Tampa Interstate Study - Supplemental Environmental Impact Statement

I-275 from Howard Frankland Bridge to
North of Dr. Martin Luther King, Jr. Boulevard and
SR 60 from I-275 to just North of Cypress Street
and
I-4 from I-275 to East of 50th Street with New Alignment from I-4 South to
the Existing Selmon Expressway and Improvements to the Selmon
Expressway from the Kennedy Boulevard Overpass East to Maydell Drive

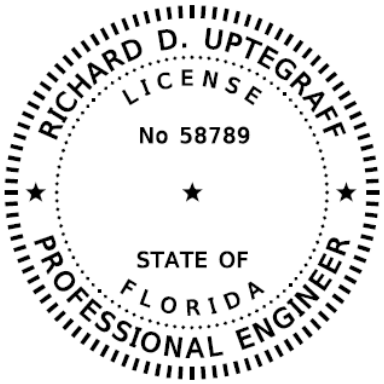
Hillsborough County, Florida

Work Program Item Segment Number 258337-2

Segments 1A & 2A

I acknowledge that the procedures and references used to develop the results contained in this report are standard to the professional practice of transportation engineering as applied through professional judgment and experience.

I hereby certify that I am a registered professional engineer in the State of Florida practicing with Atkins North America, Inc., and that I have prepared or approved the evaluation, findings, opinions, conclusions, or technical advice for this project.



This item has been digitally signed and sealed by:

Richard D Uptegraff 2020.07.26 22:20:23 -04'00'

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

Atkins North America, Inc
4030 W. Boy Scout Blvd. Suite 700
Tampa, FL 33607
Richard D. Uptegraff, P.E. No 58789

Memo

To:	Abdul Waris, P.E.		
From:	Richard Uptegraff, P.E	**Email:**	richard.uptegraff@atkinsglobal.com
Phone:	1-941-926-6598	**Date:**	11/07/2019
Ref:	TBN Section 4/TIS Segment 1A and TIS Segment 2A	**cc:**	Cristina Jackson
Subject:	I-275 (SR 93) / SR 60 INTERCHANGE ALTERNATE STORMWATER MANAGEMENT REPORT (ASMR)		

Project Description:

The Florida Department of Transportation is designing for the ultimate construction of the I-275/SR 60 Interchange. The proposed improvements in Segment 1A include, I-275 (SR 93) from east of the Howard Frankland Bridge to Cypress Street and to east of Himes Avenue. The project will include design improvements for the existing interchange as well as design improvements on Reo Street, Occident Street, Ward Street, Westshore Boulevard, Kennedy Boulevard and Trask Street. Improvements also include realignment of Lemon Street.

The proposed improvements in Segment 2A includes I-275 from east of Himes Avenue to east of Rome Avenue. Previous I-275 improvements included the outer roadway general use lanes. Proposed work in this section consists of adding express lanes in the median. The I-275 section from Lois Avenue to the Hillsborough River is a transition section from the SR 60 interchange to the Tampa Downtown Interchange (DTI). All the existing ponds within Segment 2A were designed and permitted to treat and attenuate the entire I-275 right of way and will accommodate the ultimate construction. SWFWMD Permit 402958.006 – covers from Westshore Boulevard to Himes Avenue and SWFWMD Permit 405619.001 – covers from Himes Avenue to the Hillsborough River.

Objective:

The objective of this ASMR and documentation is to support the use of Stormwater Management Facility (SMF) sites within existing right of way and the use of remnant parcels to provide the presumptive treatment requirements and nutrient & phosphorus removal requirements for Segment 1A. See table 1 and 2 on pages 3 and 4 for treatment and nutrient removal comparisons.

Executive Summary:

Appendices

Appendix A.	A-1 – A-2	Soils Information
Appendix B.	B-1 – B-5	FEMA Floodplain Maps
Appendix C.	C-1 – C-2	WBID Map
Appendix D.	D-1 – D-10	Basin Figures
Appendix E.	E-1 – E-2	Stormwater Management Facilities Matrix
Appendix F.	F-1 – F-31	Geotech Information
Appendix G.	G-1 – G-23	Stormwater Management Facilities Calculations
Appendix H.	H-1 – H-56	SMF Nutrient Removal Calculations
Appendix I.	I-1 – I-3	SWFWMD Pre-Application Meeting Notes

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This ASMR identifies SMF locations that are hydraulically feasible and environmentally permittable based on the best available information. SMF locations 1,2,4,6,7,9, and 13 were removed during the potential SMF location process. Potential SMF locations 3,5,8,10,11,12, and 14 were analysed and evaluated for using these areas meeting the following criteria:

- within existing right of way
- within remnant parcels impacted by the roadway alignment
- within existing parcels owned by the Florida Department of Transportation

The project area consists of nine existing drainage basins, all of which are open basins. There are two outfalls within the project limits: Old Tampa Bay (OTB) and Lemon Street Canal. The presumptive treatment requirements will be 1 inch over the new impervious for wet detention and a half of an inch for dry retention. An area of direct discharge into OTB from west of Basin 5, Basin 8, and Basin 10 to the begin project limits will not meet the requirements of presumptive treatment and nutrient removal due to the limited area on the causeway for SMF locations. Available compensatory credits from each basin will be used to offset this shortfall. Old Tampa Bay Water Quality Improvement Project (SWFWMD Permit No. 4300920) will be used to compensate for any additional shortfalls in nutrient removal. Please see table 1 on pages 3 & 4.

The Waterbody ID's (WBID'S) within the project limits are:

- 1606 (Lemon Street Ditch)
- 1607 (Cypress Point Park Drainage)
- 1612 (Drain to Culbreath Bayou)

See Appendix C for WBID mapping.

Existing Drainage Patterns:

Existing runoff in the surrounding areas includes discharge into OTB via Lemon Street Canal on the northside of the interchange and an existing 10' x 6' CBC on the southside of the interchange. Stormwater runoff from the existing I-275 / SR 60 roadway is collected by barrier wall inlets, shoulder gutter inlets, ditch bottom inlets and roadside ditches. Some portions of the existing runoff are directed to existing ponds for treatment and other areas are directly discharged to the outfalls. See Appendix D – Basin Figures.

Proposed Basin Summary:

Direct discharge to OTB area is west of Basin 5, Basin 8, and Basin 10 will not be treated in a Stormwater Management Facility. See Appendix D – Basin Figures

Basin 3 extends from approximately the beginning of the eastbound I-275 off ramp to Kennedy Boulevard and from Kennedy Boulevard to west of Westshore Boulevard. All runoff will be conveyed via a stormwater system and be collected by existing SMF 3 in conjunction with new SMF 3 cells that will discharge directly to OTB. The roadway design will provide wall and a bridge span to max out the allowed space.

Basin 5 includes runoff from the westbound express lane ramp from Reo Street / Kennedy Boulevard to I-275 that will be conveyed via stormwater system and roadside ditches. The roadway adjacent to SMF 5 will be a curb & gutter section. The runoff will be collected by SMF 5 and discharge directly to OTB.

Basin 8 includes the southbound lanes from north of Cypress Street on SR 60 traveling south to west on I-275 1400 feet west of Reo Street. All runoff will be conveyed via stormmwater system and be collected by SMF 8. Wall will be provided to maximize the pond area. SMF 8 will discharge to a roadside ditch and discharge to OTB.

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Basin 10 includes eastbound lanes that will extend from west of SR 60 to Westshore Boulevard. All runoff will be conveyed via a stormwater system and be collected by existing regraded SMF 10. SMF 10 will discharge to the 10’ x 6’ existing CBC and discharge to OTB.

Basin 11 collects runoff from northbound lanes on SR 60 from north of eastbound I-275 lanes to just north of westbound I-275 lanes. The small area within the interchange is conveyed to SMF 11 and will have dual discharge locations. One is south to the existing 10’ x 6’ CBC and the other is north to the Lemon Street Canal. Wall will be provided to maximize the pond area. The ultimate discharge location is into OTB.

Basin 12 includes all westbound lanes on I-275 from east of Westshore Boulevard to the interchange and north on SR 60 from the interchange to Cypress Street. All runoff is conveyed via stormwater system to SMF 12. SMF 12 will have dual discharge locations. One is south to the existing 10’ x 6’ CBC and the other is north to the Lemon Street Canal. Wall will be provided to maximize the pond area. The ultimate discharge location is into OTB.

Basin 14 will collect runoff from eastbound I-275 lanes from east of Basin 10 to end of project limits. Runoff will be conveyed through a stormwater system and be collected by SMF 14. One outfall is south to the existing 10’ x 6’ CBC and the other outfall is north to the Lemon Street Canal. The ultimate discharge location is into OTB.

Table 1: Treatment and Compensatory Comparisons

	OUTFALL	Treatment and Compensatory Comparison					
		Total Impervious Collected (ac)	Required Impervious area for Treatment(ac)	Treatment Volume Required (ac-ft)	Impervious Area Treated (ac)	Treatment Volume Provided (ac-ft)	Compensatory Credit Area Available (ac)
SMF 3 (Wet)	OTB	20.36	14.72	1.23	15.60	1.30	0.88
SMF 5 (Wet)	OTB	2.30	0.72	0.06	2.30	0.19	1.58
SMF 8 (Dry)	OTB	21.01	14.17	0.59	21.01	0.88	6.84
SMF 10 (Wet)	CBC	19.50	16.44	1.37	19.50	1.63	3.06
SMF 11 (Wet)	Existing CBC/Lemon Street Canal	0.33	-0.33	-0.03	0.33	0.03	0.33
SMF 12 (Dry)	Existing CBC/Lemon Street Canal	19.65	11.76	0.49	19.65	0.82	7.89
SMF 14 (Wet)	Existing CBC/Lemon Street Canal	2.50	1.62	0.14	2.50	0.21	0.88
Total Compensatory Credits Available:							**21.46**

Table 1 (Continued): Treatment and Compensatory Comparisons

	OUTFALL	Compensatory Comparison					
		Total Impervious Collected (ac)	Required Impervious area for Treatment(ac)	Treatment Volume Required (ac-ft)	Treatment Volume Provided (ac-ft)	Area Actually Treated (ac)	Compensatory Credit Area Required (ac)
Direct Discharge	OTB	44.09	21.61	1.80	N/A	N/A	21.61
Total Additional Compensatory Credits Required:							**21.61**

Table 2: Nitrogen Comparisons

	Pond Type	Nitrogen		
		Pre Loading (kg/yr)	Post Discharge (kg/yr)	Net Benefit (kg/yr)
Direct Discharge	N/A	107.94	278.87	-170.93
SMF 3	WET	116.72	76.12	40.60
SMF 5	WET	9.06	6.99	2.07
SMF 8	DRY	74.06	63.07	10.99
SMF 10	WET	75.74	60.97	14.77
SMF 11	WET	5.41	0.73	4.68
SMF 12	DRY	91.98	58.14	33.84
SMF 14	WET	7.35	5.50	1.85
			TOTAL:	**-62.13**

Credits needed from Old Tampa Bay Water Quality Improvement Project SWFWMD (Permit No. 4300920)

Nitrogen shortfall is 62.13 (kg/yr)

The nutrient & phosphorus BMPTRAINS calculations for Direct Discharge were produced in two separate loading sheets to demonstrate a pre-post without a Stormwater Management Facility. See Appendix H – SMF Nutrient Removal Calculations.

Alternative Proposed Drainage Design:

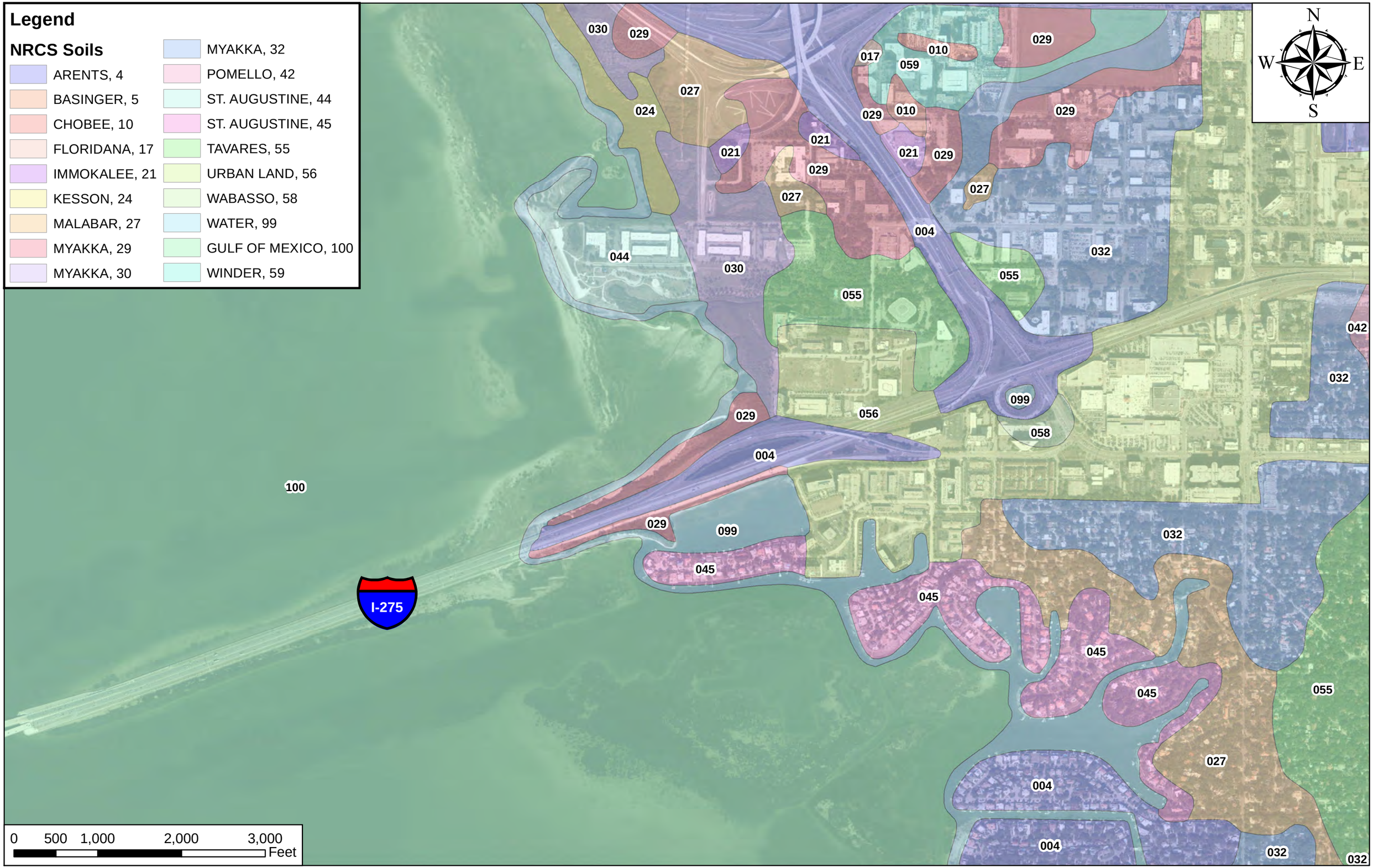
With the success of the Old Tampa Bay Water Quality Improvements Project, an alternate proposed drainage concept will be used during design development. This alternative limits the use of formal ponds and substitutes the use of sediment sumps to provide first flush runoff BMP's. The following table details the changes to the proposed concept which eliminates two proposed ponds and converts several ponds from standard treatment ponds to sediment sumps. The sediment sumps will be smaller than standard ponds and will be sized per SWFWMD criteria provided in the Applicant's Handbook Volume I. See Appendix I for the SWFWMD Pre-Application Meeting Notes during which this conceptual approach was discussed.

Table 3: Alternative SMF Design

SMF	Proposed Pond Type	Alternative Design
SMF 3	WET	Sediment Sump
SMF 5	WET	Removed, no pond will be provided
SMF 8	DRY	Sediment Sump
SMF 10	WET	Wet Pond
SMF 11	WET	Removed, no pond will be provided
SMF 12	DRY	Sediment Sump
SMF 14	WET	Sediment Sump

Memo

Appendix A. Soils Information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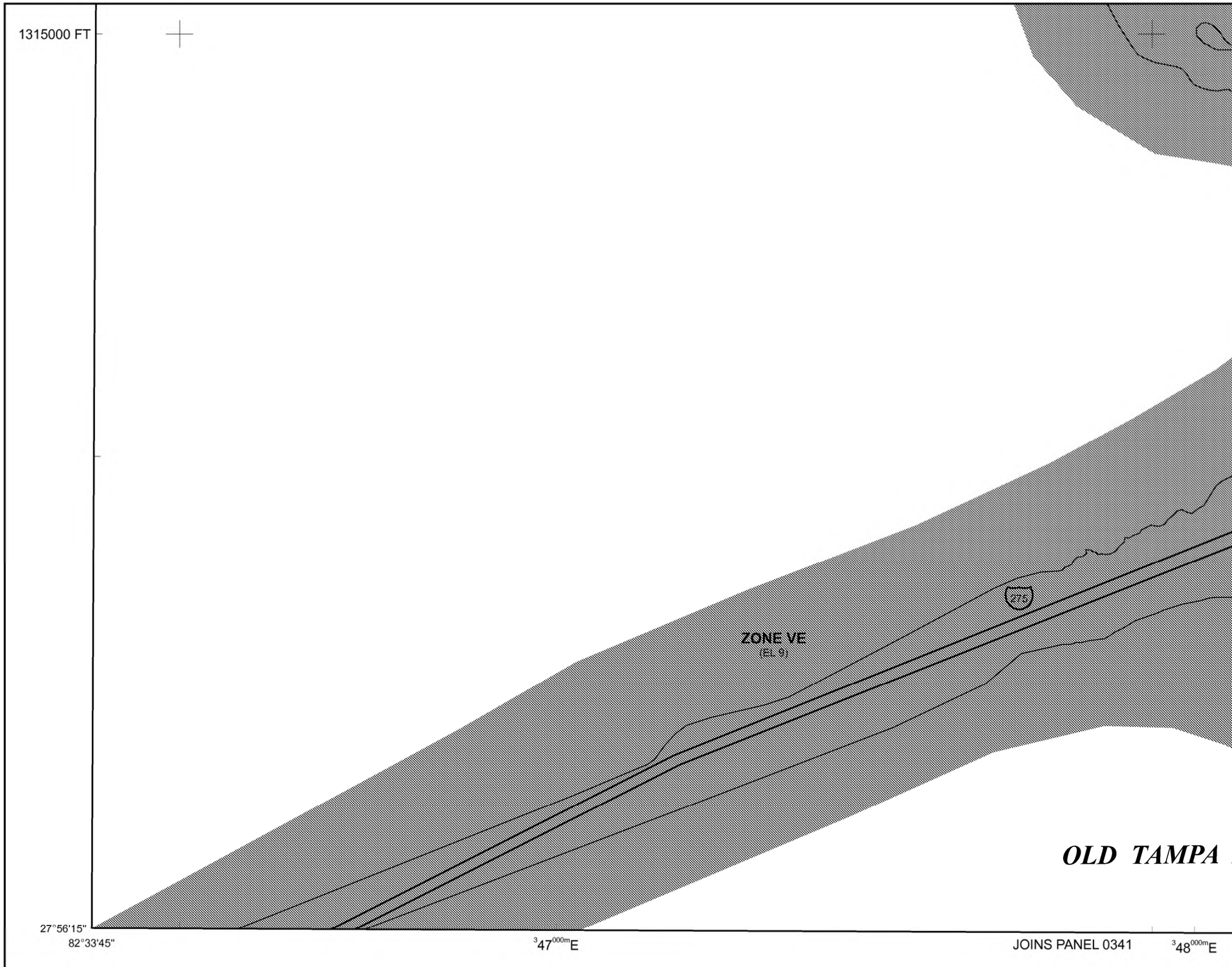
NRCS Soils
ARENTS, 4
BASINGER, 5
CHOBEE, 10
FLORIDANA, 17
IMMOKALEE, 21
KESSON, 24
MALABAR, 27
MYAKKA, 29
MYAKKA, 30
MYAKKA, 32
POMELLO, 42
ST. AUGUSTINE, 44
ST. AUGUSTINE, 45
TAVARES, 55
URBAN LAND, 56
WABASSO, 58
WATER, 99
GULF OF MEXICO, 100
WINDER, 59
N
W
E
S
I-275
0 500 1,000 2,000 3,000
Feet

Memo

Appendix B. FEMA Floodplain Maps



onal Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

250 0 500 1000 FEET

METER

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0333H

FIRM

FLOOD INSURANCE RATE MAP

HILLSBOROUGH COUNTY, FLORIDA
AND INCORPORATED AREAS

PANEL 333 OF 801

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

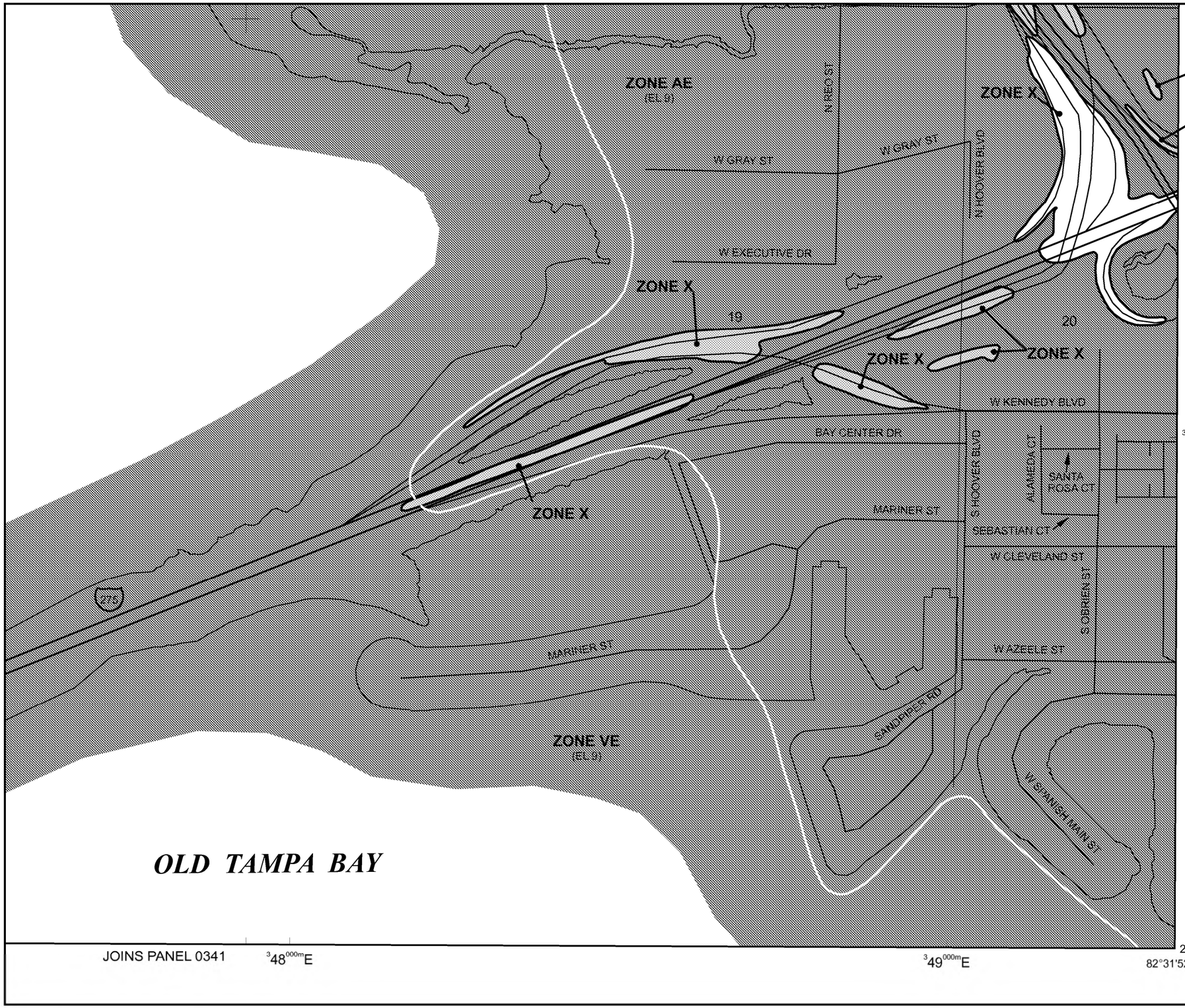
COMMUNITY	NUMBER	PANEL	SUFFIX
HILLSBOROUGH COUNTY	120112	0333	H
TAMPA, CITY OF	120114	0333	H

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

MAP NUMBER
12057C0333H

EFFECTIVE DATE
AUGUST 28, 2008

Federal Emergency Management Agency



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MAP SCALE 1" = 500'

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onal Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

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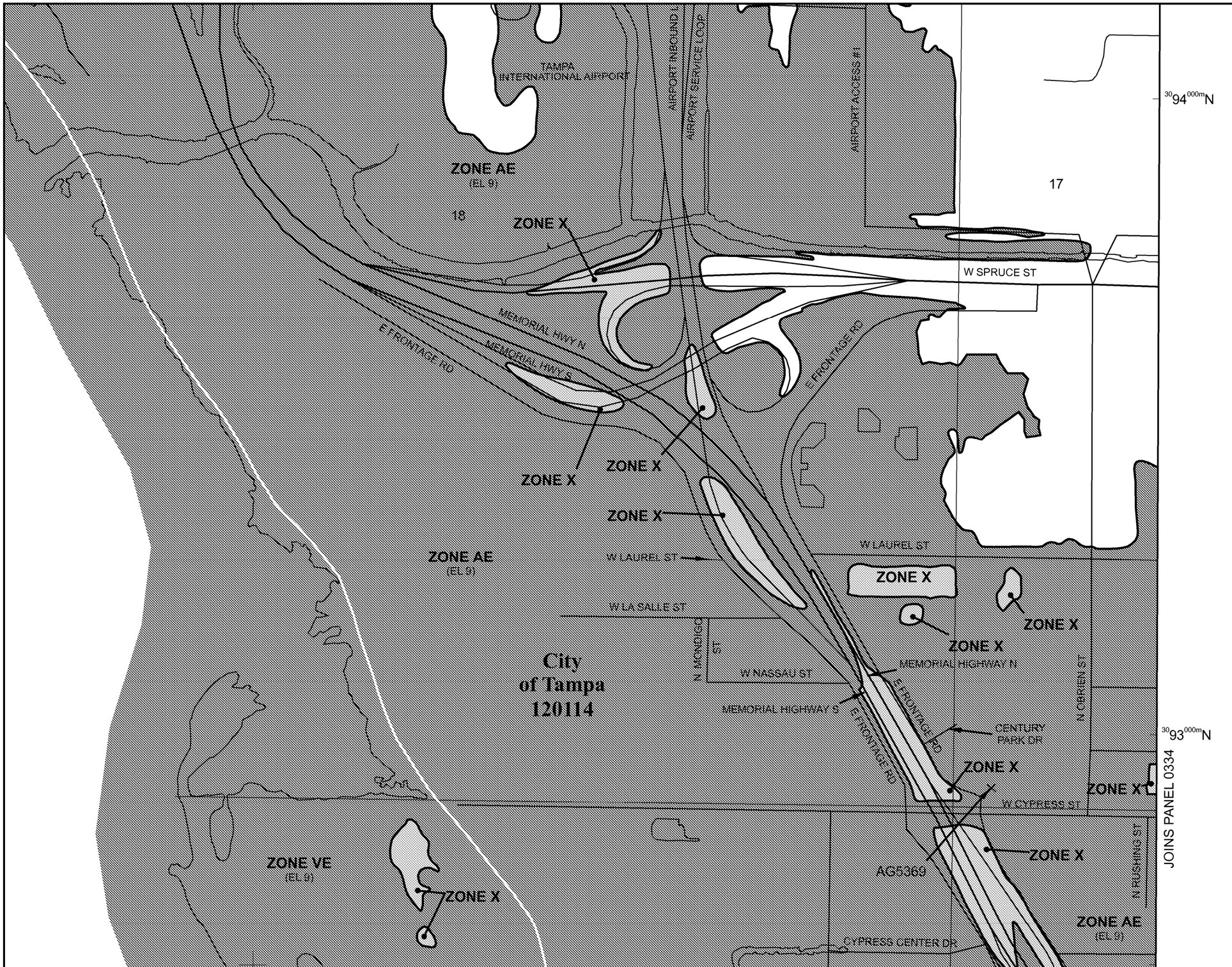

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NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0333H

FIRM

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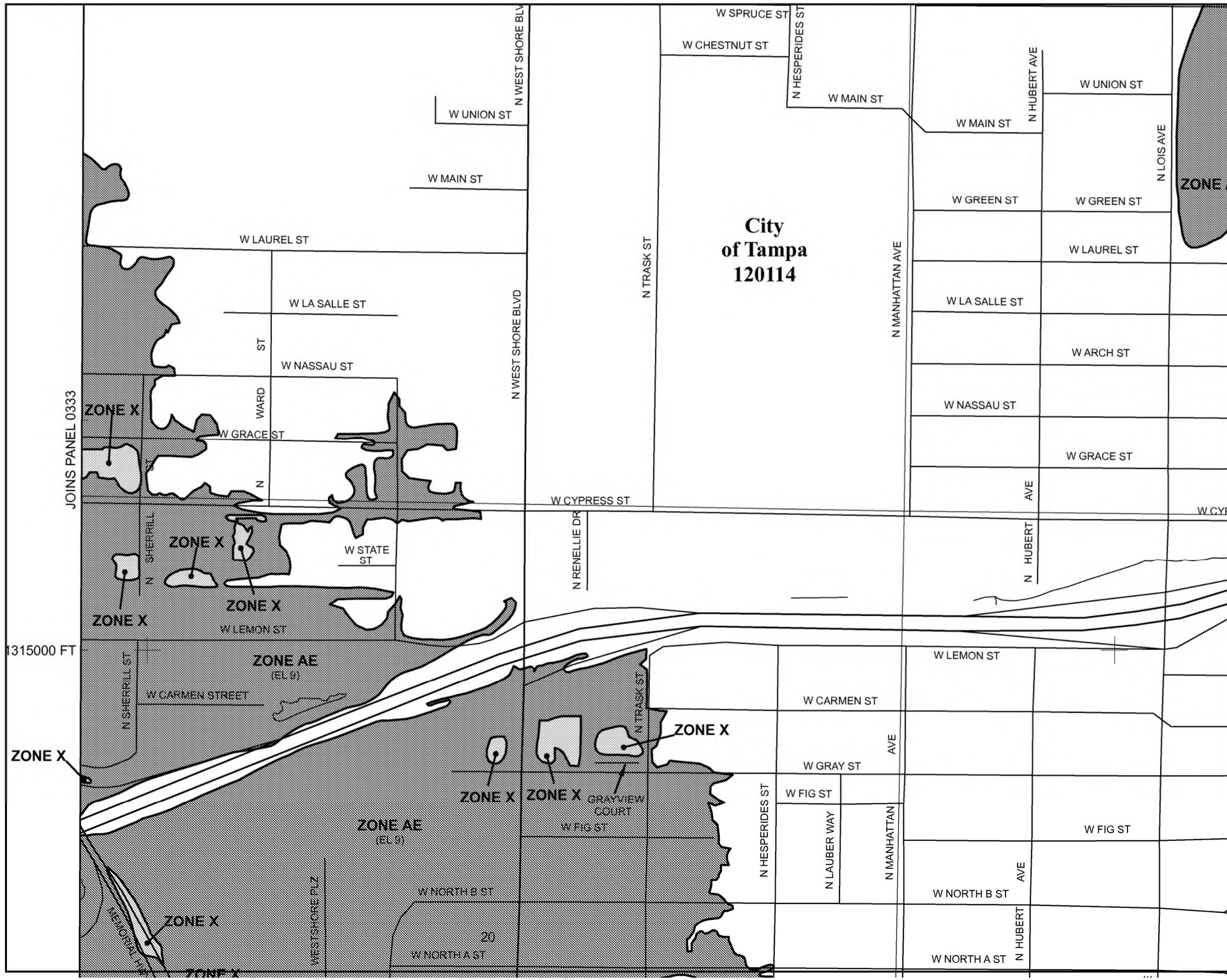

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MAP SCALE 1" = 500'

250 0 500 1000 FEET

METER

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0334H

FIRM

FLOOD INSURANCE RATE MAP

HILLSBOROUGH COUNTY, FLORIDA
AND INCORPORATED AREAS

PANEL 334 OF 801

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
TAMPA, CITY OF	120114	0334	H

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MAP NUMBER
12057C0334H

EFFECTIVE DATE
AUGUST 28, 2008

Federal Emergency Management Agency

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Appendix C. WBID Map

I-275 SR 60 WBID Map

May 3, 2018

1:18,056

0 0.225 0.45 0.9 mi

0 0.35 0.7 1.4 km

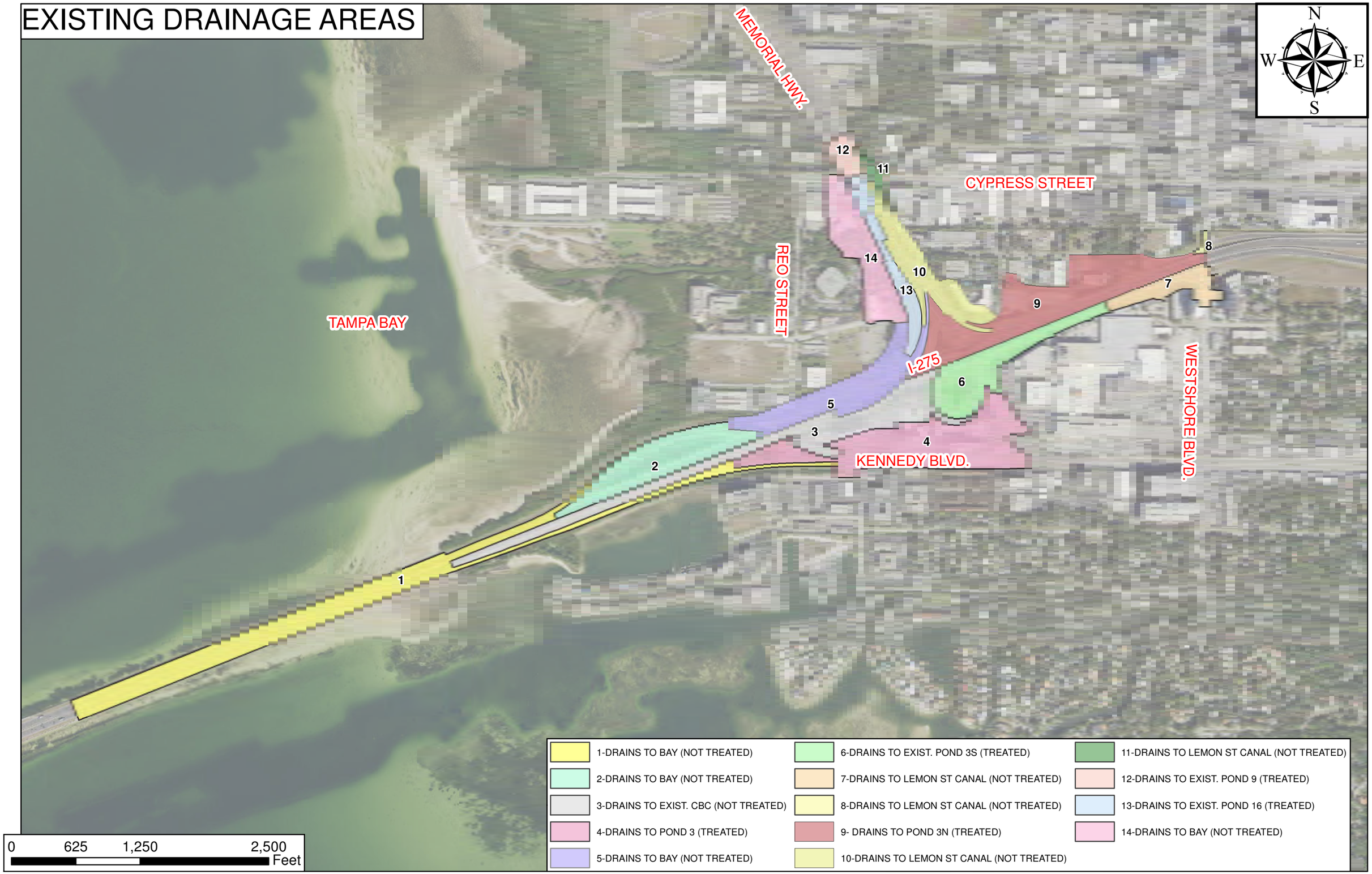
FDEP,DEAR
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Map created by Map Direct, powered by ESRI.

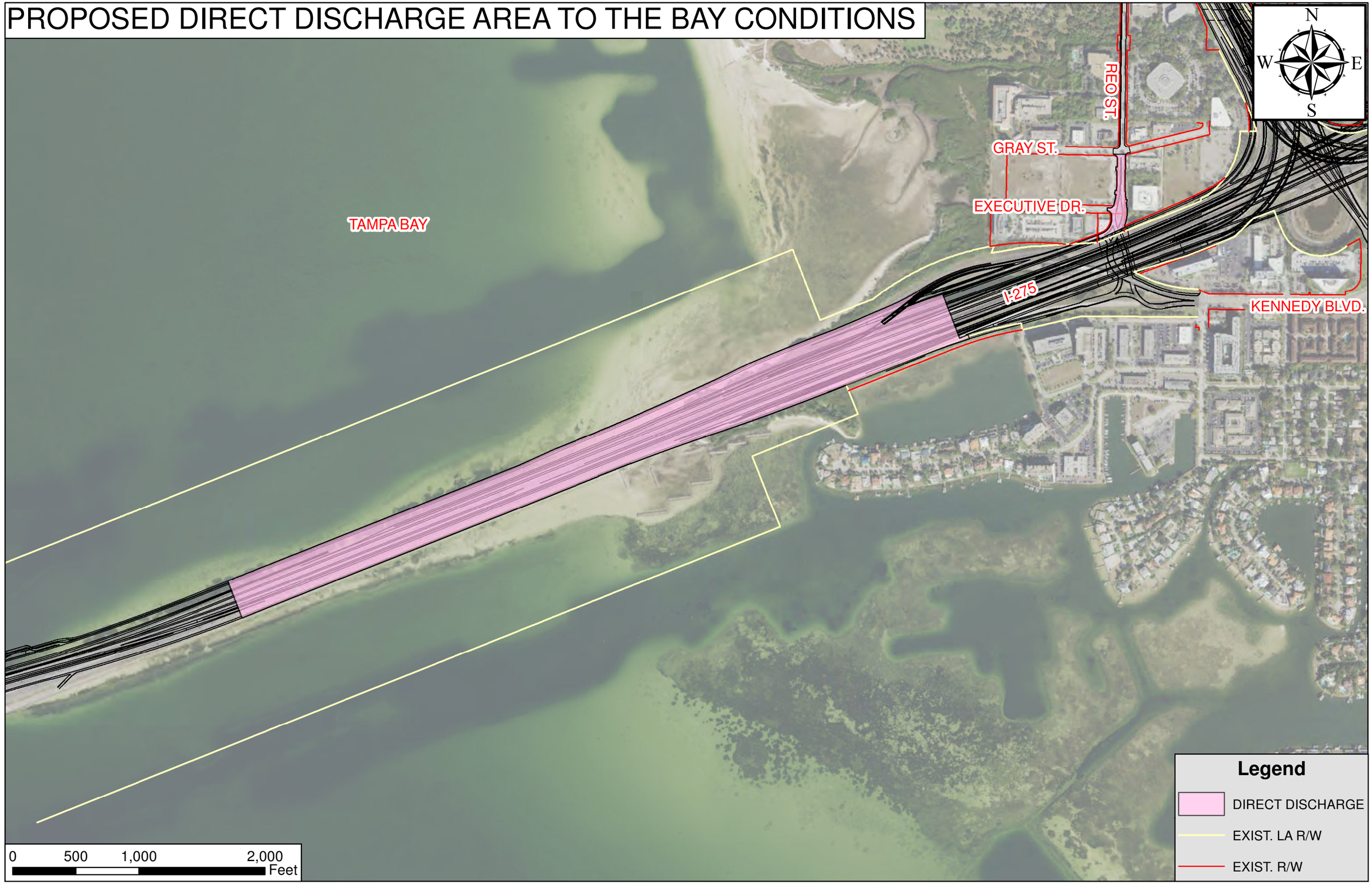
Memo

Appendix D. Basin Figures

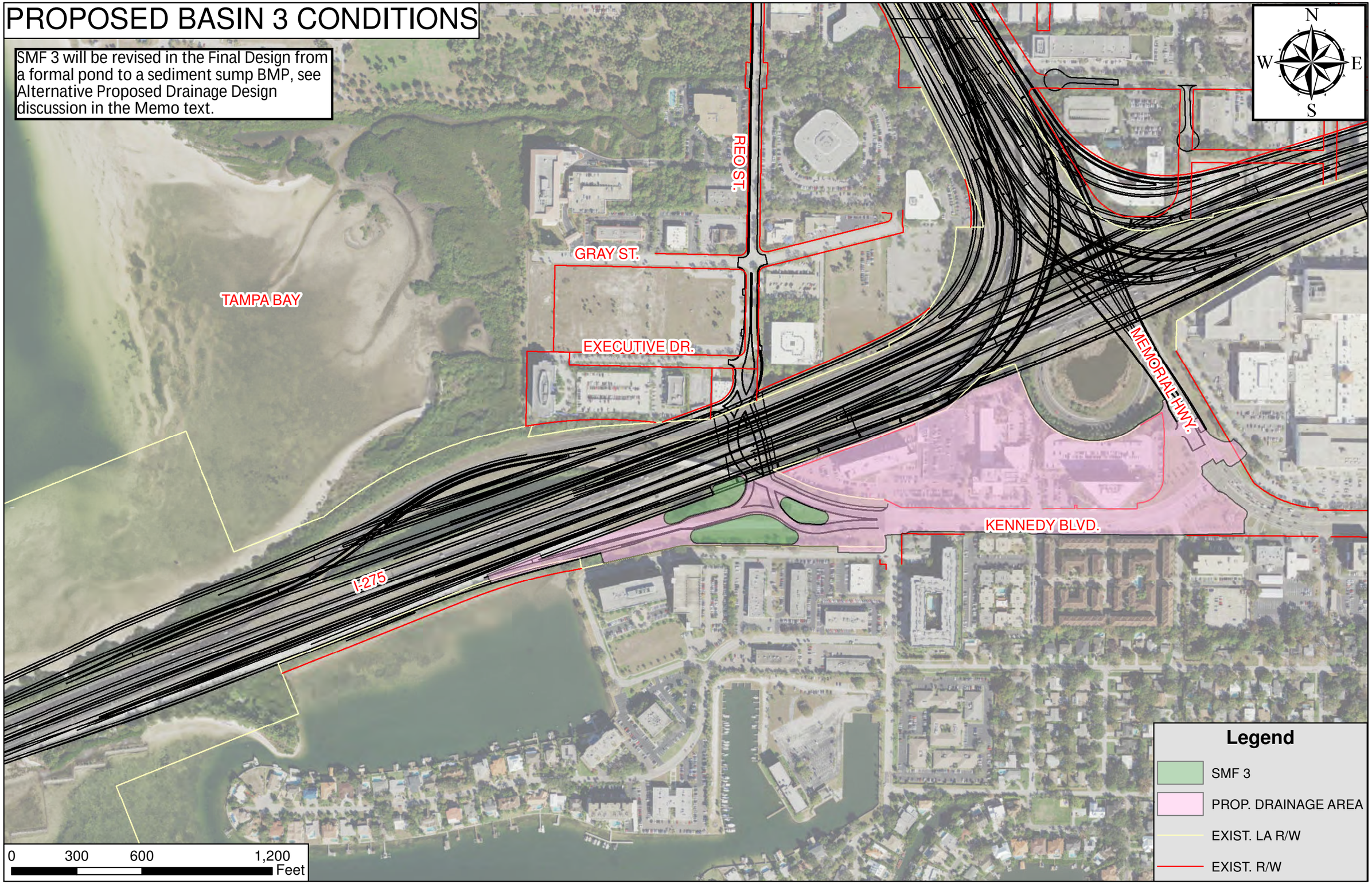
EXISTING DRAINAGE AREAS



PROPOSED DIRECT DISCHARGE AREA TO THE BAY CONDITIONS

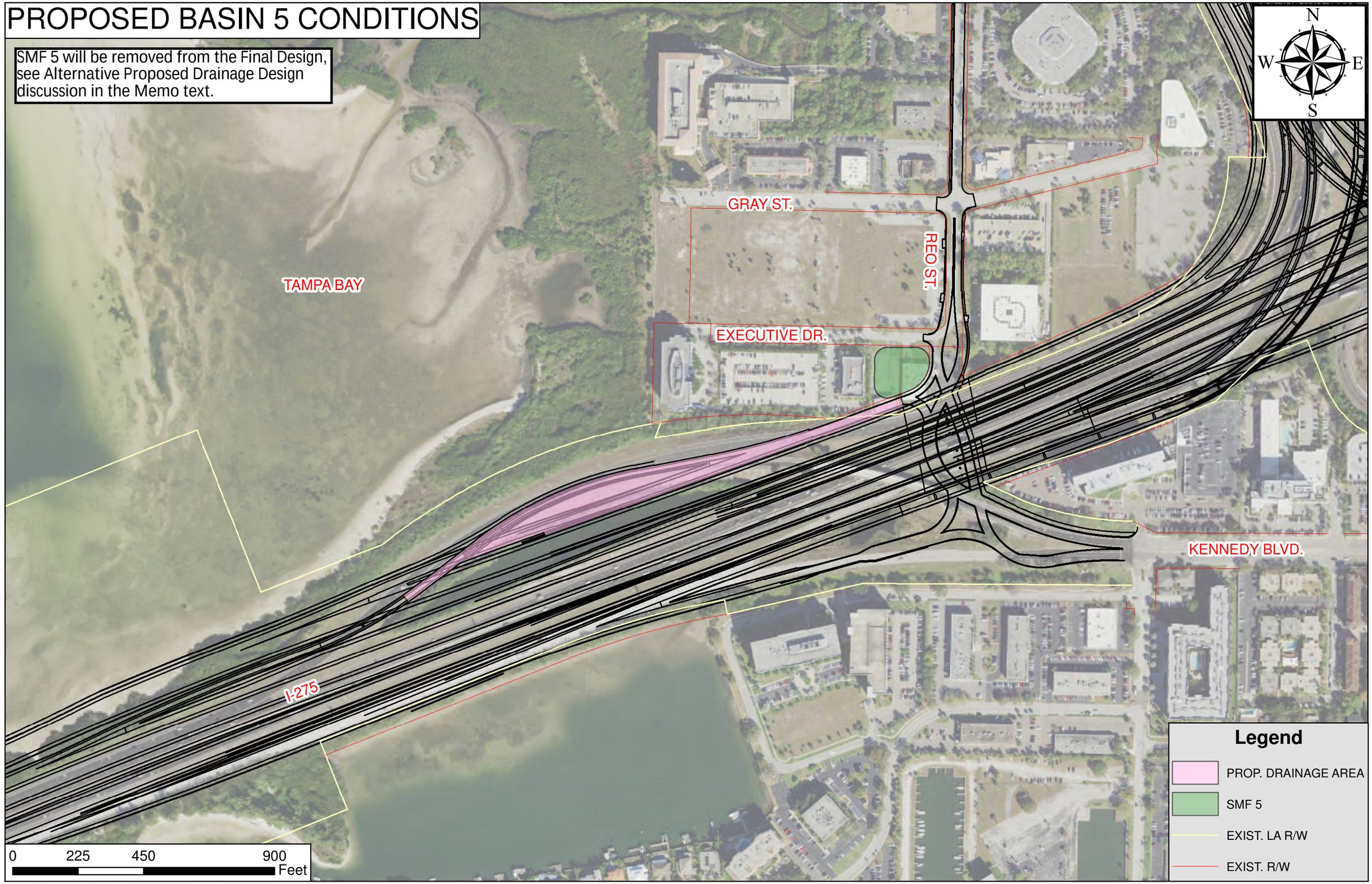


PROPOSED BASIN 3 CONDITIONS

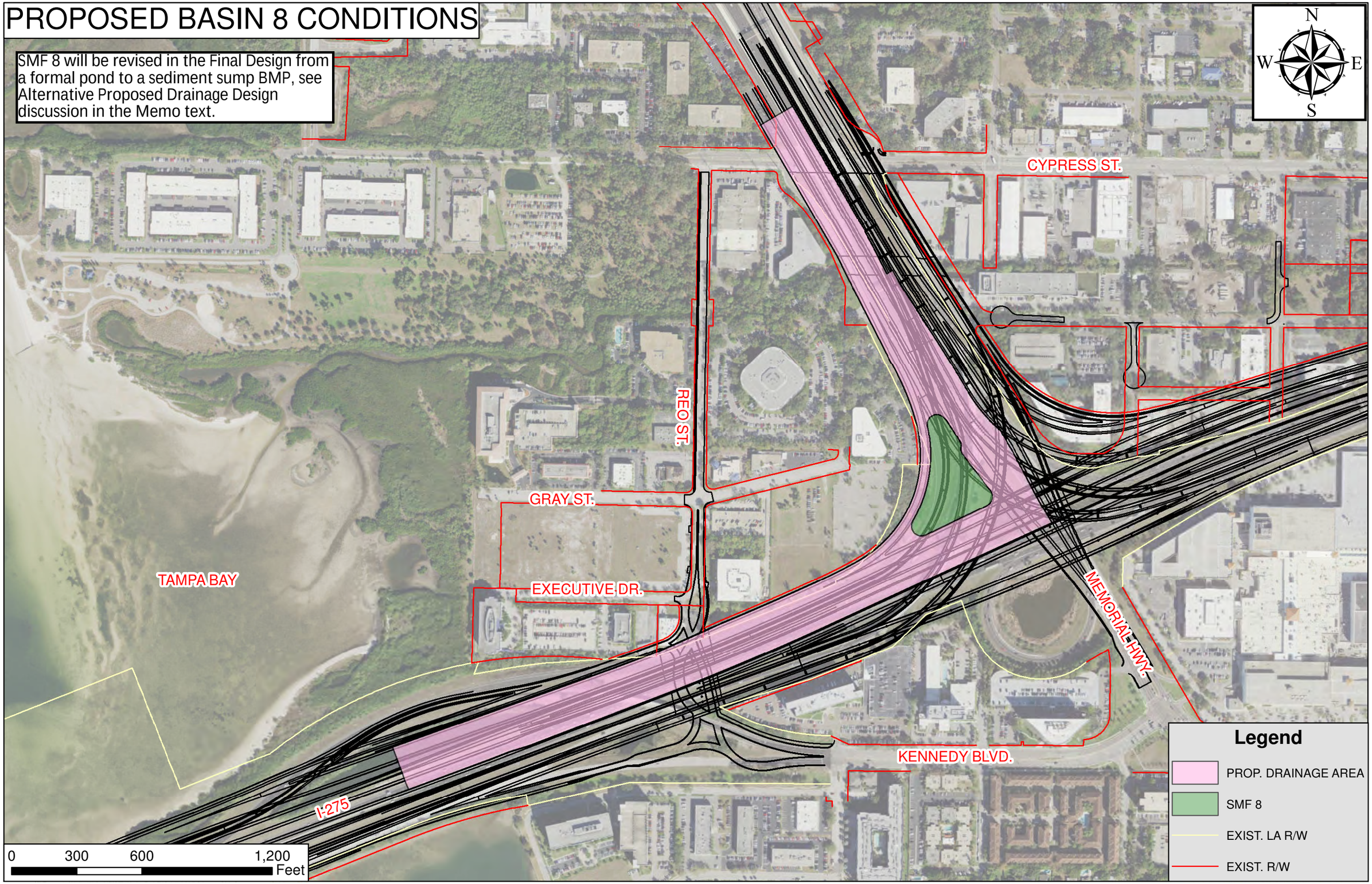


PROPOSED BASIN 5 CONDITIONS

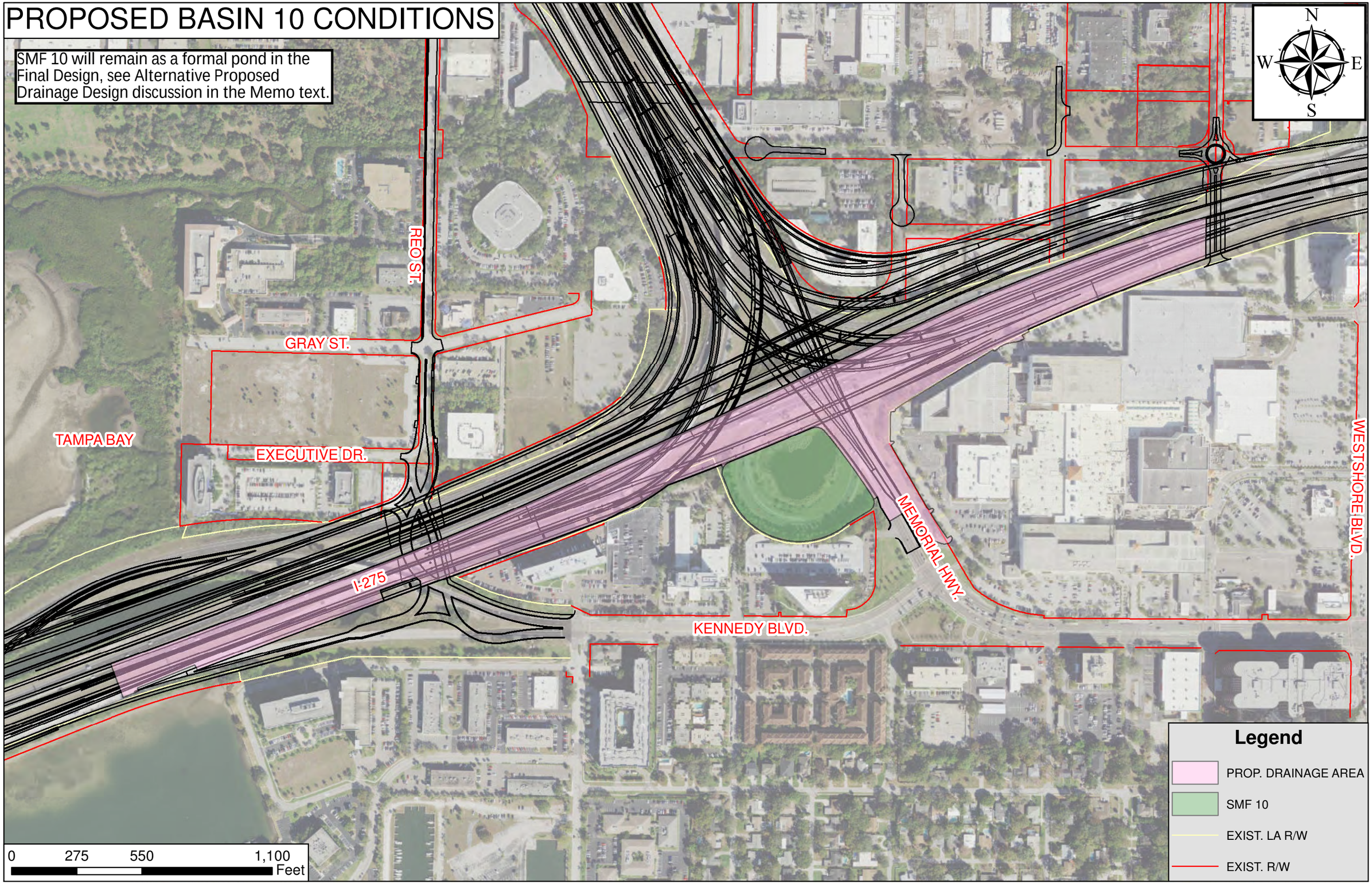
SMF 5 will be removed from the Final Design, see Alternative Proposed Drainage Design discussion in the Memo text.



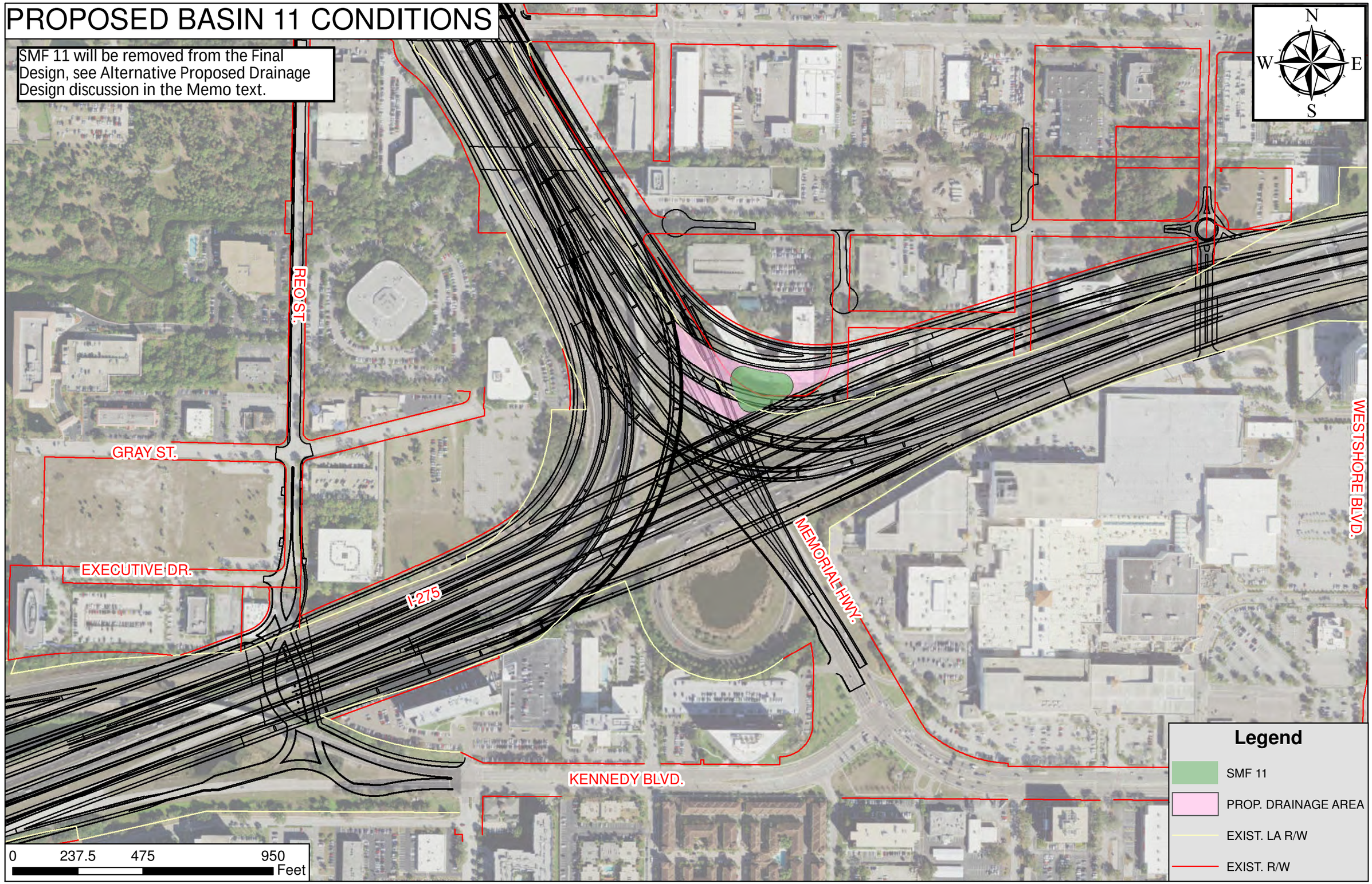
PROPOSED BASIN 8 CONDITIONS



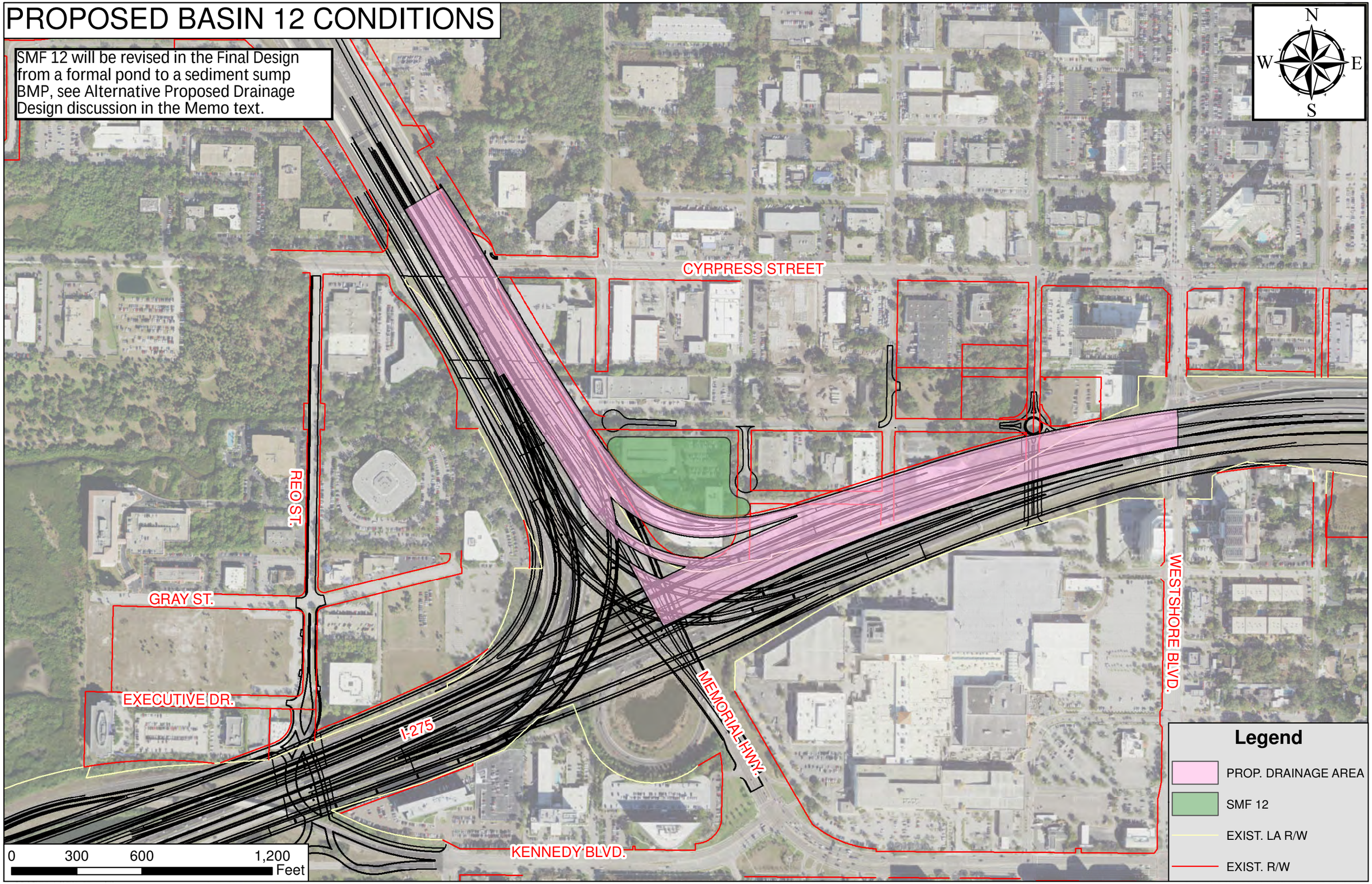
PROPOSED BASIN 10 CONDITIONS



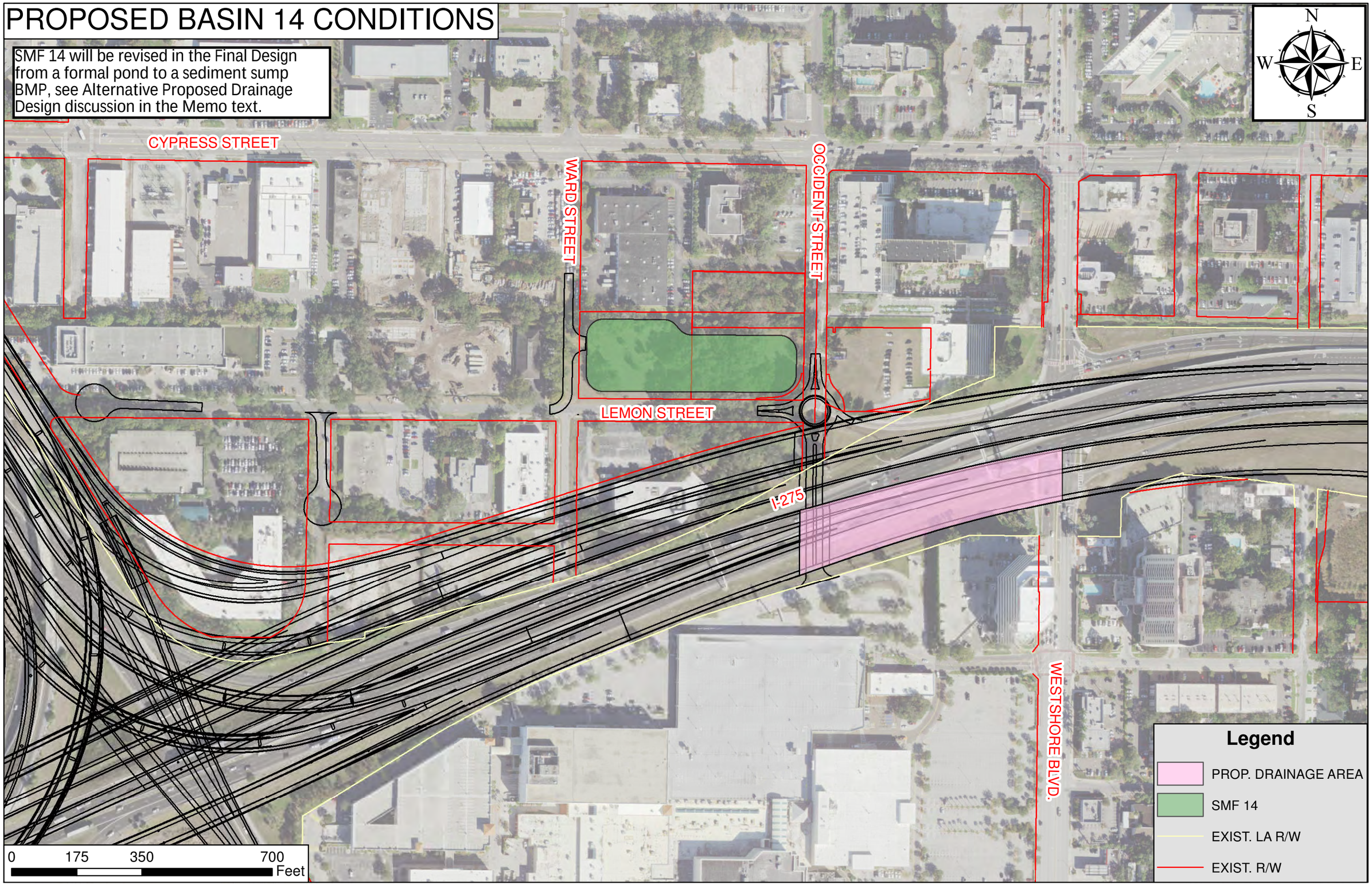
PROPOSED BASIN 11 CONDITIONS



PROPOSED BASIN 12 CONDITIONS



PROPOSED BASIN 14 CONDITIONS



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Appendix E. Stormwater Management Facilities Matrix

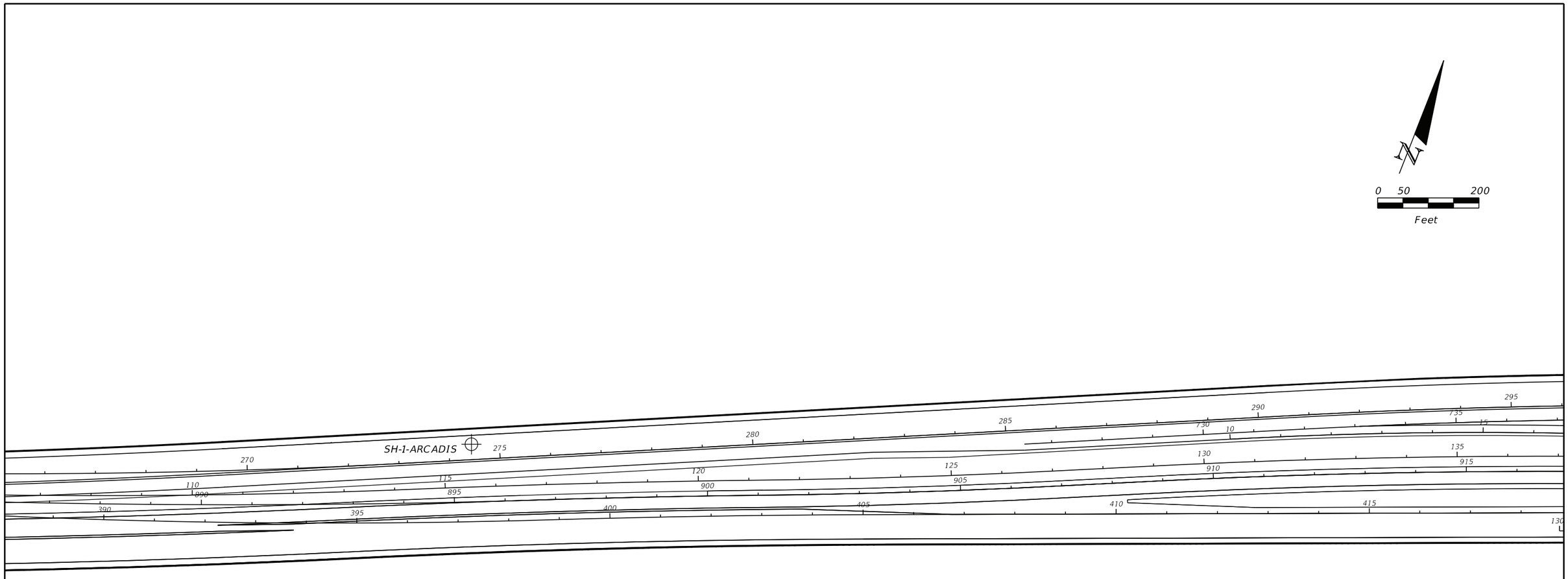
	SMF Alternative	SMF Alternative	SMF Alternative	SMF Alternative	SMF Alternative	SMF Alternative	SMF Alternative
	SMF 3	SMF 5 *	SMF 8	SMF 10	SMF 11*	SMF 12	SMF 14
Location	I-275	I-275	Within Interchange	I-275	Within Interchange	I-275	Lemon Street
Side (Lt., Rt.)	RT	LT	RT	RT	RT	RT	LT
SMF Area (Ac) (OTOB)	2.19	0.67	2.40	4.70	0.64	3.81	2.16
Est. Ground Elev. (Ft) At SMF Site	6.00	7.00	12.50	6.00	7.00	8.00	8.00
Proposed LEOP Within Basin	6.48	7.90	8.40	6.98	5.47	8.92	38.40
Est. SHWT Elev.	1.56	4.60	2.60	1.93	2.70	3.30	6.90
Basin Hydrology	Open	Open	Open	Open	Open	Open	Open
Treatment System	Wet Detention	Wet Detention	Dry Retention	Wet Detention	Wet Detention	Dry Retention	Wet Detention
Soils Name	Arents, Urban Land	Urband Land	Tavares	Arents	Arents	Arents, Myakka, Tarares	Myakka
Hydrological Soil Group	A	A	A	A	A	A	A
Land Use	Developed	Developed	Developed	Developed	Developed	Developed	Developed
Recorded Arechaeological Sites	0	0	0	0	0	0	1
Archaeological Potential	Low	Moderate	Low	Low	Low	Low	High
Recorded Historical Structures	2 adjacent	1 within	0	0	0	0	0
Recorded Historical Resources	0	0	0	0	0	0	1 adjacent
Tentative Hazard Ranking	Low	Low	Medium	Low	Low	High	Medium
Protected Species Probability	Moderate	None	Low	Low	Low	Moderate	None
Potential Wetland/OSW Involvement	Moderate	None	Low	High	Low	None	None
Proximity to Inflow (ft) (LEOP)	1000	100	100	100	200	100	200
Proximity to Outfall (ft)	500	500	500	100	800	500	500
SMF Easement Required	None	None	None	None	None	None	None
Number of Parcels	1	2	1	1	1	1	2
Remnant Parcel (R) or Within Existing RW (E)	E	R	E	E	E	R	R
Recommended SMF Location In PD&E PSR	Yes	No	Yes	Yes	No	No	Yes
Wetland Mitigation Cost	None	None	None	None	None	None	None
Recommended SMF Site	**SMF 3**	**SMF 5**	**SMF 8**	**SMF 10**	**SMF 11**	**SMF 12**	**SMF 14**

THE INFORMATION PRESENTED IN THIS TABLE IS SUBJECT TO CHANGE UNTIL THE FINAL PHASE OF THE PROJECT

* SMF 5 and 11 will be removed from the Final Design, see Alternative Proposed Drainage Design discussion in the Memo text.

Memo

Appendix F. Geotech Information



LEGEND

⊕ APPROXIMATE AUGER BORING LOCATION

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

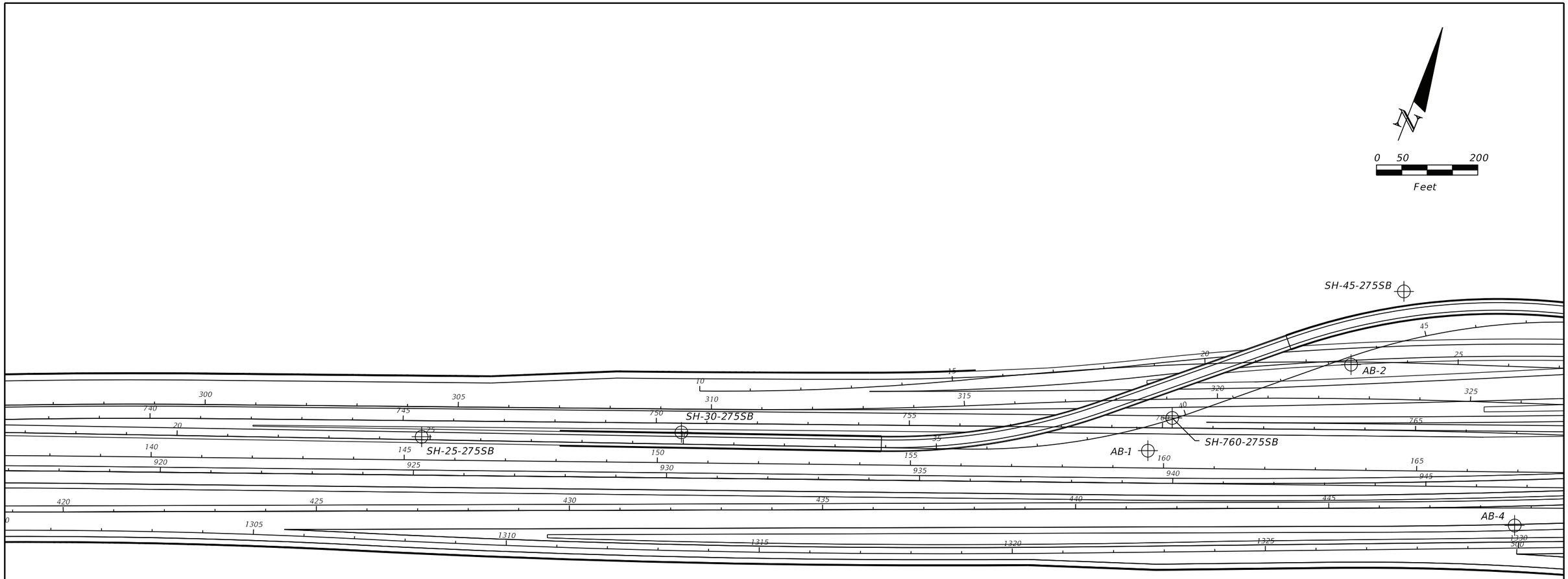
ERICK M. FREDERICK, P.E.
P.E. LICENSE NUMBER 63920
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637
CERTIFICATE OF AUTHORIZATION NO. 6486

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 93	HILLSBOROUGH	412531-1-52-01

BORING LOCATION PLAN (1)

SHEET NO.
F-2



LEGEND

⊕ APPROXIMATE AUGER BORING LOCATION

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

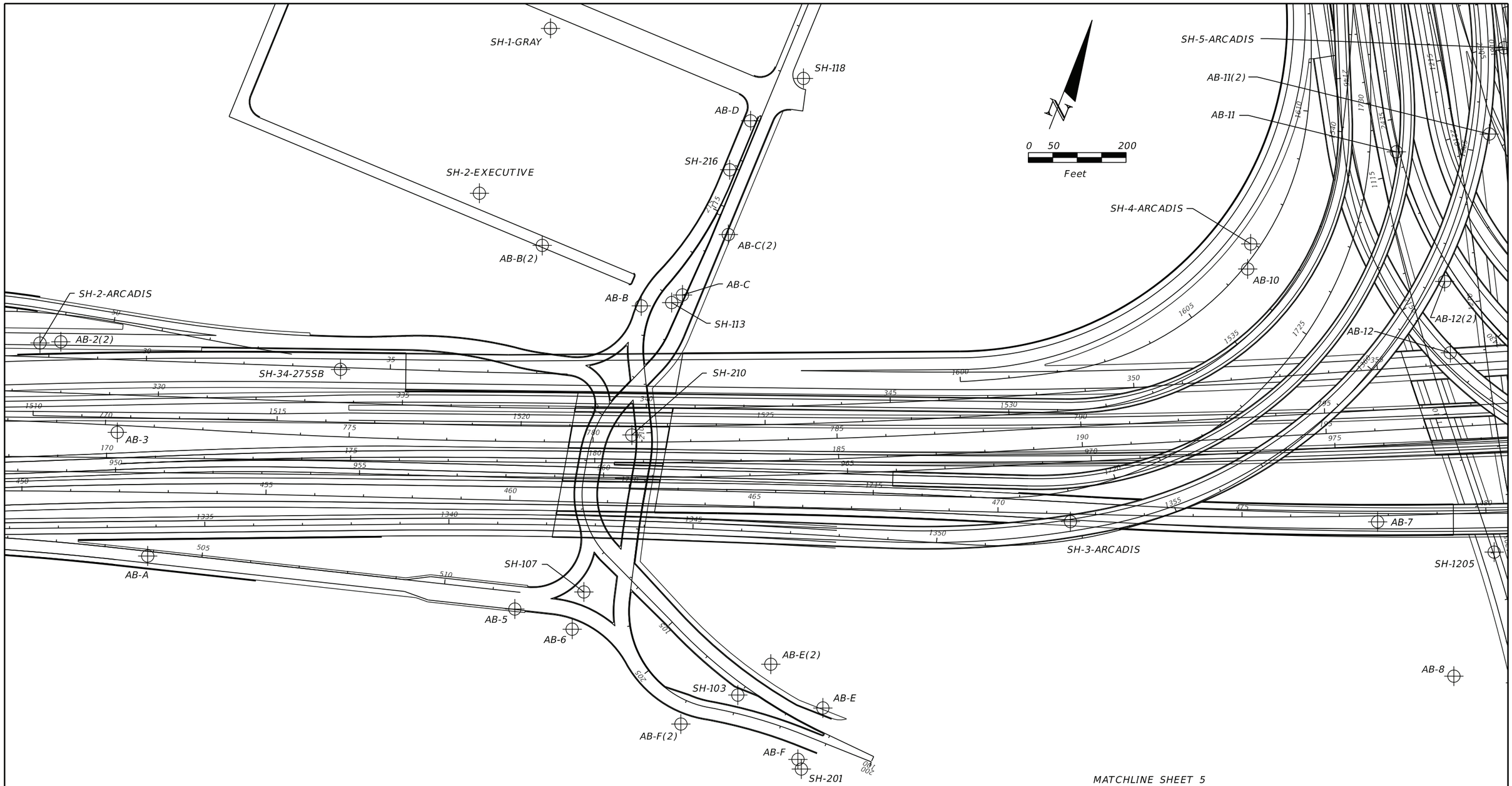
ERICK M. FREDERICK, P.E.
P.E. LICENSE NUMBER 63920
TIERRA, INC.
7351 TEMPLE TERRACE HIGHWAY
TAMPA, FLORIDA 33637
CERTIFICATE OF AUTHORIZATION NO. 6486

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 93	HILLSBOROUGH	412531-1-52-01

BORING LOCATION PLAN (2)

SHEET NO.
F-3



LEGEND

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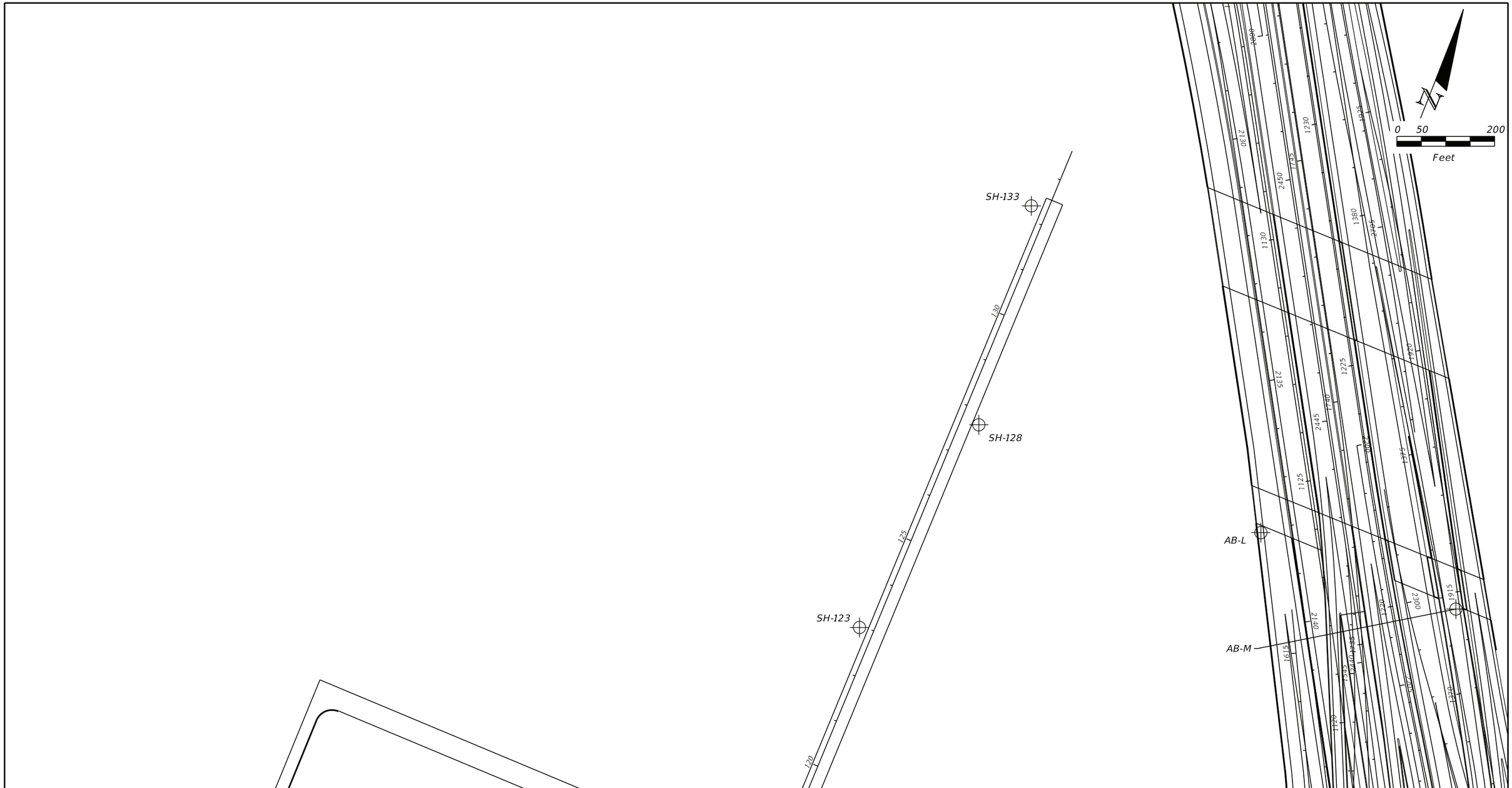
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 93	HILLSBOROUGH	412531-1-52-01

BORING LOCATION PLAN (3)

SHEET NO.
F-4



LEGEND

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SR 93	HILLSBOROUGH	412531-1-52-01

BORING LOCATION PLAN (4)

SHEET NO.
F-5

LEGEND

⊕ APPROXIMATE AUGER BORING LOCATION

REVISIONS			
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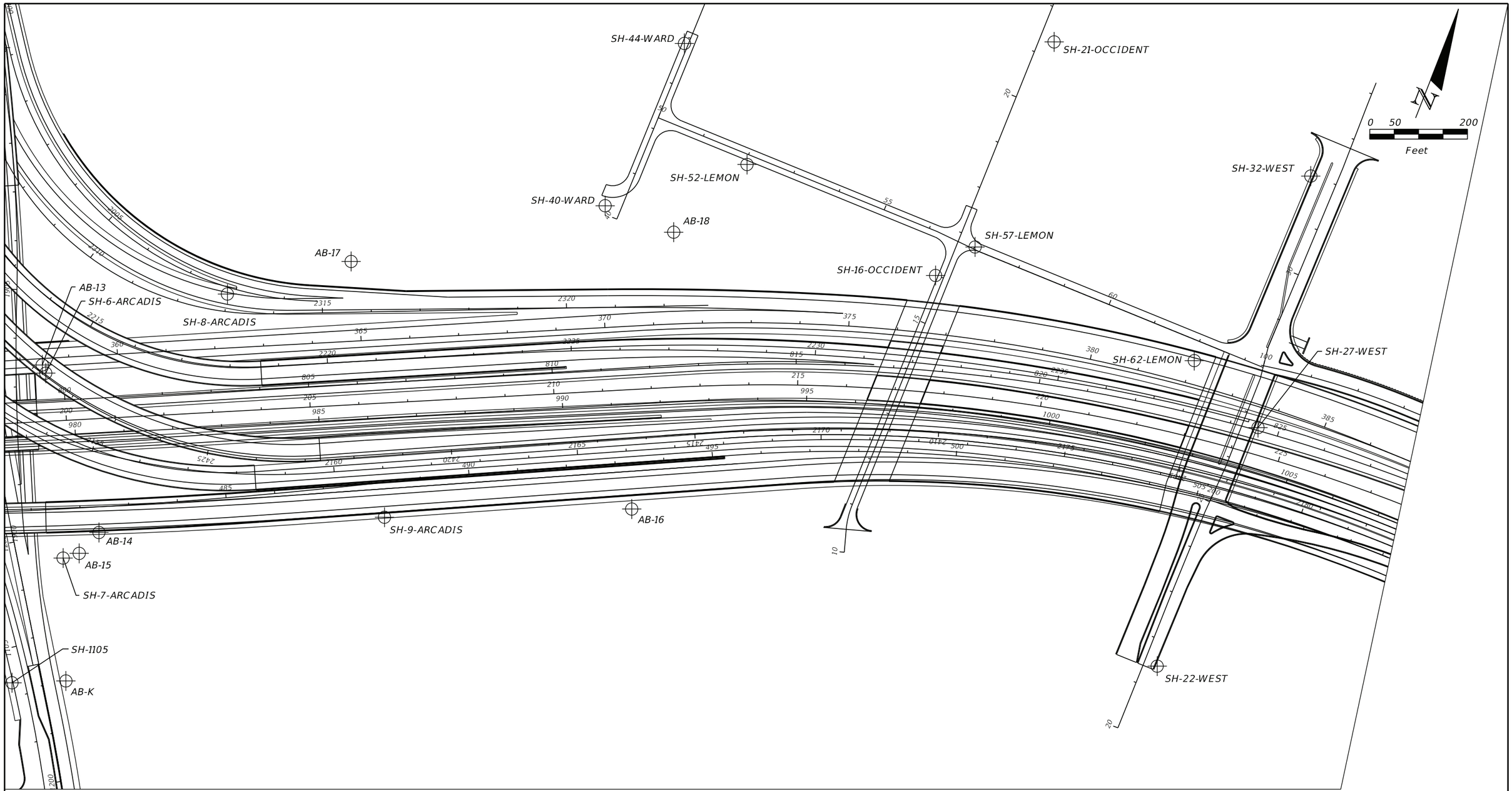
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 93	HILLSBOROUGH	412531-1-52-01

BORING LOCATION PLAN (5)

SHEET NO.
F-6



LEGEND

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REVISIONS			
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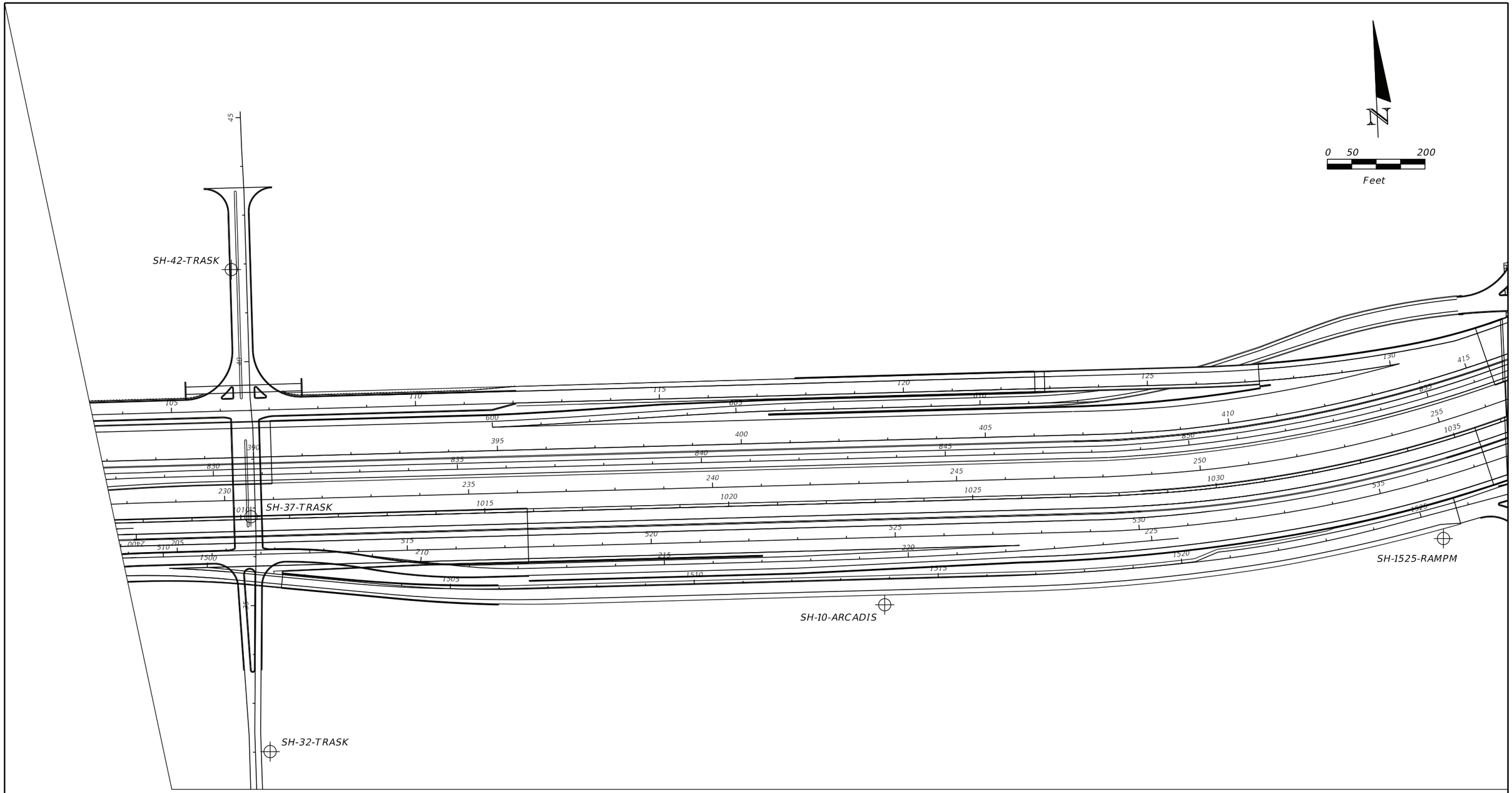
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 93	HILLSBOROUGH	412531-1-52-01

BORING LOCATION PLAN (6)

SHEET NO.
F-7



LEGEND

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REVISIONS			
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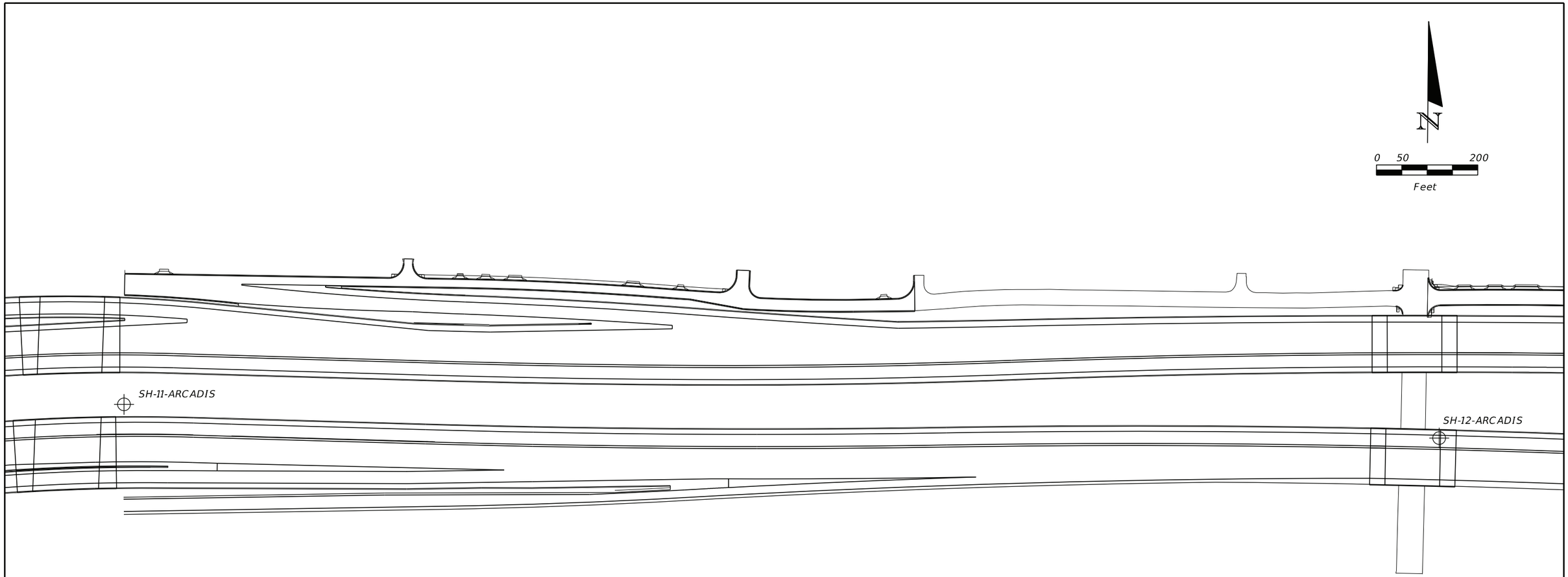
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 93	HILLSBOROUGH	412531-1-52-01

BORING LOCATION PLAN (7)

SHEET NO.
F-8



LEGEND

APPROXIMATE AUGER BORING LOCATION

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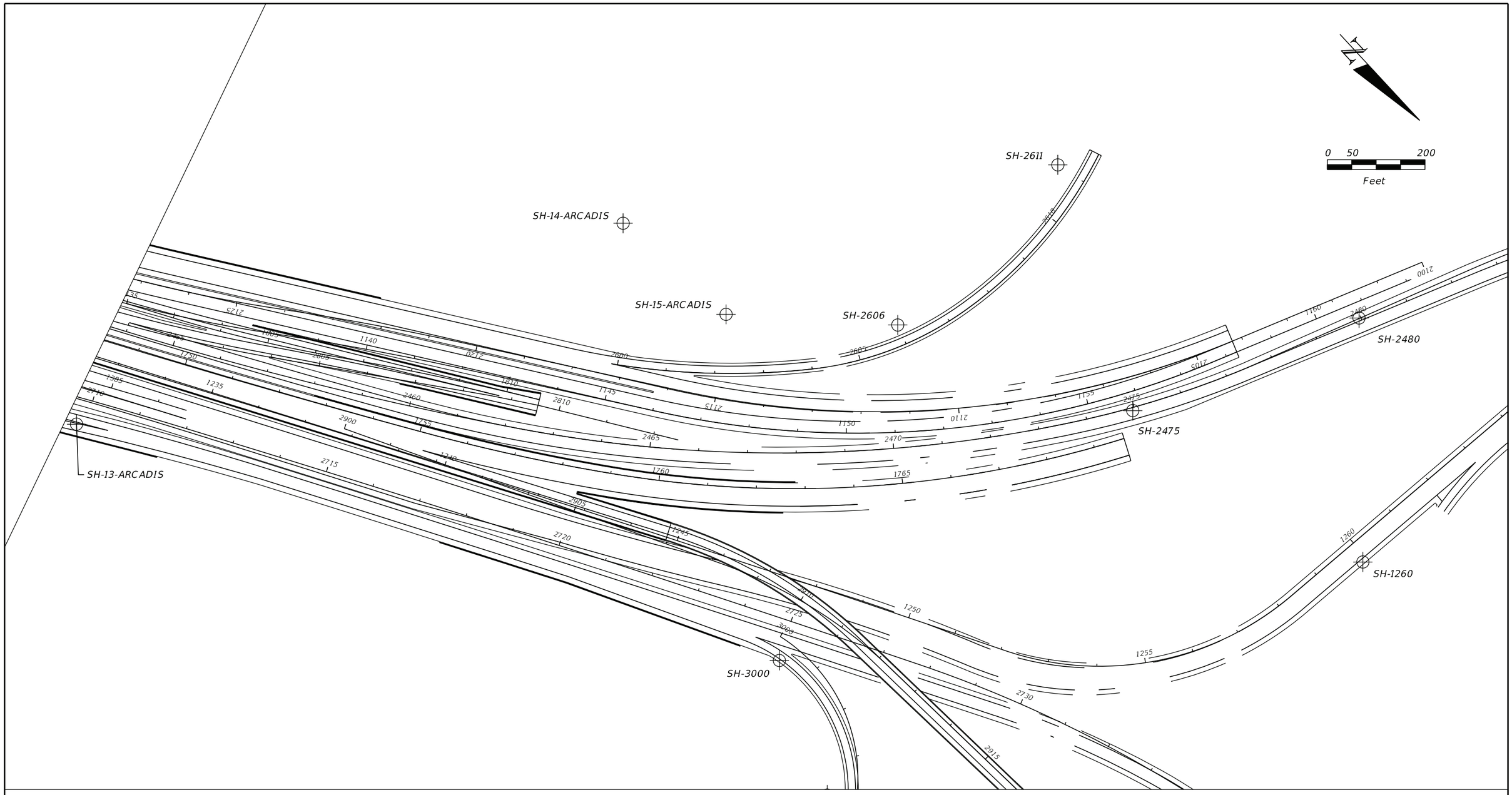
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 93	HILLSBOROUGH	412531-1-52-01

BORING LOCATION PLAN (8)

SHEET NO.
F-9



LEGEND

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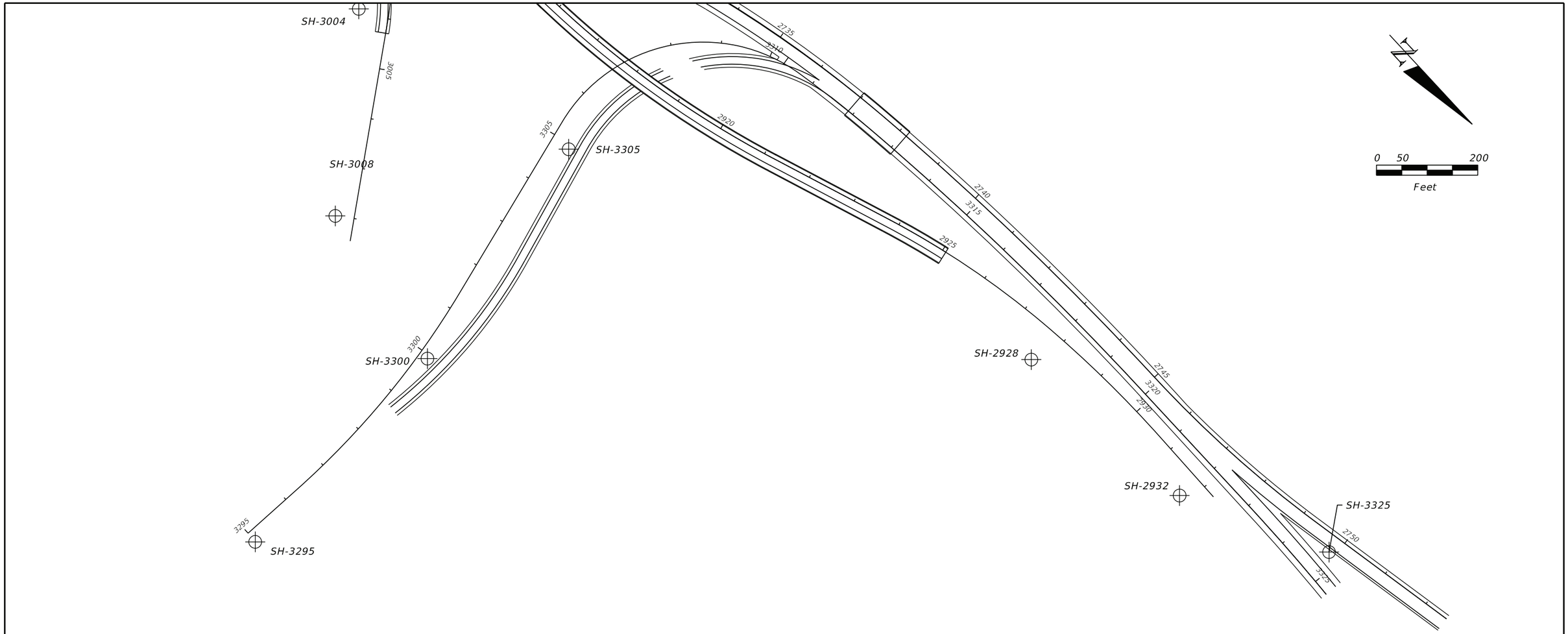
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 93	HILLSBOROUGH	412531-1-52-01

BORING LOCATION PLAN (9)

SHEET NO.
F-10



LEGEND

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REVISIONS			
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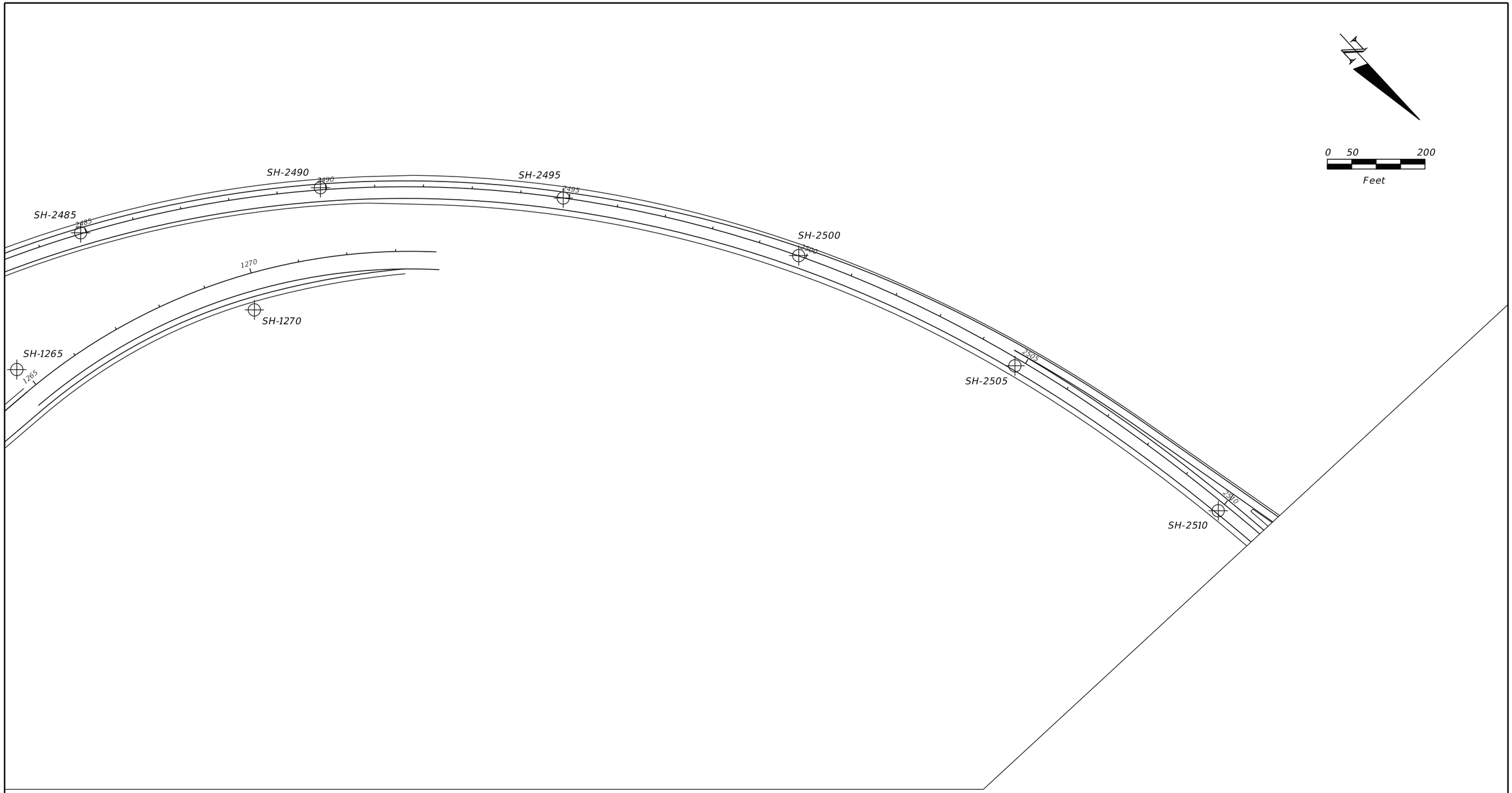
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 93	HILLSBOROUGH	412531-1-52-01

BORING LOCATION PLAN (10)

SHEET NO.
F-11



LEGEND

⊕ APPROXIMATE AUGER BORING LOCATION

REVISIONS			
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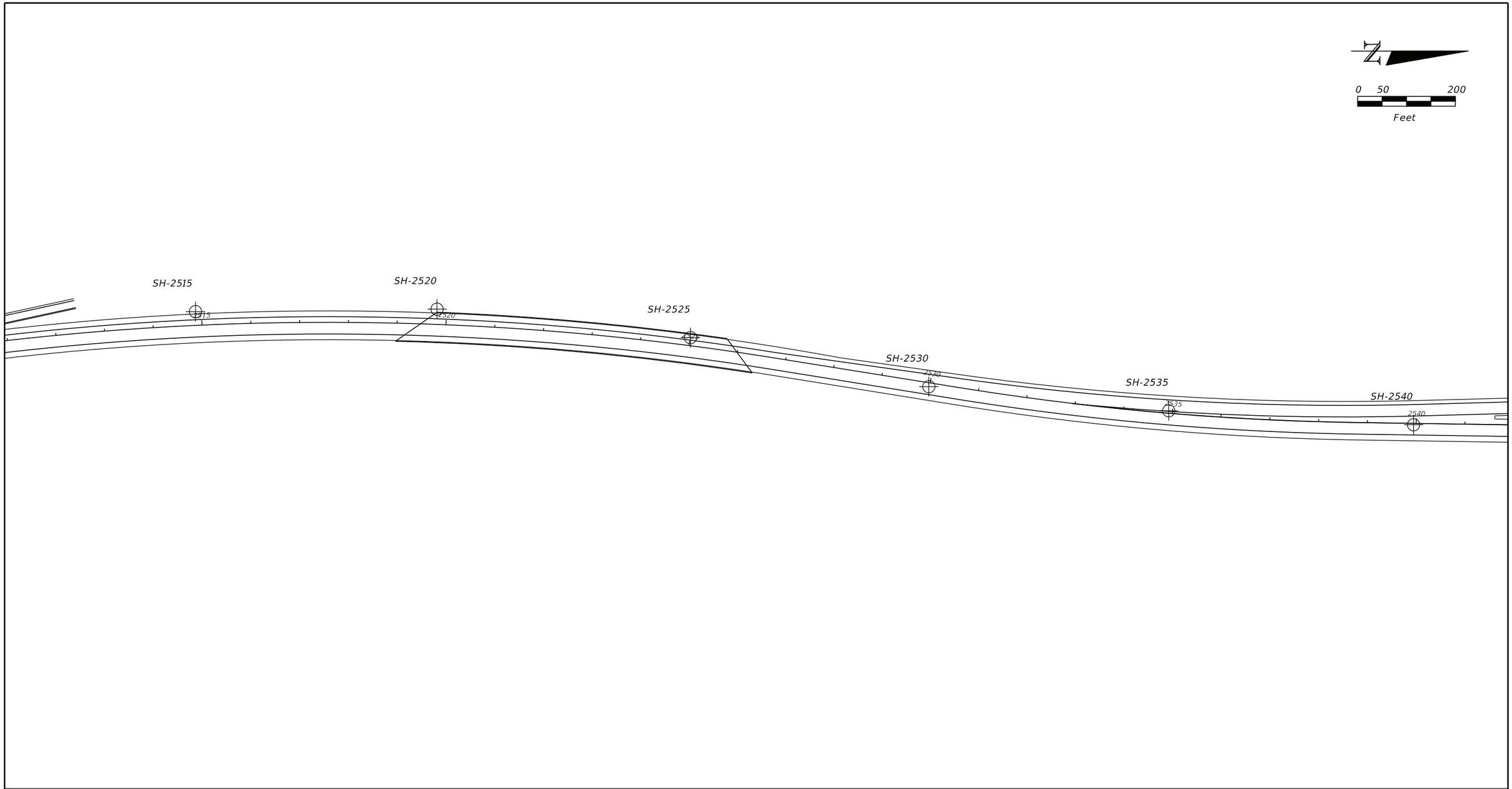
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 93	HILLSBOROUGH	412531-1-52-01

BORING LOCATION PLAN (11)

SHEET NO.
F-12



LEGEND

⊕ APPROXIMATE AUGER BORING LOCATION

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

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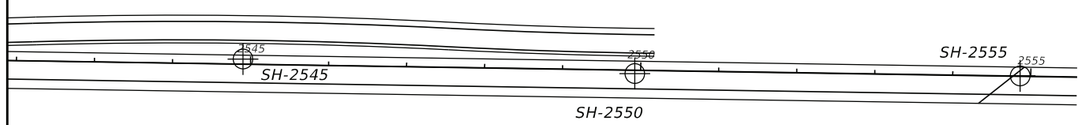
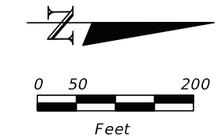
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 93	HILLSBOROUGH	412531-1-52-01

BORING LOCATION PLAN (12)

SHEET NO.
F-13





LEGEND

⊕ APPROXIMATE AUGER BORING LOCATION

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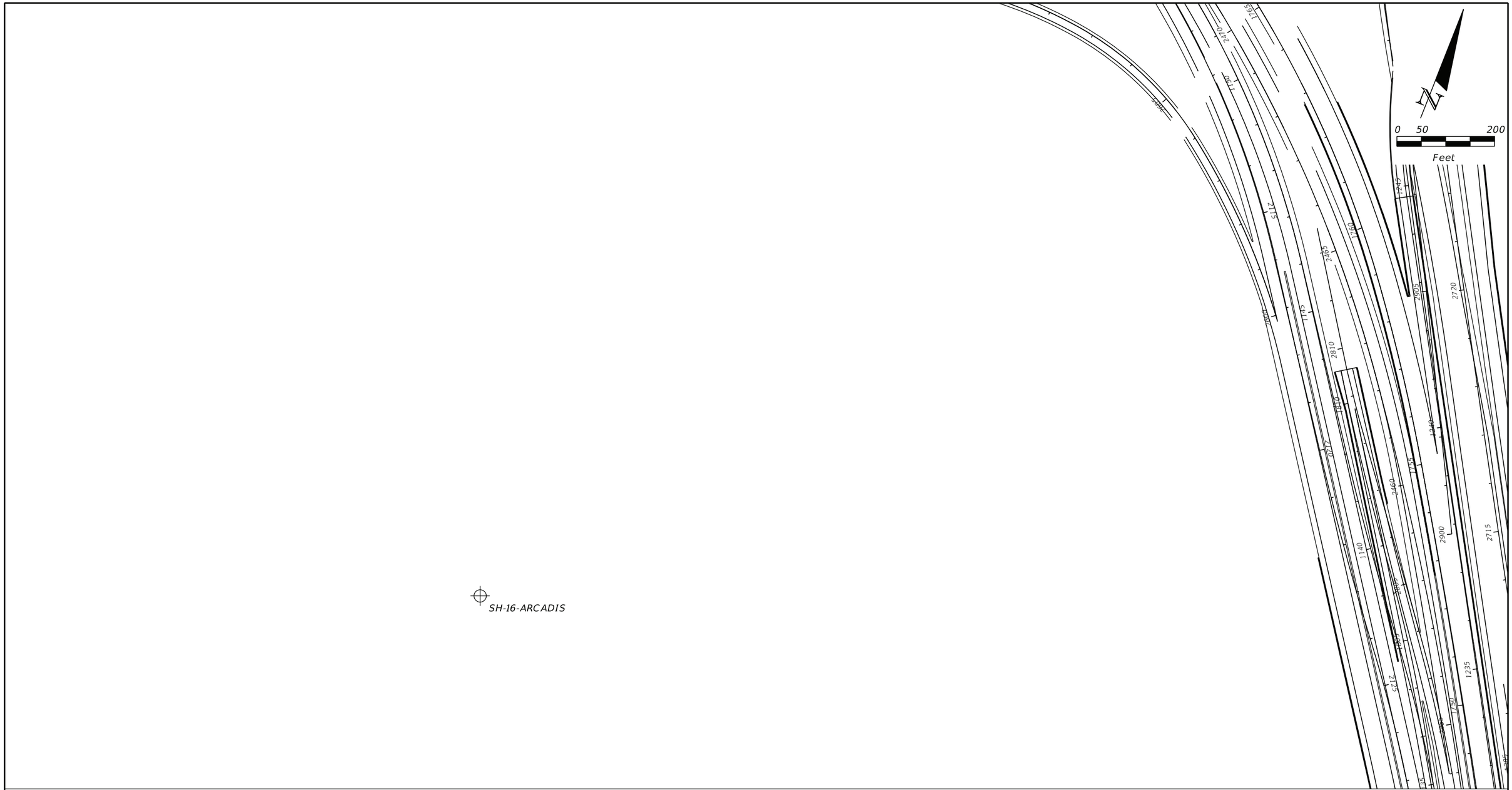
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 93	HILLSBOROUGH	412531-1-52-01

BORING LOCATION PLAN (12)

SHEET NO.
F-14



LEGEND

APPROXIMATE AUGER BORING LOCATION

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

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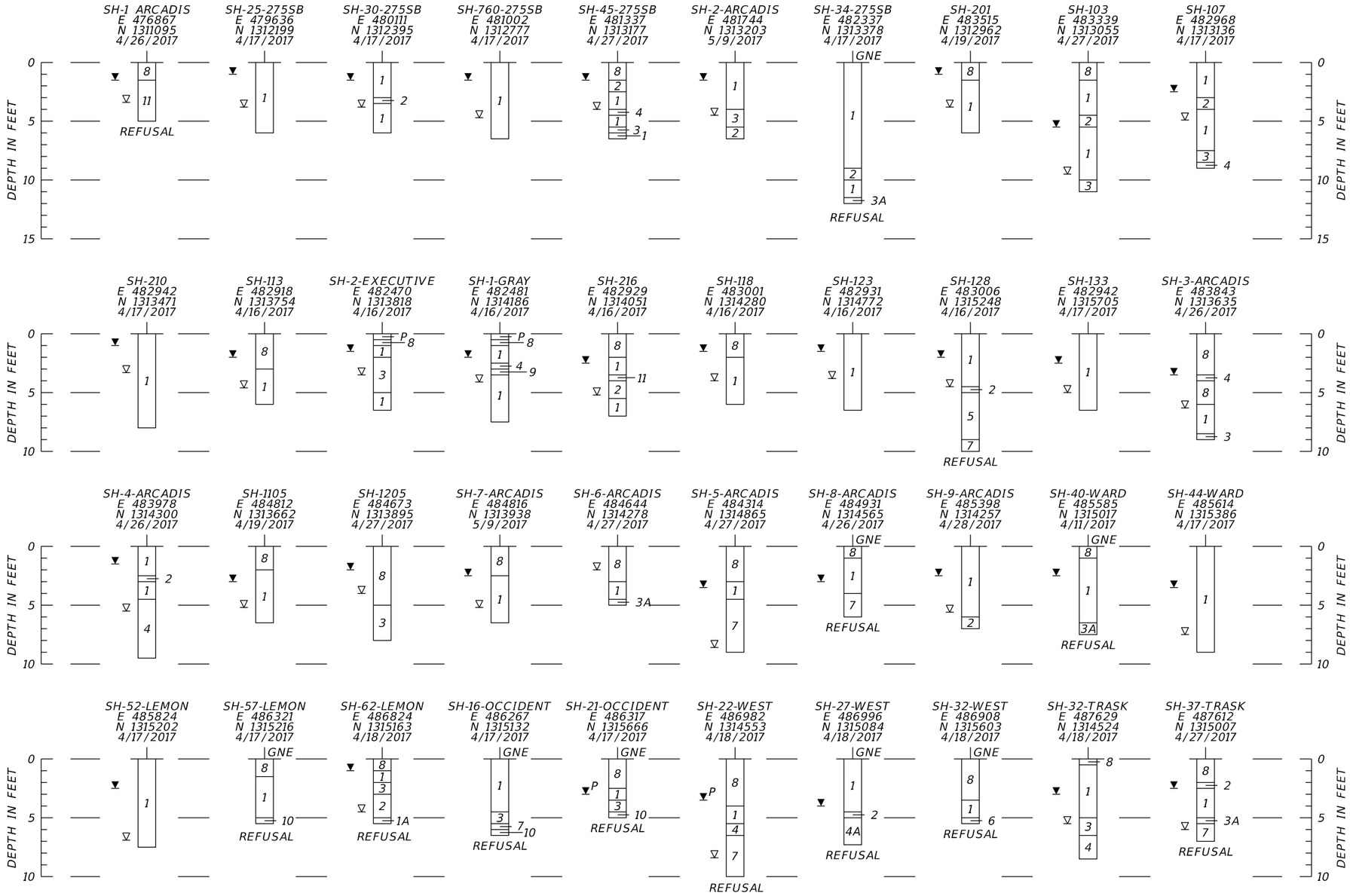
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 93	HILLSBOROUGH	412531-1-52-01

BORING LOCATION PLAN (14)

SHEET NO.
F-15



LEGEND

1. GRAY TO PALE BROWN TO DARK BROWN SAND TO SAND WITH SILT, SOMETIMES WITH SHELL FRAGMENTS AND/OR TRACE ORGANICS (A-3)
2. GRAY TO PALE BROWN TO BROWN SILTY SAND, SOMETIMES WITH SHELL FRAGMENTS AND/OR TRACE ORGANICS (A-1-b/A-2-4)
3. GREEN TO GRAY TO DARK BROWN SILTY-CLAYEY TO CLAYEY SAND (A-2-4/A-2-6/A-2-7)
4. BLUE-GREEN TO GRAY TO BROWN TO DARK BROWN SANDY CLAY TO CLAY (A-4/A-6/A-7-5/A-7-6)
5. GREEN TO GRAY TO BROWN TO DARK BROWN CLAY (A-7-5/A-7-6)
6. WEATHERED LIMESTONE
7. WHITE TO LIGHT GRAY CALCAREOUS CLAY WITH WEATHERED LIMESTONE FRAGMENTS (A-6/A-7-5/A-7-6)
8. GRAY TO PALE BROWN TO DARK BROWN SAND TO SILTY SAND, OCCASIONALLY WITH SHELL AND/OR ROCK FRAGMENTS AND/OR CLAY NODULES (A-3/A-2-4) – FILL
9. DARK BROWN ORGANIC SAND TO ORGANIC SAND WITH SILT (A-3)
10. LIMESTONE AND CEMENTED SAND TO CEMENTED SILTY SAND (A-3/A-2-4)
11. LIGHT GRAY TO GRAY TO BROWN SHELLY SAND TO SAND WITH SILT (A-3)

A -	WITH LIMESTONE FRAGMENTS
P -	ASPHALT PAVEMENT AND/OR BASE MATERIAL
A-3	AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW.
▽	GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
▽P	PERCHED GROUNDWATER LEVEL ENCOUNTERED
▼	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE
▼+	ESTIMATED SEASONAL HIGH GROUNDWATER TABLE AT OR ABOVE EXISTING GRADE
▼P	ESTIMATED PERCHED SEASONAL HIGH GROUNDWATER TABLE
GNE	GROUNDWATER NOT ENCOUNTERED
E	STATE PLANE EASTING FLORIDA WEST NAD 83 (FT)
N	STATE PLANE NORTHING FLORIDA WEST NAD 83 (FT)
REFUSAL	AUGER REFUSAL ON HARD MATERIAL/SOIL
CAVE-IN	BOREHOLE TERMINATED DUE TO CAVE-IN FROM SHALLOW GROUNDWATER INTRUSION
NOTE:	THE BORING LOCATIONS WERE PROVIDED BY THE PROJECT SURVEYOR.

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

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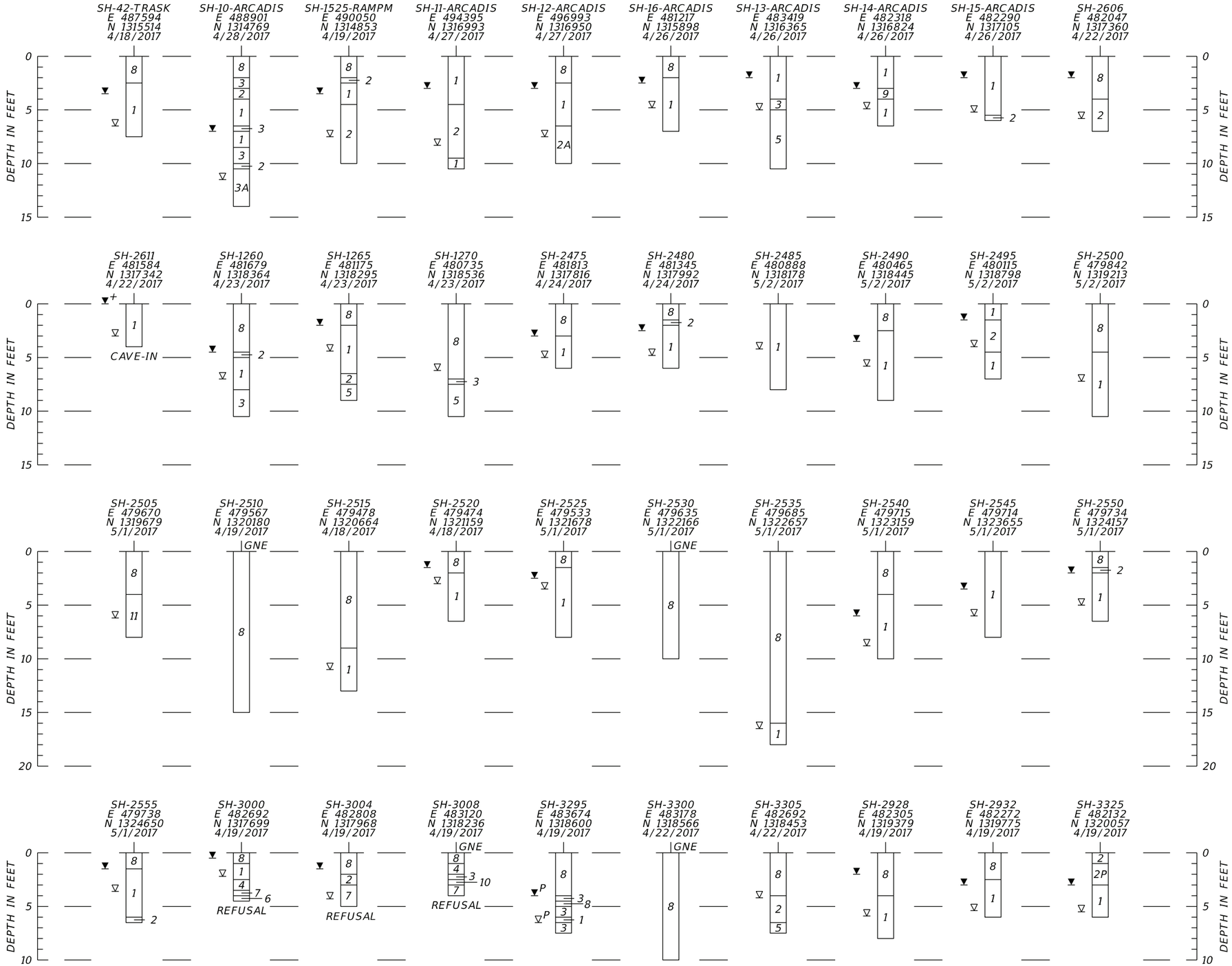
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
93	HILLSBOROUGH	412531-1-52-01

ROADWAY PROFILES (1)

SHEET NO.
F-16



LEGEND

1. GRAY TO PALE BROWN TO DARK BROWN SAND TO SAND WITH SILT, SOMETIMES WITH SHELL FRAGMENTS AND/OR TRACE ORGANICS (A-3)
2. GRAY TO PALE BROWN TO BROWN SILTY SAND, SOMETIMES WITH SHELL FRAGMENTS AND/OR TRACE ORGANICS (A-1-b/A-2-4)
3. GREEN TO GRAY TO DARK BROWN SILTY-CLAYEY TO CLAYEY SAND (A-2-4/A-2-6/A-2-7)
4. BLUE-GREEN TO GRAY TO BROWN TO DARK BROWN SANDY CLAY TO CLAY (A-4/A-6/A-7-5/A-7-6)
5. GREEN TO GRAY TO BROWN TO DARK BROWN CLAY (A-7-5/A-7-6)
6. WEATHERED LIMESTONE
7. WHITE TO LIGHT GRAY CALCAREOUS CLAY WITH WEATHERED LIMESTONE FRAGMENTS (A-6/A-7-5/A-7-6)
8. GRAY TO PALE BROWN TO DARK BROWN SAND TO SILTY SAND, OCCASIONALLY WITH SHELL AND/OR ROCK FRAGMENTS AND/OR CLAY NODULES (A-3/A-2-4) – FILL
9. DARK BROWN ORGANIC SAND TO ORGANIC SAND WITH SILT (A-3)
10. LIMESTONE AND CEMENTED SAND TO CEMENTED SILTY SAND (A-3/A-2-4)
11. LIGHT GRAY TO GRAY TO BROWN SHELLY SAND TO SAND WITH SILT (A-3)

A - WITH LIMESTONE FRAGMENTS

P - ASPHALT PAVEMENT AND/OR BASE MATERIAL

A-3 AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW.

▽ GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS

▽P PERCHED GROUNDWATER LEVEL ENCOUNTERED

▼ ESTIMATED SEASONAL HIGH GROUNDWATER TABLE

▼+ ESTIMATED SEASONAL HIGH GROUNDWATER TABLE AT OR ABOVE EXISTING GRADE

▼P ESTIMATED PERCHED SEASONAL HIGH GROUNDWATER TABLE

GNE GROUNDWATER NOT ENCOUNTERED

E STATE PLANE EASTING FLORIDA WEST NAD 83 (FT)

N STATE PLANE NORTHING FLORIDA WEST NAD 83 (FT)

REFUSAL AUGER REFUSAL ON HARD MATERIAL/SOIL

CAVE-IN BOREHOLE TERMINATED DUE TO CAVE-IN FROM SHALLOW GROUNDWATER INTRUSION

NOTE: THE BORING LOCATIONS WERE PROVIDED BY THE PROJECT SURVEYOR.

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STATE OF FLORIDA
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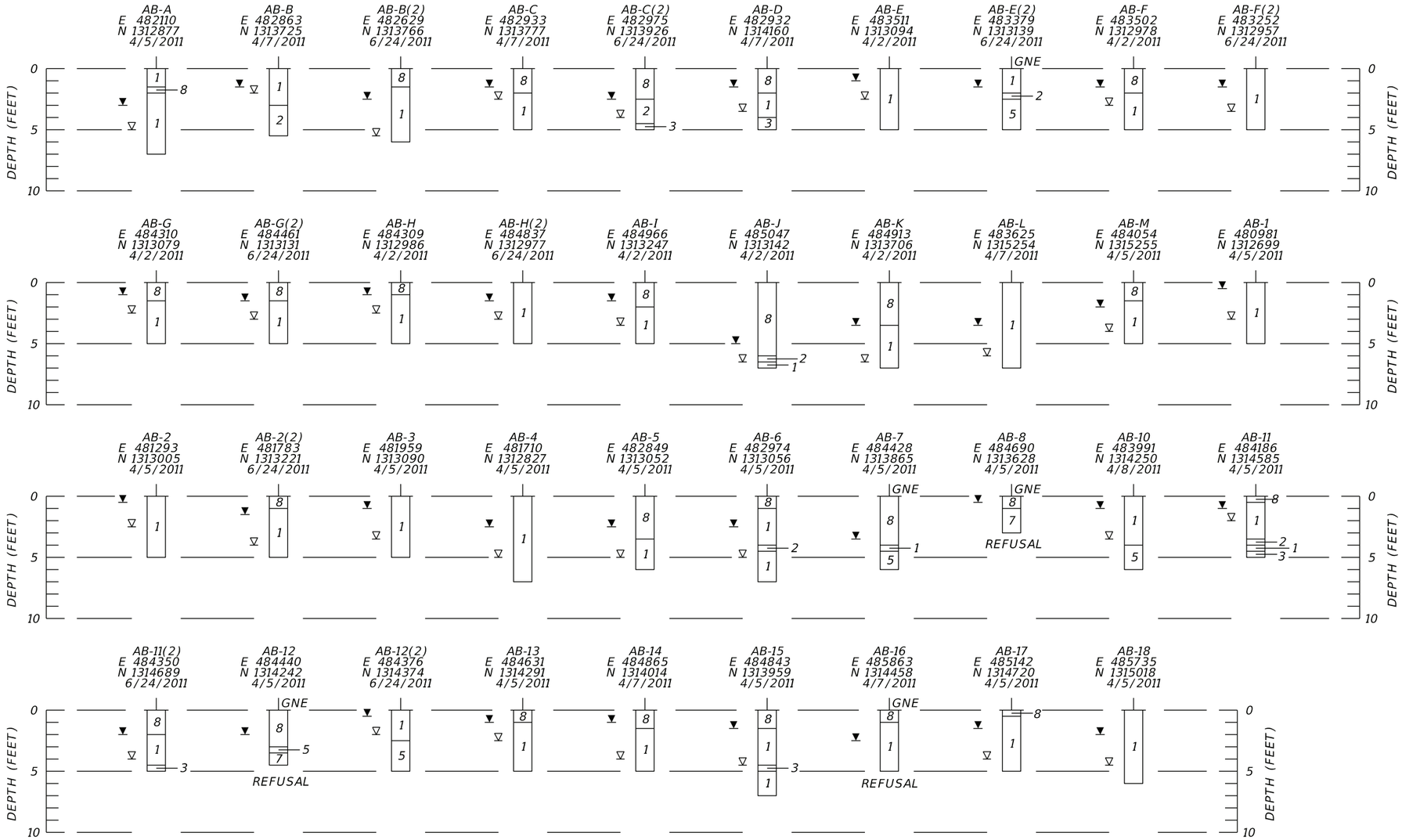
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
93	HILLSBOROUGH	412531-1-52-01

ROADWAY PROFILES (2)

SHEET NO.
F-17



LEGEND

1. GRAY TO PALE BROWN TO DARK BROWN SAND TO SAND WITH SILT, SOMETIMES WITH SHELL FRAGMENTS AND/OR TRACE ORGANICS (A-3)
2. GRAY TO PALE BROWN TO BROWN SILTY SAND, SOMETIMES WITH SHELL FRAGMENTS AND/OR TRACE ORGANICS (A-1-b/A-2-4)
3. GREEN TO GRAY TO DARK BROWN SILTY-CLAYEY TO CLAYEY SAND (A-2-4/A-2-6/A-2-7)
4. BLUE-GREEN TO GRAY TO BROWN TO DARK BROWN SANDY CLAY TO CLAY (A-4/A-6/A-7-5/A-7-6)
5. GREEN TO GRAY TO BROWN TO DARK BROWN CLAY (A-7-5/A-7-6)
6. WEATHERED LIMESTONE
7. WHITE TO LIGHT GRAY CALCAREOUS CLAY WITH WEATHERED LIMESTONE FRAGMENTS (A-6/A-7-5/A-7-6)
8. GRAY TO PALE BROWN TO DARK BROWN SAND TO SILTY SAND, OCCASIONALLY WITH SHELL AND/OR ROCK FRAGMENTS AND/OR CLAY NODULES (A-3/A-2-4) – FILL
9. DARK BROWN ORGANIC SAND TO ORGANIC SAND WITH SILT (A-3)
10. LIMESTONE AND CEMENTED SAND TO CEMENTED SILTY SAND (A-3/A-2-4)
11. LIGHT GRAY TO GRAY TO BROWN SHELLY SAND TO SAND WITH SILT (A-3)

A - WITH LIMESTONE FRAGMENTS

P - ASPHALT PAVEMENT AND/OR BASE MATERIAL

A-3 AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW.

▽ GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS

▽P PERCHED GROUNDWATER LEVEL ENCOUNTERED

▼ ESTIMATED SEASONAL HIGH GROUNDWATER TABLE

▼+ ESTIMATED SEASONAL HIGH GROUNDWATER TABLE AT OR ABOVE EXISTING GRADE

▼P ESTIMATED PERCHED SEASONAL HIGH GROUNDWATER TABLE

GNE GROUNDWATER NOT ENCOUNTERED

E STATE PLANE EASTING FLORIDA WEST NAD 83 (FT)

N STATE PLANE NORTHING FLORIDA WEST NAD 83 (FT)

REFUSAL AUGER REFUSAL ON HARD MATERIAL/SOIL

CAVE-IN BOREHOLE TERMINATED DUE TO CAVE-IN FROM SHALLOW GROUNDWATER INTRUSION

NOTE: THE BORING LOCATIONS WERE PROVIDED BY THE PROJECT SURVEYOR.

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ROAD NO.	COUNTY	FINANCIAL PROJECT ID
93	HILLSBOROUGH	412531-1-52-01

ROADWAY PROFILES (3)

SHEET NO.
F-18

Preliminary Summary of Seasonal High Groundwater Table Estimates
I-275 (SR 93) from West of Memorial Highway (SR 60) to Spruce Street
Hillsborough County, Florida
FPID No. 412531-1-32-01 TWO 2
Tierra Project No. 6511-10-122-002

Boring Name	Boring Location[1]		Boring Depth[2] (ft)	Surveyed Ground Elevation[3] (ft, NAVD 88)	Measured Groundwater Table			USDA Soil Survey		Estimated SHGWT[5]	
	Easting State Plane, FL West NAD 83	Northing State Plane, FL West NAD 83			Date Recorded	Depth[2] (ft)	Elevation (ft, NAVD 88)	Map Symbol	Estimated SHGWT Depth[4] (ft)	Depth (ft)	Elevation (ft, NAVD 88)
I-275 from East of Howard Frankland Bridge to West of Memorial Highway (SR 60)											
SH - 1-ARCADIS	476867	1311095	5.0	3.9	4/26/2017	3.4	0.5	100	--[8]	1.5	2.4
SH - 25-275SB	479636	1312199	6.0	3.6	4/17/2017	3.8	-0.2	4	1.5-3.0	1.0	2.6
SH - 30-275SB	480111	1312395	6.0	3.8	4/17/2017	3.8	0.0	4	1.5-3.0	1.5	2.3
SH - 760-275SB	481002	1312777	6.5	5.5	4/17/2017	4.7	0.8	4	1.5-3.0	1.5	4.0
SH - 45-275SB	481337	1313177	6.5	4.7	4/27/2017	4.0	0.7	4	1.5-3.0	1.5	3.2
SH - 2-ARCADIS	481744	1313203	6.5	4.9	5/9/2017	4.5	0.4	4	1.5-3.0	1.5	3.4
SH - 34-275SB	482337	1313378	12.0	15.6	4/17/2017	GNE[6]	< 3.6	4	1.5-3.0	N.D.[7]	N.D.[7]
North of I-275 and West of Memorial Highway (SR 60)											
SH - 201	483515	1312962	6.0	4.9	4/19/2017	3.7	1.2	56	--[9]	1.0	3.9
SH - 103	483339	1313055	11.0	9.2	4/27/2017	9.5	-0.3	4	1.5-3.0	5.5	3.7
SH - 107	482968	1313136	9.0	6.4	4/17/2017	4.8	1.6	4	1.5-3.0	2.5	3.9
SH - 210	482942	1313471	8.0	4.6	4/17/2017	3.3	1.3	56	--[9]	1.0	3.6
SH - 113	482918	1313754	6.0	6.4	4/16/2017	4.6	1.8	56	--[9]	2.0	4.4
SH - 2-EXECUTIVE	482470	1313818	6.5	5.6	4/16/2017	3.5	2.1	56	--[9]	1.5	4.1
SH - 1-GRAY	482481	1314186	7.5	6.4	4/16/2017	4.1	2.3	56	--[9]	2.0	4.4
SH - 216	482929	1314051	7.0	6.6	4/16/2017	5.2	1.4	56	--[9]	2.5	4.1
SH - 118	483001	1314280	6.0	5.4	4/16/2017	4.0	1.4	56	--[9]	1.5	3.9
SH - 123	482931	1314772	6.5	5.5	4/16/2017	3.8	1.7	55	3.5-6.0	1.5	4.0
SH - 128	483006	1315248	10.0	5.2	4/16/2017	4.5	0.7	55	3.5-6.0	2.0	3.2
SH - 133	482942	1315705	6.5	5.6	4/17/2017	5.0	0.6	29	0.5-1.5	2.5	3.1

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Preliminary Summary of Seasonal High Groundwater Table Estimates
I-275 (SR 93) from West of Memorial Highway (SR 60) to Spruce Street
Hillsborough County, Florida
FPID No. 412531-1-32-01 TWO 2
Tierra Project No. 6511-10-122-002

Boring Name	Boring Location[1]		Boring Depth[2] (ft)	Surveyed Ground Elevation[3] (ft, NAVD 88)	Measured Groundwater Table			USDA Soil Survey		Estimated SHGWT[5]	
	Easting State Plane, FL West NAD 83	Northing State Plane, FL West NAD 83			Date Recorded	Depth[2] (ft)	Elevation (ft, NAVD 88)	Map Symbol	Estimated SHGWT Depth[4] (ft)	Depth (ft)	Elevation (ft, NAVD 88)
I-275 and Memorial Highway (SR 60) Interchange											
SH - 3-ARCADIS	483843	1313635	9.0	7.4	4/26/2017	6.3	1.1	4	1.5-3.0	3.5	3.9
SH - 4-ARCADIS	483978	1314300	9.5	5.0	4/26/2017	5.5	-0.5	55	3.5-6.0	1.5	3.5
SH - 1105	484812	1313662	6.5	6.6	4/19/2017	5.2	1.5	4	1.5-3.0	3.0	3.6
SH - 1205	484673	1313895	8.0	5.2	4/27/2017	4.0	1.2	4	1.5-3.0	2.0	3.2
SH - 7-ARCADIS	484816	1313938	6.5	5.6	5/9/2017	5.2	0.4	4	1.5-3.0	2.5	3.1
SH - 6-ARCADIS	484644	1314278	5.0	3.5	4/27/2017	2.0	1.5	4	1.5-3.0	N.D.[7]	N.D.[7]
SH - 5-ARCADIS	484314	1314865	9.0	8.3	4/27/2017	8.6	-0.3	4	1.5-3.0	3.5	4.8
SH - 8-ARCADIS	484931	1314565	6.0	7.3	4/26/2017	GNE[6]	< 1.3	32	0.5-1.5	3.0	4.3
SH - 9-ARCADIS	485398	1314257	7.0	7.0	4/28/2017	5.6	1.4	56	--[9]	2.5	4.5
Ward Street											
SH - 40-WARD	485585	1315017	7.5	8.0	4/11/2017	GNE[6]	< 0.5	32	0.5-1.5	2.5	5.5
SH - 44-WARD	485614	1315386	9.0	9.3	4/17/2017	7.5	1.8	32	0.5-1.5	3.5	5.8
Lemon Street											
SH - 52-LEMON	485824	1315202	7.5	7.9	4/17/2017	6.9	1.0	32	0.5-1.5	2.5	5.4
SH - 57-LEMON	486321	1315216	5.5	9.8	4/17/2017	GNE[6]	< 4.3	56	--[9]	N.D.[7]	N.D.[7]
SH - 62-LEMON	486824	1315163	5.5	6.2	4/18/2017	4.5	1.7	56	--[9]	1.0	5.2
Occident Street											
SH - 16-OCCIDENT	486267	1315132	6.5	8.3	4/17/2017	GNE[6]	< 1.8	56	0.5-1.5	N.D.[7]	N.D.[7]
SH - 21-OCCIDENT	486317	1315666	5.0	9.2	4/17/2017	GNE[6]	< 4.2	56	--[9]	3.0[P]	6.2[P]

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Preliminary Summary of Seasonal High Groundwater Table Estimates
I-275 (SR 93) from West of Memorial Highway (SR 60) to Spruce Street
Hillsborough County, Florida
FPID No. 412531-1-32-01 TWO 2
Tierra Project No. 6511-10-122-002

Boring Name	Boring Location[1]		Boring Depth[2] (ft)	Surveyed Ground Elevation[3] (ft, NAVD 88)	Measured Groundwater Table			USDA Soil Survey		Estimated SHGWT[5]	
	Easting State Plane, FL West NAD 83	Northing State Plane, FL West NAD 83			Date Recorded	Depth[2] (ft)	Elevation (ft, NAVD 88)	Map Symbol	Estimated SHGWT Depth[4] (ft)	Depth (ft)	Elevation (ft, NAVD 88)
Westshore Boulevard											
SH - 22-WEST	486982	1314553	10.0	9.0	4/18/2017	8.4	0.6	56	--[9]	4.0[P]	5.5[P]
SH - 27-WEST	486996	1315084	7.3	9.9	4/18/2017	GNE[6]	< 2.6	56	--[9]	4.0	5.9
SH - 32-WEST	486908	1315603	5.5	10.2	4/18/2017	GNE[6]	< 4.7	56	--[9]	N.D.[7]	N.D.[7]
Trask Street											
SH - 32-TRASK	487629	1314524	8.5	9.4	4/18/2017	5.5	3.9	32/56	0.5-1.5/--[9]	3	6.4
SH - 37-TRASK	487612	1315007	7.0	9.0	4/27/2017	6.0	3.0	56	--[9]	2.5	6.5
SH - 42-TRASK	487594	1315514	7.5	11.1	4/18/2017	6.5	4.6	56	--[9]	3.5	7.6
I-275 at North Manhattan Avenue											
SH - 10-ARCADIS	488901	1314769	14.0	13.9	4/28/2017	11.5	2.4	42	2.0-3.5	7.0	6.9
I-275 at North Lois Avenue											
SH - 1525-RAMPM	490050	1314853	10.0	15.5	4/19/2017	7.5	8.0	42	2.0-3.5	3.5	12.0
I-275 at North Himes Avenue											
SH - 11-ARCADIS	494395	1316993	10.5	30.4	4/27/2017	8.3	22.1	32	0.5-1.5	3.0	27.4
I-275 at North MacDill Avenue											
SH - 12-ARCADIS	496993	1316950	10.0	31.8	4/27/2017	7.5	24.3	55	3.5-6.0	3.0	28.8
West Cypress Street West of Memorial Highway (SR 60)											
SH - 16-ARCADIS	481217	1315898	7.0	5.4	4/26/2017	4.8	0.6	30	0.0-0.5	2.5	2.9

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Preliminary Summary of Seasonal High Groundwater Table Estimates
I-275 (SR 93) from West of Memorial Highway (SR 60) to Spruce Street
Hillsborough County, Florida
FPID No. 412531-1-32-01 TWO 2
Tierra Project No. 6511-10-122-002

Boring Name	Boring Location[1]		Boring Depth[2] (ft)	Surveyed Ground Elevation[3] (ft, NAVD 88)	Measured Groundwater Table			USDA Soil Survey		Estimated SHGWT[5]	
	Easting State Plane, FL West NAD 83	Northing State Plane, FL West NAD 83			Date Recorded	Depth[2] (ft)	Elevation (ft, NAVD 88)	Map Symbol	Estimated SHGWT Depth[4] (ft)	Depth (ft)	Elevation (ft, NAVD 88)
East Frontage Road North of West Cypress Street and South of West Laurel Street											
SH - 13-ARCADIS	483419	1316365	10.5	6.7	4/26/2017	5.0	1.7	21/29	0.5-1.5	2.0	4.7
North of West LaSalle Street at North Mondigo Street											
SH - 14-ARCADIS	482318	1316824	6.5	6.5	4/26/2017	4.9	1.6	21	0.5-1.5	3.0	3.5
SH - 15-ARCADIS	482290	1317105	6.0	5.2	4/26/2017	5.2	0.0	21	0.5-1.5	2.0	3.2
George J. Bean Outbound Parkway Loop											
SH - 2606	482047	1317360	7.0	5.1	4/22/2017	5.8	-0.7	29	0.5-1.5	2.0	3.1
SH - 2611	481584	1317342	4.0	3.0	4/22/2017	3.0	0.0	29	0.5-1.5	Above Grade	> 3.0
Memorial Highway (SR 60) at George J. Bean Parkway											
SH - 1260	481679	1318364	10.5	7.7	4/23/2017	7.0	0.7	4	1.5-3.0	4.5	3.2
SH - 1265	481175	1318295	9.0	4.9	4/23/2017	4.4	0.5	4	1.5-3.0	2.0	2.9
SH - 1270	480735	1318536	10.5	5.9	4/24/2017	6.3	-0.4	4	1.5-3.0	N.D.[7]	N.D.[7]
Memorial Highway (SR 60) from Spruce Street to Independence Parkway											
SH - 2475	481813	1317816	6.0	8.5	4/24/2017	5.0	3.5	4	1.5-3.0	3.0	5.5
SH - 2480	481345	1317992	6.0	7.7	4/24/2017	4.8	2.9	4	1.5-3.0	2.5	5.2
SH - 2485	480888	1318178	8.0	4.7	5/2/2017	4.2	0.5	4	1.5-3.0	N.D.[7]	N.D.[7]
SH - 2490	480465	1318445	9.0	6.6	5/2/2017	5.8	0.8	29	0.5-1.5	3.5	3.1
SH - 2495	480115	1318798	7.0	3.6	5/2/2017	4.0	-0.4	4	1.5-3.0	1.5	2.1
SH - 2500	479842	1319213	10.5	7.0	5/2/2017	7.2	-0.2	99	--[10]	N.D.[7]	N.D.[7]
SH - 2505	479670	1319679	8.0	6.9	5/1/2017	6.2	0.7	4	1.5-3.0	N.D.[7]	N.D.[7]
SH - 2510	479567	1320180	15.0	15.2	4/19/2017	GNE	< 0.2	4	1.5-3.0	N.D.[7]	N.D.[7]
SH - 2515	479478	1320664	13.0	13.2	4/18/2017	11.0	2.2	4	1.5-3.0	N.D.[7]	N.D.[7]
SH - 2520	479474	1321159	6.5	4.6	4/18/2017	3.0	1.6	4	1.5-3.0	1.5	3.1
SH - 2525	479533	1321678	8.0	7.3	5/1/2017	3.5	3.8	4/29	1.5-3.0/0.5-1.5	2.5	4.8

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Preliminary Summary of Seasonal High Groundwater Table Estimates
I-275 (SR 93) from West of Memorial Highway (SR 60) to Spruce Street
Hillsborough County, Florida
FPID No. 412531-1-32-01 TWO 2
Tierra Project No. 6511-10-122-002

Boring Name	Boring Location[1]		Boring Depth[2] (ft)	Surveyed Ground Elevation[3] (ft, NAVD 88)	Measured Groundwater Table			USDA Soil Survey		Estimated SHGWT[5]	
	Easting State Plane, FL West NAD 83	Northing State Plane, FL West NAD 83			Date Recorded	Depth[2] (ft)	Elevation (ft, NAVD 88)	Map Symbol	Estimated SHGWT Depth[4] (ft)	Depth (ft)	Elevation (ft, NAVD 88)
Memorial Highway (SR 60) from Spruce Street to Independence Parkway (Continued)											
SH - 2530	479635	1322166	10.0	36.4	5/1/2017	GNE	< 26.4	27/29	0.0-1.0/0.5-1.5	N.D.[7]	N.D.[7]
SH - 2535	479685	1322657	18.0	20.4	5/1/2017	16.5	3.9	27	0.0-1.0	N.D.[7]	N.D.[7]
SH - 2540	479715	1323159	10.0	13.0	5/1/2017	8.8	4.2	27	0.0-1.0	6.0	7.0
SH - 2545	479714	1323655	8.0	11.2	5/1/2017	6.0	5.2	21	0.5-1.5	3.5	7.7
SH - 2550	479734	1324157	6.5	10.4	5/1/2017	5.0	5.4	21	0.5-1.5	2.0	8.4
SH - 2555	479738	1324650	6.5	8.9	5/1/2017	3.6	5.3	21	0.5-1.5	1.5	7.4
Ramp from Memorial Highway (SR 60) to West Spruce Street											
SH - 3000	482692	1317699	4.5	4.3	4/19/2017	2.2	2.1	4	1.5-3.0	0.5	3.8
SH - 3004	482808	1317968	5.0	6.6	4/19/2017	4.3	2.3	4	1.5-3.0	1.5	5.1
SH - 3008	483120	1318236	4.0	8.9	4/19/2017	GNE	< 4.9	4	1.5-3.0	N.D.[7]	N.D.[7]
Ramp from West Spruce Street to Memorial Highway (SR 60)											
SH - 3295	483674	1318600	7.5	11.1	4/19/2017	6.5[P]	4.6	4	1.5-3.0	4.0[P]	7.1
SH - 3300	483178	1318566	10.0	18.1	4/22/2017	GNE	< 8.1	4	1.5-3.0	N.D.[7]	N.D.[7]
SH - 3305	482692	1318453	7.5	4.8	4/22/2017	4.2	0.6	4	1.5-3.0	N.D.[7]	N.D.[7]
George J. Bean Inbound Parkway Toward Tampa International Airport											
SH - 2928	482305	1319379	8.0	6.1	4/19/2017	5.8	0.3	4	1.5-3.0	2.0	4.1
SH - 2932	482272	1319775	6.0	6.4	4/19/2017	5.4	1.0	4	1.5-3.0	3.0	3.4
SH - 3325	482132	1320057	6.0	7.2	4/19/2017	5.5	1.7	4	1.5-3.0	3.0	4.2

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Preliminary Summary of Seasonal High Groundwater Table Estimates
I-275 (SR 93) from West of Memorial Highway (SR 60) to Spruce Street
Hillsborough County, Florida
FPID No. 412531-1-32-01 TWO 2
Tierra Project No. 6511-10-122-002

Boring Name	Boring Location[1]		Boring Depth[2] (ft)	Surveyed Ground Elevation[3] (ft, NAVD 88)	Measured Groundwater Table						USDA Soil Survey		Estimated SHGWT[5]	
	Easting State Plane, FL West NAD 83	Northing State Plane, FL West NAD 83			Date Recorded	Depth[2] (ft)	Elevation (ft, NAVD 88)	Date Recorded	Depth[2] (ft)	Elevation (ft, NAVD 88)	Map Symbol	Estimated SHGWT Depth[4] (ft)	Depth[2] (ft)	Elevation (ft, NAVD 88)
AB-A	482110	1312877	7	5.6	4/5/2011	5.0	0.6	5/25/2011	5.0	0.6	56	---[9]	3.0	2.6
AB-B	482863	1313725	5.5	6.6	4/7/2011	2.0	4.6	5/25/2011	3.5	3.1	56	---[9]	1.5	5.1
AB-B(2)	482632	1313759	6	6.0	6/24/2011	5.5	0.5				56	---[9]	2.5	3.5
AB-C	482933	1313777	5	6.3	4/7/2011	2.8	3.5	5/25/2011	3.3	3.0	56	---[9]	1.5	4.8
AB-C(2)	482975	1313914	5	7.4	6/24/2011	4.0	3.4				56	---[9]	2.5	4.9
AB-D	482932	1314160	5	5.9	4/7/2011	3.5	2.4	5/25/2011	3.5	2.4	56	---[9]	1.5	4.4
AB-E	483511	1313094	5	4.9	4/2/2011	2.5	2.4	5/25/2011	3.0	1.9	4	1.5-3.0	1.0	3.9
AB-E(2)	483376	1313140	5	3.7	6/24/2011	GNE[6]	< -1.3				4	1.5-3.0	1.5	2.2
AB-F	483502	1312978	5	5.7	4/2/2011	3.0	2.7	5/25/2011	4.5	1.2	4	1.5-3.0	1.5	4.2
AB-F(2)	483257	1312952	5	4.0	6/24/2011	3.5	0.5				4	1.5-3.0	1.5	2.5
AB-G	484310	1313079	5	6.7	4/2/2011	2.5	4.2	5/25/2011	3.0	3.7	56	---[9]	1.0	5.7
AB-G(2)	484451	1313106	5	6.9	6/24/2011	3.0	3.9				56	---[9]	1.5	5.4
AB-H	484309	1312986	5	6.5	4/2/2011	2.5	4.0	5/25/2011	3.0	3.5	56	---[9]	1.0	5.5
AB-H(2)	484837	1312983	5	7.6	6/24/2011	3.0	4.6				56	---[9]	1.5	6.1
AB-I	484966	1313247	5	7.3	4/2/2011	3.5	3.8	5/25/2011	5.0	2.3	58	0.5-1.5	1.5	5.8
AB-J	485047	1313142	7	11.9	4/2/2011	6.5	5.4	5/25/2011	8.5	3.4	56	---[9]	5.0	6.9
AB-K	484913	1313706	7	9.5	4/2/2011	6.5	3.0	5/25/2011	7.0	2.5	4 & 58	1.5-3.0; 0.5-1.5	3.5	6.0
AB-L	483625	1315254	7	6.7	4/7/2011	6.0	0.7	5/25/2011	6.3	0.5	4 & 55	1.5-3.0; 3.5-6.0	3.5	3.2
AB-M	484054	1315255	5	7.2	4/5/2011	4.0	3.2	5/25/2011	5.0	2.2	4 & 55	1.5-3.0; 3.5-6.0	2.0	5.2
AB-1	480981	1312699	5	6.3	4/5/2011	3.0	3.3	5/25/2011	4.5	1.8	4	1.5-3.0	0.5	5.8
AB-2	481293	1313005	5	5.0	4/5/2011	2.5	2.5	5/25/2011	3.8	1.2	4	1.5-3.0	0.5	4.5
AB-2(2)	481790	1313227	5	5.2	6/24/2011	4.0	1.2				4	1.5-3.0	1.5	3.7
AB-3	481959	1313090	5	6.1	4/5/2011	3.5	2.6	5/25/2011	5.0	1.1	4	1.5-3.0	1.0	5.1
AB-4	481710	1312827	7	6.2	4/5/2011	5.0	1.2	5/25/2011	5.5	0.7	4 & 29	1.5-3.0; 0.5-1.5	2.5	3.7
AB-5	482849	1313052	6	6.4	4/5/2011	5.3	1.1	5/25/2011	5.5	0.9	4	1.5-3.0	2.5	3.9
AB-6	482974	1313056	7	6.8	4/5/2011	5.0	1.8	5/25/2011	4.5	2.3	4	1.5-3.0	2.5	4.3

(1) Boring locations were provided by the project surveyor.
(2) Depth below existing grades at time of augering.
(3) Ground elevations provided by the project surveyor.
(4) Seasonal high groundwater table depth estimated based on the Hillsborough County, Florida USDA Soil Survey information.
(5) Seasonal high groundwater table depth estimated based on soil stratigraphy, measured groundwater levels from the borings, the Hillsborough County, Florida USDA Soil Survey information and past experience with similar soil conditions.
(6) GNE: Groundwater table not encountered within the depth of the boring performed.
(7) N.D.: Seasonal high groundwater table could not be determined due to disturbed subsurface conditions. Natural SHGWT indicators were not clearly evident.
(8) The USDA Soil Map Unit 100 is categorized as "Waters of the Gulf of Mexico" and does not provide a seasonal high groundwater table estimate.
(9) The USDA Soil Map Unit 56 is categorized as "Urban Land" and does not provide a seasonal high groundwater table estimate.
(P) SHGWT levels anticipated to "perch" above silty to clayey soils encountered within the borings at the indicated depth.
(10) The USDA Soil Map Unit 99 is categorized as "Water" and does not provide a seasonal high groundwater table estimate.

Preliminary Summary of Seasonal High Groundwater Table Estimates
I-275 (SR 93) from West of Memorial Highway (SR 60) to Spruce Street
Hillsborough County, Florida
FPID No. 412531-1-32-01 TWO 2
Tierra Project No. 6511-10-122-002

Boring Name	Boring Location[1]		Boring Depth[2] (ft)	Surveyed Ground Elevation[3] (ft, NAVD 88)	Measured Groundwater Table						USDA Soil Survey		Estimated SHGWT[5]	
	Easting State Plane, FL West NAD 83	Northing State Plane, FL West NAD 83			Date Recorded	Depth[2] (ft)	Elevation (ft, NAVD 88)	Date Recorded	Depth[2] (ft)	Elevation (ft, NAVD 88)	Map Symbol	Estimated SHGWT Depth[4] (ft)	Depth[2] (ft)	Elevation (ft, NAVD 88)
AB-7	484428	1313865	6	6.5	4/5/2011	GNE[6]	< 0.5	5/25/2011	GNE[6]	< -0.5	4	1.5-3.0	3.5	3.0
AB-8	484690	1313628	3	3.4	4/5/2011	GNE[6]	< 0.4	5/25/2011	2.5	0.9	4	1.5-3.0	0.5	2.9
AB-10	483991	1314250	6	5.2	4/8/2011	3.5	1.7	5/25/2011	GNE[6]	< -1.8	4 & 55	1.5-3.0; 3.5-6.0	1.0	4.2
AB-11	484186	1314585	5	6.7	4/5/2011	2.3	4.4	5/25/2011	2.5	4.2	4	1.5-3.0	1.0	5.7
AB-11(2)	484343	1314676	5	6.8	6/24/2011	4.0	2.8				4	1.5-3.0	2.0	4.8
AB-12	484440	1314242	4.5	4.4	4/5/2011	GNE[6]	< -0.1	5/25/2011	3.8	0.6	4	1.5-3.0	2.0	2.4
AB-12(2)	484371	1314364	5	3.2	6/24/2011	2.0	1.2				4	1.5-3.0	0.5	2.7
AB-13	484631	1314291	5	4.3	4/5/2011	2.8	1.5	5/25/2011	3.3	1.0	4	1.5-3.0	1.0	3.3
AB-14	484865	1314014	5	3.4	4/7/2011	4.0	-0.6	5/25/2011	3.0	0.4	4	1.5-3.0	1.0	2.4
AB-15	484843	1313959	7	5.1	4/5/2011	4.8	0.3	5/25/2011	4.5	0.6	4	1.5-3.0	1.5	3.6
AB-16	485863	1314458	5	7.0	4/7/2011	GNE[6]	< 2.0	5/25/2011	GNE[6]	< 1.0	56	---[9]	2.5	4.5
AB-17	485142	1314720	5	8.0	4/5/2011	4.0	4.0	5/25/2011	4.5	3.5	32	0.5-1.5	1.5	6.5
AB-18	485735	1315018	6	8.9	4/5/2011	4.5	4.4	5/25/2011	GNE[6]	< 2.4	32	0.5-1.5	2.0	6.9

SMF 11 & SMF 12

SMF 14

(1) Boring locations were provided by the project surveyor.
(2) Depth below existing grades at time of augering.
(3) Ground elevations provided by the project surveyor.
(4) Seasonal high groundwater table depth estimated based on the Hillsborough County, Florida USDA Soil Survey information.
(5) Seasonal high groundwater table depth estimated based on soil stratigraphy, measured groundwater levels from the borings, the Hillsborough County, Florida USDA Soil Survey information and past experience with similar soil conditions.
(6) GNE: Groundwater table not encountered within the depth of the boring performed.
(7) N.D.: Seasonal high groundwater table could not be determined due to disturbed subsurface conditions. Natural SHGWT indicators were not clearly evident.
(8) The USDA Soil Map Unit 100 is categorized as "Waters of the Gulf of Mexico" and does not provide a seasonal high groundwater table estimate.
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(P) SHGWT levels anticipated to "perch" above silty to clayey soils encountered within the borings at the indicated depth.
(10) The USDA Soil Map Unit 99 is categorized as "Water" and does not provide a seasonal high groundwater table estimate.

COMPONENTS OF CONTRACT PLANS SET

ROADWAY PLANS
SIGNING AND PAVEMENT MARKING PLANS
INTELLIGENT TRANSPORTATION SYSTEM PLANS
LIGHTING PLANS
STRUCTURE PLANS

A DETAILED INDEX APPEARS ON THE
KEY SHEET OF EACH COMPONENT

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

AS-BUILT

CONTRACT PLANS

FINANCIAL PROJECT ID 41253I-3-52-01
HILLSBOROUGH COUNTY (10190)
STATE ROAD NO. 93 (I-275) STATE ROAD NO. 60 (MEMORIAL HIGHWAY)
N.B. EXIT RAMP TO SR 60 (MEMORIAL HIGHWAY) OPERATIONAL IMPROVEMENTS

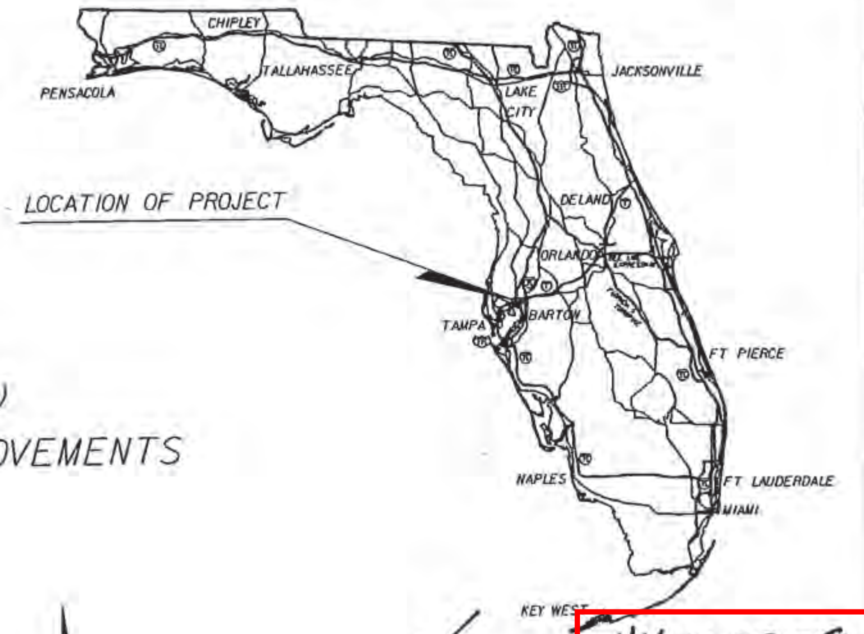
INDEX OF ROADWAY PLANS

SHEET NO.	SHEET DESCRIPTION
1	KEY SHEET
~~2-3~~	~~SUMMARY OF PAY ITEMS~~
~~4-8~~	~~DRAINAGE MAP~~
~~9~~	~~SUMMARY OF EXISTING DRAINAGE STRUCTURES~~
~~10-15~~	~~TYPICAL SECTIONS~~
~~16~~	~~BARRIER WALL DETAIL~~
~~17-18~~	~~SUMMARY OF QUANTITIES~~
~~19~~	~~SUMMARY OF DRAINAGE STRUCTURES~~
~~20~~	~~OPTIONAL MATERIALS TABULATION~~
~~21~~	~~REFERENCE POINTS~~
~~22~~	~~GENERAL NOTES~~
~~23-24~~	~~PROJECT LAYOUT~~
25-3~~3~~ 32	PLAN SHEETS
34-40	PROFILE SHEETS
~~41~~	~~RAMP TERMINAL DETAIL~~
42-49	DRAINAGE STRUCTURES
50	POND PLAN
51	POND DETAILS
~~52~~	~~ROADWAY SOIL SURVEY~~
~~53-76~~	~~CROSS SECTIONS~~
~~77-86~~	~~STORM WATER POLLUTION PREVENTION PLAN~~
~~87-115~~	~~TRAFFIC CONTROL PLANS~~
~~116-124~~	~~UTILITY ADJUSTMENTS~~

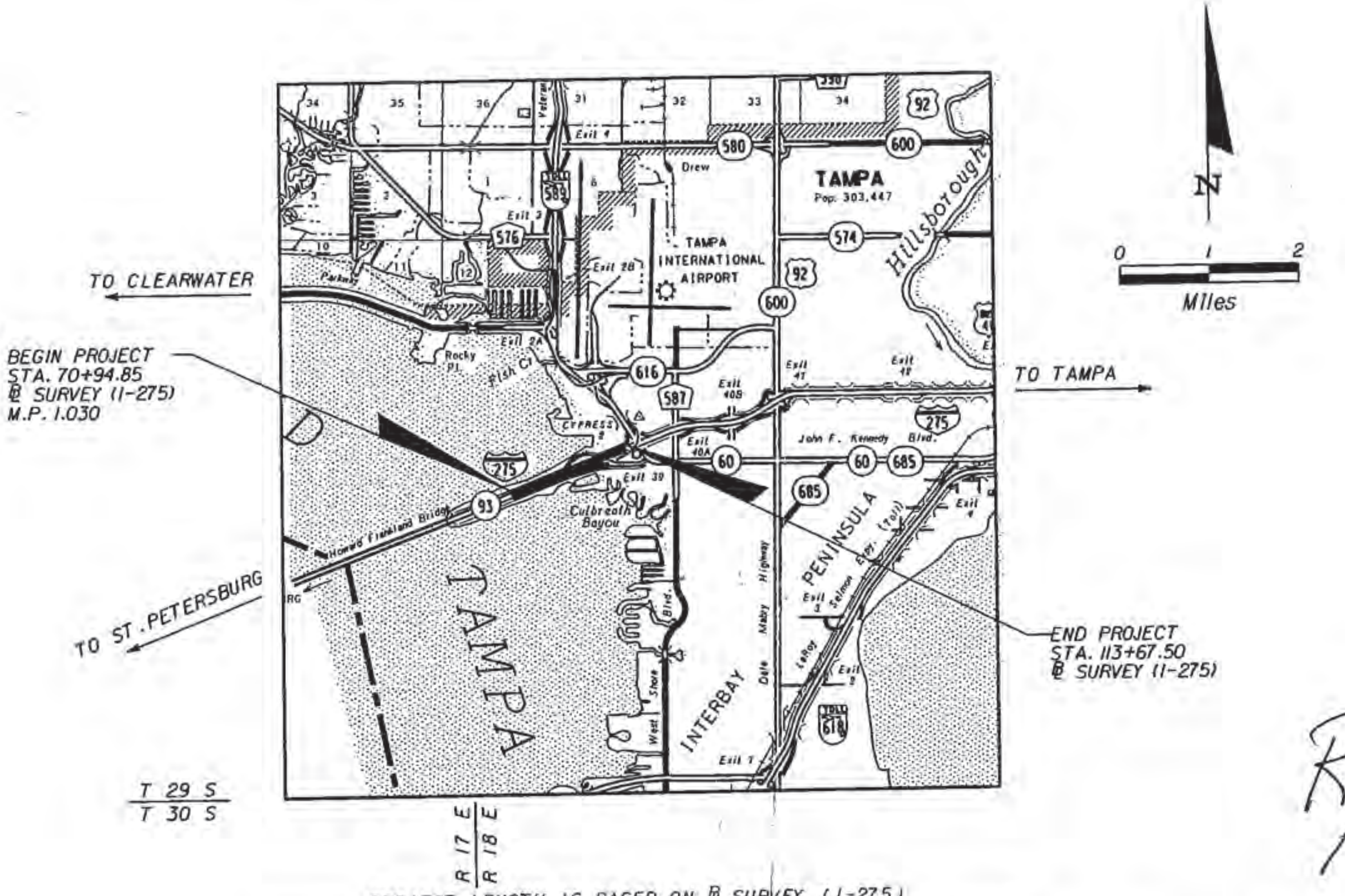
GOVERNING STANDARDS AND SPECIFICATIONS:
FLORIDA DEPARTMENT OF TRANSPORTATION,
DESIGN STANDARDS DATED 2008,
AND STANDARD SPECIFICATIONS FOR ROAD AND
BRIDGE CONSTRUCTION DATED 2007,
AS AMENDED BY CONTRACT DOCUMENTS.

APPLICABLE DESIGN STANDARDS MODIFICATIONS: 01-01-09
For Design Standards Modifications click on
"Design Standards" at the following web site:
http://www.dot.state.fl.us/rddesign/

REVISIONS



LOCATION OF PROJECT



TO CLEARWATER

TO TAMPA

TO ST. PETERSBURG

BEGIN PROJECT
STA. 70+94.85
℄ SURVEY (I-275)
M.P. 1.030

END PROJECT
STA. 113+67.50
℄ SURVEY (I-275)

PROJECT LENGTH IS BASED ON ℄ SURVEY (I-275)

LENGTH OF PROJECT		
	LINEAR FEET	MILES
ROADWAY	4272.65	0.809
BRIDGES	0.0	0.000
NET LENGTH OF PROJECT	4272.65	0.809
EXCEPTIONS	0.0	0.000
GROSS LENGTH OF PROJECT	4272.65	0.809

FDOT PROJECT MANAGER: BRIAN L. SHROYER

KEY SHEET REVISIONS	
DATE	DESCRIPTION

44 002958.009

☒ INSPECTION CONDUCTED BY DISTRICT
1/27/2011 RNT
☐ INSPECTION NOT CONDUCTED BY DISTRICT
RIGHT RESERVED FOR FUTURE INSPECTION

ROADWAY SHOP DRAWINGS
TO BE SUBMITTED TO:
JEFFREY C. DRAPP, P.E.
HNTB CORPORATION
10210 HIGHLAND MANOR DR.
SUITE 140
TAMPA, FL 33610
PHONE: (813) 246-5527

PLANS PREPARED BY:

HNTB

10210 HIGHLAND MANOR DR.
SUITE 140
TAMPA, FL. 33610
(813) 246-5527
VENDOR ID NO. VF-43-1694597
CONTRACT ID NUMBER: C-3749
CERT. OF AUTH. NO. 6500

TRANSFERRED TO
OPERATION PHASE

NOTE: THE SCALE OF THESE PLANS MAY HAVE CHANGED DUE TO REPRODUCTION.

Roy Carpenter
10-5-10

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
RECEIVED
BRD - TAMPA

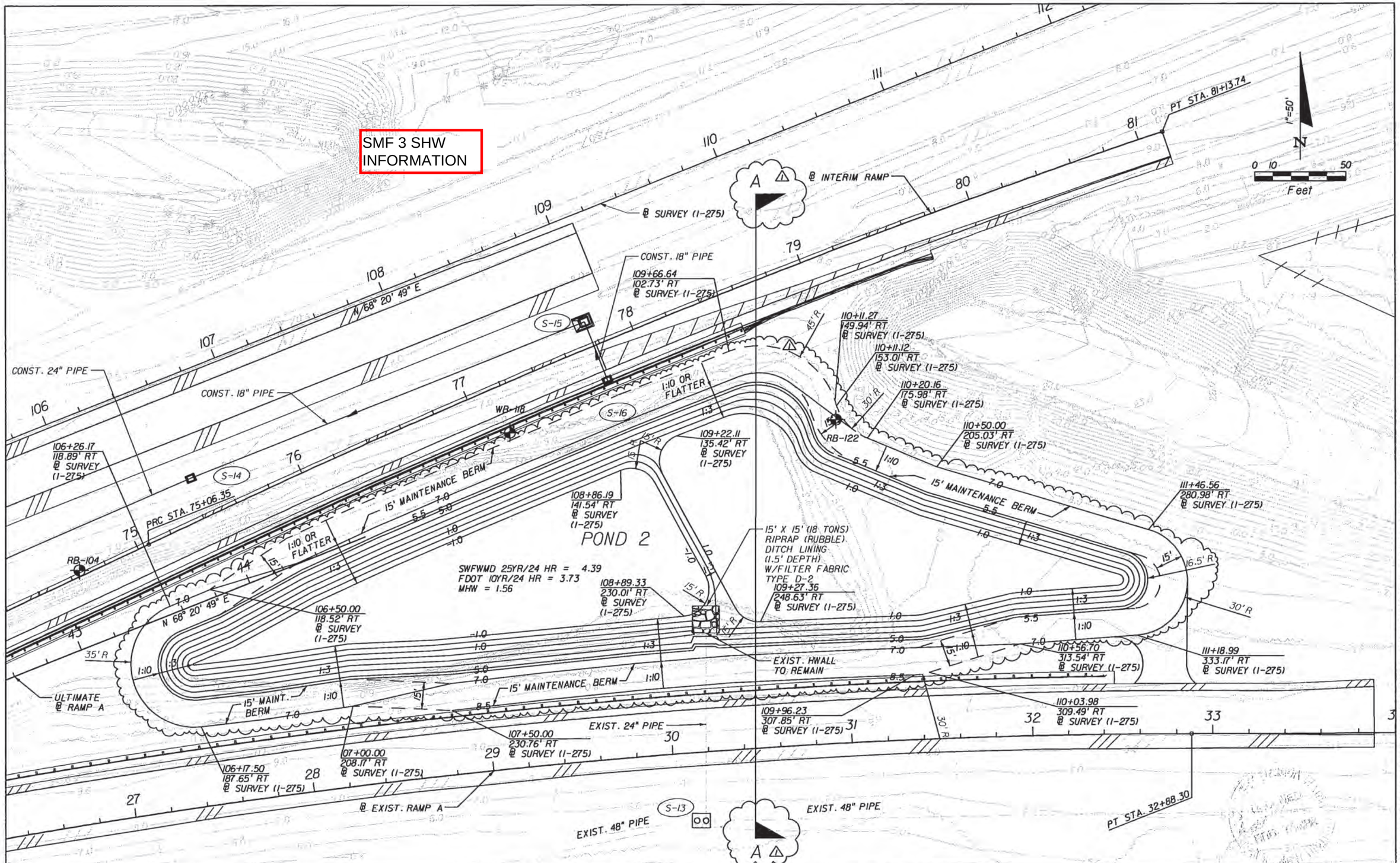
ROADWAY PLANS
ENGINEER OF RECORD: JEFFREY C. DRAPP, P.E.
P.E. NO.: 54618

FISCAL YEAR	SHEET NO.
09	

NOTICE: THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE SIGNED AND SEALED UNDER RULE 61G15-23.003, F.A.C.

godrloonsen 1/5/2009 1:58:02 PM C:\e\deliver\41253135201\roadway\KEYSRD01.DGN

SMF 3 SHW INFORMATION



REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION
09/08/09	1 RE-ORIENTED SECTION A-A AND CLARIFIED POND MAINTENANCE BERM		

HNTB
10210 HIGHLAND MANOR DR.
SUITE 140
TAMPA, FL. 33610
(813) 246-5527
CERT. OF AUTH. NO. 6500
DOUGLAS J. BURKHART, P.E., NO. 40900

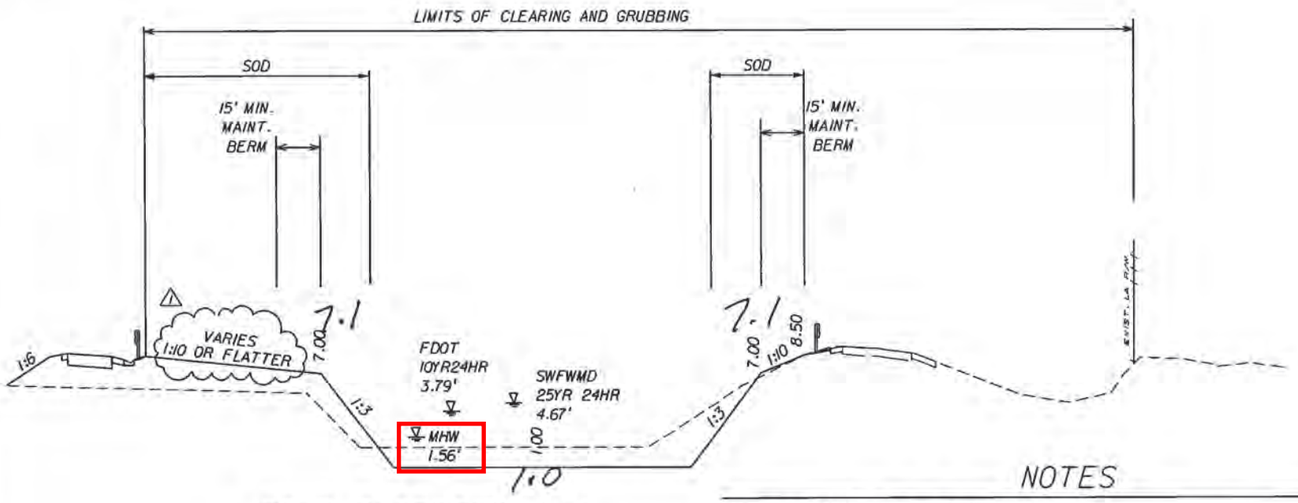
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 93	HILLSBOROUGH	412531-3-52-01

POND PLAN SHEET
POND 2

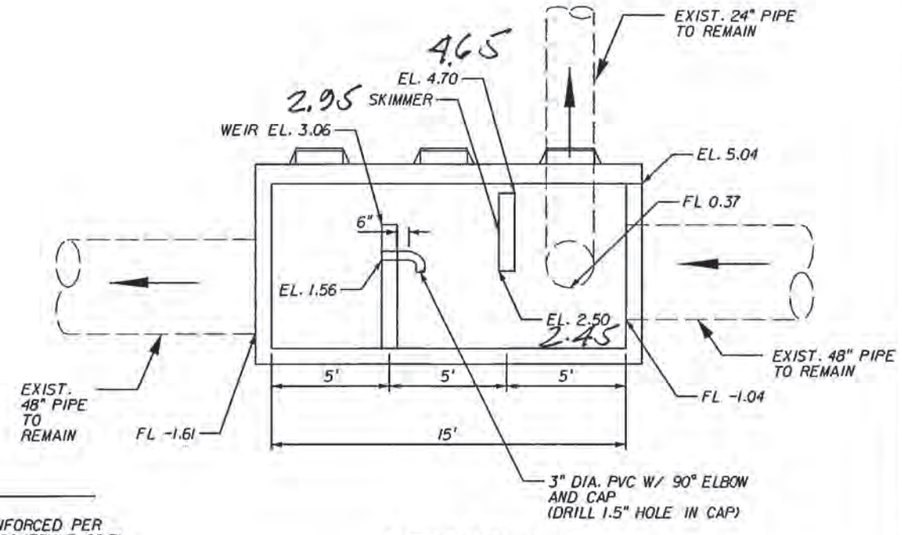
SHEET NO.

NOTICE: THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE SIGNED AND SEALED UNDER RULE 61G15-23.003, F.A.C.



POND 2 SECTION A-A

NTS



SECTION A-A

NTS

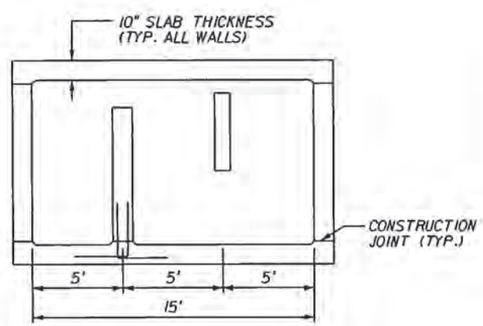
NOTES

1. A BENCH MARK IS TO BE CONSTRUCTED WITHIN THE POND RIGHT-OF-WAY OR ON THE HEADWALL OF THE 10'x6' CBC (STATION 13+75 @ RAMP A1) TO VERIFY CRITICAL ELEVATIONS OF THE POND AND OUTFALL STRUCTURES. COST TO BE INCLUDED IN MOBILIZATION PAY ITEM 101-1.

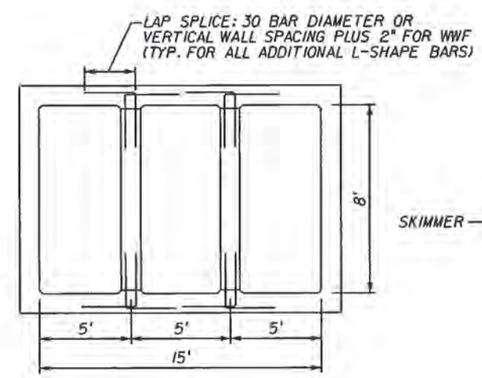
2. THE COST OF THE 3" PVC BLEED DOWN (3" PVC & 90° ELBOW) SHALL BE INCLUDED IN THE COST OF THE STRUCTURE.

3. ALL WALLS SHALL BE REINFORCED PER INDEX 200 (SHEET 5 OF 5, SCHEDULE C6.5). ADDITIONAL L-SHAPE BARS ARE REQUIRED AS SHOWN IN THE REINFORCEMENT DETAILS.

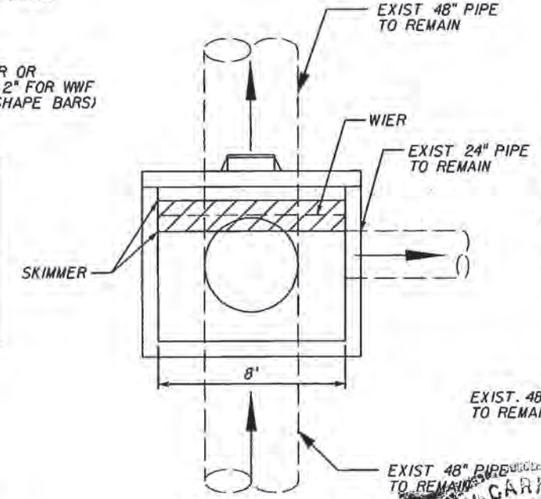
4. THE COST OF THE WEIR AND ALL ASSOCIATED CONCRETE AND REINFORCING SHALL BE INCLUDED IN THE COST OF THE STRUCTURE.



REINFORCEMENT DETAIL
ELEVATION VIEW
NTS
(See Note 3 & 4)

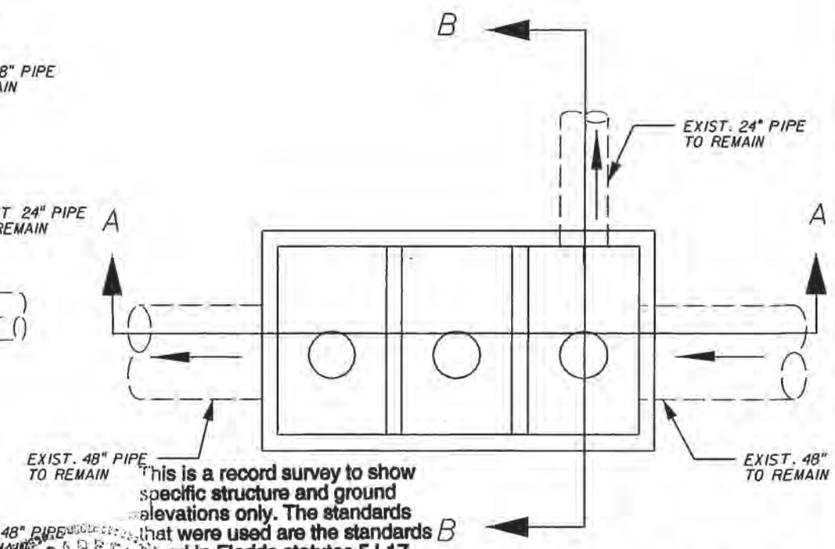


REINFORCEMENT DETAIL
PLAN VIEW
NTS
(See Note 3 & 4)



SECTION B-B

NTS



This is a record survey to show specific structure and ground elevations only. The standards that were used are the standards found in Florida statutes 5J-17. What I found is in blue.

SMART BOX CONFIGURATION - POND 2 (S-13)

NTS

12-20-10 Roy Carpenter

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION
09/08/09	⚠ REVISED SLOPE		

HNTB
10210 HIGHLAND MANOR DR.
SUITE 140
TAMPA, FL. 33610
(813) 246-5527
CERT. OF AUTH. NO. 6500
DOUGLAS J. BURKHART, P.E., NO. 40900

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 93	HILLSBOROUGH	41253T-3-52-01

POND DETAIL
POND 2

SHEET NO.

jcdropp 2/15/2010 11:04:48 AM J:\44685-DS\CADD\41253\3520\Roadway\ORDTRDD01rev01.dgn

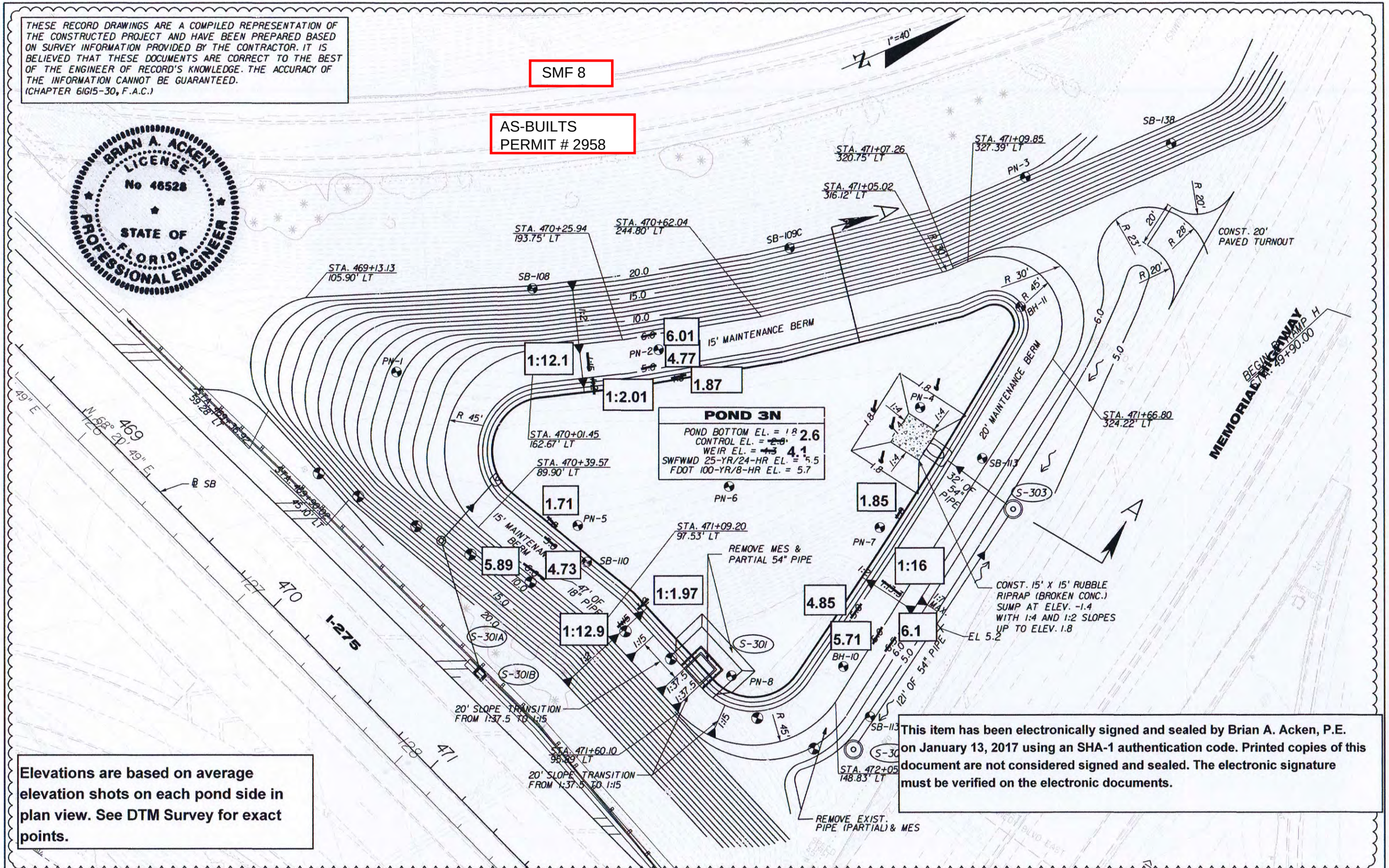
NOTICE: THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE SIGNED AND SEALED UNDER RULE 61G15-23.003, F.A.C.

THESE RECORD DRAWINGS ARE A COMPILED REPRESENTATION OF THE CONSTRUCTED PROJECT AND HAVE BEEN PREPARED BASED ON SURVEY INFORMATION PROVIDED BY THE CONTRACTOR. IT IS BELIEVED THAT THESE DOCUMENTS ARE CORRECT TO THE BEST OF THE ENGINEER OF RECORD'S KNOWLEDGE. THE ACCURACY OF THE INFORMATION CANNOT BE GUARANTEED. (CHAPTER 61G15-30, F.A.C.)

SMF 8

AS-BUILTS
PERMIT # 2958

BRIAN A. ACKEN
LICENSE
No 46528
STATE OF FLORIDA
PROFESSIONAL ENGINEER



Elevations are based on average elevation shots on each pond side in plan view. See DTM Survey for exact points.

This item has been electronically signed and sealed by Brian A. Acken, P.E. on January 13, 2017 using an SHA-1 authentication code. Printed copies of this document are not considered signed and sealed. The electronic signature must be verified on the electronic documents.

REVISIONS

DATE	DESCRIPTION	DATE	DESCRIPTION
6/15/16	△ AS-BUILT		

Advantage Engineering, Inc.
3914 Flatiron Loop, Suite 102 Wesley Chapel, Florida 33544 (813) 975-9638
Certificate of Authorization #00008806
EOR: Brian A. Acken, P.E. Fl. Reg. No. 46528

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 93	HILLSBOROUGH	258398-5-52-01 258399-2-52-01

POND DETAIL SHEET
POND 3N

SHEET NO.

COMPONENTS OF CONTRACT PLANS SET

ROADWAY PLANS
STRUCTURE PLANS

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

CONTRACT PLANS

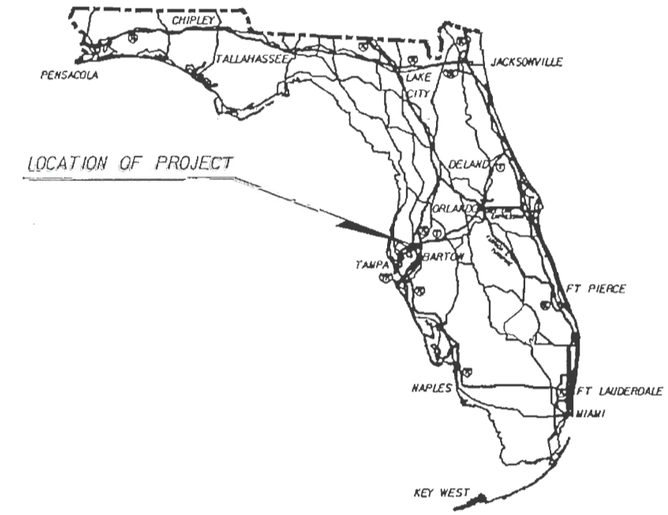
FINANCIAL PROJECT ID 258398-4-52-01

HILLSBOROUGH COUNTY (10190)

STATE ROAD NO. 93 (I-275)

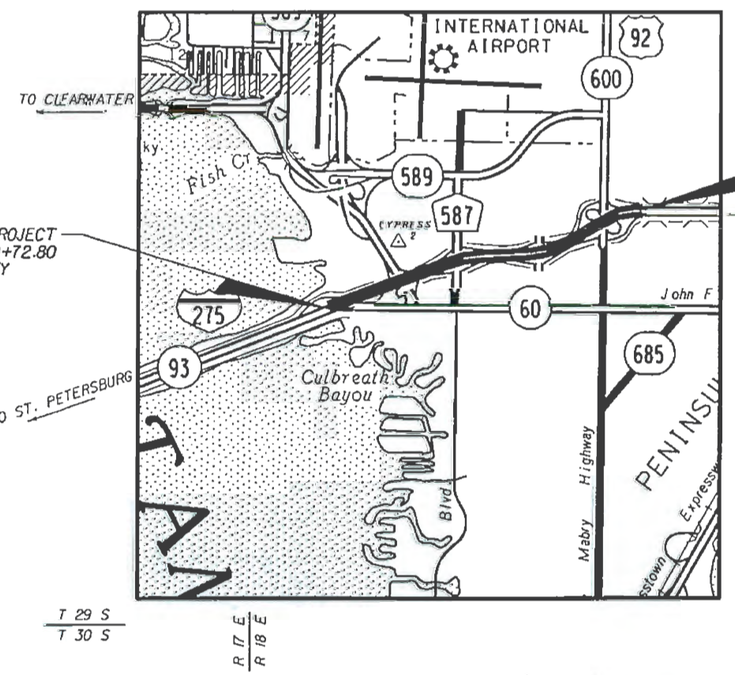
I-275 WEST TAMPA

DRAINAGE/UTILITIES



A DETAILED INDEX APPEARS ON THE KEY SHEET OF EACH COMPONENT

INDEX OF ROADWAY PLANS



ROADWAY SHOP DRAWINGS TO BE SUBMITTED TO:
JEFFREY C. DRAPP, P.E.
HNTB CORPORATION
10210 HIGHLAND MANOR DR.
SUITE 140
TAMPA, FL 33610
PHONE: (813) 246-5527

PLANS PREPARED BY:

HNTB
10210 HIGHLAND MANOR DR.
SUITE 140
TAMPA, FL. 33610
(813) 246-5527
VENDOR ID NO. VF-43-1694597
CONTRACT ID NUMBER: C-3749
CERT. OF AUTH. NO. 6500

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT PERMITTED CONSTRUCTION DRAWINGS

FILE OF RECORD

N

0 1/2 1
Mile

GOVERNING STANDARDS AND SPECIFICATIONS:
FLORIDA DEPARTMENT OF TRANSPORTATION,
DESIGN STANDARDS DATED 2006,
AND STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION DATED 2007,
AS AMENDED BY CONTRACT DOCUMENTS.

APPLICABLE DESIGN STANDARDS MODIFICATIONS: 7-1-07

For Design Standards Modifications click on "Design Standards" at the following web site:
http://www.dot.state.fl.us/rddesign/

REVISIONS

1. FINANCIAL PROJECT ID 258398-4-52-01
Roadway Sheets 1, 12 (Revised 05-14-07)

2. FINANCIAL PROJECT ID 258398-4-56-04
Sheets U-1, U-22 to U-33 (Revised 05-14-07)

3. FINANCIAL PROJECT ID 258398-4-52-01
Roadway Sheets 1, 1A to 1D, 12, 16, 18, 20, 22, 39 (Revised 07-09-07)
Structure Sheets SP06, SP10 (Revised 07-09-07)

4. FINANCIAL PROJECT ID 258398-4-52-01
Roadway Sheets 1, 12, 83, 85, 91 to 98, 169 (Revised 02-28-08)
Structure Sheets W01 to W03, W09, W10, W14, W16 (Revised 02-28-08)

5. FINANCIAL PROJECT ID 258398-4-52-01
Roadway Sheets 1 (Revised 05-05-08)
Structure Sheets A02, A03, B01 to B10, B14 to B18, B24 to B31, B34 to B41, B44, B45 (Revised 05-05-08)
B31A, B31B, B41A (Added 05-05-08)

6. FINANCIAL PROJECT ID 258398-4-52-01
Roadway Sheets 1, 21, 22, 39, 47, 50, 147 (Revised 05-05-08)

JEFFREY C. DRAPP
LICENSE
No 54618
STATE OF FLORIDA
PROFESSIONAL ENGINEER
4/29/08

PROJECT LENGTH IS BASED ON ℄ SURVEY

LENGTH OF PROJECT	LINEAR FEET	MILES
ROADWAY	13,227.20	2.505
BRIDGES	0.00	0.000
NET LENGTH OF PROJECT	13,227.20	2.505
EXCEPTIONS	0.00	0.00
GROSS LENGTH OF PROJECT	13,227.20	2.505

FDOT PROJECT MANAGER: ADAM S. PEREZ, P.E.

KEY SHEET REVISIONS		
DATE	BY	DESCRIPTION

NOTE: THIS PROJECT TO BE LET TO CONTRACT WITH FINANCIAL PROJECT ID 258398-4-56-03, FINANCIAL PROJECT ID 258398-4-56-04

NOTE: THE SCALE OF THESE PLANS MAY HAVE CHANGED DUE TO REPRODUCTION.

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
RECEIVED
MAY 3 2010
RRD-TAMPA

ROADWAY PLANS
ENGINEER OF RECORD: JEFFREY C. DRAPP

P.E. NO.: 54618

FISCAL YEAR	SHEET NO.
08	1

NOTICE: THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE SIGNED AND SEALED UNDER RULE 61G15-23.003, F.A.C.

10/13/2008 4:33:18 PM J:\14685-05\CADD\258398452D1\roadway\keysrd01rev5.dgn

44002958.013

GENERAL NOTES:

1. THE VERTICAL BENCH MARK DATUM USED FOR THE PLANS IS NGVD-29. HORIZONTAL DATUM IS NAD 1927.

2. BUILDINGS TO BE REMOVED BY OTHERS, UNLESS OTHERWISE NOTED.

3. EXISTING DRAINAGE STRUCTURES SHALL REMAIN UNLESS OTHERWISE NOTED.

4. ANY PUBLIC LAND CORNER OR BENCH MARK WITHIN THE LIMITS OF CONSTRUCTION IS TO BE PROTECTED. IF A CORNER MONUMENT IS IN DANGER OF BEING DESTROYED AND HAS NOT BEEN PROPERLY REFERENCED, THE ENGINEER SHOULD NOTIFY THE DISTRICT LOCATION SURVEYOR, WITHOUT DELAY, BY TELEPHONE.

5. EXISTING FENCING WITHIN THE PROJECT LIMITS SHALL REMAIN UNLESS OTHERWISE NOTED IN THE PLANS.

6. THE CONTRACTOR SHALL ADDRESS THE SWPPP AND PERMITS FOR FURTHER DETAILS REGARDING POLLUTION PREVENTION.

7. PIPE PLUGS INSTALLED ON NEW PIPE SHALL BE INSTALLED INSIDE OF THE PIPE BELLS AND IN SUCH A MANNER AS TO ALLOW THE FUTURE CONNECTION OF A PIPE AND GASKET.

8. THE CONTRACTOR SHALL SUBMIT TO THE DEPARTMENT AN EROSION CONTROL PLAN (ECP) AS REQUIRED IN SECTION 104 OF THE STANDARD SPECIFICATIONS. THIS ECP SHALL INCLUDE THE IMPLEMENTATION SCHEDULE OF THIS SECTION AND THE SWPPP OF THESE PLANS.

9. DRAINAGE OUTFALL BOX CULVERT CONSTRUCTION FROM STA. 1022+83.57 BACK SHALL BE GIVEN HIGH PRIORITY AND COMPLETED FOR THE DEPARTMENT'S FINAL ACCEPTANCE WHILE REMAINING WORK IS IN PROGRESS. COMPLETION OF WORK WITHIN THIS AREA IS NECESSARY FOR A SEPARATE CONTRACT, NOT PART OF THIS WORK, TO COMMENCE. FINAL ACCEPTANCE OF WORK WITHIN THIS AREA SHALL REQUIRE TOTAL COMPLETION INCLUDING, BUT NOT LIMITED TO, FINAL GRADING AND SODDING. ALL CONTRACTOR'S MATERIALS, EQUIPMENT, STAGING APPURTENANCES, ETC. SHALL BE REMOVED AND THE AREA PRESENTED TO BE COMPLETE AND FINISHED FOR PARTIAL ACCEPTANCE AS DEFINED UNDER FDOT SECTION 5, ITEM 5-10.2.

10. A MINIMUM OF 15/16" STEEL WALL THICKNESS WILL BE REQUIRED FOR ANY CASING TO BE USED FOR JACK AND BORE OR MICRO TUNNELING OPERATIONS.

11. THE CONTRACTOR SHALL SUBMIT DOCUMENTATION, INCLUDING PERSONNEL (FOREMAN, SKILLED LABORER'S), OF SUCCESSFUL COMPLETION OF LARGE (GREATER THAN 72") JACK AND BORE/MICRO TUNNELING INSTALLATIONS, AND FIELD DEMONSTRATE HIS ABILITY TO INSTALL 100 LF OF 102" ID TEST BORE AT A LOCATION DETERMINED BY THE ENGINEER ACCURATELY TO WITHIN 1 (ONE) INCH BOTH VERTICALLY AND HORIZONTALLY AT THE ENDS OR OTHER POINTS PHYSICALLY OBSERVED. COMPENSATION FOR ALL WORK AND MATERIALS REQUIRED TO COMPLETE THIS WORK SHALL BE IN ACCORDANCE WITH 556-8 OF THE STANDARD SPECIFICATIONS.

12. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL REQUIRED PERMITS FOR THE INSTALLATION AND OPERATION OF DEWATERING AND/OR GROUNDWATER CONTROL SYSTEMS. THIS COULD INCLUDE, AND IS NOT LIMITED TO, THE ACQUISITION OF A WATER USE PERMIT FROM THE SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT.

CONTAMINATION NOTES:

1. CONTAMINATED AREAS: THE CONTRACTOR SHALL NOTIFY ROBERTO GONZALEZ A MINIMUM OF 4 (FOUR) WEEKS PRIOR TO ANY WORK BEING PERFORMED IN CONTAMINATED AREAS. THE CONTRACTOR SHALL BE REQUIRED TO COORDINATE WORK WITH THE DISTRICT'S REMEDIATION CONTRACTOR. THE DISTRICT REMEDIATION CONTRACTOR IS NOT PART OF THIS CONTRACT. THE DISTRICT REMEDIATION CONTRACTOR WILL BE CONTRACTED BY THE DEPARTMENT INDEPENDENT OF THIS CONTRACT (258398). FOR CONTAMINATION ISSUES OUTSIDE OF THE SITES SPECIFIED BELOW, IMMEDIATELY CONTACT ROBERTO GONZALEZ, FDOT DISTRICT 7 AT (813) 975-6923. FOR CONSTRUCTION ACTIVITIES IN AREAS OUTLINED BELOW, THE ROLES OF BOTH CONTRACTOR AND DISTRICT REMEDIATION CONTRACTOR ARE DEFINED AS FOLLOWS:

A. 500 WEST SHORE BLVD., SUN TRUST BUILDING. APPROXIMATE CENTERLINE OF CONSTRUCTION STA 23+50 TO 25+50, FROM CENTERLINE OF CONSTRUCTION TO APPROXIMATELY 80 LT. CONSTRUCTION PLANS INDICATE THAT DRAINAGE STRUCTURES S-1016, S-1016B, S-1017 AND S-402 WILL BE INSTALLED. THE DRAINAGE WORK INCLUDES THE INSTALLATION OF A JACK AND BORE ACROSS WESTSHORE BLVD. FOR A 66" STEEL CASING AND 48" PIPE AS WELL AS SHORT RUNS OF 18" PIPING.

GROUNDWATER CONTAMINATION FROM LEAD HAS BEEN DETECTED IN THIS LOCATION. PRIOR TO CONSTRUCTION, THE DISTRICT REMEDIATION CONTRACTOR WILL COLLECT GROUNDWATER SAMPLES. IF CONTAMINATION IS IDENTIFIED THE DISTRICT REMEDIATION CONTRACTOR WILL PROVIDE DEWATERING SERVICES, TREATMENT AND DISPOSAL OF CONTAMINATED WATER. DURING CONSTRUCTION THE DISTRICT REMEDIATION CONTRACTOR WILL PROVIDE GROUNDWATER TREATMENT PRIOR TO DISCHARGE. THIS DISCHARGE WILL OCCUR UNDER A PERMIT THROUGH THE DISTRICT REMEDIATION CONTRACTOR FOR THE SITE IDENTIFIED. THE CONTRACTOR WILL PROVIDE THE WELL POINTS FOR THE DEWATERING SERVICES. THE CONTRACTOR WILL PROVIDE FOR THE DEWATERING SERVICES IF THERE IS NO CONTAMINATION DETECTED IN THE GROUNDWATER. THE DISTRICT REMEDIATION CONTRACTOR WILL BE RESPONSIBLE FOR SCREENING OF SOILS USING AN ORGANIC VAPOR ANALYZER (OVA). SCREENING OF GROUNDWATER IMPACTED SOILS WILL BE COMPLETED BY THE DISTRICT REMEDIATION CONTRACTOR PRIOR TO REUSE, MOVEMENT OR DISPOSAL OF THE SOILS. REUSE AND MOVEMENT WILL BE PERFORMED BY THE CONTRACTOR. TREATMENT AND DISPOSAL OF IMPACTED SOILS WILL BE PERFORMED BY THE DISTRICT REMEDIATION CONTRACTOR.

B. 4106 CYPRESS STREET, SEWCO PRINTING (SITE 29). UTILITY ADJUSTMENTS FOR CYPRESS STREET FOR APPROXIMATE CENTERLINE OF CONSTRUCTION STA 102+00 TO 1064+50 MAY ALSO BE IMPACTED FROM CENTERLINE TO APPROXIMATELY 50 RT. PLANNED ACTIVITIES INCLUDE THE REMOVAL OF 170 LINEAR FEET (LF) OF 42" SANITARY SEWER AND ASSOCIATED MANHOLES, AS WELL AS THE REMOVAL OF 27 LF OF 8" SANITARY SEWER.

GROUNDWATER CONTAMINATION FROM COPPER HAS BEEN DETECTED AT THIS LOCATION. PRIOR TO CONSTRUCTION, THE DISTRICT REMEDIATION CONTRACTOR WILL COLLECT GROUNDWATER SAMPLES. IF CONTAMINATION IS IDENTIFIED THE DISTRICT REMEDIATION CONTRACTOR WILL PROVIDE DEWATERING SERVICES, TREATMENT AND DISPOSAL OF CONTAMINATED WATER. DURING CONSTRUCTION THE DISTRICT REMEDIATION CONTRACTOR WILL PROVIDE GROUNDWATER TREATMENT PRIOR TO DISCHARGE. THIS DISCHARGE WILL OCCUR UNDER A PERMIT THROUGH THE DISTRICT REMEDIATION CONTRACTOR FOR THE SITE IDENTIFIED. THE CONTRACTOR WILL PROVIDE THE WELL POINTS FOR THE DEWATERING SERVICES. THE CONTRACTOR WILL PROVIDE FOR THE DEWATERING SERVICES IF THERE IS NO CONTAMINATION DETECTED IN THE GROUNDWATER. THE DISTRICT REMEDIATION CONTRACTOR WILL BE RESPONSIBLE FOR SCREENING OF SOILS USING AN ORGANIC VAPOR ANALYZER (OVA). SCREENING OF GROUNDWATER IMPACTED SOILS WILL BE COMPLETED BY THE DISTRICT REMEDIATION CONTRACTOR PRIOR TO REUSE, MOVEMENT OR DISPOSAL OF THE SOILS. REUSE AND MOVEMENT WILL BE PERFORMED BY THE CONTRACTOR. TREATMENT AND DISPOSAL OF IMPACTED SOILS WILL BE PERFORMED BY THE DISTRICT REMEDIATION CONTRACTOR. THE CONTRACTOR WILL PROVIDE ALL REQUIRED STRUCTURES AND ASSOCIATED PIPING FOR INSTALLATION BY THE DISTRICT REMEDIATION CONTRACTOR.

C. 4102 TO 4104 CYPRESS STREET, JESTO TRANSMISSION (SITE 30- FORMER COMPLETE AUTO REPAIR). UTILITY ADJUSTMENTS FOR CYPRESS STREET FOR APPROXIMATE CENTERLINE OF CONSTRUCTION STA 102+00 TO 1064+50 MAY ALSO BE IMPACTED FROM CENTERLINE TO APPROXIMATELY 50 RT.

GROUNDWATER CONTAMINATION FROM COPPER AND CHROMIUM HAS BEEN DETECTED AT THIS LOCATION. PRIOR TO CONSTRUCTION, THE DISTRICT REMEDIATION CONTRACTOR WILL COLLECT GROUNDWATER SAMPLES. IF CONTAMINATION IS IDENTIFIED THE DISTRICT REMEDIATION CONTRACTOR WILL PROVIDE DEWATERING SERVICES, TREATMENT AND DISPOSAL OF CONTAMINATED WATER. DURING CONSTRUCTION THE DISTRICT REMEDIATION CONTRACTOR WILL PROVIDE GROUNDWATER TREATMENT PRIOR TO DISCHARGE. THIS DISCHARGE WILL OCCUR UNDER A PERMIT THROUGH THE DISTRICT REMEDIATION CONTRACTOR FOR THE SITE IDENTIFIED. THE CONTRACTOR WILL PROVIDE THE WELL POINTS FOR THE DEWATERING SERVICES. THE CONTRACTOR WILL PROVIDE FOR THE DEWATERING SERVICES IF THERE IS NO CONTAMINATION DETECTED IN THE GROUNDWATER. THE DISTRICT REMEDIATION CONTRACTOR WILL BE RESPONSIBLE FOR SCREENING OF SOILS USING AN ORGANIC VAPOR ANALYZER (OVA). SCREENING OF GROUNDWATER IMPACTED SOILS WILL BE COMPLETED BY THE DISTRICT REMEDIATION CONTRACTOR PRIOR TO REUSE, MOVEMENT OR DISPOSAL OF THE SOILS. REUSE AND MOVEMENT WILL BE PERFORMED BY THE CONTRACTOR. TREATMENT AND DISPOSAL OF IMPACTED SOILS WILL BE PERFORMED BY THE DISTRICT REMEDIATION CONTRACTOR. INSTALLATION OF AFFECTED STRUCTURES, GROUNDWATER TREATMENT, SOIL SCREENING AND DISPOSAL WILL BE PERFORMED BY THE DISTRICT REMEDIATION CONTRACTOR. THE CONTRACTOR WILL PROVIDE ALL REQUIRED STRUCTURES AND ASSOCIATED PIPING FOR INSTALLATION BY THE DISTRICT REMEDIATION CONTRACTOR.

D. 612 NORTH LOIS AVENUE, NEVADA BOB'S GOLF AND TENNIS (SITE 31- FORMER TEXACO STATION). THE APPROXIMATE CENTERLINE OF CONSTRUCTION FOR LOIS AVE. IS FROM STA 25+50 TO 28+50. THE ENTERLINE FOR CONSTRUCTION OF THE POND IS APPROXIMATELY STA 74+00 TO 79+50. PLANNED ACTIVITIES INCLUDE THE INSTALLATION OF POND 5E AS WELL AS THE INSTALLATION OF STRUCTURES S-600A, S-600B, S-560A, S-550, S-549, S-559 AND S-567. INSTALLATIONS WILL ALSO INCLUDE SECTIONS OF 29" X 45" BOX CULVERT AND SECTIONS OF 18", 30" AND 36" PIPING.

THE SITE HAS BURIED WASTES THAT MAY IMPACT CONSTRUCTION. DEBRIS REMOVAL WILL BE PERFORMED BY THE DISTRICT REMEDIATION CONTRACTOR PRIOR TO CONSTRUCTION ACTIVITIES. PRELIMINARY GRADING OF POND 5E WILL BE COMPLETED PRIOR TO CONSTRUCTION. GROUNDWATER CONTAMINATION FROM CHROMIUM, COPPER AND LEAD HAS BEEN DETECTED AT THIS LOCATION. DURING CONSTRUCTION THE DISTRICT REMEDIATION CONTRACTOR WILL PROVIDE GROUNDWATER TREATMENT PRIOR TO DISCHARGE. THIS DISCHARGE WILL OCCUR UNDER A PERMIT THROUGH THE DISTRICT REMEDIATION CONTRACTOR FOR THE SITE IDENTIFIED. THE CONTRACTOR WILL PROVIDE THE WELL POINTS FOR THE DEWATERING SERVICES. THE DISTRICT REMEDIATION CONTRACTOR WILL PROVIDE DEWATERING SERVICES, TREATMENT AND DISPOSAL OF CONTAMINATED WATER. THE CONTRACTOR WILL PROVIDE FOR THE DEWATERING SERVICES IF THERE IS NO CONTAMINATION DETECTED IN THE GROUNDWATER. THE DISTRICT REMEDIATION CONTRACTOR WILL BE RESPONSIBLE FOR SCREENING OF SOILS USING AN ORGANIC VAPOR ANALYZER (OVA). SCREENING OF GROUNDWATER IMPACTED SOILS WILL BE COMPLETED BY THE DISTRICT REMEDIATION CONTRACTOR PRIOR TO REUSE, MOVEMENT OR DISPOSAL OF THE SOILS. REUSE AND MOVEMENT WILL BE PERFORMED BY THE CONTRACTOR. TREATMENT AND DISPOSAL OF IMPACTED SOILS WILL BE PERFORMED BY THE DISTRICT REMEDIATION CONTRACTOR.

E. 1101 NORTH DALE MABRY HIGHWAY, WATRESS FIRM/LEATHER COLLECTION (SITE 36- FORMER MOBIL STATION). APPROXIMATE CENTERLINE OF CONSTRUCTION FOR DALE MABRY HIGHWAY STA 37+50 TO 42+50, FROM CENTERLINE OF CONSTRUCTION TO APPROXIMATELY 80 LT. STRUCTURES S-777, S-778, S-778A AND S-779 MAY BE AFFECTED.

GROUNDWATER CONTAMINATION FROM PETROLEUM AND METALS HAS BEEN DETECTED IN BOTH SOIL AND GROUNDWATER AT THIS LOCATION. IF GROUNDWATER OR GROUNDWATER IMPACTED SOILS ARE ENCOUNTERED DURING CONSTRUCTION THEN GROUNDWATER RECOVERY AND TREATMENT PRIOR TO DISCHARGE WILL BE REQUIRED. DURING CONSTRUCTION THE DISTRICT REMEDIATION CONTRACTOR WILL PROVIDE GROUNDWATER TREATMENT PRIOR TO DISCHARGE. THIS DISCHARGE WILL OCCUR UNDER A PERMIT THROUGH THE DISTRICT REMEDIATION CONTRACTOR FOR THE SITE IDENTIFIED. THE CONTRACTOR WILL PROVIDE THE WELL POINTS FOR THE DEWATERING SERVICES. THE CONTRACTOR WILL PROVIDE FOR THE DEWATERING SERVICES IF THERE IS NO CONTAMINATION DETECTED IN THE GROUNDWATER. THE DISTRICT REMEDIATION CONTRACTOR WILL BE RESPONSIBLE FOR SCREENING OF SOILS USING AN ORGANIC VAPOR ANALYZER (OVA). SCREENING OF GROUNDWATER IMPACTED SOILS WILL BE COMPLETED BY THE DISTRICT REMEDIATION CONTRACTOR PRIOR TO REUSE, MOVEMENT OR DISPOSAL OF THE SOILS. REUSE AND MOVEMENT WILL BE PERFORMED BY THE CONTRACTOR. TREATMENT AND DISPOSAL OF IMPACTED SOILS WILL BE PERFORMED BY THE DISTRICT REMEDIATION CONTRACTOR. THE CONTRACTOR WILL PROVIDE ALL REQUIRED STRUCTURES AND ASSOCIATED PIPING FOR INSTALLATION BY THE DISTRICT REMEDIATION CONTRACTOR. INSTALLATION BY THE CONTRACTOR WILL NOT BE REQUIRED AT THIS LOCATION.

UTILITY OWNERS:

SEE UTILITY ADJUSTMENT SHEETS FOR LIST OF UTILITY OWNERS.

JEFFREY C. DRAPP
LICENSE
No 54618
STATE OF FLORIDA
PROFESSIONAL ENGINEER

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
PERMITTED CONSTRUCTION DRAWINGS

FILE OF RECORD

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
RECEIVED
MAY 3 2010
RRD-TAMPA

NOTE: THE FOLLOWING ABBREVIATIONS HAVE BEEN UTILIZED IN THE PLANS FOR CLARITY AND EASE OF PLANS READING.

WJL — WETLAND JUISDICTIONAL LINE

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

HNTB
10210 HIGHLAND MANOR DR.
SUITE 140
TAMPA, FL. 33610
(813) 246-5527
CERT. OF AUTH. NO. 6500
JEFFREY C. DRAPP, P.E., NO. 54618

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 93	HILLSBOROUGH	258398-4-52-01

GENERAL NOTES

SHEET NO. 33

SMF 10

DATUM CONVERTION NAVD 88 TO NGVD 29 = 0.869

POND 3S
SHW 2.8
(SWFWMD PERMIT
NO. 402958-E08187)
WS EL. 3.5

EXIST. INLET TO REMAIN
15" PIPE
10'x6' CONC. BOX CULVERT
54" PIPE
(2) 78" PIPE
(2) 102" STEEL CASING PIPE (JACK AND BORE)
REMOVE EXIST. PIPE AND EW
43"x68" PIPE
72" STEEL CASING PIPE (JACK AND BORE)
REMOVE HDWL AND 40' OF EXIST 24" PIPE
REMOVE EXIST HDWL. PLUG AND FILL W/ FLOWABLE FILL
EXIST. MH & 24" PIPE TO REMAIN, PLUG & FILL W/ FLOWABLE FILL
CONST. (3) 60" PIPE
CONST. (3) 78" STEEL CASING PIPE (JACK AND BORE)
10'x6' CONC. BOX CULVERT SEE BOX CULVERT DETAILS
REMOVE EXIST. HDWL
REMOVE EXIST CONTROL STRUCTURE
EXIST. PIPE TO REMAIN, FILL W/ FLOWABLE FILL AND PLUG
15" PIPE
℄ CONST. OUTFALL
24" PIPE (TO REMAIN)
REMOVE EXIST HDWL AND 10' OF 24" PIPE
66" STEEL CASING PIPE (JACK AND BORE)
48" PIPE
10'x5' CONC. BOX CULVERT SEE BOX CULVERT DETAILS
MEMORIAL HIGHWAY
EXIST. WATER SURFACE
R/W LINE
LA R/W LINE
WJL
SB-106
SB-112
SB-112A
SB-120
BH-2
BH-3
S-1007B
S-1008
S-1008A
S-1008B
S-1009
S-1009A
S-1010
S-1010A
S-1010B
S-1010E
1023
1024
1025
1027
1030
1031
0 15 30 60
Feet

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT PERMITTED CONSTRUCTION DRAWINGS

FILE OF RECORD

DOUGLAS J. BURKHART LICENSE No 40900 STATE OF FLORIDA PROFESSIONAL ENGINEER

NOTICE: THE OFFICIAL FORM OF THIS SHEET IS THE ELECTRONIC FILE SIGNED AND SEALED UNDER RULE 61G15-23.003, F.A.C.

REVISIONS					
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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 93	HILLSBOROUGH	258398-4-52-01

POND DETAIL SHEET
POND NO. 3S

SHEET NO. 78

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SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT RECEIVED MAY 9 2007 BRD-TAMPA

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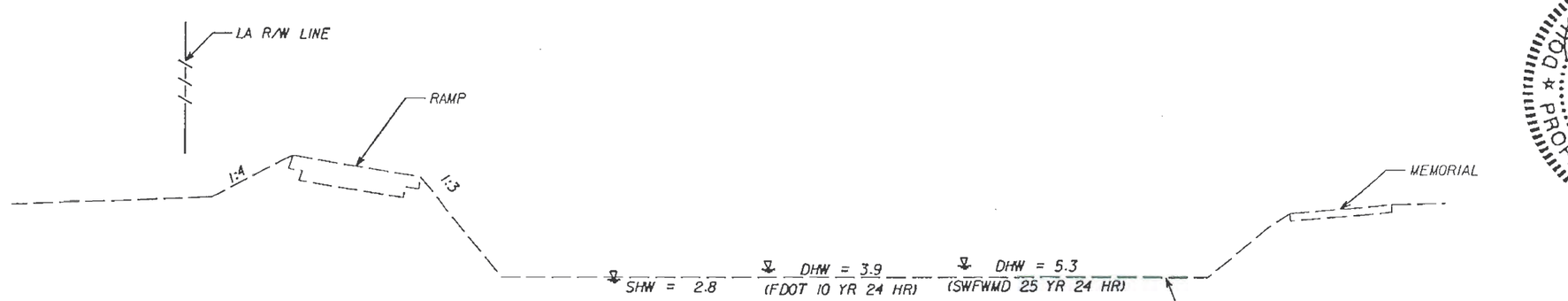
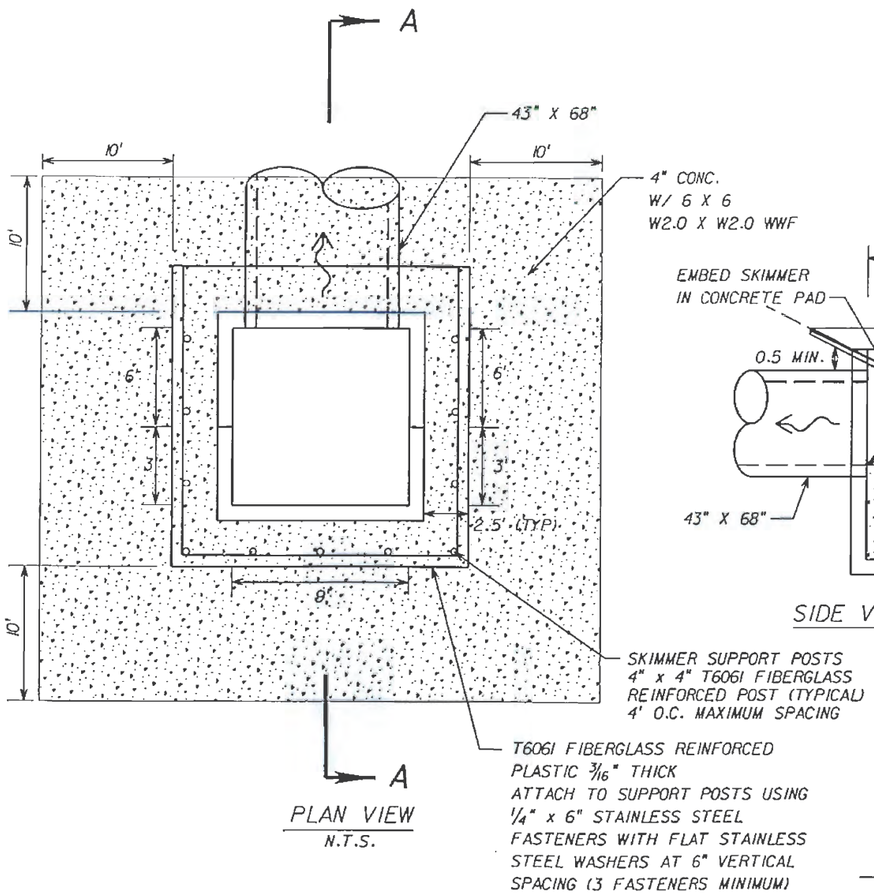
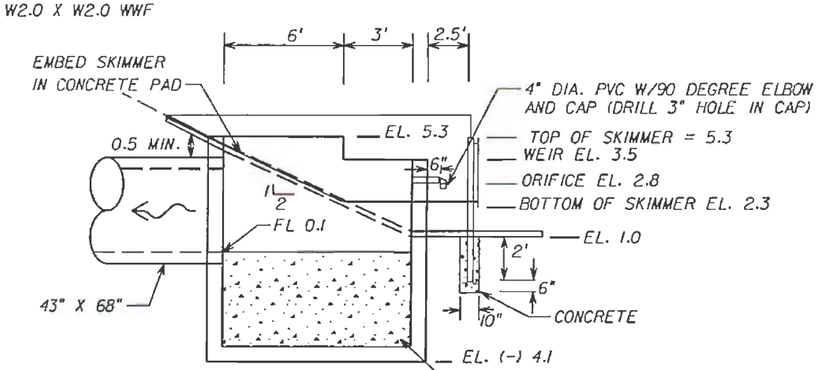


POND SECTION A-A
N.T.S.

NOTE: THIS LINE REPRESENTS THE EXISTING SURFACE WATER ELEVATION AT THE TIME OF SURVEY. IT DOES NOT REPRESENT THE POND BOTTOM.



PLAN VIEW
N.T.S.



SIDE VIEW SECTION A-A
N.T.S.

(S-1009A) STA. 470+99, 160.00' RT
CONST: J-BOTTOM (9' X 9') (INLET SPECIAL)
CONTROL STRUCTURE
PER INDEX NO. 200, 201, 240, & 199
NO GRATE

POND 3S CONTROL STRUCTURE DETAIL
N.T.S.

POND 3S CONTROL STR. NOTES

1. THE COST OF 4" PVC BLEED DOWN (4" PVC AND 90° ELBOW) SHALL BE INCLUDED IN THE COST OF THE CONTROL STRUCTURE
2. THE COST OF THE SKIMMER AND ALL APPURTENANCES SHALL BE INCLUDED IN THE COST OF THE CONTROL STRUCTURE

NOTE:

1. A BENCHMARK IS TO BE CONSTRUCTED WITHIN THE POND RIGHT-OF-WAY TO VERIFY CRITICAL ELEVATIONS OF THE POND AND OUTFALL STRUCTURES

DOUGLAS J. BURKHART LICENSE NO. 40900 STATE OF FLORIDA PROFESSIONAL ENGINEER

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT PERMITTED CONSTRUCTION DRAWINGS

FILE OF RECORD

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT RECEIVED MAY 3 2011 RRD-TAMPA

NOTICE: THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE SIGNED AND SEALED UNDER RULE 61G15-23.003, F.A.C.

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

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CERT. OF AUTH. NO. 6500
DOUGLAS J. BURKHART, P.E., NO. 40900

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 93	HILLSBOROUGH	258398-4-52-01

POND DETAIL SHEET
POND NO. 3S

SHEET NO. 79

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Memo

Appendix G. Stormwater Management Facilities Calculations

ATKINS

Designed By:	MAW
Date:	3/26/2018
Checked By:	RDU
Date:	3/26/2018

I-275 (SR 93) Design
SMF 3

Pre-Development

Total Area =	29.40 ac
Pond Area at SHWT =	0.62 ac
Impervious Area Treated =	14.02 ac
Impervious Area Not Treated =	5.64 ac
Pervious Area =	9.12 ac

Post-Development

Total Area =	29.40 ac
Pond Area at SHWT =	0.79 ac
Impervous Area =	20.36 ac
Pervious Area =	8.25 ac

SMF 3

TREATMENT CALCULATIONS

Wet Detention

Treat 1 in. of runoff over Impervious Area	
Pre-Development Impervious Area Not Treated	5.64 ac
Post-Development Impervious Area	20.36 ac
Impervious Area Required to be Treated	**14.72 ac**
Compensatory Treatment Area	**0.88 ac**
Area to be treated	**15.60 ac**
Treatment volume required	**1.30 ac-ft**

ATKINS

Designed By: MAW
Date: 3/26/2018
Checked By: RDU
Date: 3/26/2018

I-275 (SR 93) Design
SMF 3

ATTENUATION CALCULATIONS

Will attenuation be necessary? no
Zone 6 - 100yr/24hr (P) 11.3 in.

Pre-Development CN Calculations

	Condition	Area	CN	Weighted CN
Pond Area at SHWT		0.62 ac	100	2.11
Impervious Area Treated		14.02 ac	98	46.73
Impervious Area Not Treated		5.64 ac	98	18.80
Pervious Area - HSG A	Good	9.12 ac	39	12.10
	Total Area =	29.40 ac	CN_{pre} =	80

SCS Method for Attenuation Volume:

$$S = \frac{1{,}000}{CN} - 10$$
$$Q = \frac{(P - 0.2S)^2}{P + 0.8S}$$

S_{pre} = 2.54 in.
Q_{pre} = 8.74 in.
Pre-development runoff volume = **21.40 ac-ft**

ATTENUATION CALCULATIONS (CONT.)

Post-Development CN Calculations

	Condition	Area	CN	Weighted CN
Pond Area at SHWT		0.79 ac	100	2.69
Impervious Area Treated		20.36 ac	98	67.87
Pervious Area - HSG A	Good	8.25 ac	39	10.94
	Total Area =	29.40 ac	CN_{post} =	81

SCS Method for Attenuation Volume:

$$S = \frac{1{,}000}{CN} - 10$$
$$Q = \frac{(P - 0.2S)^2}{P + 0.8S}$$

S_{post} = 2.27 in.
Q_{post} = 8.97 in.
Post-development runoff volume = **21.97 ac-ft**

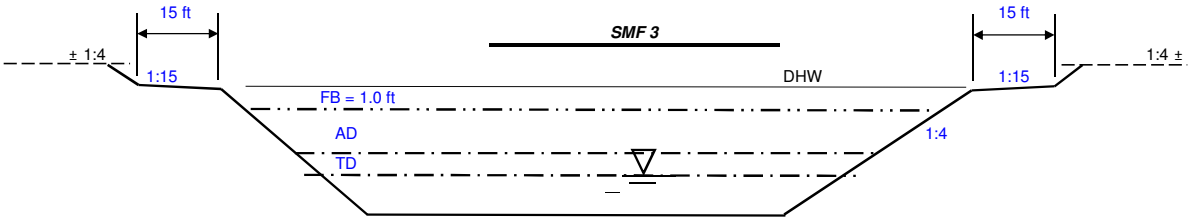
Attenuation volume required (Post-Pre) **0.00 ac-ft** **Outfall is Tidally influenced, No Attenuation required.**

ATKINS

Designed By: MAW
Date: 3/26/2018
Checked By: RDU
Date: 3/26/2018

I-275 (SR 93) Design
SMF 3

POND SIZE ESTIMATE



Approx. Pond Bottom Elevation = -4.47

Approx. Low Edge of Pavement (LEOP) at Existing curb inlet top in a curb return on Kennedy

Approx. SHWT Elevation = 1.56

Approx. LEOP Elevation = 6.48 ft
Approx. LEOB Elevation = 6.36 ft — AHW LEOP = 3.48
Approx. hydraulic clearance from LEOP = 1.00 ft — AHW LEOB = 3.36
Head loss from LEOP to SMF (1000 ft) = 1.00 ft — DHW = 3.36
Head loss from SMF to Outfall (500 ft) = 0.50 ft
Available depth for T.D. + A.D. = 1.92 ft

Assumed HGL Slope = 0.001 ft/ft

Attenuation Depth, A.D.	**0.40 ft**	Iterative
Treatment Depth, T.D.	**1.40 ft**	Iterative
Allowable High Water Elevation	3.4 ft	
Area at AHW (Area at Top of Attenuation Depth)	**1.14 ac**	Iterative
Area at Weir (Area at Bottom of Attenuation Depth)	**1.06 ac**	Iterative
Area at SHWT (Area at Bottom of Treatment Depth)	**0.79 ac**	Iterative

Treatment Volume Required
1.30 ac-ft
Attenuation Volume Required
0.00 ac-ft
Total Volume Required
1.30 ac-ft

Provided Attenuation Volume	0.44 ac-ft
Provided Treatment Volume	1.30 ac-ft
Proposed Impervious Area to Be Treated	15.60 ac
Provided Treatment Depth =	1.00 in.

ATKINS

Designed By:	MAW
Date:	3/26/2018
Checked By:	RDU
Date:	3/26/2018

I-275 (SR 93) Design
SMF 5

Pre-Development

Total Area =	3.69 ac
Pond Area at SHWT =	0.00 ac
Impervious Area Treated =	0.00 ac
Impervious Area Not Treated =	1.58 ac
Pervious Area =	2.11 ac

Post-Development

Total Area =	3.69 ac
Pond Area at SHWT =	0.37 ac
Impervous Area =	2.30 ac
Pervious Area =	1.02 ac

SMF 5

TREATMENT CALCULATIONS

Wet Detention

Treat 1 in. of runoff over Impervious Area	
Pre-Development Impervious Area Not Treated	1.58 ac
Post-Development Impervious Area	2.30 ac
Impervious Area Required to be Treated	**0.72 ac**
Compensatory Treatment Area	**1.58 ac**
Area to be treated	**2.30 ac**
Treatment volume required	**0.19 ac-ft**

ATKINS

Designed By: MAW
Date: 3/26/2018
Checked By: RDU
Date: 3/26/2018

I-275 (SR 93) Design
SMF 5

ATTENUATION CALCULATIONS

Will attenuation be necessary? no
Zone 6 - 100yr/24hr (P) 11.3 in.

Pre-Development CN Calculations

	Condition	Area	CN	Weighted CN
Pond Area at SHWT		0.00 ac	100	0.00
Impervious Area Treated		0.00 ac	98	0.00
Impervious Area Not Treated		1.58 ac	98	41.96
Pervious Area - HSG A	Good	2.11 ac	39	22.30
	Total Area =	3.69 ac	CN_{pre} =	64

SCS Method for Attenuation Volume:

$$S = \frac{1{,}000}{CN} - 10$$
$$Q = \frac{(P - 0.2S)^2}{P + 0.8S}$$

S_{pre} = 5.56 in.
Q_{pre} = 6.59 in.
Pre-development runoff volume = **2.03 ac-ft**

ATTENUATION CALCULATIONS (CONT.)

Post-Development CN Calculations

	Condition	Area	CN	Weighted CN
Pond Area at SHWT		0.37 ac	100	10.03
Impervious Area Treated		2.30 ac	98	61.08
Pervious Area - HSG A	Good	1.02 ac	39	10.78
	Total Area =	3.69 ac	CN_{post} =	82

SCS Method for Attenuation Volume:

$$S = \frac{1{,}000}{CN} - 10$$
$$Q = \frac{(P - 0.2S)^2}{P + 0.8S}$$

S_{post} = 2.21 in.
Q_{post} = 9.02 in.
Post-development runoff volume = **2.77 ac-ft**

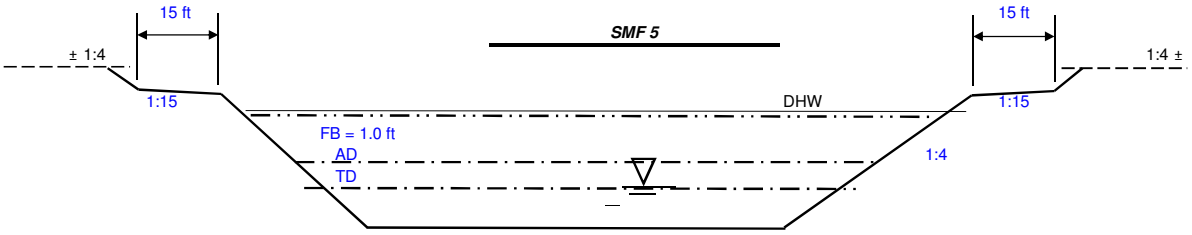
Attenuation volume required (Post-Pre) **0.00 ac-ft** **Outfall is Tidally influenced, No Attenuation required.**

ATKINS

Designed By: MAW
Date: 3/26/2018
Checked By: RDU
Date: 3/26/2018

I-275 (SR 93) Design
SMF 5

POND SIZE ESTIMATE



Approx. Pond Bottom Elevation = -1.40
Approx. SHWT Elevation = 4.60

Approx. Low Edge of Pavement (LEOP) at PR_REO_275WB_GP
Approx. LEOP Elevation = 7.90 ft
Approx. LEOB Elevation = 7.90 ft
Approx. hydraulic clearance from LEOP = 1.00 ft
Head loss from LEOP to SMF (100 ft) = 0.10 ft
Head loss from SMF to Outfall (500 ft) = 0.50 ft
Available depth for T.D. + A.D. = 1.20 ft

AHW LEOP = 5.80
AHW LEOB = 5.80
DHW = 5.80

Assumed HGL Slope = 0.001 ft/ft

Attenuation Depth, A.D.	**0.40 ft**	Iterative
Treatment Depth, T.D.	**0.80 ft**	Iterative
Allowable High Water Elevation	5.8 ft	
Area at AHW (Area at Top of Attenuation Depth)	**0.42 ac**	Iterative
Area at Weir (Area at Bottom of Attenuation Depth)	**0.40 ac**	Iterative
Area at SHWT (Area at Bottom of Treatment Depth)	**0.37 ac**	

Provided Attenuation Volume	0.16 ac-ft
Provided Treatment Volume	0.31 ac-ft

Proposed Impervious Area to Be Treated	2.30 ac

Provided Treatment Depth =	1.61 in.

Treatment Volume Required
0.19 ac-ft
Attenuation Volume Required
0.00 ac-ft
Total Volume Required
0.19 ac-ft

ATKINS

Designed By:	MAW
Date:	3/26/2018
Checked By:	RDU
Date:	3/26/2018

I-275 (SR 93) Design
SMF 8

Pre-Development

Total Area =	19.05 ac	Loading Total Area =	27.00 ac	For Nutrient CN Sheet
Pond Area at SHWT =	0.51 ac	Total Impervious =	13.04 ac	For Nutrient CN Sheet
Impervious Area Treated =	4.77 ac			
Impervious Area Not Treated =	6.84 ac			
Pervious Area =	6.93 ac			

Post-Development

Total Area =	27.00 ac
Pond Area at SHWT =	1.57 ac
Impervous Area =	21.01 ac
Pervious Area =	4.42 ac

SMF 8

TREATMENT CALCULATIONS

Dry Retention

Treat 0.5 in. of runoff over Impervious Area	
Pre-Development Impervious Area Not Treated	6.84 ac
Post-Development Impervious Area	21.01 ac
Impervious Area Required to be Treated	**14.17 ac**
Compensatory Treatment Area	**6.84 ac**
Area to be treated	**21.01 ac**
Treatment volume required	**0.88 ac-ft**

ATKINS

Designed By: MAW
Date: 3/26/2018
Checked By: RDU
Date: 3/26/2018

I-275 (SR 93) Design
SMF 8

ATTENUATION CALCULATIONS

Will attenuation be necessary? no
Zone 6 - 100yr/24hr (P) 11.3 in.

Pre-Development CN Calculations

	Condition	Area	CN	Weighted CN
Pond Area at SHWT		0.51 ac	100	2.68
Impervious Area Treated		4.77 ac	98	24.54
Impervious Area Not Treated		6.84 ac	98	35.19
Pervious Area - HSG A	Good	6.93 ac	39	14.19
	Total Area =	19.05 ac	CN_{pre} =	77

SCS Method for Attenuation Volume:

$$S = \frac{1{,}000}{CN} - 10$$
$$Q = \frac{(P - 0.2S)^2}{P + 0.8S}$$

S_{pre} = 3.06 in.
Q_{pre} = 8.31 in.
Pre-development runoff volume = **13.20 ac-ft**

ATTENUATION CALCULATIONS (CONT.)

Post-Development CN Calculations

	Condition	Area	CN	Weighted CN
Pond Area at SHWT		1.57 ac	100	5.81
Impervious Area Treated		21.01 ac	98	76.26
Pervious Area - HSG A	Good	4.42 ac	39	6.38
	Total Area =	27.00 ac	CN_{post} =	88

SCS Method for Attenuation Volume:

$$S = \frac{1{,}000}{CN} - 10$$
$$Q = \frac{(P - 0.2S)^2}{P + 0.8S}$$

S_{post} = 1.30 in.
Q_{post} = 9.87 in.
Post-development runoff volume = **22.21 ac-ft**

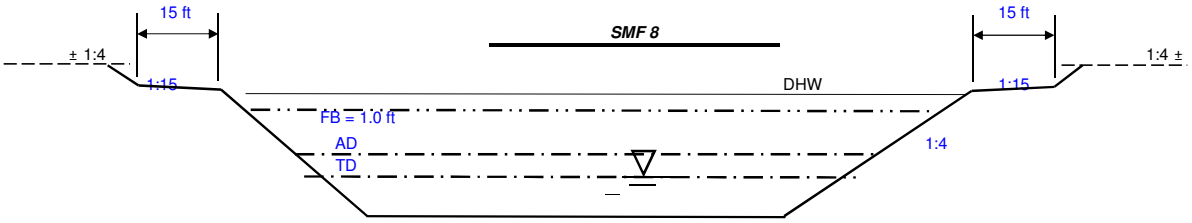
Attenuation volume required (Post-Pre) **0.00 ac-ft** **Outfall is Tidally influenced, No Attenuation required.**

ATKINS

Designed By: MAW
Date: 3/26/2018
Checked By: RDU
Date: 3/26/2018

I-275 (SR 93) Design
SMF 8

POND SIZE ESTIMATE



Approx. Pond Bottom Elevation (Plus 2' for dry detention) = 4.60

Approx. Low Edge of Pavement (LEOP) at STA 1115+00.00 (PR_9G6S)

Approx. SHWT Elevation = 2.60

Approx. LEOP Elevation =	8.40 ft	
Approx. LEOB Elevation =	8.40 ft	AHW LEOP = 6.30
Approx. hydraulic clearance from LEOP =	1.00 ft	AHW LEOB = 6.30
Head loss from LEOP to SMF (100 ft) =	0.10 ft	DHW = 6.20
Head loss from SMF to Outfall (500 ft) =	0.50 ft	
Available depth for T.D. + A.D. =	3.70 ft	

Assumed HGL Slope = 0.001 ft/ft

Attenuation Depth, A.D.	**1.0 ft**	Iterative
Treatment Depth, T.D.	**0.6 ft**	Iterative
Allowable High Water Elevation	6.2 ft	
Area at AHW (Area at Top of Attenuation Depth)	**1.77 ac**	Iterative
Area at Weir (Area at Bottom of Attenuation Depth)	**1.65 ac**	Iterative
Area at SHWT (Area at Bottom of Treatment Depth)	**1.57 ac**	Iterative

Treatment Volume Required
0.88 ac-ft
Attenuation Volume Required
0.00 ac-ft
Total Volume Required
0.88 ac-ft

Provided Attenuation Volume	1.71 ac-ft
Provided Treatment Volume	0.97 ac-ft
Proposed Impervious Area to Be Treated	21.01 ac
Provided Treatment Depth =	0.55 in.

ATKINS

Designed By:	MAW
Date:	3/26/2018
Checked By:	RDU
Date:	3/26/2018

I-275 (SR 93) Design
SMF 10

Pre-Development

Total Area =	24.55 ac	Loading Total Area =	27.57 ac	For Nutrient CN Sheet
Pond Area at SHWT =	2.07 ac	Total Impervious =	13.85 ac	For Nutrient CN Sheet
Impervious Area Treated =	7.21 ac			
Impervious Area Not Treated =	3.06 ac			
Pervious Area =	12.21 ac			

Post-Development

Total Area =	27.57 ac
Pond Area at SHWT =	3.29 ac
Impervous Area =	19.50 ac
Pervious Area =	4.78 ac

SMF 10

TREATMENT CALCULATIONS

Wet Retention

Treat 1 in. of runoff over Impervious Area	
Pre-Development Impervious Area Not Treated	3.06 ac
Post-Development Impervious Area	19.50 ac
Impervious Area Required to be Treated	**16.44 ac**
Compensatory Treatment Area	**3.06 ac**
Area to be treated	**19.50 ac**
Treatment volume required	**1.63 ac-ft**

ATKINS

Designed By: MAW
Date: 3/26/2018
Checked By: RDU
Date: 3/26/2018

I-275 (SR 93) Design
SMF 10

ATTENUATION CALCULATIONS

Will attenuation be necessary? yes
Zone 6 - 100yr/24hr (P) 11.3 in.

Pre-Development CN Calculations

	Condition	Area	CN	Weighted CN
Pond Area at SHWT		2.07 ac	100	8.43
Impervious Area Treated		7.21 ac	98	28.78
Impervious Area Not Treated		3.06 ac	98	12.22
Pervious Area - HSG A	Good	12.21 ac	39	19.40
	Total Area =	24.55 ac	CN_{pre} =	69

SCS Method for Attenuation Volume:

$$S = \frac{1{,}000}{CN} - 10$$
$$Q = \frac{(P - 0.2S)^2}{P + 0.8S}$$

S_{pre} = 4.53 in.
Q_{pre} = 7.24 in.
Pre-development runoff volume = **14.81 ac-ft**

ATTENUATION CALCULATIONS (CONT.)

Post-Development CN Calculations

	Condition	Area	CN	Weighted CN
Pond Area at SHWT		3.29 ac	100	11.93
Impervious Area Treated		19.50 ac	98	69.31
Pervious Area - HSG A	Good	4.78 ac	39	6.76
	Total Area =	27.57 ac	CN_{post} =	88

SCS Method for Attenuation Volume:

$$S = \frac{1{,}000}{CN} - 10$$
$$Q = \frac{(P - 0.2S)^2}{P + 0.8S}$$

S_{post} = 1.36 in.
Q_{post} = 9.81 in.
Post-development runoff volume = **22.55 ac-ft**

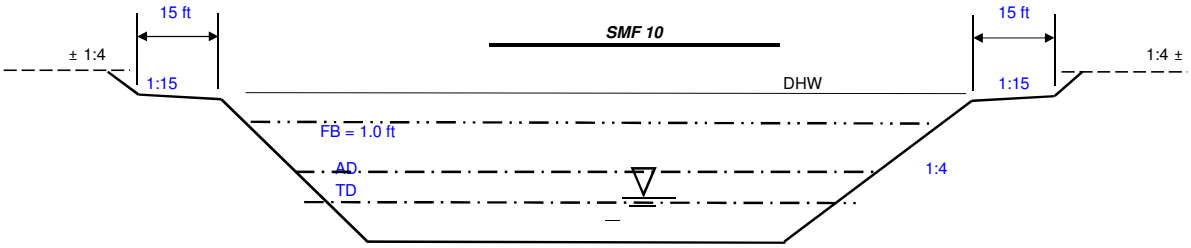
Attenuation volume required (Post-Pre) **7.74 ac-ft**

ATKINS

Designed By: MAW
Date: 3/26/2018
Checked By: RDU
Date: 3/26/2018

I-275 (SR 93) Design
SMF 10

POND SIZE ESTIMATE



Approx. Pond Bottom Elevation = -2.07

Approx. Low Edge of Pavement (LEOP) at STA 1105+23.36 (PR_9G6S)

Approx. SHWT Elevation = 1.93

Approx. LEOP Elevation =	6.98 ft		
Approx. LEOB Elevation =	6.93 ft	AHW LEOP = 4.88	
Approx. hydraulic clearance from LEOP =	1.00 ft	AHW LEOB = 4.83	
Head loss from LEOP to SMF (100 ft) =	0.10 ft	DHW = 4.83	Assumed HGL Slope = 0.001 ft/ft
Head loss from SMF to Outfall (100 ft) =	0.10 ft		
Available depth for T.D. + A.D. =	2.95 ft		

Attenuation Depth, A.D.	**2.4 ft**	Iterative
Treatment Depth, T.D.	**0.5 ft**	Iterative
Allowable High Water Elevation	4.8 ft	
Area at AHW (Area at Top of Attenuation Depth)	**3.68 ac**	Iterative
Area at Weir (Area at Bottom of Attenuation Depth)	**3.35 ac**	Iterative
Area at SHWT (Area at Bottom of Treatment Depth)	**3.29 ac**	Iterative

Treatment Volume Required
1.63 ac-ft
Attenuation Volume Required
7.74 ac-ft
Total Volume Required
9.36 ac-ft

Provided Attenuation Volume	8.44 ac-ft
Provided Treatment Volume	1.66 ac-ft
Proposed Impervious Area to Be Treated	19.50 ac
Provided Treatment Depth =	1.02 in.

ATKINS

Designed By:	MAW
Date:	3/26/2018
Checked By:	RDU
Date:	3/26/2018

I-275 (SR 93) Design
SMF 11

Pre-Development

Total Area =	1.73 ac
Pond Area at SHWT =	0.00 ac
Impervious Area Treated =	0.26 ac
Impervious Area Not Treated =	0.66 ac
Pervious Area =	0.81 ac

Post-Development

Total Area =	1.73 ac
Pond Area at SHWT =	0.30 ac
Impervous Area =	0.33 ac
Pervious Area =	1.10 ac

SMF 11

TREATMENT CALCULATIONS

Wet Detention

Treat 1 in. of runoff over Impervious Area	
Pre-Development Impervious Area Not Treated	0.66 ac
Post-Development Impervious Area	0.33 ac
Impervious Area Required to be Treated	**-0.33 ac**
Compensatory Treatment Area	**0.33 ac**
Area to be treated	**0.00 ac**
Treatment volume required	**0.00 ac-ft**

ATKINS

Designed By: MAW
Date: 3/26/2018
Checked By: RDU
Date: 3/26/2018

I-275 (SR 93) Design
SMF 11

ATTENUATION CALCULATIONS

Will attenuation be necessary? yes
Zone 6 - 100yr/24hr (P) 11.3 in.

Pre-Development CN Calculations

	Condition	Area	CN	Weighted CN
Pond Area at SHWT		0.00 ac	100	0.00
Impervious Area Treated		0.26 ac	98	14.73
Impervious Area Not Treated		0.66 ac	98	37.39
Pervious Area - HSG A	Good	0.81 ac	39	18.26
	Total Area =	1.73 ac	CN_{pre} =	70

SCS Method for Attenuation Volume:

$$S = \frac{1{,}000}{CN} - 10$$
$$Q = \frac{(P - 0.2S)^2}{P + 0.8S}$$

S_{pre} = 4.21 in.
Q_{pre} = 7.46 in.
Pre-development runoff volume = **1.08 ac-ft**

ATTENUATION CALCULATIONS (CONT.)

Post-Development CN Calculations

	Condition	Area	CN	Weighted CN
Pond Area at SHWT		0.30 ac	100	17.34
Impervious Area Treated		0.33 ac	98	18.69
Pervious Area - HSG A	Good	1.10 ac	39	24.80
	Total Area =	1.73 ac	CN_{post} =	61

SCS Method for Attenuation Volume:

$$S = \frac{1{,}000}{CN} - 10$$
$$Q = \frac{(P - 0.2S)^2}{P + 0.8S}$$

S_{post} = 6.44 in.
Q_{post} = 6.09 in.
Post-development runoff volume = **0.88 ac-ft**

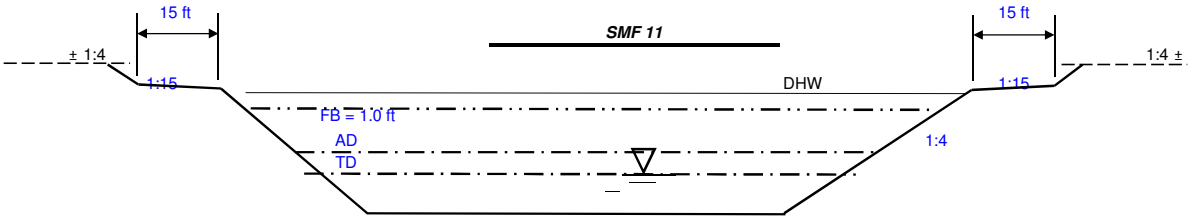
Attenuation volume required (Post-Pre) **-0.20 ac-ft**

ATKINS

Designed By: MAW
Date: 3/26/2018
Checked By: RDU
Date: 3/26/2018

I-275 (SR 93) Design
SMF 11

POND SIZE ESTIMATE



Approx. Pond Bottom Elevation =
-5.30

low point at STA 1209+33.71 El.6.06 (5.47 w/cross slope)
Approx. Low Edge of Pavement (LEOP) at STA 1213+96.34 (PR_3G6N)

Approx. SHWT Elevation =
2.70 3.30 SHWT LOWER ORIFICE 6"

Approx. LEOP Elevation =	5.47 ft	AHW LEOP = 3.27
Approx. LEOB Elevation =	5.40 ft	AHW LEOB = 3.20
Approx. hydraulic clearance from LEOP =	1.00 ft	
Head loss from LEOP to SMF (200 ft) =	0.20 ft	DHW = 3.20
Head loss from SMF to Outfall (800 ft) =	0.80 ft	
Available depth for T.D. + A.D. =	0.57 ft	

Assumed HGL Slope = 0.001 ft/ft

Attenuation Depth, A.D.	**0.2 ft**	Iterative
Treatment Depth, T.D.	**0.3 ft**	Iterative
Allowable High Water Elevation	3.2 ft	
Area at AHW (Area at Top of Attenuation Depth)	**0.32 ac**	Iterative
Area at Weir (Area at Bottom of Attenuation Depth)	**0.32 ac**	Iterative
Area at SHWT (Area at Bottom of Treatment Depth)	**0.30 ac**	Iterative

Treatment Volume Required
0.00 ac-ft
Attenuation Volume Required
-0.20 ac-ft
Total Volume Required
-0.20 ac-ft

Provided Attenuation Volume	0.06 ac-ft
Provided Treatment Volume	0.09 ac-ft
Proposed Impervious Area to Be Treated	0.00 ac
Provided Treatment Depth =	0.00 in.

ATKINS

Designed By:	MAW
Date:	3/26/2018
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Date:	3/26/2018

I-275 (SR 93) Design
SMF 12

Pre-Development

Total Area =	14.60 ac	Loading Total Area =	26.74 ac	For Nutrient CN Sheet
Pond Area at SHWT =	0.00 ac	Total Impervious =	15.49 ac	For Nutrient CN Sheet
Impervious Area Treated =	1.85 ac			
Impervious Area Not Treated =	7.89 ac			
Pervious Area =	4.86 ac			

Post-Development

Total Area =	26.74 ac
Pond Area at SHWT =	2.70 ac
Impervous Area =	19.65 ac
Pervious Area =	4.39 ac

SMF 12

TREATMENT CALCULATIONS

Dry Retention

Treat 0.5 in. of runoff over Impervious Area	
Pre-Development Impervious Area Not Treated	7.89 ac
Post-Development Impervious Area	19.65 ac
Impervious Area Required to be Treated	**11.76 ac**
Compensatory Treatment Area	**7.89 ac**
Area to be treated	**19.65 ac**
Treatment volume required	**0.82 ac-ft**

ATKINS

Designed By: MAW
Date: 3/26/2018
Checked By: RDU
Date: 3/26/2018

I-275 (SR 93) Design
SMF 12

ATTENUATION CALCULATIONS

Will attenuation be necessary? no
Zone 6 - 100yr/24hr (P) 11.3 in.

Pre-Development CN Calculations

	Condition	Area	CN	Weighted CN
Pond Area at SHWT		0.00 ac	100	0.00
Impervious Area Treated		1.85 ac	98	12.42
Impervious Area Not Treated		7.89 ac	98	52.96
Pervious Area - HSG A	Good	4.86 ac	39	12.98
	Total Area =	14.60 ac	CN_{pre} =	78

SCS Method for Attenuation Volume:

$$S = \frac{1{,}000}{CN} - 10$$
$$Q = \frac{(P - 0.2S)^2}{P + 0.8S}$$

S_{pre} = 2.76 in.
Q_{pre} = 8.55 in.
Pre-development runoff volume = **10.40 ac-ft**

ATTENUATION CALCULATIONS (CONT.)

Post-Development CN Calculations

	Condition	Area	CN	Weighted CN
Pond Area at SHWT		2.70 ac	100	10.10
Impervious Area Treated		19.65 ac	98	72.02
Pervious Area - HSG A	Good	4.39 ac	39	6.40
	Total Area =	26.74 ac	CN_{post} =	89

SCS Method for Attenuation Volume:

$$S = \frac{1{,}000}{CN} - 10$$
$$Q = \frac{(P - 0.2S)^2}{P + 0.8S}$$

S_{post} = 1.30 in.
Q_{post} = 9.88 in.
Post-development runoff volume = **22.01 ac-ft**

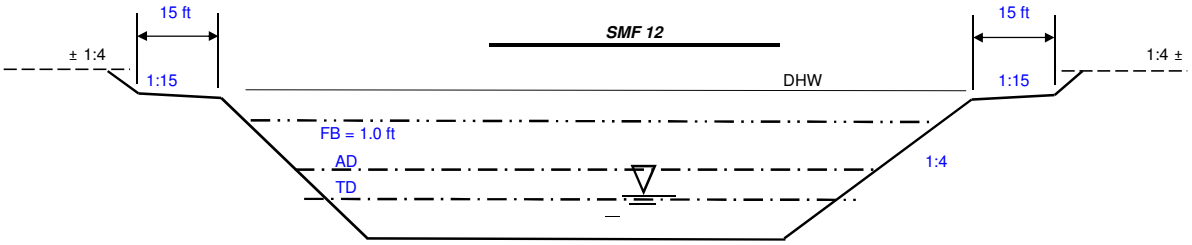
Attenuation volume required (Post-Pre) **0.00 ac-ft** **Outfall is Tidally influenced, No Attenuation required.**

ATKINS

Designed By: MAW
Date: 3/26/2018
Checked By: RDU
Date: 3/26/2018

I-275 (SR 93) Design
SMF 12

POND SIZE ESTIMATE



Approx. Pond Bottom Elevation (Plus 2' for dry detention) = 5.30

Approx. Low Edge of Pavement (LEOP) at STA 2002+16.39 (PR_3C2WAP)

Approx. SHWT Elevation = 3.30

Approx. LEOP Elevation =	8.92 ft	
Approx. LEOB Elevation =	8.90 ft	AHW LEOP = 6.82
Approx. hydraulic clearance from LEOP =	1.00 ft	AHW LEOB = 6.80
Head loss from LEOP to SMF (100 ft) =	0.10 ft	DHW = 6.80
Head loss from SMF to Outfall (500 ft) =	0.50 ft	
Available depth for T.D. + A.D. =	3.52 ft	

Assumed HGL Slope = 0.001 ft/ft

Attenuation Depth, A.D.	**1.0 ft**	Iterative
Treatment Depth, T.D.	**0.5 ft**	Iterative
Allowable High Water Elevation	6.8 ft	
Area at AHW (Area at Top of Attenuation Depth)	**2.91 ac**	Iterative
Area at Weir (Area at Bottom of Attenuation Depth)	**2.80 ac**	Iterative
Area at SHWT (Area at Bottom of Treatment Depth)	**2.70 ac**	Iterative

Treatment Volume Required
0.82 ac-ft
Attenuation Volume Required
0.00 ac-ft
Total Volume Required
0.82 ac-ft

Provided Attenuation Volume	2.86 ac-ft
Provided Treatment Volume	1.38 ac-ft
Proposed Impervious Area to Be Treated	19.65 ac
Provided Treatment Depth =	0.84 in.

ATKINS

Designed By:	MAW
Date:	3/26/2018
Checked By:	RDU
Date:	3/26/2018

I-275 (SR 93) Design
SMF 14

Pre-Development

Total Area =	4.99 ac
Pond Area at SHWT =	0.00 ac
Impervious Area Treated =	0.44 ac
Impervious Area Not Treated =	0.88 ac
Pervious Area =	3.67 ac

Post-Development

Total Area =	4.99 ac
Pond Area at SHWT =	1.08 ac
Impervous Area =	2.50 ac
Pervious Area =	1.41 ac

SMF 14

TREATMENT CALCULATIONS

Wet Detention

Treat 1 in. of runoff over Impervious Area	
Pre-Development Impervious Area Not Treated	0.88 ac
Post-Development Impervious Area	2.50 ac
Impervious Area Required to be Treated	**1.62 ac**
Compensatory Treatment Area	**0.88 ac**
Area to be treated	**2.50 ac**
Treatment volume required	**0.21 ac-ft**

ATKINS

Designed By: MAW
Date: 3/26/2018
Checked By: RDU
Date: 3/26/2018

I-275 (SR 93) Design
SMF 14

ATTENUATION CALCULATIONS

Will attenuation be necessary? yes
Zone 6 - 100yr/24hr (P) 11.3 in.

Pre-Development CN Calculations

	Condition	Area	CN	Weighted CN
Pond Area at SHWT		0.00 ac	100	0.00
Impervious Area Treated		0.44 ac	98	8.64
Impervious Area Not Treated		0.88 ac	98	17.28
Pervious Area - HSG A	Good	3.67 ac	39	28.68
	Total Area =	4.99 ac	CN_{pre} =	55

SCS Method for Attenuation Volume:

$$S = \frac{1{,}000}{CN} - 10$$
$$Q = \frac{(P - 0.2S)^2}{P + 0.8S}$$

S_{pre} = 8.31 in.
Q_{pre} = 5.17 in.
Pre-development runoff volume = **2.15 ac-ft**

ATTENUATION CALCULATIONS (CONT.)

Post-Development CN Calculations

	Condition	Area	CN	Weighted CN
Pond Area at SHWT		1.08 ac	100	21.64
Impervious Area Treated		2.50 ac	98	49.10
Pervious Area - HSG A	Good	1.41 ac	39	11.02
	Total Area =	4.99 ac	CN_{post} =	82

SCS Method for Attenuation Volume:

$$S = \frac{1{,}000}{CN} - 10$$
$$Q = \frac{(P - 0.2S)^2}{P + 0.8S}$$

S_{post} = 2.23 in.
Q_{post} = 9.00 in.
Post-development runoff volume = **3.74 ac-ft**

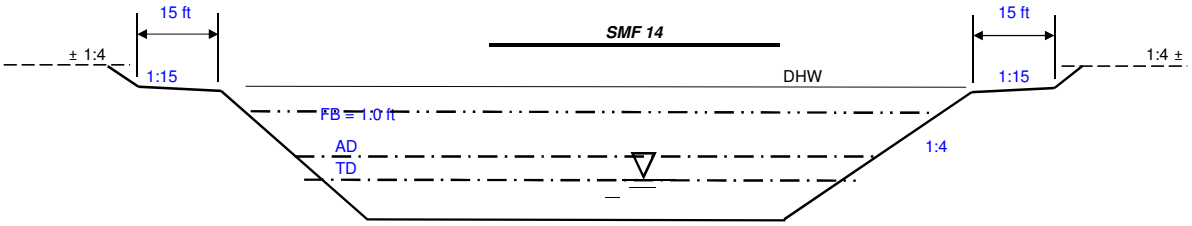
Attenuation volume required (Post-Pre) **1.59 ac-ft**

ATKINS

Designed By: MAW
Date: 3/26/2018
Checked By: RDU
Date: 3/26/2018

I-275 (SR 93) Design
SMF 14

POND SIZE ESTIMATE



Approx. Pond Bottom Elevation = -1.10
Approx. SHWT Elevation = 6.90

Approx. Low Edge of Pavement (LEOP) 275NB_GP
Approx. LEOP Elevation = 38.40 ft
Approx. LEOB Elevation = 12.00 ft
Approx. hydraulic clearance from LEOP = 1.00 ft
Head loss from LEOP to SMF (1000 ft) = 1.00 ft
Head loss from SMF to Outfall (50 ft) = 0.05 ft
Available depth for T.D. + A.D. = 28.50 ft

AHW LEOP = 35.40
AHW LEOB = 9.00
DHW = 9.00

Assumed HGL Slope = 0.001 ft/ft

Attenuation Depth, A.D.	**1.7 ft**	Iterative
Treatment Depth, T.D.	**0.4 ft**	Iterative
Allowable High Water Elevation	9.0 ft	
Area at AHW (Area at Top of Attenuation Depth)	**1.32 ac**	Iterative
Area at Weir (Area at Bottom of Attenuation Depth)	**1.13 ac**	Iterative
Area at SHWT (Area at Bottom of Treatment Depth)	**1.08 ac**	Iterative

Treatment Volume Required
0.21 ac-ft
Attenuation Volume Required
1.59 ac-ft
Total Volume Required
1.80 ac-ft

Provided Attenuation Volume	2.08 ac-ft
Provided Treatment Volume	0.44 ac-ft
Proposed Impervious Area to Be Treated	2.50 ac
Provided Treatment Depth =	2.12 in.

ATKINS

I-275 (SR 93) Design
Direct Discharge to OTB

Designed By: MAW
Date: 3/26/2018
Checked By: RDU
Date: 3/26/2018

Pre-Development

Total Area =	52.10 ac
Pond Area/water=	13.18 ac
Impervious Area Treated =	0.00 ac
Impervious Area Not Treated =	22.48 ac
Pervious Area =	16.44 ac

Post-Development

Total Area =	52.10 ac
Pond Area at SHWT =	0.00 ac
Impervous Area =	44.09 ac
Pervious Area =	8.01 ac

TREATMENT CALCULATIONS

Wet Detention

Treat 1 in. of runoff over Impervious Area	
Pre-Development Impervious Area Not Treated	22.48 ac
Compensatory Treatment	0.00 ac
Post-Development Impervious Area	44.09 ac
Area to be Treated	**21.61 ac**
Treatment Volume Required	**1.80 ac-ft**

Memo

Appendix H. SMF Nutrient Removal Calculations

ATKINS

Designed By:	MAW
Date:	3/28/2018
Checked By:	RDU
Date:	3/28/2018

Subject: FPID 412531-1-52-01 I-275 (SR 93)
Direct Discharge to Old Tampa Bay

Pre-Development

Non DCIA CN Composite Calculation

Direct Discharge to Old Tampa Bay

Condition	Good	Good
Land Use	Open Space	Open Space
Hydrologic Group	A	A
Percent of Open Space	N/A	N/A
Open Space CN	39	100
Area	16.44 ac	13.18 ac
Adjusted Percent Open	n/a	n/a
Total Open Space Area	**29.62 ac**	
Existing Non DCIA CN	**66**	

Basin Description	Land Use	Area	% DCIA	Non DCIA CN	Runoff Coeff.[1]	EMC (TN)[2]	EMC (TP)[2]
Existing Open Space	Undeveloped	16.44 ac	0%	66	0.058	1.15 mg/L	0.06 mg/L
Existing Pavement	Highway	22.48 ac	100%	98	0.823	1.52 mg/L	0.20 mg/L
Existing Pond Area/Water	Water	13.18 ac	0%	66	0.058	0.00 mg/L	0.00 mg/L
Existing Pond Berm	Pond	0.00 ac	0%	39	0.010	0.00 mg/L	0.00 mg/L

Total Area:	52.10 ac	Pre-Development DCIA %:	43.15%	
Total Area minus the Water:	38.92 ac			
		Weighted Coefficients:	0.388	
		Weighted Coefficients Without Water:	1.364 mg/L	0.139 mg/L

Post-Development

Non DCIA CN Composite Calculation

Direct Discharge to Old Tampa Bay

Condition	Good
Land Use	Open Space
Hydrologic Group	A
Percent of Open Space	N/A
Open Space CN	39
Area	8.01 ac
Adjusted Percent Open	n/a
Total Open Space Area	**8.01 ac**
Proposed Non DCIA CN	**39**

Basin Description	Land Use	Area	% DCIA	Non DCIA CN	Runoff Coeff.[1]	EMC (TN)[2]	EMC (TP)[2]
Proposed Open Space	Undeveloped	8.01 ac	0%	39	0.010	1.15 mg/L	0.06 mg/L
Proposed Pavement	Highway	44.09 ac	100%	98	0.823	1.52 mg/L	0.20 mg/L
Proposed Pond Area at the SHWT	Water	0.00 ac	0%	100	0.616	0.00 mg/L	0.00 mg/L
Proposed Pond Berm	Pond	0.00 ac	0%	39	0.010	0.00 mg/L	0.00 mg/L

Total Area:	52.10 ac	Post-Development DCIA %:	84.63%	
Total Area minus the Pond:	52.10 ac			
		Weighted Coefficients:	0.698	
		Weighted Coefficients Without Water:	1.463 mg/L	0.178 mg/L

Annual Runoff Volume: **154.56 ac-ft/yr** **(EQ 1)**

GENERAL SITE INFORMATION: V 8.6

GO TO INTRODUCTION PAGE

3/30/2018

Blue Numbers =	Input data
Red Numbers =	Calculated or Carryover

HELP Rainfall

Select the appropriate Meteorological Zone, input the appropriate Mean Annual Rainfall amount and select the type of analysis

NAME OF PROJECT

Existing Direct Discharge to OTB

VIEW ZONE MAP

Meteorological Zone (Please use zone map):	CLICK ON CELL BELOW TO SELECT Zone 4
Mean Annual Rainfall (Please use rainfall map):	51.00 Inches
Type of analysis:	CLICK ON CELL BELOW TO SELECT Net improvement
Treatment efficiency (N, P) (ex 80 70 (no decimal points) **use only for specified removal efficiency**):	%

VIEW MEAN ANNUAL RAINFALL

GO TO WATERSHED CHARACTERISTICS

Select the STORMWATER TREATMENT ANALYSIS Button below to begin analyzing the effectiveness of Best Management Practices.

STORMWATER TREATMENT ANALYSIS

Systems available for analysis:
Retention Basin with option for calculating effluent concentration
Wet Detention
Exfiltration Trench
Pervious Pavement
Stormwater Harvesting
Biofiltration
Greenroof
Rainwater Harvesting
Managed Aquatic Plants Detention
Vegetated Natural Buffer
Vegetated Filter Strip
Swale
Rain Garden
Tree Well
Lined reuse pond
User Defined BMP

RESET INPUT FOR STORMWATER TREATMENT ANALYSIS

Model documentation and example problems.

There is a user's manual for the BMPTRAINS model. It can be downloaded from www.stormwater.ucf.edu. The results from the example problems shown in the manual however may not reflect current model results due to ongoing updates of the model.

METHODOLOGY FOR CALCULATING REQUIRED TREATMENT EFFICIENCY

METHODOLOGY FOR RETENTION SYSTEMS

METHODOLOGY FOR WET DETENTION SYSTEMS

METHODOLOGY FOR GREENROOF SYSTEMS

METHODOLOGY FOR WATER HARVESTING SYSTEMS

WATERSHED CHARACTERISTICS V 8.6

GO TO STORMWATER TREATMENT ANALYSIS

Blue Numbers =	Input data
Red Numbers =	Calculated

LAND USES/EMC

SELECT CATCHMENT CONFIGURATION 7/17/2018

CLICK ON CELL BELOW TO SELECT CONFIGURATION

A - Single Catchment

COMINGLING | MULTI-LAND USE

VIEW CATCHMENT CONFIGURATION

GO TO GENERAL SITE INFORMATION PAGE

For comingling, the off-site catchment must be upstream. The delay is only for retention BMPs and must be used in hours as measured by the time of concentration at a one inch/hour rain

Delay [hrs] [ ]

max delay = 15 hrs.

CATCHMENT NO.1 NAME: Existing Only for Loading

VIEW AVERAGE ANNUAL RUNOFF "C" Factor

VIEW EMC & FLUCCS

GO TO GIS LANDUSE DATA

Pre-development land use:	CLICK ON CELL BELOW TO SELECT
with default EMCs	Developed User Defined (overwrite defaults)
Post-development land use:	CLICK ON CELL BELOW TO SELECT
with default EMCs	Developed User Defined (overwrite defaults)

OVERWRITE DEFAULT CONCENTRATIONS USING:

	PRE:		POST:	
EMC(N):	1.364	mg/L	0.000	mg/L
EMC(P):	0.139	mg/L	0.000	mg/L

Total pre-development catchment area:	38.920	AC
Total post-development catchment or for BMP analysis:	0.000	AC
Pre-development Non DCIA CN:	66.00	
Pre-development DCIA percentage:	43.15	%
Post-development Non DCIA CN:	0.00	
Post-development DCIA percentage:	0.00	%
Estimated BMP Area (No loading from this area)	0.000	AC

Average annual pre runoff volume:	64.169	ac-ft/year
Average annual post runoff volume (note no BMP area):		ac-ft/year
Pre-development Annual Mass Loading - **Nitrogen:**	107.943	kg/year
Pre-development Annual Mass Loading - **Phosphorus:**	11.000	kg/year
Post-development Annual Mass Loading - **Nitrogen:**		kg/year
Post-development Annual Mass Loading - **Phosphorus:**		kg/year

CATCHMENT NO.2 NAME:

Pre-development land use:	CLICK ON CELL BELOW TO SELECT
with default EMCs	CLICK ON CELL BELOW TO SELECT
Post-development land use:	
with default EMCs	

OVERWRITE DEFAULT CONCENTRATIONS:

	PRE:		POST:	
EMC(N):		mg/L		mg/L
EMC(P):		mg/L		mg/L

USE DEFAULT CONCENTRATIONS

Total pre-development catchment area:		AC
Total post-development catchment or BMP analysis area:		AC
Pre-development Non DCIA CN:		
Pre-development DCIA percentage:		%
Post-development Non DCIA CN:		
Post-development DCIA percentage:		%
Estimated BMP Area (No loading from this area)		AC

Average annual pre runoff volume:		ac-ft/year
Average annual post runoff volume (note no BMP area):		ac-ft/year
Pre-development Annual Mass Loading - **Nitrogen:**		kg/year
Pre-development Annual Mass Loading - **Phosphorus:**		kg/year
Post-development Annual Mass Loading - **Nitrogen:**		kg/year
Post-development Annual Mass Loading - **Phosphorus:**		kg/year

CATCHMENTS AND TREATMENT SURFACE DISCHARGE SUMMARY V 8.6

CALCULATION METHODS:

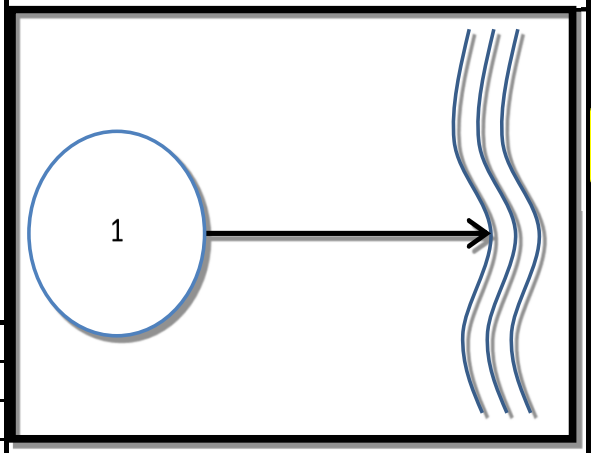
1. The effectiveness of each BMP in a single catchment is converted to an equivalent capture volume.
2. Certain BMP treatment train combinations have not been evaluated and in practice they are at this time not used, an example is a greenroof following a tree well.
3. Wet detention is last when used in a single catchment with other BMPs, except when followed by filtration

PROJECT TITLE	Existing Direct Discharge to OTB	Optional Identification		
	Existing Only for Loadi	Catchment 2	Catchment 3	Catchment 4
BMP Name				
BMP Name				
BMP Name				

REVIEW, ONE OR MORE CATCHMENT HAS BEEN SPECIFIED WITHOUT A BMP

Surface Water Discharge Summary Performance of Entire Watershed

Catchment Configuration	A - Single Catchment	Treatment Objectives or Target for	7/17/2018
Nitrogen Pre Load (kg/yr)	107.94		BMPTRAINS MODEL
Phosphorus Pre Load (kg/yr)	11.00		
Nitrogen Post Load (kg/yr)	0.00		
Phosphorus Post Load (kg/yr)	0.00		
Target Load Reduction (N) %			
Target Load Reduction (P) %			
Target Discharge Load, N (kg/yr)			
Target Discharge Load, P (kg/yr)			
Provided Overall Efficiency, N (%):			
Provided Overall Efficiency, P (%):			
Discharged Load, N (kg/yr & lb/yr):	0.00	0.00	
Discharged Load, P (kg/yr & lb/yr):	0.00	0.00	
Load Removed, N (kg/yr & lb/yr):	0.00	0.00	
Load Removed, P (kg/yr & lb/yr):	0.00	0.00	



GENERAL SITE INFORMATION: V 8.6

GO TO INTRODUCTION PAGE

3/30/2018

Blue Numbers =	Input data
Red Numbers =	Calculated or Carryover

HELP Rainfall

Select the appropriate Meteorological Zone, input the appropriate Mean Annual Rainfall amount and select the type of analysis

NAME OF PROJECT

Proposed Direct Discharge to OTB

VIEW ZONE MAP

Meteorological Zone (Please use zone map):	CLICK ON CELL BELOW TO SELECT Zone 4
Mean Annual Rainfall (Please use rainfall map):	51.00 Inches
Type of analysis:	CLICK ON CELL BELOW TO SELECT Net improvement
Treatment efficiency (N, P) (ex 80 70 (no decimal points) **use only for specified removal efficiency**):	%

VIEW MEAN ANNUAL RAINFALL

GO TO WATERSHED CHARACTERISTICS

Select the STORMWATER TREATMENT ANALYSIS Button below to begin analyzing the effectiveness of Best Management Practices.

STORMWATER TREATMENT ANALYSIS

Systems available for analysis:
Retention Basin with option for calculating effluent concentration
Wet Detention
Exfiltration Trench
Pervious Pavement
Stormwater Harvesting
Biofiltration
Greenroof
Rainwater Harvesting
Managed Aquatic Plants Detention
Vegetated Natural Buffer
Vegetated Filter Strip
Swale
Rain Garden
Tree Well
Lined reuse pond
User Defined BMP

RESET INPUT FOR STORMWATER TREATMENT ANALYSIS

Model documentation and example problems.

There is a user's manual for the BMPTRAINS model. It can be downloaded from www.stormwater.ucf.edu. The results from the example problems shown in the manual however may not reflect current model results due to ongoing updates of the model.

METHODOLOGY FOR CALCULATING REQUIRED TREATMENT EFFICIENCY

METHODOLOGY FOR RETENTION SYSTEMS

METHODOLOGY FOR WET DETENTION SYSTEMS

METHODOLOGY FOR GREENROOF SYSTEMS

METHODOLOGY FOR WATER HARVESTING SYSTEMS

WATERSHED CHARACTERISTICS V 8.6

GO TO STORMWATER TREATMENT ANALYSIS

Blue Numbers = Input data
Red Numbers = Calculated

LAND USES/EMC

SELECT CATCHMENT CONFIGURATION 7/17/2018

CLICK ON CELL BELOW TO SELECT CONFIGURATION
A - Single Catchment

VIEW CATCHMENT CONFIGURATION

GO TO GENERAL SITE INFORMATION PAGE

For comingling, the off-site catchment must be upstream. The delay is only for retention BMPs and must be used in hours as measured by the time of concentration at a one inch/hour rain

COMINGLING MULTI-LAND USE

Delay [hrs]

max delay = 15 hrs.

VIEW AVERAGE ANNUAL RUNOFF "C" Factor

VIEW EMC & FLUCCS

GO TO GIS LANDUSE DATA

CATCHMENT NO.1 NAME: Proposed Only for Loading

Pre-development land use: with default EMCs	CLICK ON CELL BELOW TO SELECT Developed User Defined (overwrite defaults)
Post-development land use: with default EMCs	CLICK ON CELL BELOW TO SELECT Developed User Defined (overwrite defaults)

Total pre-development catchment area:		AC
Total post-development catchment or for BMP analysis:	52.100	AC
Pre-development Non DCIA CN:		
Pre-development DCIA percentage:		%
Post-development Non DCIA CN:	39.00	
Post-development DCIA percentage:	84.63	%
Estimated BMP Area (No loading from this area)	0.000	AC

OVERWRITE DEFAULT CONCENTRATIONS USING:

	PRE:		POST:	
EMC(N):		mg/L	1.463	mg/L
EMC(P):		mg/L	0.178	mg/L

Average annual pre runoff volume:		ac-ft/year
Average annual post runoff volume (note no BMP area):	154.560	ac-ft/year
Pre-development Annual Mass Loading - **Nitrogen:**		kg/year
Pre-development Annual Mass Loading - **Phosphorus:**		kg/year
Post-development Annual Mass Loading - **Nitrogen:**	278.867	kg/year
Post-development Annual Mass Loading - **Phosphorus:**	33.929	kg/year

CATCHMENT NO.2 NAME:

Pre-development land use: with default EMCs	CLICK ON CELL BELOW TO SELECT
Post-development land use: with default EMCs	CLICK ON CELL BELOW TO SELECT

Total pre-development catchment area:		AC
Total post-development catchment or BMP analysis area:		AC
Pre-development Non DCIA CN:		
Pre-development DCIA percentage:		%
Post-development Non DCIA CN:		
Post-development DCIA percentage:		%
Estimated BMP Area (No loading from this area)		AC

OVERWRITE DEFAULT CONCENTRATIONS:

	PRE:		POST:	
EMC(N):		mg/L		mg/L
EMC(P):		mg/L		mg/L

USE DEFAULT CONCENTRATIONS

Average annual pre runoff volume:		ac-ft/year
Average annual post runoff volume (note no BMP area):		ac-ft/year
Pre-development Annual Mass Loading - **Nitrogen:**		kg/year
Pre-development Annual Mass Loading - **Phosphorus:**		kg/year
Post-development Annual Mass Loading - **Nitrogen:**		kg/year
Post-development Annual Mass Loading - **Phosphorus:**		kg/year

STORMWATER TREATMENT ANALYSIS:	V 8.6	GO TO GENERAL SITE INFORMATION PAGE	Blue Numbers =	Input data
			Red Numbers =	Calculated

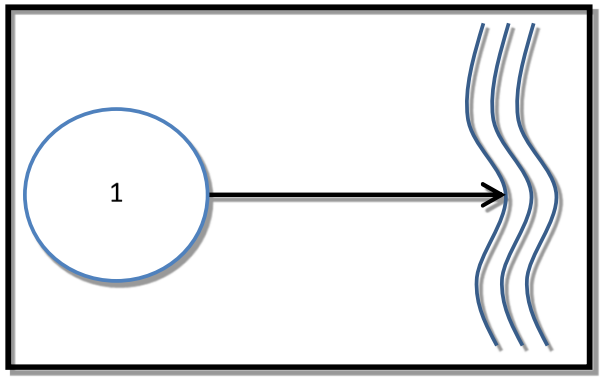
If not done, specify pre- and post-development watershed characteristics.

7/17/2018

GO TO WATERSHED CHARACTERISTICS

Total Required Treatment Efficiency:

Required Treatment Eff (**Nitrogen**):	100	%
Required Treatment Eff (**Phosphorus**):	100	%



Select one of the BMPs below to analyze efficiency or review the summary data.

RETENTION BASIN	WET DETENTION / MAP	EXFILTRATION TRENCH	RAIN GARDEN / depression storage	SWALE	USER DEFINED BMP
PERVIOUS PAVEMENT	STORMWATER HARVESTING	FILTRATION	View Media Mixes	NOTE !!!: All individual system must be sized prior to being analyzed in conjunction with other systems. Please read instructions in the CATCHMENT AND TREATMENT SUMMARY RESULTS tab for more information.	
GREENROOF	RAINWATER HARVESTING	LINED REUSE POND & UNDERDRAIN INPUT	GO TO COST ANALYSIS WORKSHEET		
VEGETATED NATURAL BUFFER	VEGETATED FILTER STRIP	TREE WELL	CATCHMENT AND TREATMENT SURFACE		

CATCHMENTS AND TREATMENT SURFACE DISCHARGE SUMMARY V 8.6

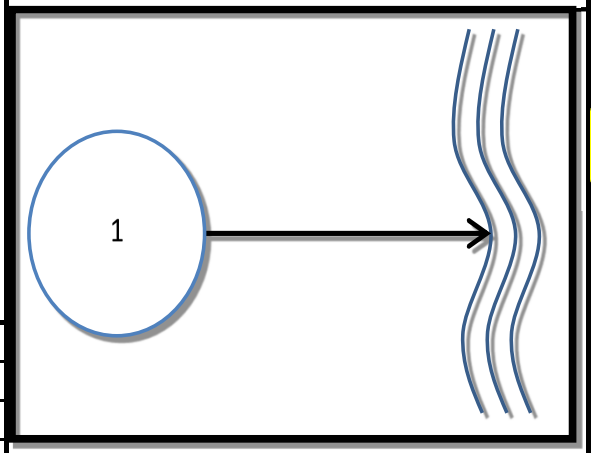
CALCULATION METHODS:

1. The effectiveness of each BMP in a single catchment is converted to an equivalent capture volume.
2. Certain BMP treatment train combinations have not been evaluated and in practice they are at this time not used, an example is a greenroof following a tree well.
3. Wet detention is last when used in a single catchment with other BMPs, except when followed by filtration

PROJECT TITLE	Proposed Direct Discharge to OTB	Optional Identification		
	Proposed Only for Loadi	Catchment 2	Catchment 3	Catchment 4
BMP Name				
BMP Name				
BMP Name				

Surface Water Discharge Summary Performance of Entire Watershed

Catchment Configuration	A - Single Catchment		7/17/2018
			BMPTRAINS MODEL
Nitrogen Pre Load (kg/yr)	0.00	Treatment Objectives or Target for	
Phosphorus Pre Load (kg/yr)	0.00		
Nitrogen Post Load (kg/yr)	278.87		
Phosphorus Post Load (kg/yr)	33.93		
Target Load Reduction (N) %	100		
Target Load Reduction (P) %	100		
Target Discharge Load, N (kg/yr)	0.00	TN NOT MET	
Target Discharge Load, P (kg/yr)	0.00		
Provided Overall Efficiency, N (%):	0	TP NOT MET	
Provided Overall Efficiency, P (%):	0		
Discharged Load, N (kg/yr & lb/yr):	278.87	614.23	
Discharged Load, P (kg/yr & lb/yr):	33.93	74.73	
Load Removed, N (kg/yr & lb/yr):	0.00	0.00	
Load Removed, P (kg/yr & lb/yr):	0.00	0.00	



ATKINS

Designed By:	MAW
Date:	3/28/2018
Checked By:	RDU
Date:	3/28/2018

Subject: FPID 412531-1-52-01 I-275 (SR 93)
Basin 3

Pre-Development

Non DCIA CN Composite Calculation

	Basin 3		
Condition	Good	Good	Good
Land Use	Open Space	Open Space	Open Space
Hydrologic Group	A	A	A
Percent of Open Space	N/A	N/A	N/A
Open Space CN	39	39	100
Area	8.93 ac	0.19 ac	0.62 ac
Adjusted Percent Open	n/a	n/a	n/a
Total Open Space Area	**9.74 ac**		
Existing Non DCIA CN	**43**		

Basin Description	**Land Use**	**Area**	**% DCIA**	**Non DCIA CN**	**Runoff Coeff.[1]**	**EMC (TN)[2]**	**EMC (TP)[2]**
Existing Open Space	Undeveloped	8.93 ac	0%	43	0.014	1.15 mg/L	0.06 mg/L
Existing Pavement	Highway	19.66 ac	100%	98	0.823	1.52 mg/L	0.20 mg/L
Existing Pond Area at the SHWT	Water	0.62 ac	0%	43	0.014	0.00 mg/L	0.00 mg/L
Existing Pond Berm	Pond	0.19 ac	0%	43	0.014	0.00 mg/L	0.00 mg/L

Total Area:	29.40 ac	Pre-Development DCIA %:	66.87%	
Total Area minus the Water/Pond:	28.59 ac			
		Weighted Coefficients:	0.555	
		Weighted Coefficients Without Ponds:	1.404 mg/L	0.155 mg/L

Post-Development

Non DCIA CN Composite Calculation

Basin	**Basin 3**		
Condition	Good	Good	Good
Land Use	Open Space	Open Space	Open Space
Hydrologic Group	A	A	A
Percent of Open Space	N/A	N/A	N/A
Open Space CN	39	39	100
Area	6.06 ac	2.19 ac	0.79 ac
Adjusted Percent Open	n/a	n/a	n/a
Total Open Space Area	**9.04 ac**		
Proposed Non DCIA CN	**44**		

Basin Description	**Land Use**	**Area**	**% DCIA**	**Non DCIA CN**	**Runoff Coeff.[1]**	**EMC (TN)[2]**	**EMC (TP)[2]**
Proposed Open Space	Undeveloped	6.06 ac	0%	44	0.015	1.15 mg/L	0.06 mg/L
Proposed Pavement	Highway	20.36 ac	100%	98	0.823	1.52 mg/L	0.20 mg/L
Proposed Pond Area at the SHWT	Water	0.79 ac	0%	44	0.015	0.00 mg/L	0.00 mg/L
Proposed Pond Berm	Pond	2.19 ac	0%	44	0.015	0.00 mg/L	0.00 mg/L

Total Area:	29.40 ac	Post-Development DCIA %:	69.25%	
Total Area minus the Water/Pond:	26.42 ac			
		Weighted Coefficients:	0.575	
		Weighted Coefficients Without Ponds:	1.435 mg/L	0.167 mg/L

Annual Runoff Volume: **71.80 ac-ft/yr** **(EQ 1)**

ATKINS

Designed By:	MAW
Date:	3/28/2018
Checked By:	RDU
Date:	3/28/2018

Subject: FPID 412531-1-52-01 I-275 (SR 93)
Basin 3

PROPOSED TREATMENT SYSTEM(S)

☑ **Wet Detention** ☐ **Dry Retention**

WET DETENTION

Permanent Pool Volume:	**2.66 ac-ft**	
Average Residence Time:	**14 days**	**(EQ 4)**

Description	Elevation	Area	Volume
Control/Bleeddown Elevation	1.50 ft	0.79 ac	**1.25 ac-ft**
Slope Change	-0.50 ft	0.46 ac	
Slope Change	-0.50 ft	0.46 ac	**1.41 ac-ft**
Pond Bottom Elevation	-4.47 ft	0.25 ac	
		0.00 ac	**0.00 ac-ft**
		0.00 ac	
Total Permanent Pool Volume:			**2.66 ac-ft**

GENERAL SITE INFORMATION: V 8.6

GO TO INTRODUCTION PAGE

3/30/2018

Blue Numbers =	Input data
Red Numbers =	Calculated or Carryover

HELP Rainfall

Select the appropriate Meteorological Zone, input the appropriate Mean Annual Rainfall amount and select the type of analysis

NAME OF PROJECT: SMF 3

VIEW ZONE MAP

Meteorological Zone (Please use zone map): CLICK ON CELL BELOW TO SELECT — Zone 4

Mean Annual Rainfall (Please use rainfall map): 51.00 Inches

VIEW MEAN ANNUAL RAINFALL

Type of analysis: CLICK ON CELL BELOW TO SELECT — Net improvement

Treatment efficiency (N, P) (ex 80 70 (no decimal points) **use only for specified removal efficiency**): %

GO TO WATERSHED CHARACTERISTICS

Select the STORMWATER TREATMENT ANALYSIS Button below to begin analyzing the effectiveness of Best Management Practices.

STORMWATER TREATMENT ANALYSIS

Systems available for analysis:
Retention Basin with option for calculating effluent concentration
Wet Detention
Exfiltration Trench
Pervious Pavement
Stormwater Harvesting
Biofiltration
Greenroof
Rainwater Harvesting
Managed Aquatic Plants Detention
Vegetated Natural Buffer
Vegetated Filter Strip
Swale
Rain Garden
Tree Well
Lined reuse pond
User Defined BMP

RESET INPUT FOR STORMWATER TREATMENT ANALYSIS

Model documentation and example problems.

There is a user's manual for the BMPTRAINS model. It can be downloaded from www.stormwater.ucf.edu. The results from the example problems shown in the manual however may not reflect current model results due to ongoing updates of the model.

METHODOLOGY FOR CALCULATING REQUIRED TREATMENT EFFICIENCY

METHODOLOGY FOR RETENTION SYSTEMS

METHODOLOGY FOR WET DETENTION SYSTEMS

METHODOLOGY FOR GREENROOF SYSTEMS

METHODOLOGY FOR WATER HARVESTING SYSTEMS

WATERSHED CHARACTERISTICS V 8.6

GO TO STORMWATER TREATMENT ANALYSIS

Blue Numbers =	Input data
Red Numbers =	Calculated

LAND USES/EMC

SELECT CATCHMENT CONFIGURATION 7/17/2018

CLICK ON CELL BELOW TO SELECT CONFIGURATION

A - Single Catchment

COMINGLING | MULTI-LAND USE

VIEW CATCHMENT CONFIGURATION

GO TO GENERAL SITE INFORMATION PAGE

For comingling, the off-site catchment must be upstream. The delay is only for retention BMPs and must be used in hours as measured by the time of concentration at a one inch/hour rain

Delay [hrs] [ ]

max delay = 15 hrs.

CATCHMENT NO.1 NAME: [ ]

Pre-development land use: with default EMCs	CLICK ON CELL BELOW TO SELECT Developed User Defined (overwrite defaults)	
Post-development land use: with default EMCs	CLICK ON CELL BELOW TO SELECT Developed User Defined (overwrite defaults)	
Total pre-development catchment area:	28.590	AC
Total post-development catchment or for BMP analysis:	29.400	AC
Pre-development Non DCIA CN:	43.00	
Pre-development DCIA percentage:	66.87	%
Post-development Non DCIA CN:	44.00	
Post-development DCIA percentage:	69.25	%
Estimated BMP Area (No loading from this area)	2.980	AC

VIEW AVERAGE ANNUAL RUNOFF "C" Factor

VIEW EMC & FLUCCS

GO TO GIS LANDUSE DATA

OVERWRITE DEFAULT CONCENTRATIONS USING:

	PRE:		POST:	
EMC(N):	1.404	mg/L	1.435	mg/L
EMC(P):	0.155	mg/L	0.167	mg/L

Average annual pre runoff volume:	67.410	ac-ft/year
Average annual post runoff volume (note no BMP area):	64.505	ac-ft/year
Pre-development Annual Mass Loading - **Nitrogen:**	116.721	kg/year
Pre-development Annual Mass Loading - **Phosphorus:**	12.886	kg/year
Post-development Annual Mass Loading - **Nitrogen:**	114.157	kg/year
Post-development Annual Mass Loading - **Phosphorus:**	13.285	kg/year

CATCHMENT NO.2 NAME: [ ]

Pre-development land use: with default EMCs	CLICK ON CELL BELOW TO SELECT	
Post-development land use: with default EMCs	CLICK ON CELL BELOW TO SELECT	
Total pre-development catchment area:		AC
Total post-development catchment or BMP analysis area:		AC
Pre-development Non DCIA CN:		
Pre-development DCIA percentage:		%
Post-development Non DCIA CN:		
Post-development DCIA percentage:		%
Estimated BMP Area (No loading from this area)		AC

OVERWRITE DEFAULT CONCENTRATIONS:

	PRE:		POST:	
EMC(N):		mg/L		mg/L
EMC(P):		mg/L		mg/L

USE DEFAULT CONCENTRATIONS

Average annual pre runoff volume:		ac-ft/year
Average annual post runoff volume (note no BMP area):		ac-ft/year
Pre-development Annual Mass Loading - **Nitrogen:**		kg/year
Pre-development Annual Mass Loading - **Phosphorus:**		kg/year
Post-development Annual Mass Loading - **Nitrogen:**		kg/year
Post-development Annual Mass Loading - **Phosphorus:**		kg/year

WET DETENTION / MANAGED AQUATIC PLANTS: 7/17/2018 V 8.6

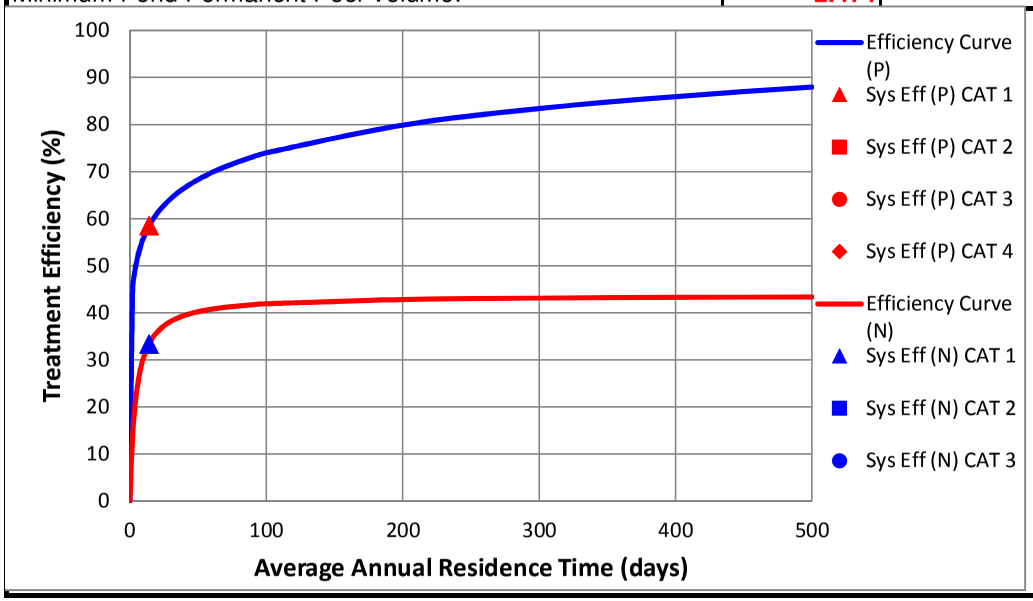
Also called: FLOATING ISLANDS and includes a wet detention pond: **SMF 3**

	Catchment 1	Catchment 2	Catchment 3	Catchment 4	
Total pre-development catchment area:	28.590	0.000	0.000	0.000	ac
Total post-development catchment area:	26.420	0.000	0.000	0.000	ac
Average annual residence time (between 1 and 500 days)	14.00				days
Littoral Zone or other improvements used?*					
Littoral Zone or other improvement efficiency credit:					%
Floating Wetland or Mats used in the design:					
Floating Wetland or Mats credit:					%
Total **Nitrogen** removal required:	0.000				%
Total **Phosphorus** removal required:	3.006				%
Total **Nitrogen** removal efficiency:	33.324	0.000	0.000	0.000	%
Total **Phosphorous** removal efficiency:	58.430	0.000	0.000	0.000	%
Is the wet detention sufficient:	YES				
Average annual runoff volume:	64.505				ac-ft/yr

* pond coverage must follow Regulatory Requirements

Wet Detention Pond Characteristic:

Minimum Pond Permanent Pool Volume:	2.474				ac-ft



NOTE FOR TREATMENT EFFICIENCY GRAPH:

The purpose of the treatment efficiency graphs is to help illustrate the treatment efficiency of the wet detention system as the function of average annual residence time (and permanent pool volume). The graph illustrates that there is a point of diminished return as the permanent pool volume is substantially increased. Therefore, to provide the most economical BMP treatment system, other alternatives such as "treatment trains" and compensatory treatment should be considered.

STORMWATER TREATMENT ANALYSIS:	V 8.6	GO TO GENERAL SITE INFORMATION PAGE	Blue Numbers =	Input data
			Red Numbers =	Calculated

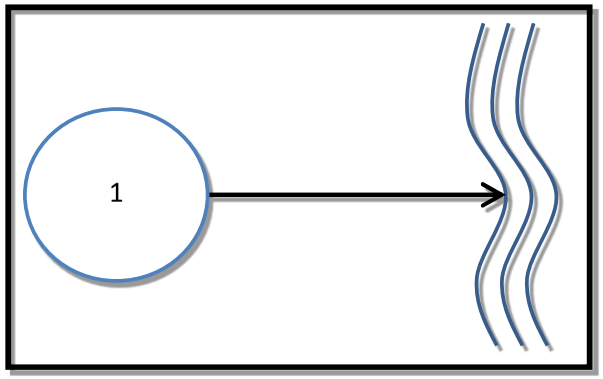
If not done, specify pre- and post-development watershed characteristics.

7/17/2018

GO TO WATERSHED CHARACTERISTICS

Total Required Treatment Efficiency:

Required Treatment Eff (**Nitrogen**):	0	%
Required Treatment Eff (**Phosphorus**):	3	%



Select one of the BMPs below to analyze efficiency or review the summary data.

RETENTION BASIN	WET DETENTION / MAP	EXFILTRATION TRENCH	RAIN GARDEN / depression storage	SWALE	USER DEFINED BMP
PERVIOUS PAVEMENT	STORMWATER HARVESTING	FILTRATION	View Media Mixes	NOTE !!!: All individual system must be sized prior to being analyzed in conjunction with other systems. Please read instructions in the CATCHMENT AND TREATMENT SUMMARY RESULTS tab for more information.	
GREENROOF	RAINWATER HARVESTING	LINED REUSE POND & UNDERDRAIN INPUT	GO TO COST ANALYSIS WORKSHEET		
VEGETATED NATURAL BUFFER	VEGETATED FILTER STRIP	TREE WELL	CATCHMENT AND TREATMENT SURFACE		

CATCHMENTS AND TREATMENT SURFACE DISCHARGE SUMMARY V 8.6

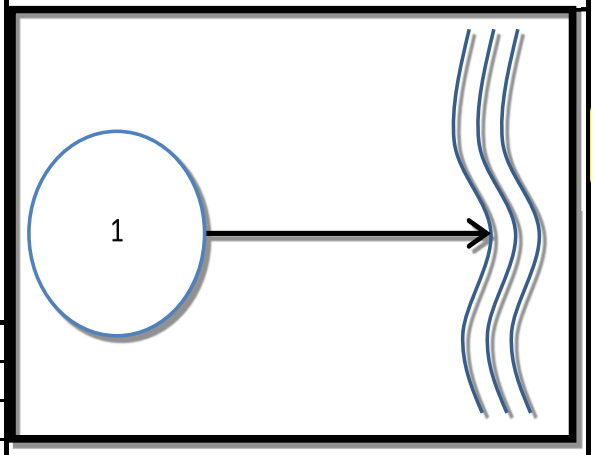
CALCULATION METHODS:

1. The effectiveness of each BMP in a single catchment is converted to an equivalent capture volume.
2. Certain BMP treatment train combinations have not been evaluated and in practice they are at this time not used, an example is a greenroof following a tree well.
3. Wet detention is last when used in a single catchment with other BMPs, except when followed by filtration

PROJECT TITLE	SMF 3	Optional Identification		
	Catchment 1	Catchment 2	Catchment 3	Catchment 4
BMP Name	Wet Detention/ MAPs			
BMP Name				
BMP Name				

Surface Water Discharge Summary Performance of Entire Watershed

Catchment Configuration	A - Single Catchment	Treatment Objectives or Target for TN MET TP MET	7/17/2018 BMPTRAINS MODEL
Nitrogen Pre Load (kg/yr)	116.72		
Phosphorus Pre Load (kg/yr)	12.89		
Nitrogen Post Load (kg/yr)	114.16		
Phosphorus Post Load (kg/yr)	13.29		
Target Load Reduction (N) %	0		
Target Load Reduction (P) %	3		
Target Discharge Load, N (kg/yr)	114.16		
Target Discharge Load, P (kg/yr)	12.89		
Provided Overall Efficiency, N (%):	33		
Provided Overall Efficiency, P (%):	58		
Discharged Load, N (kg/yr & lb/yr):	76.12	167.65	
Discharged Load, P (kg/yr & lb/yr):	5.52	12.16	
Load Removed, N (kg/yr & lb/yr):	38.04	83.79	
Load Removed, P (kg/yr & lb/yr):	7.76	17.10	



ATKINS

Designed By:	MAW
Date:	3/28/2018
Checked By:	RDU
Date:	3/28/2018

Subject: FPID 412531-1-52-01 I-275 (SR 93)
Basin 5

Pre-Development

Non DCIA CN Composite Calculation

	Basin 5		
Condition	Good	Good	Good
Land Use	Open Space	Open Space	Open Space
Hydrologic Group	A	A	A
Percent of Open Space	N/A	N/A	N/A
Open Space CN	39	39	100
Area	2.11 ac	0.00 ac	0.00 ac
Adjusted Percent Open	n/a	n/a	n/a
Total Open Space Area	**2.11 ac**		
Existing Non DCIA CN	**39**		

Basin Description	**Land Use**	**Area**	**% DCIA**	**Non DCIA CN**	**Runoff Coeff.[1]**	**EMC (TN)[2]**	**EMC (TP)[2]**
Existing Open Space	Undeveloped	2.11 ac	0%	39	0.010	1.15 mg/L	0.06 mg/L
Existing Pavement	Highway	1.58 ac	100%	98	0.823	1.52 mg/L	0.20 mg/L
Existing Pond Area at the SHWT	Water	0.00 ac	0%	39	0.010	0.00 mg/L	0.00 mg/L
Existing Pond Berm	Pond	0.00 ac	0%	39	0.010	0.00 mg/L	0.00 mg/L

Total Area:	3.69 ac	Pre-Development DCIA %:	42.82%	
Total Area minus the Water/Pond:	3.69 ac			
		Weighted Coefficients:	0.358	
		Weighted Coefficients Without Water/Ponds:	1.308 mg/L	0.117 mg/L

Post-Development

Non DCIA CN Composite Calculation

Basin	**Basin 5**		
Condition	Good	Good	Good
Land Use	Open Space	Open Space	Open Space
Hydrologic Group	A	A	A
Percent of Open Space	N/A	N/A	N/A
Open Space CN	39	39	100
Area	0.72 ac	0.30 ac	0.37 ac
Adjusted Percent Open	n/a	n/a	n/a
Total Open Space Area	**1.39 ac**		
Proposed Non DCIA CN	**55**		

Basin Description	**Land Use**	**Area**	**% DCIA**	**Non DCIA CN**	**Runoff Coeff.[1]**	**EMC (TN)[2]**	**EMC (TP)[2]**
Proposed Open Space	Undeveloped	0.72 ac	0%	55	0.030	1.15 mg/L	0.06 mg/L
Proposed Pavement	Highway	2.30 ac	100%	98	0.823	1.52 mg/L	0.20 mg/L
Proposed Pond Area at the SHWT	Water	0.37 ac	0%	55	0.030	0.00 mg/L	0.00 mg/L
Proposed Pond Berm	Pond	0.30 ac	0%	55	0.030	0.00 mg/L	0.00 mg/L

Total Area:	3.69 ac	Post-Development DCIA %:	62.33%	
Total Area minus the Water/Pond:	3.02 ac			
		Weighted Coefficients:	0.524	
		Weighted Coefficients Without Ponds:	1.432 mg/L	0.165 mg/L

Annual Runoff Volume: **8.22 ac-ft/yr** **(EQ 1)**

ATKINS

Designed By:	MAW
Date:	3/28/2018
Checked By:	RDU
Date:	3/28/2018

Subject: FPID 412531-1-52-01 I-275 (SR 93)
Basin 5

PROPOSED TREATMENT SYSTEM(S)

☑ **Wet Detention** ☐ **Dry Retention**

WET DETENTION

Permanent Pool Volume:	**1.63 ac-ft**	
Average Residence Time:	**72 days**	**(EQ 4)**

Description	Elevation	Area	Volume
Control/Bleeddown Elevation	4.60 ft	0.37 ac	**0.65 ac-ft**
Slope Change	2.60 ft	0.28 ac	
Slope Change	2.60 ft	0.28 ac	**0.98 ac-ft**
Pond Bottom Elevation	-1.40 ft	0.21 ac	
		0.00 ac	**0.00 ac-ft**
		0.00 ac	
Total Permanent Pool Volume:			**1.63 ac-ft**

GENERAL SITE INFORMATION: V 8.6

GO TO INTRODUCTION PAGE

3/29/2018

Blue Numbers =	Input data
Red Numbers =	Calculated or Carryover

HELP Rainfall

Select the appropriate Meteorological Zone, input the appropriate Mean Annual Rainfall amount and select the type of analysis

NAME OF PROJECT

SMF 5

VIEW ZONE MAP

Meteorological Zone (Please use zone map): CLICK ON CELL BELOW TO SELECT — Zone 4

Mean Annual Rainfall (Please use rainfall map): 51.00 Inches

VIEW MEAN ANNUAL RAINFALL

Type of analysis: CLICK ON CELL BELOW TO SELECT — Net improvement

Treatment efficiency (N, P) (ex 80 70 (no decimal points) **use only for specified removal efficiency**): %

GO TO WATERSHED CHARACTERISTICS

Select the STORMWATER TREATMENT ANALYSIS Button below to begin analyzing the effectiveness of Best Management Practices.

STORMWATER TREATMENT ANALYSIS

Systems available for analysis:
Retention Basin with option for calculating effluent concentration
Wet Detention
Exfiltration Trench
Pervious Pavement
Stormwater Harvesting
Biofiltration
Greenroof
Rainwater Harvesting
Managed Aquatic Plants Detention
Vegetated Natural Buffer
Vegetated Filter Strip
Swale
Rain Garden
Tree Well
Lined reuse pond
User Defined BMP

RESET INPUT FOR STORMWATER TREATMENT ANALYSIS

Model documentation and example problems.

There is a user's manual for the BMPTRAINS model. It can be downloaded from www.stormwater.ucf.edu. The results from the example problems shown in the manual however may not reflect current model results due to ongoing updates of the model.

METHODOLOGY FOR CALCULATING REQUIRED TREATMENT EFFICIENCY

METHODOLOGY FOR RETENTION SYSTEMS

METHODOLOGY FOR WET DETENTION SYSTEMS

METHODOLOGY FOR GREENROOF SYSTEMS

METHODOLOGY FOR WATER HARVESTING SYSTEMS

WATERSHED CHARACTERISTICS V 8.6

GO TO STORMWATER TREATMENT ANALYSIS

Blue Numbers =	Input data
Red Numbers =	Calculated

LAND USES/EMC

SELECT CATCHMENT CONFIGURATION 7/17/2018

CLICK ON CELL BELOW TO SELECT CONFIGURATION

A - Single Catchment

COMINGLING | MULTI-LAND USE

VIEW CATCHMENT CONFIGURATION

GO TO GENERAL SITE INFORMATION PAGE

For comingling, the off-site catchment must be upstream. The delay is only for retention BMPs and must be used in hours as measured by the time of concentration at a one inch/hour rain

Delay [hrs]

max delay = 15 hrs,

CATCHMENT NO.1 NAME:

	CLICK ON CELL BELOW TO SELECT
Pre-development land use: with default EMCs	Developed User Defined (overwrite defaults)
	CLICK ON CELL BELOW TO SELECT
Post-development land use: with default EMCs	Developed User Defined (overwrite defaults)

VIEW AVERAGE ANNUAL RUNOFF "C" Factor

VIEW EMC & FLUCCS

GO TO GIS LANDUSE DATA

OVERWRITE DEFAULT CONCENTRATIONS USING:

	PRE:		POST:	
EMC(N):	1.308	mg/L	1.432	mg/L
EMC(P):	0.117	mg/L	1.650	mg/L

Total pre-development catchment area:	3.690	AC
Total post-development catchment or for BMP analysis:	3.690	AC
Pre-development Non DCIA CN:	39.00	
Pre-development DCIA percentage:	42.82	%
Post-development Non DCIA CN:	55.00	
Post-development DCIA percentage:	62.33	%
Estimated BMP Area (No loading from this area)	0.670	AC

Average annual pre runoff volume:	5.615	ac-ft/year
Average annual post runoff volume (note no BMP area):	6.734	ac-ft/year
Pre-development Annual Mass Loading - **Nitrogen:**	9.058	kg/year
Pre-development Annual Mass Loading - **Phosphorus:**	0.810	kg/year
Post-development Annual Mass Loading - **Nitrogen:**	11.892	kg/year
Post-development Annual Mass Loading - **Phosphorus:**	13.702	kg/year

CATCHMENT NO.2 NAME:

	CLICK ON CELL BELOW TO SELECT
Pre-development land use: with default EMCs	
	CLICK ON CELL BELOW TO SELECT
Post-development land use: with default EMCs	

OVERWRITE DEFAULT CONCENTRATIONS:

	PRE:		POST:	
EMC(N):		mg/L		mg/L
EMC(P):		mg/L		mg/L

USE DEFAULT CONCENTRATIONS

Total pre-development catchment area:		AC
Total post-development catchment or BMP analysis area:		AC
Pre-development Non DCIA CN:		
Pre-development DCIA percentage:		%
Post-development Non DCIA CN:		
Post-development DCIA percentage:		%
Estimated BMP Area (No loading from this area)		AC

Average annual pre runoff volume:		ac-ft/year
Average annual post runoff volume (note no BMP area):		ac-ft/year
Pre-development Annual Mass Loading - **Nitrogen:**		kg/year
Pre-development Annual Mass Loading - **Phosphorus:**		kg/year
Post-development Annual Mass Loading - **Nitrogen:**		kg/year
Post-development Annual Mass Loading - **Phosphorus:**		kg/year

WET DETENTION / MANAGED AQUATIC PLANTS: 7/17/2018 V 8.6

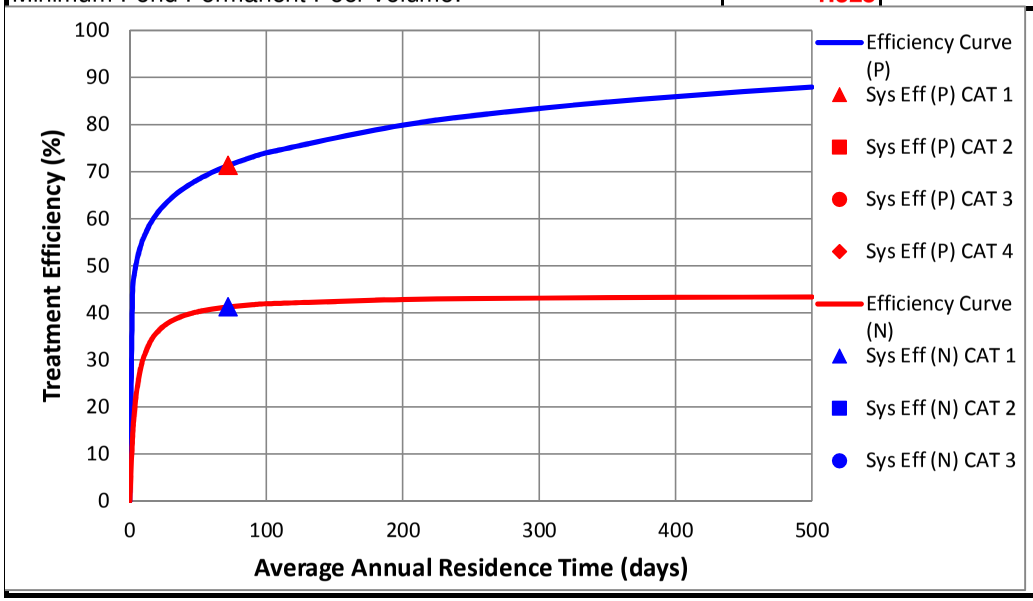
Also called: FLOATING ISLANDS and includes a wet detention pond: **SMF 5**

	Catchment 1	Catchment 2	Catchment 3	Catchment 4	
Total pre-development catchment area:	3.690	0.000	0.000	0.000	ac
Total post-development catchment area:	3.020	0.000	0.000	0.000	ac
Average annual residence time (between 1 and 500 days)	72.00				days
Littoral Zone or other improvements used?*					
Littoral Zone or other improvement efficiency credit:					%
Floating Wetland or Mats used in the design:					
Floating Wetland or Mats credit:					%
Total **Nitrogen** removal required:	23.828				%
Total **Phosphorus** removal required:	94.087				%
Total **Nitrogen** removal efficiency:	41.241	0.000	0.000	0.000	%
Total **Phosphorous** removal efficiency:	71.277	0.000	0.000	0.000	%
Is the wet detention sufficient:	YES				
Average annual runoff volume:	6.734				ac-ft/yr

* pond coverage must follow Regulatory Requirements

Wet Detention Pond Characteristic:

Minimum Pond Permanent Pool Volume:	1.328				ac-ft



NOTE FOR TREATMENT EFFICIENCY GRAPH:

The purpose of the treatment efficiency graphs is to help illustrate the treatment efficiency of the wet detention system as the function of average annual residence time (and permanent pool volume). The graph illustrates that there is a point of diminished return as the permanent pool volume is substantially increased. Therefore, to provide the most economical BMP treatment system, other alternatives such as "treatment trains" and compensatory treatment should be considered.

STORMWATER TREATMENT ANALYSIS:	V 8.6	GO TO GENERAL SITE INFORMATION PAGE	Blue Numbers =	Input data
			Red Numbers =	Calculated

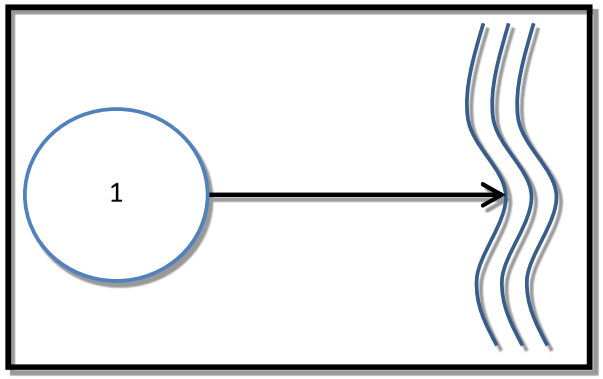
If not done, specify pre- and post-development watershed characteristics.

7/17/2018

GO TO WATERSHED CHARACTERISTICS

Total Required Treatment Efficiency:

Required Treatment Eff (**Nitrogen**):	24	%
Required Treatment Eff (**Phosphorus**):	94	%



Select one of the BMPs below to analyze efficiency or review the summary data.

RETENTION BASIN	WET DETENTION / MAP	EXFILTRATION TRENCH	RAIN GARDEN / depression storage	SWALE	USER DEFINED BMP
PERVIOUS PAVEMENT	STORMWATER HARVESTING	FILTRATION	View Media Mixes	NOTE !!!: All individual system must be sized prior to being analyzed in conjunction with other systems. Please read instructions in the CATCHMENT AND TREATMENT SUMMARY RESULTS tab for more information.	
GREENROOF	RAINWATER HARVESTING	LINED REUSE POND & UNDERDRAIN INPUT	GO TO COST ANALYSIS WORKSHEET		
VEGETATED NATURAL BUFFER	VEGETATED FILTER STRIP	TREE WELL	CATCHMENT AND TREATMENT SURFACE		

CATCHMENTS AND TREATMENT SURFACE DISCHARGE SUMMARY V 8.6

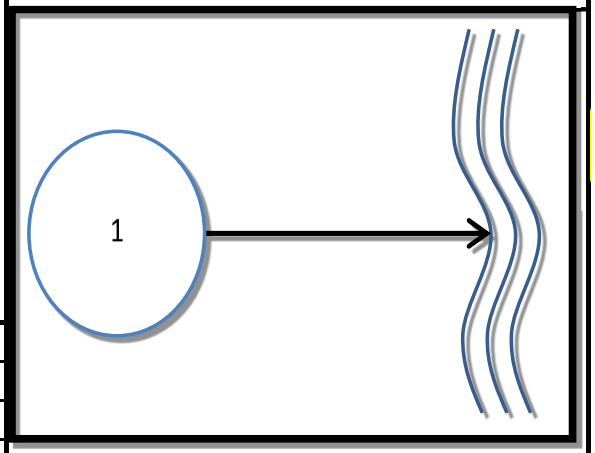
CALCULATION METHODS:

1. The effectiveness of each BMP in a single catchment is converted to an equivalent capture volume.
2. Certain BMP treatment train combinations have not been evaluated and in practice they are at this time not used, an example is a greenroof following a tree well.
3. Wet detention is last when used in a single catchment with other BMPs, except when followed by filtration

PROJECT TITLE	SMF 5	Optional Identification		
	Catchment 1	Catchment 2	Catchment 3	Catchment 4
BMP Name	Wet Detention/ MAPs			
BMP Name				
BMP Name				

Surface Water Discharge Summary Performance of Entire Watershed

Catchment Configuration	A - Single Catchment	Treatment Objectives or Target for TN MET TP NOT MET	7/17/2018 BMPTRAINS MODEL
Nitrogen Pre Load (kg/yr)	9.06		
Phosphorus Pre Load (kg/yr)	0.81		
Nitrogen Post Load (kg/yr)	11.89		
Phosphorus Post Load (kg/yr)	13.70		
Target Load Reduction (N) %	24		
Target Load Reduction (P) %	94		
Target Discharge Load, N (kg/yr)	9.04		
Target Discharge Load, P (kg/yr)	0.82		
Provided Overall Efficiency, N (%):	41		
Provided Overall Efficiency, P (%):	71		
Discharged Load, N (kg/yr & lb/yr):	6.99	15.39	
Discharged Load, P (kg/yr & lb/yr):	3.94	8.67	
Load Removed, N (kg/yr & lb/yr):	4.90	10.80	
Load Removed, P (kg/yr & lb/yr):	9.77	21.51	



ATKINS

Designed By:	MAW
Date:	3/28/2018
Checked By:	RDU
Date:	3/28/2018

Subject: FPID 412531-1-52-01 I-275 (SR 93)
Basin 8

Pre-Development

Non DCIA CN Composite Calculation

	Basin 8		
Condition	Good	Good	Good
Land Use	Open Space	Open Space	Open Space
Hydrologic Group	A	A	A
Percent of Open Space	N/A	N/A	N/A
Open Space CN	39	39	100
Area	13.21 ac	0.24 ac	0.51 ac
Adjusted Percent Open	n/a	n/a	n/a
Total Open Space Area	**13.96 ac**		
Existing Non DCIA CN	**41**		

Basin Description	**Land Use**	**Area**	**% DCIA**	**Non DCIA CN**	**Runoff Coeff.[1]**	**EMC (TN)[2]**	**EMC (TP)[2]**
Existing Open Space	Undeveloped	13.21 ac	0%	41	0.012	1.15 mg/L	0.06 mg/L
Existing Pavement	Highway	13.04 ac	100%	98	0.823	1.52 mg/L	0.20 mg/L
Existing Pond Area at the SHWT	Water	0.51 ac	0%	41	0.012	0.00 mg/L	0.00 mg/L
Existing Pond Berm	Pond	0.24 ac	0%	41	0.012	0.00 mg/L	0.00 mg/L

Total Area:	27.00 ac	Pre-Development DCIA %:	48.30%	
Total Area minus the Water/Pond:	26.25 ac			
		Weighted Coefficients:	0.404	
		Weighted Coefficients Without Water/Ponds:	1.334 mg/L	0.127 mg/L

Post-Development

Non DCIA CN Composite Calculation

Basin	**Basin 8**		
Condition	Good	Good	Good
Land Use	Open Space	Open Space	Open Space
Hydrologic Group	A	A	A
Percent of Open Space	N/A	N/A	N/A
Open Space CN	39	39	100
Area	3.60 ac	0.82 ac	1.57 ac
Adjusted Percent Open	n/a	n/a	n/a
Total Open Space Area	**5.99 ac**		
Proposed Non DCIA CN	**55**		

Basin Description	**Land Use**	**Area**	**% DCIA**	**Non DCIA CN**	**Runoff Coeff.[1]**	**EMC (TN)[2]**	**EMC (TP)[2]**
Proposed Open Space	Undeveloped	3.60 ac	0%	55	0.030	1.15 mg/L	0.06 mg/L
Proposed Pavement	Highway	21.01 ac	100%	98	0.823	1.52 mg/L	0.20 mg/L
Proposed Pond Area at the SHWT	Water	1.57 ac	0%	55	0.030	0.00 mg/L	0.00 mg/L
Proposed Pond Berm	Pond	0.82 ac	0%	55	0.030	0.00 mg/L	0.00 mg/L

Total Area:	27.00 ac	Post-Development DCIA %:	77.81%	
Total Area minus the Water/Pond:	24.61 ac			
		Weighted Coefficients:	0.647	
		Weighted Coefficients Without Ponds:	1.466 mg/L	0.179 mg/L

Annual Runoff Volume: **74.25 ac-ft/yr** **(EQ 1)**

GENERAL SITE INFORMATION: V 8.6

GO TO INTRODUCTION PAGE

3/30/2018

Blue Numbers =	Input data
Red Numbers =	Calculated or Carryover

Select the appropriate Meteorological Zone, input the appropriate Mean Annual Rainfall amount and select the type of analysis

NAME OF PROJECT: SMF 8

HELP Rainfall

VIEW ZONE MAP

Meteorological Zone (Please use zone map): CLICK ON CELL BELOW TO SELECT — Zone 4

Mean Annual Rainfall (Please use rainfall map): 51.00 Inches

VIEW MEAN ANNUAL RAINFALL

Type of analysis: CLICK ON CELL BELOW TO SELECT — Net improvement

Treatment efficiency (N, P) (ex 80 70 (no decimal points) **use only for specified removal efficiency**): %

GO TO WATERSHED CHARACTERISTICS

Select the STORMWATER TREATMENT ANALYSIS Button below to begin analyzing the effectiveness of Best Management Practices.

STORMWATER TREATMENT ANALYSIS

Systems available for analysis:
Retention Basin with option for calculating effluent concentration
Wet Detention
Exfiltration Trench
Pervious Pavement
Stormwater Harvesting
Biofiltration
Greenroof
Rainwater Harvesting
Managed Aquatic Plants Detention
Vegetated Natural Buffer
Vegetated Filter Strip
Swale
Rain Garden
Tree Well
Lined reuse pond
User Defined BMP

RESET INPUT FOR STORMWATER TREATMENT ANALYSIS

Model documentation and example problems.

There is a user's manual for the BMPTRAINS model. It can be downloaded from www.stormwater.ucf.edu. The results from the example problems shown in the manual however may not reflect current model results due to ongoing updates of the model.

METHODOLOGY FOR CALCULATING REQUIRED TREATMENT EFFICIENCY

METHODOLOGY FOR RETENTION SYSTEMS

METHODOLOGY FOR WET DETENTION SYSTEMS

METHODOLOGY FOR GREENROOF SYSTEMS

METHODOLOGY FOR WATER HARVESTING SYSTEMS

WATERSHED CHARACTERISTICS V 8.6

GO TO STORMWATER TREATMENT ANALYSIS

Blue Numbers = Input data
Red Numbers = Calculated

LAND USES/EMC

SELECT CATCHMENT CONFIGURATION 7/17/2018

CLICK ON CELL BELOW TO SELECT CONFIGURATION

A - Single Catchment

COMINGLING MULTI-LAND USE

VIEW CATCHMENT CONFIGURATION

GO TO GENERAL SITE INFORMATION PAGE

For comingling, the off-site catchment must be upstream. The delay is only for retention BMPs and must be used in hours as measured by the time of concentration at a one inch/hour rain

Delay [hrs]

max delay = 15 hrs.

CATCHMENT NO.1 NAME:

CLICK ON CELL BELOW TO SELECT

Pre-development land use: Developed User Defined (overwrite defaults)
with default EMCs

CLICK ON CELL BELOW TO SELECT

Post-development land use: Developed User Defined (overwrite defaults)
with default EMCs

VIEW AVERAGE ANNUAL RUNOFF "C" Factor

VIEW EMC & FLUCCS

GO TO GIS LANDUSE DATA

OVERWRITE DEFAULT CONCENTRATIONS USING:

	PRE:		POST:	
EMC(N):	1.334	mg/L	1.466	mg/L
EMC(P):	0.127	mg/L	0.179	mg/L

Total pre-development catchment area:	26.250	AC
Total post-development catchment or for BMP analysis:	27.000	AC
Pre-development Non DCIA CN:	41.00	
Pre-development DCIA percentage:	48.30	%
Post-development Non DCIA CN:	55.00	
Post-development DCIA percentage:	77.81	%
Estimated BMP Area (No loading from this area)	2.390	AC

Average annual pre runoff volume:	45.019	ac-ft/year
Average annual post runoff volume (note no BMP area):	67.663	ac-ft/year
Pre-development Annual Mass Loading - **Nitrogen:**	74.063	kg/year
Pre-development Annual Mass Loading - **Phosphorus:**	7.051	kg/year
Post-development Annual Mass Loading - **Nitrogen:**	122.332	kg/year
Post-development Annual Mass Loading - **Phosphorus:**	14.937	kg/year

CATCHMENT NO.2 NAME:

CLICK ON CELL BELOW TO SELECT

Pre-development land use:
with default EMCs

CLICK ON CELL BELOW TO SELECT

Post-development land use:
with default EMCs

OVERWRITE DEFAULT CONCENTRATIONS:

	PRE:		POST:	
EMC(N):		mg/L		mg/L
EMC(P):		mg/L		mg/L

USE DEFAULT CONCENTRATIONS

Total pre-development catchment area:		AC
Total post-development catchment or BMP analysis area:		AC
Pre-development Non DCIA CN:		
Pre-development DCIA percentage:		%
Post-development Non DCIA CN:		
Post-development DCIA percentage:		%
Estimated BMP Area (No loading from this area)		AC

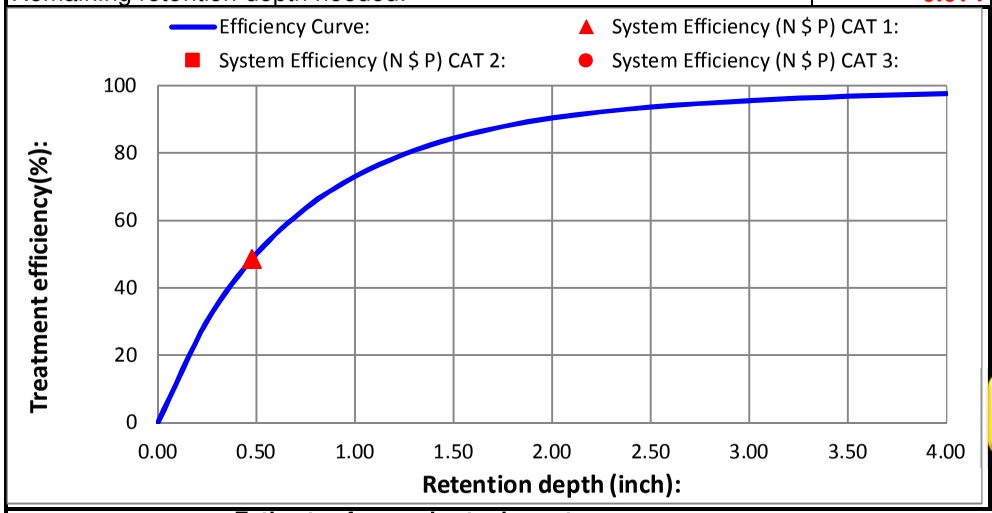
Average annual pre runoff volume:		ac-ft/year
Average annual post runoff volume (note no BMP area):		ac-ft/year
Pre-development Annual Mass Loading - **Nitrogen:**		kg/year
Pre-development Annual Mass Loading - **Phosphorus:**		kg/year
Post-development Annual Mass Loading - **Nitrogen:**		kg/year
Post-development Annual Mass Loading - **Phosphorus:**		kg/year

RETENTION BASIN: 7/17/2018 V 8.6

RETENTION BASIN SERVING:	SMF 8				
Loadings from BMP area are contained by the BMP, thus no BMP area load.	Catchment 1	Catchment 2	Catchment 3	Catchment 4	
Watershed area cotributing to basin:	24.610	0.000	0.000	0.000	ac
Required Treatment Eff (**Nitrogen**):	39.457				%
Required Treatment Eff (**Phosphorus**):	52.794				%
Required retention depth over the watershed to meet required efficiency	0.551	0.000	0.000	0.000	in
Required water quality retention volume:	1.129	0.000	0.000	0.000	ac-ft

RETENTION BASIN FOR MULTIPLE TREATMENT SYSTEMS (if there is a need for additional removal efficiencies in a series of BMPs):

Retention volume based on retention depth and Total area - BMP area	0.984	0.000	0.000	0.000	ac-ft
Provided retention depth (0.1-3.99 inches over the watershed)	0.480				in
Provided treatment efficiency (**Nitrogen**):	48.442	0.000	0.000	0.000	%
Provided treatment efficiency (**Phosphorus**):	48.442	0.000	0.000	0.000	%
Remaining treatment efficiency (**Nitrogen**):	0.000				%
Remaining treatment efficiency (**Phosphorus**):	8.442				%
Remaining retention depth needed:	0.071	0.000	0.000	0.000	in



NOTE FOR TREATMENT EFFICIENCY GRAPH:

The purpose of this graph is to help illustrate the treatment efficiency of the retention system as the function of retention depth **for a single BMP and in a single catchment**. The graph illustrates that there is a diminished return as the retention depth is increased. Thus evaluations of other alternatives in "treatment trains" and compensatory treatment should be considered. **NOTE:** the retention volume can not exceed 3.99 inches to be within the range of data used to determine effectiveness.

HELP - EXAMPLE PROBLEM 3

View Media Mixes

Estimate of groundwater impacts	Catchment 1	Catchment 2	Catchment 3	Catchment 4
Use only down flow media mix before water enters the ground, specify type				
Nitrogen mass reduction in groundwater discharge (%)				
Phosphorus mass reduction in groundwater discharge (%)				

STORMWATER TREATMENT ANALYSIS:	V 8.6	GO TO GENERAL SITE INFORMATION PAGE	Blue Numbers =	Input data
			Red Numbers =	Calculated

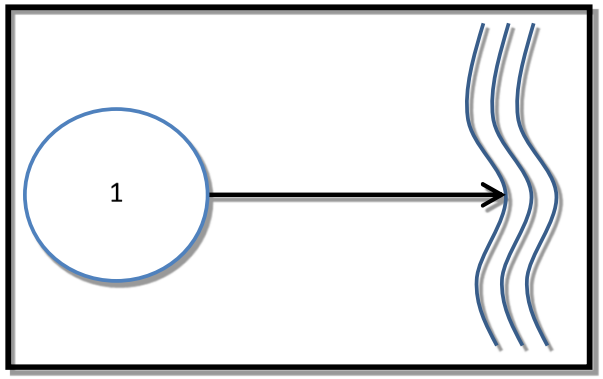
If not done, specify pre- and post-development watershed characteristics.

7/17/2018

GO TO WATERSHED CHARACTERISTICS

Total Required Treatment Efficiency:

Required Treatment Eff (**Nitrogen**):	39	%
Required Treatment Eff (**Phosphorus**):	53	%



Select one of the BMPs below to analyze efficiency or review the summary data.

RETENTION BASIN	WET DETENTION / MAP	EXFILTRATION TRENCH	RAIN GARDEN / depression storage	SWALE	USER DEFINED BMP
PERVIOUS PAVEMENT	STORMWATER HARVESTING	FILTRATION	View Media Mixes	NOTE !!!: All individual system must be sized prior to being analyzed in conjunction with other systems. Please read instructions in the CATCHMENT AND TREATMENT SUMMARY RESULTS tab for more information.	
GREENROOF	RAINWATER HARVESTING	LINED REUSE POND & UNDERDRAIN INPUT	GO TO COST ANALYSIS WORKSHEET		
VEGETATED NATURAL BUFFER	VEGETATED FILTER STRIP	TREE WELL	CATCHMENT AND TREATMENT SURFACE		

CATCHMENTS AND TREATMENT SURFACE DISCHARGE SUMMARY V 8.6

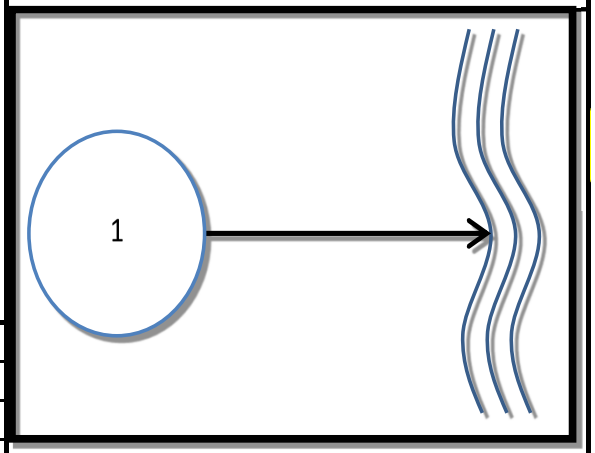
CALCULATION METHODS:

1. The effectiveness of each BMP in a single catchment is converted to an equivalent capture volume.
2. Certain BMP treatment train combinations have not been evaluated and in practice they are at this time not used, an example is a greenroof following a tree well.
3. Wet detention is last when used in a single catchment with other BMPs, except when followed by filtration

PROJECT TITLE	SMF 8	Optional Identification		
	Catchment 1	Catchment 2	Catchment 3	Catchment 4
BMP Name	Retention Basin			
BMP Name				
BMP Name				

Surface Water Discharge Summary Performance of Entire Watershed

Catchment Configuration	A - Single Catchment	Treatment Objectives or Target for TN MET TP NOT MET	7/17/2018 BMPTRAINS MODEL
Nitrogen Pre Load (kg/yr)	74.06		
Phosphorus Pre Load (kg/yr)	7.05		
Nitrogen Post Load (kg/yr)	122.33		
Phosphorus Post Load (kg/yr)	14.94		
Target Load Reduction (N) %	39		
Target Load Reduction (P) %	53		
Target Discharge Load, N (kg/yr)	74.62		
Target Discharge Load, P (kg/yr)	7.02		
Provided Overall Efficiency, N (%):	48		
Provided Overall Efficiency, P (%):	48		
Discharged Load, N (kg/yr & lb/yr):	63.07	138.92	
Discharged Load, P (kg/yr & lb/yr):	7.70	16.96	
Load Removed, N (kg/yr & lb/yr):	59.26	130.53	
Load Removed, P (kg/yr & lb/yr):	7.24	15.94	



ATKINS

Designed By:	MAW
Date:	3/28/2018
Checked By:	RDU
Date:	3/28/2018

Subject: FPID 412531-1-52-01 I-275 (SR 93)
Basin 10

Pre-Development

Non DCIA CN Composite Calculation

	Basin 10		
Condition	Good	Good	Good
Land Use	Open Space	Open Space	Open Space
Hydrologic Group	A	A	A
Percent of Open Space	N/A	N/A	N/A
Open Space CN	39	39	100
Area	11.38 ac	0.27 ac	2.07 ac
Adjusted Percent Open	n/a	n/a	n/a
Total Open Space Area	**13.72 ac**		
Existing Non DCIA CN	**48**		

Basin Description	**Land Use**	**Area**	**% DCIA**	**Non DCIA CN**	**Runoff Coeff.[1]**	**EMC (TN)[2]**	**EMC (TP)[2]**
Existing Open Space	Undeveloped	11.38 ac	0%	48	0.020	1.15 mg/L	0.06 mg/L
Existing Pavement	Highway	13.85 ac	100%	98	0.823	1.52 mg/L	0.20 mg/L
Existing Pond Area at the SHWT	Water	2.07 ac	0%	48	0.020	0.00 mg/L	0.00 mg/L
Existing Pond Berm	Pond	0.27 ac	0%	48	0.020	0.00 mg/L	0.00 mg/L

Total Area:	27.57 ac	Pre-Development DCIA %:	50.24%	
Total Area minus the Water/Pond:	25.23 ac			
		Weighted Coefficients:	0.423	
		Weighted Coefficients Without Water/Ponds:	1.353 mg/L	0.135 mg/L

Post-Development

Non DCIA CN Composite Calculation

Basin	**Basin 10**		
Condition	Good	Good	Good
Land Use	Open Space	Open Space	Open Space
Hydrologic Group	A	A	A
Percent of Open Space	N/A	N/A	N/A
Open Space CN	39	39	100
Area	3.70 ac	1.08 ac	3.29 ac
Adjusted Percent Open	n/a	n/a	n/a
Total Open Space Area	**8.07 ac**		
Proposed Non DCIA CN	**64**		

Basin Description	**Land Use**	**Area**	**% DCIA**	**Non DCIA CN**	**Runoff Coeff.[1]**	**EMC (TN)[2]**	**EMC (TP)[2]**
Proposed Open Space	Undeveloped	3.70 ac	0%	64	0.051	1.15 mg/L	0.06 mg/L
Proposed Pavement	Highway	19.50 ac	100%	98	0.823	1.52 mg/L	0.20 mg/L
Proposed Pond Area at the SHWT	Water	3.29 ac	0%	64	0.051	0.00 mg/L	0.00 mg/L
Proposed Pond Berm	Pond	1.08 ac	0%	64	0.051	0.00 mg/L	0.00 mg/L

Total Area:	27.57 ac	Post-Development DCIA %:	70.73%	
Total Area minus the Water/Pond:	23.20 ac			
		Weighted Coefficients:	0.597	
		Weighted Coefficients Without Ponds:	1.461 mg/L	0.177 mg/L

Annual Runoff Volume: **69.95 ac-ft/yr** **(EQ 1)**

ATKINS

Designed By:	MAW
Date:	3/28/2018
Checked By:	RDU
Date:	3/28/2018

Subject: FPID 412531-1-52-01 I-275 (SR 93)
Basin 10

PROPOSED TREATMENT SYSTEM(S)

☑ **Wet Detention** ☐ **Dry Retention**

WET DETENTION

Permanent Pool Volume:	**28.79 ac-ft**	
Average Residence Time:	**150 days**	**(EQ 4)**

Description	Elevation	Area	Volume
Control/Bleeddown Elevation	1.93 ft	3.61 ac	**6.63 ac-ft**
Slope Change	-0.07 ft	3.02 ac	
Slope Change	-0.07 ft	3.02 ac	**22.16 ac-ft**
Pond Bottom Elevation	-8.07 ft	2.52 ac	
		0.00 ac	**0.00 ac-ft**
		0.00 ac	
Total Permanent Pool Volume:			**28.79 ac-ft**

GENERAL SITE INFORMATION: V 8.6

GO TO INTRODUCTION PAGE

3/30/2018

Blue Numbers =	Input data
Red Numbers =	Calculated or Carryover

HELP Rainfall

Select the appropriate Meteorological Zone, input the appropriate Mean Annual Rainfall amount and select the type of analysis

NAME OF PROJECT: SMF 10

VIEW ZONE MAP

Meteorological Zone (Please use zone map): CLICK ON CELL BELOW TO SELECT — Zone 4

Mean Annual Rainfall (Please use rainfall map): 51.00 Inches

VIEW MEAN ANNUAL RAINFALL

Type of analysis: CLICK ON CELL BELOW TO SELECT — Net improvement

Treatment efficiency (N, P) (ex 80 70 (no decimal points) **use only for specified removal efficiency**): %

GO TO WATERSHED CHARACTERISTICS

Select the STORMWATER TREATMENT ANALYSIS Button below to begin analyzing the effectiveness of Best Management Practices.

STORMWATER TREATMENT ANALYSIS

Systems available for analysis:
Retention Basin with option for calculating effluent concentration
Wet Detention
Exfiltration Trench
Pervious Pavement
Stormwater Harvesting
Biofiltration
Greenroof
Rainwater Harvesting
Managed Aquatic Plants Detention
Vegetated Natural Buffer
Vegetated Filter Strip
Swale
Rain Garden
Tree Well
Lined reuse pond
User Defined BMP

RESET INPUT FOR STORMWATER TREATMENT ANALYSIS

Model documentation and example problems.

There is a user's manual for the BMPTRAINS model. It can be downloaded from www.stormwater.ucf.edu. The results from the example problems shown in the manual however may not reflect current model results due to ongoing updates of the model.

METHODOLOGY FOR CALCULATING REQUIRED TREATMENT EFFICIENCY

METHODOLOGY FOR RETENTION SYSTEMS

METHODOLOGY FOR WET DETENTION SYSTEMS

METHODOLOGY FOR GREENROOF SYSTEMS

METHODOLOGY FOR WATER HARVESTING SYSTEMS

WATERSHED CHARACTERISTICS V 8.6

GO TO STORMWATER TREATMENT ANALYSIS

Blue Numbers = Input data
Red Numbers = Calculated

LAND USES/EMC

SELECT CATCHMENT CONFIGURATION 7/17/2018

CLICK ON CELL BELOW TO SELECT CONFIGURATION

A - Single Catchment

VIEW CATCHMENT CONFIGURATION

GO TO GENERAL SITE INFORMATION PAGE

For comingling, the off-site catchment must be upstream. The delay is only for retention BMPs and must be used in hours as measured by the time of concentration at a one inch/hour rain

COMINGLING MULTI-LAND USE

Delay [hrs]

max delay = 15 hrs.

VIEW AVERAGE ANNUAL RUNOFF "C" Factor

VIEW EMC & FLUCCS

GO TO GIS LANDUSE DATA

CATCHMENT NO.1 NAME:

	CLICK ON CELL BELOW TO SELECT
Pre-development land use: with default EMCs	Developed User Defined (overwrite defaults)
	CLICK ON CELL BELOW TO SELECT
Post-development land use: with default EMCs	Developed User Defined (overwrite defaults)

OVERWRITE DEFAULT CONCENTRATIONS USING:

	PRE:		POST:	
EMC(N):	1.353	mg/L	1.461	mg/L
EMC(P):	0.135	mg/L	0.177	mg/L

Total pre-development catchment area:	25.230	AC
Total post-development catchment or for BMP analysis:	27.570	AC
Pre-development Non DCIA CN:	48.00	
Pre-development DCIA percentage:	50.24	%
Post-development Non DCIA CN:	64.00	
Post-development DCIA percentage:	70.73	%
Estimated BMP Area (No loading from this area)	4.370	AC

Average annual pre runoff volume:	45.394	ac-ft/year
Average annual post runoff volume (note no BMP area):	58.854	ac-ft/year
Pre-development Annual Mass Loading - **Nitrogen:**	75.744	kg/year
Pre-development Annual Mass Loading - **Phosphorus:**	7.558	kg/year
Post-development Annual Mass Loading - **Nitrogen:**	106.042	kg/year
Post-development Annual Mass Loading - **Phosphorus:**	12.847	kg/year

CATCHMENT NO.2 NAME:

	CLICK ON CELL BELOW TO SELECT
Pre-development land use: with default EMCs	
	CLICK ON CELL BELOW TO SELECT
Post-development land use: with default EMCs	

OVERWRITE DEFAULT CONCENTRATIONS:

	PRE:		POST:	
EMC(N):		mg/L		mg/L
EMC(P):		mg/L		mg/L

USE DEFAULT CONCENTRATIONS

Total pre-development catchment area:		AC
Total post-development catchment or BMP analysis area:		AC
Pre-development Non DCIA CN:		
Pre-development DCIA percentage:		%
Post-development Non DCIA CN:		
Post-development DCIA percentage:		%
Estimated BMP Area (No loading from this area)		AC

Average annual pre runoff volume:		ac-ft/year
Average annual post runoff volume (note no BMP area):		ac-ft/year
Pre-development Annual Mass Loading - **Nitrogen:**		kg/year
Pre-development Annual Mass Loading - **Phosphorus:**		kg/year
Post-development Annual Mass Loading - **Nitrogen:**		kg/year
Post-development Annual Mass Loading - **Phosphorus:**		kg/year

WET DETENTION / MANAGED AQUATIC PLANTS: 7/17/2018 V 8.6

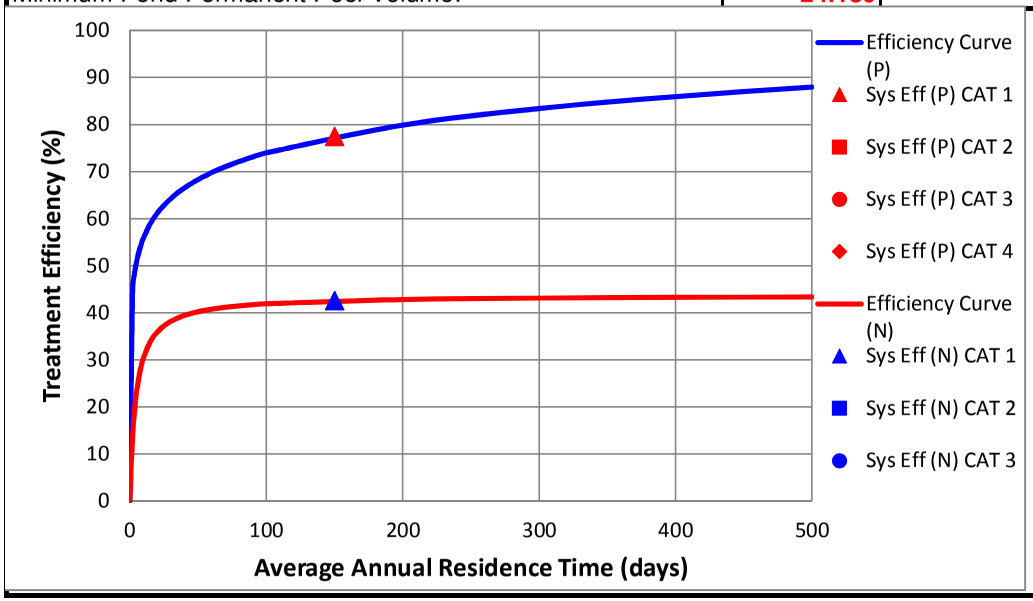
Also called: FLOATING ISLANDS and includes a wet detention pond: **SMF 10**

	Catchment 1	Catchment 2	Catchment 3	Catchment 4	
Total pre-development catchment area:	25.230	0.000	0.000	0.000	ac
Total post-development catchment area:	23.200	0.000	0.000	0.000	ac
Average annual residence time (between 1 and 500 days)	150.00				days
Littoral Zone or other improvements used?*					
Littoral Zone or other improvement efficiency credit:					%
Floating Wetland or Mats used in the design:					
Floating Wetland or Mats credit:					%
Total **Nitrogen** removal required:	28.572				%
Total **Phosphorus** removal required:	41.172				%
Total **Nitrogen** removal efficiency:	42.509	0.000	0.000	0.000	%
Total **Phosphorous** removal efficiency:	77.405	0.000	0.000	0.000	%
Is the wet detention sufficient:	YES				
Average annual runoff volume:	58.854				ac-ft/yr

* pond coverage must follow Regulatory Requirements

Wet Detention Pond Characteristic:

Minimum Pond Permanent Pool Volume:	24.186				ac-ft



NOTE FOR TREATMENT EFFICIENCY GRAPH:

The purpose of the treatment efficiency graphs is to help illustrate the treatment efficiency of the wet detention system as the function of average annual residence time (and permanent pool volume). The graph illustrates that there is a point of diminished return as the permanent pool volume is substantially increased. Therefore, to provide the most economical BMP treatment system, other alternatives such as "treatment trains" and compensatory treatment should be considered.

STORMWATER TREATMENT ANALYSIS:	V 8.6	GO TO GENERAL SITE INFORMATION PAGE	Blue Numbers =	Input data
			Red Numbers =	Calculated

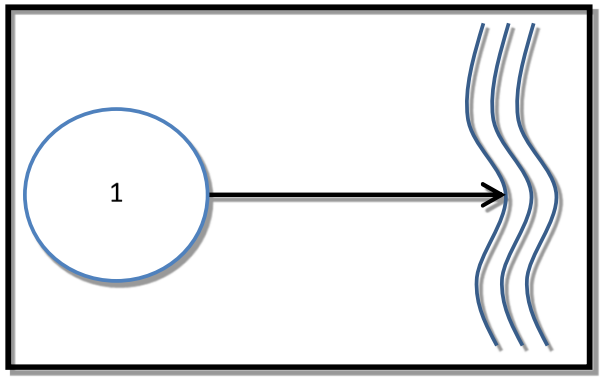
If not done, specify pre- and post-development watershed characteristics.

7/17/2018

GO TO WATERSHED CHARACTERISTICS

Total Required Treatment Efficiency:

Required Treatment Eff (**Nitrogen**):	29	%
Required Treatment Eff (**Phosphorus**):	41	%



Select one of the BMPs below to analyze efficiency or review the summary data.

RETENTION BASIN	WET DETENTION / MAP	EXFILTRATION TRENCH	RAIN GARDEN / depression storage	SWALE	USER DEFINED BMP
PERVIOUS PAVEMENT	STORMWATER HARVESTING	FILTRATION	View Media Mixes	NOTE !!!: All individual system must be sized prior to being analyzed in conjunction with other systems. Please read instructions in the CATCHMENT AND TREATMENT SUMMARY RESULTS tab for more information.	
GREENROOF	RAINWATER HARVESTING	LINED REUSE POND & UNDERDRAIN INPUT	GO TO COST ANALYSIS WORKSHEET		
VEGETATED NATURAL BUFFER	VEGETATED FILTER STRIP	TREE WELL	CATCHMENT AND TREATMENT SURFACE		

CATCHMENTS AND TREATMENT SURFACE DISCHARGE SUMMARY V 8.6

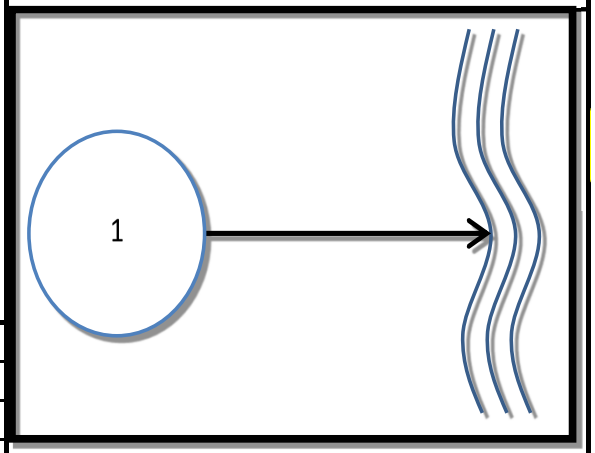
CALCULATION METHODS:

1. The effectiveness of each BMP in a single catchment is converted to an equivalent capture volume.
2. Certain BMP treatment train combinations have not been evaluated and in practice they are at this time not used, an example is a greenroof following a tree well.
3. Wet detention is last when used in a single catchment with other BMPs, except when followed by filtration

PROJECT TITLE	SMF 10	Optional Identification		
	Catchment 1	Catchment 2	Catchment 3	Catchment 4
BMP Name	Wet Detention/ MAPs			
BMP Name				
BMP Name				

Surface Water Discharge Summary Performance of Entire Watershed

Catchment Configuration	A - Single Catchment	Treatment Objectives or Target for TN MET TP MET	7/17/2018 BMPTRAINS MODEL
Nitrogen Pre Load (kg/yr)	75.74		
Phosphorus Pre Load (kg/yr)	7.56		
Nitrogen Post Load (kg/yr)	106.04		
Phosphorus Post Load (kg/yr)	12.85		
Target Load Reduction (N) %	29		
Target Load Reduction (P) %	41		
Target Discharge Load, N (kg/yr)	75.29		
Target Discharge Load, P (kg/yr)	7.58		
Provided Overall Efficiency, N (%):	43		
Provided Overall Efficiency, P (%):	77		
Discharged Load, N (kg/yr & lb/yr):	60.97	134.28	
Discharged Load, P (kg/yr & lb/yr):	2.90	6.39	
Load Removed, N (kg/yr & lb/yr):	45.08	99.29	
Load Removed, P (kg/yr & lb/yr):	9.94	21.90	



ATKINS

Designed By:	MAW
Date:	3/28/2018
Checked By:	RDU
Date:	3/28/2018

Subject: FPID 412531-1-52-01 I-275 (SR 93)
Basin 11

Pre-Development

Non DCIA CN Composite Calculation

	Basin 11		
Condition	Good	Good	Good
Land Use	Open Space	Open Space	Open Space
Hydrologic Group	A	A	A
Percent of Open Space	N/A	N/A	N/A
Open Space CN	39	39	100
Area	0.81 ac	0.00 ac	0.00 ac
Adjusted Percent Open	n/a	n/a	n/a
Total Open Space Area	**0.81 ac**		
Existing Non DCIA CN	**39**		

Basin Description	**Land Use**	**Area**	**% DCIA**	**Non DCIA CN**	**Runoff Coeff.[1]**	**EMC (TN)[2]**	**EMC (TP)[2]**
Existing Open Space	Undeveloped	0.81 ac	0%	39	0.010	1.15 mg/L	0.06 mg/L
Existing Pavement	Highway	0.92 ac	100%	98	0.823	1.52 mg/L	0.20 mg/L
Existing Pond Area at the SHWT	Water	0.00 ac	0%	39	0.010	0.00 mg/L	0.00 mg/L
Existing Pond Berm	Pond	0.00 ac	0%	39	0.010	0.00 mg/L	0.00 mg/L

Total Area:	1.73 ac	Pre-Development DCIA %:	53.18%	
Total Area minus the Water/Pond:	1.73 ac			
		Weighted Coefficients:	0.442	
		Weighted Coefficients Without Water/Ponds:	1.347 mg/L	0.132 mg/L

Post-Development

Non DCIA CN Composite Calculation

Basin	**Basin 11**		
Condition	Good	Good	Good
Land Use	Open Space	Open Space	Open Space
Hydrologic Group	A	A	A
Percent of Open Space	N/A	N/A	N/A
Open Space CN	39	39	100
Area	0.76 ac	0.34 ac	0.30 ac
Adjusted Percent Open	n/a	n/a	n/a
Total Open Space Area	**1.40 ac**		
Proposed Non DCIA CN	**52**		

Basin Description	**Land Use**	**Area**	**% DCIA**	**Non DCIA CN**	**Runoff Coeff.[1]**	**EMC (TN)[2]**	**EMC (TP)[2]**
Proposed Open Space	Undeveloped	0.76 ac	0%	52	0.025	1.15 mg/L	0.06 mg/L
Proposed Pavement	Highway	0.33 ac	100%	98	0.823	1.52 mg/L	0.20 mg/L
Proposed Pond Area at the SHWT	Water	0.30 ac	0%	52	0.025	0.00 mg/L	0.00 mg/L
Proposed Pond Berm	Pond	0.34 ac	0%	52	0.025	0.00 mg/L	0.00 mg/L

Total Area:	1.73 ac	Post-Development DCIA %:	19.08%	
Total Area minus the Water/Pond:	1.09 ac			
		Weighted Coefficients:	0.177	
		Weighted Coefficients Without Ponds:	1.262 mg/L	0.099 mg/L

Annual Runoff Volume: **1.30 ac-ft/yr** **(EQ 1)**

ATKINS

Designed By:	MAW
Date:	3/28/2018
Checked By:	RDU
Date:	3/28/2018

Subject: FPID 412531-1-52-01 I-275 (SR 93)
Basin 11

PROPOSED TREATMENT SYSTEM(S)

☑ **Wet Detention** ☐ **Dry Retention**

WET DETENTION

Permanent Pool Volume:	**1.24 ac-ft**	
Average Residence Time:	**348 days**	**(EQ 4)**

Description	Elevation	Area	Volume
Control/Bleeddown Elevation	2.70 ft	0.30 ac	**0.52 ac-ft**
Slope Change	0.70 ft	0.22 ac	
Slope Change	0.70 ft	0.22 ac	**0.72 ac-ft**
Pond Bottom Elevation	-3.30 ft	0.14 ac	
		0.00 ac	**0.00 ac-ft**
		0.00 ac	
Total Permanent Pool Volume:			**1.24 ac-ft**

GENERAL SITE INFORMATION: V 8.6

GO TO INTRODUCTION PAGE

3/29/2018

Blue Numbers =	Input data
Red Numbers =	Calculated or Carryover

HELP Rainfall

Select the appropriate Meteorological Zone, input the appropriate Mean Annual Rainfall amount and select the type of analysis

NAME OF PROJECT

SMF 11

VIEW ZONE MAP

Meteorological Zone (Please use zone map): CLICK ON CELL BELOW TO SELECT — Zone 4

Mean Annual Rainfall (Please use rainfall map): 51.00 Inches

VIEW MEAN ANNUAL RAINFALL

Type of analysis: CLICK ON CELL BELOW TO SELECT — Net improvement

Treatment efficiency (N, P) (ex 80 70 (no decimal points) **use only for specified removal efficiency**): %

GO TO WATERSHED CHARACTERISTICS

Select the STORMWATER TREATMENT ANALYSIS Button below to begin analyzing the effectiveness of Best Management Practices.

STORMWATER TREATMENT ANALYSIS

Systems available for analysis:
Retention Basin with option for calculating effluent concentration
Wet Detention
Exfiltration Trench
Pervious Pavement
Stormwater Harvesting
Biofiltration
Greenroof
Rainwater Harvesting
Managed Aquatic Plants Detention
Vegetated Natural Buffer
Vegetated Filter Strip
Swale
Rain Garden
Tree Well
Lined reuse pond
User Defined BMP

RESET INPUT FOR STORMWATER TREATMENT ANALYSIS

Model documentation and example problems.

There is a user's manual for the BMPTRAINS model. It can be downloaded from www.stormwater.ucf.edu. The results from the example problems shown in the manual however may not reflect current model results due to ongoing updates of the model.

METHODOLOGY FOR CALCULATING REQUIRED TREATMENT EFFICIENCY

METHODOLOGY FOR RETENTION SYSTEMS

METHODOLOGY FOR WET DETENTION SYSTEMS

METHODOLOGY FOR GREENROOF SYSTEMS

METHODOLOGY FOR WATER HARVESTING SYSTEMS

WATERSHED CHARACTERISTICS V 8.6

GO TO STORMWATER TREATMENT ANALYSIS

Blue Numbers = Input data
Red Numbers = Calculated

LAND USES/EMC

SELECT CATCHMENT CONFIGURATION 7/17/2018

CLICK ON CELL BELOW TO SELECT CONFIGURATION
A - Single Catchment

VIEW CATCHMENT CONFIGURATION

GO TO GENERAL SITE INFORMATION PAGE

For comingling, the off-site catchment must be upstream. The delay is only for retention BMPs and must be used in hours as measured by the time of concentration at a one inch/hour rain

COMINGLING MULTI-LAND USE

Delay [hrs]

max delay = 15 hrs,

VIEW AVERAGE ANNUAL RUNOFF "C" Factor

VIEW EMC & FLUCCS

GO TO GIS LANDUSE DATA

CATCHMENT NO.1 NAME:

	CLICK ON CELL BELOW TO SELECT
Pre-development land use: with default EMCs	Developed User Defined (overwrite defaults)
	CLICK ON CELL BELOW TO SELECT
Post-development land use: with default EMCs	Developed User Defined (overwrite defaults)

Total pre-development catchment area:	1.730	AC
Total post-development catchment or for BMP analysis:	1.730	AC
Pre-development Non DCIA CN:	39.00	
Pre-development DCIA percentage:	53.18	%
Post-development Non DCIA CN:	52.00	
Post-development DCIA percentage:	19.08	%
Estimated BMP Area (No loading from this area)	0.640	AC

OVERWRITE DEFAULT CONCENTRATIONS USING:

	PRE:		POST:	
EMC(N):	1.347	mg/L	1.262	mg/L
EMC(P):	0.132	mg/L	0.099	mg/L

Average annual pre runoff volume:	3.255	ac-ft/year
Average annual post runoff volume (note no BMP area):	0.822	ac-ft/year
Pre-development Annual Mass Loading - **Nitrogen:**	5.407	kg/year
Pre-development Annual Mass Loading - **Phosphorus:**	0.530	kg/year
Post-development Annual Mass Loading - **Nitrogen:**	1.279	kg/year
Post-development Annual Mass Loading - **Phosphorus:**	0.100	kg/year

CATCHMENT NO.2 NAME:

	CLICK ON CELL BELOW TO SELECT
Pre-development land use: with default EMCs	
	CLICK ON CELL BELOW TO SELECT
Post-development land use: with default EMCs	

Total pre-development catchment area:		AC
Total post-development catchment or BMP analysis area:		AC
Pre-development Non DCIA CN:		
Pre-development DCIA percentage:		%
Post-development Non DCIA CN:		
Post-development DCIA percentage:		%
Estimated BMP Area (No loading from this area)		AC

OVERWRITE DEFAULT CONCENTRATIONS:

	PRE:		POST:	
EMC(N):		mg/L		mg/L
EMC(P):		mg/L		mg/L

USE DEFAULT CONCENTRATIONS

Average annual pre runoff volume:		ac-ft/year
Average annual post runoff volume (note no BMP area):		ac-ft/year
Pre-development Annual Mass Loading - **Nitrogen:**		kg/year
Pre-development Annual Mass Loading - **Phosphorus:**		kg/year
Post-development Annual Mass Loading - **Nitrogen:**		kg/year
Post-development Annual Mass Loading - **Phosphorus:**		kg/year

WET DETENTION / MANAGED AQUATIC PLANTS: 7/17/2018 V 8.6

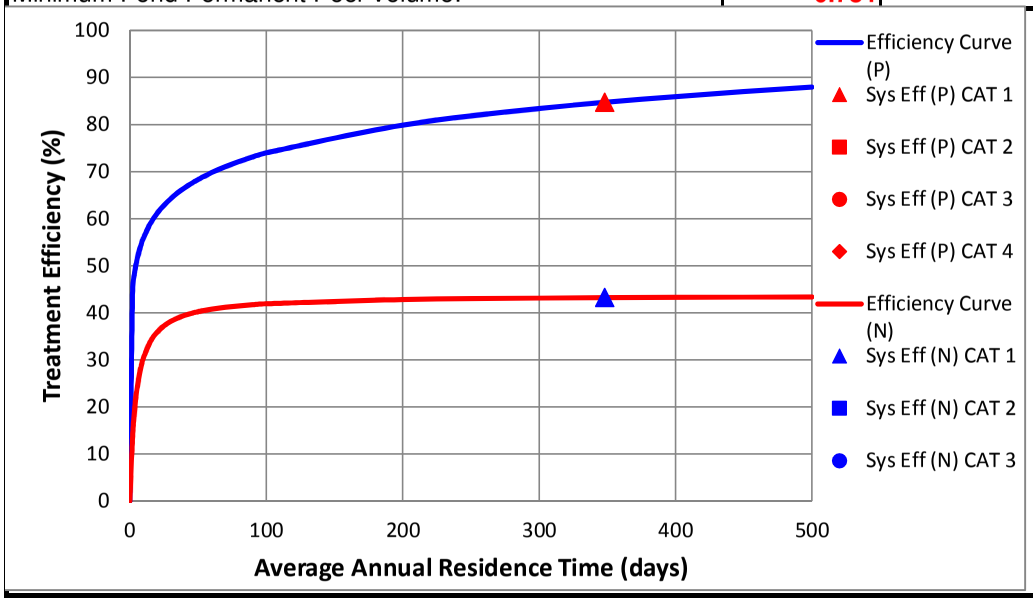
Also called: FLOATING ISLANDS and includes a wet detention pond: **SMF 11**

	Catchment 1	Catchment 2	Catchment 3	Catchment 4	
Total pre-development catchment area:	1.730	0.000	0.000	0.000	ac
Total post-development catchment area:	1.090	0.000	0.000	0.000	ac
Average annual residence time (between 1 and 500 days)	348.00				days
Littoral Zone or other improvements used?*					
Littoral Zone or other improvement efficiency credit:					%
Floating Wetland or Mats used in the design:					
Floating Wetland or Mats credit:					%
Total **Nitrogen** removal required:	0.000				%
Total **Phosphorus** removal required:	0.000				%
Total **Nitrogen** removal efficiency:	43.206	0.000	0.000	0.000	%
Total **Phosphorous** removal efficiency:	84.715	0.000	0.000	0.000	%
Is the wet detention sufficient:	YES				
Average annual runoff volume:	0.822				ac-ft/yr

* pond coverage must follow Regulatory Requirements

Wet Detention Pond Characteristic:

Minimum Pond Permanent Pool Volume:	0.784				ac-ft



NOTE FOR TREATMENT EFFICIENCY GRAPH:

The purpose of the treatment efficiency graphs is to help illustrate the treatment efficiency of the wet detention system as the function of average annual residence time (and permanent pool volume). The graph illustrates that there is a point of diminished return as the permanent pool volume is substantially increased. Therefore, to provide the most economical BMP treatment system, other alternatives such as "treatment trains" and compensatory treatment should be considered.

STORMWATER TREATMENT ANALYSIS:	V 8.6	GO TO GENERAL SITE INFORMATION PAGE	Blue Numbers =	Input data
			Red Numbers =	Calculated

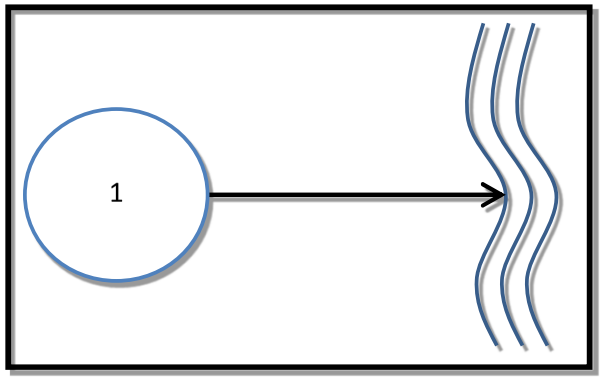
If not done, specify pre- and post-development watershed characteristics.

7/17/2018

GO TO WATERSHED CHARACTERISTICS

Total Required Treatment Efficiency:

Required Treatment Eff (**Nitrogen**):	0	%
Required Treatment Eff (**Phosphorus**):	0	%



Select one of the BMPs below to analyze efficiency or review the summary data.

RETENTION BASIN	WET DETENTION / MAP	EXFILTRATION TRENCH	RAIN GARDEN / depression storage	SWALE	USER DEFINED BMP
PERVIOUS PAVEMENT	STORMWATER HARVESTING	FILTRATION	View Media Mixes	NOTE !!!: All individual system must be sized prior to being analyzed in conjunction with other systems. Please read instructions in the CATCHMENT AND TREATMENT SUMMARY RESULTS tab for more information.	
GREENROOF	RAINWATER HARVESTING	LINED REUSE POND & UNDERDRAIN INPUT	GO TO COST ANALYSIS WORKSHEET		
VEGETATED NATURAL BUFFER	VEGETATED FILTER STRIP	TREE WELL	CATCHMENT AND TREATMENT SURFACE		

CATCHMENTS AND TREATMENT SURFACE DISCHARGE SUMMARY V 8.6

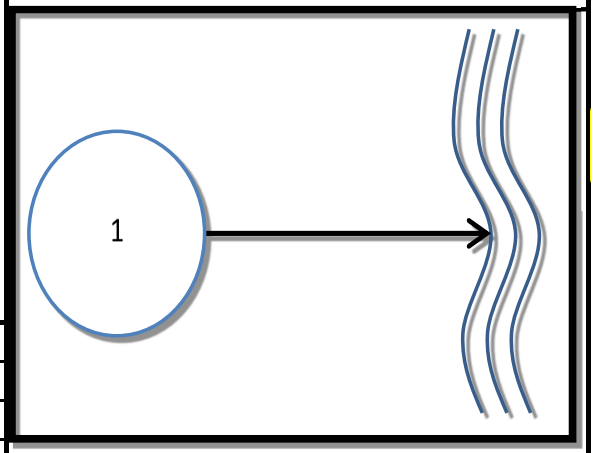
CALCULATION METHODS:

1. The effectiveness of each BMP in a single catchment is converted to an equivalent capture volume.
2. Certain BMP treatment train combinations have not been evaluated and in practice they are at this time not used, an example is a greenroof following a tree well.
3. Wet detention is last when used in a single catchment with other BMPs, except when followed by filtration

PROJECT TITLE	SMF 11	Optional Identification		
	Catchment 1	Catchment 2	Catchment 3	Catchment 4
BMP Name	Wet Detention/ MAPs			
BMP Name				
BMP Name				

Surface Water Discharge Summary Performance of Entire Watershed

Catchment Configuration	A - Single Catchment	Treatment Objectives or Target for TN MET TP MET	7/17/2018 BMPTRAINS MODEL
Nitrogen Pre Load (kg/yr)	5.41		
Phosphorus Pre Load (kg/yr)	0.53		
Nitrogen Post Load (kg/yr)	1.28		
Phosphorus Post Load (kg/yr)	0.10		
Target Load Reduction (N) %	0		
Target Load Reduction (P) %	0		
Target Discharge Load, N (kg/yr)	1.28		
Target Discharge Load, P (kg/yr)	0.10		
Provided Overall Efficiency, N (%):	43		
Provided Overall Efficiency, P (%):	85		
Discharged Load, N (kg/yr & lb/yr):	0.73	1.60	
Discharged Load, P (kg/yr & lb/yr):	0.02	0.03	
Load Removed, N (kg/yr & lb/yr):	0.55	1.22	
Load Removed, P (kg/yr & lb/yr):	0.09	0.19	



ATKINS

Designed By:	MAW
Date:	3/28/2018
Checked By:	RDU
Date:	3/28/2018

Subject: FPID 412531-1-52-01 I-275 (SR 93)
Basin 12

Pre-Development

Non DCIA CN Composite Calculation

	Basin 12		
Condition	Good	Good	Good
Land Use	Open Space	Open Space	Open Space
Hydrologic Group	A	A	A
Percent of Open Space	N/A	N/A	N/A
Open Space CN	39	39	100
Area	11.25 ac	0.00 ac	0.00 ac
Adjusted Percent Open	n/a	n/a	n/a
Total Open Space Area	**11.25 ac**		
Existing Non DCIA CN	**39**		

Basin Description	**Land Use**	**Area**	**% DCIA**	**Non DCIA CN**	**Runoff Coeff.[1]**	**EMC (TN)[2]**	**EMC (TP)[2]**
Existing Open Space	Undeveloped	11.25 ac	0%	39	0.010	1.15 mg/L	0.06 mg/L
Existing Pavement	Highway	15.49 ac	100%	98	0.823	1.52 mg/L	0.20 mg/L
Existing Pond Area at the SHWT	Water	0.00 ac	0%	39	0.010	0.00 mg/L	0.00 mg/L
Existing Pond Berm	Pond	0.00 ac	0%	39	0.010	0.00 mg/L	0.00 mg/L

Total Area:	26.74 ac	Pre-Development DCIA %:	57.93%	
Total Area minus the Water/Pond:	26.74 ac			
		Weighted Coefficients:	0.481	
		Weighted Coefficients Without Water/Ponds:	1.364 mg/L	0.139 mg/L

Post-Development

Non DCIA CN Composite Calculation

Basin	**Basin 12**		
Condition	Good	Good	Good
Land Use	Open Space	Open Space	Open Space
Hydrologic Group	A	A	A
Percent of Open Space	N/A	N/A	N/A
Open Space CN	39	39	100
Area	3.29 ac	1.10 ac	2.70 ac
Adjusted Percent Open	n/a	n/a	n/a
Total Open Space Area	**7.09 ac**		
Proposed Non DCIA CN	**62**		

Basin Description	**Land Use**	**Area**	**% DCIA**	**Non DCIA CN**	**Runoff Coeff.[1]**	**EMC (TN)[2]**	**EMC (TP)[2]**
Proposed Open Space	Undeveloped	3.29 ac	0%	62	0.046	1.15 mg/L	0.06 mg/L
Proposed Pavement	Highway	19.65 ac	100%	98	0.823	1.52 mg/L	0.20 mg/L
Proposed Pond Area at the SHWT	Water	2.70 ac	0%	62	0.046	0.00 mg/L	0.00 mg/L
Proposed Pond Berm	Pond	1.10 ac	0%	62	0.046	0.00 mg/L	0.00 mg/L

Total Area:	26.74 ac	Post-Development DCIA %:	73.49%	
Total Area minus the Water/Pond:	22.94 ac			
		Weighted Coefficients:	0.617	
		Weighted Coefficients Without Ponds:	1.467 mg/L	0.179 mg/L

Annual Runoff Volume: **70.12 ac-ft/yr** **(EQ 1)**

GENERAL SITE INFORMATION: V 8.6

GO TO INTRODUCTION PAGE

3/30/2018

Blue Numbers =	Input data
Red Numbers =	Calculated or Carryover

Select the appropriate Meteorological Zone, input the appropriate Mean Annual Rainfall amount and select the type of analysis

NAME OF PROJECT: SMF 12

HELP Rainfall

VIEW ZONE MAP

Meteorological Zone (Please use zone map): CLICK ON CELL BELOW TO SELECT — Zone 4

Mean Annual Rainfall (Please use rainfall map): 51.00 Inches

VIEW MEAN ANNUAL RAINFALL

Type of analysis: CLICK ON CELL BELOW TO SELECT — Net improvement

Treatment efficiency (N, P) (ex 80 70 (no decimal points) **use only for specified removal efficiency**): %

GO TO WATERSHED CHARACTERISTICS

Select the STORMWATER TREATMENT ANALYSIS Button below to begin analyzing the effectiveness of Best Management Practices.

STORMWATER TREATMENT ANALYSIS

Systems available for analysis:
Retention Basin with option for calculating effluent concentration
Wet Detention
Exfiltration Trench
Pervious Pavement
Stormwater Harvesting
Biofiltration
Greenroof
Rainwater Harvesting
Managed Aquatic Plants Detention
Vegetated Natural Buffer
Vegetated Filter Strip
Swale
Rain Garden
Tree Well
Lined reuse pond
User Defined BMP

RESET INPUT FOR STORMWATER TREATMENT ANALYSIS

Model documentation and example problems.

There is a user's manual for the BMPTRAINS model. It can be downloaded from www.stormwater.ucf.edu. The results from the example problems shown in the manual however may not reflect current model results due to ongoing updates of the model.

METHODOLOGY FOR CALCULATING REQUIRED TREATMENT EFFICIENCY

METHODOLOGY FOR RETENTION SYSTEMS

METHODOLOGY FOR WET DETENTION SYSTEMS

METHODOLOGY FOR GREENROOF SYSTEMS

METHODOLOGY FOR WATER HARVESTING SYSTEMS

WATERSHED CHARACTERISTICS V 8.6

GO TO STORMWATER TREATMENT ANALYSIS

Blue Numbers = Input data
Red Numbers = Calculated

LAND USES/EMC

SELECT CATCHMENT CONFIGURATION 7/17/2018

CLICK ON CELL BELOW TO SELECT CONFIGURATION
A - Single Catchment

VIEW CATCHMENT CONFIGURATION

GO TO GENERAL SITE INFORMATION PAGE

For comingling, the off-site catchment must be upstream. The delay is only for retention BMPs and must be used in hours as measured by the time of concentration at a one inch/hour rain

COMINGLING MULTI-LAND USE

Delay [hrs]

max delay = 15 hrs.

VIEW AVERAGE ANNUAL RUNOFF "C" Factor

VIEW EMC & FLUCCS

GO TO GIS LANDUSE DATA

CATCHMENT NO.1 NAME:

	CLICK ON CELL BELOW TO SELECT
Pre-development land use: with default EMCs	Developed User Defined (overwrite defaults)
	CLICK ON CELL BELOW TO SELECT
Post-development land use: with default EMCs	Developed User Defined (overwrite defaults)

OVERWRITE DEFAULT CONCENTRATIONS USING:

	PRE:		POST:	
EMC(N):	1.364	mg/L	1.467	mg/L
EMC(P):	0.139	mg/L	0.179	mg/L

Total pre-development catchment area:	26.740	AC
Total post-development catchment or for BMP analysis:	26.740	AC
Pre-development Non DCIA CN:	39.00	
Pre-development DCIA percentage:	57.93	%
Post-development Non DCIA CN:	62.00	
Post-development DCIA percentage:	73.49	%
Estimated BMP Area (No loading from this area)	3.800	AC

Average annual pre runoff volume:	54.681	ac-ft/year
Average annual post runoff volume (note no BMP area):	60.137	ac-ft/year
Pre-development Annual Mass Loading - **Nitrogen:**	91.983	kg/year
Pre-development Annual Mass Loading - **Phosphorus:**	9.374	kg/year
Post-development Annual Mass Loading - **Nitrogen:**	108.800	kg/year
Post-development Annual Mass Loading - **Phosphorus:**	13.275	kg/year

CATCHMENT NO.2 NAME:

	CLICK ON CELL BELOW TO SELECT
Pre-development land use: with default EMCs	
	CLICK ON CELL BELOW TO SELECT
Post-development land use: with default EMCs	

OVERWRITE DEFAULT CONCENTRATIONS:

	PRE:		POST:	
EMC(N):		mg/L		mg/L
EMC(P):		mg/L		mg/L

USE DEFAULT CONCENTRATIONS

Total pre-development catchment area:		AC
Total post-development catchment or BMP analysis area:		AC
Pre-development Non DCIA CN:		
Pre-development DCIA percentage:		%
Post-development Non DCIA CN:		
Post-development DCIA percentage:		%
Estimated BMP Area (No loading from this area)		AC

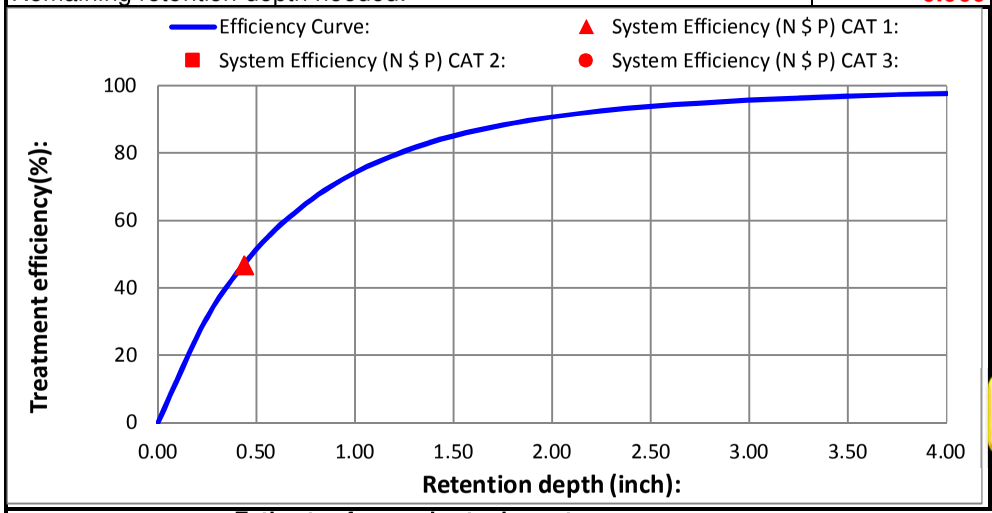
Average annual pre runoff volume:		ac-ft/year
Average annual post runoff volume (note no BMP area):		ac-ft/year
Pre-development Annual Mass Loading - **Nitrogen:**		kg/year
Pre-development Annual Mass Loading - **Phosphorus:**		kg/year
Post-development Annual Mass Loading - **Nitrogen:**		kg/year
Post-development Annual Mass Loading - **Phosphorus:**		kg/year

RETENTION BASIN: 7/17/2018 V 8.6

RETENTION BASIN SERVING:	SMF 12				
Loadings from BMP area are contained by the BMP, thus no BMP area load.	Catchment 1	Catchment 2	Catchment 3	Catchment 4	
Watershed area cotributing to basin:	22.940	0.000	0.000	0.000	ac
Required Treatment Eff (**Nitrogen**):	15.457				%
Required Treatment Eff (**Phosphorus**):	29.392				%
Required retention depth over the watershed to meet required efficiency	0.235	0.000	0.000	0.000	in
Required water quality retention volume:	0.450	0.000	0.000	0.000	ac-ft

RETENTION BASIN FOR MULTIPLE TREATMENT SYSTEMS (if there is a need for additional removal efficiencies in a series of BMPs):

Retention volume based on retention depth and Total area - BMP area	0.841	0.000	0.000	0.000	ac-ft
Provided retention depth (0.1-3.99 inches over the watershed)	0.440				in
Provided treatment efficiency (**Nitrogen**):	46.561	0.000	0.000	0.000	%
Provided treatment efficiency (**Phosphorus**):	46.561	0.000	0.000	0.000	%
Remaining treatment efficiency (**Nitrogen**):	0.000				%
Remaining treatment efficiency (**Phosphorus**):	0.000				%
Remaining retention depth needed:	0.000	0.000	0.000	0.000	in



NOTE FOR TREATMENT EFFICIENCY GRAPH:

The purpose of this graph is to help illustrate the treatment efficiency of the retention system as the function of retention depth **for a single BMP and in a single catchment**. The graph illustrates that there is a diminished return as the retention depth is increased. Thus evaluations of other alternatives in "treatment trains" and compensatory treatment should be considered. **NOTE:** the retention volume can not exceed 3.99 inches to be within the range of data used to determine effectiveness.

HELP - EXAMPLE PROBLEM 3

View Media Mixes

Estimate of groundwater impacts	Catchment 1	Catchment 2	Catchment 3	Catchment 4
Use only down flow media mix before water enters the ground, specify type				
Nitrogen mass reduction in groundwater discharge (%)				
Phosphorus mass reduction in groundwater discharge (%)				

STORMWATER TREATMENT ANALYSIS:	V 8.6	GO TO GENERAL SITE INFORMATION PAGE	Blue Numbers =	Input data
			Red Numbers =	Calculated

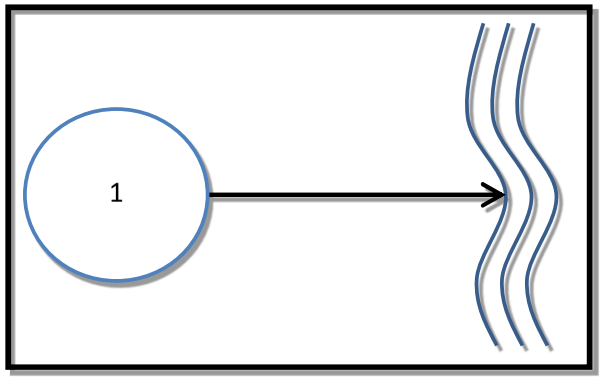
If not done, specify pre- and post-development watershed characteristics.

7/17/2018

GO TO WATERSHED CHARACTERISTICS

Total Required Treatment Efficiency:

Required Treatment Eff (**Nitrogen**):	15	%
Required Treatment Eff (**Phosphorus**):	29	%



Select one of the BMPs below to analyze efficiency or review the summary data.

RETENTION BASIN	WET DETENTION / MAP	EXFILTRATION TRENCH	RAIN GARDEN / depression storage	SWALE	USER DEFINED BMP
PERVIOUS PAVEMENT	STORMWATER HARVESTING	FILTRATION	View Media Mixes	NOTE !!!: All individual system must be sized prior to being analyzed in conjunction with other systems. Please read instructions in the CATCHMENT AND TREATMENT SUMMARY RESULTS tab for more information.	
GREENROOF	RAINWATER HARVESTING	LINED REUSE POND & UNDERDRAIN INPUT	GO TO COST ANALYSIS WORKSHEET		
VEGETATED NATURAL BUFFER	VEGETATED FILTER STRIP	TREE WELL	CATCHMENT AND TREATMENT SURFACE		

CATCHMENTS AND TREATMENT SURFACE DISCHARGE SUMMARY V 8.6

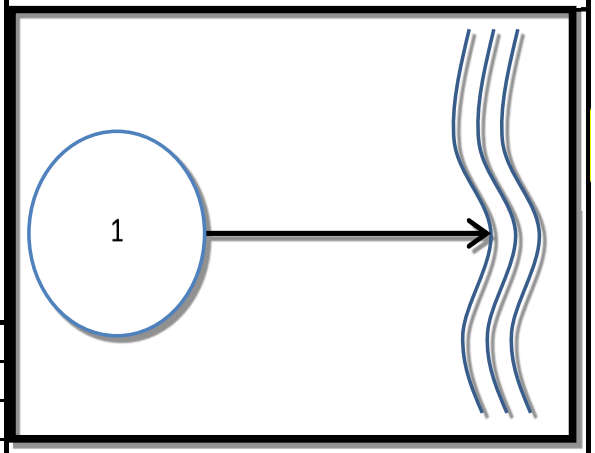
CALCULATION METHODS:

1. The effectiveness of each BMP in a single catchment is converted to an equivalent capture volume.
2. Certain BMP treatment train combinations have not been evaluated and in practice they are at this time not used, an example is a greenroof following a tree well.
3. Wet detention is last when used in a single catchment with other BMPs, except when followed by filtration

PROJECT TITLE	SMF 12	Optional Identification		
	Catchment 1	Catchment 2	Catchment 3	Catchment 4
BMP Name	Retention Basin			
BMP Name				
BMP Name				

Surface Water Discharge Summary Performance of Entire Watershed

Catchment Configuration	A - Single Catchment	Treatment Objectives or Target for TN MET TP MET	7/17/2018 BMPTRAINS MODEL
Nitrogen Pre Load (kg/yr)	91.98		
Phosphorus Pre Load (kg/yr)	9.37		
Nitrogen Post Load (kg/yr)	108.80		
Phosphorus Post Load (kg/yr)	13.28		
Target Load Reduction (N) %	15		
Target Load Reduction (P) %	29		
Target Discharge Load, N (kg/yr)	92.48		
Target Discharge Load, P (kg/yr)	9.43		
Provided Overall Efficiency, N (%):	47		
Provided Overall Efficiency, P (%):	47		
Discharged Load, N (kg/yr & lb/yr):	58.14	128.06	
Discharged Load, P (kg/yr & lb/yr):	7.09	15.63	
Load Removed, N (kg/yr & lb/yr):	50.66	111.58	
Load Removed, P (kg/yr & lb/yr):	6.18	13.61	



ATKINS

Designed By:	MAW
Date:	3/28/2018
Checked By:	RDU
Date:	3/28/2018

Subject: FPID 412531-1-52-01 I-275 (SR 93)
Basin 14

Pre-Development

Non DCIA CN Composite Calculation

	Basin 14		
Condition	Good	Good	Good
Land Use	Open Space	Open Space	Open Space
Hydrologic Group	A	A	A
Percent of Open Space	N/A	N/A	N/A
Open Space CN	39	39	100
Area	3.67 ac	0.00 ac	0.00 ac
Adjusted Percent Open	n/a	n/a	n/a
Total Open Space Area	**3.67 ac**		
Existing Non DCIA CN	**39**		

Basin Description	**Land Use**	**Area**	**% DCIA**	**Non DCIA CN**	**Runoff Coeff.[1]**	**EMC (TN)[2]**	**EMC (TP)[2]**
Existing Open Space	Undeveloped	3.67 ac	0%	39	0.010	1.15 mg/L	0.06 mg/L
Existing Pavement	Highway	1.32 ac	100%	98	0.823	1.52 mg/L	0.20 mg/L
Existing Pond Area at the SHWT	Water	0.00 ac	0%	39	0.010	0.00 mg/L	0.00 mg/L
Existing Pond Berm	Pond	0.00 ac	0%	39	0.010	0.00 mg/L	0.00 mg/L

Total Area:	4.99 ac	Pre-Development DCIA %:	26.45%	
Total Area minus the Water/Pond:	4.99 ac			
		Weighted Coefficients:	0.225	
		Weighted Coefficients Without Water/Ponds:	1.248 mg/L	0.093 mg/L

Post-Development

Non DCIA CN Composite Calculation

Basin	**Basin 14**		
Condition	Good	Good	Good
Land Use	Open Space	Open Space	Open Space
Hydrologic Group	A	A	A
Percent of Open Space	N/A	N/A	N/A
Open Space CN	39	39	100
Area	0.33 ac	1.08 ac	1.08 ac
Adjusted Percent Open	n/a	n/a	n/a
Total Open Space Area	**2.49 ac**		
Proposed Non DCIA CN	**65**		

Basin Description	**Land Use**	**Area**	**% DCIA**	**Non DCIA CN**	**Runoff Coeff.[1]**	**EMC (TN)[2]**	**EMC (TP)[2]**
Proposed Open Space	Undeveloped	0.33 ac	0%	65	0.056	1.15 mg/L	0.06 mg/L
Proposed Pavement	Highway	2.50 ac	100%	98	0.823	1.52 mg/L	0.20 mg/L
Proposed Pond Area at the SHWT	Water	1.08 ac	0%	65	0.056	0.00 mg/L	0.00 mg/L
Proposed Pond Berm	Pond	1.08 ac	0%	65	0.056	0.00 mg/L	0.00 mg/L

Total Area:	4.99 ac	Post-Development DCIA %:	50.10%	
Total Area minus the Water/Pond:	2.83 ac			
		Weighted Coefficients:	0.440	
		Weighted Coefficients Without Ponds:	1.477 mg/L	0.183 mg/L

Annual Runoff Volume: **9.33 ac-ft/yr** **(EQ 1)**

ATKINS

Designed By:	MAW
Date:	3/28/2018
Checked By:	RDU
Date:	3/28/2018

Subject: FPID 412531-1-52-01 I-275 (SR 93)
Basin 14

PROPOSED TREATMENT SYSTEM(S)

☑ **Wet Detention** ☐ **Dry Retention**

WET DETENTION

Permanent Pool Volume:	**5.03 ac-ft**	
Average Residence Time:	**197 days**	**(EQ 4)**

Description	Elevation	Area	Volume
Control/Bleeddown Elevation	6.90 ft	1.08 ac	**1.95 ac-ft**
Slope Change	4.90 ft	0.87 ac	
Slope Change	4.90 ft	0.87 ac	**3.08 ac-ft**
Pond Bottom Elevation	0.90 ft	0.67 ac	
		0.00 ac	**0.00 ac-ft**
		0.00 ac	
Total Permanent Pool Volume:			**5.03 ac-ft**

GENERAL SITE INFORMATION: V 8.6

GO TO INTRODUCTION PAGE

3/30/2018

Blue Numbers =	Input data
Red Numbers =	Calculated or Carryover

HELP Rainfall

Select the appropriate Meteorological Zone, input the appropriate Mean Annual Rainfall amount and select the type of analysis

NAME OF PROJECT

SMF 14

VIEW ZONE MAP

Meteorological Zone (Please use zone map):	CLICK ON CELL BELOW TO SELECT Zone 4
Mean Annual Rainfall (Please use rainfall map):	51.00 Inches
Type of analysis:	CLICK ON CELL BELOW TO SELECT Net improvement
Treatment efficiency (N, P) (ex 80 70 (no decimal points) **use only for specified removal efficiency**):	%

VIEW MEAN ANNUAL RAINFALL

GO TO WATERSHED CHARACTERISTICS

Select the STORMWATER TREATMENT ANALYSIS Button below to begin analyzing the effectiveness of Best Management Practices.

STORMWATER TREATMENT ANALYSIS

Systems available for analysis:
Retention Basin with option for calculating effluent concentration
Wet Detention
Exfiltration Trench
Pervious Pavement
Stormwater Harvesting
Biofiltration
Greenroof
Rainwater Harvesting
Managed Aquatic Plants Detention
Vegetated Natural Buffer
Vegetated Filter Strip
Swale
Rain Garden
Tree Well
Lined reuse pond
User Defined BMP

RESET INPUT FOR STORMWATER TREATMENT ANALYSIS

Model documentation and example problems.

There is a user's manual for the BMPTRAINS model. It can be downloaded from www.stormwater.ucf.edu. The results from the example problems shown in the manual however may not reflect current model results due to ongoing updates of the model.

METHODOLOGY FOR CALCULATING REQUIRED TREATMENT EFFICIENCY

METHODOLOGY FOR RETENTION SYSTEMS

METHODOLOGY FOR WET DETENTION SYSTEMS

METHODOLOGY FOR GREENROOF SYSTEMS

METHODOLOGY FOR WATER HARVESTING SYSTEMS

WATERSHED CHARACTERISTICS V 8.6

GO TO STORMWATER TREATMENT ANALYSIS

Blue Numbers = Input data
Red Numbers = Calculated

LAND USES/EMC

SELECT CATCHMENT CONFIGURATION 7/17/2018

CLICK ON CELL BELOW TO SELECT CONFIGURATION
A - Single Catchment

VIEW CATCHMENT CONFIGURATION

GO TO GENERAL SITE INFORMATION PAGE

For comingling, the off-site catchment must be upstream. The delay is only for retention BMPs and must be used in hours as measured by the time of concentration at a one inch/hour rain

COMINGLING MULTI-LAND USE

Delay [hrs]

max delay = 15 hrs,

VIEW AVERAGE ANNUAL RUNOFF "C" Factor

VIEW EMC & FLUCCS

GO TO GIS LANDUSE DATA

CATCHMENT NO.1 NAME:

	CLICK ON CELL BELOW TO SELECT
Pre-development land use: with default EMCs	Developed User Defined (overwrite defaults)
	CLICK ON CELL BELOW TO SELECT
Post-development land use: with default EMCs	Developed User Defined (overwrite defaults)

OVERWRITE DEFAULT CONCENTRATIONS USING:

	PRE:		POST:	
EMC(N):	1.248	mg/L	1.477	mg/L
EMC(P):	0.093	mg/L	0.183	mg/L

Total pre-development catchment area:	4.990	AC
Total post-development catchment or for BMP analysis:	4.990	AC
Pre-development Non DCIA CN:	39.00	
Pre-development DCIA percentage:	26.45	%
Post-development Non DCIA CN:	65.00	
Post-development DCIA percentage:	50.10	%
Estimated BMP Area (No loading from this area)	2.160	AC

Average annual pre runoff volume:	4.773	ac-ft/year
Average annual post runoff volume (note no BMP area):	5.277	ac-ft/year
Pre-development Annual Mass Loading - **Nitrogen:**	7.346	kg/year
Pre-development Annual Mass Loading - **Phosphorus:**	0.547	kg/year
Post-development Annual Mass Loading - **Nitrogen:**	9.613	kg/year
Post-development Annual Mass Loading - **Phosphorus:**	1.191	kg/year

CATCHMENT NO.2 NAME:

	CLICK ON CELL BELOW TO SELECT
Pre-development land use: with default EMCs	
	CLICK ON CELL BELOW TO SELECT
Post-development land use: with default EMCs	

OVERWRITE DEFAULT CONCENTRATIONS:

	PRE:		POST:	
EMC(N):		mg/L		mg/L
EMC(P):		mg/L		mg/L

USE DEFAULT CONCENTRATIONS

Total pre-development catchment area:		AC
Total post-development catchment or BMP analysis area:		AC
Pre-development Non DCIA CN:		
Pre-development DCIA percentage:		%
Post-development Non DCIA CN:		
Post-development DCIA percentage:		%
Estimated BMP Area (No loading from this area)		AC

Average annual pre runoff volume:		ac-ft/year
Average annual post runoff volume (note no BMP area):		ac-ft/year
Pre-development Annual Mass Loading - **Nitrogen:**		kg/year
Pre-development Annual Mass Loading - **Phosphorus:**		kg/year
Post-development Annual Mass Loading - **Nitrogen:**		kg/year
Post-development Annual Mass Loading - **Phosphorus:**		kg/year

WET DETENTION / MANAGED AQUATIC PLANTS: 7/17/2018 V 8.6

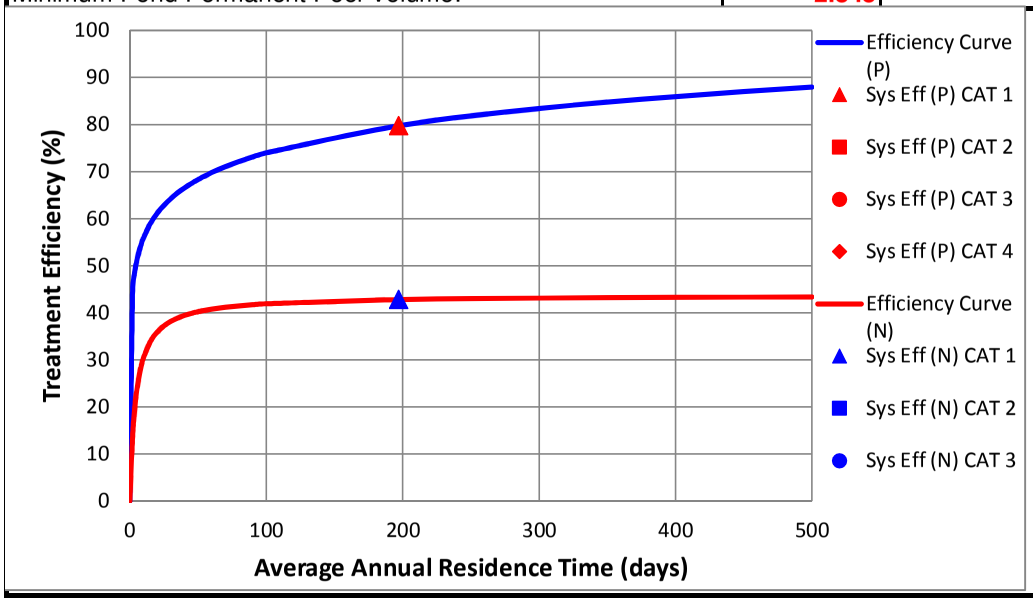
Also called: FLOATING ISLANDS and includes a wet detention pond: **SMF 14**

	Catchment 1	Catchment 2	Catchment 3	Catchment 4	
Total pre-development catchment area:	4.990	0.000	0.000	0.000	ac
Total post-development catchment area:	2.830	0.000	0.000	0.000	ac
Average annual residence time (between 1 and 500 days)	197.00				days
Littoral Zone or other improvements used?*					
Littoral Zone or other improvement efficiency credit:					%
Floating Wetland or Mats used in the design:					
Floating Wetland or Mats credit:					%
Total **Nitrogen** removal required:	23.582				%
Total **Phosphorus** removal required:	54.039				%
Total **Nitrogen** removal efficiency:	42.798	0.000	0.000	0.000	%
Total **Phosphorous** removal efficiency:	79.740	0.000	0.000	0.000	%
Is the wet detention sufficient:	YES				
Average annual runoff volume:	5.277				ac-ft/yr

* pond coverage must follow Regulatory Requirements

Wet Detention Pond Characteristic:

Minimum Pond Permanent Pool Volume:	2.848				ac-ft



NOTE FOR TREATMENT EFFICIENCY GRAPH:

The purpose of the treatment efficiency graphs is to help illustrate the treatment efficiency of the wet detention system as the function of average annual residence time (and permanent pool volume). The graph illustrates that there is a point of diminished return as the permanent pool volume is substantially increased. Therefore, to provide the most economical BMP treatment system, other alternatives such as "treatment trains" and compensatory treatment should be considered.

STORMWATER TREATMENT ANALYSIS:	V 8.6	GO TO GENERAL SITE INFORMATION PAGE	Blue Numbers =	Input data
			Red Numbers =	Calculated

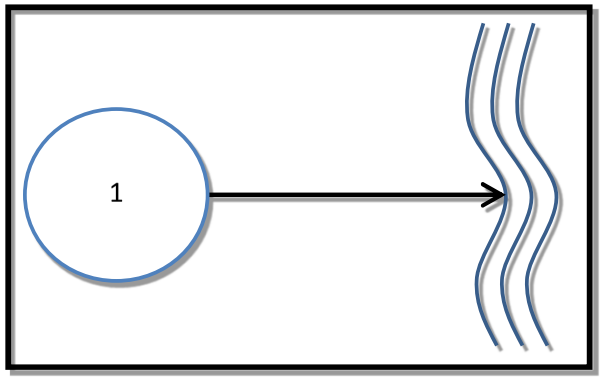
If not done, specify pre- and post-development watershed characteristics.

7/17/2018

GO TO WATERSHED CHARACTERISTICS

Total Required Treatment Efficiency:

Required Treatment Eff (**Nitrogen**):	24	%
Required Treatment Eff (**Phosphorus**):	54	%



Select one of the BMPs below to analyze efficiency or review the summary data.

RETENTION BASIN	WET DETENTION / MAP	EXFILTRATION TRENCH	RAIN GARDEN / depression storage	SWALE	USER DEFINED BMP
PERVIOUS PAVEMENT	STORMWATER HARVESTING	FILTRATION	View Media Mixes	NOTE !!!: All individual system must be sized prior to being analyzed in conjunction with other systems. Please read instructions in the CATCHMENT AND TREATMENT SUMMARY RESULTS tab for more information.	
GREENROOF	RAINWATER HARVESTING	LINED REUSE POND & UNDERDRAIN INPUT	GO TO COST ANALYSIS WORKSHEET		
VEGETATED NATURAL BUFFER	VEGETATED FILTER STRIP	TREE WELL	CATCHMENT AND TREATMENT SURFACE		

CATCHMENTS AND TREATMENT SURFACE DISCHARGE SUMMARY V 8.6

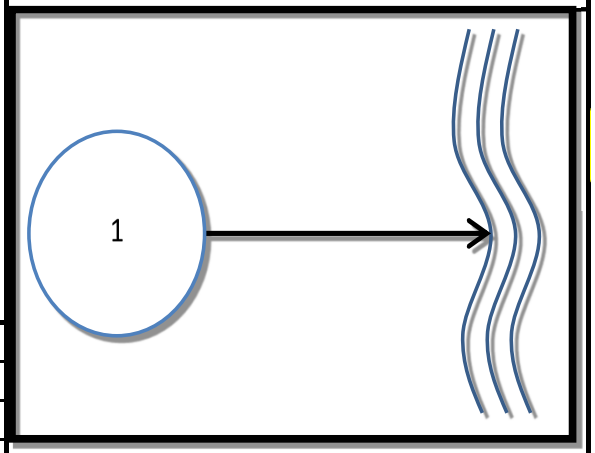
CALCULATION METHODS:

1. The effectiveness of each BMP in a single catchment is converted to an equivalent capture volume.
2. Certain BMP treatment train combinations have not been evaluated and in practice they are at this time not used, an example is a greenroof following a tree well.
3. Wet detention is last when used in a single catchment with other BMPs, except when followed by filtration

PROJECT TITLE	SMF 14	Optional Identification		
	Catchment 1	Catchment 2	Catchment 3	Catchment 4
BMP Name	Wet Detention/ MAPs			
BMP Name				
BMP Name				

Surface Water Discharge Summary Performance of Entire Watershed

Catchment Configuration	A - Single Catchment	Treatment Objectives or Target for TN MET TP MET	7/17/2018 BMPTRAINS MODEL
Nitrogen Pre Load (kg/yr)	7.35		
Phosphorus Pre Load (kg/yr)	0.55		
Nitrogen Post Load (kg/yr)	9.61		
Phosphorus Post Load (kg/yr)	1.19		
Target Load Reduction (N) %	24		
Target Load Reduction (P) %	54		
Target Discharge Load, N (kg/yr)	7.31		
Target Discharge Load, P (kg/yr)	0.55		
Provided Overall Efficiency, N (%):	43		
Provided Overall Efficiency, P (%):	80		
Discharged Load, N (kg/yr & lb/yr):	5.50	12.11	
Discharged Load, P (kg/yr & lb/yr):	0.24	0.53	
Load Removed, N (kg/yr & lb/yr):	4.11	9.06	
Load Removed, P (kg/yr & lb/yr):	0.95	2.09	



Memo

Appendix I. SWFWMD Pre-Application Meeting Notes

THIS FORM IS INTENDED TO FACILITATE AND GUIDE THE DIALOGUE DURING A PRE-APPLICATION MEETING BY PROVIDING A PARTIAL "PROMPT LIST" OF DISCUSSION SUBJECTS. IT IS NOT A LIST OF REQUIREMENTS FOR SUBMITTAL BY THE APPLICANT.

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
RESOURCE REGULATION DIVISION
PRE-APPLICATION MEETING NOTES

FILE NUMBER: PA 407035

Date: **Time:** **Project Name:**	08/28/2019 11:00 TBNext Section 4 (FPID 412531)		
District Engineer:	Rob McDaniel		
District ES:	Lauren Greenawalt		
Attendees:	Abdul Waris, Cristina Jackson, Chris Kuzlo, Shane Paynter, Michael Wilder		
County: **Total Land Acreage:**	Hillsborough	**Sec/Twp/Rge:** **Project Acreage:**	17-21/29/18 acres

Prior On-Site/Off-Site Permit Activity:
- ERP - 43002958.002, 43000920.004, .017
- Previous PA 403418 6/7/16

Project Overview:
- Discussions focused on Segment 4 (Tampa Airport and SR 60 Interchange) and Segment 5 (near downtown Tampa and the Hillsborough River)

Environmental Discussion: (Wetlands On-Site, Wetlands on Adjacent Properties, Delineation, T&E species, Easements, Drawdown Issues, Setbacks, Justification, Elimination/Reduction, Permanent/Temporary Impacts, Secondary and Cumulative Impacts, Mitigation Options, SHWL, Upland Habitats, Site Visit, etc.)
- The meeting did not involve an environmental discussion. See previous pre-application notes for environmental information.

Site Information Discussion: (SHW Levels, Floodplain, Tailwater Conditions, Adjacent Off-Site Contributing Sources, Receiving Waterbody, etc.)
- The consultants proposed the idea of providing sediment sumps/roadside swales to capture first flushes of runoff from the new impervious area due to the widening of Segment 4 (Tampa Airport and SR 60 Interchange). Formal stormwater treatment and attenuation ponds would not be included as part of this proposal. The sediment sumps/roadside swales would be sized using criteria provided in the Applicant's Handbook Volume I (AHVI). Water quality treatment (net improvement required for discharges to Tampa Bay) would be demonstrated by the withdrawal of credits from the FDOT Old Tampa Bay Water Quality Improvement Project, ERP No. 43000920.017. This was determined to be an acceptable approach.
- The second portion of the discussion focused on the elimination of a formal treatment and attenuation pond from an extended portion of Segment 5 (Hillsborough River to I-4 interchange) of the I-275 improvements. The consultants proposed further withdrawal of water quality credits from the FDOT Old Tampa Bay Water Quality Improvement Project, ERP No. 43000920.017, to compensate for the lack of formal stormwater treatment. This design approach would need to demonstrate that no adverse water quality impacts would occur within the receiving water of the Hillsborough River (WBID 1443E). Although not impaired, compliance with Rule 62-330.301(1)(e and f), F.A.C. will need to be demonstrated. Since this portion of the roadway improvements are located within a designated, separate waterbody from Tampa Bay, the withdrawal of credits from the FDOT Old Tampa Bay Water Quality Improvement Project would not satisfactorily benefit the receiving segment of the Hillsborough River. Withdrawal of credits alone would not be sufficient to demonstrate water quality requirements will be satisfied for the Segment 5 improvements.
- The District encourages the incorporation of stormwater quality BMP's to the maximum extent practicable to minimize the discharge of sediments, oils and greases and floatable pollutants from the project area.

Water Quantity Discussions: (Basin Description, Storm Event, Pre/Post Volume, Pre/Post Discharge, etc.)
- Not discussed

Water Quality Discussions: (Type of Treatment, Technical Characteristics, Non-presumptive Alternatives, etc.)
- See above

Sovereign Lands Discussion: (Determining Location, Correct Form of Authorization, Content of Application, Assessment of Fees, Coordination with FDEP)

- Not discussed

Operation and Maintenance/Legal Information: (Ownership or Perpetual Control, O&M Entity, O&M Instructions, Homeowner Association Documents, Coastal Zone requirements, etc.)

- The permit must be issued to entity that owns or controls the property.
- Provide evidence of ownership or control by deed, easement, contract for purchase, etc. Evidence of ownership or control must include a legal description. A Property Appraiser summary of the legal description is NOT acceptable.

Application Type and Fee Required:

- SWERP – Sections A, C, and E of the ERP Application.
- Consult the fee schedule for different thresholds.

Other: (Future Pre-Application Meetings, Fast Track, Submittal Date, Construction Start Date, Required District Permits – WUP, WOD, Well Construction, etc.)

- An application for an individual permit to construct or alter a dam, impoundment, reservoir, or appurtenant work, requires that a notice of receipt of the application must be published in a newspaper within the affected area. Provide documentation that such noticing has been accomplished. Note that the published notices of receipt for an ERP can be in accordance with the language provided in Rule 40D-1.603(10), F.A.C.

- Provide a copy of the legal description (of all applicable parcels within the project area) in one of the following forms:
  a. Deed with complete Legal Description attachment.
  b. Plat.
  c. Boundary survey of the property(ies) with a sketch.

- The plans and drainage report submitted electronically must include the appropriate information required under Rules 61G15-23.005 and 61G15-23.004 (Digital), F.A.C. The following text is required by the Florida Board of Professional Engineers (FBPE) to meet this requirement when a digitally created seal is not used and must appear where the signature would normally appear:

  ELECTRONIC (Manifest): *[NAME] State of Florida, Professional Engineer, License No. [NUMBER] This item has been electronically signed and sealed by [NAME] on the date indicated here using a SHA authentication code. Printed copies of this document are not considered signed and sealed and the SHA authentication code must be verified on any electronic copies*

  DIGITAL: *[NAME] State of Florida, Professional Engineer, License No. [NUMBER]; This item has been digitally signed and sealed by [NAME] on the date indicated here using a Digital Signature; Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.*
- Provide soil erosion and sediment control measures for use during construction. Refer to ERP Applicant's Handbook Vol. 1 Part IV Erosion and Sediment Control.

Disclaimer: The District ERP pre-application meeting process is a service made available to the public to assist interested parties in preparing for submittal of a permit application. Information shared at pre-application meetings is superseded by the actual permit application submittal. District permit decisions are based upon information submitted during the application process and Rules in effect at the time the application is complete.