



DRAFT LOCATION HYDRAULIC REPORT TECHNICAL MEMORANDUM

Florida Department of Transportation
District Five

PROJECT DEVELOPMENT AND ENVIRONMENT STUDY
I-75 (SR 93) at NW 49th Street

Marion County, Florida
Financial Management Number: 435209-1-22-01
ETDM Number: 14242

OCTOBER 2020

The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being, or have been, carried out by the Florida Department of Transportation (FDOT) pursuant to 23 U.S.C. §327 and a Memorandum of Understanding dated December 14, 2016, and executed by the Federal Highway Administration and FDOT.

TABLE OF CONTENTS

1.0 INTRODUCTION	1
2.0 FLOODPLAIN INFORMATION	2
3.0 EXISTING AND PROPOSED CROSS DRAINS.....	2
4.0 FLOODING HISTORY AND MAINTENANCE CONCERNS.....	3
5.0 CONCLUSIONS.....	3

LIST OF TABLES

Table-1 – Existing I-75 Cross Drain General Information.....	3
--	---

LIST OF APPENDICES

Appendix A – Figures.....	A-1 to A-7
Figure 1: Project Location Map	A-1
Figure 2: Vicinity/USGS Quad Map.....	A-2
Figure 3: Water Management District Boundary Map	A-3
Figure 4: FEMA Floodplain Map	A-4
Figure 5: Proposed Pond/Floodplain Compensation Map.....	A-5
Figure 6: Pre-Development Drainage Map.....	A-6
Figure 7: Post-Development Drainage Map	A-7
Appendix B – Calculations	B-1 to B-2
Appendix C – I-75 Straight Line Diagrams	C-1 to C-2
Appendix D – ICPR Documentation	D-1 to D-10

1.0 INTRODUCTION

The Florida Department of Transportation (FDOT) in conjunction with Marion County is planning to provide a new I-75 interchange at NW 49 Street just west of the City of Ocala, Florida. The proposed interchange is needed to support the economic viability of the Ocala 489, a 489-acre industrial and commercial development, which is intended to serve as an economic engine for job creation in the region.

The goal of the NW 49th Street and I-75 Interchange Project Development and Environment (PD&E) study is to develop a proposed improvement strategy that is technically sound, environmentally sensitive and publicly acceptable. As with every PD&E study, emphasis has been placed on the development, evaluation and documentation of detailed engineering and environmental studies including data collection, conceptual design, environmental analyses, project documentation, and the preparation of a Pond Siting Report (PSR) and Location Hydraulic Report (LHR).

After a comprehensive evaluation process, one alternative was selected as being the most effective option. The recommended alternative (shown on Appendix A, Figure 2), diverging diamond interchange (Alternative 3), consists of a diamond interchange in which the two directions of traffic on the minor road (NW 49 Street) crossover, or diverge, to the opposite side between the signalized crossover intersections at the on/off ramps. This eliminates the need for left-turning vehicles to cross the paths of approaching through vehicles, facilitating operational maneuvers and eliminating the potential for side-impact crashes. This allows for a simple two-phase operation at the two signalized intersections within the interchange (no left turns), thus improving efficiency. The recommended alternative also includes the extension of NW 49 Street from NW 44 Avenue to Marion County's future NW 35 Street extension (currently in final design). NW 49 Street (shown in Appendix B) will feature four 12-foot travel lanes with 7-foot bicycle lanes, a 28-foot raised median, and 6-foot sidewalk. The proposed right-of-way for NW 49 Street is 122 feet. NW 49 Street will curve towards the south east of I-75 to connect to Marion County's future NW 35 Street extension through Magnum Materials Mine. At the western limit, the proposed NW 49 Street will tie in to the existing NW 49 Street at the NW 44 Avenue intersection. Improvements at the NW 44 Avenue intersection include the addition of a northbound right turn lane and a southbound left turn lane for access to the proposed NW 49 Street and interchange ramps. Additionally, based on the preliminary profile of NW 49 Street, the intersection of NW 44 Avenue would need to be reconstructed to raise the profile approximately 2 feet.

The purpose of this memo is to identify potential floodplain impacts and encroachments and measures to minimize the impacts. The memo also will identify existing and proposed cross drains, their function, and potential floodplain impacts associated with the cross drain extensions. Since this project will not have major impacts to floodplains due to cross drain extension and proposed roadway improvement, a technical memorandum is prepared per discussion with FDOT.

The project is in both the St Johns River Water Management District (SJRWMD) and the Southwest Florida Water Management District (SWFWMD). The western edge of I-75 acts as the divider between the two Water Management Districts. I-75 is under the jurisdiction of and permitted by SJRWMD and NW 44th Ave is permitted by SWFWMD. As the majority of the project falls under SJRWMD jurisdiction, and new impervious areas will be collected and ultimately discharged to the east, an interagency agreement will be sought to allow for a single permit under the authority of the SJRWMD. The project location and vicinity (USGS Quad) maps are shown in **Figures 1** and **2**, respectively. **Figure 3** shows the water management districts' boundaries within the project area.

2.0 FLOODPLAIN INFORMATION

The Federal Emergency Management Agency (FEMA) has developed Flood Insurance Rate Maps (FIRM) for Marion County. There are no FEMA regulated floodways within the limits of the project. Small segments of the project in Basin G2 and the NE Offsite Area are located within FEMA designated flood zones (both designated Zone AE - Elevations 73.0 and 69.7, respectively). The floodplain impacts in the project area are at the I-75 northbound roadside swales. Please refer to Figure 4 for a map of the FEMA floodplains and Figure 5 for the floodplain impact and compensation areas.

The floodplain impacts due to the interchange construction are estimated to be 3.52 acre-feet. The floodplain impacts will be compensated by regrading the swales along the east side of I-75 within Basin G2 utilizing the "Cup for Cup" method. The flood plain compensation provided by the proposed swales is approximately 5.45 acre-feet. **Appendix B** contains the flood impact and compensation calculations. A detailed floodplain compensation analysis should be provided in the final design.

3.0 EXISTING AND PROPOSED CROSS DRAINS

The proposed NW 49th Street is a new alignment; therefore, there are no existing cross drains or bridge structures for review. However, the I-75 corridor within the proposed interchange has 3 cross drains that function as equalizer pipes between northbound and southbound dry retention swales. **Figure 6** shows the existing cross drains and pre-development drainage patterns. All 3 existing cross drains will be extended to accommodate the future interchange's on and off ramp alignments. The functionality of these cross drains will be maintained, and the recommended improvements will not adversely impact the overall drainage function of I-75. Refer to **Table-1** for existing I-75 cross drain information. **Appendix C** contains the I-75 Straight Line Diagram showing the existing I-75 cross drains.

Since these cross drains are equalizer pipes, a cross drain analysis is not required during PD&E and will be conducted during the design. CD-1 and CD-2 are located outside the floodplain. No significant floodplain impacts are anticipated with the cross drain extensions. Only CD-3 will

have minor impact on a floodplain and the impact will be compensated within the roadside swales.

Table-1 Existing I-75 Cross Drain General Information

Cross Drain ID	Station Location	Pipe Description	Date of Plan
I-75 CD-1	2447+00	24" RCP	1992
I-75 CD-2	2475+00	24" RCP	1992
I-75 CD-3	2500+00	24" RCP	1992

No new cross drains are proposed within the mainline right-of-way, however one new cross drain, CD-4, is proposed to drain offsite runoff that will be blocked by the proposed NW 49th Street roadway alignment. The proposed 36" cross drain, CD-4, will maintain the historical flow connectivity, draining the offsite runoff into the depressional area within the Baldwin property. The depressional area within the Baldwin property has historically received runoff from the surrounding higher grounds. **Figure 7** shows the proposed cross drain extensions, new cross drain, and post-development drainage patterns.

Appendix D contains the ICPR documentation for CD-4. Preliminary analysis utilizing ICPR was performed for this PD&E, but the final design team should verify the proposed culvert size and its location, based on the final roadway alignment and profile. Overtopping analysis should be done during the final design to determine the probability of when (which storm frequency) water levels begin to flow over the proposed NW 49th St.

4.0 FLOODING HISTORY AND MAINTENANCE CONCERNS

During a phone interview with the FDOT maintenance staff at the Ocala Operations Center on May 2, 2019, it was indicated that no areas of flooding concern were present along the proposed I-75 and NW 49th Street Interchange area. The staff member, Jeff Purdy, mentioned the existing roadside ditch along I-75, ditch blocks, and median drainage pipes had no maintenance issues. The only maintenance issue discussed during the phone interview was that the median guardrails are too close to each other, which makes mowing more difficult with the standard mowing equipment.

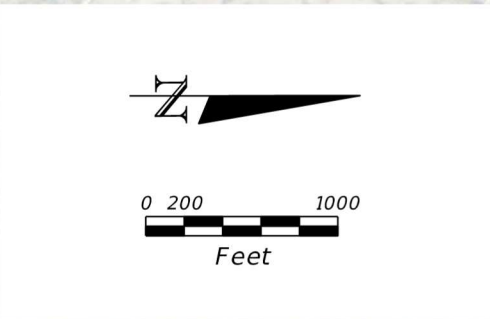
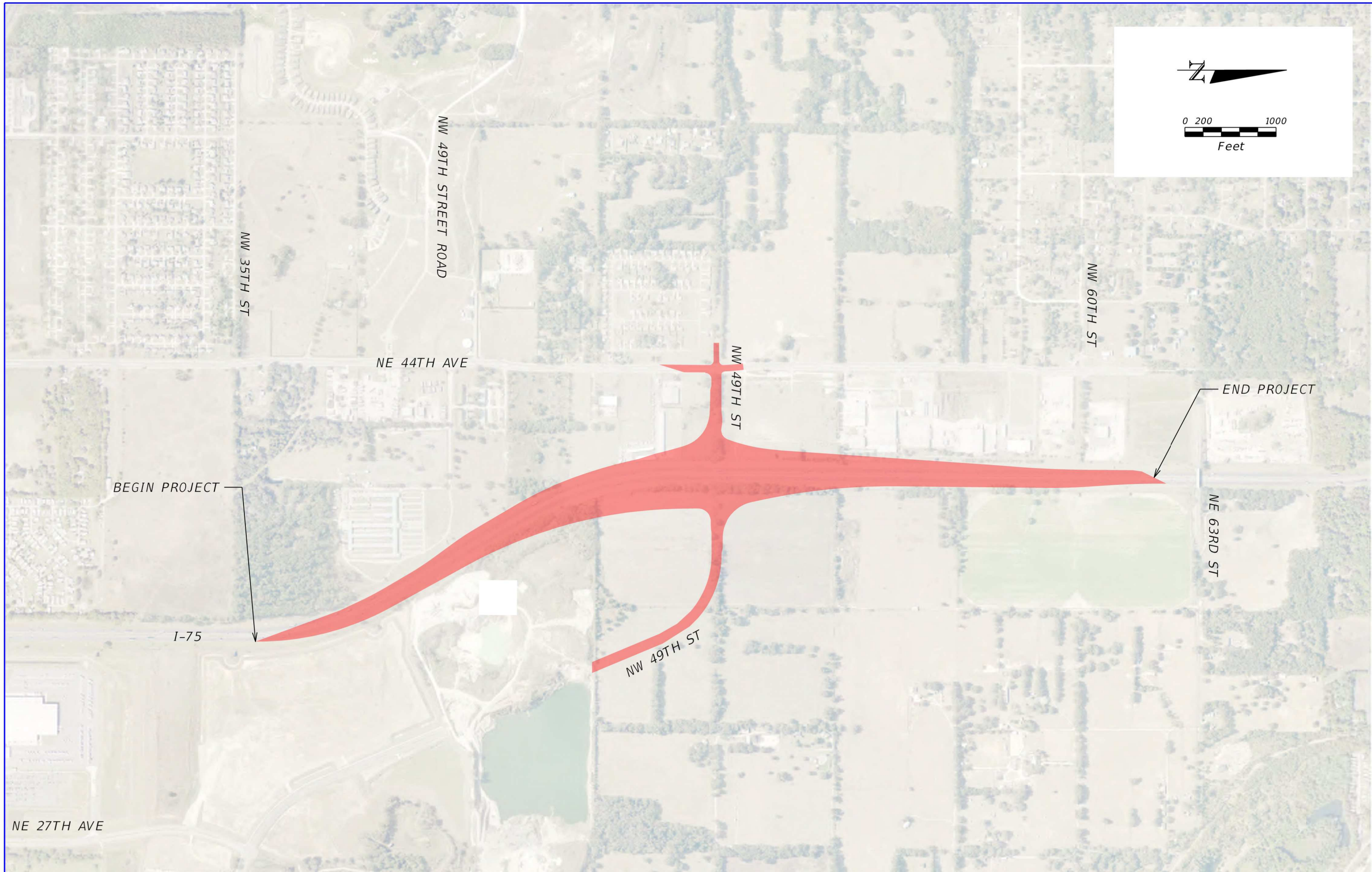
5.0 CONCLUSIONS

The proposed project will not create substantial changes to the existing floodplain elevations. The floodplain impacts will be compensated in the proposed regraded swales within the project boundaries. The proposed drainage features will be designed in accordance with the FDOT Drainage Manual, Topic No. 625-040-002.

Modifications to existing drainage structures (extending cross drains, relocating ditch blocks, and adding headwalls) included in this project will result in an insignificant change in their capacity to carry floodwater. These modifications will cause minimal increases in flood heights and flood limits which will not result in any significant adverse impacts on the natural and beneficial floodplain values or any significant change in flood risks or damage. There will be no significant change in the potential for interruption or termination of emergency service of emergency evacuation routes as the result of modifications to existing drainage structures. Therefore, it has been determined that this encroachment is not significant.

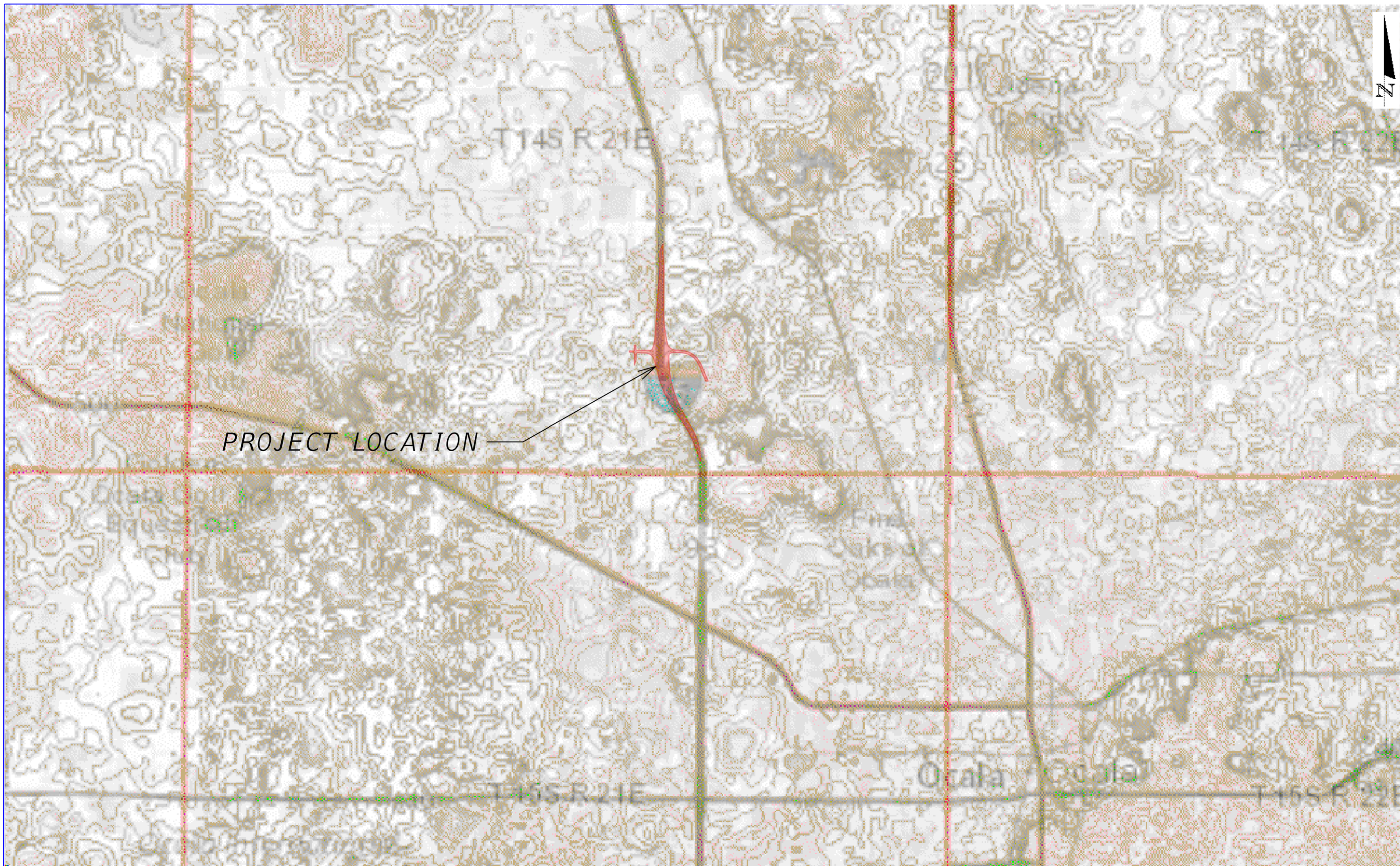
APPENDIX A:

FIGURES



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

REVISIONS				METRIC ENGINEERING, INC. 13940 S.W. 136 STREET SUITE 200 MIAMI, FLORIDA 33186 TEL. (305) 235-5098 FAX. (305) 235-5271 CERTIFICATE OF AUTHORIZATION 2294	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			PROJECT LOCATION MAP FIGURE 1	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		A-1
						I-75	MARION		435209-1-22-01



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

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

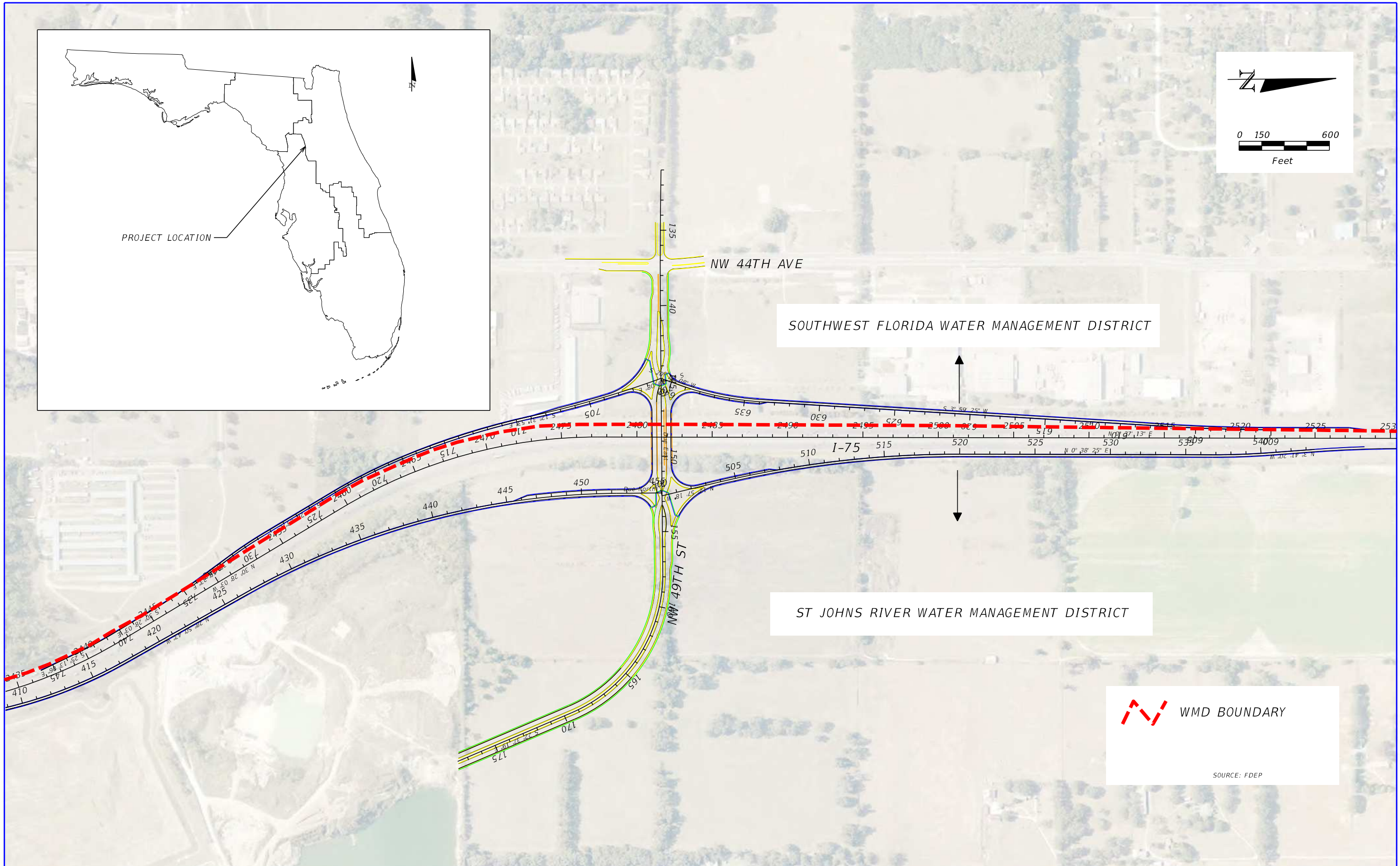
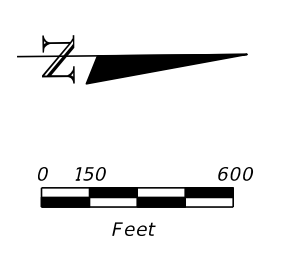
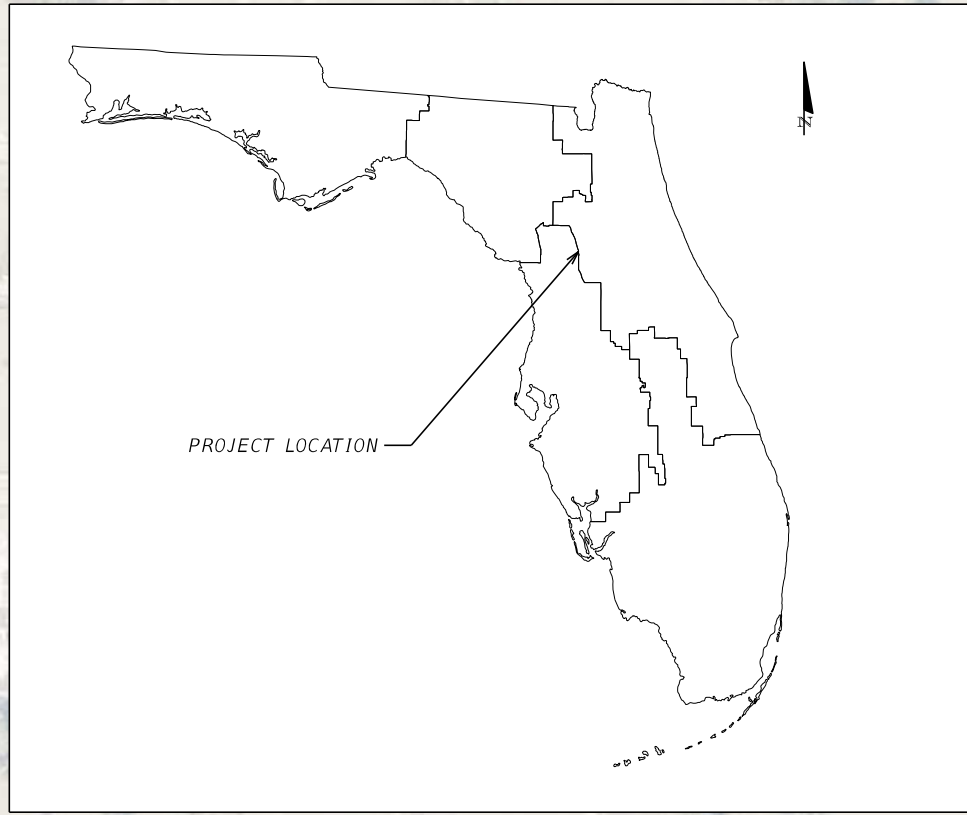
METRIC ENGINEERING, INC.
 13940 S.W. 136 STREET
 SUITE 200
 MIAMI, FLORIDA 33186
 TEL. (305) 235-5098
 FAX. (305) 235-5271
 CERTIFICATE OF AUTHORIZATION 2294

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION		
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
1-75	MARION	435209-1-22-01

**VICINITY / USGS QUAD MAP
FIGURE 2**

SHEET
NO. A-2

A-2



REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

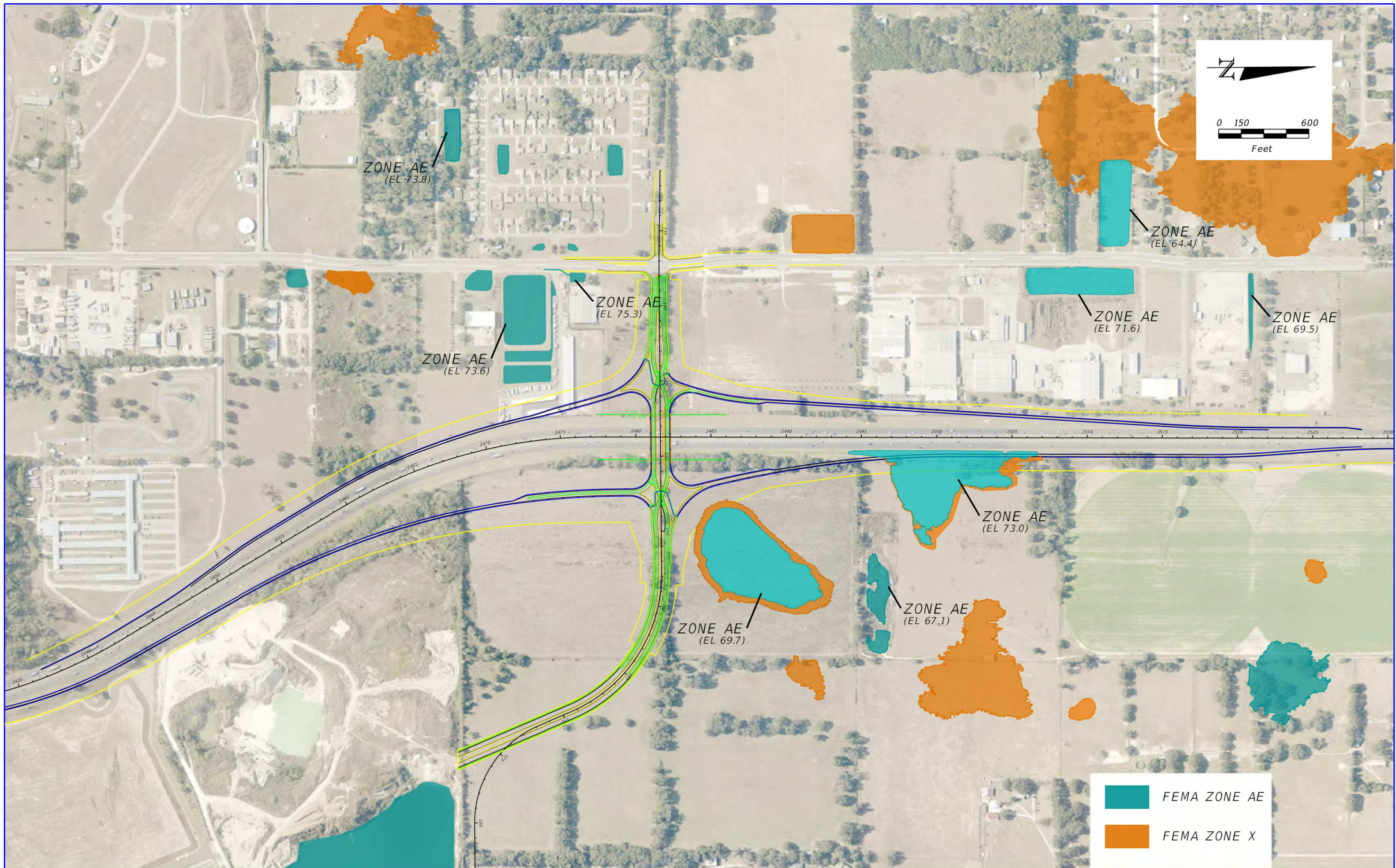
METRIC ENGINEERING, INC.
 13940 S.W. 136 STREET
 SUITE 200
 MIAMI, FLORIDA 33186
 TEL. (305) 235-5098
 FAX. (305) 235-5271
 CERTIFICATE OF AUTHORIZATION 2294

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION		
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
I-75	MARION	435209-1-22-01

WATER MANAGEMENT DISTRICT
BOUNDARY MAP
FIGURE 3

SHEET NO.
A-3

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



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

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

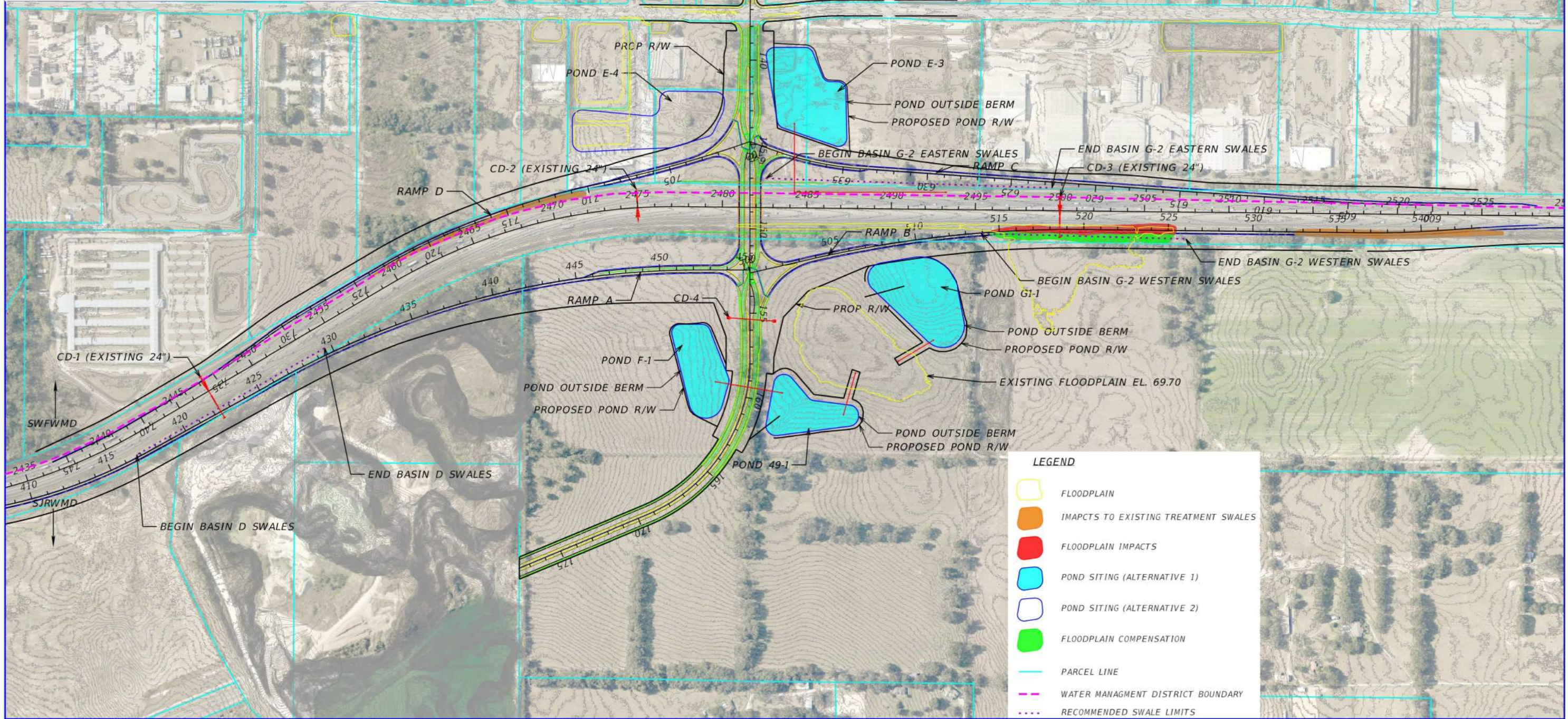
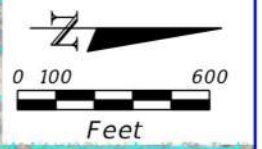
METRIC ENGINEERING, INC.
 13940 S.W. 136 STREET
 SUITE 200
 MIAMI, FLORIDA 33186
 TEL. (305) 235-5098
 FAX. (305) 235-5271
 CERTIFICATE OF AUTHORIZATION 2294

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION		
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
1-75	MARION	435209-1-22-01

FEMA FLOODPLAIN MAP
FIGURE 4

SHEET NO.
A-4

Station	Cross-Sectional Area of Dredge (SF)	Cross-Sectional Area of Fill (SF)	Volume of Floodplain Compensation (AC-FT)	Volume of Floodplain Impacts (AC-FT)
514+50.00	0.00	0.00	0.02	0.02
515+00.00	31.84	31.84	0.41	0.15
516+00.00	324.41	94.50	0.57	0.36
517+00.00	174.68	217.30	0.48	0.36
518+00.00	241.76	97.69	0.51	0.18
519+00.00	200.60	60.27	0.56	0.24
520+00.00	286.80	152.05	0.81	0.45
521+00.00	416.91	242.46	0.92	0.65
522+00.00	388.00	325.17	0.53	0.47
523+00.00	72.00	82.59	0.29	0.29
524+00.00	177.57	174.27	0.31	0.29
525+00.00	89.79	82.13	0.05	0.05
525+50.00	0.00	0.00	0.00	0.00
Project Totals:			5.45	3.52



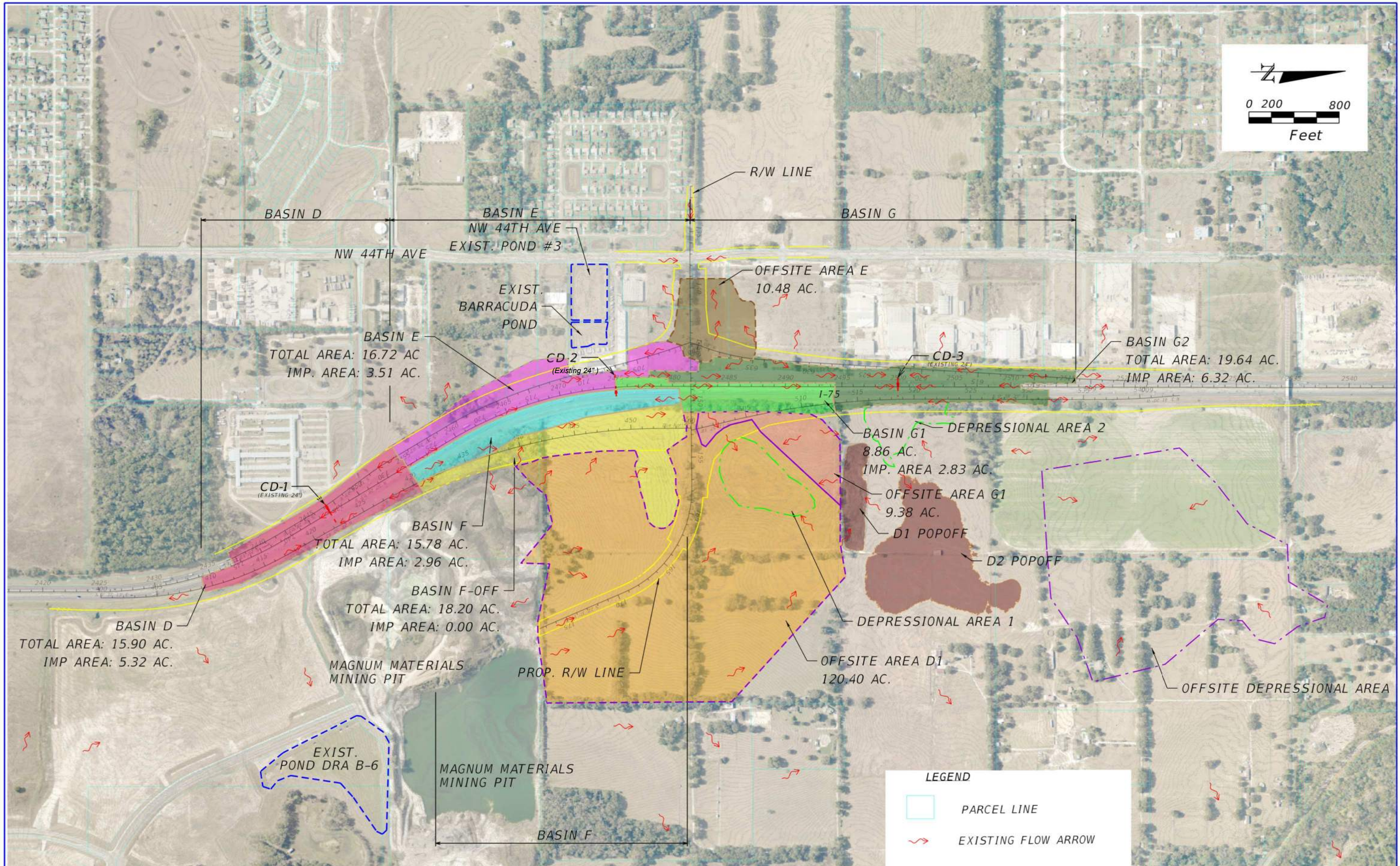
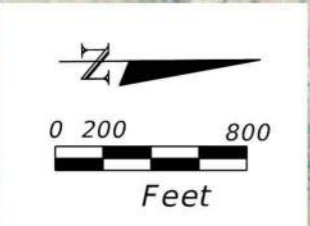
REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

METRIC ENGINEERING, INC.
 13940 S.W. 136 STREET
 SUITE 200
 MIAMI, FLORIDA 33186
 TEL. (305) 235-5098
 FAX. (305) 235-5271
 CERTIFICATE OF AUTHORIZATION 2294

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION		
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
I-75	MARION	435209-1-22-01

**PROPOSED POND/
FLOODPLAIN COMPENSATION MAP**
FIGURE 5

SHEET NO.
A-5



REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

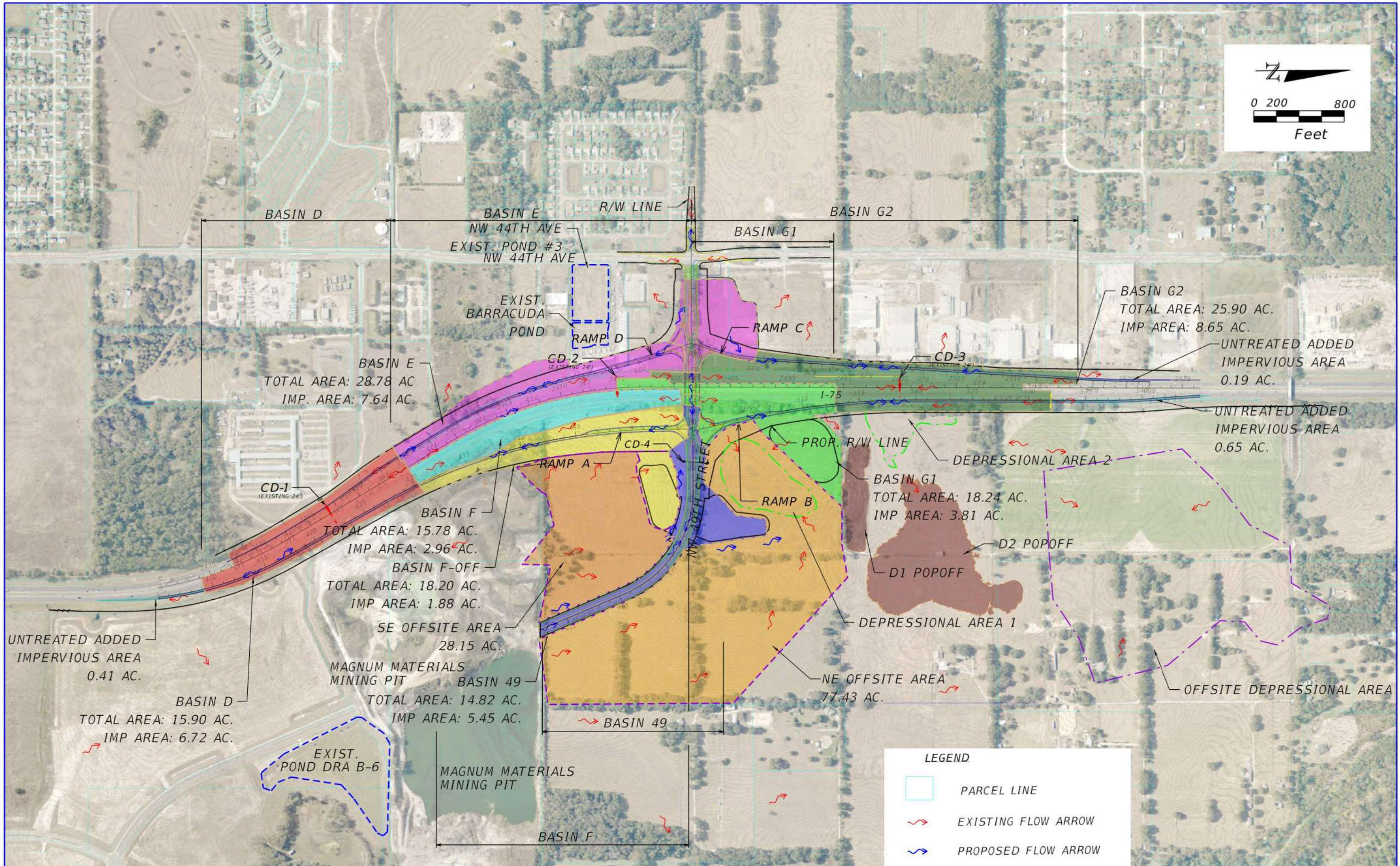
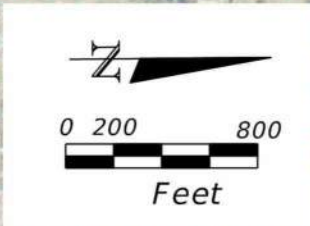
METRIC ENGINEERING, INC.
 13940 S.W. 136 STREET
 SUITE 200
 MIAMI, FLORIDA 33186
 TEL. (305) 235-5098
 FAX. (305) 235-5271
 CERTIFICATE OF AUTHORIZATION 2294

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION		
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
I-75	MARION	435209-1-22-01

**PRE-DEVELOPMENT
DRAINAGE MAP
FIGURE 6**

SHEET NO.
A-6

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



LEGEND

- PARCEL LINE
- EXISTING FLOW ARROW
- PROPOSED FLOW ARROW

REVISIONS				METRIC ENGINEERING, INC. 13940 S.W. 136 STREET SUITE 200 MIAMI, FLORIDA 33186 TEL. (305) 235-5098 FAX. (305) 235-5271 CERTIFICATE OF AUTHORIZATION 2294	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			POST-DEVELOPMENT DRAINAGE MAP FIGURE 7	SHEET NO. A-7
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
					I-75	MARION	435209-1-22-01		

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

APPENDIX B:
CALCULATIONS

**TIME OF CONCENTRATION &
CURVE NUMBER CALCULATIONS**

Time of Concentration, Tc & Curve Number, CN Calculations

BASIN: E-OFFSITE (EX)

Sheet 1 of 1 Proj. I-75&49th

Computed By: JPB Date: 9/07/2020

Checked By: MAH Date: 10/12/2020

Tc Calculations:

Sheet Flow

	Segment ID:		AB		
1. Surface description (table 3-1, TR-55)			Grass		
2. Manning's Roughness coefficient, n (table 3-1, TR-55)			0.15		
3. Two year 24 hour rainfall, P2	in		4.8		
4. Flow length, L (total L < 300 ft)	ft		300		
5. Land slope, s	Begin Elev.	ft	129.0		
	End Elev.	ft	123.0		
		Slope	ft/ft	0.020	
6. $T_t = (0.007 * (nL)^{0.8}) / ((P2^{0.5})(s^{0.4})) * 60$	Compute Tt	min.	19.27	+	= 19.3

Shallow Concentrated Flow

	Segment ID:		BC		
7. Surface description (paved or unpaved)			unpaved		
Velocity Coefficient K (Paved = 20.328, Unpaved = 16.1345)			20.328		
8. Flow length, L	ft		2650		
9. Watercourse slope, S	Begin Elev.	ft	123.0		
	End Elev.	ft	69.0		
		Slope	ft/ft	0.020	
10. Average velocity, V ($V = K * S^{0.5}$)		ft/s	2.90		
11. $T_t = L / (60 * V)$	Compute Tt	min.	15.2	+	= 15.2

Channel Flow

	Segment ID:		CD		
14. Hydraulic radius, $R = A / WP$		ft	0.00		
15. Flow length, L		ft	500		
16. Slope, s	Begin Elev.	ft	32.0		
	End Elev.	ft	31.0		
		Slope	ft/ft	0.002	
17. Manning's roughness coefficient, n (table 3-1, TR-55)			0.15		
18. $V = (1.49 * R^{0.67} * s^{0.5}) / N$		ft/s	0.00		
19. $T_t = L / (60 * V)$	Compute Tt	min.	0.0	+	= 0.0
20. Total of 6, 11 and 19					= 34.5 min.
Minimum Time of Concentration	minimum:		10.0	min.	
Time of Concentration					34.5 min.
					0.6 hr

CN Calculations:

Land Use Description	Soil Group	CN	Area (ac.)	Product
Impervious Areas	A/D	98	0.00	0.00
Pastureland	A	39	150.21	5858.19
Water Bodies	A/D	100	0.00	0.00
TOTALS:			150.21	5858.19
COMPOSITE CN =				39.0

FLOODPLAIN IMPACTS AND COMPENSATION
CALCULATIONS

Dredge & Fill Volumes

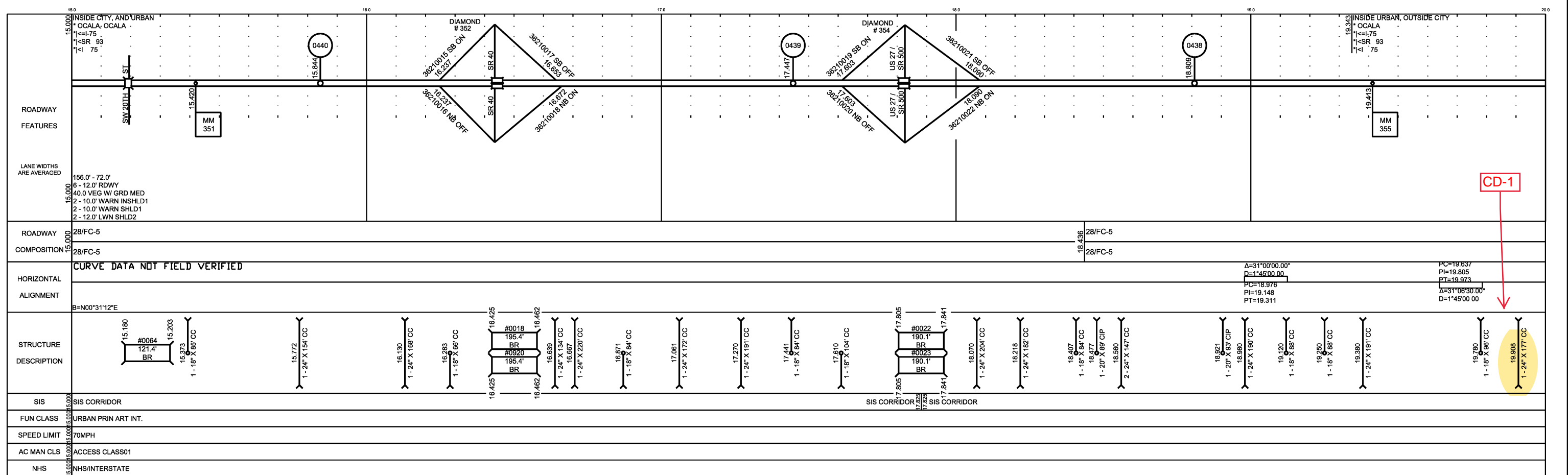
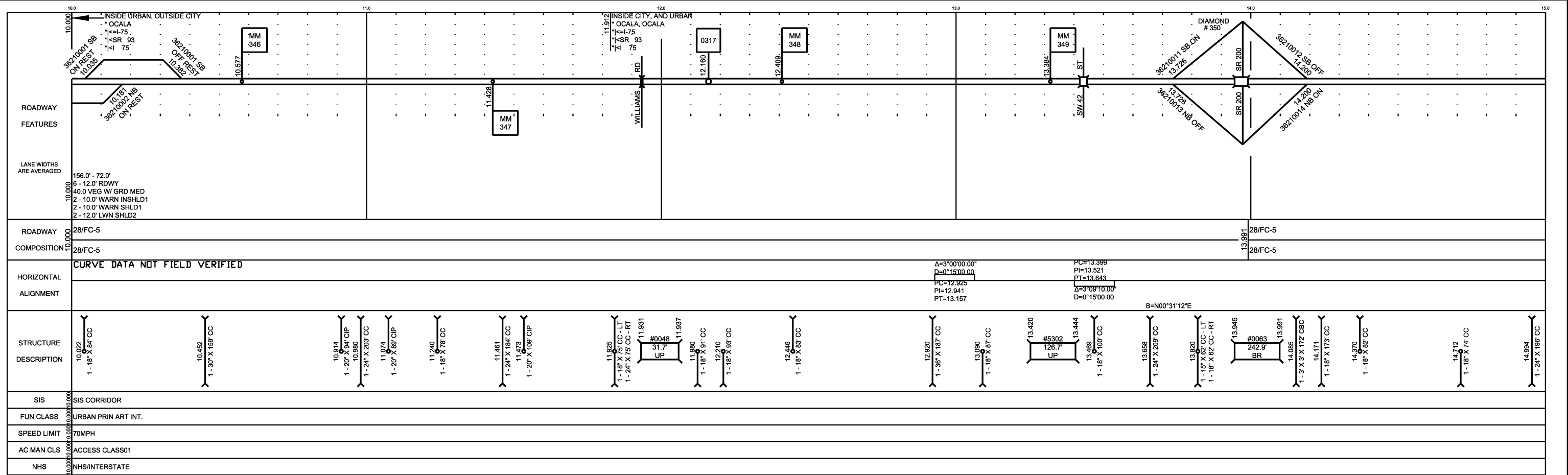
Computed: JPB Date: 08/27/2020
 Checked: MAH Date: 10/09/2020

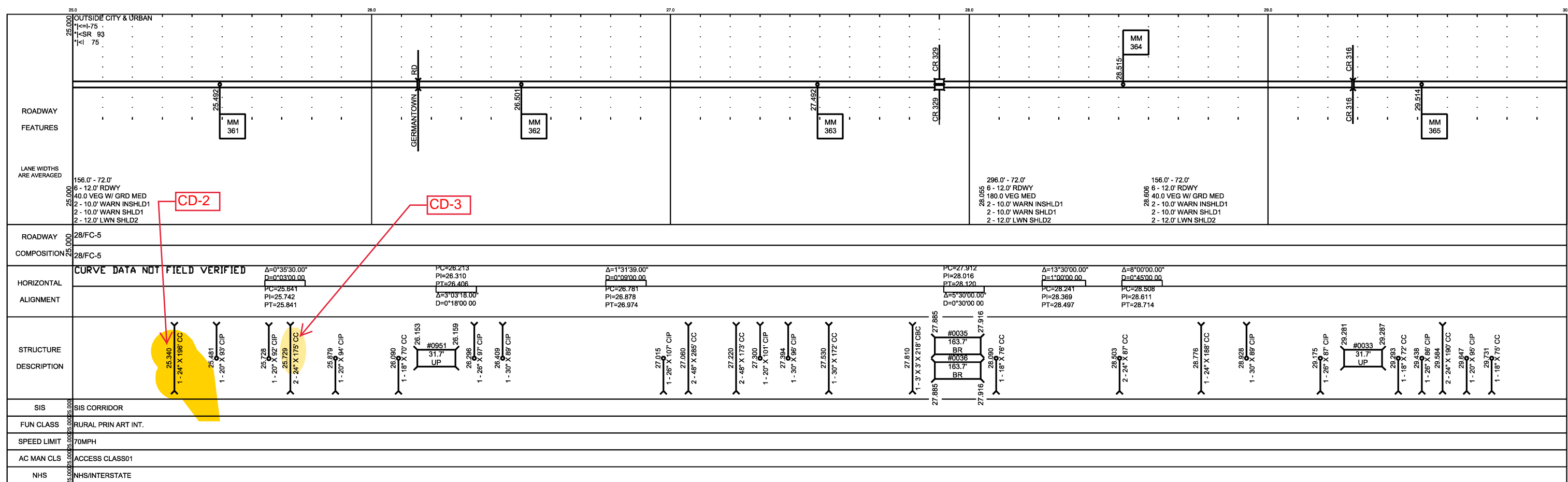
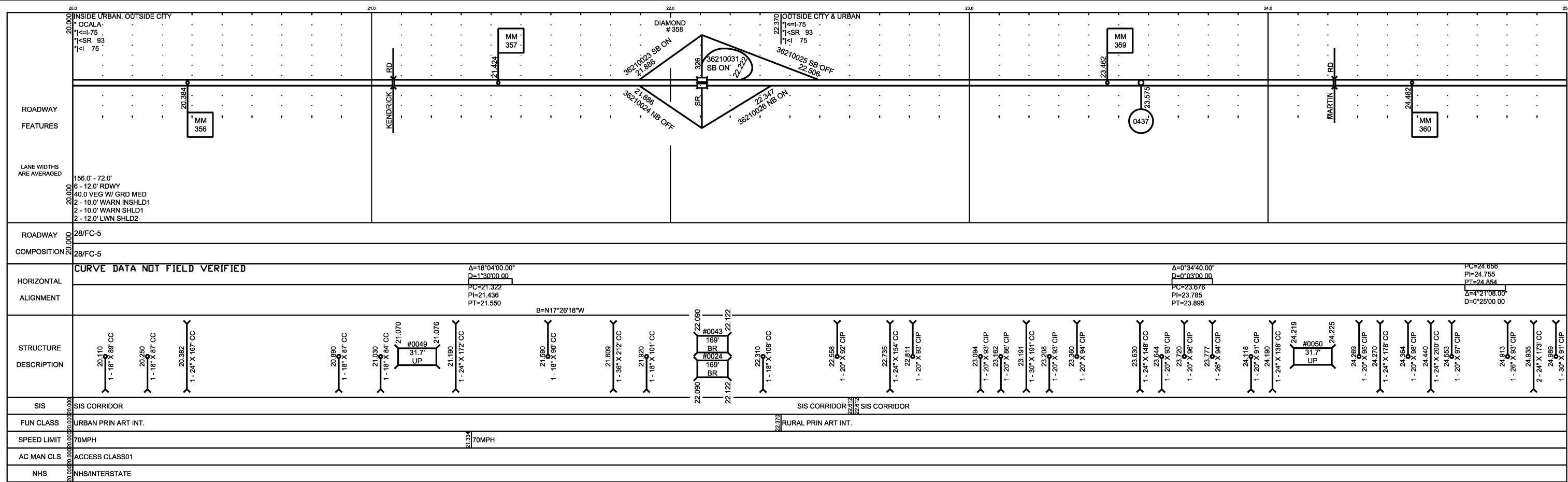
Swales I-75

Station	Cross-Sectional Area of Dredge (SF)	Cross-Sectional Area of Fill (SF)	Volume of Floodplain Compensation (AC-FT)	Volume of Floodplain Impacts (AC-FT)		
514+50.00	0.00	0.00	0.02	0.02	Represents begin station of impacts	
515+00.00	31.84	31.84	0.41	0.15		
516+00.00	324.41	94.50	0.57	0.36		
517+00.00	174.68	217.30	0.48	0.36		
518+00.00	241.76	97.69	0.51	0.18		
519+00.00	200.60	60.27	0.56	0.24		
520+00.00	286.80	152.05	0.81	0.45		
521+00.00	416.91	242.46	0.92	0.65		
522+00.00	388.00	325.17	0.53	0.47		
523+00.00	72.00	82.59	0.29	0.29		
524+00.00	177.57	174.27	0.31	0.29		
525+00.00	89.79	82.13	0.05	0.05		
525+50.00	0.00	0.00	0.00	0.00		Represents end station of impacts
Project Totals:			5.45	3.52		

APPENDIX C:

I-75 STRAIGHT LINE DIAGRAMS



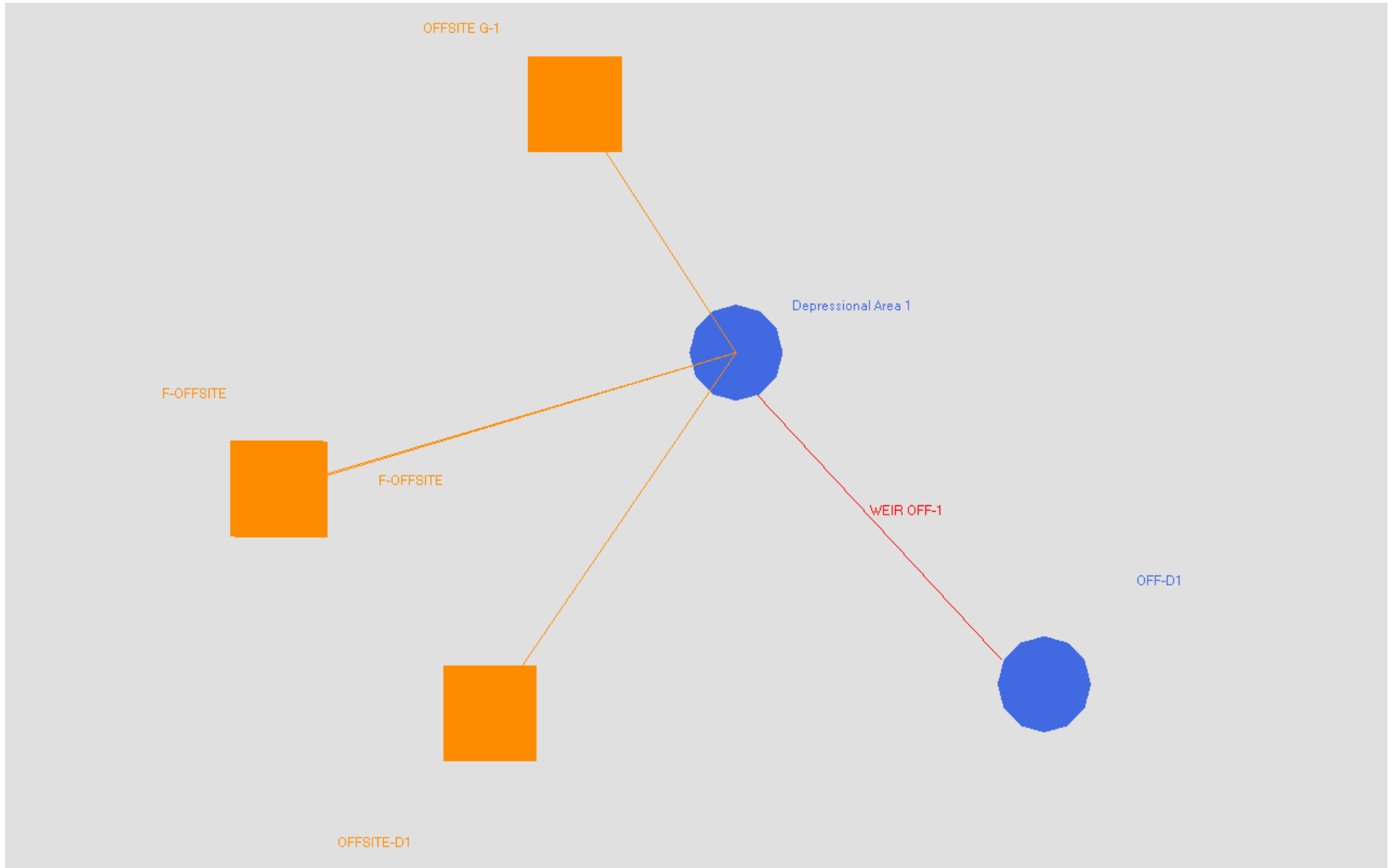


APPENDIX D:

ICPR DOCUMENTATION

PRE-DEVELOPMENT ICPR DOCUMENTATION

Pre-Development Node-Link Diagram



Node Max Conditions [Pre-Development]

Node Name	Sim Name	Warning Stage [ft]	Max Stage [ft]	Min/Max Delta Stage [ft]	Max Total Inflow [cfs]	Max Total Outflow [cfs]	Max Surface Area [ft2]
Depressional Area 1	100yr-24hr	73.00	72.10	0.0010	226.32	0.00	523664
OFF-D1	100yr-24hr	73.00	66.00	0.0000	0.00	0.00	43996
Depressional Area 1	10yr-24hr	73.00	69.72	0.0010	61.85	0.00	309116
OFF-D1	10yr-24hr	73.00	66.00	0.0000	0.00	0.00	43996
Depressional Area 1	25yr-24hr	73.00	70.22	0.0010	87.60	0.00	352953
OFF-D1	25yr-24hr	73.00	66.00	0.0000	0.00	0.00	43996

Manual Basin: F-OFFSITE

Scenario: Pre-Development
 Node: Depressional Area 1
 Hydrograph Method: NRCS Unit Hydrograph
 Infiltration Method: Curve Number
 Time of Concentration: 40.9000 min
 Max Allowable Q: 999.00 cfs
 Time Shift: 0.0000 hr
 Unit Hydrograph: UH484
 Peaking Factor: 484.0

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
18.2000	OFFSITE	OFFSITE	

Comment:

Manual Basin: OFFSITE G-1

Scenario: Pre-Development
 Node: Depressional Area 1
 Hydrograph Method: NRCS Unit Hydrograph
 Infiltration Method: Curve Number
 Time of Concentration: 25.5000 min
 Max Allowable Q: 999.00 cfs
 Time Shift: 0.0000 hr
 Unit Hydrograph: UH484
 Peaking Factor: 484.0

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
9.3800	OFFSITE	OFFSITE	

Comment:

Manual Basin: OFFSITE-D1

Scenario: Pre-Development
 Node: Depressional Area 1
 Hydrograph Method: NRCS Unit Hydrograph
 Infiltration Method: Curve Number
 Time of Concentration: 34.5000 min
 Max Allowable Q: 999.00 cfs
 Time Shift: 0.0000 hr
 Unit Hydrograph: UH484
 Peaking Factor: 484.0

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
120.4000	OFFSITE	OFFSITE	

Comment:

Manual Basin: F-OFFSITE

Scenario: Pre-Floodrights
 Node: Depressional Area 1
 Hydrograph Method: NRCS Unit Hydrograph
 Infiltration Method: Curve Number
 Time of Concentration: 40.9000 min
 Max Allowable Q: 999.00 cfs
 Time Shift: 0.0000 hr
 Unit Hydrograph: UH484
 Peaking Factor: 484.0

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
18.2000	OFFSITE	OFFSITE	

Comment:

Manual Basin: OFFSITE G-1

Scenario: Pre-Floodrights
 Node: Depressional Area 1
 Hydrograph Method: NRCS Unit Hydrograph
 Infiltration Method: Curve Number
 Time of Concentration: 25.5000 min
 Max Allowable Q: 999.00 cfs
 Time Shift: 0.0000 hr
 Unit Hydrograph: UH484
 Peaking Factor: 484.0

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
9.3800	OFFSITE	OFFSITE	

Comment:

Manual Basin: OFFSITE-D1

Scenario: Pre-Floodrights
 Node: Depressional Area 1
 Hydrograph Method: NRCS Unit Hydrograph
 Infiltration Method: Curve Number
 Time of Concentration: 34.5000 min
 Max Allowable Q: 999.00 cfs
 Time Shift: 0.0000 hr
 Unit Hydrograph: UH484
 Peaking Factor: 484.0

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
120.4000	OFFSITE	OFFSITE	

Comment:

Node: Depressional Area 1

Scenario: Pre-Development
 Type: Stage/Area
 Base Flow: 0.00 cfs
 Initial Stage: 66.00 ft
 Warning Stage: 73.00 ft

Stage [ft]	Area [ac]	Area [ft2]
66.00	0.1200	5227
67.00	1.7600	76666
68.00	3.4700	151153
69.00	5.5900	243500
70.00	7.6700	334105
71.00	9.6700	421225
72.00	11.8100	514444
73.00	13.8600	603742

Comment:

Node: OFF-D1

Scenario: Pre-Development
 Type: Stage/Area
 Base Flow: 0.00 cfs
 Initial Stage: 66.00 ft
 Warning Stage: 73.00 ft

Stage [ft]	Area [ac]	Area [ft2]
66.00	1.0100	43996
67.00	1.4500	63162
70.00	2.6800	116741
71.00	2.9000	126324
72.00	3.6100	157252
73.00	3.8500	167706

Comment: Represents offsite pop-off location for Depressional Area 1

Node: Depressional Area 1

Scenario: Pre-Floodrights
 Type: Stage/Area
 Base Flow: 0.00 cfs
 Initial Stage: 66.00 ft
 Warning Stage: 73.00 ft

Stage [ft]	Area [ac]	Area [ft2]
66.00	0.1200	5227

Stage [ft]	Area [ac]	Area [ft2]
67.00	1.7600	76666
68.00	3.4700	151153
69.00	5.5900	243500
70.00	7.6700	334105
71.00	9.6700	421225
72.00	11.8100	514444
73.00	13.8600	603742

Comment:

Node: OFF-D1

Scenario: Pre-Floodrights
 Type: Stage/Area
 Base Flow: 0.00 cfs
 Initial Stage: 66.00 ft
 Warning Stage: 73.00 ft

Stage [ft]	Area [ac]	Area [ft2]
66.00	1.0100	43996
67.00	1.4500	63162
70.00	2.6800	116741
71.00	2.9000	126324
72.00	3.6100	157252
73.00	3.8500	167706

Comment: Represents offsite pop-off location for Depressional Area 1

Weir Link: WEIR OFF-1

Scenario: Pre-Development	Bottom Clip
From Node: Depressional Area 1	Default: 0.00 ft
To Node: OFF-D1	Op Table:
Link Count: 1	Ref Node:
Flow Direction: Both	Top Clip
Damping: 0.0000 ft	Default: 0.00 ft
Weir Type: Broad Crested Vertical	Op Table:
Geometry Type: Irregular	Ref Node:
Invert: 73.00 ft	Discharge Coefficients
Control Elevation: 73.00 ft	Weir Default: 2.800
Cross Section: X-OFF-1-W	Weir Table:
	Orifice Default: 0.600
	Orifice Table:

Comment: represents elevation at which the depression overtops to the adjacent offsite depressional area to the north

Weir Link: WEIR OFF-1	
Scenario: Pre-Floodrights	Bottom Clip
From Node: Depressional Area 1	Default: 0.00 ft
To Node: OFF-D1	Op Table:
Link Count: 1	Ref Node:
Flow Direction: Both	Top Clip
Damping: 0.0000 ft	Default: 0.00 ft
Weir Type: Broad Crested Vertical	Op Table:
Geometry Type: Irregular	Ref Node:
Invert: 73.00 ft	Discharge Coefficients
Control Elevation: 73.00 ft	Weir Default: 2.800
Cross Section: X-OFF-1-W	Weir Table:
	Orifice Default: 0.600
	Orifice Table:

Comment: represents elevation at which the depression overtops to the adjacent offsite depressional area to the north

Simulation: 100yr-24hr

Scenario: Pre-Development
 Run Date/Time: 10/12/2020 10:18:19 AM
 Program Version: ICPR4 4.03.02.00

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	96.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		30.0000

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Restart File

Save Restart: False

Resources & Lookup Tables

Resources	Lookup Tables
Rainfall Folder:	Boundary Stage Set:
Unit Hydrograph Folder:	Extern Hydrograph Set:
	Curve Number Set: CurveNumbers
	Green-Ampt Set:
	Vertical Layers Set:
	Impervious Set: Basins

Tolerances & Options

Time Marching: SAOR	IA Recovery Time: 24.0000 hr
Max Iterations: 6	
Over-Relax Weight: 0.5 dec	
Fact:	
dZ Tolerance: 0.0010 ft	Manual Basin Rain Opt: Global
Max dZ: 1.0000 ft	
Link Optimizer Tol: 0.0001 ft	Rainfall Name: ~FLMOD
Edge Length Option: Automatic	Rainfall Amount: 11.40 in
	Storm Duration: 24.0000 hr
	Dflt Damping (1D): 0.0050 ft
	Min Node Srf Area (1D): 100 ft2
	Energy Switch (1D): Energy

Comment:

Simulation: 10yr-24hr

Scenario: Pre-Development
 Run Date/Time: N/A
 Program Version: N/A

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	96.0000
	Hydrology [sec]	Surface Hydraulics [sec]		
Min Calculation Time:	60.0000	0.1000		
Max Calculation Time:		30.0000		

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Rainfall Folder:

Unit Hydrograph Folder:

Lookup Tables

Boundary Stage Set:
Extern Hydrograph Set:
Curve Number Set: CurveNumbers

Green-Ampt Set:
Vertical Layers Set:
Impervious Set: Basins

Tolerances & Options

Time Marching: SAOR
Max Iterations: 6
Over-Relax Weight Fact: 0.5 dec
dZ Tolerance: 0.0010 ft
Max dZ: 1.0000 ft
Link Optimizer Tol: 0.0001 ft

Edge Length Option: Automatic

IA Recovery Time: 24.0000 hr

Manual Basin Rain Opt: Global

Rainfall Name: ~FLMOD
Rainfall Amount: 7.68 in
Storm Duration: 24.0000 hr

Dflt Damping (1D): 0.0050 ft
Min Node Srf Area (1D): 100 ft2
Energy Switch (1D): Energy

Comment:

Simulation: 25yr-24hr

Scenario: Pre-Development
 Run Date/Time: N/A
 Program Version: N/A

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	96.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		30.0000

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Rainfall Folder:

 Unit Hydrograph Folder:

Lookup Tables

Boundary Stage Set:
 Extern Hydrograph Set:
 Curve Number Set: CurveNumbers

 Green-Ampt Set:
 Vertical Layers Set:
 Impervious Set: Basins

Tolerances & Options

Time Marching: SAOR
 Max Iterations: 6
 Over-Relax Weight: 0.5 dec
 Fact:
 dZ Tolerance: 0.0010 ft
 Max dZ: 1.0000 ft

IA Recovery Time: 24.0000 hr

 Manual Basin Rain Opt: Global

Link Optimizer Tol: 0.0001 ft
 Edge Length Option: Automatic

Rainfall Name: ~FLMOD
 Rainfall Amount: 8.40 in
 Storm Duration: 24.0000 hr
 Dfit Damping (1D): 0.0050 ft
 Min Node Srf Area (1D): 100 ft2
 Energy Switch (1D): Energy

Comment:

Simulation: 50yr-24hr
 Scenario: Pre-Development
 Run Date/Time: N/A
 Program Version: N/A

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	96.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		30.0000

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Rainfall Folder:

Lookup Tables

Boundary Stage Set:

Unit Hydrograph
Folder:

Extern Hydrograph Set:
Curve Number Set: CurveNumbers

Green-Ampt Set:
Vertical Layers Set:
Impervious Set: Basins

Tolerances & Options

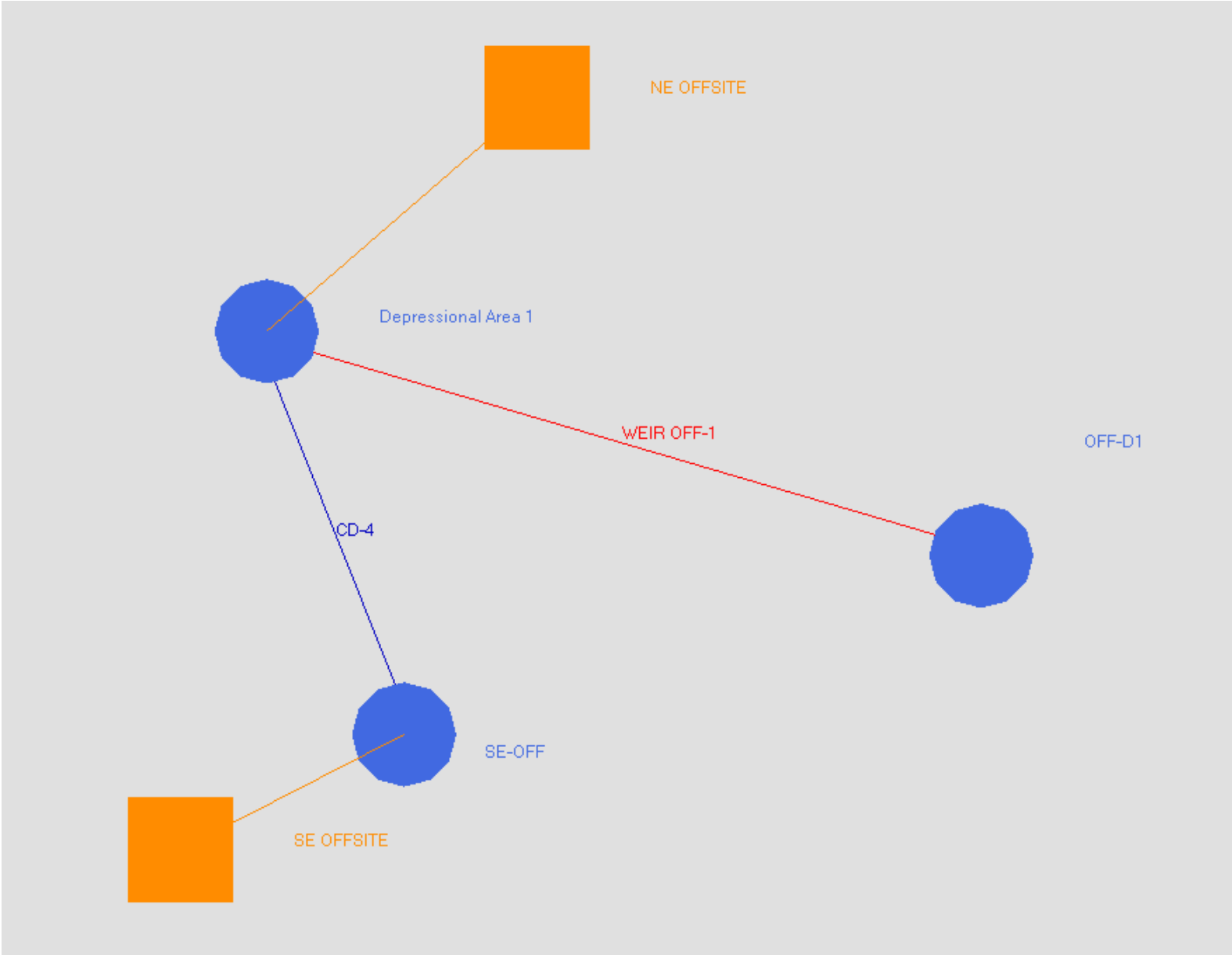
Time Marching: SAOR
Max Iterations: 6
Over-Relax Weight 0.5 dec
Fact:
dZ Tolerance: 0.0010 ft
Max dZ: 1.0000 ft
Link Optimizer Tol: 0.0001 ft
Edge Length Option: Automatic

IA Recovery Time: 24.0000 hr
Manual Basin Rain Opt: Global
Rainfall Name: ~FLMOD
Rainfall Amount: 9.84 in
Storm Duration: 24.0000 hr
Dflt Damping (1D): 0.0050 ft
Min Node Srf Area 100 ft2
(1D):
Energy Switch (1D): Energy

Comment:

POST-DEVELOPMENT ICPR DOCUMENTATION

Post-Development Node-Link Diagram



Node Max Conditions [Post-Development]

Node Name	Sim Name	Warning Stage [ft]	Max Stage [ft]	Min/Max Delta Stage [ft]	Max Total Inflow [cfs]	Max Total Outflow [cfs]	Max Surface Area [ft2]
Depressional Area 1	100yr-24hr	73.00	71.18	0.0010	164.38	0.00	438350
OFF-D1	100yr-24hr	73.00	66.00	0.0000	0.00	0.00	43996
SE-OFF	100yr-24hr	82.40	82.05	0.0010	43.52	42.64	4669
Depressional Area 1	10yr-24hr	73.00	69.16	0.0010	44.72	0.00	258344
OFF-D1	10yr-24hr	73.00	66.00	0.0000	0.00	0.00	43996
SE-OFF	10yr-24hr	82.40	80.40	0.0010	11.90	11.52	4655
Depressional Area 1	25yr-24hr	73.00	69.58	0.0010	63.38	0.00	296317
OFF-D1	25yr-24hr	73.00	66.00	0.0000	0.00	0.00	43996
SE-OFF	25yr-24hr	82.40	80.70	0.0010	16.86	16.38	4666
Depressional Area 1	50yr-24hr	73.00	70.38	0.0010	107.87	0.00	366904
OFF-D1	50yr-24hr	73.00	66.00	0.0000	0.00	0.00	43996
SE-OFF	50yr-24hr	82.40	81.33	0.0010	28.60	27.95	4669

Manual Basin: NE OFFSITE

Scenario: Post-Development
 Node: Depressional Area 1
 Hydrograph Method: NRCS Unit Hydrograph
 Infiltration Method: Curve Number
 Time of Concentration: 32.3000 min
 Max Allowable Q: 999.00 cfs
 Time Shift: 0.0000 hr
 Unit Hydrograph: UH484
 Peaking Factor: 484.0

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
77.4300	OFFSITE	OFFSITE	

Comment:

Manual Basin: SE OFFSITE

Scenario: Post-Development
 Node: SE-OFF
 Hydrograph Method: NRCS Unit Hydrograph
 Infiltration Method: Curve Number
 Time of Concentration: 34.5000 min
 Max Allowable Q: 999.00 cfs
 Time Shift: 0.0000 hr
 Unit Hydrograph: UH484
 Peaking Factor: 484.0

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
28.1500	OFFSITE	OFFSITE	

Comment:

Node: Depressional Area 1

Scenario: Post-Development
 Type: Stage/Area
 Base Flow: 0.00 cfs
 Initial Stage: 66.00 ft
 Warning Stage: 73.00 ft

Stage [ft]	Area [ac]	Area [ft2]
66.00	0.1200	5227
67.00	1.7600	76666
68.00	3.4700	151153
69.00	5.5900	243500
70.00	7.6700	334105
71.00	9.6700	421225
72.00	11.8100	514444

Stage [ft]	Area [ac]	Area [ft2]
73.00	13.8600	603742

Comment:

Node: OFF-D1

Scenario: Post-Development
 Type: Stage/Area
 Base Flow: 0.00 cfs
 Initial Stage: 66.00 ft
 Warning Stage: 73.00 ft

Stage [ft]	Area [ac]	Area [ft2]
66.00	1.0100	43996
67.00	1.4500	63162
70.00	2.6800	116741
71.00	2.9000	126324
72.00	3.6100	157252
73.00	3.8500	167706

Comment: Represents offsite pop-off location for Depressional Area 1

Node: SE-OFF

Scenario: Post-Development
 Type: Stage/Area
 Base Flow: 0.00 cfs
 Initial Stage: 79.00 ft
 Warning Stage: 82.40 ft

Stage [ft]	Area [ac]	Area [ft2]
79.00	0.1000	4356
82.00	0.1000	4356

Comment: Warning stage set at roadway sag

Pipe Link: CD-4

	Upstream	Downstream
Scenario:	Post-Development	
From Node:	SE-OFF	
To Node:	Depressional Area	
Link Count:	1	
Flow Direction:	Both	
	Invert: 79.00 ft	Invert: 73.00 ft
	Manning's N: 0.0120	Manning's N: 0.0120
	Geometry: Circular	Geometry: Circular
	Max Depth: 3.50 ft	Max Depth: 3.50 ft
	Bottom Clip	
	Default: 0.00 ft	Default: 0.00 ft

Damping:	0.0000 ft	Op Table:		Op Table:	
Length:	182.00 ft	Ref Node:		Ref Node:	
FHWA Code:	1	Manning's N:	0.0000	Manning's N:	0.0000
Entr Loss Coef:	0.50	Top Clip			
Exit Loss Coef:	1.00	Default:	0.00 ft	Default:	0.00 ft
Bend Loss Coef:	0.00	Op Table:		Op Table:	
Bend Location:	0.00 ft	Ref Node:		Ref Node:	
Energy Switch:	Energy	Manning's N:	0.0000	Manning's N:	0.0000

Comment:

Weir Link: WEIR OFF-1

Scenario:	Post-Development	Bottom Clip
From Node:	Depressional Area 1	Default: 0.00 ft
To Node:	OFF-D1	Op Table:
Link Count:	1	Ref Node:
Flow Direction:	Both	Top Clip
Damping:	0.0000 ft	Default: 0.00 ft
Weir Type:	Broad Crested Vertical	Op Table:
Geometry Type:	Irregular	Ref Node:
Invert:	73.00 ft	Discharge Coefficients
Control Elevation:	73.00 ft	Weir Default: 2.800
Cross Section:	X-OFF-1-W	Weir Table:
		Orifice Default: 0.600
		Orifice Table:

Comment: represents elevation at which the depression overtops to the adjacent offsite depressional area to the north

Simulation: 100yr-24hr

Scenario: Post-Development
 Run Date/Time: 10/12/2020 2:38:29 PM
 Program Version: ICPR4 4.03.02.00

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	96.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		30.0000

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Rainfall Folder:

Unit Hydrograph
Folder:

Lookup Tables

Boundary Stage Set:

Extern Hydrograph Set:

Curve Number Set: CurveNumbers

Green-Ampt Set:

Vertical Layers Set:

Impervious Set: Basins

Tolerances & Options

Time Marching: SAOR	IA Recovery Time: 24.0000 hr
Max Iterations: 6	
Over-Relax Weight 0.5 dec	
Fact:	
dZ Tolerance: 0.0010 ft	Manual Basin Rain Opt: Global
Max dZ: 1.0000 ft	
Link Optimizer Tol: 0.0001 ft	Rainfall Name: ~FLMOD
	Rainfall Amount: 11.40 in
Edge Length Option: Automatic	Storm Duration: 24.0000 hr
	Dflt Damping (1D): 0.0050 ft
	Min Node Srf Area 100 ft2
	(1D):
	Energy Switch (1D): Energy

Comment:

Simulation: 10yr-24hr

Scenario: Post-Development
Run Date/Time: 10/12/2020 2:59:34 PM
Program Version: ICPR4 4.03.02.00

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	96.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		30.0000

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Rainfall Folder:

Unit Hydrograph
Folder:

Lookup Tables

Boundary Stage Set:
 Extern Hydrograph Set:
 Curve Number Set: CurveNumbers

 Green-Ampt Set:
 Vertical Layers Set:
 Impervious Set: Basins

Tolerances & Options

Time Marching: SAOR	IA Recovery Time: 24.0000 hr
Max Iterations: 6	
Over-Relax Weight 0.5 dec	
Fact:	
dZ Tolerance: 0.0010 ft	Manual Basin Rain Opt: Global
Max dZ: 1.0000 ft	
Link Optimizer Tol: 0.0001 ft	Rainfall Name: ~FLMOD
	Rainfall Amount: 7.68 in
Edge Length Option: Automatic	Storm Duration: 24.0000 hr

Dflt Damping (1D): 0.0050 ft
 Min Node Srf Area 100 ft2
 (1D):
 Energy Switch (1D): Energy

Comment:

Simulation: 25yr-24hr

Scenario: Post-Development
 Run Date/Time: 10/12/2020 3:22:35 PM
 Program Version: ICPR4 4.03.02.00

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	96.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		30.0000

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Rainfall Folder:

Unit Hydrograph
Folder:

Lookup Tables

Boundary Stage Set:
 Extern Hydrograph Set:
 Curve Number Set: CurveNumbers

Green-Ampt Set:
Vertical Layers Set:
Impervious Set: Basins

Tolerances & Options

Time Marching: SAOR	IA Recovery Time: 24.0000 hr
Max Iterations: 6	
Over-Relax Weight 0.5 dec	
Fact:	
dZ Tolerance: 0.0010 ft	Manual Basin Rain Opt: Global
Max dZ: 1.0000 ft	
Link Optimizer Tol: 0.0001 ft	Rainfall Name: ~FLMOD
	Rainfall Amount: 8.40 in
Edge Length Option: Automatic	Storm Duration: 24.0000 hr
	Dflt Damping (1D): 0.0050 ft
	Min Node Srf Area 100 ft2
	(1D):
	Energy Switch (1D): Energy

Comment:

Simulation: 50yr-24hr

Scenario: Post-Development
Run Date/Time: 10/12/2020 3:48:26 PM
Program Version: ICPR4 4.03.02.00

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	96.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		30.0000

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Rainfall Folder:

Unit Hydrograph
Folder:

Lookup Tables

Boundary Stage Set:
 Extern Hydrograph Set:
 Curve Number Set: CurveNumbers

 Green-Ampt Set:
 Vertical Layers Set:
 Impervious Set: Basins

Tolerances & Options

Time Marching: SAOR
 Max Iterations: 6
 Over-Relax Weight 0.5 dec
 Fact:
 dZ Tolerance: 0.0010 ft
 Max dZ: 1.0000 ft
 Link Optimizer Tol: 0.0001 ft

 Edge Length Option: Automatic

IA Recovery Time: 24.0000 hr

 Manual Basin Rain Opt: Global

 Rainfall Name: ~FLMOD
 Rainfall Amount: 9.84 in
 Storm Duration: 24.0000 hr

 Dfit Damping (1D): 0.0050 ft
 Min Node Srf Area 100 ft2
 (1D):
 Energy Switch (1D): Energy

Comment:
