OSCEOLA COUNTY BOARD OF COUNTY COMMISSIONERS

TECHNICAL REPORT COVER SHEET

FINAL LOCATION HYDRAULICS REPORT

Old Lake Wilson Road Widening

Project Development and Environment (PD&E) Study

From County Road 532 to South of Sinclair Road

March 2022

Osceola County Board of County Commissioners

1 Courthouse Square, Suite 2300

Kissimmee, Florida 34741

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

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Authorized Signature

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Print/Type Name

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Title

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MICHAEL A. HOLT
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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

EXECUTIVE SUMMARY

Osceola County is conducting a Project Development and Environment (PD&E) study to evaluate the widening of Old Lake Wilson Road from two to four lanes. The purpose of this PD&E study is to evaluate engineering and environmental data and document information that will aid the County in determining the location, type, and preliminary design of the proposed improvements. The total project length is approximately 2.5 miles. The study includes capacity improvements along the roadway and at intersections, a new bridge over Interstate 4 (I-4), the addition of a median, and bicycle and pedestrian features.

The project is located within the jurisdiction of the South Florida Water Management District (SFWMD) and the Florida Department of Environmental Protection (FDEP). The project is divided into eight (8) sub-basins based on the existing roadway profile, roadside ditch profiles, and culvert and cross drain locations.

The proposed widening of Old Lake Wilson Road from two to four lanes will result in minor impacts to the adjacent Federal Emergency Management Agency (FEMA) floodplains. The estimated magnitude of fill is negligible with respect to the relative size of the floodplain area (both upstream and downstream), therefore no adverse impacts are anticipated. However, the transverse floodplain impacts associated with the proposed culvert and bridge culvert extensions and replacements will need to be further analyzed during the design phase. The proposed bridge culvert widening over the regulatory floodway at Davenport Creek will require a FEMA No-Rise Certification be processed through Osceola County Floodplain Management. The proposed improvements will have a transverse encroachment on Davenport Creek and Davenport Creek tributary. There are no known flooding issues within the project limits.

There are two cross drains and one bridge culvert within the study limits. The necessary cross drain extensions or replacements will have transverse impacts on the existing floodplains that will need to be further analyzed during the design phase. It is recommended that bridge culvert over the FEMA regulatory floodway at Davenport Creek be replaced, as stated in the Conceptual Bridge Hydraulics Assessment, submitted under a separate cover. Replacement of or modifications to the bridge culvert will require a FEMA No-Rise Certification be processed through Osceola County Floodplain Management.

Modifications to existing drainage structures such as the extension of cross drains 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. In addition, replacement drainage structures for this project will perform hydraulically in a manner equal to or greater than the existing structure, and backwater surface elevations are not expected to increase. Thus, there will be no significant adverse impacts on natural and beneficial floodplain values. There will be no significant change in flood risk, and there will not be a significant change in the potential for interruption or termination of emergency service or emergency evacuation routes due to the modification or replacement of existing structures. Therefore, it has been determined that this encroachment is not significant.

1.0 INTRODUCTION

Osceola County is conducting a Project Development and Environment (PD&E) study to evaluate capacity improvements to Old Lake Wilson Road. The project limits extend from County Road 532 (CR 532) to south of Sinclair Road, a distance of approximately 2.5 miles. The project consists of the widening of Old Lake Wilson Road from two to four lanes.

Currently, Old Lake Wilson Road is a two (2) lane undivided rural roadway. There are a total of eight (8) intersections within the project limits. The anticipated scope of work at each intersection is summarized below.

- CR 532 Intersection: This intersection is anticipated to be reconstructed as part of the Polk County and/or CR 532 widening; therefore, no changes are anticipated.
- Excitement Drive Intersection: A bi-directional median may be considered to reduce the number of conflict points and to improve safety.
- Assembly Court Intersection: A bi-directional median may be considered to reduce the number of conflict points and to improve safety.
- Spine Road Intersection: Signalization or a roundabout may be considered.
- Fairfax Drive/Marker Avenue Intersection: Signalization or a roundabout may be considered.
- Pendent Court Intersection: This intersection will remain a right-out only driveway.
- Sinclair Road Intersection: This intersection is already four lanes; therefore, no changes are anticipated.
- Access Road for the Gulfstream Interconnect/booster Station: No changes are anticipated.

One (1) bridge culvert over the Davenport Creek crossing is recommended to be replaced along with the roadway, as stated in the Conceptual Bridge Hydraulics Assessment, submitted under a separate cover.

The intent of this Location Hydraulics Report (LHR) is to identify the potential 100-year (base) floodplain encroachments resulting from the roadway and bridge culvert improvements evaluated in this study. In accordance with 23 Code of Federal Regulation (CFR) 650 Subpart A, Section 650.111, floodplains are to be protected. The intent of these regulations is to avoid possible long and short-term adverse impacts associated with the modification of floodplains as a result of development. These regulations urge that when floodplains are anticipated, alternatives should be sought out where practical and that development incompatible with floodplain values should be avoided. Conclusions and recommendations were developed using the best available data and conceptual roadway alignment and typical sections. The cross-drain lengths and exact locations shall be verified during the design phase, when survey is available.

2.0 PROJECT DESCRIPTION

The PD&E study limits include Old Lake Wilson Road from CR 532 to South of Sinclair Road (SR 70). The study limits are in Osceola County. A Project Location Map is shown in **Figure 2-1**. Refer to **Appendix C** for a USGS Quadrangle Map. The project is located within the section, township, and range shown in **Table 2-1**.

Table 2-1: Section, Township, and Range Data

Range	Township	Section
27E	25S	10

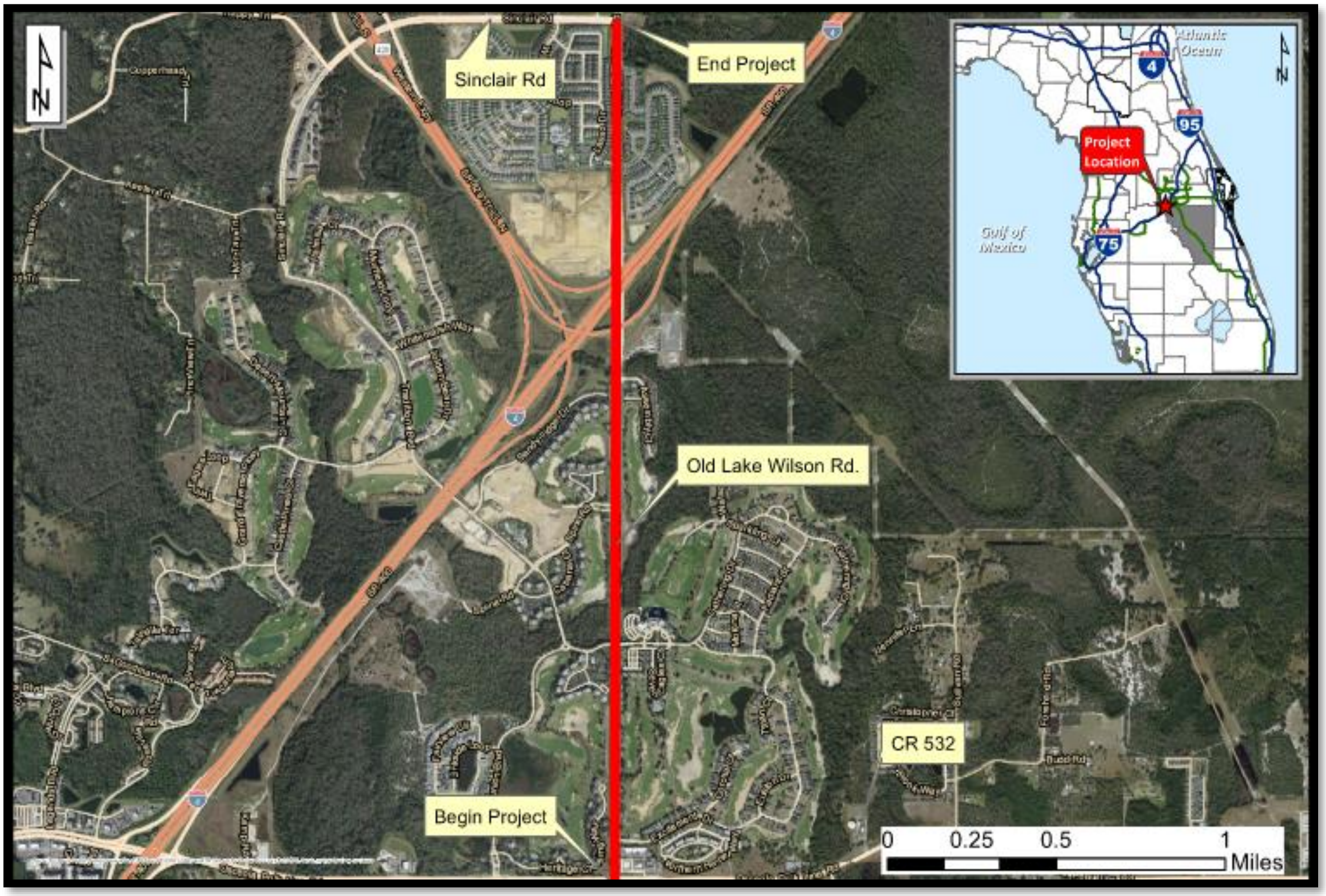


Figure 2-1: Project Location Map

The vertical datum used for this study is the North American Vertical Datum of 1988 (NAVD 88). To convert from NAVD 88 to National Geodetic Vertical Datum of 1929 (NGVD 29), add 0.87 feet. Refer to **Appendix B** for the datum conversion.

The study includes widening Old Lake Wilson Road from two 12-foot lanes to four 11-foot lanes, the addition of a median, and accommodations for bicycles and pedestrians.

3.0 EXISTING CONDITIONS

The existing Old Lake Wilson Road from CR 532 to South of Sinclair Road consists of two 12-foot travel lanes and 4-foot unpaved outside shoulders on both sides. **Figure 3-1** shows the Existing Typical Section.

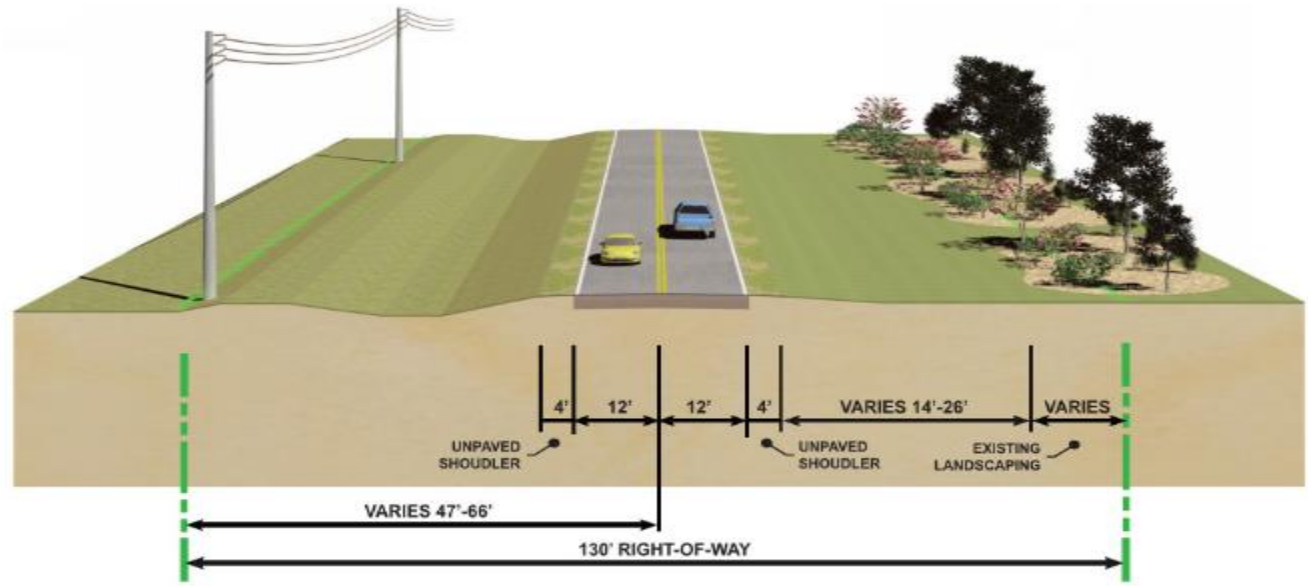


Figure 3-1: Existing Typical Section

BASIN 1

Basin 1 begins at Station 106+00 and ends at Station 131+50. Stormwater runoff sheet flows from the roadway to ill-defined ditches and swales and are conveyed to onsite wetlands which discharge to Davenport Creek. Davenport Creek flows in a general direction from west to east and ultimately discharges into Reedy Creek. There are no cross drains in Basin 1.

BASIN 2

Basin 2 begins at Station 131+50 and ends at Station 146+00. Stormwater runoff sheet flows from the roadway to ill-defined roadside ditches and swales, which discharge north to existing bridge culvert #924147 (quadruple 11' x 7.5' metal arch pipe) located at Station 147+00, which discharges into Davenport Creek. Davenport Creek flows in a general direction from west to east and ultimately discharges into Reedy Creek.

BASIN 3

Basin 3 begins at Station 146+00, at Davenport Creek and ends at Station 170+00. Stormwater runoff sheet flows from the roadway to ill-defined roadside ditches, which ultimately discharge south into Davenport Creek through existing bridge culvert #924147 located at station 147+00, or discharge north through the existing triple 42" RCP cross drain located at station 183+00, which discharges into Davenport Creek Tributary. Both Davenport Creek and its tributary flow in a general direction from west to east and ultimately discharge into Reedy Creek.

BASIN 4

Basin 4 begins at Station 170+00, north of Davenport Creek and ends at Station 183+00, north of the Davenport Creek Tributary crossing (existing triple 42" RCP cross drain). Stormwater runoff sheet flows from the roadway to ill-defined roadside ditches and swales, discharges north to the existing triple 42" RCP cross drain located at station 183+00, which discharges into Davenport Creek Tributary and into Davenport Creek. Davenport Creek flows in a general direction from west to east and ultimately discharges into Reedy Creek.

BASIN 5

Basin 5 begins at Station 183+00, north of the Davenport Creek Tributary crossing (existing triple 42" RCP cross drain) and ends at Station 197+00, the high point on the bridge over I-4. Stormwater runoff is collected by shoulder gutter inlets which discharges to existing pond G-1 within the I-4/SR 429 Interchange, discharging an existing wetland and eventually to the Davenport Creek Tributary (based on information on the I-4 Beyond the Ultimate (BtU)).

BASIN 6

Basin 6 begins at Station 197+00, the high point on the bridge over I-4 and ends at Station 207+50, at the end of the bridge return over the I-4. Stormwater runoff from the east side of the road is collected by shoulder gutter inlets and conveyed to a concrete ditch on the on the northwest side of the bridge through an MES. The existing ditch flows east to an existing 42-inch cross drain under I-4 (CD-6) and discharges to an existing wetland and eventually to Reedy Creek (based on information on the I-4 BtU).

BASIN 7

Basin 7 begins at Station 207+50, at the end of the bridge over the I-4 and ends at Station 219+85, the beginning of Basin D001 as described in SFWMD Permit No. 49-00954-P (Application No. 090515-5) and Permit No. 49-01107-P-38 (Application No. 150331-13). Along the right side of Old Lake Wilson Road, stormwater runoff is collected by in an ill-defined ditch and is conveyed to a concrete ditch on the north side of the bridge. Along the left side of Old Lake Wilson Road, stormwater runoff is collected in an ill-defined ditch and is conveyed beneath Old Lake Wilson Road to a concrete ditch on the north side of the bridge. Stormwater runoff collected in the concrete ditch continues flowing northwest through an existing roadway ditch along I-4 and ultimately discharges to wetland G1.

BASIN 8

Basin 8 begins at Station 219+85, the beginning of Basin D001 as described in SFWMD Permit No. 49-00954-P (Application No. 090515-5) and Permit No. 49-01107-P-38 (Application No. 150331-13) and ends at Station 229+20, South of Sinclair Road. Along both sides of Old Lake Wilson Road, stormwater runoff sheet flows into a concrete lined ditch where it is collected by inlets and is conveyed to dry detention pond D002-P and discharges to an adjacent wetland conservation area and ultimately discharges to Reedy Creek.

3.1 SOILS

The predominant soils within and adjacent to the corridor are excessively drained sandy soils with isolated areas of moderately/poorly drained soils associated with culvert crossings. The Natural Resource Conservation Service (NRCS) Web Soil Survey of Osceola County was used to determine the soil types within the project limits.

Based on a review and evaluation of subsurface information available for the project area, it is expected that soil and groundwater conditions found along the corridor are favorable for roadway improvements. Refer to **Appendix E** for a Soils Map. **Table 3-1** provides the soil names, as well as their hydrologic soil group and drainage condition.

Table 3-1: Soil Types

Soil Name	NRCS Map Unit	Hydrologic Soil Group	Drainage Class, Dominant Condition
Candler sand, 0 to 5 percent slopes	7	A	Excessively drained
Candler sand, 5 to 12 percent slopes	8	A	Excessively drained
Hontoon muck, frequently ponded, 0 to 1 percent slopes	15	A/D	Very poorly drained
Pomello fine sand, 0 to 5 percent slopes	34	A	Moderately well drained
Pompano fine sand, frequently ponded, 0 to 1 percent slopes	37	A/D	Very poorly drained

3.2 LAND USE

The land use within the right-of-way throughout the study limits is classified as Roads and Highways. The areas adjacent to the project right-of-way consist of the following land uses:

- From the beginning of the project at Osceola Polk Line Road to Excitement Drive - The project area is surrounded by commercial and service area on the east side of the corridor as well as some high density residential area, and high density residential area on the west side of the corridor.
- From Excitement Drive to the overpass at Gathering Drive - The land use along both sides of the corridor are predominantly recreational and high density residential.
- From the overpass at Gathering Drive to Assembly Court – The project area is surrounded by a small commercial area as well as a hardwood forest wetland followed by a large stretch of recreational area. There is also some high density residential area on both sides of the corridor at Assembly Court.
- From Assembly Court to the I-4/SR 429 Interchange – There is a hardwood forest wetland area north of Assembly Court. The lands adjacent to the corridor are classified as transportation area and some utility area at the I-4 and SR 429 interchange.
- From the I-4/SR 429 Interchange to Sinclair Road - The adjacent land use is high density residential area.

Please refer to **Appendix F** for the Land Use Map.

3.3 Cross Culverts

There are two (2) existing culverts within the project limits. **Table 3-2** provides a summary of the existing culverts.

Table 3-2: Existing Culverts within Project Limits

Approx. Station	Cross Culvert Size	Existing Length (ft)	Existing Structure Number
183+00	Triple 42" RCP	127.00	EX-169 (per I-4 BtU Plans)
201+15	Single 24" RCP	247.00	EX-255 (per I-4 BtU Plans)

3.4 Bridge Culverts

There is one (1) existing bridge culvert within the culvert limits. **Table 3-3** provides the information found on the National Bridge Inventory Data (NBID) for Bridge Culvert #924147. The original bridge culvert was constructed in 1954 and it is approximately 42 ft wide with four 11' x 7.5' arch pipes for a total bridge length of 57.4 ft. The July 2020 Bridge Inspection Report for Bridge Culvert #924147 also notes the following issues:

- Area of undermining @ pipe 3 (see **Appendix H** for a plan view of pipe designations)
- Multiple sand-cement bags missing over the east end of pipe 1
- Sand-cement bags missing @ western waterline (approx. 4' x 3') between pipes 3 & 4
- Sand-cement bags generally brittle with some open joints and vegetative growth (both walls)
- Settlement over the east end of pipe 1 with cracking up to ¼"
- Delaminative corrosion and corrosion holes in pipes 3 & 4
- Previously applied bituminous coating is failing, resulting in corrosion (all pipes)
- Miscellaneous asphalt "mowing strips" behind guardrail cracked and broken apart
- Depression in headwall over pipe 4 (2' dia x 1 ½' deep)
- 75% occlusion of pipe 1 and 50% occlusion of pipe 2
- "Up to 2 ft" of sand accumulation in pipes 3 & 4

Refer to **Appendix H** for Bridge Inspection Report and NBID documentation. A Conceptual Bridge Hydraulics Assessment was submitted under a separate cover.

Table 3-3: Existing Bridge Culvert #924147 within Project Limits

Structure Description	Approx. Station	Structure Number	Cross Culvert Size	Length (ft)
Bridge Culvert over Davenport Creek	147+00	924147	Quadruple 11' x 7.5' metal arch pipe	42

3.5 FLOODPLAINS AND FLOODWAYS

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) for Osceola County was reviewed to determine the extents of the FEMA floodplains within the project limits. **Table 3-5** lists the FEMA FIRM, including its effective date. The FEMA FIRM is provided in **Appendix D**.

Table 3-4: Summary of FEMA FIRMs

FEMA Panel Name	FEMA Panel Number	Effective Date
FIRM Osceola County, Florida And Incorporated Areas	12097C0040G	June 18, 2013

The applicable Flood Insurance Study (FIS) for this project is the Osceola County FIS (effective June 18, 2013). There is one regulatory floodway within this project corridor: Davenport Creek. The Flood Insurance Study has information concerning the floodways' drainage area, discharge, and flood profile. The Osceola County FIS is provided in **Appendix D**.

3.5.1 DAVENPORT CREEK FLOODPLAIN

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) No. 12097C0040G (dated June 18, 2013) identifies a Zone AE floodplain at Davenport Creek. Davenport Creek is designated as a regulatory floodway at the crossing of Old Lake Wilson Road, with elevation 91 west of the bridge culvert and elevation 90 east of the bridge culvert.

3.5.2 DAVENPORT CREEK TRIBUTARY FLOODPLAIN

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) No. 12097C0040G (dated June 18, 2013) identifies a Zone A (elevation undetermined) floodplain at the Davenport Creek Tributary.

4.0 PROPOSED CONDITIONS

The proposed future improvements include widening Old Lake Wilson Road from two 12-foot lanes to four 11-foot lanes, the addition of a median, and accommodations for bicycles and pedestrians. All typical section alternatives maintain the existing landscape on the right side of Old Lake Wilson Road. Two (2) typical sections are being considered. Typical Section 1 includes four 11-foot travel lanes, a 37.5-foot median, 5-foot bike lanes, curb and gutter, a 10-foot sidewalk along the left (LT) side of the alignment, and a 5-foot sidewalk along the right (RT) side of the alignment. **Figure 4-1** shows Proposed Typical Section 1.

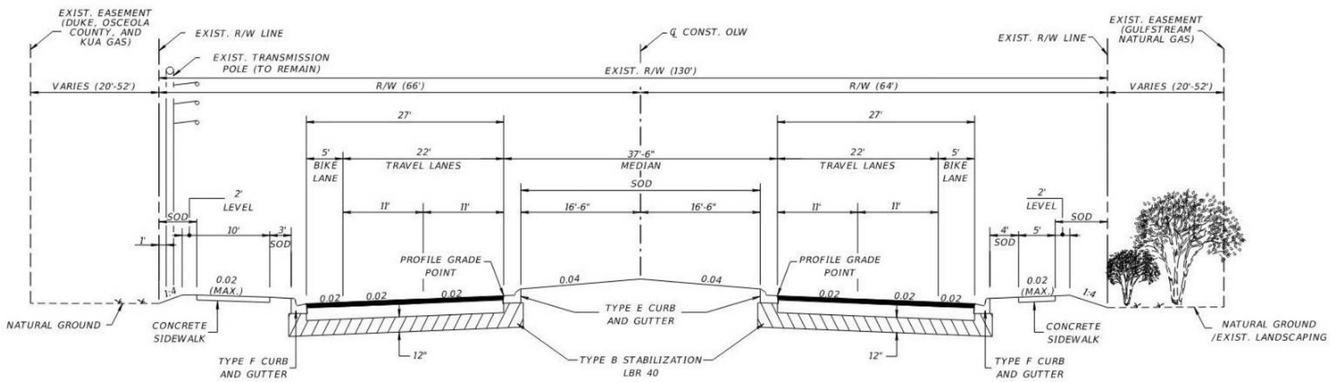


Figure 4-1: Proposed Typical Section 1

Typical Section 2 includes four 11-foot travel lanes, a 37.5-foot median, 7-foot buffered bike lanes, curb and gutter, an 8-foot sidewalk along the left (LT) side of the alignment, and a 5-foot sidewalk along the right (RT) side of the alignment. **Figure 4-2** shows Proposed Typical Section 2.

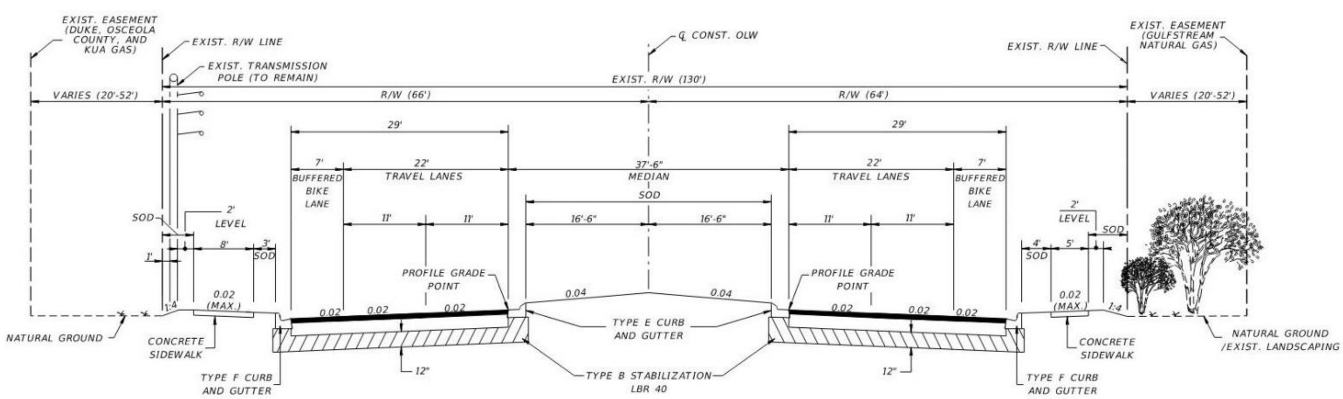


Figure 4-2: Proposed Typical Section 2

4.1 Cross Culverts

The proposed roadway widening will require extension of one of the existing cross drains along Old Lake Wilson Road. Although this culvert is proposed to be replaced as part of the I-4 BtU project, the I-4 BtU project is on hold and the earliest segments of the project are projected to begin construction in greater than 10 years, thus this cross drain is included as an extension as part of this project. **Table 4-1** provides a summary of the projected improvements at each cross culvert. Cross drain calculations can be found in **Appendix I**.

Table 4-1: Proposed Improvements and Modifications to Cross Culverts within Project Limits

Approx. Station	Cross Culvert Size	Number of Barrels	Existing Length (ft)	Approx. Proposed Extension (ft)	Proposed Improvement or Modification	Notes
183+00	Triple 42" RCP	3	127.00	24.00	Extension	Within the 100-year Zone A Floodplain
201+15	Single 24" RCP	1	247.00	0.00	None	

4.2 Bridge Culverts

The Bridge Inspection Report from July 2020 indicates several issues with the existing bridge culvert, as noted in Section 3.4. Due to the age and existing conditions of the bridge culvert, it is unlikely that simply widening to accommodate the proposed improvements will meet expectations as to future service life. In addition, hydraulic analysis of the existing crossing shows overtopping of the road in the existing condition. If the existing bridge culvert is widened to accommodate the proposed roadway improvements, the hydraulic analysis shows an increase in the upstream stages at the crossing. Since this crossing is a regulatory crossing and requires a No-Rise certification, widening the existing crossing is not a suitable alternative. For these reasons, bridge culvert #924147 is recommended to be replaced to accommodate the proposed improvements. **Table 4-2** provides a summary of the proposed improvements and modifications. Additional detail and design considerations for the replacement of this crossing are provided in the **Conceptual Bridge Hydraulics Assessment** memorandum submitted under separate cover.

Table 4-2: Proposed Improvements and Modifications to Bridge Culverts within Project Limits

Structure Description	Approx. Location (STA)	Bridge Number	Recommended Improvement or Modification	Approximate Proposed Length	Notes
Bridge Culvert over Davenport Creek	146+94	924147	Replacement w/Quadruple 12' x 8' Conc. Box Culvert*	125 feet	Within 100-year Floodplain Regulatory Floodway

*Estimated size based on preliminary HY-8 Analysis. Exact replacement configuration to be determined during design phase based on No-Rise Analysis.

4.3 FLOODPLAINS AND FLOODWAYS

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) No. 12097C0040G (dated June 18, 2013) identifies a Zone A floodplain at the Davenport Creek Tributary and a Zone AE floodplain at Davenport Creek. Davenport Creek is designated as a regulatory floodway at the crossing of Old Lake Wilson Road, with elevation 91 west of the bridge culvert and elevation 90 east of the bridge culvert.

The anticipated floodplain impacts due to the proposed roadway widening were estimated to determine potential impacts to the 100-year floodplains and necessary compensation volumes. The anticipated impacts are provided in **Table 4-3**. The impact volume from the proposed widening will need to be assessed during the design phase, when survey of the existing ground, geotechnical data for the seasonal high water table (SHWT), and proposed cross sections are available. Off-site floodplain compensation sites shall be evaluated to provide compensation for the floodplain impacts.

Table 4-3: Mainline Floodplain Encroachment Estimates

Floodplain Description	Approximate Location (STA)	Encroachment Limits	Approximate Encroachment Area (ac)
Davenport Creek	146+94	From Station 145+08.91 to Station 151+51.51	1.29
Davenport Creek Tributary	183+16	From Station 181+74.63 to Station 184+51.36	0.72

The estimated magnitude of fill is negligible with respect to the relative size of the floodplain area (both upstream and downstream), therefore no adverse impacts are anticipated. However, the transverse floodplain impacts associated with the proposed culvert and bridge culvert extensions and replacements will need to be further analyzed during the design phase. The proposed bridge culvert widening over the regulatory floodway at Davenport Creek will require a FEMA No-Rise Certification be processed through Osceola County Floodplain Management. The proposed improvements will have a transverse encroachment on Davenport Creek and Davenport Creek tributary. Exhibits showing the location of the anticipated encroachments can be found in **Appendix D**.

4.4 HISTORY OF FLOODING

There is no history of flooding within the project limits. Refer to **Appendix G** for correspondence with Osceola County.

4.5 RISK EVALUATION

The proposed improvements were evaluated to determine whether there would be adverse floodplain impacts. The culverts and bridge culverts will be reviewed during the design phase, once survey is available and a more thorough hydrologic and hydraulic method of analysis is utilized, to determine the impact of the extensions on the headwaters.

Modifications to existing drainage structures such as the extension of cross drains 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. In addition, replacement drainage structures for this project will perform hydraulically in a manner equal to or greater than the existing structure, and backwater surface elevations are not expected to increase. Thus, there will be no significant adverse impacts on natural and beneficial floodplain values. There will be no significant change in flood risk, and there will not be a significant change in the potential for interruption or termination of emergency service or emergency evacuation routes due to the modification or replacement of existing structures. Therefore, it has been determined that this encroachment is not significant.

5.0 RECOMMENDATIONS AND CONCLUSIONS

The proposed widening of Old Lake Wilson Road from two to four lanes will result in minor impacts to the adjacent Federal Emergency Management Agency (FEMA) floodplains. The estimated magnitude of fill is negligible with respect to the relative size of the floodplain area (both upstream and downstream), therefore no adverse impacts are anticipated. However, the transverse floodplain impacts associated with the proposed culvert and bridge culvert extensions and replacements will need to be further analyzed during the design phase. The proposed bridge culvert widening over the regulatory floodway at Davenport Creek will require a FEMA No-Rise Certification be processed through Osceola County Floodplain Management. The proposed improvements will have a transverse encroachment on Davenport Creek and Davenport Creek tributary. There are no known flooding issues within the project limits.

There is one (1) bridge culvert within the study limits. The proposed bridge culvert replacement over the FEMA regulatory floodway at Davenport Creek will require a FEMA No-Rise Certification be processed through Osceola County Floodplain Management. The construction of this project is considered only a transverse encroachment on Davenport Creek and on Davenport Creek Tributary. Refer to the Conceptual Bridge Hydraulics Assessment memorandum submitted under separate cover for additional information and design considerations.

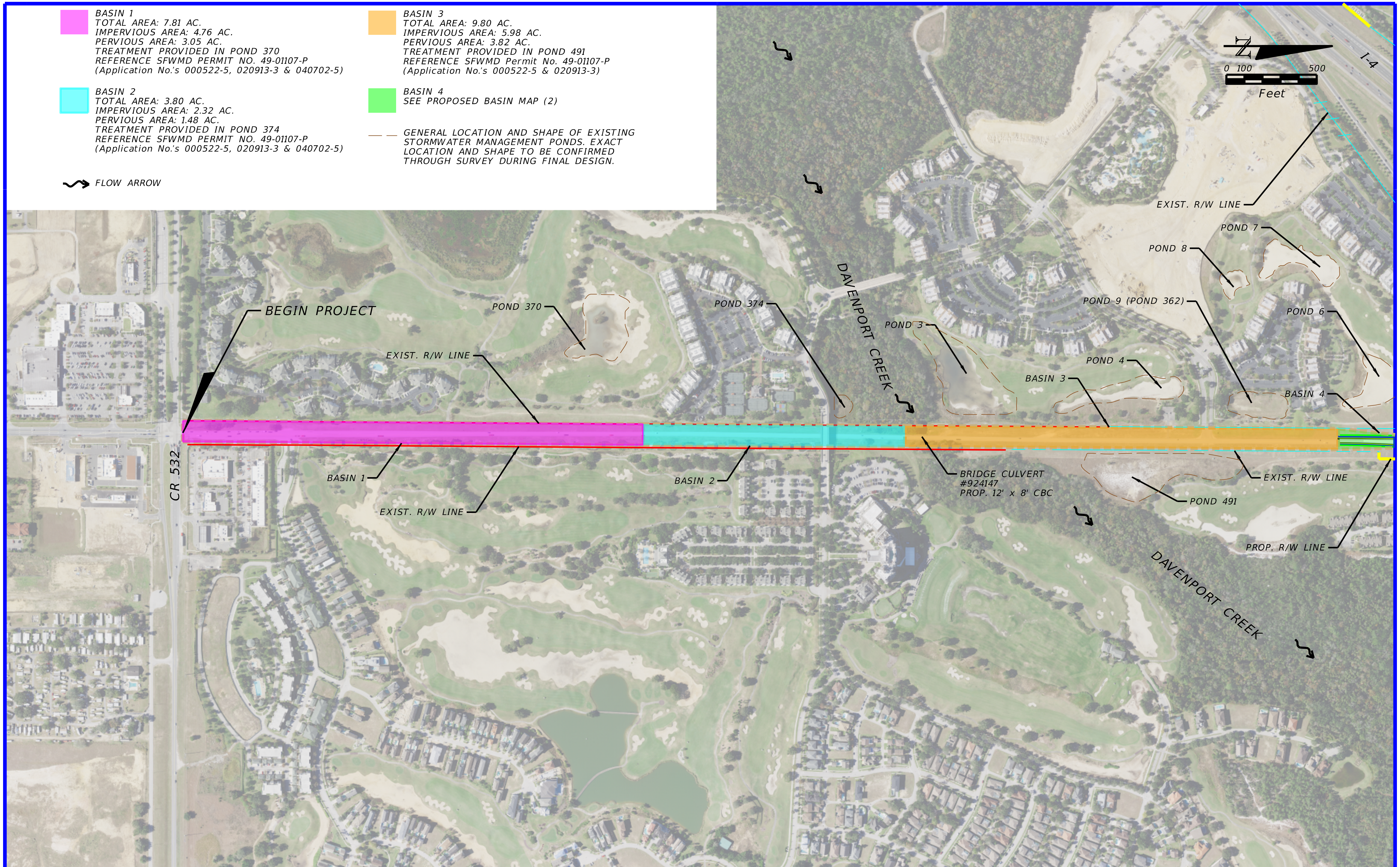
Modifications to existing drainage structures such as the extension of cross drains included in this project will result in an insignificant change in their capacity to carry floodwater. These modifications will cause minimal increases in flood heights and flood limits which will not result in any significant adverse impacts on the natural and beneficial floodplain values or any significant change in flood risks or damage. In addition, replacement drainage structures for this project will perform hydraulically in a manner equal to or greater than the existing structure, and backwater surface elevations are not expected to increase. Thus, there will be no significant adverse impacts on natural and beneficial floodplain values. There will be no significant change in flood risk, and there will not be a significant change in the potential for interruption or termination of emergency service or emergency evacuation routes due to the modification or replacement of existing structures. Therefore, it has been determined that this encroachment is not significant.

6.0 REFERENCES

- FDEP Map Direct
- FDOT Drainage Manual (2021)
- FDOT Drainage Design Guide (2021)
- FEMA Flood Map Service Center
- NRCS Web Soil Survey
- SFWMD ePermitting
- SFWMD ERP Applicant’s Handbook, Volume I (2018)
- SFWMD ERP Applicant’s Handbook, Volume II (2016)
- FEMA Document: Managing Floodplain Development in Approximate Zone A Areas (1995)

Appendix A

Drainage Maps



OSCEOLA COUNTY BOARD OF COUNTY COMMISSIONERS 1 COURTHOUSE SQUARE, SUITE 2300 KISSIMMEE, FLORIDA 34741	MICHAEL A. HOLT, PE #76111 PATEL, GREENE & ASSOCIATES, LLC 280 W. CANTON AVE. SUITE 400 WINTER PARK, FLORIDA 32789	REVISION	DATE	BY	PROPOSED BASIN MAP (1)	OLD LAKE WILSON ROAD (CR 545)	PROJECT NO.	SHEET

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

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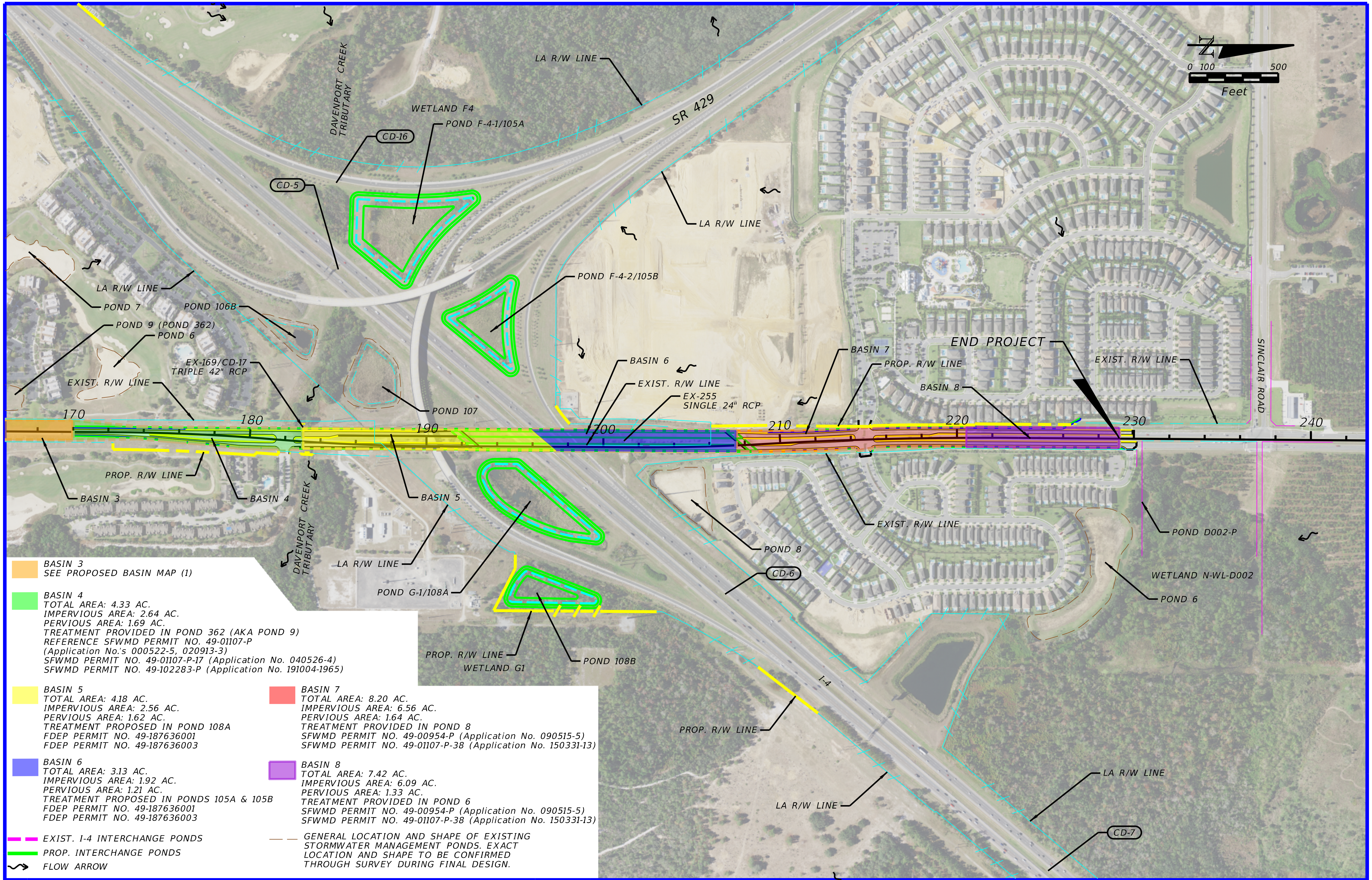


BASIN 3
SEE PROPOSED BASIN MAP (1)

BASIN 4
TOTAL AREA: 4.33 AC.
IMPERVIOUS AREA: 2.64 AC.
PERVIOUS AREA: 1.69 AC.
TREATMENT PROVIDED IN POND 362 (AKA POND 9)
REFERENCE SFWMD PERMIT NO. 49-01107-P
(Application No.'s 000522-5, 020913-3)
SFWMD PERMIT NO. 49-01107-P-17 (Application No. 040526-4)
SFWMD PERMIT NO. 49-102283-P (Application No. 191004-1965)

BASIN 5
TOTAL AREA: 4.18 AC.
IMPERVIOUS AREA: 2.56 AC.
PERVIOUS AREA: 1.62 AC.
TREATMENT PROPOSED IN POND 108A
FDEP PERMIT NO. 49-187636001
FDEP PERMIT NO. 49-187636003

BASIN 6
TOTAL AREA: 3.13 AC.
IMPERVIOUS AREA: 1.92 AC.
PERVIOUS AREA: 1.21 AC.
TREATMENT PROPOSED IN PONDS 105A & 105B
FDEP PERMIT NO. 49-187636001
FDEP PERMIT NO. 49-187636003

BASIN 7
TOTAL AREA: 8.20 AC.
IMPERVIOUS AREA: 6.56 AC.
PERVIOUS AREA: 1.64 AC.
TREATMENT PROVIDED IN POND 8
SFWMD PERMIT NO. 49-00954-P (Application No. 090515-5)
SFWMD PERMIT NO. 49-01107-P-38 (Application No. 150331-13)

BASIN 8
TOTAL AREA: 7.42 AC.
IMPERVIOUS AREA: 6.09 AC.
PERVIOUS AREA: 1.33 AC.
TREATMENT PROVIDED IN POND 6
SFWMD PERMIT NO. 49-00954-P (Application No. 090515-5)
SFWMD PERMIT NO. 49-01107-P-38 (Application No. 150331-13)

EXIST. I-4 INTERCHANGE PONDS
PROP. INTERCHANGE PONDS
FLOW ARROW
GENERAL LOCATION AND SHAPE OF EXISTING STORMWATER MANAGEMENT PONDS. EXACT LOCATION AND SHAPE TO BE CONFIRMED THROUGH SURVEY DURING FINAL DESIGN.

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

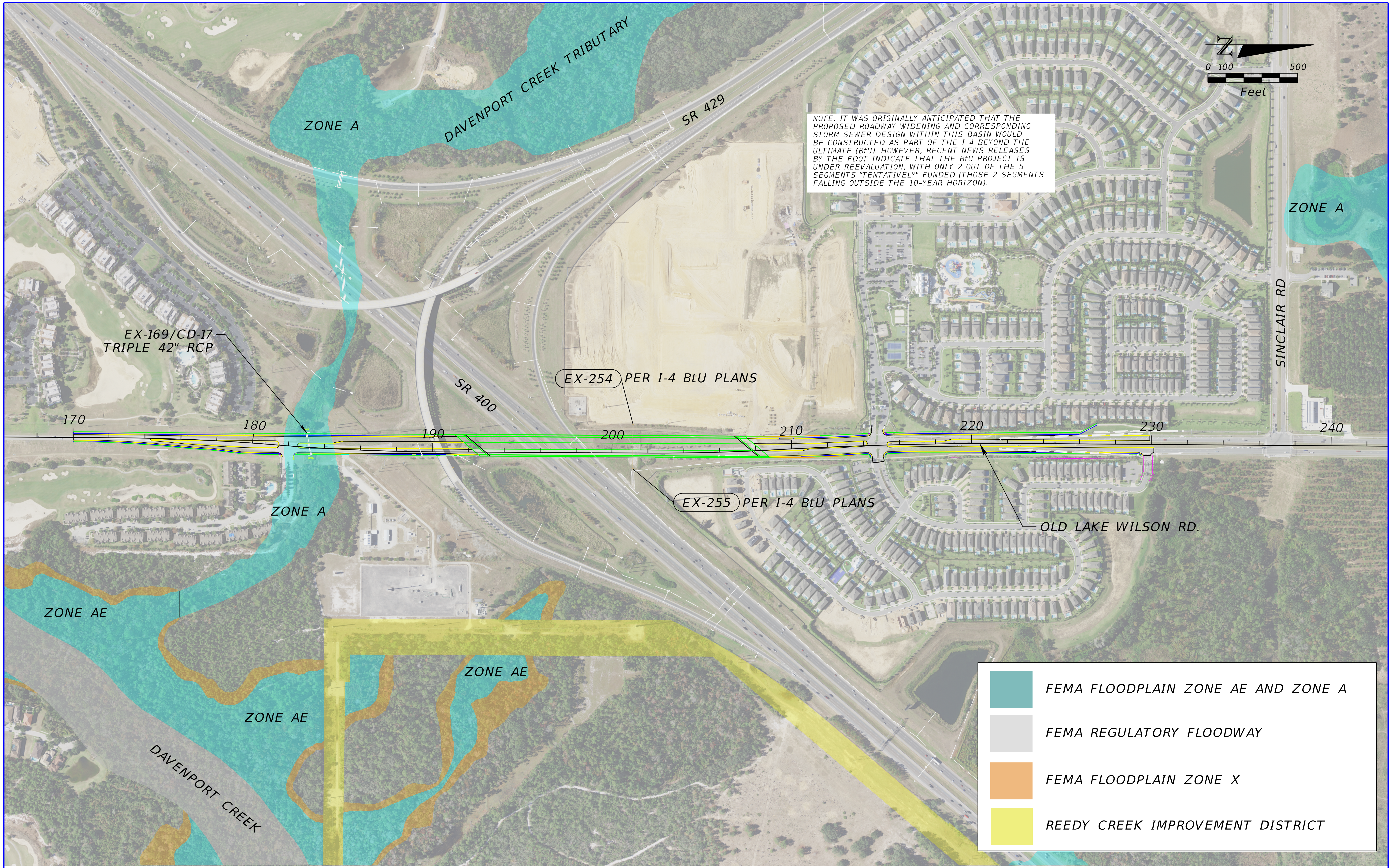
OSCEOLA COUNTY BOARD OF COUNTY COMMISSIONERS 1 COURTHOUSE SQUARE, SUITE 2300 KISSIMMEE, FLORIDA 34741	MICHAEL A. HOLT, PE #76111 PATEL, GREENE & ASSOCIATES, LLC 280 W. CANTON AVE. SUITE 400 WINTER PARK, FLORIDA 32789	REVISION	DATE	BY	PROPOSED BASIN MAP (2)	OLD LAKE WILSON ROAD (CR 545)	PROJECT NO.	SHEET

6/17/2022 2:02:45 PM J:\Osceola County\Projects\Old Lake Wilson Road PD&E\drainage\DRPRRD01_Post_02.dgn

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

OSCEOLA COUNTY BOARD OF COUNTY COMMISSIONERS 1 COURTHOUSE SQUARE, SUITE 2300 KISSIMMEE, FLORIDA 34741	MICHAEL A. HOLT, PE #76111 PATEL, GREENE & ASSOCIATES, LLC 280 W. CANTON AVE. SUITE 400 WINTER PARK, FLORIDA 32789	REVISION / DATE / BY	EXIST. CROSS DRAIN MAP (1)	OLD LAKE WILSON ROAD (CR 545)	PROJECT NO.	SHEET

12/6/2021 2:19:29 PM J:\Osceola County\Projects\Old Lake Wilson Road PD&E\drainage\DRPRRD01_Figure3_01.dgn



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

OSCEOLA COUNTY BOARD OF COUNTY COMMISSIONERS 1 COURTHOUSE SQUARE, SUITE 2300 KISSIMMEE, FLORIDA 34741	MICHAEL A. HOLT, PE #76111 PATEL, GREENE & ASSOCIATES, LLC 280 W. CANTON AVE. SUITE 400 WINTER PARK, FLORIDA 32789	REVISION	DATE	BY	EXIST. CROSS DRAIN MAP (2)	OLD LAKE WILSON ROAD (CR 545)	PROJECT NO.	SHEET

12/6/2021 2:22:37 PM J:\Osceola County\Projects\Old Lake Wilson Road PD&E\drainage\DRPRRD01_Figure3_02.dgn

APPENDIX B

VERTCON DATUM CONVERSION

Questions concerning the VERTCON process may be mailed to NGS

Latitude: 28 17 32.640

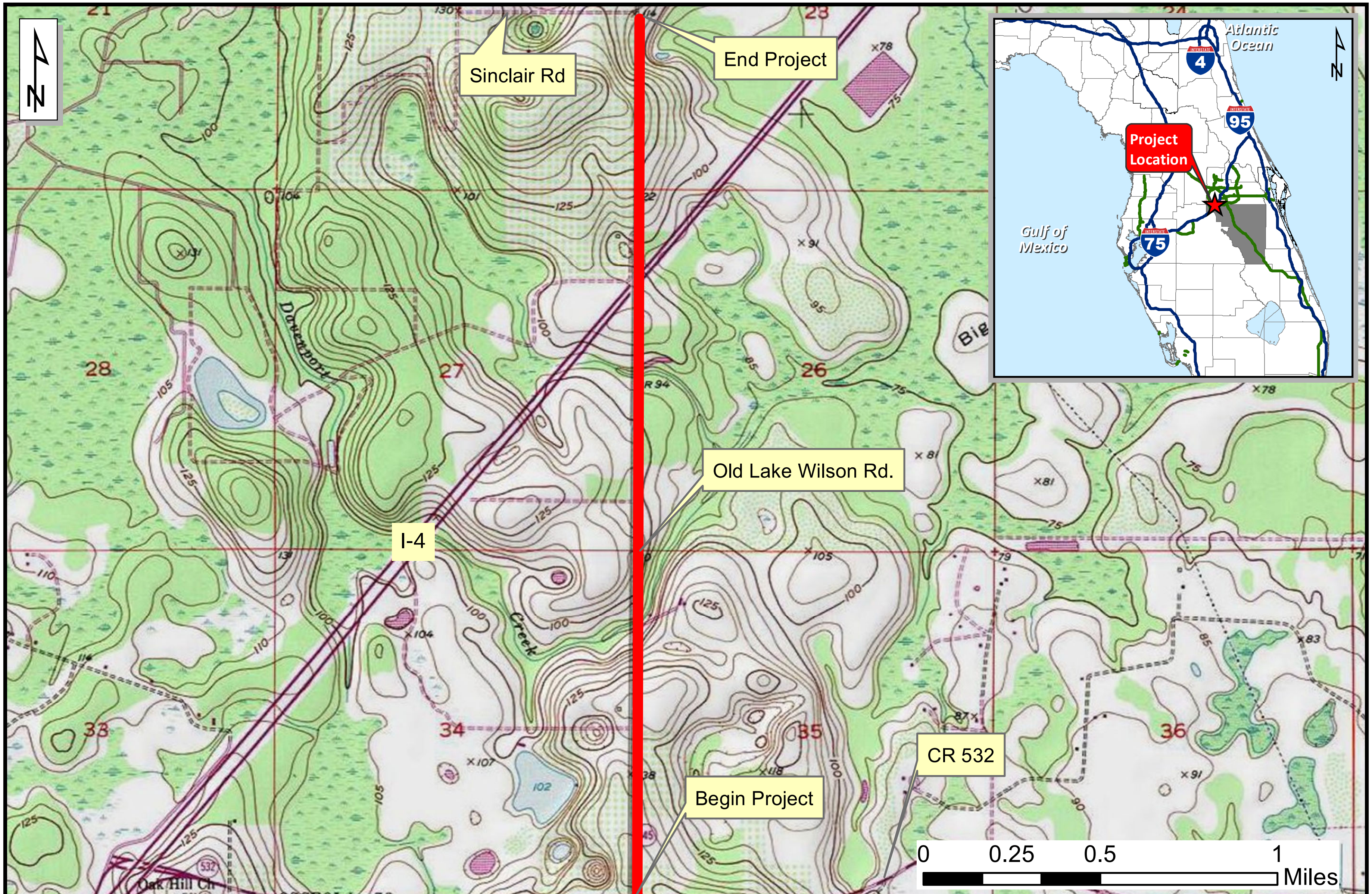
Longitude: 081 35 42.00

NGVD 29 height: 0.00 FT

Datum shift(NAVD 88 minus NGVD 29): -0.869 feet

Converted to NAVD 88 height: -0.869 feet

APPENDIX C
USGS QUADRANGLE MAP



USGS Quad Map

Old Lake Wilson Rd. From CR 532 (Oscola Polk Line Rd.) to South of Sinclair Rd.

APPENDIX D

FEMA FLOODPLAIN DATA

Excerpts from Osceola County FIS

FLOOD INSURANCE STUDY

OSCEOLA COUNTY, FLORIDA

AND INCORPORATED AREAS

Community Name	Community Number
KISSIMMEE, CITY OF	120190
OSCEOLA COUNTY (UNINCORPORATED AREAS)	120189
REEDY CREEK IMPROVEMENT DISTRICT	120577
ST. CLOUD, CITY OF	120191

REVISED
June 18, 2013

Federal Emergency Management Agency

FLOOD INSURANCE STUDY NUMBER
12097CV000A

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

Part or all of this Flood Insurance Study may be revised and republished at any time. In addition, part of this Flood Insurance Study may be revised by the Letter of Map Revision process, which does not involve republication or redistribution of the Flood Insurance Study. It is, therefore, the responsibility of the user to consult with community officials and to check the community repository to obtain the most current Flood Insurance Study components.

Initial Countywide FIS Effective Date: May 7, 2001

First Revised Countywide FIS Date: June 18, 2013

TABLE OF CONTENTS

FIGURES

TABLES

EXHIBITS

TABLE OF CONTENTS (Continued)

FLOOD INSURANCE STUDY

OSCEOLA COUNTY, FLORIDA, AND INCORPORATED AREAS

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study (FIS) revises and updates information on the existence and severity of flood hazards in the geographic area of Osceola County, including the Cities of Kissimmee and St. Cloud; Reedy Creek Improvement District; and the unincorporated areas of Osceola County (referred to collectively herein as Osceola County), and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood-risk data for various areas of the community that will be used to establish actuarial flood insurance rates and to assist the community in its efforts to promote sound floodplain management. Minimum floodplain management requirements for participation in the National Flood Insurance Program (NFIP) are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

The Reedy Creek Improvement District is located in more than one county; the flood hazard information for the portion of this community located in Orange County is included in the FIS report for Orange County, Florida, and Incorporated Areas (Reference 1).

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence, and the State (or other jurisdictional agency) will be able to explain them.

The Flood Insurance Rate Map (FIRM) and FIS report for this countywide study have been produced in digital format. Flood hazard information was converted to meet the Federal Emergency Management Agency (FEMA) FIRM database specifications and geographic information standards and is provided in a digital format so that it can be incorporated into a local Geographic Information System and be accessed more easily by the community.

1.2 Authority and Acknowledgments

The sources of authority for this FIS report are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

For this revision of the countywide FIS, new hydrologic and hydraulic analyses were prepared by BakerAECOM, LLC, for FEMA, under Contract No. HSFEHQ-09-D-0368, Task R4-TO66. This revised study was completed in March 2011.

For the initial countywide FIS, the hydrologic and hydraulic analyses were prepared by Engineering Methods & Applications, Inc., for FEMA, under Inter-Agency Agreement No. EMW-95-C-4705. That work was completed in July 1996.

The initial countywide FIS was prepared to include all jurisdictions within Osceola County in a countywide FIS. Information on the authority and acknowledgements for each jurisdiction with a previously printed FIS report included in the countywide FIS is shown below:

Kissimmee, City of:	The hydrologic and hydraulic analyses for the FIS report dated January 2, 1981, were prepared by the U.S. Army Corps of Engineers (USACE), Jacksonville District, for the Federal Insurance Administration (FIA), under Inter-Agency Agreement No. IAA-H-1878, Project Order No. 10. That work was completed in June 1979.
Osceola County (Unincorporated areas):	The hydraulic analyses for the FIS report dated August 3, 1981, were prepared by the USACE, Jacksonville District, for FEMA, under Inter-Agency Agreement No. IAA-H-1878, Project Order No. 10, Amendment No. 1. That work was completed in January 1980.
	The hydrologic and hydraulic analyses for the FIS report dated March 16, 1989, were prepared by the USACE, Jacksonville District for FEMA, under Inter-Agency Agreement No. IAA-H-1878, Project Order No. 10, Amendment No. 1. That work was completed in January 1980.
	The hydrologic and hydraulic analyses for the FIS report dated November 20, 1996, were prepared by Post, Buckley, Schuh & Jernigan, Inc.
St. Cloud, City of:	The hydrologic and hydraulic analyses for the FIS report dated March 1980 were prepared by the USACE, Jacksonville District, for the FIA, under Inter-Agency Agreement No. IAA-H-1878, Project Order No. 10. That work was completed in February 1979.
	For the FIS report dated April 3, 1996, flooding information was taken from the FIS for the unincorporated areas of Osceola County because of corporate limits changes and flooding mismatches between the City of St. Cloud and the unincorporated areas of Osceola County (Reference 2).

The authority and acknowledgments for Reedy Creek Improvement District are not included because there was no previously printed FIS report for this community.

Base map information shown on the FIRM was provided in digital format by Osceola County Planning Office.

The coordinate system used for producing the FIRM is the Florida State Plane FIPS 0901. Corner coordinates shown on the FIRMs are in latitude and longitude referenced to the UTM projection, North American Datum (NAD 83) HARN and the GRS80. Distance units were measured in feet.

1.3 Coordination

An initial Consultation Coordination Officer (CCO) meeting (also occasionally referred to as the Scoping meeting) is held with representatives of the communities, FEMA, and the study contractors to explain the nature and purpose of the FIS and to identify the streams to be studied by detailed methods. A final CCO (often referred to as the Preliminary DFIRM Community Coordination, or PDCC, meeting) is held with representatives of the communities, FEMA, and the study contractors to review the results of the study.

For this revision of the countywide FIS, the initial CCO meeting was held on November 3, 2009, and attended by community officials, representatives of the St. Johns River and South Florida Water Management Districts, the State of Florida, FEMA Region IV, and the study contractor, Baker AECOM, LLC.

The final CCO meeting was held on August 16, 2011 to review and accept the results of this FIS. Those who attended this meeting included representatives of St. Cloud, Kissimmee, Osceola County, AECOM, and FEMA. All problems raised at that meeting have been addressed in this study.

The dates of the historical initial and final CCO meetings held for the communities within the boundaries of Osceola County are shown in Table 1, "Historical CCO Meeting Dates."

Table 1: Historical CCO Meeting Dates

Community Name	Initial CCO Date	Final CCO Date
Kissimmee, City of	December 13, 1977	March 13, 1980
Osceola County and Incorporated Areas (countywide)	September 22, 1994	September 29, 1998
Osceola County (Unincorporated Areas)	February 23, 1978	March 2, 1981
St. Cloud, City of	December 13, 1977	July 10, 1979

Table 2: Flooding Sources Studied by Detailed Methods (continued)

Flooding Source	Reach Length (miles) or Area (square miles)	Limits of Study
Coon Lake	1.8	For its entire shoreline within Osceola County
Cox Creek	1.7	[2]
Cypress Lake	0.01 sq. mi.	[2]
Davenport Creek	7.5	From its confluence with Reedy Creek to Oak Island Drive
Davenport Creek Tributary No. 1	1.0	From its confluence with Davenport Creek to Oak Island Drive
Davenport Creek Tributary No. 2	1.6	From its confluence with Davenport Creek to a point approximately 0.86 mile upstream of confluence
Dead River	0.5	[2]
East City Canal	3.2	From its confluence with Lake Tohopekaliga to just downstream of Oak Street
East City Canal Tributary 1[1]	0.4	From the confluence with East City Canal to a point approximately 2,370 feet upstream
East Lake Tohopekaliga	20.1	[2]
Gator Bay Branch	1.1	[2]
Heart Lake	0.01 sq. mi.	[2]
Jackson Canal	1.7	[2]
Jim Branch	0.6	[2]
Kissimmee River	3.0	[2]
Lake Bullock	1.4	
Lake Cecil	1.6	[2]
Lake Center	3.3	For its entire shoreline within Osceola County
Lake Davenport	1.0	For its entire shoreline within Osceola County
Lake Gentry	0.7	For its entire shoreline within Osceola County

Table 3: Flooding Sources Studied by Approximate Methods (continued)

Flooding Source	Reach Length (miles) or Area (square miles)
Crabgrass Creek	10.7
Cypress Lake	0.1 sq. mi.
Davenport Creek	0.9
Dead River	3.6
Elbow Branch	3.1
Fish Lake	0.4 sq. mi.
Gap Creek	2.9
Garrett Branch	3.5
Gator Branch	6.6
Hammock Branch	1.9
Hatchineha Canal	2.4
Hog Pen Slough	0.3 sq. mi.
Indian Branch	2.7
Jackson Canal	4.5
Jane Green Creek	3.6
Jim Branch	0.8
Kissimmee River	12.9
Lake Jackson	3.2
Lake Marian	8.0
Little Creek	3.2
Little North Prong	1.9
Major Sloush	0.2 sq. mi.
Mill Slough	0.9
North Branch Crabgrass Creek	2.2
North Fork Taylor Creek	5.2
NP (unnamed streams)	916.0
NP - Priority 1- Poinciana	0.6
NP - Priority 4 – Kennansville	14.7
Orchid Creek	7.5
Padgett Branch	0.8

Table 5: Summary of Discharges (continued)

Flooding Source and Location	Drainage Area (Square Miles)	Peak Discharge (Cubic Feet per Second)			
		10-percent-annual-chance	2-percent-annual-chance	1-percent-annual-chance	0.2-percent-annual-chance
DAVENPORT CREEK					
At mouth	27.13	2,126	3,396	3,991	5,320
Approximately 0.6 mile downstream of State Route 545	26.73	1,932	3,099	3,648	4,866
At State Route 545	25.56	1,516	2,524	2,986	4,066
Approximately 0.4 mile upstream of State Route 545	25.28	1,496	2,511	2,970	4,042
Approximately 0.3 mile downstream of Interstate Route 4	24.94	1,487	2,491	2,944	4,066
Approximately 0.6 mile downstream of Keefer Trail	22.49	1,417	2,368	2,798	3,813
At Keefer Trail	22.20	1,416	2,358	2,785	3,791
Approximately 0.6 mile upstream of Keefer Trail	14.88	363	628	820	1,346
At confluence of Davenport Creek Tributary No. 2	8.53	898	1,466	1,718	2,341
Approximately 1,000 feet downstream of confluence of Davenport Creek Tributary No. 1	5.54	389	578	663	871
At Oak Island Road	0.40	9	18	21	178
DAVENPORT CREEK TRIBUTARY NO. 1					
Approximately 100 feet downstream of North Goodman Road	3.96	95	224	348	693

Table 5: Summary of Discharges (continued)

Flooding Source and Location	Drainage Area (Square Miles)	Peak Discharge (Cubic Feet per Second)			
		10-percent-annual-chance	2-percent-annual-chance	1-percent-annual-chance	0.2-percent-annual-chance
DAVENPORT CREEK TRIBUTARY NO. 2					
Approximately 0.9 mile upstream of mouth	1.56	679	1,066	1,239	1,626
EAST CITY CANAL[1]					
At mouth	6.37	1,128	1,531	1,661	2,018
EAST CITY CANAL TRIBUTARY 1					
At confluence with East City Canal	0.9	375	575	687	932
MILL SLOUGH					
At U.S. Route 441	11.6	710	1,040	1,360	2,050
At Mill Slough Road	10.7	660	970	1,300	1,900
PEG HORN SLOUGH					
At mouth	2.28	714	1,003	1,090	1,258
At Neptune Road	2.01	612	840	896	1,008
At Old Landfill entrance road	1.19	351	416	420	427
At Canoe Creek Road	0.46	209	398	465	508
REEDY CREEK					
At Cypress Lake	282.0	3,300	5,000	5,700	6,350
At Lake Russell	264.0	2,700	4,000	4,500	5,100
At U.S. Route 92 bridge	209.0	800	1,100	1,100	1,100

[1]Peak discharges computed with UNET (Reference 25)

Table 6: Summary of Stillwater Elevations (continued)

Flooding Source and Location	Elevation (feet NAVD88) 10-percent-annual-chance	2-percent-annual-chance	1-percent-annual-chance	0.2-percent-annual-chance
SARDINE LAKE	64.4	65.2	65.6	66.1
TROUT LAKE	64.5	65.3	65.6	66.2

*Data not available

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals. Users should be aware that flood elevations shown on the FIRM represent rounded whole-foot elevations and may not exactly reflect the elevations shown on the Flood Profiles or in the Floodway Data tables in the FIS report. Flood elevations shown on the FIRM are primarily intended for flood insurance rating purposes. For construction and/or floodplain management purposes, users are cautioned to use the flood elevation data presented in this FIS in conjunction with the data shown on the FIRM.

Except where noted, cross sections were obtained from field surveys. All bridges, dams, and culverts were field surveyed to obtain elevation data and structural geometry. Cross sections were located at close intervals upstream and downstream of bridge and culverts to compute the significant backwater effects of these structures.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway was computed (Section 4.2), selected cross section locations are also shown on the FIRM (Exhibit 2).

Table 7, “Manning’s ‘n’ Values,” contains the channel and overbank "n" values for the streams studied by detailed methods.

Table 7: Manning’s “n” Values

Flooding Source	Channel “n”	Overbank “n”
Bass Slough	0.025	0.025-0.10
Bass Slough Tributary	0.025	0.035-0.075
Big Wateree Creek Tributary 4	*	*
Boggy Creek	0.030	0.020
C-33 Canal	0.025-0.17	0.03-0.18
Canoe Creek (C-34 Canal)	0.025-0.17	0.03-0.18
Davenport Creek	0.025-0.17	0.03-0.18
Davenport Creek Tributary No. 1	0.025-0.17	0.03-0.18

Table 7: Manning's "n" Values (continued)

Flooding Source	Channel "n"	Overbank "n"
Davenport Creek Tributary No. 2	0.025-0.17	0.03-0.18
East City Canal	0.025-0.17	0.03-0.18
East City Canal Tributary 1	0.025-0.11	0.035-0.11
Mill Slough in City of Kissimmee	0.04	0.50
Mill Slough in Osceola County (Unincorporated Areas)	0.030	0.020
Peg Horn Slough	0.025-0.17	0.03-0.18
Reedy Creek	0.030	0.020
Reedy Creek Tributary No. 1	0.025-0.17	0.03-0.18
Reedy Creek Tributary No. 2	0.025-0.17	0.03-0.18
Reedy Creek Tributary No. 3	0.025-0.17	0.03-0.18
Shingle Creek	0.025-0.17	0.03-0.18
St. Johns River	0.025-0.17	0.03-0.18
West Branch Shingle Creek*	0.025-0.17	0.03-0.18
West City Canal	0.025-0.17	0.03-0.18
WPA Canal	0.025-0.17	0.03-0.18
WPA Canal Tributary 1	0.025-0.095	0.025-0.095
WPA Canal Tributary 1-1	0.025	0.045-0.095

*Includes West Branch Shingle Creek Tributary listed separately in previous FIS reports

Flood profiles were drawn showing the computed water-surface elevations for floods of the selected recurrence intervals.

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the Flood Profiles (Exhibit 1) are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

3.2.1 Methods for Flooding Sources with New or Revised Analyses in Current Study

Water-surface profiles for the 10-, 2-, 1- and 0.2-percent-annual-chance recurrence intervals were computed for detailed analyses, and the water-surface profile for the 1-percent-annual-chance recurrence interval was computed for approximate analyses. The USACE HEC-RAS step-backwater computer program version 4.0 was utilized for hydraulic analyses of Bass Slough (Lower Reach), Bass Slough (Upper Reach), Bass Slough Tributary, WPA Canal Tributary 1,

Revised Analyses for Countywide FIS

Cross sections were obtained from a variety of sources. The primary source was new field surveys. Other cross sections were obtained from the South Florida Water Management District and from the previous FISs.

Water-surface elevations of floods of the selected recurrence intervals were computed using the USACE UNET one-dimensional, unsteady flow and HEC-2 water-surface profile computer programs; UNET was used for C-33 Canal, Canoe Creek (C-34 Canal), East City Canal, West City Canal, and Lakes Center, Gentry, Joel, Lizzie, Myrtle, and Preston and Alligator, Brick, Coon, and Trout Lakes; HEC-2 was used for Davenport Creek, Davenport Creek Tributary No. 1, Davenport Creek Tributary No. 2, Peg Horn Slough, Reedy Creek Tributary No. 1, Reedy Creek Tributary No. 2, and Reedy Creek Tributary No. 3, Shingle Creek, West Branch Shingle Creek, West Branch Shingle Creek Tributary, and WPA Canal (References 25 and 28). For the St. Johns River, the hydraulic analyses were taken from *The Mean Annual, 10-Year, 25-Year, and 100-Year Flood Profiles for the Upper St. Johns River Under Existing Conditions* (Reference 19). Starting water-surface elevations for streams were taken to be normal depth; for lakes, the highest operating elevations specified by the South Florida Water Management District were used (Reference 19).

Gage data for historical storm events was used for calibration and verification of the UNET and HEC-2 models. Gage data were obtained from the South Florida Water Management District and the USGS (References 29 and 30). USGS gages were used for the Alligator Chain of Lakes at the S-60 spillway on the C-33 Canal (ID 02260800); at the S-57 culvert on the C-30 Canal (ID 02261500); on the east shore of Cypress Lake near the mouth of Canoe Creek (ID 02266600); on Shingle Creek at the Kissimmee Airport (ID 02263800); on Shingle Creek at Campbell (ID 02264495); and on Davenport Creek near Loughman (ID 02266480). South Florida Water Management District gages were used on the Kissimmee East-West Canal (ID KISSD-H and KISSD-E).

3.3 Vertical Datum

All FIS reports and FIRMs are referenced to a specific vertical datum. The vertical datum provides a starting point against which flood, ground, and structure elevations can be referenced and compared. Until recently, the standard vertical datum used for newly created or revised FIS reports and FIRMs was the National Geodetic Vertical Datum of 1929 (NGVD). With the completion of the North American Vertical Datum of 1988 (NAVD), many FIS reports and FIRMs are now prepared using NAVD as the referenced vertical datum.

All flood elevations shown in this FIS report and on the FIRM are referenced to the NAVD. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. It is important to note that adjacent counties may be referenced to NGVD, which may result in differences in base flood elevations across county lines.

No floodway was computed Davenport Creek Tributary 1, Davenport Creek Tributary 2, St. Johns River, and Tributary No. 1.

Near the confluence of streams studied in detail, floodway computations were made without regard to flood elevations on the receiving water body. Therefore, “Without Floodway” elevations presented in Table 8, “Floodway Data,” for certain downstream cross sections of Bass Slough Tributary, East City Canal Tributary 1, Reedy Creek Tributary No. 1, Reedy Creek Tributary No. 2, Shingle Creek, West City Canal, WPA Canal Tributary 1, and WPA Canal Tributary 1-1 are lower than the regulatory flood elevations in that area, which must take into account the 1-percent-annual-chance flooding due to backwater from other sources.

Encroachment into areas subject to inundation by floodwaters having hazardous velocities aggravates the risk of flood damage and heightens potential flood hazards by further increasing velocities. A listing of stream velocities at selected cross sections is provided in Table 8. To reduce the risk of property damage in areas where the stream velocities are high, the community may wish to restrict development in areas outside the floodway.

The area between the floodway and 1-percent-annual-chance floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation (WSEL) of the base flood more than 1 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 1.

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD 88)	WITHOUT FLOODWAY (FEET NAVD 88)	WITH FLOODWAY (FEET NAVD 88)	INCREASE (FEET)
DAVENPORT CREEK								
A	4,500	734	3,963	1.0	80.2	80.2	81.2	1.0
B	5,330	440[2]	2,627	1.5	81.8	81.8	82.4	0.6
C	6,730	359	2,112	1.7	84.4	84.4	84.8	0.4
D	8,130	292	1,723	2.1	86.0	86.0	86.8	0.8
E	9,230	112	794	4.6	88.9	88.9	89.5	0.6
F	10,520	223	2,087	1.4	92.9	92.9	93.6	0.7
G	11,820	231	1,596	1.9	93.5	93.5	94.2	0.7
H	13,385	136	819	3.6	95.1	95.1	95.5	0.4
I	14,045	42	453	6.5	96.2	96.2	96.7	0.5
J	15,745	191	1,782	1.7	98.8	98.8	99.6	0.8
K	16,872	384	3,259	0.9	102.6	102.6	103.2	0.6
L	18,342	228	1,923	1.5	103.2	103.2	103.8	0.6
M	20,392	286	1,627	1.7	104.9	104.9	105.6	0.7
N-R*								

[1] Stream distance in feet above confluence with Reedy Creek
[2] Value represents total width; however, floodway is not shown inside Reedy Creek Improvement District
* Floodway data not available

TABLE 8

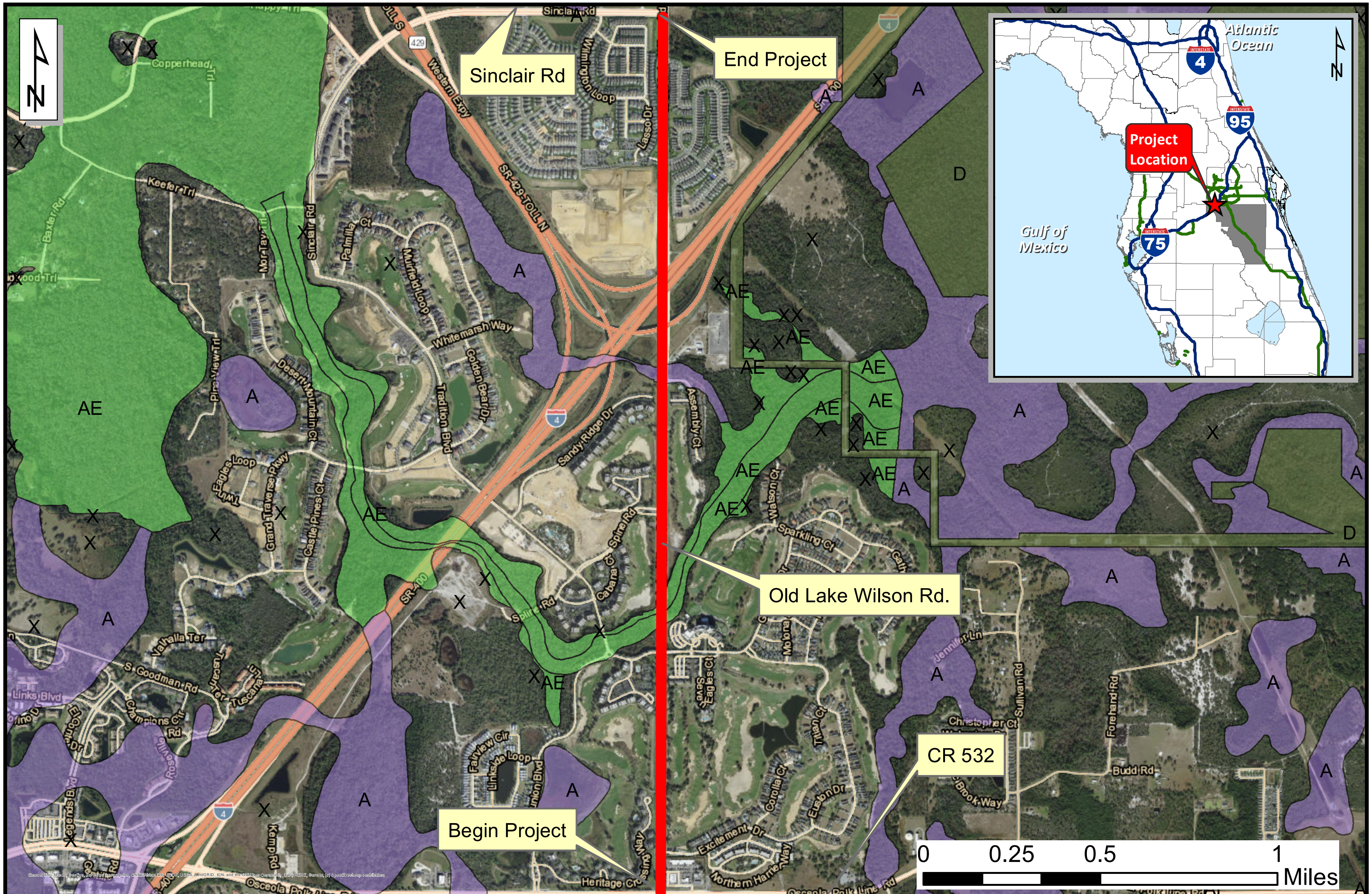
FEDERAL EMERGENCY MANAGEMENT AGENCY

OSCEOLA COUNTY, FL

AND INCORPORATED AREAS

FLOODWAY DATA

DAVENPORT CREEK



Flood Zone Map

Old Lake Wilson Rd. From CR 532 (Oscola Polk Line Rd.) to South of Sinclair Rd.

MAP SCALE 1" = 1000'

500 0 500 1,000 1,500 2,000 FEET

00 0 300 600 MET

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0040G

FIRM

FLOOD INSURANCE RATE MAP

OSCEOLA COUNTY, FLORIDA

AND INCORPORATED AREAS

PANEL 40 OF 900

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
OSCEOLA COUNTY	120189	0040	G
REEDY CREEK IMPROVEMENT DISTRICT	120577	0040	G

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.

U.S. DEPARTMENT OF HOMELAND SECURITY

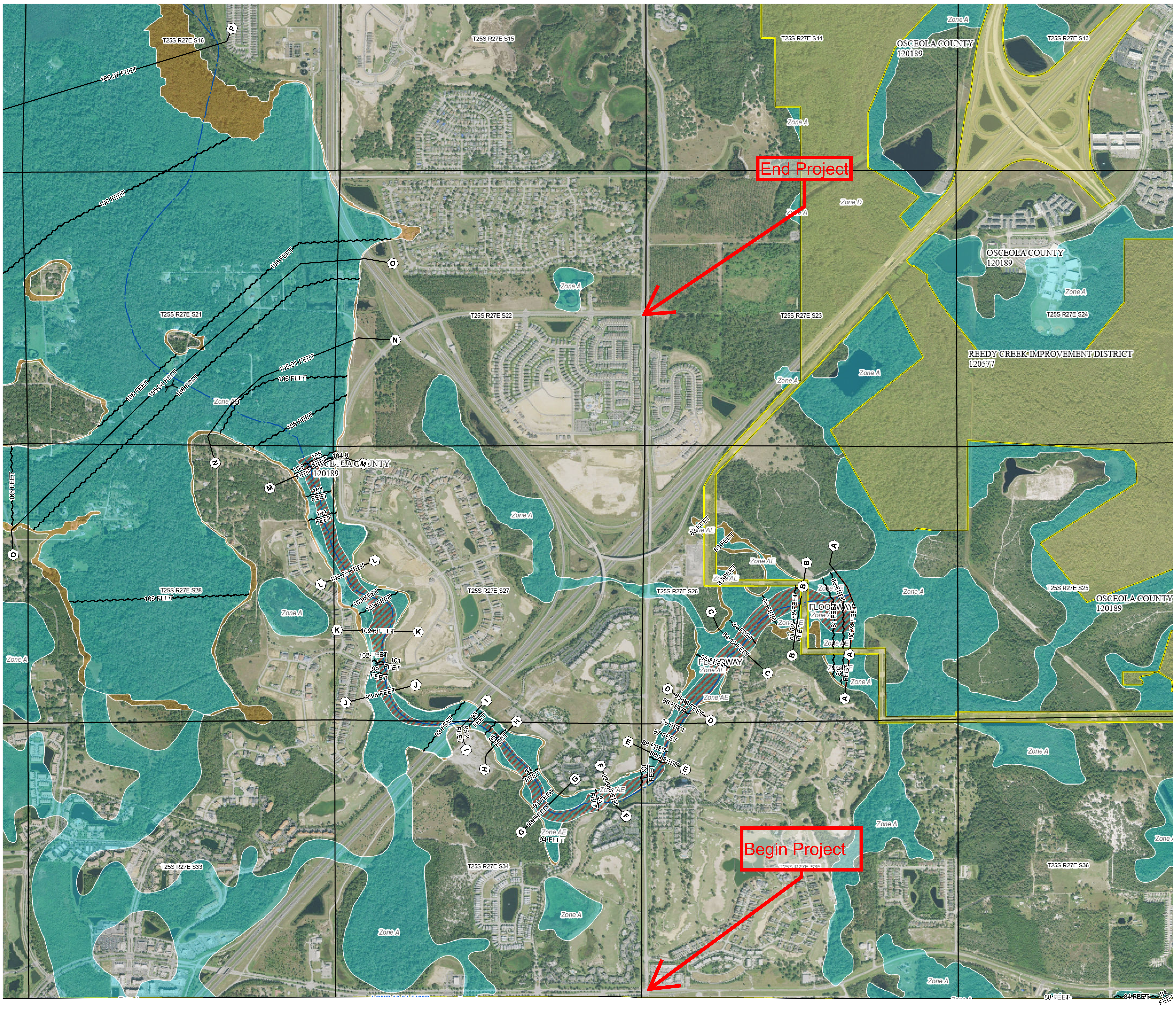
MAP NUMBER
12097C0040G

MAP REVISED
JUNE 18, 2013

Federal Emergency Management Agency

This is an official FIRMette showing a portion of the above-referenced flood map created from the MSC FIRMette Web tool. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For additional information about how to make sure the map is current, please see the Flood Hazard Mapping Updates Overview Fact Sheet available on the FEMA Flood Map Service Center home page at https://msc.fema.gov.

81°37'30.87"W 28°19'15.04"N



USGS The National Map: Orthoimagery. Data refreshed October, 2020.

81°33'44.16"W 28°15'3.69"N

FLOOD HAZARD INFORMATION

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

SPECIAL FLOOD HAZARD AREAS	Without Base Flood Elevation (BFE) *Zone A, V, A99* With BFE or Depth *Zone AE, AO, AH, VE, AR* Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD	0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X* Future Conditions 1% Annual Chance Flood Hazard *Zone X* Area with Reduced Flood Risk due to Levee See Notes *Zone X* Area with Flood Risk due to Levee *Zone D*
OTHER AREAS	NO SCREEN Area of Minimal Flood Hazard *Zone X* Effective LOMRs Area of Undetermined Flood Hazard *Zone D*
GENERAL STRUCTURES	Channel, Culvert, or Storm Sewer Levee, Dike, or Floodwall
OTHER FEATURES	B 20.2 Cross Sections with 1% Annual Chance 17.5 Water Surface Elevation 8 Coastal Transect Coastal Transect Baseline Profile Baseline Hydrographic Feature 513 Base Flood Elevation Line (BFE) Limit of Study Jurisdiction Boundary

NOTES TO USERS

For information and questions about this Flood Insurance Rate Map (FIRM), available products associated with this FIRM, including historic versions, the current map date for each FIRM panel, how to order products, or the National Flood Insurance Program (NFIP) in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Flood Map Service Center website at https://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website.

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

For community and countywide map dates, refer to the Flood Insurance Study Report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Basemap information shown on this FIRM was provided in digital format by USDA, Farm Service Agency (FSA). This information was derived from NAIP, dated April 11, 2018.

This map was exported from FEMA's National Flood Hazard Layer (NFHL) on **12/10/2020 6:01 PM** and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time. For additional information, please see the Flood Hazard Mapping Updates Overview Fact Sheet at https://www.fema.gov/media-library/assets/documents/118418

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards. This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date.

SCALE

Map Projection:
GCS, Geodetic Reference System 1980;
Vertical Datum: NAVD88
For information about the specific vertical datum for elevation features, datum conversions, or vertical monuments used to create this map, please see the Flood Insurance Study (FIS) Report for your community at https://msc.fema.gov

N

1 inch = 1,000 feet **1:12,000**

0 500 1,000 2,000 3,000 4,000 Feet

0 105 210 420 630 840 Meters

FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

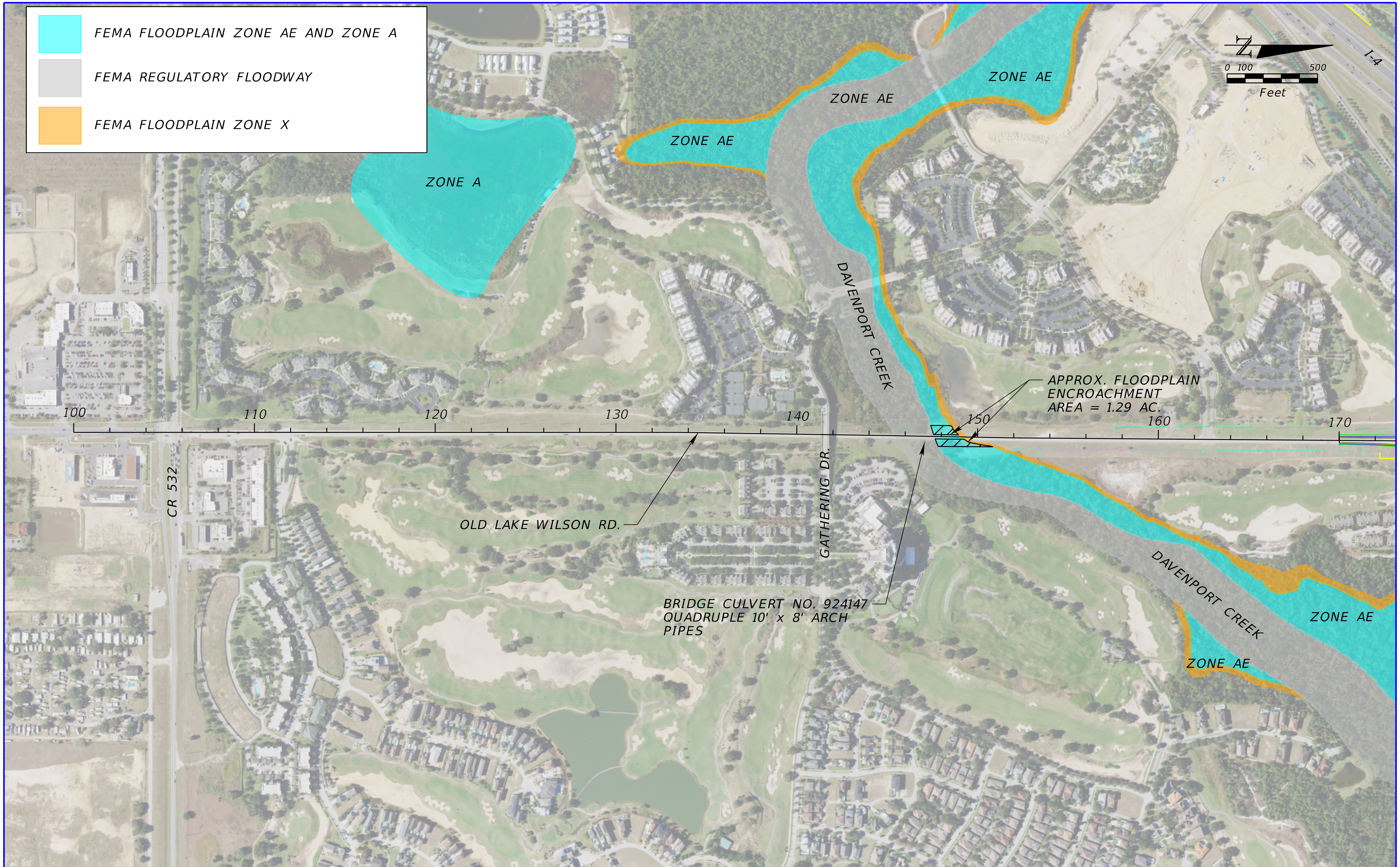
OSCEOLA COUNTY, FLORIDA AND INCORPORATED AREAS

PANEL **40** OF **900**

Panel Contains:

COMMUNITY	NUMBER	PANEL
OSCEOLA COUNTY	120189	0040
REEDY CREEK IMPROVEMENT DISTRICT	120577	0040
POLK COUNTY	120261	0040

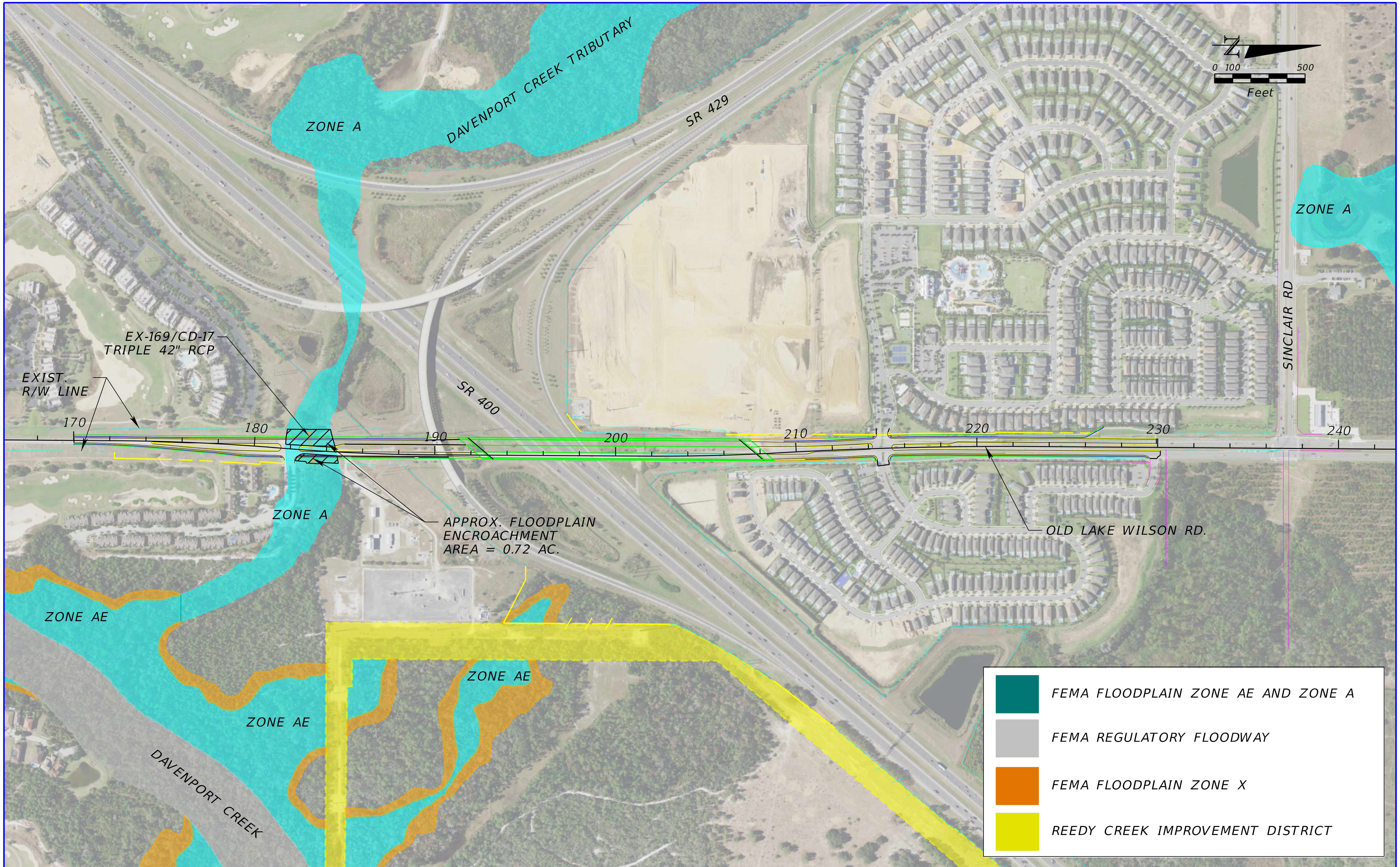
MAP NUMBER
12097C0040G
EFFECTIVE DATE
June 18, 2013



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

OSCEOLA COUNTY BOARD OF COUNTY COMMISSIONERS 1 COURTHOUSE SQUARE, SUITE 2300 KISSIMMEE, FLORIDA 34741	MICHAEL A. HOLT, PE #76111 PATEL, GREENE & ASSOCIATES, LLC 280 W. CANTON AVE. SUITE 400 WINTER PARK, FLORIDA 32789	REVISION	DATE	BY	EXIST. CROSS DRAIN MAP (1)	OLD LAKE WILSON ROAD (CR 545)	PROJECT NO.	SHEET

6/17/2022 4:43:39 PM J:\Osceola County\Projects\Old Lake Wilson Road PD&E\drainage\DRPRRD01_Figure3_01.dgn



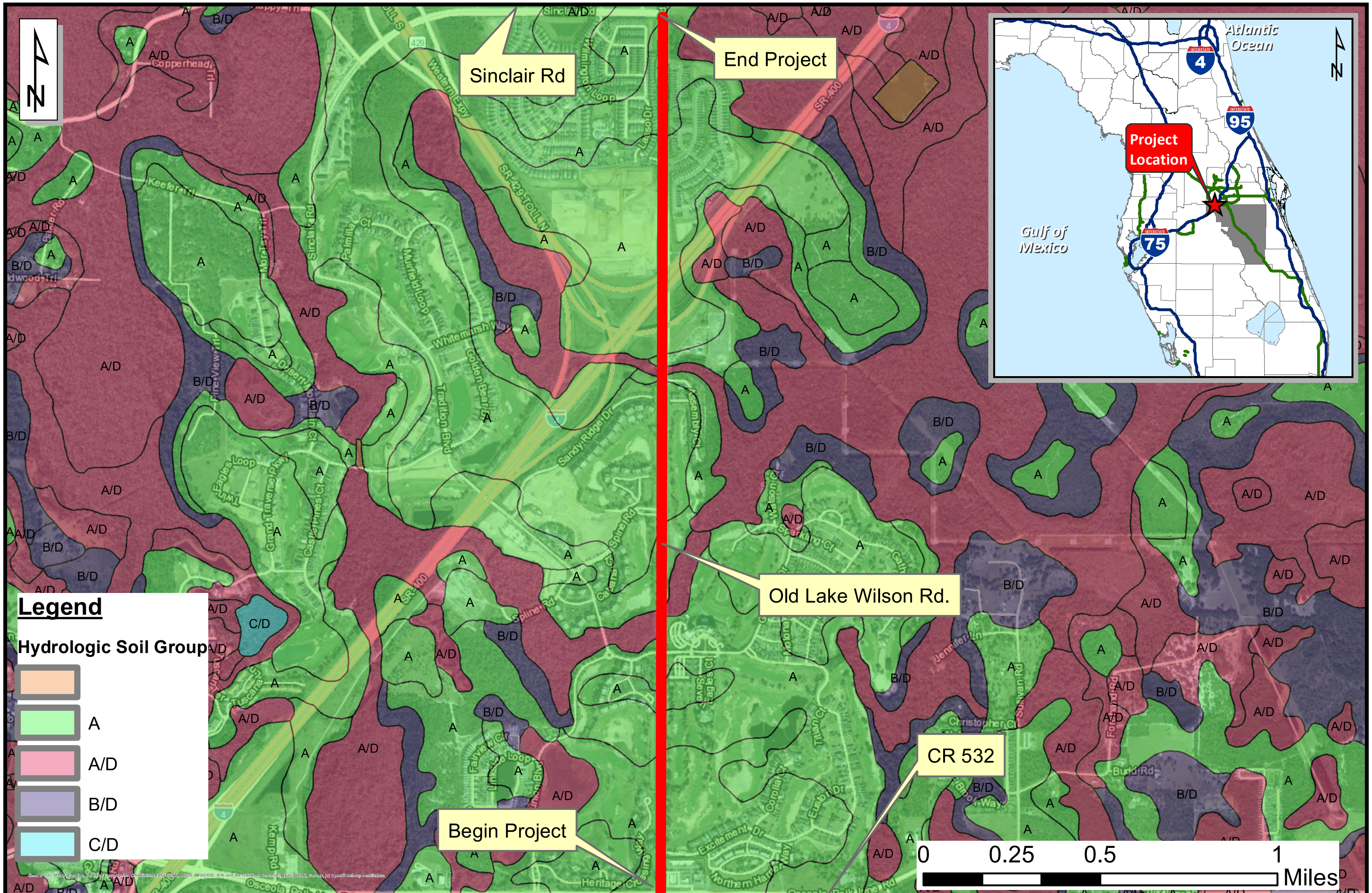
THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE DIGITALLY SIGNED AND SEALED UNDER RULE 61G15-23.004, F.A.C.

OSCEOLA COUNTY BOARD OF COUNTY COMMISSIONERS 1 COURTHOUSE SQUARE, SUITE 2300 KISSIMMEE, FLORIDA 34741	MICHAEL A. HOLT, PE #76111 PATEL, GREENE & ASSOCIATES, LLC 280 W. CANTON AVE. SUITE 400 WINTER PARK, FLORIDA 32789	REVISION	DATE	BY	EXIST. CROSS DRAIN MAP (2)	OLD LAKE WILSON ROAD (CR 545)	PROJECT NO.	SHEET

6/17/2022 5:13:55 PM J:\Osceola County\Projects\Old Lake Wilson Road PD&E\drainage\DRPRRD01_Figure3_02.dgn

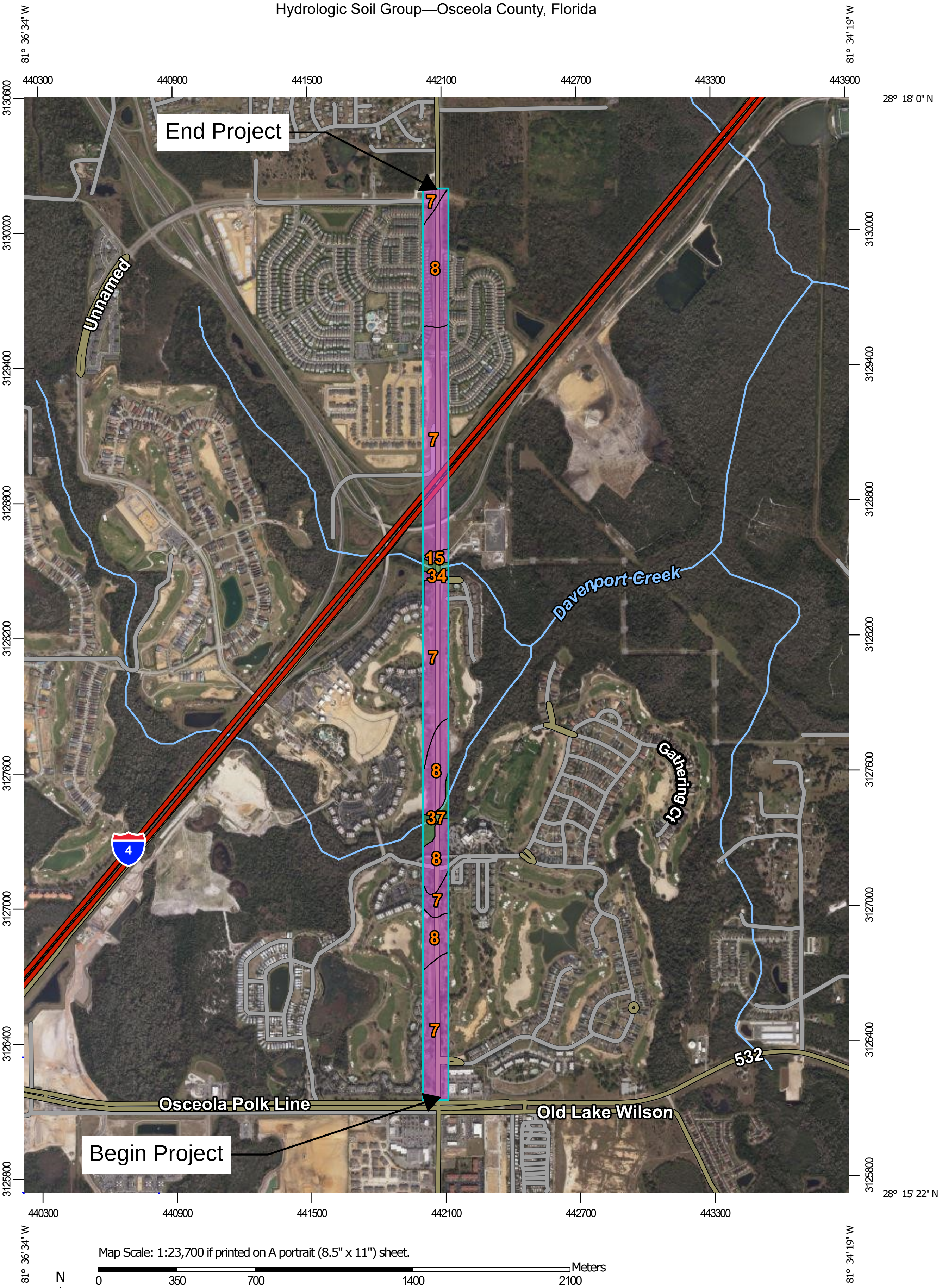
APPENDIX E

SOILS DATA

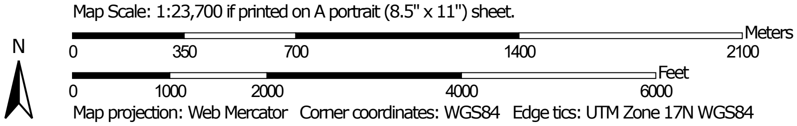


Hydrologic Soil Group

Old Lake Wilson Rd. From CR 532 (Oscola Polk Line Rd.) to South of Sinclair Rd.



Map Scale: 1:23,700 if printed on A portrait (8.5" x 11") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Osceola County, Florida
Survey Area Data: Version 18, Jun 9, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Feb 2, 2020—Mar 13, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
7	Candler sand, 0 to 5 percent slopes	A	71.4	62.3%
8	Candler sand, 5 to 12 percent slopes	A	36.7	32.0%
15	Hontoon muck, frequently ponded, 0 to 1 percent slopes	A/D	1.3	1.1%
34	Pomello fine sand, 0 to 5 percent slopes	A	2.2	1.9%
37	Pompano fine sand, frequently ponded, 0 to 1 percent slopes	A/D	3.1	2.7%
Totals for Area of Interest			**114.6**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

APPENDIX F

EXISTING AND FUTURE LAND USE MAP

Land Use Map

Old Lake Wilson Rd. From CR 532 (Oscola Polk Line Rd.) to South of Sinclair Rd.

Appendix G
Correspondence

From: Rick Cole <Rick.Cole@osceola.org>
Sent: Tuesday, September 14, 2021 2:01 PM
To: Joshua DeVries <Joshua.Devries@OSCEOLA.ORG>
Cc: Susan E Gosselin <susan.gosselin@OSCEOLA.ORG>; David Dangel <ddangel@inwoodinc.com>
Subject: RE: Old Lake Wilson Road History of Flooding

Josh,

Road & Bridge has no history of flooding within the project limits shown on the map. Thank you

Rick Cole
Road & Bridge Assistant Director
Osceola County Florida
O: (407) 742-7500
F: (407) 891-1795
rick.cole@osceola.org
www.osceola.org

From: Joshua DeVries <Joshua.Devries@OSCEOLA.ORG>
Sent: Tuesday, September 14, 2021 1:44 PM
To: Rick Cole <Rick.Cole@osceola.org>
Cc: Susan E Gosselin <susan.gosselin@OSCEOLA.ORG>; David Dangel <ddangel@inwoodinc.com>
Subject: FW: Old Lake Wilson Road History of Flooding

Rick,

Susan mentioned that you might be able to assist with the below highlighted question asking us to verify that there is no history of flooding within the project limits. I have attached a map showing the project limits in blue. Any assistance is greatly appreciated.

Thank You,

Joshua DeVries, AICP
Director of Planning / Sr. Planner
Department of Transportation and Transit
Osceola County Government
1 Courthouse Square, Suite 3100
Kissimmee, FL 34741
Phone: 407.742.7813
Fax: 407.742.0204
Joshua.DeVries@Osceola.org

From: David Dangel <ddangel@inwoodinc.com>
Sent: Tuesday, September 14, 2021 9:55 AM
To: Joshua DeVries <Joshua.Devries@OSCEOLA.ORG>
Subject: FW: Old Lake Wilson Road History of Flooding

[EXTERNAL EMAIL] - This email originates outside of Osceola County Government. Do not click links or open attachments unless you recognize and confirm the sender's email address. If you are unsure if an email is safe or not, please forward the email to itsecurity@osceola.org

Josh,

Please see the question below from PGA. Is there someone at the County that would be good for them to contact about any kind of flooding history on Old Lake Wilson Road?

David

From: Jen Rehrl <Jen.Rehrl@patelgreene.com>
Sent: Tuesday, September 14, 2021 9:39 AM
To: David Dangel <ddangel@inwoodinc.com>
Cc: Michael Holt <Michael.Holt@patelgreene.com>
Subject: Old Lake Wilson Road History of Flooding

Good morning, David,

I am working on the Old Lake Wilson Road LHR and PSR. We received a comment during our QC that we need to contact Osceola County to verify that there is no history of flooding within the project limits. Do you have a contact at the County that could help answer this question (we will copy you on our email to the County to keep you in the loop)? If you would prefer to email the County directly, that would work too.

Thanks for your help.

Jennifer Rehrl
Engineer Intern II

Patel, Greene & Associates, LLC (PGA)
280 W. Canton Avenue, Suite 400, Winter Park, FL 32789
Office: (407) 720-7420, Ext. 408 | Cell: (863) 242-6029 | Email: Jen.Rehrl@patelgreene.com

Follow PGA on Social Media
Website Facebook LinkedIn Twitter Instagram

Please Note: Florida has a very broad Public Records Law. E-mails to this entity or its employees may be considered a public record. Your e-mail communication, including your email address may be disclosed to the public and media at any time.

Appendix H

Bridge Inspection Report July 2020 and NBID Documentation

Bridge Inspection Report July 2020

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
Inspection/CIDR Report with PDF attachment(s)
Inspection

Structure ID: 924147

DISTRICT: D5 - Deland **INSPECTION DATE: 7/20/2020** **LKSP**

BY:	Ayres Associates	STRUCTURE NAME:	4-11x7.5x42 CMPC
OWNER:	2 County Hwy Agency	YEAR BUILT:	1954
MAINTAINED BY:	2 County Hwy Agency	SECTION NO.:	92 570 000
STRUCTURE TYPE:	3 Steel - 19 Culvert	MP:	0.806
LOCATION:	0.8 Mile North of CR-532	ROUTE:	00545
SERV. TYPE ON:	1 Highway	FACILITY CARRIED:	Old Lake Wilson Rd
SERV. TYPE UNDER:	5 Waterway	FEATURE INTERSECTED:	Davenport Creek

☐ FUNCTIONALLY OBSOLETE ☐ STRUCTURALLY DEFICIENT

TYPE OF INSPECTION: Regular NBI

DATE FIELD INSPECTION WAS PERFORMED: ABOVE WATER: 7/20/2020 UNDERWATER: 7/20/2020

SUFFICIENCY RATING: 85.3
HEALTH INDEX: 31.82

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
BRIDGE INSPECTION REPORT
ADDENDUM

CONTENTS OF ADDENDUM

	Bridge Location Map		Sketches and Photos
*	Additional Element Inspection Notes		Recommended Corrective Action
	Load Rating Analysis Summary		Scour Evaluation
*	Posting Photos	*	Fracture Critical Inspections

* This section is not included in this report.

PREPARED FOR: FDOT
BRIDGE OWNER: OSCEOLA COUNTY
PREPARED BY: AYRES ASSOCIATES

REPORT IDENTIFICATION

Bridge Number: 924147 – Regular NBI	Inspection Date: 07/20/2020
Bridge Name: Old Lake Wilson Rd over Davenport Creek (4-11x7.5x42 CMPC)	
Facility Carried: Old Lake Wilson Rd.	
Featured Intersected: Davenport Creek	

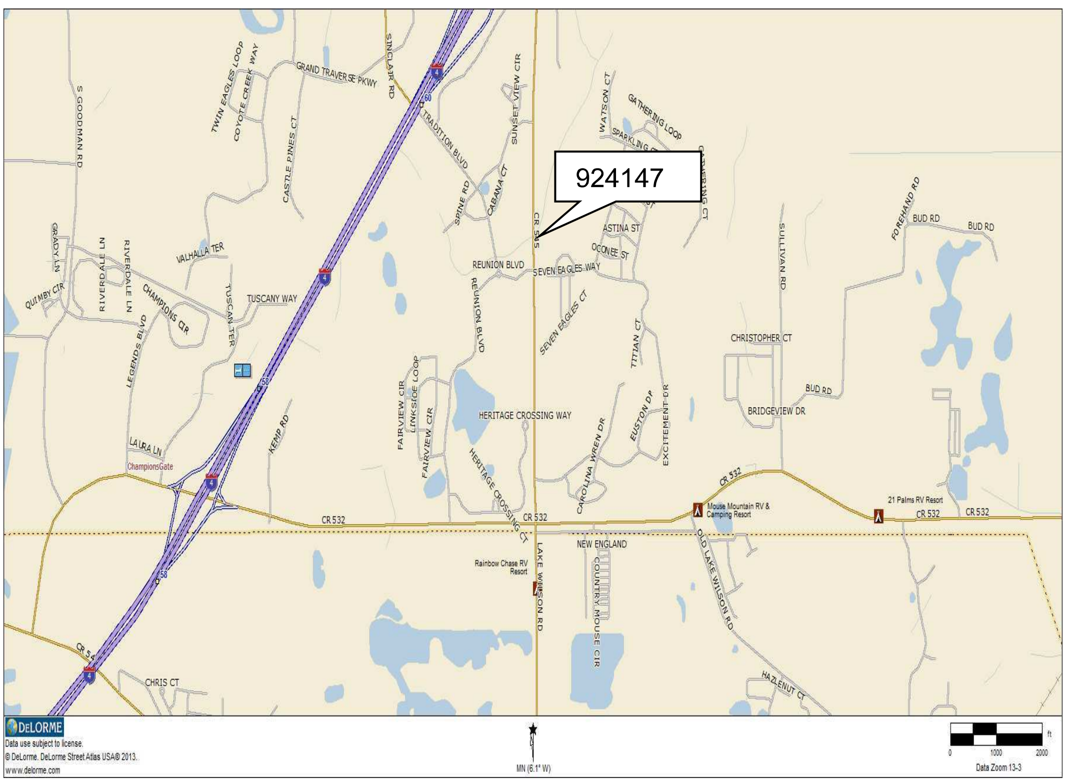
North Approach

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
BRIDGE INSPECTION REPORT

Bridge No: 924147 Inspection Date: 07/20/2020

BRIDGE LOCATION MAP

West Elevation



Old Lake Wilson Rd over Davenport Creek 0.8 Mile North of CR-532
(4-11x7.5x42 CMPC)

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
BRIDGE INSPECTION REPORT

Bridge No: 924147 Inspection Date: 07/20/2020

SKETCHES AND PHOTOS

Photo 1: Element 8290: Build up in Pipe 1

Photo 2: Element 8477: Sand cement rip rap bags missing from the east headwall at Pipe 1

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
BRIDGE INSPECTION REPORT

Bridge No: 924147 Inspection Date: 07/20/2020

SKETCHES AND PHOTOS

Photo 3: Element 8477: Missing bags from the west headwall between Pipes 3 and 4

Photo 4: Element 8477: Settled sand cement rip rap bags in the east headwall over Pipe 1

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
BRIDGE INSPECTION REPORT

Bridge No: 924147 Inspection Date: 07/20/2020

SKETCHES AND PHOTOS

Photo 5: Element 8477: Vegetation growing through the joints of the west headwall

Photo 6: Element 240: Delaminative corrosion on pipes sidewalls and connecting hardware and failed bituminous/galvanized coatings of pipes

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
BRIDGE INSPECTION REPORT

Bridge No: 924147 Inspection Date: 07/20/2020

SKETCHES AND PHOTOS

Photo 7: Element 240: Corrosion hole at the east end of Pipe 3

Photo 8: Inspection Notes: Crack in the asphalt surfacing over and approaching the structure

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
BRIDGE INSPECTION REPORT

Bridge No: 924147 Inspection Date: 07/20/2020

SKETCHES AND PHOTOS

Photo 9: Inspection Notes: Washout in the west asphalt mowing strip

Photo 10: Inspection Notes: Depression over Wall 4 in the asphalt mowing strip

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
BRIDGE INSPECTION REPORT

Bridge No: 924147 Inspection Date: 07/20/2020

SCOUR EVALUATION

LEFT SIDE

		ORIGINAL	PREVIOUS	CURRENT	CHANGE
		12/18/90	07/30/18	07/20/20	
Wall 1			3.6	3.8	-0.2
C/L of Pipe 1		4.5	4.6	3.9	0.7
Wall 2			5.9	4.9	1.0
C/L of Pipe 2		5.8	6.2	5.6	0.6
Wall 3			5.5	5.8	-0.3
C/L of Pipe 3		7.4	7.1	7.0	0.1
Wall 4			8.0	7.2	0.8
C/L of Pipe 4		7.5	8.0	8.0	0.0
Wall 5			7.9	7.5	0.4

Waterline at C/L of Pipe 3	7.0	5.1	6.0

RIGHT SIDE

		ORIGINAL	PREVIOUS	CURRENT	CHANGE
		12/18/90	07/30/18	07/20/20	
Wall 1			3.8	3.6	0.2
C/L of Pipe 1		3.5	3.8	3.6	0.2
Wall 2			4.0	2.1	1.9
C/L of Pipe 2		4.5	6.5	3.4	3.1
Wall 3			6.7	6.2	0.5
C/L of Pipe 3		6.8	6.5	6.5	0.0
Wall 4			7.4	6.3	1.1
C/L of Pipe 4		5.8	7.4	7.6	-0.2
Wall 5			7.0	7.5	-0.5

Waterline at C/L of Pipe 3	6.4	4.5	5.0

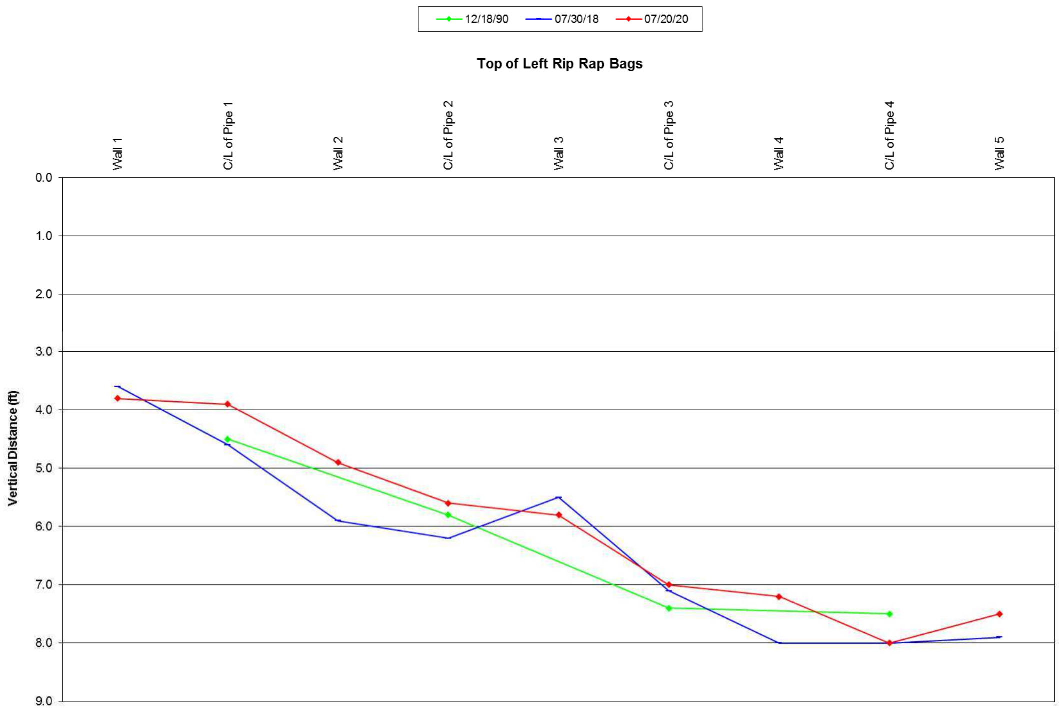
Negative Change = Degradation; Positive Change = Aggradation
The Degradation/Aggradation measurements for this bridge do not indicate significant difference from the last inspection
All measurements are in feet.
Measurement Reference : Top of Sand-Cement Rip Rap Bags

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
BRIDGE INSPECTION REPORT

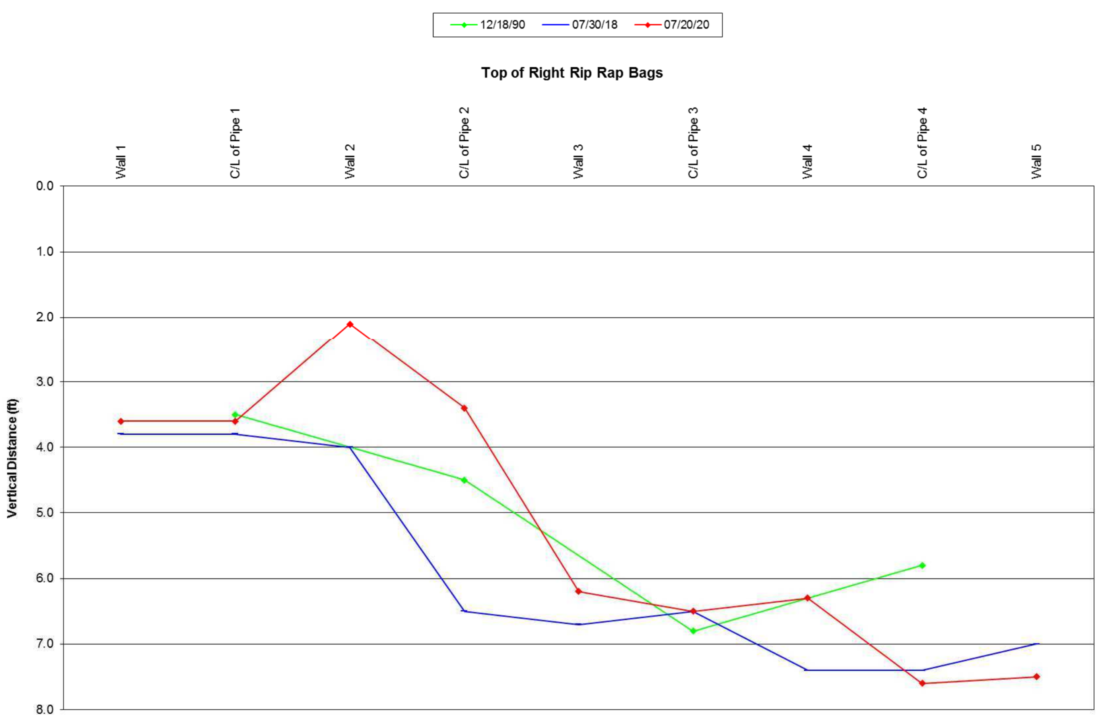
Bridge No: 924147 Inspection Date: 07/20/2020

SCOUR EVALUATION

LEFT SIDE SOUNDINGS



RIGHT SIDE SOUNDINGS



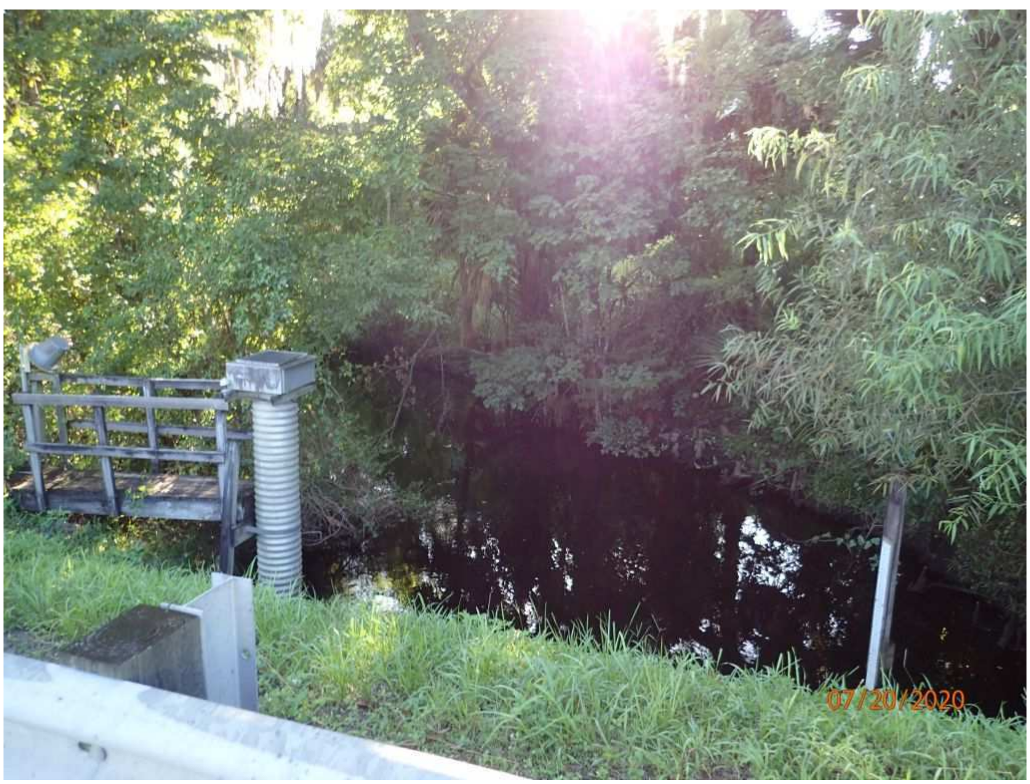
Relative Channel Plots Are Not To Scale.
Any Vertical Curvature Of Datum Point Is Not Reflective In Plot.

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
BRIDGE INSPECTION REPORT

Bridge No: 924147 Inspection Date: 07/20/2020

SCOUR EVALUATION

Channel Looking West



Channel Looking East

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
BRIDGE INSPECTION REPORT

Bridge No: 924147 Inspection Date: 07/20/2020

FIELD PREPARATION

A. Tools and Equipment

Full Size Cargo Van:	Yes:	__	No:	X	Pick-up Truck:	Yes:	X	No: _
Automobile:	Yes:	_	No:	X				
Camera:	Yes:	X	No:	__	Video:	Yes:	_	No: X
NDT Equipment:	Yes:	_	No:	X				
NDT Type: N/A								
Binoculars:	Yes:	_	No:	X				
Diving Performed:	Yes:	X	No:	_	Max Depth: 2.6ft.		Current: < 1 fps	

Dive Mode: N/A

Hand Tools: (i.e. Chipping Hammer, 6' Ruler, etc.)

1. Standard Inspection Tools
2. Chipping Hammers
3. Flashlights
4. Carpenter Ruler
5. Inspection Hand Tools

Other:__

B. Services

Flag Crew: N/A

Snooper: N/A

Electrician: N/A

Other: N/A

C. Scheduling (Brief Explanation)

Topside with Underwater:
Topside Hours: 2 hrs. Underwater Hours: 0 hrs. Travel Time: 2 hrs.

D. Site Conditions

Boat Needed: NO Type of Boat: N/A

Location of Boat Ramp: N/A

Lengthy Travel Required: NO

Difficult Access: NO

Water Obviously Polluted: NO

Water quality is fair (partially meets use): YES

Strong Water Current: NO

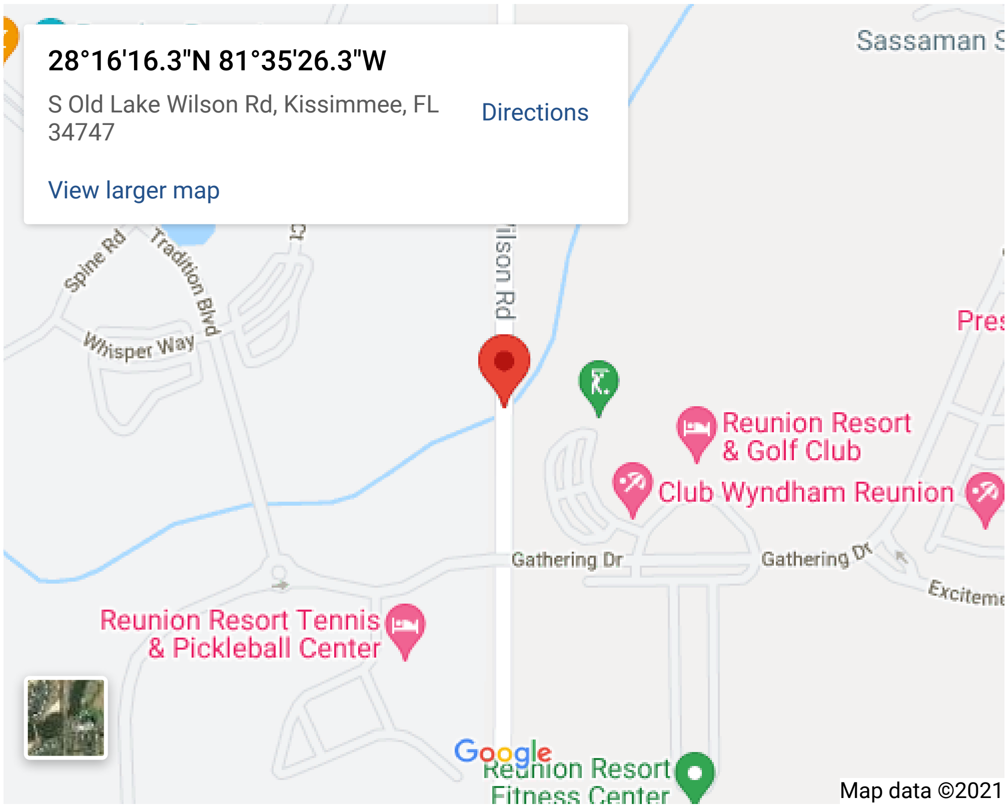
Other: NONE

E. UNDERWATER ELEMENTS INSPECTED:
N/A

NBID Documentation

Old Lake Wilson Rd over Davenport Creek

Coordinates:
+28.27120, -81.59064
28°16'16" N, 81°35'26" W



Facts

Source: National Bridge Inventory. Information not verified; use at your own risk.

Name:	Old Lake Wilson Rd over Davenport Creek
Structure number:	924147
Location:	0.8 Mile North of CR-532
Purpose:	Carries highway over waterway
Route classification:	Minor Arterial (Urban) *[16]*
Length of largest span:	11.5 ft. *[3.5 m]*
Total length:	57.4 ft. *[17.5 m]*
Owner:	County Highway Agency *[02]*
Year built:	1954
Historic significance:	Bridge is not eligible for the National Register of Historic Places *[5]*
Design load:	MS 18 / HS 20 *[5]*
Number of main spans:	4
Main spans material:	Steel *[3]*
Main spans design:	Culvert *[19]*
Deck type:	Not applicable *[N]*

Latest Available Inspection: July 2018

Good/Fair/Poor Condition:	Fair
Status:	Open, no restriction *[A]*
Average daily traffic:	8,419 *[as of 2014]*
Truck traffic:	5% of total traffic
Structural appraisal:	Somewhat better than minimum adequacy to tolerate being left in place as is *[5]*
Water adequacy appraisal:	Equal to present minimum criteria *[6]*
Roadway alignment appraisal:	Better than present minimum criteria *[7]*
Channel protection:	Bank protection is being eroded. River control devices and/or embankment have major damage. Trees and rush restrict the channel. *[5]*
Culvert condition:	Moderate to major deterioration or disintegration, extensive cracking and leaching or spalls on concrete or masonry walls and slabs. Minor settlement or misalignment. Noticeable scouring or erosion at curtain walls, wingwalls or pipes. Metal culverts have significant distortion and deflection in one section, significant corrosion or deep pitting. *[5]*
Scour condition:	Bridge foundations determined to be stable for assessed or calculated scour condition. *[5]*
Sufficiency rating:	85.4

Previous Inspections

Date	Condition	Culvert Condition	ADT	Suff. Rating
July 2018	Fair	5 out of 10	8419	85.4
July 2016	Fair	5 out of 10	8419	85.4
July 2014	Fair	5 out of 10	8419	85.4
July 2012	Fair	6 out of 10	8419	96.8
July 2010	Fair	6 out of 10	8419	96.8
July 2008	Fair	6 out of 10	8419	76.1
July 2006	Fair	6 out of 10	8419	85.2
July 2004	Fair	6 out of 10	8419	85.2
July 2002	Fair	6 out of 10	8419	85.2
July 2000	Fair	6 out of 10	8364	85.2
July 1998	Fair	6 out of 10	8309	83.2
July 1996	Fair	6 out of 10	9165	83.3
July 1994	Fair	6 out of 10	4000	85.2
July 1992	Fair	6 out of 10	4000	86.5
October 1991	Good	7 out of 10	3600	86.7

APPENDIX I
CROSS DRAIN CALCULATIONS

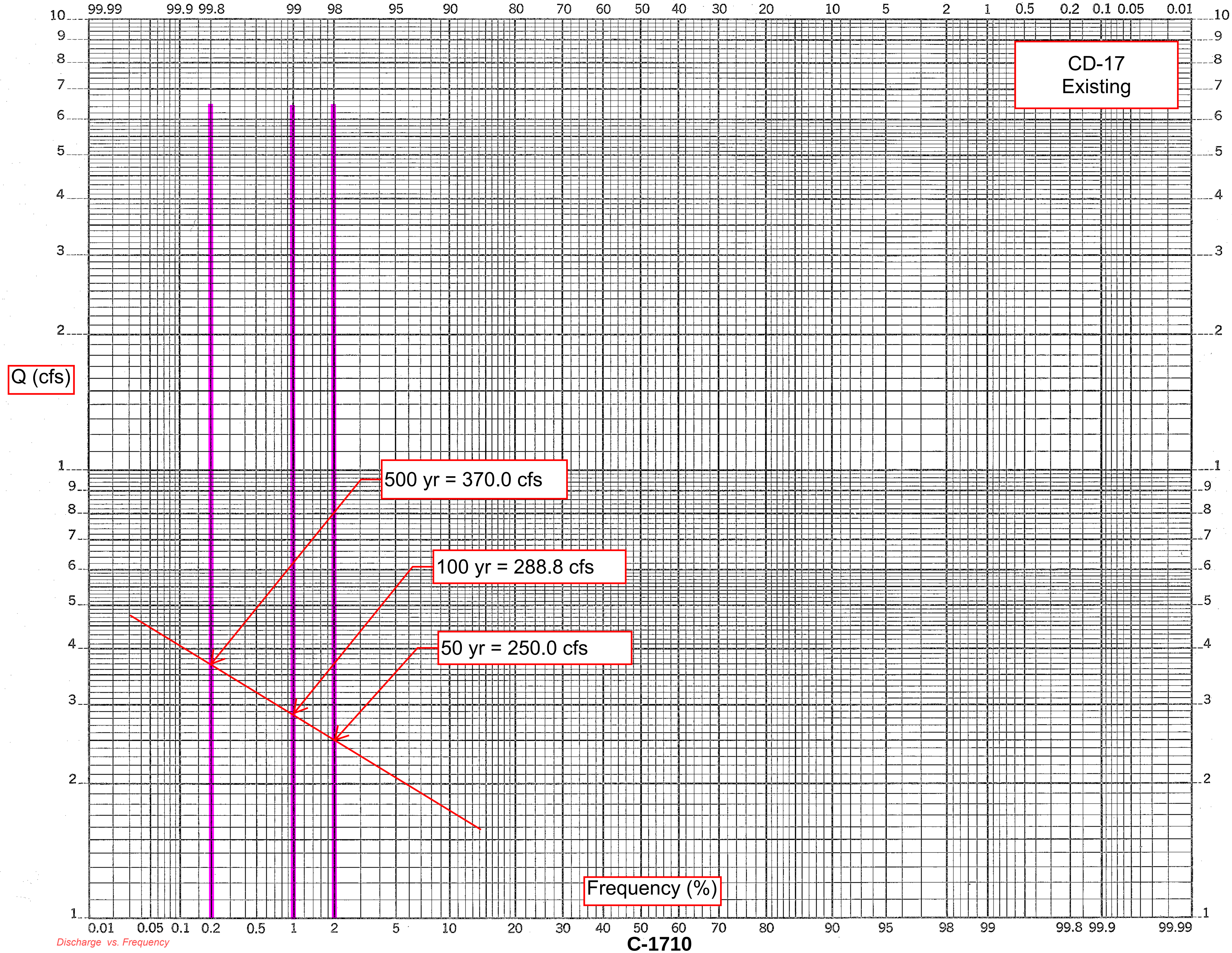
FDEP Permit No. 0187636-003-EI (I-4 BtU) project

C.2.7

CD-17

Prepared By:

FDOT


CD-17
Existing
Q (cfs)
500 yr = 370.0 cfs
100 yr = 288.8 cfs
50 yr = 250.0 cfs
Frequency (%)
Discharge vs. Frequency

C-1710

Crossing Discharge Data

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

Minimum Flow: 250 cfs

Design Flow: 288.8 cfs

Maximum Flow: 370 cfs

Table 37 - Summary of Culvert Flows at Crossing: EX. CD-17

Headwater Elevation (ft)	Total Discharge (cfs)	EX CD17 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
93.45	250.00	250.00	0.00	1
93.73	262.00	262.00	0.00	1
94.00	274.00	273.36	0.16	35
94.07	286.00	275.84	9.79	8
94.08	288.80	276.23	12.04	4
94.14	310.00	278.17	31.52	6
94.17	322.00	279.57	41.85	4
94.20	334.00	280.90	52.66	4
94.23	346.00	282.15	63.53	4
94.25	358.00	283.25	74.50	4
94.27	370.00	284.21	85.60	4
94.00	273.19	273.19	0.00	Overtopping

Rating Curve Plot for Crossing: EX. CD-17

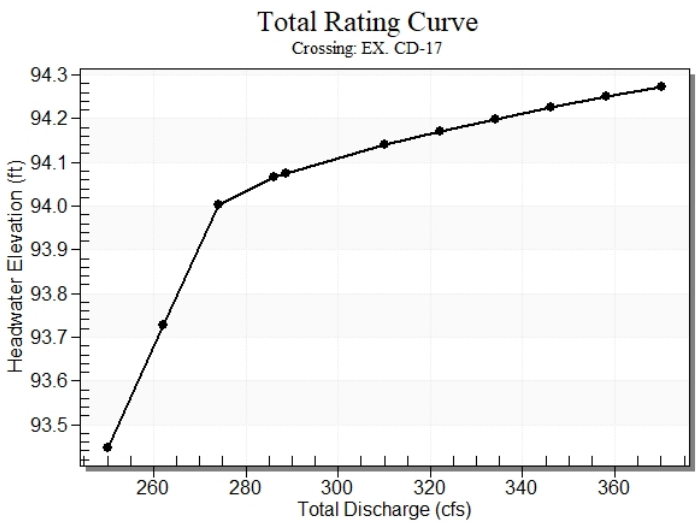


Table 38 - Culvert Summary Table: EX CD17

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
250.00	250.00	93.45	5.306	5.408	7-M2c	3.500	2.844	2.844	1.800	9.953	0.000
262.00	262.00	93.73	5.593	5.688	7-M2c	3.500	2.904	2.904	1.800	10.235	0.000
274.00	273.36	94.00	5.878	5.964	7-M2c	3.500	2.957	2.957	1.800	10.509	0.000
286.00	275.84	94.07	5.943	6.025	7-M2c	3.500	2.968	2.968	1.800	10.570	0.000
288.80	276.23	94.08	5.953	6.034	7-M2c	3.500	2.970	2.970	1.800	10.579	0.000
310.00	278.17	94.14	6.003	6.102	7-M2c	3.500	2.978	2.978	1.800	10.627	0.000
322.00	279.57	94.17	6.040	6.132	7-M2c	3.500	2.985	2.985	1.800	10.662	0.000
334.00	280.90	94.20	6.075	6.159	7-M2c	3.500	2.990	2.990	1.800	10.695	0.000
346.00	282.15	94.23	6.109	6.186	7-M2c	3.500	2.996	2.996	1.800	10.727	0.000
358.00	283.25	94.25	6.138	6.210	7-M2c	3.500	3.001	3.001	1.800	10.754	0.000
370.00	284.21	94.27	6.164	6.234	7-M2c	3.500	3.005	3.005	1.800	10.779	0.000

****

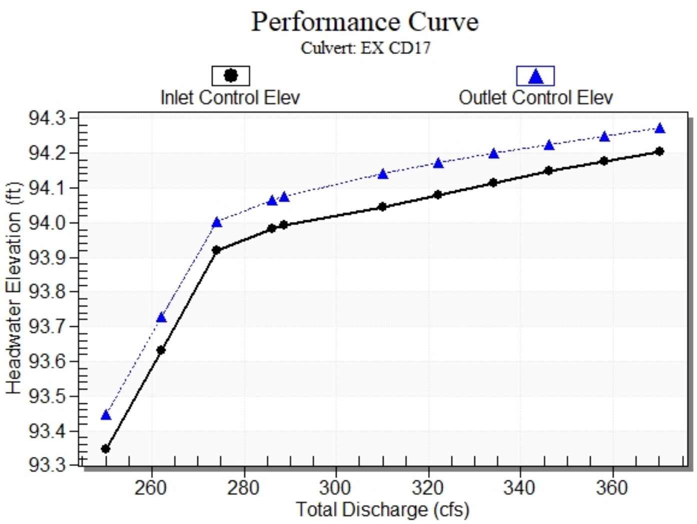
Straight Culvert

Inlet Elevation (invert): 88.04 ft, Outlet Elevation (invert): 87.79 ft

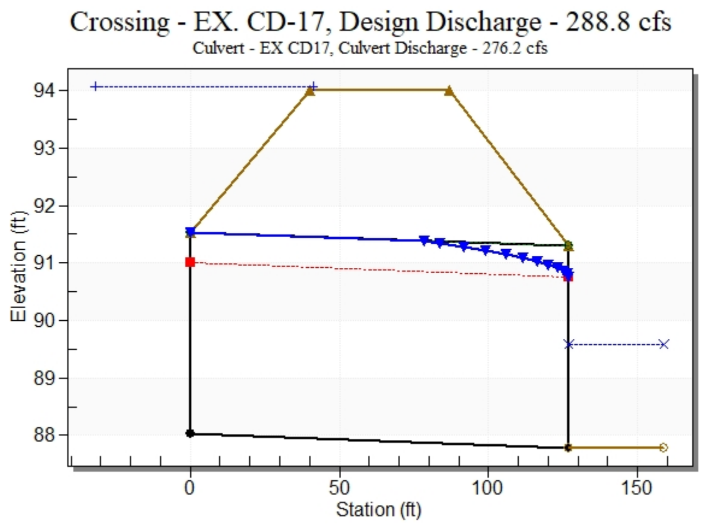
Culvert Length: 127.00 ft, Culvert Slope: 0.0020

****

Culvert Performance Curve Plot: EX CD17



Water Surface Profile Plot for Culvert: EX CD17



S

Inlet Station: 0.00 ft

Inlet Elevation: 88.04 ft

Outlet Station: 127.00 ft

Outlet Elevation: 87.79 ft

Number of Barrels: 3

Culvert Data Summary - EX CD17

Barrel Shape: Circular

Barrel Diameter: 3.50 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall

Inlet Depression: NONE

Table 39 - Downstream Channel Rating Curve (Crossing: EX. CD-17)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
250.00	89.59	1.80
262.00	89.59	1.80
274.00	89.59	1.80
286.00	89.59	1.80
288.80	89.59	1.80
310.00	89.59	1.80
322.00	89.59	1.80
334.00	89.59	1.80
346.00	89.59	1.80
358.00	89.59	1.80
370.00	89.59	1.80

Tailwater Channel Data - EX. CD-17

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 89.59 ft

Roadway Data for Crossing: EX. CD-17

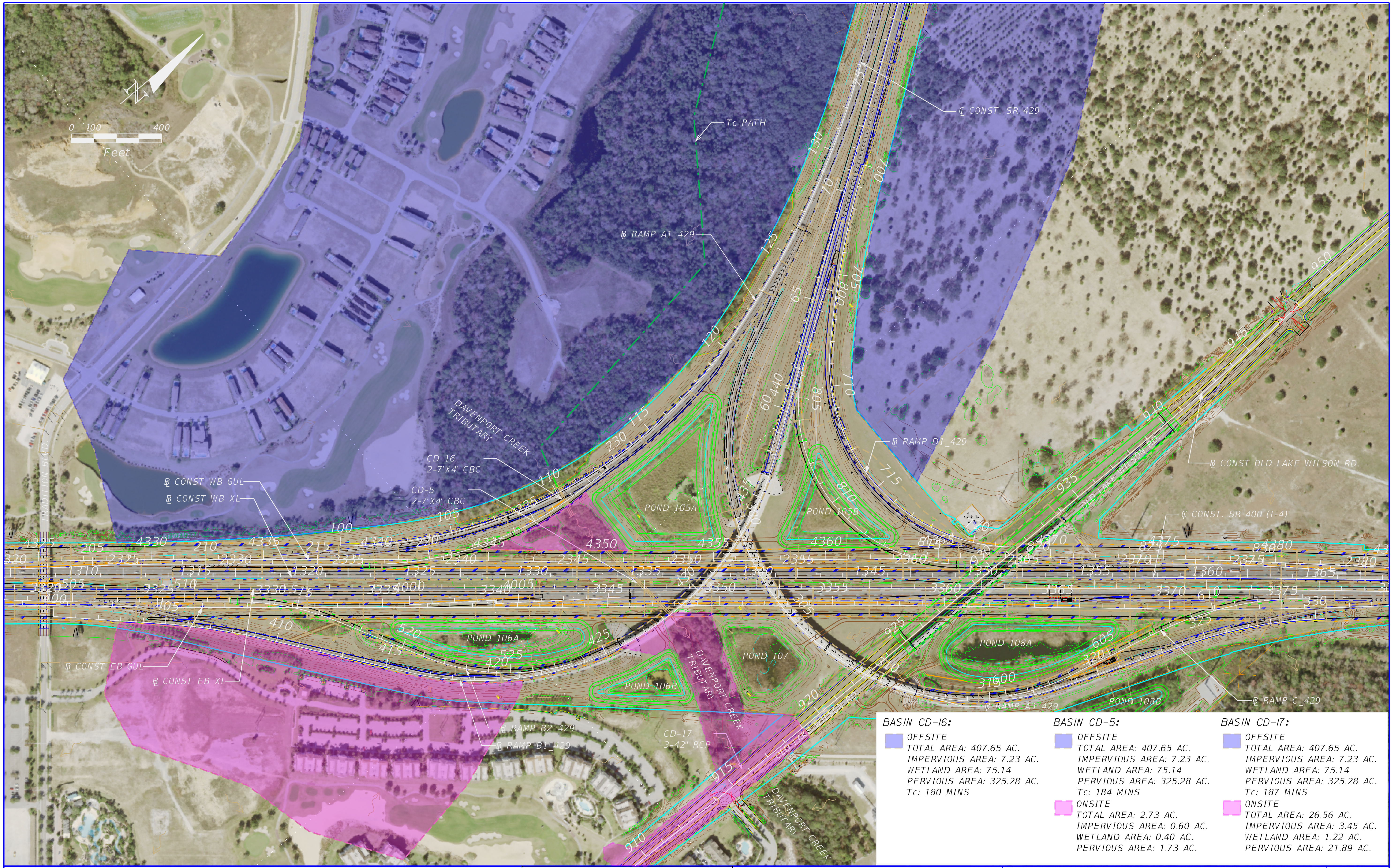
Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 200.00 ft

Crest Elevation: 94.00 ft

Roadway Surface: Paved

Roadway Top Width: 47.00 ft



BASIN CD-16:

OFFSITE
TOTAL AREA: 407.65 AC.
IMPERVIOUS AREA: 7.23 AC.
WETLAND AREA: 75.14
PERVIOUS AREA: 325.28 AC.
Tc: 180 MINS

BASIN CD-5:

OFFSITE
TOTAL AREA: 407.65 AC.
IMPERVIOUS AREA: 7.23 AC.
WETLAND AREA: 75.14
PERVIOUS AREA: 325.28 AC.
Tc: 184 MINS

ONSITE
TOTAL AREA: 2.73 AC.
IMPERVIOUS AREA: 0.60 AC.
WETLAND AREA: 0.40 AC.
PERVIOUS AREA: 1.73 AC.

BASIN CD-17:

OFFSITE
TOTAL AREA: 407.65 AC.
IMPERVIOUS AREA: 7.23 AC.
WETLAND AREA: 75.14
PERVIOUS AREA: 325.28 AC.
Tc: 187 MINS

ONSITE
TOTAL AREA: 26.56 AC.
IMPERVIOUS AREA: 3.45 AC.
WETLAND AREA: 1.22 AC.
PERVIOUS AREA: 21.89 AC.

REVISIONS

DATE	DESCRIPTION	DATE	DESCRIPTION

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P 407.971.8850

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

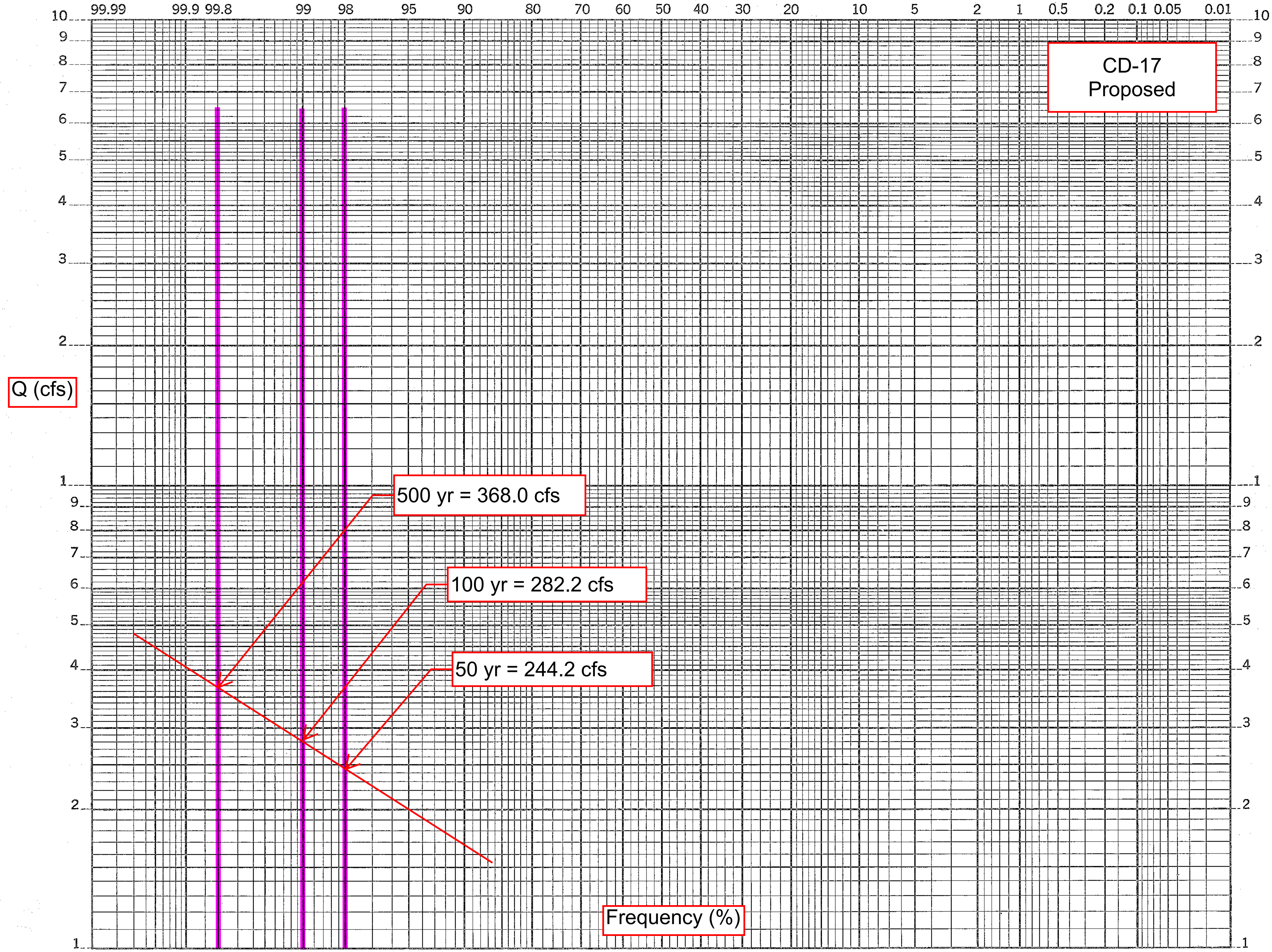
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 400	OSCEOLA	431456-1-32-01

CD-5 CD-16 & CD-17 PROPOSED BASIN MAP

SHEET NO.

C-1718

mlaos 2/20/2018 1:14:33 PM c:\pwworking\aecom_na\mlaos\dms31135\SEGC_CD-6_POST_BASIN_MAP_OFFSITE.DGN probability x 2 log cycles



Discharge vs. Frequency

C-1735

Crossing Discharge Data

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

Minimum Flow: 244.2 cfs

Design Flow: 282.2 cfs

Maximum Flow: 368 cfs

Table 40 - Summary of Culvert Flows at Crossing: PR. CD-17

Headwater Elevation (ft)	Total Discharge (cfs)	PR CD17 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
93.38	244.20	244.20	0.00	1
93.71	256.58	256.58	0.00	1
94.01	268.96	268.96	0.00	1
94.33	281.34	281.34	0.00	1
94.35	282.20	282.20	0.00	1
94.97	306.10	305.12	0.64	28
95.03	318.48	307.47	10.48	7
95.07	330.86	309.10	21.45	6
95.10	343.24	310.35	32.53	5
95.14	355.62	311.46	43.53	4
95.16	368.00	312.51	55.01	4
94.96	304.69	304.69	0.00	Overtopping

Rating Curve Plot for Crossing: PR. CD-17

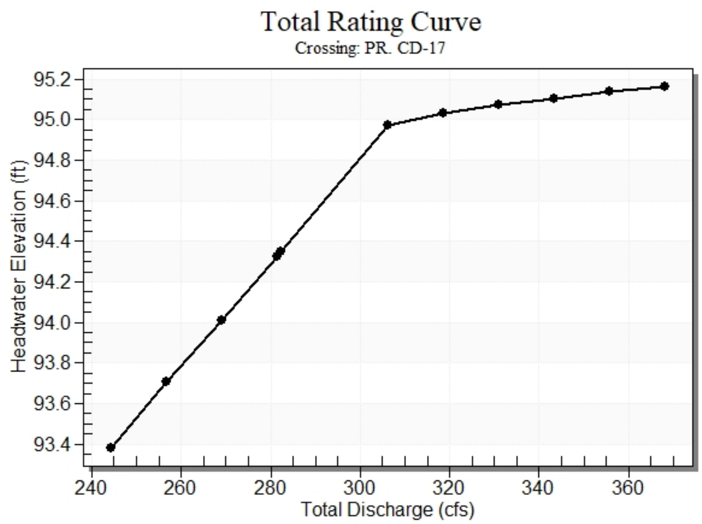


Table 41 - Culvert Summary Table: PR CD17

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
244.20	244.20	93.38	5.173	5.343	7-M2c	3.500	2.813	2.813	1.840	9.820	0.000
256.58	256.58	93.71	5.462	5.669	7-M2c	3.500	2.877	2.877	1.840	10.107	0.000
268.96	268.96	94.01	5.766	5.972	7-M2c	3.500	2.937	2.937	1.840	10.402	0.000
281.34	281.34	94.33	6.087	6.287	7-M2c	3.500	2.992	2.992	1.840	10.707	0.000
282.20	282.20	94.35	6.110	6.306	7-M2c	3.500	2.996	2.996	1.840	10.728	0.000
306.10	305.12	94.97	6.749	6.931	7-M2c	3.500	3.087	3.087	1.840	11.321	0.000
318.48	307.47	95.03	6.818	6.988	7-M2c	3.500	3.096	3.096	1.840	11.384	0.000
330.86	309.10	95.07	6.866	7.030	7-M2c	3.500	3.102	3.102	1.840	11.428	0.000
343.24	310.35	95.10	6.903	7.065	7-M2c	3.500	3.106	3.106	1.840	11.462	0.000
355.62	311.46	95.14	6.936	7.096	7-M2c	3.500	3.110	3.110	1.840	11.492	0.000
368.00	312.51	95.16	6.967	7.125	7-M2c	3.500	3.114	3.114	1.840	11.521	0.000

****

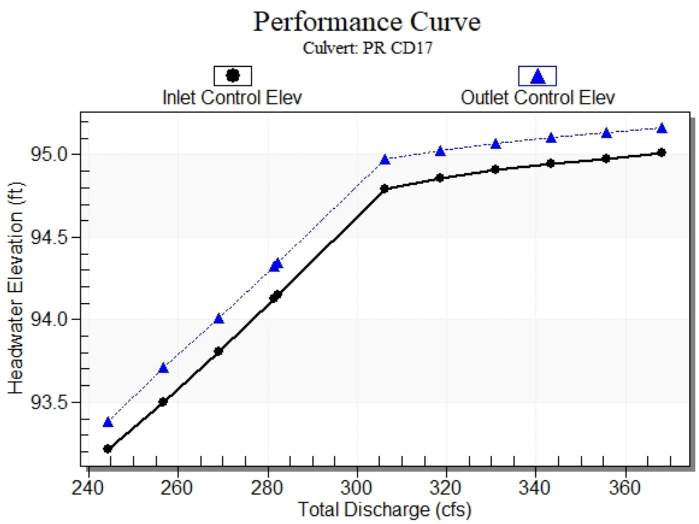
Straight Culvert

Inlet Elevation (invert): 88.04 ft, Outlet Elevation (invert): 87.74 ft

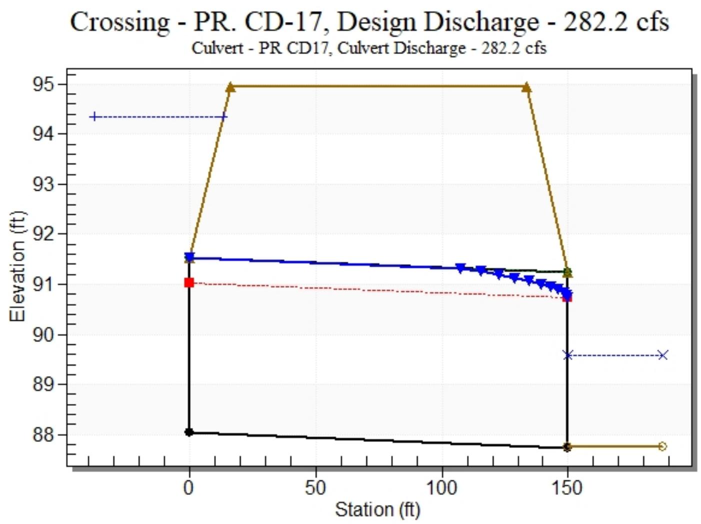
Culvert Length: 149.90 ft, Culvert Slope: 0.0020

****

Culvert Performance Curve Plot: PR CD17



Water Surface Profile Plot for Culvert: PR CD17



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Inlet Station: 0.00 ft

Inlet Elevation: 88.04 ft

Outlet Station: 149.90 ft

Outlet Elevation: 87.74 ft

Number of Barrels: 3

Culvert Data Summary - PR CD17

Barrel Shape: Circular

Barrel Diameter: 3.50 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall

Inlet Depression: NONE

Table 42 - Downstream Channel Rating Curve (Crossing: PR. CD-17)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
244.20	89.59	1.84
256.58	89.59	1.84
268.96	89.59	1.84
281.34	89.59	1.84
282.20	89.59	1.84
306.10	89.59	1.84
318.48	89.59	1.84
330.86	89.59	1.84
343.24	89.59	1.84
355.62	89.59	1.84
368.00	89.59	1.84

Tailwater Channel Data - PR. CD-17

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 89.59 ft

Roadway Data for Crossing: PR. CD-17

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 200.00 ft

Crest Elevation: 94.96 ft

Roadway Surface: Paved

Roadway Top Width: 117.00 ft

Project:	I-4 Beyond the Ultimate	Design By: MOL	Date: 3/19/2018
FDIP No.:	431456-1	Check by: REC	Date: 2/20/2018
Subject:	CD-17 Culvert Hydrological Analysis (Existing & Proposed)		

Existing Culvert

Note: The existing culvert information was obtained from the existing survey. In DEP number 49-187636001, CD-17 is named CD-1D. The tailwater elevation used matches the ICPR routing done with the permitted calculations for the SR 429 plans. The roadway elevation, at this location in the downstream end, is around 94.00 ft which is higher than the crown of pipe (tailwater) elevation. The crest length is 200 ft, the crest elevation is 94.00 NAVD and the top width is 47 ft. In the proposed condition the crest elevation is 94.96 NAVD and the top width is 117 ft.

Method used: *Rational Formula*

Existing culvert information:

Culvert span: *3.5 ft* Culvert rise: *3.5 ft*
No of culverts: *3* Material: *CBC*
Exist culvert length: *127.0 ft*
Avge flowline elev upstream: *88.04* (Navd)
Avge flowline elev downstream: *87.79* (Navd)
Longitudinal slope: 0.00197 = *0.1969%*
Tailwater: *(see below)*
Area of culvert (A): 36.75 sq ft

Estimate existing drainage area:

	Runoff coeff	Sta From	Sta To	Sta at Culvert	Area (Ac)	Slope (s) (ft/ft)	Tc (Note 1) (mins)
Total	0.25	4328+64.79	4363+37.00	915+80.00	447.80		
Elev		130.00		94.00		0.0064	187
Imp	0.95				11.75		
Wetland	0.40				77.06		
Perv	0.20				358.99		

Note 1: See Tc calculations.

Estimate existing drainage discharge:

Frequency (yr)	rainfall (i) (in/hr)	Storm Frequency Factor (X_T)	$Q = CiA\,X_T$ (Rational Formula) cu ft/s	Normal Depth (Dn) (ft)	Tailwater Existing (Note 2) (Navd)	HW Stage Existing (Note 3) (Navd)
50	1.83	1.20	250.0			*93.45*
100	2.03	1.25	288.8			*94.08*
500			*370.0*			*94.27*

Note 1: Q_{500} has been extrapolated from Discharge vs Frequency graph
Note 2: D_n estimated from std channel geometry with side slopes 6 and 4, bott width 5' and long slope 0.05%. TW = Dn + Invert
Note 3: Values obtained from HY 8 model of existing pipe

Project: I-4 Beyond the Ultimate		Design By: MOL	Date: 3/19/2018
FDIP No.: 431456-1			
		Check by: REC	Date: 2/20/2018
Subject: CD-17 Culvert Hydrological Analysis (Existing & Proposed)			

Proposed Culvert Replacement

Note: Culvert replacement span and rise to match existing

Proposed Information

	Length	Invert (Navd)
Upstream:		88.04
Downstream:		87.74
Total length of proposed culvert:	149.9 ft	

Estimate proposed drainage area:

	Runoff coeff	Sta From	Sta To	Area Note 1 (Ac)	Slope (s) (ft/ft)	Tc (Note 1) (mins)
Total	0.25	4328+64.79	4363+37.00	436.94		
Elev					0.0064	187
Perv	0.20			348.90		
Wetland	0.40			76.76		
Impv	0.95			11.28		

Note 1: See Tc Calculations

Estimate proposed discharge:

Frequency (yr)	rainfall (i) (in/hr)	Factor (Rational Formula)	Q = CiA (Rational Formula) (cu ft/s)	Normal Depth (Dn) (ft)	Tailwater Proposed (Note 2) (Navd)	HW Stage Proposed (Note 3) (Navd)
50	1.8	1.20	244.2			93.38
100	2.0	1.25	282.2			94.35
500			368.0			95.16

Note 1: Q_{500} has been extrapolated from Discharge vs Frequency graph

Note 2: D_n estimated from std channel geometry with side slopes 6 and 4, bott width 5' and long slope 0.05%. TW = Dn + Invert

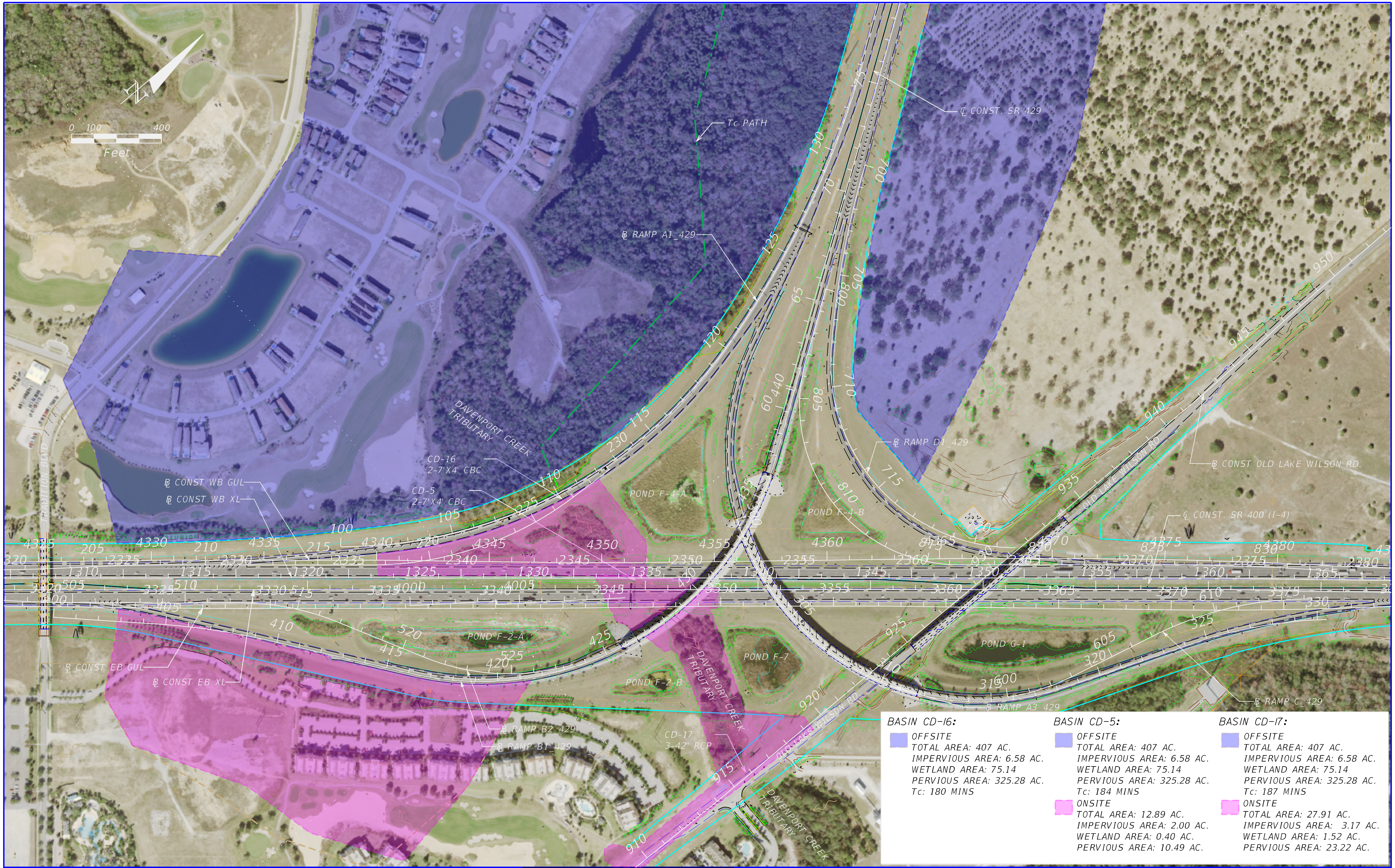
Note 3: Values obtained from HY 8 model of proposed extension pipe

Flood Hydraulic Data Comparison

Frequency (yr)	Existing HW stage	Proposed HW Stage
50	93.45	93.38
100	94.08	94.35
500	94.27	95.16

Overtopping	Existing	Proposed
Elev (Navd)	94.00	94.96
Q* (cfs)	273.2	304.7
Freq (Yr)	91	147

* From HY 8 culvert analysis and Discharge vs Frequency graph



BASIN CD-16:
- OFFSITE
  - TOTAL AREA: 407 AC.
  - IMPERVIOUS AREA: 6.58 AC.
  - WETLAND AREA: 75.14
  - PERVIOUS AREA: 325.28 AC.
  - Tc: 180 MINS

BASIN CD-5:
- OFFSITE
  - TOTAL AREA: 407 AC.
  - IMPERVIOUS AREA: 6.58 AC.
  - WETLAND AREA: 75.14
  - PERVIOUS AREA: 325.28 AC.
  - Tc: 184 MINS
- ONSITE
  - TOTAL AREA: 12.89 AC.
  - IMPERVIOUS AREA: 2.00 AC.
  - WETLAND AREA: 0.40 AC.
  - PERVIOUS AREA: 10.49 AC.

BASIN CD-17:
- OFFSITE
  - TOTAL AREA: 407 AC.
  - IMPERVIOUS AREA: 6.58 AC.
  - WETLAND AREA: 75.14
  - PERVIOUS AREA: 325.28 AC.
  - Tc: 187 MINS
- ONSITE
  - TOTAL AREA: 27.91 AC.
  - IMPERVIOUS AREA: 3.17 AC.
  - WETLAND AREA: 1.52 AC.
  - PERVIOUS AREA: 23.22 AC.

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

ENGINEER OF RECORD
Renato E. Chuw, PE
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Inwood Consulting Engineers, Inc.
Certificate of Authorization No. 7074
3000 Dovera Drive, Suite 200, Oviedo, Florida 32765
P 407.971.8850

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 400	OSCEOLA	431456-1-32-01

EX CD-5, CD-16 & CD-17 EXISTING BASIN MAP

SHEET NO.

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CROSS DRAIN CALCULATIONS

Patel, Greene & Associates, LLC

Designed By:	J. Rehrl
Date:	6/17/2022
Checked By:	M. Holt
Date:	6/17/2022

Subject: Reconstruction of Old Lake Wilson Road (CR 545)

Cross Drain Analysis

Structure Number:

Station:

Existing Cross Drain

Culvert Height/Pipe Size: (D	3.50 ft	*(42-in Pipe)*
Culvert Depth:	N/A	
Number of pipes:	3	
Pipe Type:	RCP	
Outfall:	Davenport Creek Tributary	
Flow Direction:	East	
Culvert Length:	127.00 ft	
Upstream Invert El.:	88.04 ft	
Downstream Invert El.:	87.79 ft	
Pipe Slope (ft/ft):	0.0020	
Road Pop-Over El.:	94.00 ft	
Basin Pop-Over El.:	N/A	*(Rough Approximation)*

Proposed Cross Drain

Culvert Height/Pipe Size: (D	3.50 ft	*(42-in Pipe)*
Culvert Depth:	N/A	
Number of pipes:	3	
Pipe Type:	RCP	
Outfall:	Davenport Creek Tributary	
Flow Direction:	East	
Upstream End Treatment:	ST- EW	*(If using a metered-end section, enter MES as text)*
Downstream End Treatment	ST- EW	*(If using a metered-end section, enter MES as text)*
Culvert Length:	151.00 ft	
Upstream Invert El.:	88.06 ft	
Downstream Invert El.:	87.77 ft	
Pipe Slope (ft/ft):	0.0019	
Road Pop-Over El.:	94.96 ft	*(Assumed 2" Asphalt-Overlay)*
Basin Pop-Over El.:	N/A	

Proposed Typical Section:

Number of Lanes:	4	
Lane Width:	11.0 ft	*(FDM 122.5.2.1)*
Required Clear Zone:	24.0 ft	*(FDM 215.2.3, See FDM Table 215.2.1)*
Median Width:	37.5 ft	
Additional Clearance:	9.8 ft	

HY-8 Culvert Analysis Report

Crossing Discharge Data

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

Minimum Flow: 244.20 cfs

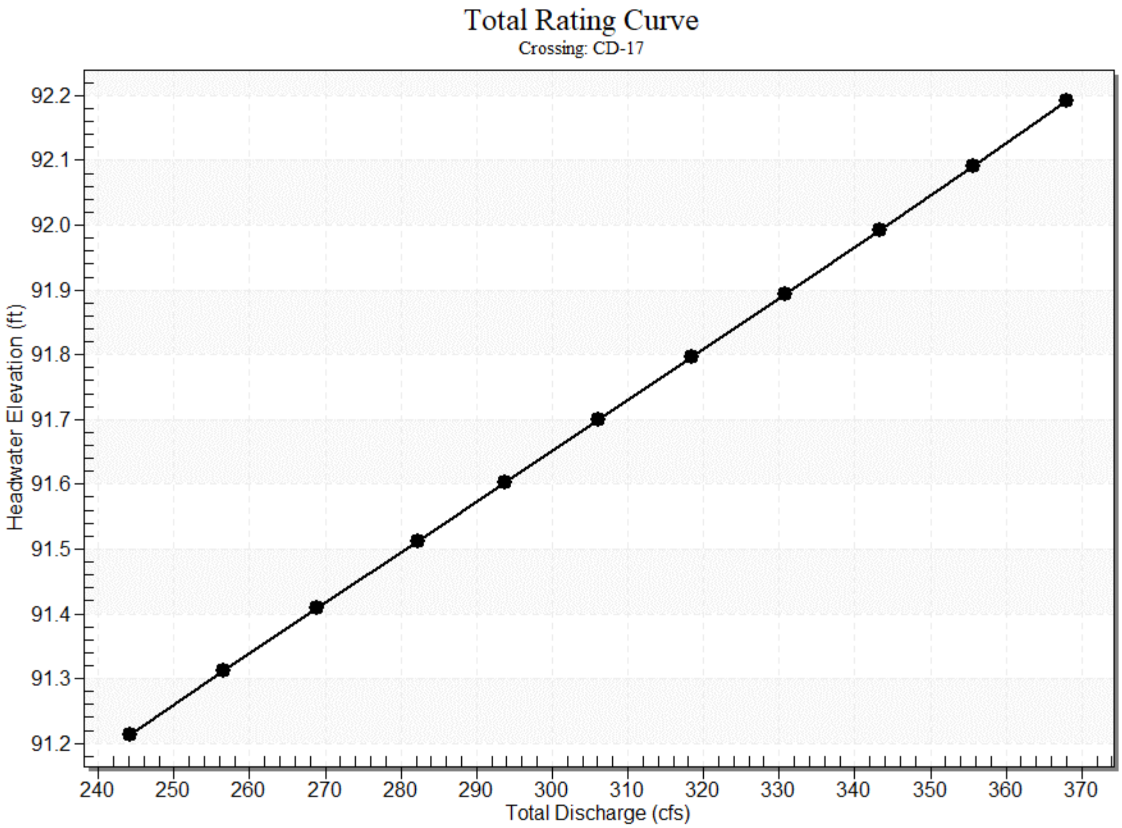
Design Flow: 282.20 cfs

Maximum Flow: 368.00 cfs

Table 1 - Summary of Culvert Flows at Crossing: CD-17

Headwater Elevation (ft)	Total Discharge (cfs)	Exist CD-17 Discharge (cfs)	Prop. CD-17 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
91.21	244.20	122.89	121.30	0.00	4
91.31	256.58	129.12	127.46	0.00	2
91.41	268.96	135.34	133.62	0.00	3
91.51	282.20	141.99	140.21	0.00	3
91.60	293.72	147.78	145.94	0.00	3
91.70	306.10	154.02	152.08	0.00	3
91.80	318.48	160.21	158.27	0.00	3
91.89	330.86	166.46	164.40	0.00	3
91.99	343.24	172.68	170.56	0.00	3
92.09	355.62	178.93	176.69	0.00	3
92.19	368.00	185.18	182.84	0.00	3
94.96	613.79	310.74	303.06	0.00	Overtopping

Rating Curve Plot for Crossing: CD-17



Culvert Data: Exist CD-17

Table 2 - Culvert Summary Table: Exist CD-17

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
244.20 cfs	122.89 cfs	91.21	3.00	3.174	2-M2c	2.47	1.99	1.99	1.80	7.25	0.00
256.58 cfs	129.12 cfs	91.31	3.10	3.272	2-M2c	2.57	2.04	2.04	1.80	7.38	0.00
268.96 cfs	135.34 cfs	91.41	3.19	3.369	2-M2c	2.67	2.09	2.09	1.80	7.51	0.00
282.20 cfs	141.99 cfs	91.51	3.30	3.472	2-M2c	2.80	2.15	2.15	1.80	7.65	0.00
293.72 cfs	147.78 cfs	91.60	3.39	3.562	7-M2c	2.93	2.19	2.19	1.80	7.77	0.00
306.10 cfs	154.02 cfs	91.70	3.48	3.659	7-M2c	3.11	2.24	2.24	1.80	7.89	0.00
318.48 cfs	160.21 cfs	91.80	3.58	3.756	7-M2c	3.50	2.29	2.29	1.80	8.02	0.00
330.86 cfs	166.46 cfs	91.89	3.68	3.853	7-M2c	3.50	2.33	2.33	1.80	8.15	0.00
343.24 cfs	172.68 cfs	91.99	3.79	3.951	7-M2c	3.50	2.38	2.38	1.80	8.28	0.00
355.62 cfs	178.93 cfs	92.09	3.89	4.051	7-M2c	3.50	2.42	2.42	1.80	8.41	0.00
368.00 cfs	185.18 cfs	92.19	4.00	4.151	7-M2c	3.50	2.46	2.46	1.80	8.53	0.00

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

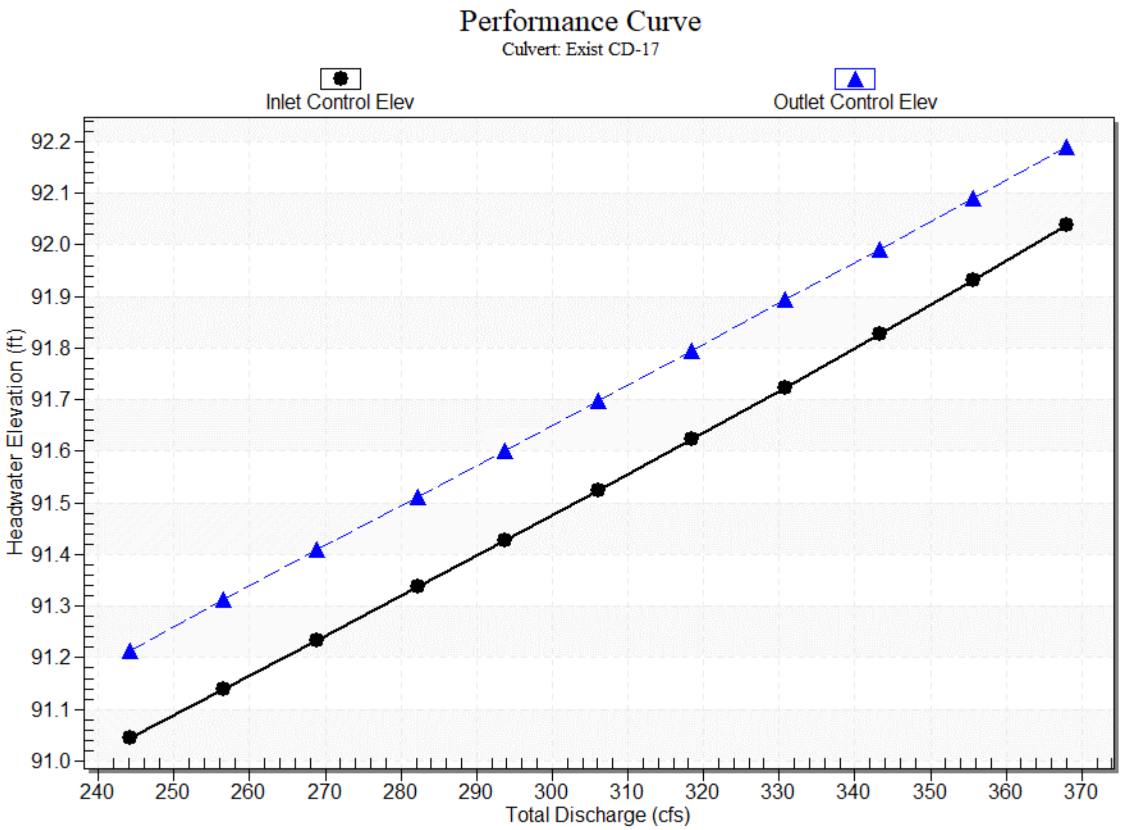
Inlet Elevation (invert): 88.04 ft,

Outlet Elevation (invert): 87.79 ft

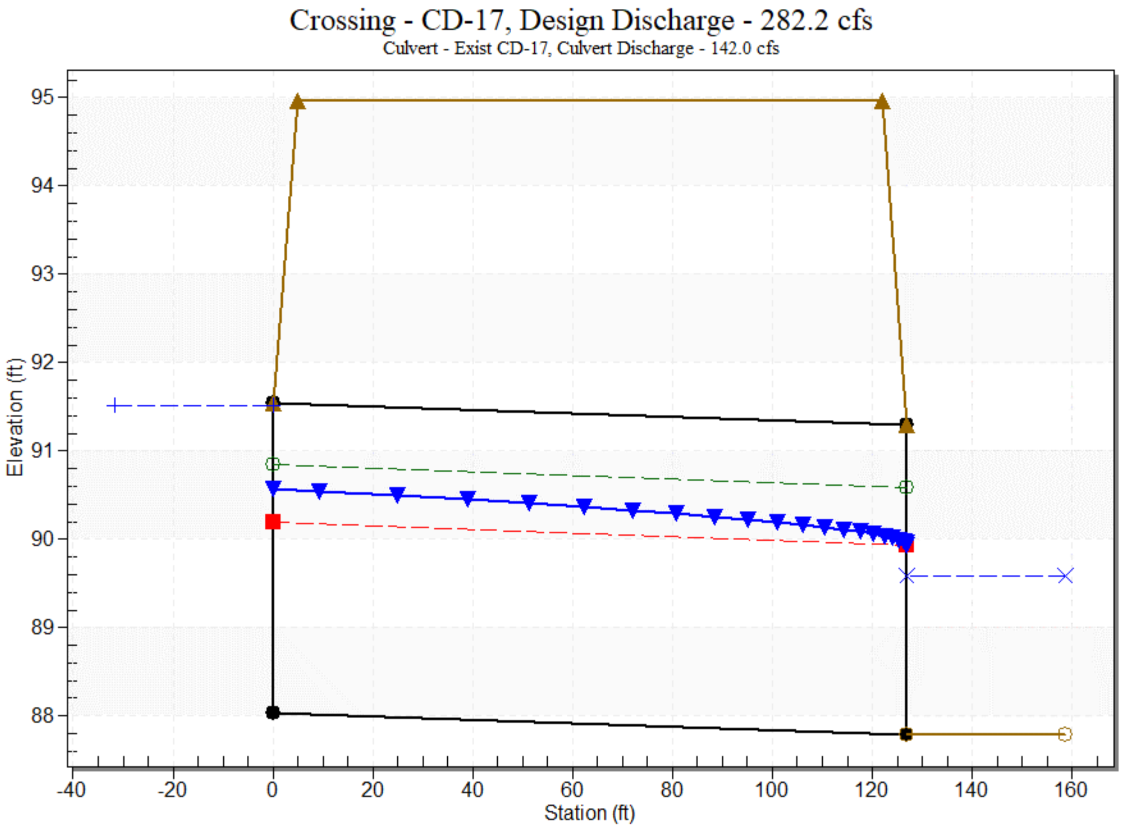
Culvert Length: 127.00 ft,

Culvert Slope: 0.0020

Culvert Performance Curve Plot: Exist CD-17



Water Surface Profile Plot for Culvert: Exist CD-17



Site Data - Exist CD-17

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 88.04 ft

Outlet Station: 127.00 ft

Outlet Elevation: 87.79 ft

Number of Barrels: 3

Culvert Data Summary - Exist CD-17

Barrel Shape: Circular

Barrel Diameter: 3.50 ft

Barrel Material:

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall (Ke=0.5)

Inlet Depression: None

Culvert Data: Prop. CD-17

Table 3 - Culvert Summary Table: Prop. CD-17

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
244.20 cfs	121.30 cfs	91.21	2.98	3.154	2-M2c	2.47	1.98	1.98	1.80	7.21	0.00
256.58 cfs	127.46 cfs	91.31	3.07	3.251	2-M2c	2.57	2.03	2.03	1.80	7.34	0.00
268.96 cfs	133.62 cfs	91.41	3.17	3.349	2-M2c	2.67	2.08	2.08	1.80	7.47	0.00
282.20 cfs	140.21 cfs	91.51	3.27	3.452	2-M2c	2.80	2.13	2.13	1.80	7.61	0.00
293.72 cfs	145.94 cfs	91.60	3.36	3.542	7-M2c	2.93	2.18	2.18	1.80	7.73	0.00
306.10 cfs	152.08 cfs	91.70	3.45	3.639	7-M2c	3.11	2.23	2.23	1.80	7.85	0.00
318.48 cfs	158.27 cfs	91.80	3.55	3.736	7-M2c	3.50	2.27	2.27	1.80	7.98	0.00
330.86 cfs	164.40 cfs	91.89	3.65	3.834	7-M2c	3.50	2.32	2.32	1.80	8.11	0.00
343.24 cfs	170.56 cfs	91.99	3.75	3.932	7-M2c	3.50	2.36	2.36	1.80	8.23	0.00
355.62 cfs	176.69 cfs	92.09	3.85	4.031	7-M2c	3.50	2.40	2.40	1.80	8.36	0.00
368.00 cfs	182.84 cfs	92.19	3.96	4.131	7-M2c	3.50	2.45	2.45	1.80	8.49	0.00

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

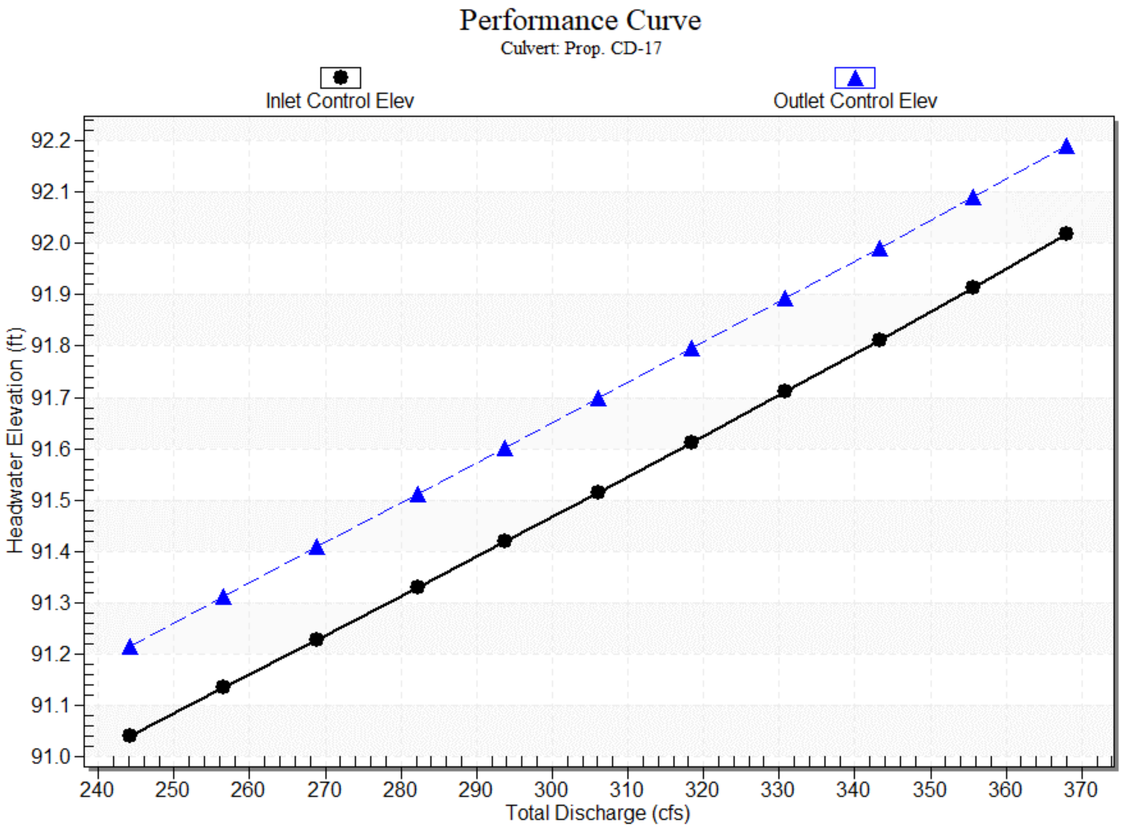
Inlet Elevation (invert): 88.06 ft,

Outlet Elevation (invert): 87.77 ft

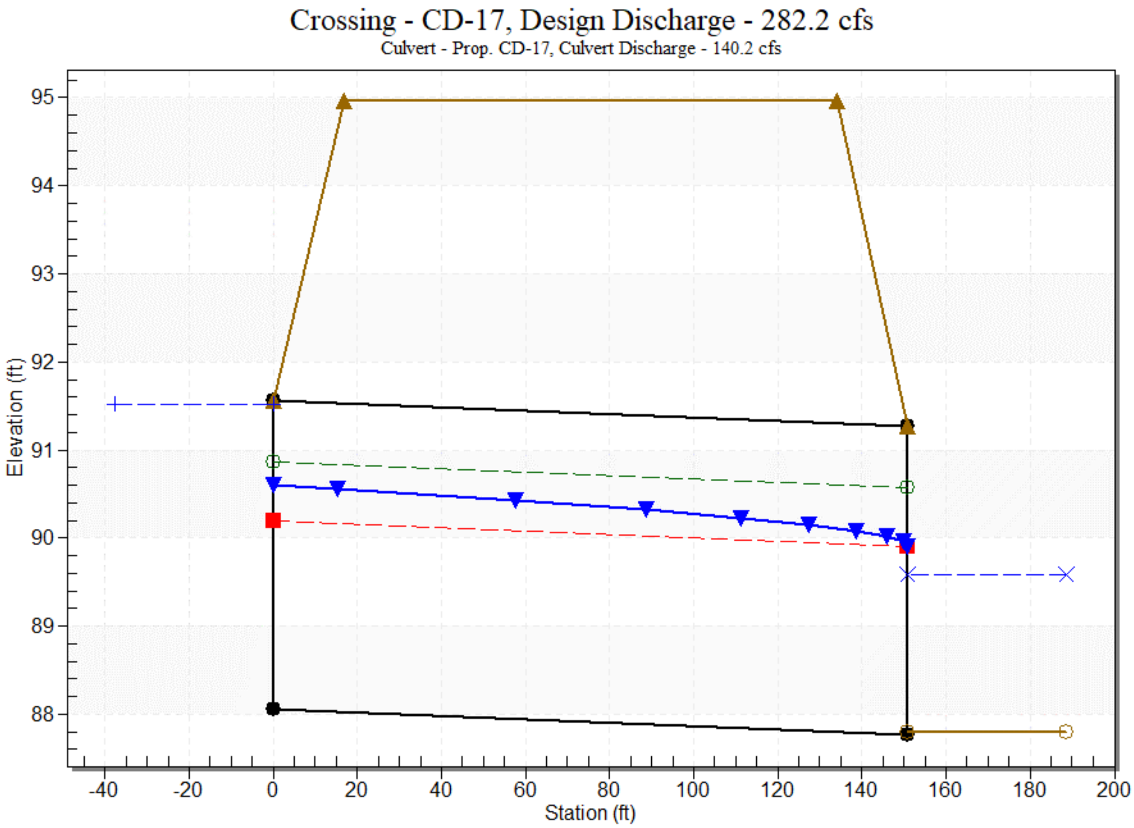
Culvert Length: 151.00 ft,

Culvert Slope: 0.0019

Culvert Performance Curve Plot: Prop. CD-17



Water Surface Profile Plot for Culvert: Prop. CD-17



Site Data - Prop. CD-17

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 88.06 ft

Outlet Station: 151.00 ft

Outlet Elevation: 87.77 ft

Number of Barrels: 3

Culvert Data Summary - Prop. CD-17

Barrel Shape: Circular

Barrel Diameter: 3.50 ft

Barrel Material:

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall (Ke=0.5)

Inlet Depression: None

Tailwater Data for Crossing: CD-17

Table 4 - Downstream Channel Rating Curve (Crossing: CD-17)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
244.20	89.59	1.80
256.58	89.59	1.80
268.96	89.59	1.80
282.20	89.59	1.80
293.72	89.59	1.80
306.10	89.59	1.80
318.48	89.59	1.80
330.86	89.59	1.80
343.24	89.59	1.80
355.62	89.59	1.80
368.00	89.59	1.80

Tailwater Channel Data - CD-17

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 89.59 ft

Roadway Data for Crossing: CD-17

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 200.00 ft

Crest Elevation: 94.96 ft

Roadway Surface: Paved

Roadway Top Width: 117.00 ft