC-SM, SC	A-2-4, A-2-6	0.6-6.0
	0-7	SP-SM	A-2-4, A-3	6.0-20.0
	7-18	SP-SM	A-3, A-2-4	6.0-20.0
	18-26	SP-SM, SM	A-2-4, A-3	0.2-6.0
	26-33	SP-SM, SM	A-2-4, A-3	2.0-6.0
	33-70	SC-SM, SC, SM	A-2-4, A-2-6, A-4, A-6	0.1-0.2
	70-80	SC-SM, SC	A-2-4, A-2-6	0.6-6.0
(42) Felda	0-5	SP-SM, SP	A-3	6.0-20.0
	5-22	SP-SM, SP	A-3	6.0-20.0
	22-50	SC-SM, SC, SM	A-2-4, A-2-6	0.6-6.0
	50-80	SP-SM, SP	A-2-4, A-3	6.0-20.0
(47) Zolfo	0-5	SP-SM, SM	A-2-4, A-3	6.0-20.0
	5-59	SP-SM, SM	A-2-4, A-3	6.0-20.0
	59-80	SP-SM, SM	A-2-4, A-3	0.6-2.0
(49) Adamsville – Urban Land	0-6	SP-SM	A-2-4, A-3	6.0-20.0
	6-80	SP-SM, SP	A-2-4, A-3	6.0-20.0
	Data not provided for Urban Land			
(50) Candler - Urban Land	0-6	SP-SM, SP	A-3	6.0-20.0
	6-63	SP-SM, SP	A-3	6.0-20.0
	63-80	SP-SM	A-2-4, A-3	6.0-20.0
	Data not provided for Urban Land			
(59) Arents - Urban Land	0-80	SP-SM, SP	A-2-4, A-3	6.0-20.0
	Data not provided for Urban Land			

Table 5-2 (Cont.)
Polk County USDA NRCS Soil Survey Information

USDA Map Symbol and Soil Name	Soil Classification			
	Depth (in)	USCS	AASHTO	Permeability (in/hr)
(63) Tavares - Urban land	0-8	SP-SM, SP	A-3	6.0-50.0
	8-80	SP-SM, SP	A-3	6.0-50.0
	Data not provided for Urban Land			
(76) Millhopper	0-7	SP-SM, SM	A-2-4	6.0-20.0
	7-59	SC-SM, SP-SM, SM	A-2-4	6.0-20.0
	59-64	CL, SC	A-2-4, A-6	2.0-6.0
	64-80	CL, SC	A-7-6, A-6	0.6-2.0

6.0 PRELIMINARY ENGINEERING EVALUATIONS

6.1 General Based on USDA Soil Survey

Based upon the USDA-NRCS Soil Surveys for Polk County, sandy soils occasionally underlain by silty to clayey (loam) soils are reported along the majority of the project corridor to depths of 80 inches below the natural ground surface. Some areas along the project corridor are expected to contain organic material/muck.

In general, the sandy soils are suitable for supporting proposed roadway embankments after proper subgrade preparation including removal and replacement of unsuitable materials. Areas along the project corridor where shallow groundwater conditions, clay soils, and muck may impact the project are detailed below.

6.1.1 Shallow Groundwater

The Seasonal High Groundwater Table (SHGWT) for the soil units presented above is reported to range from at or above the predevelopment natural grade to a depth of 6 feet or greater below the predevelopment natural grade within the project limits. According to the USDA-NRSC Soil Survey, the project corridor includes both excessively drained soils with a deep water table to very poorly drained soils with shallow water table levels. One of the **USDA Soil Survey** maps provided with this report is shaded blue for the soil types reported with a Seasonal High Groundwater Table within 1.5 feet of natural grades.

Roadway base to groundwater clearance will need to be evaluated to ensure minimum separation between the base and the SHGWT is maintained or to determine if additional measures are required (ie, blackbase, underdrains, etc.). In areas where the existing SHGWT is above grade, the SHWGT will need to be established by the project biologist utilizing biological indicators. Additionally, drainage design will need to consider the impact of shallow groundwater levels on stormwater management facilities.

6.1.2 Near Surface Clayey Soils

Shallow plastic soils are reported at an isolated area along the project alignment near Vista Del Lago Drive. The following soil mapping unit noted plastic/clayey soils (A-2-4, A-2-6) at depths within 24 inches of natural grades:

- Felda Fine Sand (Unit 42)

Plastic soils have limitations related to base clearance and are also poorly drained. Separation between plastic clayey soils and the roadway pavement sections should be in accordance with FDOT Standard Plans, Indices 120-001 and 120-002.

One of the **USDA Soil Survey** maps provided with this report is shaded orange for the soil type reported with plastic/clayey soils (A-2-4, A-2-6) at depths within 24 inches of natural grades.

6.1.3 Organic Soils

According to the USDA, organic soil mapping units are reported along the proposed roadway alignment and within select pond alternatives. The following soil mapping units noted organic/muck (A-8) soils from the predevelopment natural ground surface to up to 75 inches below the ground surface within the project limits:

- Samsula Muck (Unit 13)
- Kaliga Muck (Unit 32)
- Hontoon Muck (Unit 35)

Organic/muck (A-8) soil should be removed in accordance with FDOT Standard Plans, Index 120-002 and replaced with backfill in accordance with Index 120-001.

One of the **USDA Soil Survey** maps provided with this report is shaded red for the soil types reported to contain organic/muck soils.

6.2 Roadway Construction

Site preparation should consist of normal clearing and grubbing followed by compaction of subgrade soils. Subgrade preparation should include the removal of plastic soils, top-soils, organic soils, and unsuitable materials in accordance with FDOT Standard Plans, Index 120-002. Backfill embankment materials should consist of materials conforming to the FDOT Standard Plans, Index 120-001. Clearing and grubbing and compaction should be accomplished in accordance with the FDOT Standard Specifications.

The overall site preparation and mechanical densification work for the construction of the proposed roadway improvements should be in accordance with FDOT Standard Specifications and Standard Plans Index requirements. In general, the existing subsurface soils appear capable of supporting the construction of the proposed roadway improvements subject to the above geotechnical considerations and after proper subgrade preparation.

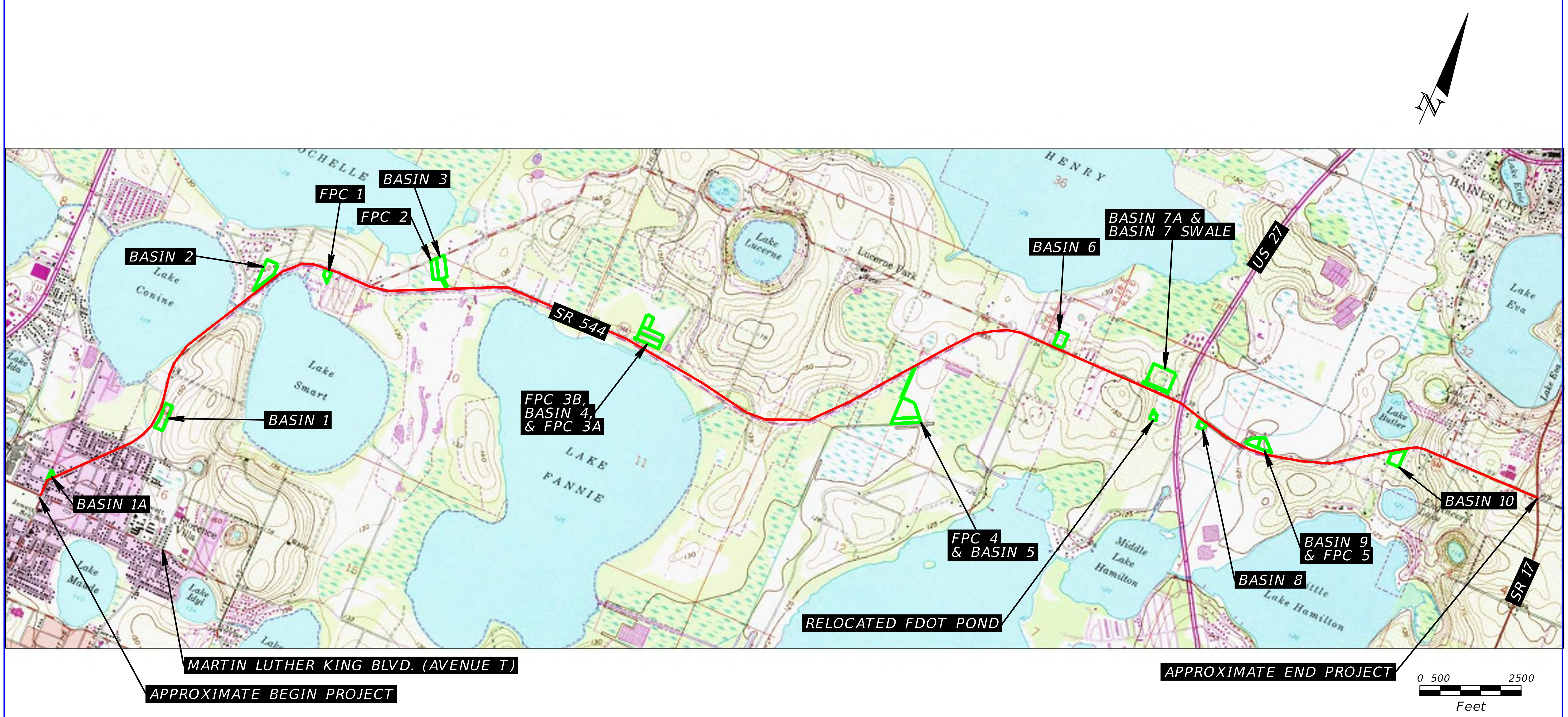
7.0 LIMITATIONS

Our services have been performed, our findings obtained and our preliminary evaluations prepared in accordance with generally accepted geotechnical engineering principles and practices at the time of this report. Tierra is not responsible for the conclusions, opinions or recommendations made by others based on this data.

The scope of the geotechnical portion of the PD&E study is to provide preliminary information on the existing subsurface conditions along the project alignment based on a review of the Polk County Soil Survey published by the USDA-NRCS to assist in the preparation of the PD&E Report for the project. The preliminary evaluations submitted in this report are based upon the data obtained from the published information. Should subsoil variations become evident during the course of this project, a re-evaluation will be necessary after we have had an opportunity to observe the characteristics of the conditions encountered. The applicability of the report should also be reviewed in the event significant changes occur in the design, nature or location of the proposed roadway construction and stormwater management areas.

Our services have been performed, our findings obtained and our preliminary evaluations prepared in accordance with generally accepted geotechnical engineering principles and practices at the time of this report. Tierra is not responsible for the conclusions, opinions or recommendations made by others based on this data.

Appendix A



REFERENCE: USGS QUADRANGLE MAP OF "WINTER HAVEN, FLORIDA"

TOWNSHIP:	28S	28S
RANGE:	26E	27E
SECTION:	1, 2, 3, 9, 10, 11, 16, 17	5, 6

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 544	POLK	440273-1-22-01

USGS QUADRANGLE MAP

SHEET NO.

bsawaska 4/4/2022 5:48:59 PM Default J:\6511\2019 Files\6511-19-056 D1 SR 544 PD&E\Microstation\Geotech\USGS01.dgn

REFERENCE: USDA SOIL SURVEY OF POLK COUNTY, FLORIDA

SEASONAL HIGH GROUNDWATER ABOVE NATURAL GRADES TO WITHIN 1.5 FEET OF NATURAL GRADES

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

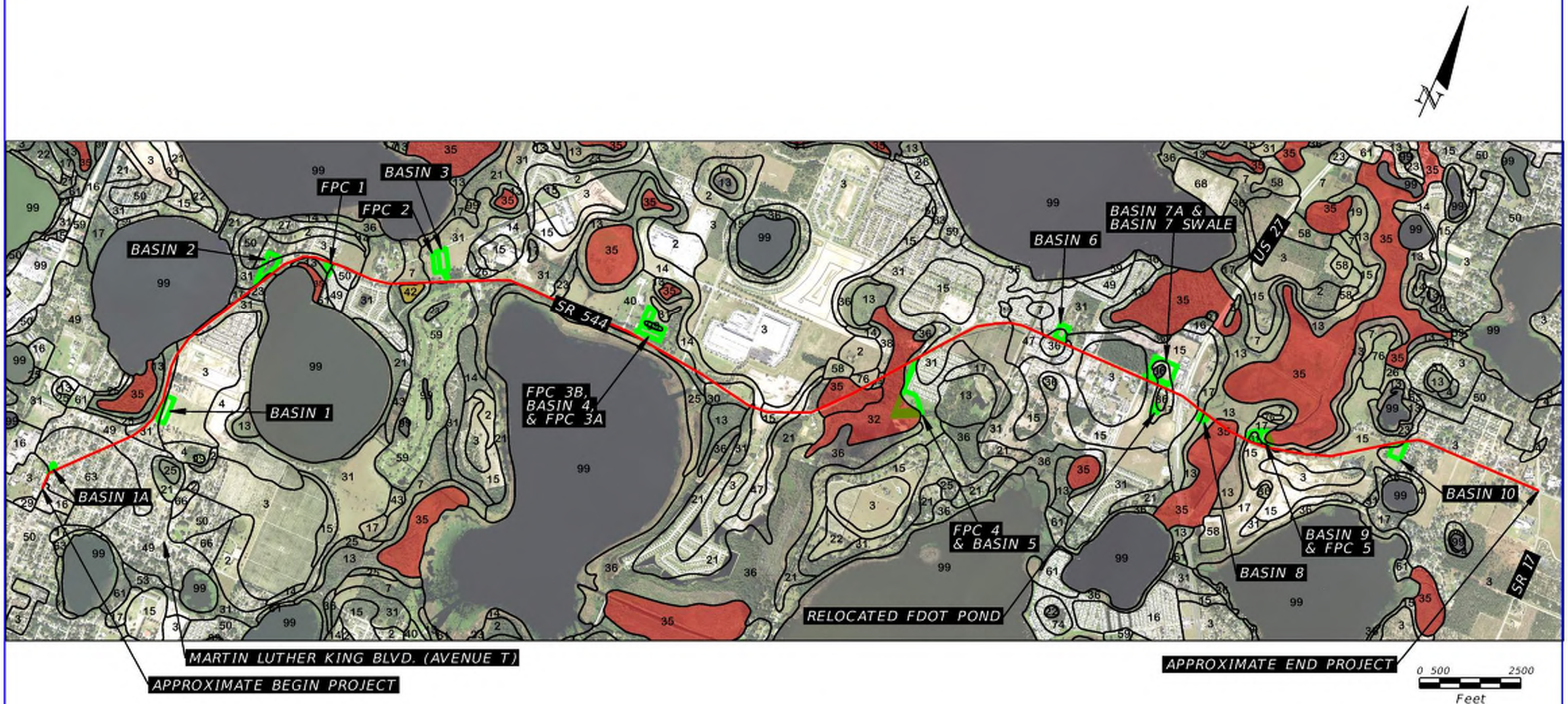
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 544	POLK	440273-1-22-01

USDA SOIL SURVEY

SHEET NO.



REFERENCE: USDA SOIL SURVEY OF POLK COUNTY, FLORIDA

ORGANIC SOILS (A-8) AT THE NATURAL GROUND SURFACE TO GREATER THAN 6 FEET BELOW NATURAL GRADES

CLAYEY SOILS WITHIN 2 FEET OF NATURAL GRADES

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 544	POLK	440273-1-22-01

USDA SOIL SURVEY

SHEET NO.

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APPENDIX K

Correspondence

State Road 544
Project Development and Environment Study
From MLK Jr. Boulevard to SR 17
Polk County, Florida
Financial Project ID: 440273-1-22-01

FDOT Pond Site Coordination Meeting Summary – November 2, 2020, 3:00 pm

1. **Attendees**

   FDOT: Richard Oujevolk, David Turley, Brent Setchell, Sergio Figueroa
   Inwood: David Dangel, Jason Houck, Renato Chuw, Dayna Duffy

2. **Discussion Items**

   a. The purpose of this meeting was to provide an overview of the preliminary pond locations for the SR 544 PD&E Study to the Department and receive feedback, in preparation to have the pond sites ready for Inwood's ecologists to conduct site specific species survey

   b. An aerial display of the project along with the pond site locations was shared to all attendees and each basin description discussed with the preliminary pond site. Attached to these meeting minutes is a PDF of this display

   c. It was discussed in the meeting that the scope for this study was to evaluate one pond site per basin so that the study can be environmentally cleared and demonstrated that it can be feasible. Evaluation of multiple pond sites per basin will be done during the design phase (when funded). Brent asked if site specific survey was necessary at this stage of the PD&E if only one pond site per basin was evaluated. Jason indicated that per new directives from EMO, it is required to get a Biological Opinion (BO).

   d. The following items were discussed regarding each specific basin and pond site

      i. Basin 1 – two possible pond sites were explored to discuss with the Department. Pond 1A is a pond site adjacent to SR 544 and located within a parcel owned by the adjacent church. The pond site is in an old agricultural crop area but does not impact the church facility. The consensus was that it is acceptable to locate a pond site in this parcel. FDOT suggested to reshape this pond so that an access opening could be provided to the back end of the parcel. An alternative pond (1B) was also investigated and located adjacent to Lake Smart. This site is about 2000 feet away from SR 544 and not within a church property. However, the pipe easement from SR 544 would have to cross a high ridge line, making the inflow pipe at this location very deep. FDOT indicated that because of this, this pond site should not be evaluated. The direction was to proceed in evaluating Pond 1A.

      ii. Basin 2 – during the discussions, Inwood indicated that Basin 2 could be left untreated and compensating treatment provided in the pond site for Basin 1 (since they shared the same outfall). However, Brent suggested that because these lakes are impaired for nutrients, it is preferrable to have a dedicated pond site for Basin 2. Another option was to utilize the proposed floodplain compensation site to capture pollutants and provide some benefit to nutrient removal prior to discharging to the lake. Another potential pond location is on another church-owned parcel across from Lake Smart. This site will also be identified for the purpose of conducting the species survey.

iii. Basin 3 – the treatment and floodplain compensation sites are proposed to abut each other and located on a private parcel. FDOT agreed with the pond site location.

iv. Basin 4 – the treatment and floodplain compensation sites are proposed to abut each other and located on a private parcel. FDOT agreed with the pond site location.

v. Basin 5 and 6 – FDOT agreed with the proposed floodplain compensation site. For the treatment pond option, this was another basin that compensating treatment could be proposed (enlarging Pond 5 and not having a pond for Basin 6). However, due to the nutrient impairments of the lakes and to provide as much benefit to the environment, a dedicated pond site will be sited in Basin 6. FDOT mentioned that a floodplain complaint was logged for the adjacent mobile homes where the preliminary Pond 6 site is shown. The conclusion was that FDOT was not the cause of the flooding. There is an existing pond on this site that overtops the berm. One suggestion from David Turley was to evaluate if the pond can be located on the adjacent parcel to the north of the Pond 6 to avoid impacting the house within the property, or if the pond could utilize the existing pond in front of the house and be equalized with a second, new pond on the adjacent parcel. Inwood will investigate these options. FDOT agreed with the pond site for Basin 5.

vi. Basin 7 – an existing FDOT pond was constructed that already treats portions of SR 544 and the turn lanes built under the existing development at the corner of SR 544 and US 27. FDOT agreed that this pond would be good to evaluate for this basin. Some expansion of the pond may be necessary to accommodate the proposed improvements of SR 544 for the study.

vii. Basin 8 and 9 – a single pond site is proposed adjacent to Lake Hamilton Creek with a compensating treatment approach. The site is outside of the floodplains with a direct outfall to the creek. A floodplain compensation site is proposed to abut the treatment site. Inwood mentioned that the compensating treatment approach made more sense in this area due the bridge culvert crossing and the large floodplain coverage within Basin 8. FDOT agreed with this pond site.

viii. Basin 10 – the pond site is on a private parcel, across from Lake Butler. There is an existing closed drainage system along SR 544 that drains to Lake Butler. The existing cross drain (CD-17, 15” pipe) collects and directs mostly the roadside runoff to the lake. This pond will be a dry retention pond but will also have an emergency outfall structure to discharge to Lake Butler. FDOT agreed with this pond site.

e. Sergio asked if we were scoped to evaluate Environmental Look Arounds/regional stormwater opportunities. Inwood mentioned that we will conduct meetings with the stakeholders including the Lakes Region Lake Water Management District (LRLWMD) to discuss any opportunities and document in the Pond Siting Report. Brent also suggested to contact the City of Winter Haven and ask about their stormwater master plan and see if there were any opportunities for their canal systems to provide a regional stormwater approach.

The meeting concluded at 4:00 pm

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID

SHEET NO.
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DATE	DESCRIPTION	DATE	DESCRIPTION

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID

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REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID

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3

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DATE	DESCRIPTION	DATE	DESCRIPTION

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID

SHEET NO.
4

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID

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5

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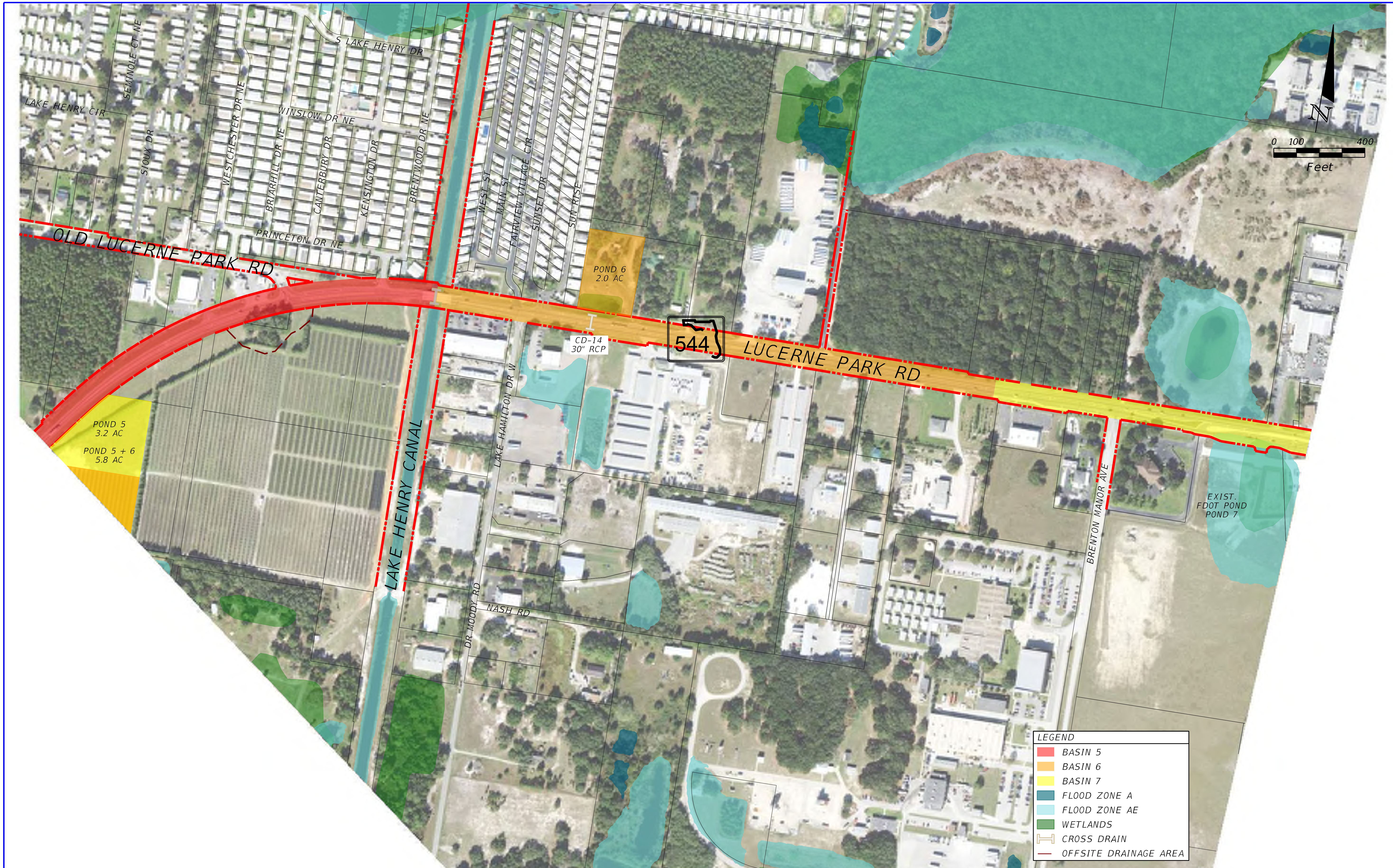

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID

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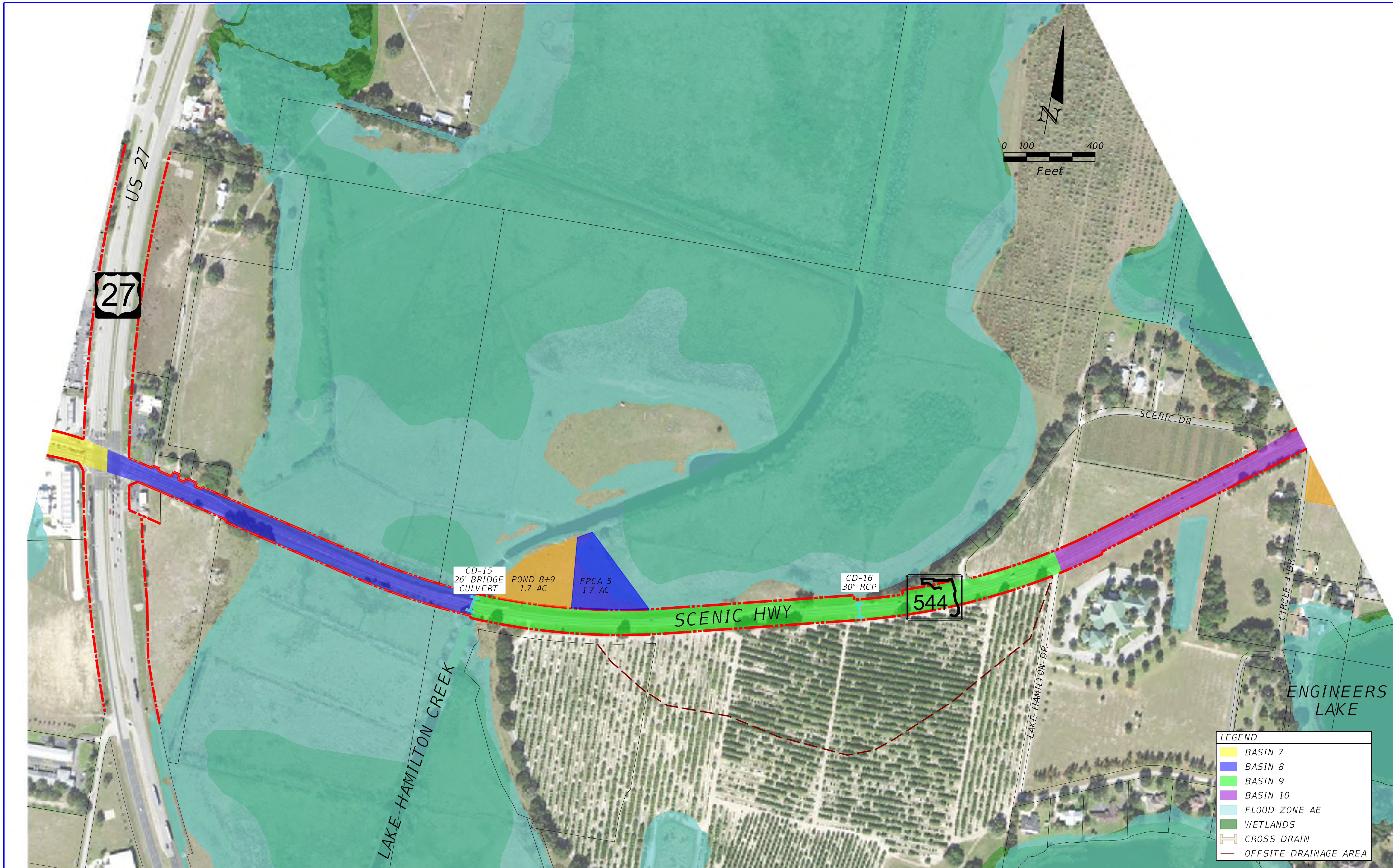
6



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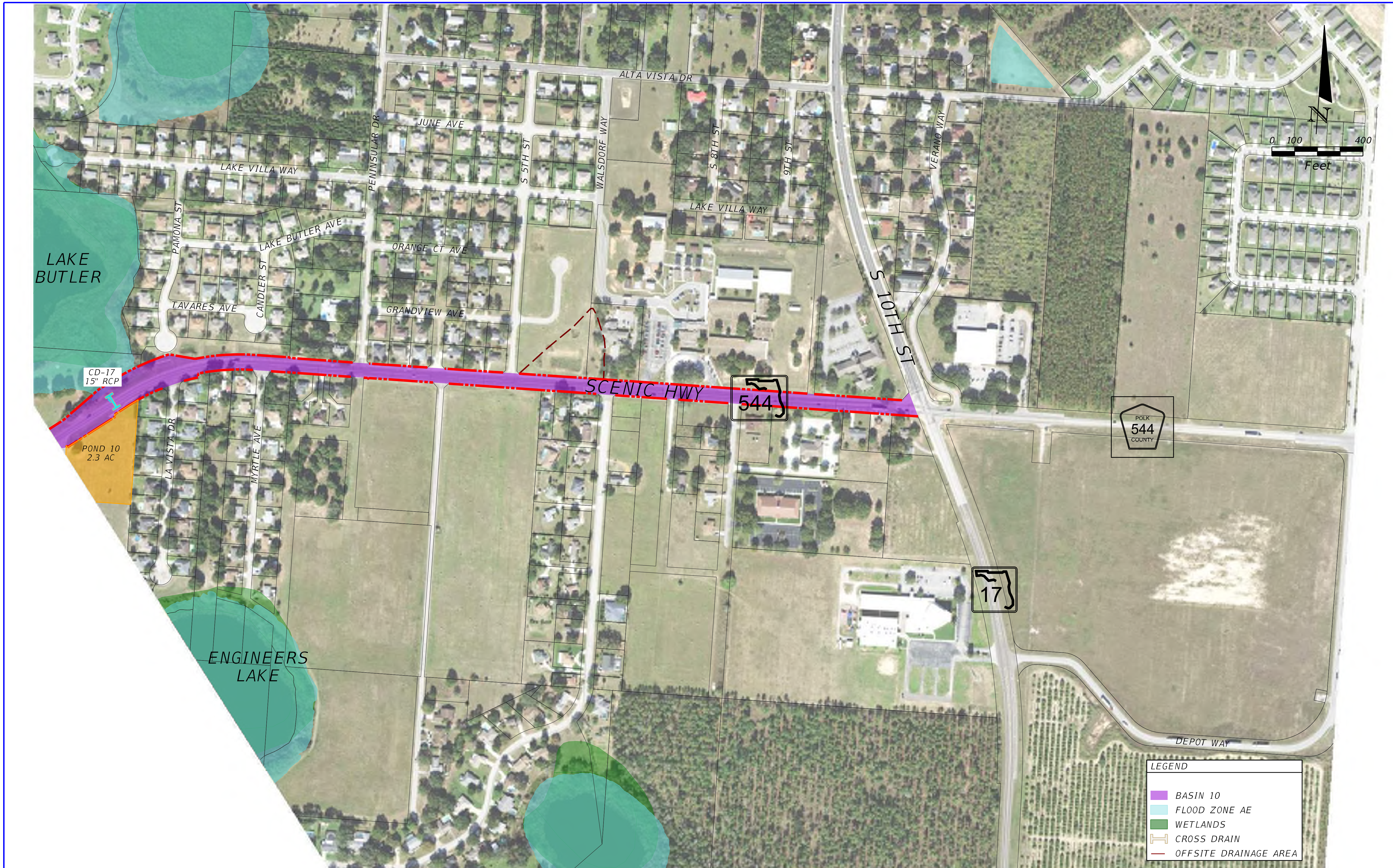
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID

SHEET NO.
7



REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID

SHEET NO.

8

State Road 544
Project Development and Environment Study
From MLK Jr. Boulevard to SR 17
Polk County, Florida
Financial Project ID: 440273-1-22-01

FDOT Pond Site Coordination Meeting Summary – August 12, 2021 at 10 a.m.

1. **Attendees**
   FDOT: Richard Oujevolk, David Turley, Brent Setchell, Sergio Figueroa
   Inwood: David Dangel, Jason Houck, Jada Barhorst, Renato Chuw, Dayna Duffy

2. **Discussion Items**

- The purpose of the meeting was to provide FDOT with updated pond sites from the original sites shown back in November 2020. Since then, new developments and permit applications have been submitted that required some of the pond sites to be reshaped or relocated to different parcels.

- A separate basin (Basin 1A) was created with a dry pond (Pond 1A) north of the beginning of the project in the Florence Villa historic district. The dry pond will be located in a remnant area within FDOT R/W. This remnant area will be created by the realignment of the intersection of 1st St. N and SR 544. Brent concurred with the site.

- This new Basin and Pond 1A allowed for the previous Pond 1 to be smaller due to the reduced volume requirements. The existing ground rises rapidly east of Pond 1. Brent indicated that the site appears to have been an agricultural land and if so, there will be a benefit in accepting the offsite water into the pond due to the reduction in nutrient loadings.

  - David indicated that there are plans for a future road just south of the church and to discuss reshaping the pond to allow room for the future road. David will coordinate with drainage for the preliminary location of the road. The pond could be shortened on the north end and expanded to the east to make up the volume needed.

  - Pond 1 also has the option to provide compensating treatment for Basin 2, since these two basins share the same outfall to the lakes. David mentioned that the project is intended to be full reconstruction of the road. Brent stated that we will need to verify with SWFWMD regarding compensating treatment as they have applied it on hardship situations. Inwood will request for this project to be added in the agenda for the Sept. 1st monthly meeting with SWFWMD for the pre application meeting and will discuss the compensating treatment applicability.

  - Brent mentioned that if we can show a net benefit to the environment, SWFWMD may be more lenient on allowing compensating treatment.

- Pond 2 was shown as a standalone pond in Basin 2 in case the compensating treatment approach would not be applicable. Brent concurred with the site

- FPCA 1, FPCA 2 and Pond 3 did not change shape or locations from the November 2020 meeting. No comments from FDOT on these sites

- FPCA 3 and Pond 4 changed from the original locations due to recent development and permit on the parcel. The new Pond 4 occupies an existing borrow pit on the adjacent parcel to the east. FPCA 3 was divided into two separate sites (FPCA 3A and 3B), each abutting the north and south side of Pond 4. Brent asked if FPCA

3B (north side) could be reshaped to allow a better remnant to the parcel. However, after explaining that an access gap was provided on the east side of the parcel, Brent concurred with the site and shapes shown in the meeting.

- FPCA 4 and Pond 5 changed from the original locations due to a future residential development on the parcel for Pond 5 and a commercial development on the parcel for FPCA 4. The new locations are located on a privately owned parcel south of the project with an existing easement from SR 544. The new Pond 5 location encroaches into the floodplains and Brent suggested another option would be to place the pond on the adjacent parcel to the east. However, Brent indicated that his preference is to impact just one parcel. Inwood stated that as the roadway concept is refined more, a more accurate floodplain impact volume will be estimated and then it will be determined if the new Pond 5 location would be acceptable. The outfall for the new pond would be either to the existing ditch that runs along the south side of the parcel or to the adjacent wetlands.

- The previous Pond 5 location had the option for an expanded shape to provide compensating treatment, however, it was agreed to provide a dedicated pond for Basin 6. This site was previously shown in the November 2020 meeting. There is also a flooding complaint on the adjacent mobile home park. This would be another reason to site a pond for Basin 6 to see if it could provide relief for the existing flooding. Brent mentioned that FDOT has documentation regarding this flooding. Inwood mentioned that they will check back through their files for the documentation or request it from FDOT if needed.

- Inwood explained that the existing FDOT pond on the south side of SR 544 for Basin 7 is proposed to be relocated further south due to the new truck parking development on the parcel. Brent was aware of this project as FDOT had been coordinating with the property owner. Inwood stated that the existing permit and calculations were checked for the FDOT pond and that enough capacity is provided for the minor improvements to SR 544 in the basin. Most of the road has already been improved to four lanes at the intersection with US 27. Brent stated that he was hesitant on relying solely on the existing FDOT pond since the basin is a closed basin and FDOT had discussed with the property owner that the existing FDOT pond would be collecting the turn lanes on SR 544. Even if there was capacity for the rest of SR 544 improvements, Brent was concerned on adding more water to the pond and overloading it, giving reasons to the property owner for future issues.

    - David indicated that two concepts are currently being evaluated for the intersection at US 27, one of which is a quadrant roadway. Additional R/W for the roadway is anticipated along the north side of SR 544. Brent suggested that another option would be get more roadway right of way and provide linear swale treatment for Basin 7. Inwood will investigate the swale capacity required and add this to their concept.

    - For the quadrant roadway option, a separate pond was shown. The pond occupies the southern portion of the quadrant roadway and the size was based on accommodating the offsite runoff being as it is in a closed basin. An outfall will be provided to the NW to the existing wetlands and the size of the pond also accommodates the attenuation in the existing condition to the wetlands. Brent suggested to eliminate the access gap along the east side of the pond. Inwood will revise the shape accordingly.

    - Brent indicated that the existing cross drain in Basin 7 acts as a relief from the floodplains to the south with a bubble up structure.

- The pond in Basin 9 remained the same as the original location presented in November 2020. However, the pond also provides compensating treatment for Basin 8. Inwood mentioned that a pond site in Basin 8 was previously shown but taken out in favor of the compensating treatment approach. As mentioned before, FDOT had concerns regarding the compensating treatment applicability with SWFWMD, so it was agreed to provide a pond in Basin 8 for conservative measures. The compensating treatment would be acceptable if a net improvement to the watershed can be demonstrated and will be verified with SWFWMD at the pre app meeting.

  - David mentioned that a Duke easement is proposed along the north side of SR 544 through this basin and that Inwood is currently coordinating with the utility agency and will need to verify that the pond shape will not conflict with the easement

- For Basin 10, Inwood explained that there is a permit exemption request from the property owner to have the ability to either develop houses or sell the property in the future. However, no development concept plans are available or prepared. Another site alternative was shown in the meeting west of this pond site and north of SR 544. Inwood asked if the Department had a preference on which site to move forward with. Brent indicated that because this is a PD&E study, it was OK to leave the original site for consideration. Furthermore, the outfall for the site is an existing cross drain in front of the pond site which made this site preferable. The pond location will also allow for the inflow pipe to discharge to the pond without having to cross the existing cross drain.

Action Items

1. Inwood to coordinate with Nicole Monies to include this project in the agenda for the pre app meeting with SWFWMD on Sept. 1st
2. Inwood to adjust Pond 1 shape to allow for the future access road south of the church
3. Investigate if Pond 1 can accept offsite runoff to the east to assist in the nutrient loading reductions
4. Investigate if Pond 5 can remain within the floodplain encroachments
5. Inwood to investigate if more roadway R/W can be acquired for a linear swale for assisted treatment in Basin 7
6. Inwood to revise shape of Pond 7 for the quadrant option to eliminate access gap on the east side
7. Inwood to locate pond in Basin 8 in case compensating treatment is not possible
8. Inwood to investigate Duke easement and potential impacts to Pond 9

The meeting concluded at 11:00 am

Inwood consulting engineers

Meeting Minutes

3000 Dovera Drive, Suite 200, Oviedo, FL 32765 I P: 407-971-8850 I F: 407-971-8955 I www.inwoodinc.com

DATE: September 1, 2021

TO: **All Attendees / Project File**

FROM: Renato Chuw, PE

RE: SR 544 PD&E Study FPID 440273-1; SWFWMD Pre Application Meeting

CC: David Turley, Richard Oujevolk, Jonathon Bennett

A Pre-Application meeting was held for the SR 544 PD&E Study with Southwest Florida Water Management District (SWFWMD) on September 1st, 2021, at 2:00 PM. The meeting was held via a Teams meeting. In attendance were:

Dave Kramer (SWFWMD)	David Dangel (Inwood)
Al Gagne (SWFWMD)	Renato Chuw (Inwood)
Brent Setchell (FDOT)	Dayna Duffy (Inwood)
Sergio Figueroa (FDOT)	Jada Barhorst (Inwood)
Nicole Monies (FDOT)	
Ben Shepherd (FDOT GEC)	

The following is a summary of the items discussed in this meeting:

<u>Project overview and description</u>

- Renato shared his screen with Google Earth along with a KMZ of the project limits, drainage basins and preliminary pond site locations. An overview of the project was provided. The project begins at MLK Jr. Blvd/Avenue T in Winter Haven and extends to SR 17 in Haines City. The scope of the project is to evaluate widening SR 544 from two to four lanes. There are a total of 17 cross drains within the project, including 3 major (bridge culvert or bridge) crossings. These are located at the canal between Lake Conine and Lake Smart, at Lake Henry Canal, and at Lake Hamilton Creek.
- The project is within the Peace River Basin and has been divided into 10 drainage basins based on existing outfall locations and drainage patterns.
- Basin 7, located west of US 27, is a closed basin. Within this basin, there is an existing FDOT pond that will soon be relocated as part of a new development. Renato also pointed out that there is a potential quadrant roadway concept at this intersection and a separate pond site was located for this alternative.
- Renato mentioned that Inwood met with SWFWMD two years ago for a pre-application meeting while pursuing this project. At that time, SWFWMD stated that it would be acceptable to provide treatment only for net-new impervious if it could be physically separated from the existing runoff. However, at the time it was expected that the original lanes would remain throughout most of the project and two new lanes would be constructed. It is now anticipated that full reconstruction will be necessary due to right-of-way constraints.
    - Dave Kramer stated that while net new impervious is the minimum acceptable treatment, it would be preferable to SWFWMD to see treatment provided for all contributing DCIA in each basin.
    - Brent Setchell added that since right-of-way acquisition is needed anyway, FDOT would also prefer the most conservative approach of treating the total area of the reconstructed pavement.

- In Basins 1 and 2, one idea presented was to provide a larger pond in Basin 1 that would overtreat that basin and provide compensation for Basin 2 since at the time, it was thought that these two basins discharge to a common location (Lake Conine and Lake Smart which are connected by a canal crossing SR 544). Basin 2 would then discharge untreated.
    - FDOT had previously concurred with this idea and pointed out that the pond site for Basin 1 has a large offsite area of pasture that could be treated in the pond to balance the additional treatment for Basin 2 and show net benefit (nutrient reduction) to the basin.
    - SWFWMD indicated that although Basins 1 and 2 discharge to different lakes that are connected by a free-flowing canal, they are separate WBIDs and would recommend keeping them as separate basins and have one pond in each basin. Inwood had previously sited an alternative pond for Basin 2 so this will now be shown as the pond site for Basin 2.
- In Basins 8 and 9, a similar plan to use compensating treatment was proposed by Inwood. Both basins drain to Lake Hamilton Creek. Inwood mentioned that based on previous discussion with FDOT, they planned to show separate ponds for both basins moving forward.
    - SWFWMD mentioned that since these basins do drain to the same WBID, compensation might be more acceptable here.
    - Inwood will still locate a separate Basin 8 pond at the request of FDOT.
- Renato mentioned that the Lake Region Lakes Management District (LRLMD) is also a stakeholder on the project and will be contacted soon. Inwood met with them previously and obtained some information about local stormwater projects.
    - The Lake Conine Stormwater Park is located adjacent to the project but cannot be used for treatment of the roadway improvement since it was a cooperative project between LRLMD and SWFWMD with grant funding dedicated only for the scope of that project.
    - Inwood and SWFWMD are also aware of another LRLMD project, believed to be located near Lake Eloise. SWFWMD believed this project was too far from the SR 544 project to provide any potential credits.
- Renato mentioned that the first half of this project (from Avenue T until the Walmart Distribution Center) is funded for design in 2025 with the remainder of the project is unfunded. However, it is expected to be added to the 5-year work program soon.
- Renato also briefly discussed the floodplains on the project. There are multiple encroachments associated with various lakes and canals in the area. The floodplains are well defined and have established Zone AE 100-year elevations.
    - Inwood utilized a standard cup for cup compensation approach when sizing and siting the floodplain compensation sites.
    - Inwood is also aware of the Peace Creek Watershed study and will verify that the floodplains are consistent with those shown in FEMA maps.
- Jada provided an overview of the ecological and environmental permitting concerns on the project. Inwood's ecology team has completed several species surveys along the corridor. They are also investigating credits available in wetland mitigation banks to offset potential wetland impacts.
    - Albert Gagne mentioned that there could be Sovereign Submerged Lands (SSL) along the corridor and that this should be investigated if purchasing right-of-way adjacent to lakes.
    - Nicole Monies mentioned that she is aware the Peace River mitigation bank will not have forested credits available for several years.

Action Items

- Inwood to revise all ponds to include treatment for all lanes of the corridor.
- Inwood to show separate ponds for each basin including Basins 2 and 8 which previously used a compensating approach.
- Inwood to arrange a meeting with LRLMD to discuss ELA opportunities.

These are the author's understanding of the discussions and decisions reached at this meeting. If there are comments or questions, please contact Renato Chuw at rchuw@inwoodinc.com or 407-971-8850.

3000 Dovera Drive, Suite 200, Oviedo, FL 32765 I P: 407-971-8850 I F: 407-971-8955 I www.inwoodinc.com

Meeting Minutes

DATE: November 30, 2021

TO: **All Attendees / Project File**

FROM: Renato Chuw, PE

RE: SR 544 PD&E Study FPID 440273-1; Lake Region Lakes Management District (LRLMD) Environmental Look Arounds (ELA) Meeting

CC: Sergio Figueroa, Richard Oujevolk, Jonathon Bennett

An Environmental Look Arounds (ELA) meeting was held for the SR 544 PD&E Study with the Lake Region Lakes Management District (LRLMD) on November 30th, 2021, at 2:00 PM. The meeting was held via a Teams meeting. In attendance were:

Roger Griffiths (LRLMD)
Brent Setchell (FDOT)
David Turley (FDOT)
David Dangel (Inwood)
Renato Chuw (Inwood)
Dayna Duffy (Inwood)
Jada Barhorst (Inwood)

The purpose of this meeting was to discuss potential regional stormwater opportunities ("Environmental Look Arounds-ELA") with the Lake Region Lakes Management District (LRLMD). The following is a summary of the items discussed in this meeting:

- Renato shared his screen with Google Earth along with a KMZ of the project limits, drainage basins and preliminary pond site locations. Proposed stormwater treatment ponds and floodplain compensation ponds for each basin were shown. An overview of the project was provided. The project begins at MLK Jr. Blvd/Avenue T in Winter Haven and extends to SR 17 in Haines City. The scope of the project is to evaluate widening SR 544 from two to four lanes.

- Inwood had previously met with the LRLMD two years ago while pursuing this project and the objective of today's meeting was to revisit any potential opportunities for regional stormwater / ELA.

- It was confirmed in the meeting that using credits in the Lake Conine Wetland restoration project is not available for the purpose of the road improvement because of the funding mechanism specifically for the wetland restoration project. This was also stated by SWFWMD in the pre-application meeting held in September 2021.

- Previous discussion with LRLMD indicated the willingness to place pond sites on their parcels if they could include aesthetics and park-like features, specifically, the boat ramp parcel to Lake Fannie. However, the decision was to avoid placing pond sites in these Section 4(f) resources.

- LRLMD mentioned a new house built along Lake Smart, just north of the Winter Ridge Condos. Access to the house was discussed. Inwood indicated that this will be evaluated as the proposed roadway concepts are refined with the widening options.

- LRLMD expressed concern about access into and out of the boat ramp entrance to Lake Conine (west of SR 544) with acceleration and deceleration lanes on SR 544, which in the existing condition, is not provided. Inwood indicated that the four-lane improvement of SR 544 will accommodate this.

- LRLMD expressed their desire to realign the existing box culvert connecting Lake Conine and Lake Smart if improvements are proposed to this culvert resulting from the four-lane widening. Realigning the culvert will provide for better visibility to boaters. In addition, providing more vertical clearance inside the culvert would be desirable. LRLMD indicated that they are willing to realign portions of the canal as needed to accommodate the improvements.

- The segment of SR 544 from MLK Boulevard to the Walmart Distribution Center is funded for design in 2025. The segment from the Walmart Distribution Center to SR 17 is currently not funded but FDOT anticipates that it will be included in their 5-year work program.

- Inwood inquire if the LRLMD was aware of any potential regional stormwater opportunities in the area. LRLMD indicated that there is a property next to the Lake Fannie boat ramp that is vacant that may be suitable for a pond site. However, after looking at maps, this area appears to contain wetlands and is within the existing floodplain associated with Lake Fannie and more likely will present challenges to show avoidance and minimization of wetland impacts.

- A previous item discussed in 2019 was regarding the Lake Eloise treatment project. LRLMD indicated that this project would not work for any credits apply toward the SR 544 project.

- Nutrient loading analysis for the project will be evaluated as part of the SR 544 study with the proposed stormwater ponds. An option was discussed regarding possible conversion of some of the existing communities that are on septic to sewer, but this would involve cooperative efforts with the City.

- Inwood mentioned that a public meeting will be held in February 2022 to present initial roadway and typical section concepts. LRLMD expressed their desired to stay involved and informed on the study progression.

These are the author's understanding of the discussions and decisions reached at this meeting. If there are comments or questions, please contact Renato Chuw at rchuw@inwoodinc.com or 407-971-8850.

Drainage Complaint Study

SR 544 – Polk County

LAKESIDE RANCH ESTATES
SR 544 IN WINTER HAVEN

Prepared for:

FLORIDA DEPARTMENT OF TRANSPORTATION
District One
Bartow, FL

Prepared By:

Leanna O'Regan
FDOT District One
801 Broadway Ave
Bartow, FL 33830

1. INTRODUCTION

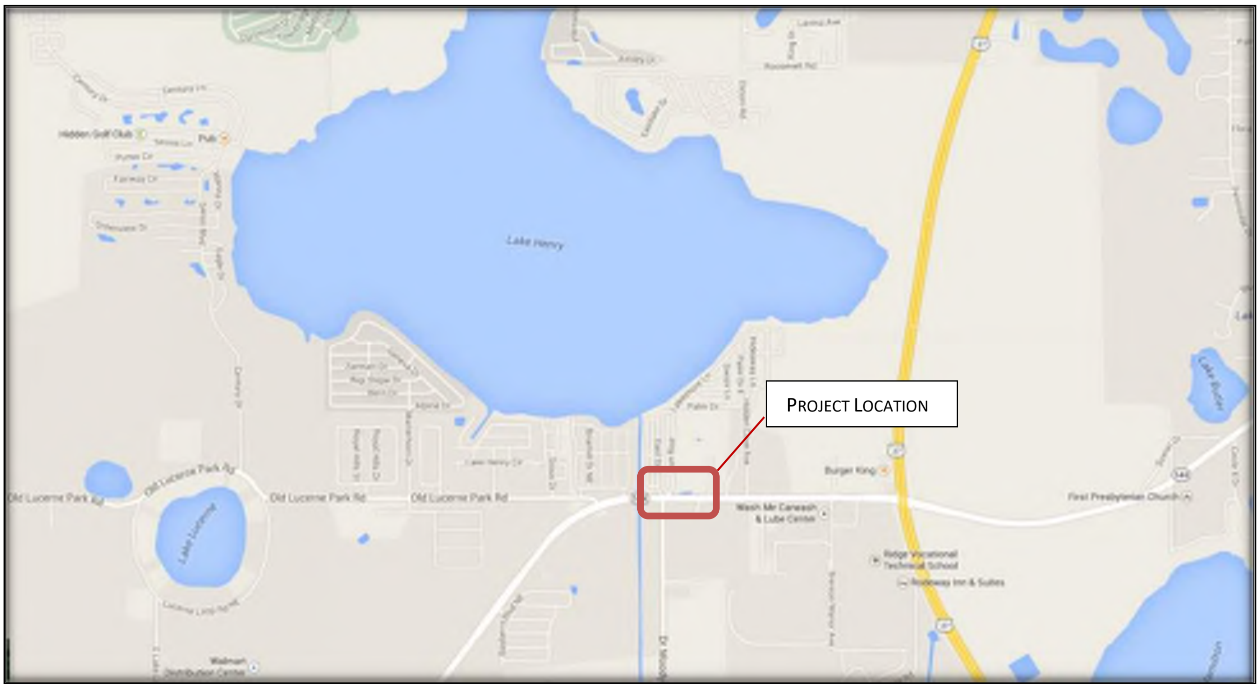


Figure 1: Project Location Map

2. DATA COLLECTION

Following is a list of data sources utilized in this investigation:

- On-site meeting with Residents March 24th, 2015
- Cook Surveying and Mapping, Inc. Survey (provided by residents)
- Polk County Property Appraiser
- Southwest Florida Water Management District permitting
- USGS
- FDOT straight line diagrams
- FDOT historical drainage maps (Section 16140-3501)
- FDOT construction plans for SR 544, 197429-1-52-01
- FDOT construction plans for SR 544, 197697-1-52-01

- FDOT Permits 2011-H-190-0179, C1605292, 2013-D-190-0003
- Field review April 27th, 2015

3. EXISTING CONDITIONS

SR 544 is an east west 2-lane urban facility with 12-foot travel lane and 5-foot paved shoulders. The road is in a normal crown section in this location. There is an existing 30-inch cross drain on SR 544, east of the Lakeside Estate entrance, which historically conveyed runoff from the south side of the roadway to an existing offsite pond located on the north side of SR 544. This runoff was then conveyed northward to Lake Henry via a system of drainage ditches and swales.

The majority of the runoff on the north side of the roadway from 1800-feet east of the cross drain, is conveyed westward to the historic 30-inch outfall via ditches and swales and through several driveway culverts. On the west side of the outfall, the runoff is collected from the Lake Hamilton Bridge and roadway areas and conveyed via ditch/swale through two existing driveway culverts and to the existing outfall.

The runoff on the south side of the roadway is conveyed via ditch/swale system from 1800-feet east of the outfall, through several driveway culverts to the historical 30-inch outfall. The runoff from the west side of the roadway and bridge section is also collected via ditch/swale and is directed to the outfall.

The flooding in this area appears to have be caused by a lack of maintenance of the existing outfall system on the north side of the roadway. The pond has become overgrown in recent years which has significantly reduced the capacity, whilst the existing outfall to Lake Henry has also become overgrown and can no longer convey runoff to the Lake. The conveyance ditches and swales previously used for conveyance have also been blocked by the addition of a private roadway/driveway entrance on private property which has been documented during FDOT staff site visits.

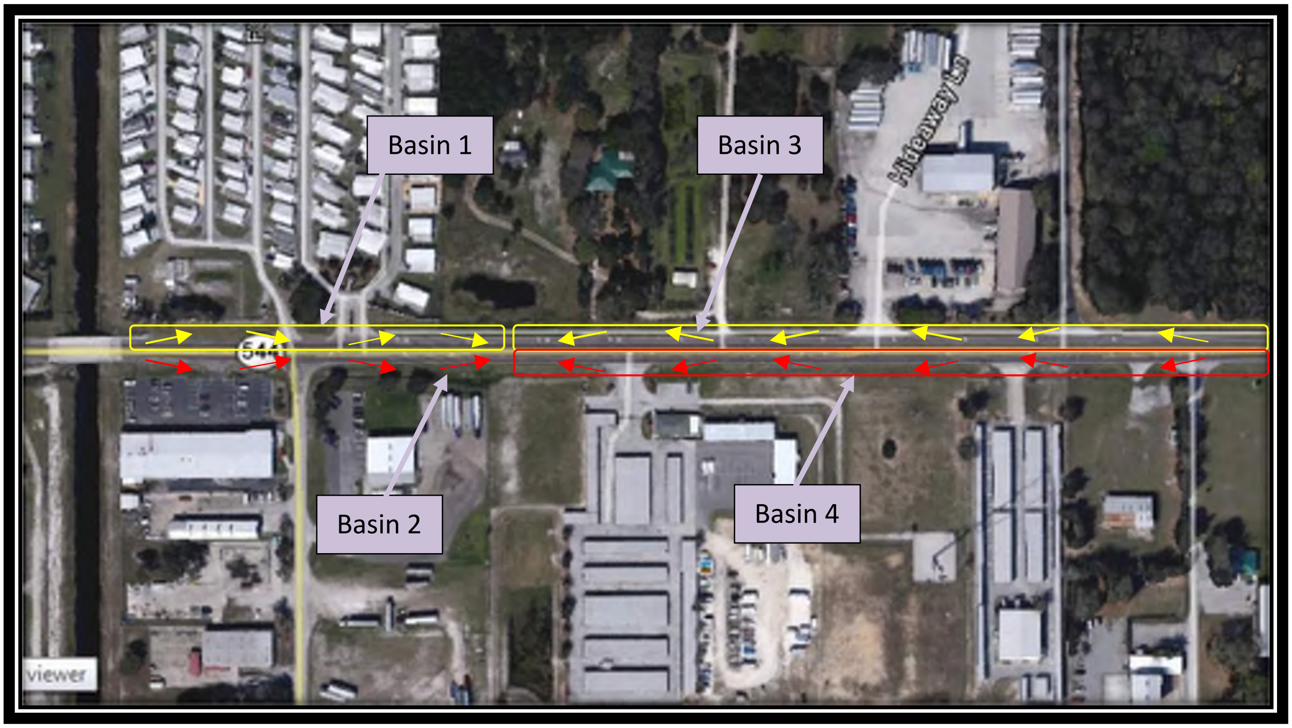


Figure 2: Project Existing Drainage Basin Map

BASIN 1:

The area included in the Basin 1 drainage boundary extends from the center of SR 544 roadway northward to the FDOT right of way line on the north side of the roadway. The area includes runoff from the bottom of the existing bridge to the location of the 30-inch cross-drain which discharges into the FDOT ditch from under SR 544.

Area & CN:
Basin Area 0.72 acres

Impervious area:					
Roadway (CN 98)	0.39 acres	X	98	=	38.22
Pervious area:					
Ditches (CN 39)	0.33 acres	X	39	=	12.87
	0.72 acres				51.09

Weighted CN Calculation:	(0.39) X (98)	=	38.22	
	(0.33) X (39)	=	12.87	
	0.72 acres		51.09	**Weighted CN = 71.0**

BASIN 2:

The area included in the Basin 2 drainage boundary extends from the center of the roadway southward to the FDOT right of way line on the south side of the roadway. The area extends along the length of the SR 544 roadway from the existing bridge to the location of 30-inch cross-drain which conveys runoff from the southside of the road to the north. Basin 2 also includes additional offsite runoff from Lake Hamilton Dr. W., (south of SR 544), which drains from the south northward discharging into the SR 544 ditch. The runoff within this basin area then collectively drains eastwards towards the existing 30-inch cross drain under SR 544. Basin 4 also includes runoff from the offsite StoreRite development on the south side of the roadway. The permitted runoff from this site is documented in FDOT Drainage Application 2013-D-190-0003 and is included in the model using the maximum discharge rate during the peak storm event of 1.0-cfs.

Area & CN:

<u>Basin Area</u> <u>1.53 acres</u>

Impervious area:

Roadway (CN 98)	0.70 acres	X	98	=	68.60
Offsite parking (CN 98)	<u>0.15</u> acres	X	98	=	<u>14.70</u>
Total Impervious	0.85 ac				83.3

Pervious area:

Grassed area (CN 39)	0.68 acres	X	39	=	26.52

Weighted CN Calculation:	(0.85) X (98)	=	83.3	
	<u>(0.68) X (39)</u>	=	<u>26.52</u>	
	1.53 ac		109.82	**<u>Weighted CN = 71.8</u>**

StoreRite

Offsite Drainage = 1.0 cfs

<u>BASIN 3:</u>

The area included in the Basin 3 drainage boundary extends from the center of the roadway northward to the right of way property line. The area extends from the center of the roadway at the location of the 30-inch crossdrain to for approximately 1400-feet eastward along SR 544 to the beginning of the roadway taper. The drainage basin is bordered by the right of way line on the northern side of the roadway.

Area & CN:

<u>Basin Area</u> <u>1.43 acres</u>

Impervious area:

Roadway (CN 98)	0.90 acres	X	98	=	88.20

Pervious area:

Grassed area (CN 39)	0.53 acres	X	39	=	20.98

Weighted CN Calculation:	(0.90) X (98)	=	88.20	
	(0.53) X (39)	=	20.98	
	1.43 acres		109.18	**Weighted CN = 76.1**

BASIN 4:

The area included in the Basin 4 boundary extends from the centerline of SR 544 southward to the right of way line on the southside of the roadway. This area includes the runoff from the east side of the existing driveway for the Dollar General Store westward to the existing 30-inch crossdrain under SR 544.

Area & CN:

Basin Area 2.23 acres

Impervious area:						
Roadway	(CN 98)	1.14 acres	X	98	=	111.72
Pervious area:						
Grassed area	(CN 39)	1.09 acres	X	39	=	42.51

Weighted CN Calculation:	(1.14) X (98)	=	111.72	
	(1.09) X (39)	=	42.51	
	2.23 acres		154.23	**Weighted CN = 69.2**

The tailwater conditions utilized for the existing and proposed condition designs will be as described in the drainage manual Chapter Three for ponds and open ditches.

4. CONCEPTUAL DESIGN