

Pond Siting Report

Florida Department of Transportation

District 5

LPGA Boulevard PD&E Study

Limits of Project: From US 92 (SR 600) to Williamson Boulevard

Volusia County, Florida

Financial Management Number: 448456-1

ETDM Number: 14332

Date: February 2023

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



LPGA BOULEVARD FROM US 92 (SR 600) TO WILLIAMSON BOULEVARD PD&E STUDY

FPID: 448456-1-22-01

POND SITING REPORT

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February 2023



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Executive Summary

FDOT is conducting a Project Development and Environment (PD&E) Study of LPGA Boulevard from US 92 (International Speedway Boulevard) to Williamson Boulevard within the City of Daytona Beach in Volusia County (approximately 6.2 miles).

Existing LPGA Boulevard is a two-lane roadway from US 92 to Tomoka Farms Road (east of the Tomoka River), a four-lane roadway from Tomoka Farms Road to the I-95 Southbound Ramps, and a six-lane roadway from the I-95 Southbound Ramps over I-95 to Williamson Boulevard. There are 14 intersections along the corridor including ramp terminals at the I-95 interchange, nine of which are signalized.

The proposed improvements involve widening of LPGA Boulevard which will include the addition of bicycle and pedestrian facilities and modifications to the LPGA Boulevard/I-95 interchange.

This Pond Siting Report (PSR) was prepared as a component of the PD&E Study in accordance with the Florida Department of Transportation (FDOT) PD&E Manual (July 1, 2020). This report will preliminarily analyze the appropriate location and size of stormwater drainage ponds to account for the increase of stormwater runoff due to the proposed roadway improvements, as well as floodplain compensation ponds for the areas with encroachments within the 100-year floodplain.

Three (3) pond site alternatives were considered and evaluated for each of the project basins throughout the preparation of this study. However, ongoing new development of the area had an impact on the decision-making process, as the availability and suitability of potential pond sites was affected by changing conditions. Where feasible three alternative stormwater management facilities were sized to provide the required treatment volume as well as the difference between the pre and post-development runoff volume.

The recommended sites are based on hydraulic factors, potential wetland impacts, site availability, joint-use potential, ROW needs, and preliminary construction cost estimates. The tables below reflect the selected stormwater pond sites and floodplain compensation pond sites respectively.

Table 0-1: Selected Stormwater Pond Alternative Locations

BASIN No.	POND NO.	POND AREA AC.
1	1B	1.22
2 & 3	2B+3A	2.62
4	4B	1.32
5	5B	1.39
6	6C	2.12
7	7A	1.51
8	8B	1.82
9 & 10	9C+10A	3.47
11	11A	1.56
12 & 13	12C+13A	2.48
13	13B	1.72
14	14B, 14C, 14D, 14E	3.62
15	15A, 15B, 15C, 15D	3.96
16	16A, 16B, 16C, 16D	6.67
17	17A, 17B, 17C	4.75

Table 0-2: Selected Floodplain Compensation Alternative Locations

LOCATION	POND No.	POND AREA (AC.)
Basin 1	1D	2.47
Basin 1	1E	2.41
Thayer Canal	6E	0.40
Basin 9	9D	2.16
Basin 9	9E	2.09
Basin 9	9F	2.08

1 Introduction

This Pond Siting Report (PSR) was prepared as a component of the PD&E Study in accordance with the Florida Department of Transportation (FDOT) PD&E Manual (July 1, 2020). This report will preliminarily analyze the appropriate location and size of stormwater drainage ponds to account for the increase of stormwater runoff due to the proposed roadway improvements.

The purpose of this stormwater report is to:

- Size ponds to provide additional runoff attenuation and water quality treatment
- Evaluate alternatives for stormwater management systems
- Identify stormwater pond locations
- Analyze impacts to adjacent properties
- Analyze impacts to wetlands and other environmental resources
- Identify opportunities for joint use locations
- Identify right-of-way needs
- Recommend pond sites

2 Project Description

FDOT is conducting a Project Development and Environment (PD&E) Study of LPGA Boulevard from US 92 (International Speedway Boulevard) to Williamson Boulevard within the City of Daytona Beach in Volusia County (approximately 6.2 miles). A project location map is provided in **Figure 2-1** and the USGS Quadrangle Map is provided in **Figure 2-2**.

LPGA Boulevard is a county road maintained by Volusia County, except between Tomoka Farms Road and Technology Boulevard/Outlet Boulevard where FDOT maintains the limited access right-of-way to the I-95 interchange. Most of LPGA Boulevard does not have paved shoulders and sidewalks, and there are only limited areas of sidewalks between Tymber Creek Road and Williamson Boulevard.

I-95 is a six-lane, Strategic Intermodal System (SIS) facility and is a hurricane evacuation route. The I-95 interchange at LPGA Boulevard (Exit 265) is a partial cloverleaf interchange, or parclo interchange, with six on and off ramps. This interchange is located approximately 3.5 miles north of the I-95 and US 92 interchange and approximately 2.7 miles south of the I-95 and SR 40 interchange.

Existing LPGA Boulevard is a two-lane roadway from US 92 to Tomoka Farms Road (east of the Tomoka River), a four-lane roadway from Tomoka Farms Road to the I-95 Southbound Ramps, and a six-lane roadway from the I-95 Southbound Ramps over I-95 to Williamson Boulevard. There are 14 intersections along the corridor including ramp terminals at the I-95 interchange, nine of which are signalized.

The proposed improvements involve widening of LPGA Boulevard which will include the addition of bicycle and pedestrian facilities and modifications to the LPGA Boulevard/I-95 interchange. See **Figure 2-3** for the proposed typical sections.

2.1 Purpose and Need

The purpose of this project is to accommodate existing and projected future travel demand, enhance safety, and improve operations for the LPGA Boulevard corridor and the I-95 interchange.

The need for the project is based on existing and future transportation demand and safety along the LPGA Boulevard corridor and at the interchange area. Improvements are necessary to address unacceptable levels of service (LOS) (below target LOS D and LOS E) and enhance the safety of travel conditions along LPGA Boulevard and at the I-95 interchange area.

2.2 Project Datum

The primary vertical datum for this report and in the project calculations is NAVD 88. Where practical, elevations are shown in both NAVD 88 and NGVD 29 to enable direct comparison between values in this report and those mostly used by the regulatory agencies and topographic references (NGVD 29). The vertical datum conversion for the project location is: NAVD 88 = NGVD '29 – 1.13ft.



Figure 2-1: Project Location Map

LPGA Boulevard from US 92 (SR 600) to Williamson Boulevard PD&E Study Pond Siting Report



Figure 2-2. USGS Quadrangle Map

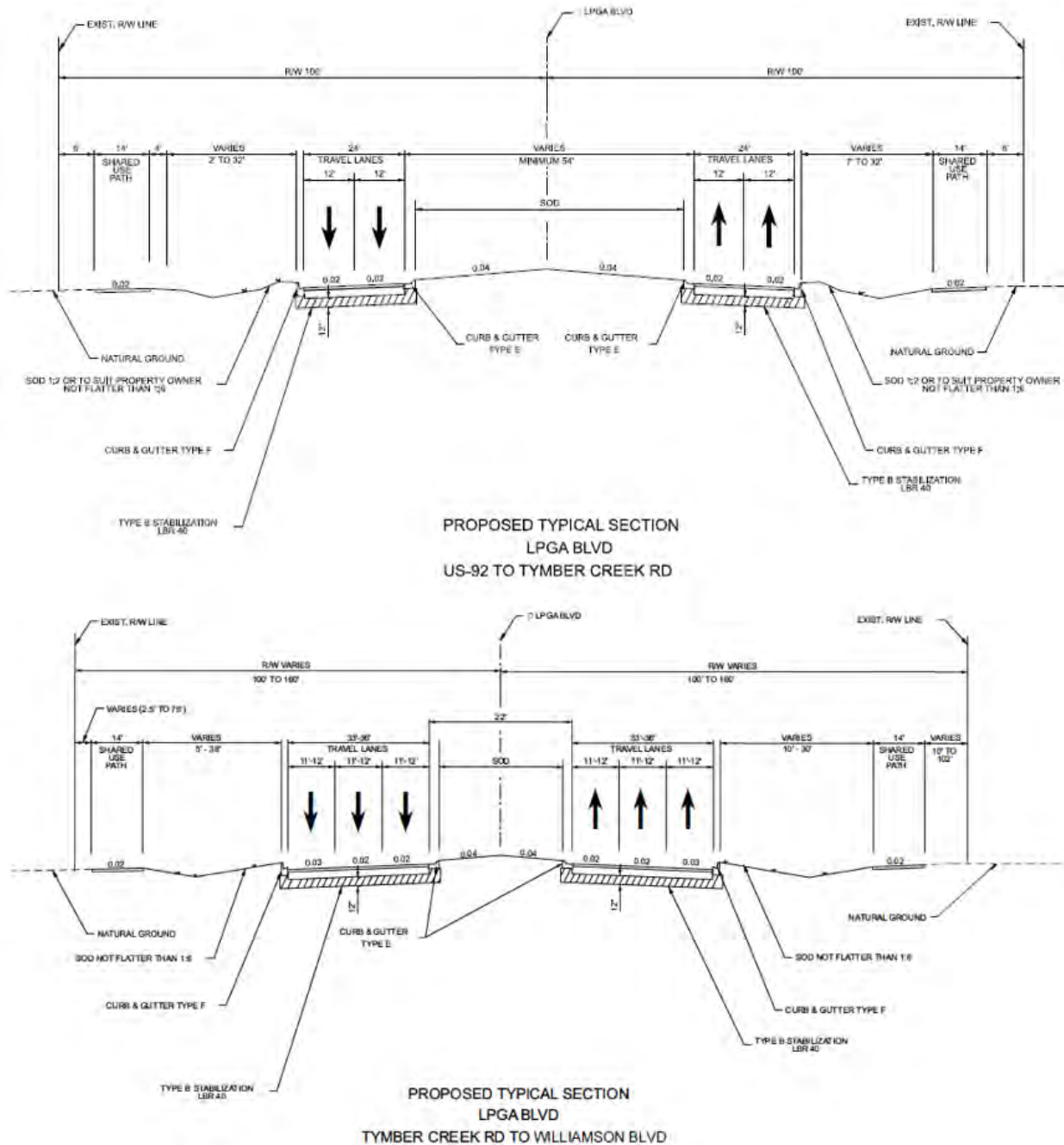


Figure 2-3: Proposed Typical Sections

3 Data Collection

Field reviews were performed to observe and document the existing drainage conditions of the corridor, and to assist on the determination of existing drainage patterns.

A coordination meeting with the FDOT District 5 Drainage Office was held on March 1, 2022, to obtain their feedback on the proposed improvements and document any concerns. Minutes from these meetings are provided in **Appendix F**.

In order to locate the existing stormwater facilities, determine existing drainage patterns within the limits of the corridor, potential site availability, and design criteria and requirements, the following sources were used:

- Volusia County – Tomoka River Watershed Management Plan, CDM -1993
- FDOT Drainage Manual, 2021 & 2022
- FDOT Drainage Design Guide, 2022
- SJRWMD Environmental Resource Permitting Manual
- Federal Emergency Management Agency (FEMA), Panel Nos. 12127C0351H, 12127C0352H, 12127C0353H, 12127C0361H and 12127C0363H.
- Volusia County Property Appraiser Website
- SJRWMD Environmental Permit Research
- USDA Soil Conservation Service (SCS) Web Soil Survey
- US Fish & Wildlife Service National Wetlands Inventory
- NOAA Atlas 14 Point Precipitation Frequency Estimates for Daytona Beach, FL
- NOAA LIDAR Data
- USGS Quadrangle Map
- FDOT Aerial Maps

4 Design Criteria

The stormwater management facilities for this project will be designed to meet the requirements of St. Johns River Water Management District (SJRWMD) and FDOT.

4.1 Water Quality Treatment

The SJRWMD requires that all projects meet State water quality standards, as set forth in Chapter 62-302, Florida Administrative Code (FAC). To assure that these criteria are met, the proposed improvements must meet the following volumetric retention/detention requirements:

Water quality treatment shall be provided for the greater of the following:

- 1" of stormwater runoff from the total contributing area
- 2.5" times the contributing impervious area.

An additional 50% treatment shall be provided for systems discharging into Outstanding Florida Waters.

Due to the shallow groundwater within the limits of the project area, water quality treatment will be provided with wet detention systems. These systems are permanently wet ponds designed to slowly release stormwater runoff through an outlet structure. As noted by SJRWMD during the ELA meeting, compensatory treatment can be provided with the best scenario being acre/acre compensation of "like" areas and will be evaluated by the District in a case by case basis.

4.2 Water Quantity

The SJRWMD requires that the post-development peak rate of discharge must not exceed the pre-development peak rate of discharge for the 25-year frequency, 24-hour duration storm.

4.3 FDOT Criteria

Ponds were designed to meet minimum FDOT design criteria with maximum, side slopes of 1:4. The proposed ponds include a 20-foot maintenance berm and one foot of freeboard from the inside edge of the maintenance berm to the maximum Design High Water (DHW). A 20% contingency is also considered in the calculations.

4.4 Special Basin Criteria

4.4.1 Outstanding Florida Waters

This project ultimately discharges into the Tomoka River which is classified as an Outstanding Florida Water therefore 50% of additional water quality treatment volume shall be provided.

4.4.2 Total Maximum Daily Load (TMDL) Requirements

The Tomoka River is in the Florida Department of Environmental Protection (FDEP) verified list of "Impaired" waterbodies therefore a Nutrient Loading Analysis shall be performed to show a net nutrient reduction for the post development conditions.

5 Environmental Look Around

A technical meeting was held with SJRWMD, Volusia County and City of Daytona Beach as part of the coordination efforts of this project on October 28, 2022. During this meeting the following was discussed:

- Potential opportunities for implementing regional stormwater facilities. Although SJRWMD was open to the use of regional ponds, no specific opportunities were found feasible.
- Opportunities for joint use ponds in parcels owned by the City of Daytona Beach.
- Water quality treatment alternatives within the project right-of-way.
- Innovative pond site alternatives.
- Discharge into the Bennett Swamp.

The meeting minutes for each of these meetings have been included in **Appendix F**.

6 Existing and Proposed Conditions

6.1 Topography

After review of the LIDAR data obtained from NOAA, it was determined that the elevations on the corridor are generally flat ranging from 27.00' to 33.00' in the area south of the Thayer Canal. From the Thayer Canal to Tymber Creek Road, ground elevations vary from 24.00' to 29.00', and the segment just west of the Tomoka River ranges between elevations 19.00' and 22.00'. Elevations east of the I-95 Interchange vary between 29.00' and 25.00'.

6.2 Soils and Groundwater Elevation

Based on the USDA Soil Conservation Service (SCS) Web Soil Survey, soils in the area are predominantly sandy with a small portion of muck in the lower areas. These soils have a groundwater depth of approximately 1 foot below the ground surface except for the area just west of the Tomoka River, where the groundwater is approximately 4 feet below the existing ground.

Figure 6.1 shows the Soils Map and **Table 6.1** reflects the corresponding soil classification.

Table 6-1: NRCS Soils Group Summary

Map Unit Symbol	Map Unit Name	Hydrological Group
3	Arents	A
8	Basinger fine sand, frequently ponded, 0 to 1 percent slopes	A/D
17	Daytona sand, 0 to 5 percent slopes	A
23	Farmton fine sand	B/D
24	Fluvaquents	D
25	Gator muck, 0 to 1 percent slopes, frequently flooded	C/D
29	Immokalee sand	B/D
32	Myakka-Myakka, wet, fine sands, 0 to 2 percent slopes	A/D
37	Orsino fine sand, 0 to 5 percent slopes	A
45	Pineda-Pineda, wet, fine sand, 0 to 2 percent slopes	A/D
47	Pits	N/A
49	Pomona fine sand	A/D
50	Pomona fine sand, depressional, 0 to 2 percent slopes	A/D
51	Pomona-St. Johns complex	A/D
53	Pompano-Placid complex	A/D
56	Samsula muck, frequently ponded, 0 to 1 percent slopes	A/D
60	Smyrna-Smyrna, wet, fine sand, 0 to 2 percent slopes	A/D
75	Wauchula fine sand	A/D

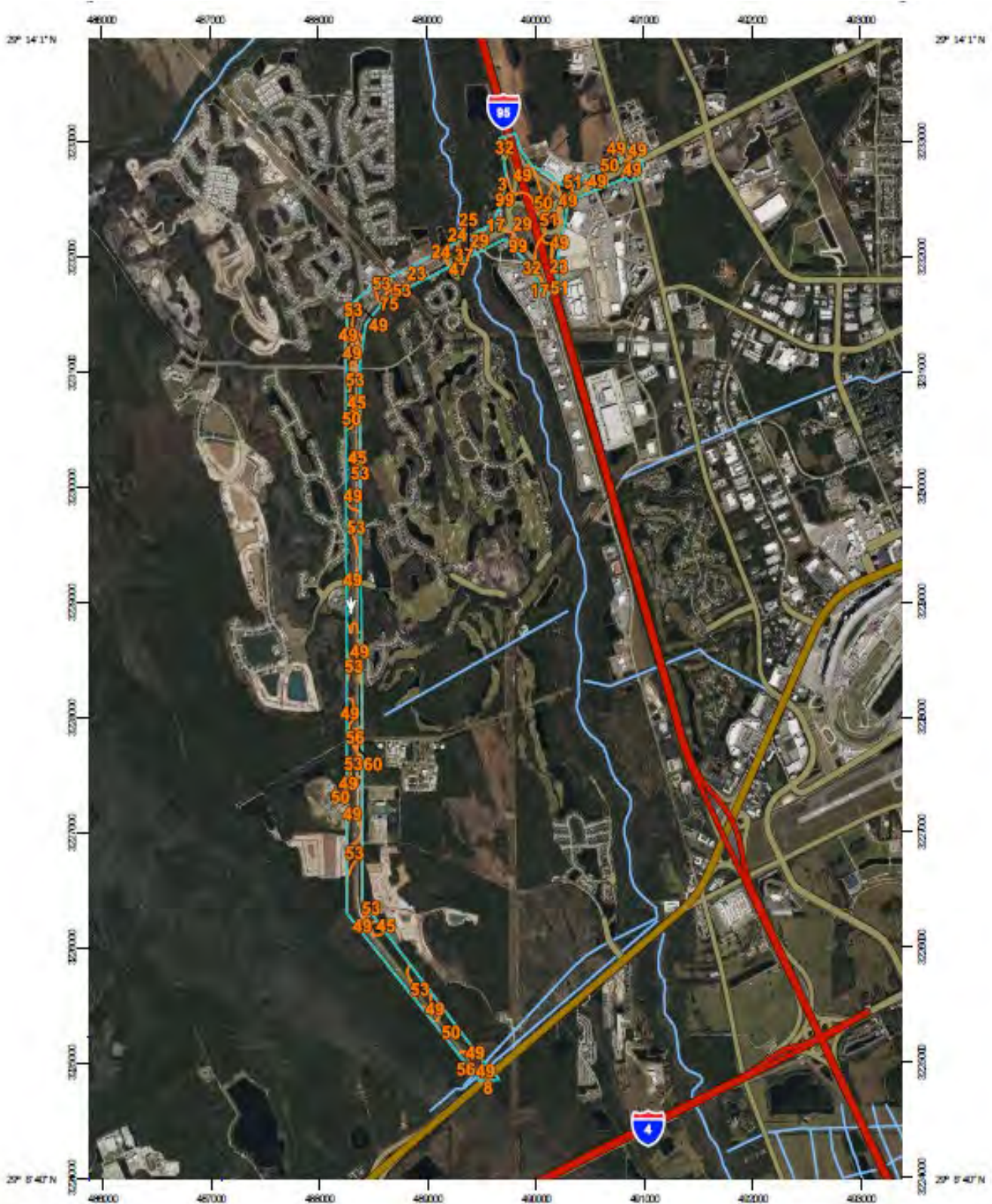


Figure 6-1: NRCS Soils Map

The soil 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.

6.3 Wetlands

From desktop review of FWS National Wetlands Inventory, wetlands in the project area are classified as Freshwater Emergent Wetlands, Freshwater Forested/Shrub Wetlands and Riverine Wetlands. **Appendix A** reflects the general location of these wetlands in relation to the proposed improvements.

6.4 Cross Drains and Bridges

Twenty-two (22) cross drains have been identified through the project. Cross drains 1 thru 16 were installed in the 1970s as part of the original road construction to allow runoff from the west of the corridor into the wetlands on the east. Although the as-built plans for these improvements reflect a cross-drain at station 518+00, it appears that it was either removed or not installed therefore runoff in that area sheet flows to the wetlands in the west. There have been several developments in the area since then, thus altering flow patterns and routing runoff outside of the public right-of-way. Many of these existing cross drains no longer serve the original purpose intended and shall be removed.

Table 6-2: Cross drain summary

CD No.	Location	Culvert Size & Type
1	301+14.00	(2) 7'X5' BC
2	318+97.00	(2) 30" RCP
3	329+97.00	(2) 30" RCP
4	343+97.00	(2) 24" RCP
5	357+00.00	(2) 24" RCP
6	377+07.00	(2) 24" RCP
7	384+08.00	(2) 30" RCP

CD No.	Location	Culvert Size & Type
8	400+08.00	(2) 30" RCP
9	412+00.00	(2) 6'X8' BC
10	422+10.00	(2) 36" RCP
11	442+10.00	(2) 30" RCP
12	456+10.00	(2) 24" RCP
13	473+10.00	(2) 36" RCP
14	489+10.00	(2) 24" RCP
15	500+10.00	(2) 18" RCP
16	540+35.00	(2) 36" RCP
17	560+84.00	(2) 48" RCP
18	Exist. Ramp D	8'x6' BC
19	I-95	8'x6' BC
20	Exist. Ramp B	6'x5' BC
21	596+42.00	6'x5' BC
22	608+20.00	(2) 48" RCP

The existing bridge over the Tomoka River will be replaced. The Bridge Hydraulics Report for those improvements is provided under separate cover.

6.5 Existing Drainage Conditions

This project is within the limits of the Tomoka River Watershed. The existing drainage characteristics vary throughout the corridor and can be divided into three (3) segments and a total of twenty (20) basins created by existing drainage divides and on existing drainage features.

6.5.1 LPGA Boulevard from US 92 to the Tomoka River

The existing drainage system in this segment consists of open shoulders and roadside ditches. A total of 199.22 acres of off-site area from the west side of the corridor have been identified. This off-site runoff sheet flows into the ditches on the west and is conveyed through cross drains into the wetlands on the east side, eventually discharging into the Tomoka River without any water quality treatment. Basins 1-13 have been identified in this area:

6.5.1.1 Basin 1

This is the southernmost basin which extends from Station 300+87.79 to Station 311+09.01. It has a total on-site drainage area of 7.95 acres, and it receives runoff from 10.09 acres of off-site area. This basin ultimately outfalls into the US 92 Canal at its southernmost limit.

6.5.1.2 Basin 2

Basin 2 extends from station 311+09.01 to station 329+95.07 and encompasses an on-site area of 8.66 acres. 26.76 acres of off-site area have been identified in this basin. The outfall for this basin is at station 319+00.00 through 2-30" pipes.

6.5.1.3 Basin 3

This basin starts at station 329+95.07 and ends at station 353+42.68. It consists of 10.78 acres of on-site area and receives runoff from 33.36 ac of off-site area. The outfall for this basin is at station 334+00.00 through 2-24" pipes which discharge into the adjacent wetlands.

6.5.1.4 Basin 4

Basin 4 extends from station 353+42.68 to station 367+80.00 and encompasses an on-site area of 6.60 acres. 24.58 acres of off-site area have been identified in this basin. This basin outfalls into the adjacent wetlands at station 357+00.00 through 2-24" pipes.

6.5.1.5 Basin 5

This basin is located between station 367+80.00 and station 384+16.22. It contains an on-site drainage area of 7.51 acres and receives runoff from 3.14 acres of off-site area. The outfalls for this basin are at station 377+00.00 (2-24") pipes and at station 384+00.00 (2-30" pipes) which discharge into the adjacent wetlands.

6.5.1.6 Basin 6

This basin starts at station 384+16.22 and ends at station 412+17.45. It consists of 12.86 acres of on-site area and receives runoff from 15.44 ac of off-site area. This basin outfalls into the adjacent wetlands at station 400+00.00 through 2-30" pipes.

6.5.1.7 Basin 7

Basin 7 starts at the Thayer Canal (station 412+17.45) and ends at station 432+50.62. This basin is comprised of 9.34 acres of on-site drainage area and 47.51 acres of off-site area. This basin outfalls into the adjacent wetlands at station 422+00.00 through 2-24" pipes and also into the Thayer Canal.

6.5.1.8 Basin 8

This basin is in the area of the Tennis Center between stations 432+50.62 and 456+06.82. 10.82 acres of on-site area are included in this basin along with 38.34 acres of off-site area. The outfall for this basin is at station 442+10.00 through 2-30" pipes which discharge into the adjacent wetlands.

6.5.1.9 Basin 9

Basin 4 extends from station 456+06.82 to station 489+12.03 and encompasses an on-site area of 15.18 acres. No off-site area has been identified in this basin. This basin outfalls into the adjacent wetlands at station 473+00.00 through 2-36" pipes.

6.5.1.10 Basin 10

Basin 10 extends from station 489+12.03 to station 516+71.62 and encompasses an on-site area of 12.67 acres. No off-site area has been identified in this basin. This basin outfalls into the adjacent wetlands at station 500+10.00 through 2-18" pipes.

6.5.1.11 Basin 11

This basin starts at station 516+71.62 and ends at station 536+09.39. It consists of 9.06 acres of on-site area without any off-site area identified. This basin outfalls into the adjacent wetlands in the west side of the corridor.

6.5.1.12 Basin 12

Basin 4 extends from station 536+09.39 to station 548+19.67 and encompasses an on-site area of 6.60 acres. 24.58 acres of off-site area have been identified in this basin. This basin outfalls into the adjacent wetlands at station 540+15.00.

6.5.1.13 Basin 13

Basin 4 extends from station 548+19.67 to station 568+54.32 and encompasses an on-site area of 9.07 acres. No off-site area has been identified in this basin. This basin outfalls into the adjacent wetlands at station 560+85.00.

6.5.2 I-95 Interchange

The interchange is divided into four (4) basins associated with the four quadrants.

6.5.2.1 Basin 14

This basin corresponds to the NW quadrant of the interchange. Runoff from the southbound on-ramp and off-ramp discharges into the NW ditch and into the infield dry pond and is conveyed to the infield wet pond through a series of cross drains, for treatment and attenuation, and eventually discharges into the 11th Street Canal located along the south side of LPGA.

6.5.2.2 Basin 15

This basin corresponds to the SW quadrant. Runoff from the southbound on-ramp is collected by the SW ditch and by the infield pond which provides treatment and attenuation prior to discharging into the 11th Street Canal through an open ditch.

6.5.2.3 Basin 16

This basin is associated with the NE quadrant of the interchange. Runoff from the northbound on-ramp is collected by the NE ditch and by the infield wet ponds which provide treatment and attenuation prior to discharging into the open ditch which connects to the 11th Street Canal through culvert crossings under LPGA.

Runoff from approximately 36.42 acres of off-site area from the adjacent property (Buc-ee's) is attributed to this basin. This property has two outfall locations: 1) Station 4032+20.00 into the ditch on the north side of LPGA; and 2) Station 914+00.00 into the ditch on the east of the I-95 northbound on-ramp.

6.5.2.4 Basin 17

The SE quadrant corresponds to this basin. Runoff from the northbound off-ramp and on-ramp is collected, treated and attenuated by the infield wet ponds prior to discharging into the 11th Street Canal through a closed drainage system.

6.5.2.5 Basin 19 and Basin 20

These two basins are associated with the I-95 northbound and southbound lanes south of the interchange and discharge into the Relocated NW 11th Street Canal.

6.5.3 Technology Boulevard to N. Williamson Boulevard

6.5.3.1 Basin 18

This basin extends from station 611+57.30 to station 633+00.00 and comprises 7.77 acres of drainage area. This basin discharges into the ditch along the south side of the corridor for treatment prior to final discharge into the 11th Street Canal.

6.6 Proposed Drainage Conditions

Drainage patterns in the post-development conditions will remain generally similar as in the pre-development conditions in terms of basin limits and ultimate discharge points. A closed storm drain system will be installed throughout the corridor to collect and convey the runoff to the discharge points.

Water quality treatment will be provided for the entire project area with wet detention ponds as the proposed alternative for treatment and attenuation. Pre-development vs. post-development analysis shall be performed to ensure the peak rate of discharge for the 25-year frequency, 24-hour duration storm is not exceeded in the proposed conditions.

Below is a general summary of the proposed improvements in the three (3) segments identified in section 6.5.

6.6.1 LPGA Boulevard from US 92 to the Tomoka River

To accommodate the proposed roadway improvements, length, locations, and size of the cross drains shall be modified during the design phase. There is no anticipated off-site runoff from the west with the extension of the culvert crossings. Water quality treatment and flood attenuation will be provided with wet detention ponds prior to ultimate discharge into the Tomoka River.

6.6.1.1 Basins 1 – 13:

The proposed drainage system for this segment of the corridor will consist of curb inlets and a series of closed pipe networks that will convey the runoff to the proposed wet detention ponds for water quality treatment and attenuation prior to discharging into the wetlands and eventually into the Tomoka River.

6.6.2 I-95 Interchange

6.6.2.1 Basins 14-17

Water quality treatment and flood attenuation will be provided in the infield areas. The existing roadside ditch in the NE quadrant along the north side of LPGA will be impacted with the proposed roadway widening. Off-site runoff from the 18.67 acres currently discharging into this ditch will be collected and conveyed as part of the proposed roadway drainage system and will be conveyed to the infield areas. Impacts to the 11th Street Canal consisting of culvert installation and canal realignment are anticipated to accommodate the proposed interchange configuration.

6.6.2.2 Basins 19-20

No drainage impacts are anticipated in these basins. Water quality treatment for these two basins will be provided as compensatory treatment in the interchange infield areas.

6.6.3 Technology Boulevard to N. Williamson Boulevard

6.6.3.1 Basin 18

Proposed drainage improvements in this basin will consist of relocation and adjustment of existing drainage features. Compensatory water quality treatment will be provided in the interchange infield areas.

7 Floodplains and Floodways

Floodplains and floodways are reflected in the Federal Emergency Management Agency (FEMA) Panel Nos. 12127C0351H, 12127C0352H, 12127C0353H, 12127C0361H and 12127C0363H. Limits of these FEMA's 100-year floodplains have been outlined on the Drainage Maps in **Appendix B. Appendix C** reflects the floodplain and floodway at Tomoka River which are designated as Zone AE with an established flood elevation. The floodplains located along the west side of the roadway are designated as Zone A without an established base flood elevation.

7.1 Floodplain Impacts

Floodplain encroachments for this project were analyzed for the 100-year floodplains based on LIDAR information obtained from NOAA, FEMA floodplain information, and on the Volusia County Tomoka River Watershed Management Plan completed in 1995 by Camp Dresser & McKee (CDM).

Although the existing roadway is out of the floodplain and there is no established FEMA floodplain on the west side of LPGA Blvd, as noted in Section 3 of the Location Hydraulics Report (submitted under separate cover), floodplain impacts were evaluated with the assumption that the BFE of the west side of the corridor is controlled by the east side of LPGA Blvd. since the floodplains are hydraulically connected. The floodplains on the east and south side of LPGA Boulevard are mostly located on FEMA Flood Zone AH with a BFE between 17 and 27 feet NAVD.

There will be slight floodplain impacts at the Thayer Canal (0.16 ac) which will be compensated with a wet pond. The floodway associated with the Tomoka River at the LPGA bridge location will not be impacted by the improvements since a longer span bridge is proposed to replace the existing bridge.



Figure 7-1: Thayer Canal Floodplain Impacts

Floodplain impact areas for which flood compensation ponds will be necessary are summarized in the table below:

Table 7-1: Floodplain Compensation Ponds Impact Areas

Location (From Sta. to Sta)		Floodplain Elevation (NAVD)	Impact Area (AC)
300+00.00	412+00.00	27	2.41
455+00.00	517+00.00	25	2.07
411+60.00	412+40.00	27	0.16

8 Stormwater Ponds

The available pond depth, including storage depth and freeboard, for alternative stormwater management facilities were sized based on the estimated average seasonal water table (ASWT) from NRCS soil data and ground surface elevations obtained from NOAA Lidar. The required storage volume within the pond includes the treatment volume as well as the difference between the pre-development and post-development runoff volume.

Alternative pond sites were identified based on available information including the following:

- Hydraulic feasibility – pond sites should be located at a proper elevation to provide sufficient vertical clearance between the roadway and pond NWL to accommodate treatment storage, attenuation volume and storm sewer hydraulic grade line.
- Environmental resource impacts - pond site should stay outside of wetlands to avoid any impacts. USWFS wetland inventory map is used for evaluation.
- Floodplain impacts
- Potential for utility impacts
- Right-of-Way (ROW) Impacts - pond sites should be located within FDOT’s property as much as possible to reduce ROW acquisition costs. In the case of a pond site located within private property, it’s preferred to layout the pond in a single property, instead of impacting multiple properties. The only offsite FDOT property is the parcel where Pond 1A is located.
- Potential for Joint-use Pond and/or regional opportunities – as discussed in ELA, the stormwater improvement sites identified in County’s Master Plan are too far away to serve both the project and County’s purpose. The opportunities of joint-use or regional pond are limited.

Existing Environmental Resource Permit records from SJRWMD were reviewed to also determine the feasibility and availability of the potential pond sites. **Table 8-1** provides a summary of the proposed pond site locations and **Appendix D** reflects the pond sizing calculations.

8.1 Pond Site Alternatives Evaluation

Three (3) pond site alternatives were considered and evaluated for each of the project basins throughout the preparation of this study. However, ongoing new development of the area had an impact on the decision-making process, as the availability and suitability of potential pond sites was affected by changing conditions.

Records from SJRWMD e-permitting website were reviewed to determine the potential site availability when reviewing the proposed site plans for these new developments. Pond site alternatives have been assessed to serve basins adjacent to each other.

Appendix G reflects a map with all the pond site locations evaluated throughout this process and the reasons behind the decision to remove them from the final selection.

8.2 Selected Pond Site Alternatives

Selected Locations for Stormwater and Floodplain Compensation ponds are outlined below.

Pond 1B

This pond site is in the NE corner of the intersection of LPGA and US 92 within a privately owned vacant parcel. There is a planned development in the area, but the ERP application was withdrawn in January 2023. Pomona fine sand is the dominant soil type in this area. This pond will discharge into the US 92 Canal. *This is a preferred pond site for Basin 1 since it is adjacent to the road and there is no ERP on record.*

Pond 1C+2A

Is in a privately owned parcel on the east side of the corridor approximately at station 312+00.00. Dominant soil type in this area is Pomona fine sand, and the groundwater table is approximately 1 foot below surface elevation. This pond will outfall into the adjacent wetlands. There is no SJRWMD ERP application on record for this parcel.

Pond 1D (Floodplain Compensation)

This pond site is in the NE corner of the intersection of LPGA and US 92 within a privately owned vacant parcel and it is adjacent to Pond 1B. This pond has an area of 2.47 acres and provides compensation for the encroachment in the floodplain between stations 300+00.00 and 412+00.00. *This is a preferred floodplain compensation pond location since it is in the same parcel as Pond 1B, it is adjacent to the road and there is no ERP on record.*

Pond 1E (Floodplain Compensation)

Is in a privately owned parcel on the east side of the corridor approximately at station 312+00.00. This pond has an area of 2.41 acres and provides compensation for the encroachment in the floodplain between stations 300+00.00 and 412+00.00.

Pond 2B+3A

This pond is approximately at station 327+00.00 in a privately owned parcel with Pompano-Placid complex soil as the dominant soil. Groundwater is approximately 1 foot below the surface. This pond discharges into the adjacent wetlands.

This is a preferred pond site for Basins 2 and 3 since there is no ERP on record, it could serve Basins 2 and 3, and it is adjacent to the road.

Pond 3C+4A

The site for this pond mainly consists of Pineda-Pineda, wet, fine sand soil. It is located approximately at station 351+00.00 on the east side of the corridor and it is within a privately owned parcel without any active ERP on record. This pond serves Basins 3 and 4 and discharges into the adjacent wetlands.

Pond 3B

Dominant soil in this site is Pomona fine sand. There is no active ERP on SJRWMD records, and it is in a privately owned parcel on the west side of the corridor approximately at station 357+00.00. This pond discharges into the wetlands on the east side of the road.

Pond 4B

This pond is approximately at station 361+00.00 just north of Royal County Blvd. in a private parcel with no active ERP on record. The dominant soil type at this site is Pompano-Placid complex and the groundwater is approximately 1 foot below the surface. The outfall for this pond will be into the wetland across Royal County Blvd.

This is a preferred pond site since it is closer to the road, there is no active permit on record, and it will not impact any wetlands.

Pond 4C+5A

The dominant soil at this pond site is Pompano-Placid complex. It is located approximately at station 372+50.00 on the east side of the road and discharges into the wetlands to the north. It is a privately owned parcel with no active permit on record.

Pond 5B

This pond site is a preferred site for Basin 5 since it is in City of Daytona Beach property. It is located at station 379+00.00 approximately 300 feet away from the LPGA right-of-way to avoid impacts to the wetlands adjacent to the road, where it will discharge to. Dominant soil type in this area is Smyrna-Smyrna, wet, fine sand. Also, there is no active permit on record.

Pond 6C

This site is owned by the City of Daytona Beach and has a dominant soil type Smyrna-Smyrna, wet, fine sand. It is located approximately at station 408+00.00 and it discharges into the adjacent wetlands.

This site is preferred for Basin 5 since it is in City property therefore there is a possibility of a joint use pond.

Pond 6E (Floodplain Compensation)

As noted in Section 7, there are minimal impacts to the Thayer Canal floodplain with the proposed improvements. This is the only alternative site for floodplain compensation in this area due to proposed/approved adjacent developments and wetlands therefore it is classified as a preferred

pond site location. This site consists mainly of Samsula muck. It is owned by the Diocese of Orlando and it is located approximately at station 411+00.00.

Pond 7A

This site is located on the west side of the corridor in a privately owned parcel with a permit for the Mosaic Southern Parcel Development. *It is a preferred site for Basin 7* since it is adjacent to the road, and there are no proposed improvements within that parcel. The dominant soil type is Pomona Fine sand, and the ultimate discharge location is the wetlands on the east side of the corridor approximately at station 415+00.00.

Pond 7B

Pond 7B is in a privately owned parcel part of the Legends Preserve Development on the east side of the corridor approximately at station 418+00.00. It discharges into the wetlands adjacent to the south and the dominant soil type is Pompano-Placid complex.

Pond 8B

Dominant soil type at this site is Pomona fine sand. This site, located at station 443+00.00, is a *preferred location for Basin 8* because it is adjacent to the road, there are no active ERPs on record, and it does not impact any wetlands. The discharge point for this pond is the adjacent wetlands to the south.

Pond 8C

This pond site is across from the Tennis Center approximately at station 451+00.00. Dominant soil type is Pompano-Placid complex and it discharges into the adjacent wetlands. It is located in a privately owned parcel with no active SJRWMD permit on record.

Pond 9A

This pond is located in a private parcel within the Bayberry Lakes Development on the west side of the road, approximately at station 460+00.00. Soil type is Pomona fine sand and it discharges into the wetlands on the east side of the corridor.

Pond 9B

The site for this pond mainly consists of Pompano-Placid complex soil. It is located approximately at station 475+50.00 on the east side of the corridor and it is within a privately owned parcel without any active ERP on record. This pond discharges into the adjacent wetlands on the east.

Pond 9C+10A

This pond is proposed within a parcel owned by the City of Daytona Beach at station 492+00.00 on the east side of the corridor. The dominant soil type is Pineda-Pineda, wet, fine sand, and discharges into the adjacent wetlands.

This is a preferred site for Basins 9 and 10 since it is in City property and per ELA meeting coordination, construction of a park is proposed in this area therefore there is a possibility of a joint use pond.

Pond 9D (Floodplain Compensation)

The site for this pond is located adjacent to Pond 9D on the east side of the corridor and it is within a privately owned parcel without any active ERP on record. This pond has an area of 2.16 acres and provides compensation for the encroachment in the floodplain between stations 455+00.00 and 517+00.00.

Pond 9E (Floodplain Compensation)

This pond is proposed within a parcel owned by the City of Daytona Beach on the east side of the corridor adjacent to Pond 9C+10A. This pond has an area of 2.09 acres and provides compensation for the encroachment in the floodplain between stations 455+00.00 and 517+00.00. *This is a preferred floodplain compensation pond location since it is shared with 9C+10A and it is within Pond 1B, it is adjacent to the road and there is no ERP on record.*

Pond 9F (Floodplain Compensation)

This pond is located to the east of the roadway is in a parcel owned by the City of Daytona Beach and it is adjacent to Pond 10B. It has an area of 2.08 acres and provides compensation for the encroachment in the floodplain between stations 455+00.00 and 517+00.00.

Pond 10B

This pond is in a parcel owned by the City of Daytona Beach at station 500+00.00. It is located to the east of the roadway and discharges into the adjacent wetlands. The dominant soil type is Pompano-Placid complex.

Pond 10C

Pond 10C is on the west side of the corridor within the Bayberry Lakes Development at station 504+00.00. It discharges into its adjacent wetlands on the west side. The site has Pompano-Placid complex as the dominant soil type.

Pond 11A

This pond is within a privately owner parcel within the Latitude Development. *This is a preferred pond site for Basin 11 since it is adjacent to the road and to an existing wet pond, and since there is no planned development for this area.* It discharges into the adjacent wetlands on the west side. The dominant soil type for this site, located at station 520+00.00 is Pomona fine sand.

Pond 11C

This pond discharges to the wetlands on the west side and is located at station 524+00.00. It is in a privately owned parcel within the Latitude Development. The site's soil type is Pomona fine sand.

Pond 12B

This pond is proposed approximately 500 feet away from the right of way to avoid future/approved development. It is proposed in a private parcel part of the Tymber Creek Development and discharges into the adjacent wetlands. Soil in the site is mainly Wauchula fine sand.

Pond 12C+13A

This is the preferred pond site for Basins 12 and 13 since it is adjacent to the road and there is no anticipated construction in this area which is part of the Tymber Creek Development. It is adjacent to a proposed dry retention area for the development and has Farmton fine sand soil type. This pond will ultimately discharge into the adjacent wetlands and is located at station 552+00.00.

Pond 13B

This pond is proposed adjacent to an existing wet pond part of the Latitude Development. The dominant soil type is Fluvaquents and is located on the north side of the corridor at station 566+00.00. It will ultimately discharge directly into the Tomoka River.

Ponds 14B, 14C, 14D & 14 E

These ponds serve the NW quadrant of the I-95 Interchange. The dominant soil type is Immokalee sand. These ponds will discharge into the 11th Street Canal prior to ultimately discharging into the Tomoka River.

Ponds 15A, 15B, 15C and 15D

These ponds serve the SW quadrant of the I-95 Interchange. The dominant soil type is Immokalee sand. These ponds will discharge into the 11th Street Canal prior to ultimately discharging into the Tomoka River.

Ponds 16A, 16B, 16C and 16D

These ponds serve the NE quadrant of the I-95 Interchange. The dominant soil type is Immokalee sand. Runoff from the NE property will be conveyed into these ponds prior to discharge into the 11th Street Canal.

Pond 17A, 17B and 17C

These ponds serve the SE quadrant of the I-95 Interchange. The dominant soil type is Immokalee sand. These ponds will discharge into the 11th Street Canal prior to ultimately discharging into the Tomoka River.

Interchange infield ponds will provide compensatory treatment for Basin 18, 19 and 20.

Table 8-1 provides a summary of the selected stormwater pond site alternatives, **Table 8-2** reflects the proposed alternatives for floodplain compensation ponds, and **Appendix D** reflects the pond sizing calculations.

Table 8-1: Selected Stormwater Pond Alternatives Summary

BASIN No.	W.Q. TREATMENT REQUIRED (AC-FT)	ATTENUATION VOLUME REQUIRED (AC-FT)	POND SIZE REQ'D (AC.)	POND SIZE PROVIDED (AC.)	POND No.	
1	1.14	0.55	1.22	1.49	1B	
1 & 2	2.36	1.18	2.17	2.36	1C+2A	
2 & 3	2.75	1.53	2.54	2.62	2B+3A	
3	1.55	0.91	1.63	1.91	3B	
3 & 4	2.46	1.40	2.34	2.51	3C+4A	
4	0.98	0.61	1.16	1.32	4B	
4 & 5	2.01	1.15	1.99	2.01	4C+5A	
5	1.10	0.70	1.28	1.39	5B	
6	1.85	1.06	1.86	2.12	6C	
7	1.35	0.83	1.49	1.51	7A	
7	1.35	0.83	1.49	1.66	7B	
8	1.56	0.91	1.64	1.82	8B	
8	1.56	0.91	1.64	1.78	8C	
9	2.16	1.22	2.10	2.24	9A	
9	2.13	1.18	1.91	2.23	9B	
9 & 10	3.90	2.08	3.36	3.47	9C+10A	
10	1.82	1.05	1.84	1.97	10B	
10	1.82	1.05	1.84	2.05	10C	
11	1.32	0.79	1.45	1.56	11A	
11	1.32	0.79	1.45	1.64	11C	
12	0.86	0.53	1.06	1.20	12B	
12 & 13	2.15	1.73	2.35	2.48	12C+13A	
13	1.35	1.23	1.69	1.72	13B	
14	4.10	1.93	3.38	2.47	3.62	14B
	4.04	0.91	2.87	0.53		14C
	4.04	0.91	2.87	0.45		14D
	4.04	0.91	2.87	0.17		14E
15	3.87	0.90	2.78	0.83	3.96	15A
	3.87	0.90	2.78	0.76		15B
	3.87	0.90	2.78	0.81		15C
	3.87	0.90	2.78	1.56		15D
16	4.68	0.90	3.18	1.96	6.67	16A
	4.68	0.90	3.18	3.07		16B
	4.68	0.90	3.18	0.72		16C
	4.68	0.90	3.18	0.92		16D

BASIN No.	W.Q. TREATMENT REQUIRED (AC-FT)	ATTENUATION VOLUME REQUIRED (AC-FT)	POND SIZE REQ'D (AC.)	POND SIZE PROVIDED (AC.)	POND No.
17	4.37	0.70	2.93	0.41	17A
	4.40	1.02	3.10	0.96	17B
	4.40	1.02	3.10	3.38	17C
18	2.27	1.01	2.05	Compensatory treatment in interchange infield	
19	0.77	0.29	0.88	Compensatory treatment in interchange infield	
20	0.84	0.44	1.00	Compensatory treatment in interchange infield	

Table 8-2: Selected Floodplain Compensation Pond Site Alternatives

LOCATION	COMPENSATION AREA REQ'D (AC.)	POND SIZE PROVIDED (AC.)	POND No.
Basin 1	2.41	2.47	1D
Basin 1	2.41	2.41	1E
Thayer Canal	0.16	0.40	6E
Basin 9	2.07	2.16	9D
Basin 9	2.07	2.09	9E
Basin 9	2.07	2.08	9F

9 Pond Site Evaluation and Conclusion

An evaluation matrix for all selected pond site alternatives along with recommended sites is shown in Table 9.1. The recommended sites are based on hydraulic factors, potential wetland impacts, site availability, joint-use potential, ROW needs, and preliminary construction cost estimates.

No wetlands impacts are anticipated in most pond sites however, during final design, the wetland boundaries need to be verified with field investigation. The preliminary costs include construction costs which only consist of the major components of pond construction which differentiate the cost for each alternative, such as earthwork and J&B pipe to the pond. The common items for each pond alternative, such as roadway storm drains, are not included in this cost.

The highlighted with bold text options are the recommended pond site

Table 9-1: Selected Pond Site Alternatives Evaluation Matrix

BASIN No.	POND NO.	POND AREA (AC.)	CONSTRUCTION COST	WETLAND IMPACTS	REMARKS
1	1B	1.22	\$256,510.42	None	Preferred site. No active permit/ application on record
Floodplain Comp.	1D	2.47	\$222,110.51	None	Preferred site. No active permit/ application on record. Adjacent to proposed pond.
1 & 2	1C+2A	2.36	\$405,804.54	None	No active permit/ application on record
Floodplain Comp.	1E	2.41	\$217,754.44	None	No active permit/ application on record
2 & 3	2B+3A	2.62	\$476,469.13	None	Preferred site. No active permit/ application on record
3	3B	1.91	\$334,264.49	None	No active permit/ application on record
3 & 4	3C+4A	2.51	\$430,672.06	None	No active permit/ application on record
4	4B	1.32	\$231,529.89	None	Preferred site. No active permit/ application on record
4 & 5	4C+5A	2.01	\$372,325.33	None	No active permit/ application on record
5	5B	1.39	\$385,363.03	None	Preferred site. Public Property. Potential Joint Use opportunity
6	6C	2.12	\$376,015.27	None	Preferred site. Potential Joint Use opportunity
	6E	0.40	\$42,783.57	None	Preferred site. Floodplain Encroachment compensation
7	7A	1.51	\$287,805.77	None	Preferred site. Adjusted pond per site plan found
6	7B	1.66	\$280,527.22	None	-
8	8B	1.82	\$299,193.14	None	Preferred site. No active permit/ application on record.
	8C	1.78	\$291,153.68	None	No active permit/ application on record
9	9A	2.24	\$521,745.12	None	
	9B	2.23	\$367,726.07	None	No active permit/ application on record
Floodplain Comp.	9D		\$195,325.59		
9 & 10	9C+10A	3.47	\$683,467.90	None	Preferred site. Proposed Park Location. Public Property. Potential Joint Use
Floodplain Comp.	9E	2.09	\$189,173.87		Preferred site. Proposed Park Location. Public Property. Potential Joint Use
Floodplain Comp.	9F		\$188,091.31		
10	10B	1.97	\$385,228.74	None	Public Property
	10C	2.05	\$362,532.76	None	
11	11A	1.56	\$250,939.55	None	Preferred site. No anticipated development in the area and near existing wet pond.
11	11C	1.64	\$274,969.82	None	-
12	12B	1.20	\$195,982.52	None	Not in conflict with proposed development. Adjacent to proposed wet pond.
12 & 13	12C+13A	2.48	\$438,135.57	None	Preferred site. Need to adjust to accommodate proposed entrance. Adjacent to proposed dry retention area.
13	13B	1.72	\$326,674.14	None	
14	14B	3.62	\$363,173.37	None	I-95 Interchange infield ponds
	14C		\$394,192.93	None	
	14D		\$394,192.93	None	
	14E		\$394,192.93	None	
15	15A	3.96	\$359,499.39	None	
	15B		\$359,499.39	None	
	15C		\$359,499.39	None	
	15D		\$359,499.39	None	
16	16A	6.67	\$313,737.38	None	
	16B		\$313,737.38	None	
	16C		\$313,737.38	None	
	16D		\$313,737.38	None	
17	17A	4.75	\$288,066.02	None	
	17B		\$305,180.26	None	
	17C		\$305,180.26	None	

10 Appendices

APPENDIX A
POND SITE LOCATIONS MAP





**LPGA Boulevard from US 92 (SR 600) to Williamson Boulevard PD&E Study
PROPOSED POND SITE ALTERNATIVES**

APPENDIX B
DRAINAGE MAP





LEGEND:

- WETLANDS
- - - BASIN DIVIDE
- PROPOSED EASEMENT
- PARCEL LINE
- EXISTING R/W LINE
- PONDS BY OTHERS
- PROPOSED PONDS
- 100 YEAR FLOODPLAIN
- FLOW ARROW

W INTERNATIONAL SPEEDWAY BLVD

US 92 CANAL

MATCH LINE 350+00.00

OFF-SITE AREA = 10.09 AC

OFF-SITE AREA = 26.76 AC

OFF-SITE AREA = 33.36 AC

CD-1

INFLOW PIPE

INFLOW PIPE

CD-2

CD-3

CD-4

LPGA BLVD.

POND 1D
(2.47 AC)

POND 1B
(1.22 AC)

POND 1C+2A
(2.36 AC)

POND 1E
(2.41 AC)

POND 2B+3A
(2.62 AC)

POND 3C+4A
(2.51 AC)

OUTFALL PIPE

OUTFALL PIPE

OUTFALL PIPE

ZONE AH
(EL. 27)

BASIN 1

BASIN 2

BASIN 3

NOTE:
All elevations are NAVD '88 Datum
(NAVD '88 EL 0.00 = NGVD '29 EL 1.13)

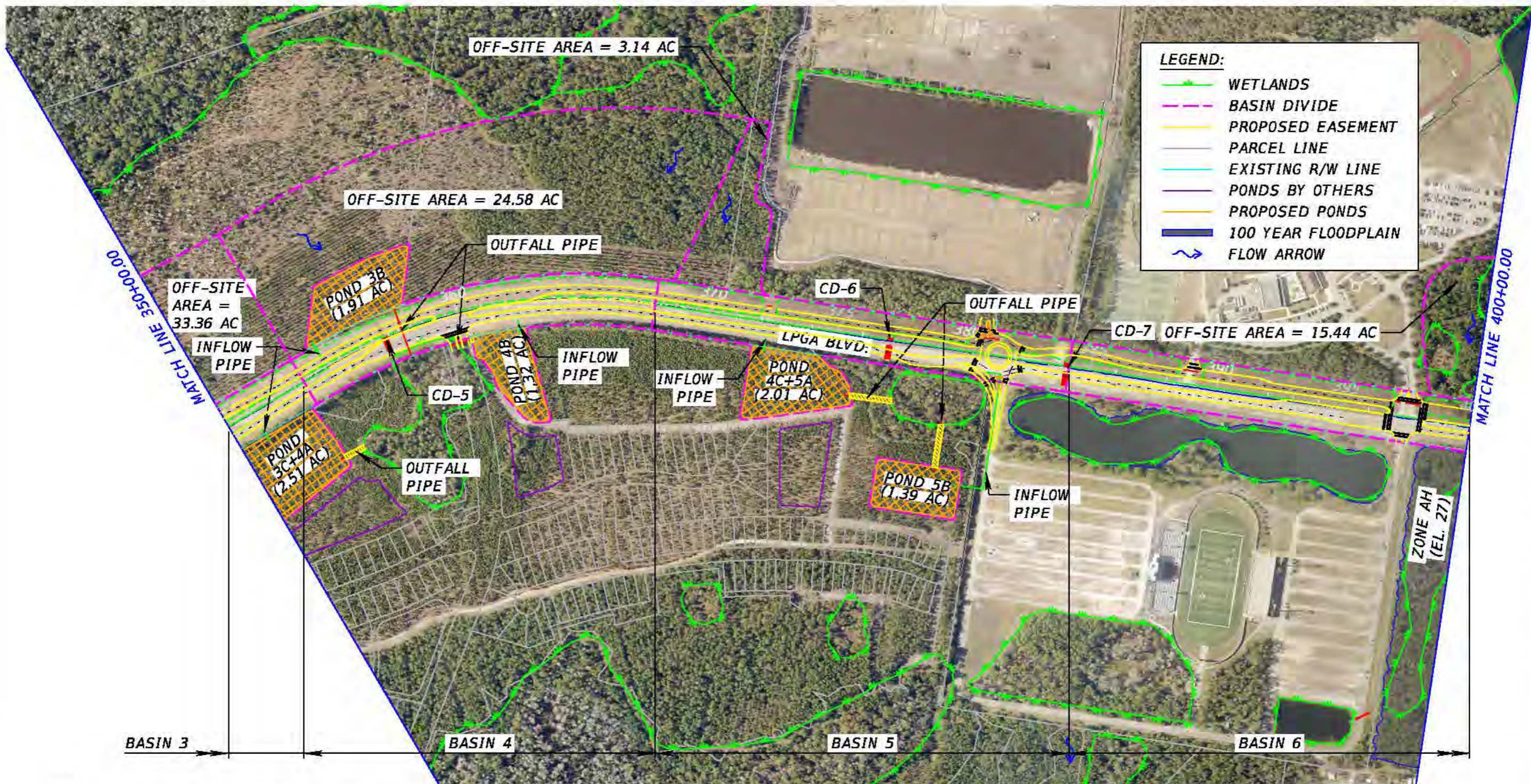
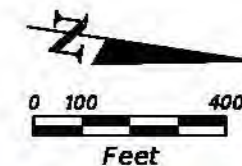
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REVISIONS		ENGINEER OF RECORD		STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION	ROAD NO.	COUNTY	FINANCIAL PROJECT ID	
				LPGA	VOLUSIA	44845615201	

PROPOSED DRAINAGE MAP

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LEGEND:

- WETLANDS
- - - BASIN DIVIDE
- PROPOSED EASEMENT
- PARCEL LINE
- EXISTING R/W LINE
- PONDS BY OTHERS
- PROPOSED PONDS
- 100 YEAR FLOODPLAIN
- FLOW ARROW

NOTE:
All elevations are NAVD '88 Datum
(NAVD '88 EL 0.00 = NGVD '29 EL 1.13)

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REVISIONS				ENGINEER OF RECORD	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID	
				ANGELA M. BARON-RUIZ LICENSE NUMBER: 76984 CHA CONSULTING, INC. 8935 NW 35TH LANE, SUITE 200 DORAL, FL 33172	LPGA	VOLUSIA	44845615201	

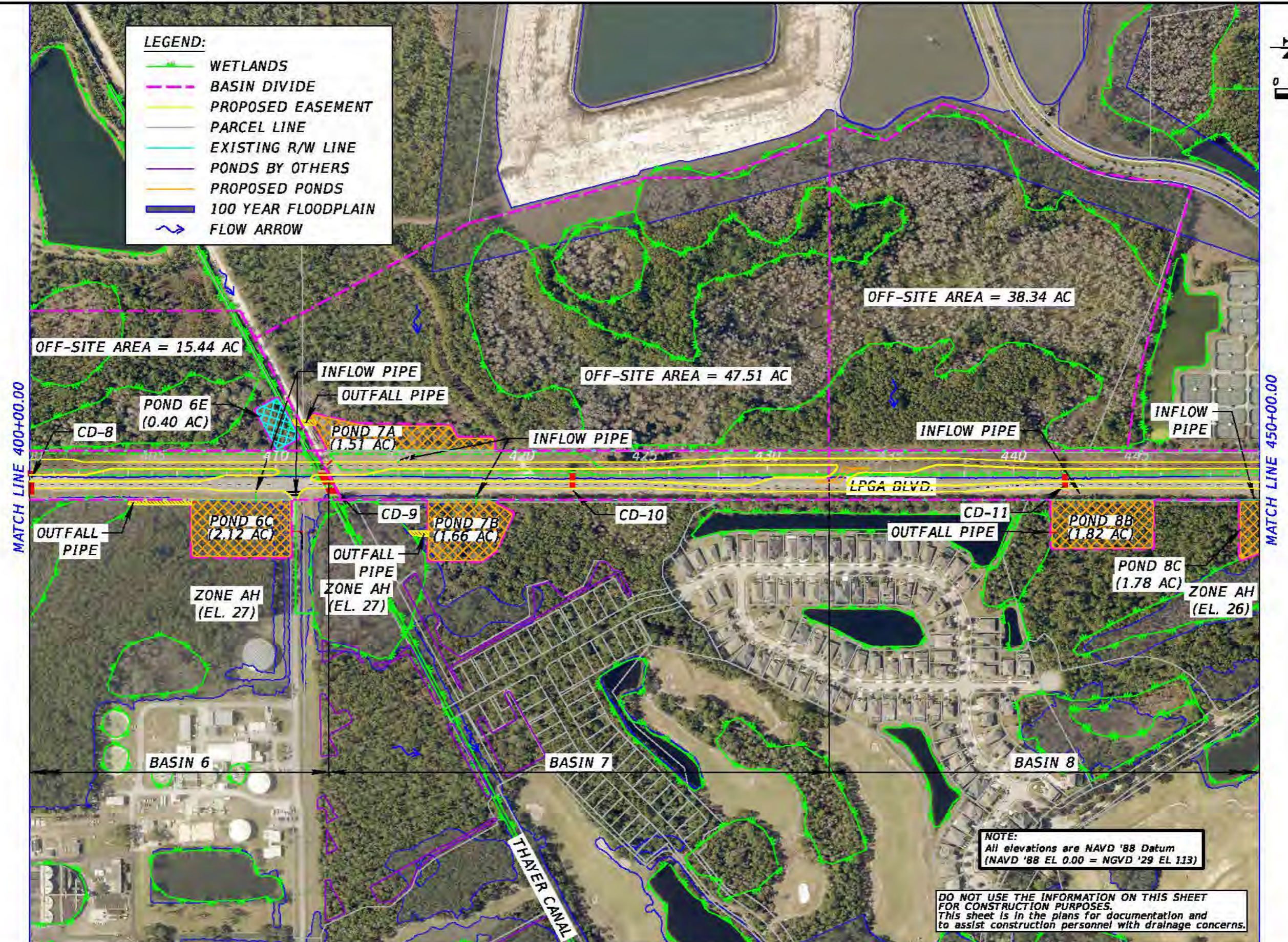
PROPOSED DRAINAGE MAP

LEGEND:

- WETLANDS
- - - BASIN DIVIDE
- PROPOSED EASEMENT
- PARCEL LINE
- EXISTING R/W LINE
- PONDS BY OTHERS
- PROPOSED PONDS
- 100 YEAR FLOODPLAIN
- ↗ FLOW ARROW

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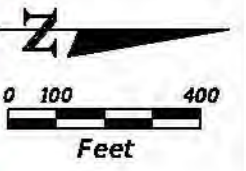
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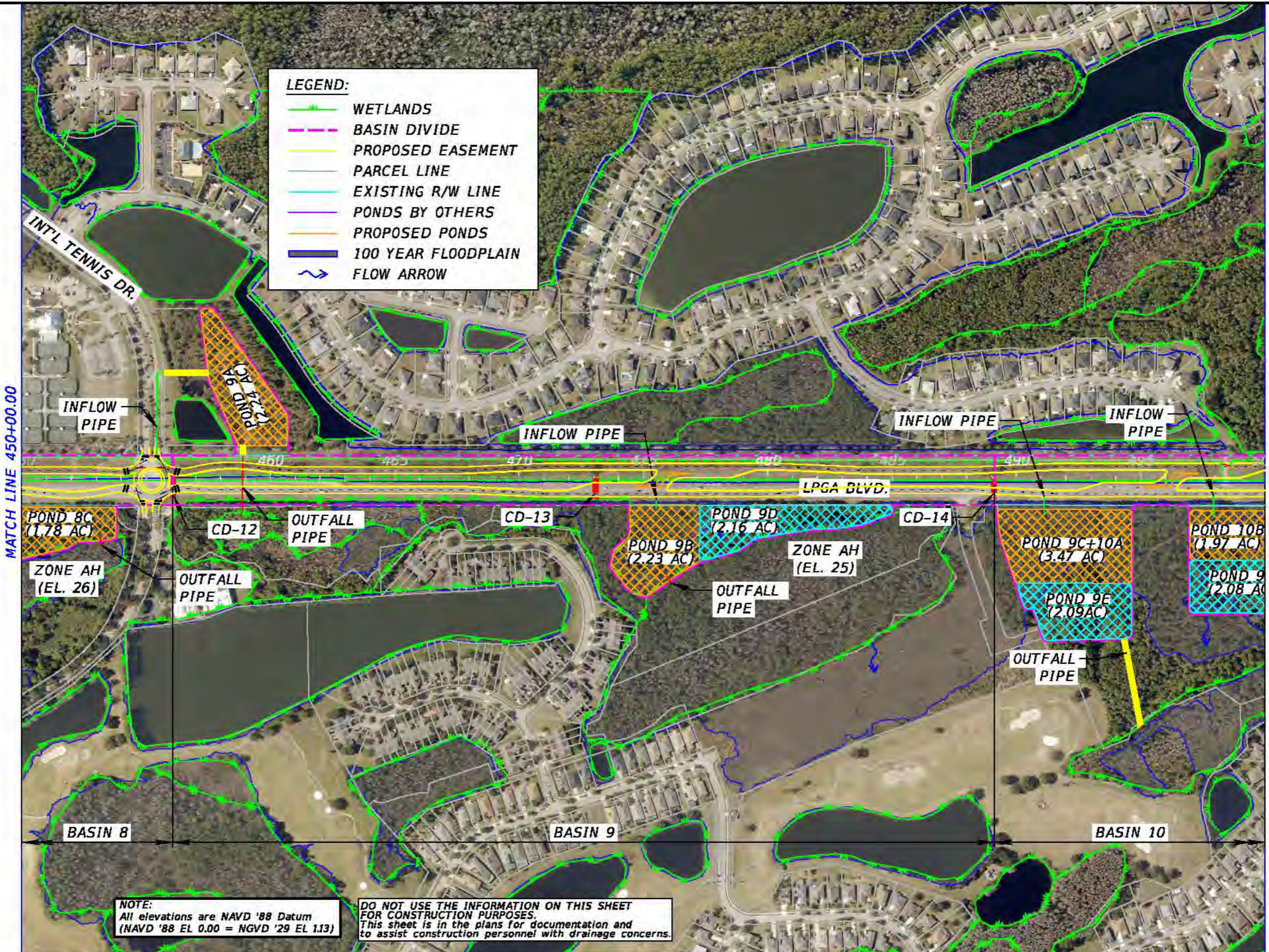
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REVISIONS		ENGINEER OF RECORD		STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION	ROAD NO.	COUNTY	FINANCIAL PROJECT ID	
				LPGA	VOLUSIA	44845615201	
ANGELA M. BARON-RUIZ LICENSE NUMBER: 76984 CHA CONSULTING, INC. 8935 NW 35TH LANE, SUITE 200 DORAL, FL 33172				PROPOSED DRAINAGE MAP			



- LEGEND:**
- WETLANDS
 - BASIN DIVIDE
 - PROPOSED EASEMENT
 - PARCEL LINE
 - EXISTING R/W LINE
 - PONDS BY OTHERS
 - PROPOSED PONDS
 - 100 YEAR FLOODPLAIN
 - ~ FLOW ARROW



MATCH LINE 450+00.00

MATCH LINE 500+00.00

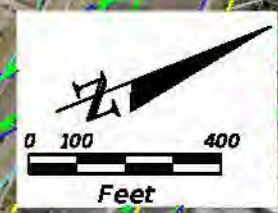
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All elevations are NAVD '88 Datum
(NAVD '88 EL 0.00 = NGVD '29 EL 1.13)

DO NOT USE THE INFORMATION ON THIS SHEET FOR CONSTRUCTION PURPOSES.
This sheet is in the plans for documentation and to assist construction personnel with drainage concerns.

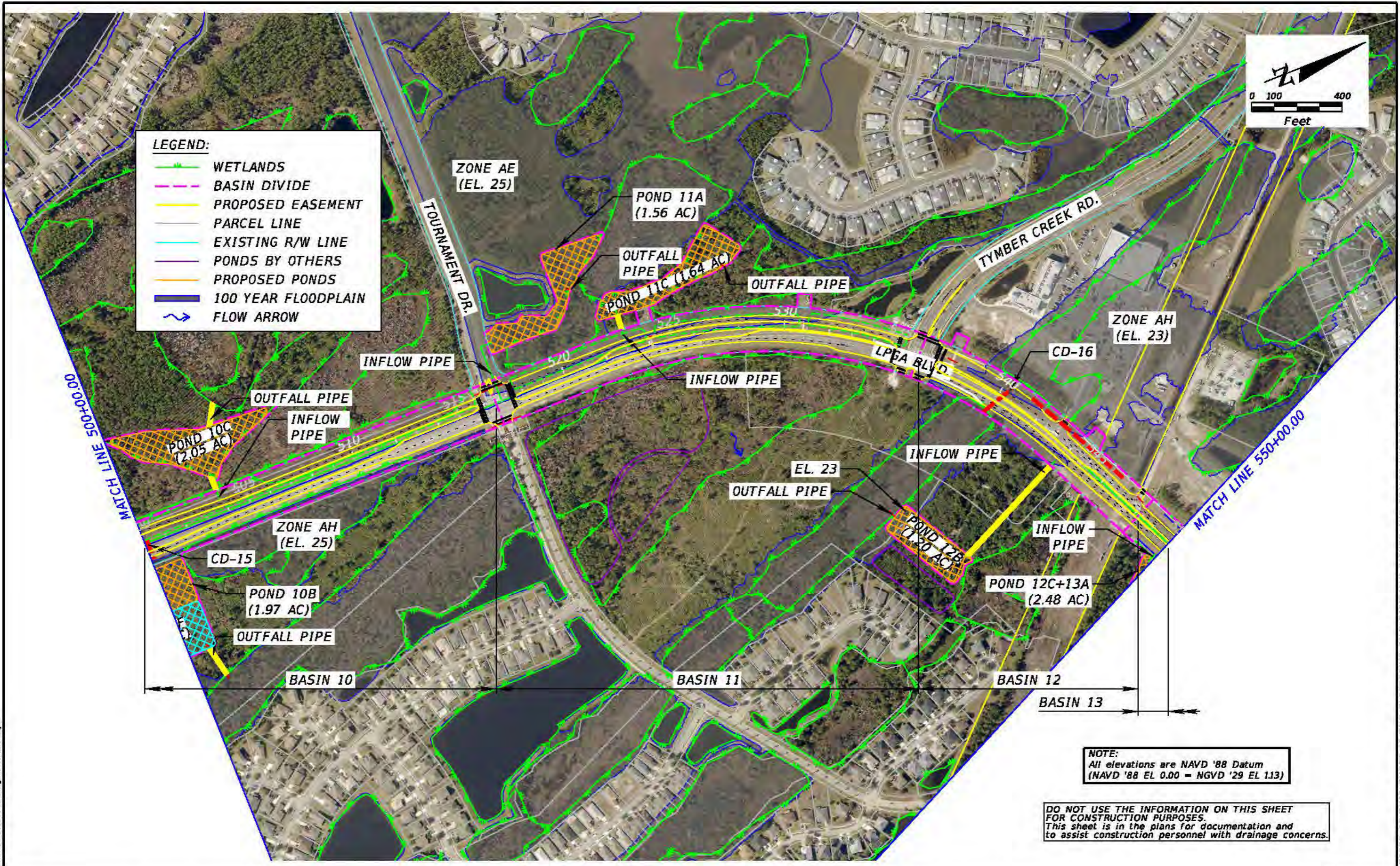
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REVISIONS		ENGINEER OF RECORD		STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION	ROAD NO.	COUNTY	FINANCIAL PROJECT ID	
				LPGA	VOLUSIA	44845615201	PROPOSED DRAINAGE MAP

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



- LEGEND:**
- WETLANDS
 - - - BASIN DIVIDE
 - PROPOSED EASEMENT
 - PARCEL LINE
 - EXISTING R/W LINE
 - PONDS BY OTHERS
 - PROPOSED PONDS
 - 100 YEAR FLOODPLAIN
 - FLOW ARROW



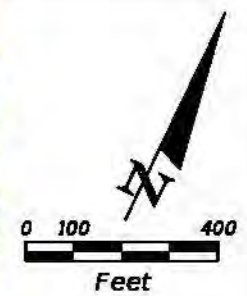
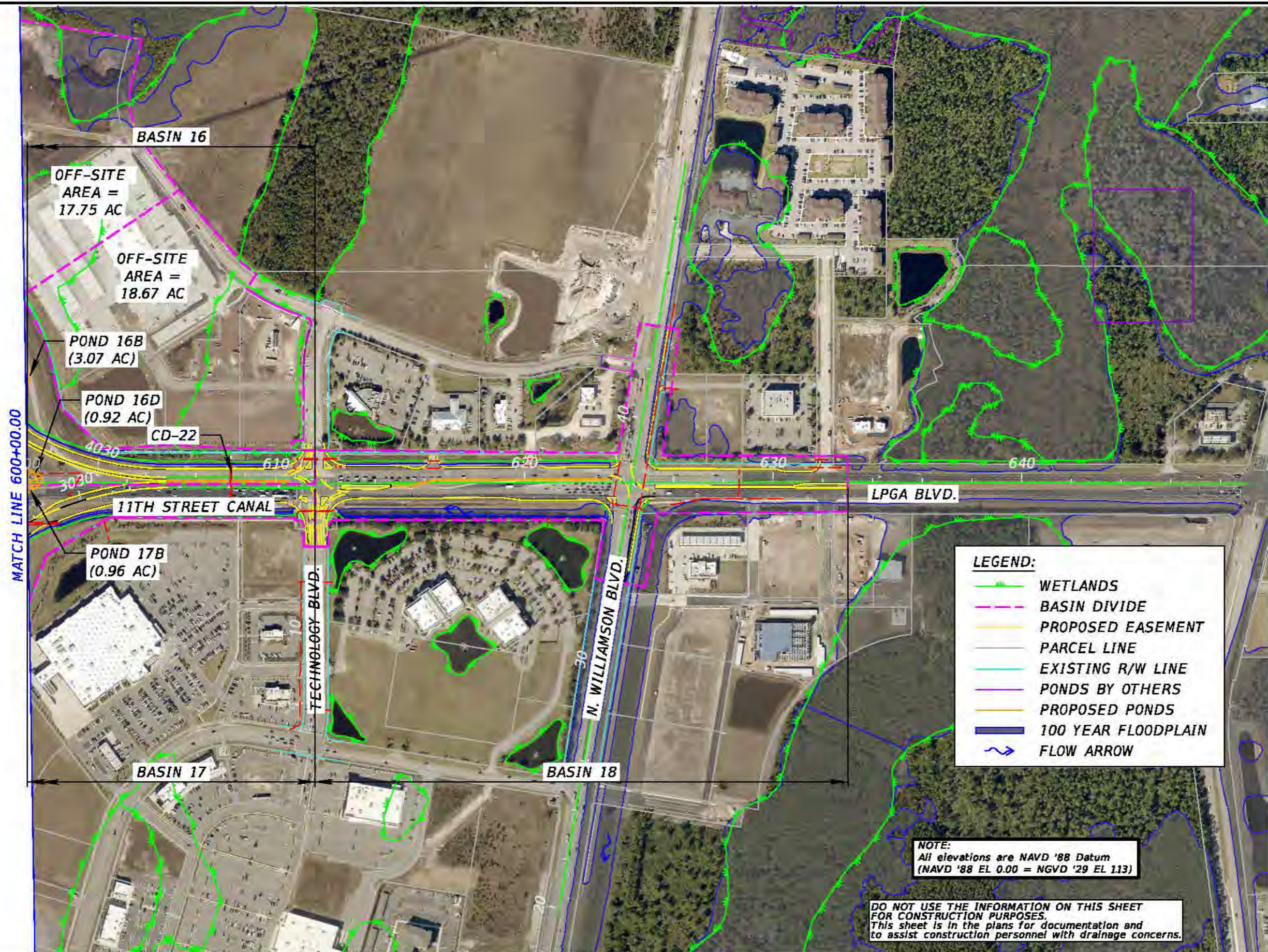
NOTE:
All elevations are NAVD '88 Datum
(NAVD '88 EL 0.00 = NGVD '29 EL 1.13)

DO NOT USE THE INFORMATION ON THIS SHEET FOR CONSTRUCTION PURPOSES. This sheet is in the plans for documentation and to assist construction personnel with drainage concerns.

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REVISIONS				ENGINEER OF RECORD		STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION			ROAD NO.	COUNTY	FINANCIAL PROJECT ID	
				ANGELA M. BARON-RUIZ LICENSE NUMBER: 76984 CHA CONSULTING, INC. 8935 NW 35TH LANE, SUITE 200 DORAL, FL 33172		LPGA	VOLUSIA	44845615201	
PROPOSED DRAINAGE MAP									



LEGEND:

- WETLANDS
- - - BASIN DIVIDE
- PROPOSED EASEMENT
- PARCEL LINE
- EXISTING R/W LINE
- PONDS BY OTHERS
- PROPOSED PONDS
- 100 YEAR FLOODPLAIN
- FLOW ARROW

NOTE:
 All elevations are NAVD '88 Datum
 (NAVD '88 EL 0.00 = NGVD '29 EL 1.13)

DO NOT USE THE INFORMATION ON THIS SHEET FOR CONSTRUCTION PURPOSES.
 This sheet is in the plans for documentation and to assist construction personnel with drainage concerns.

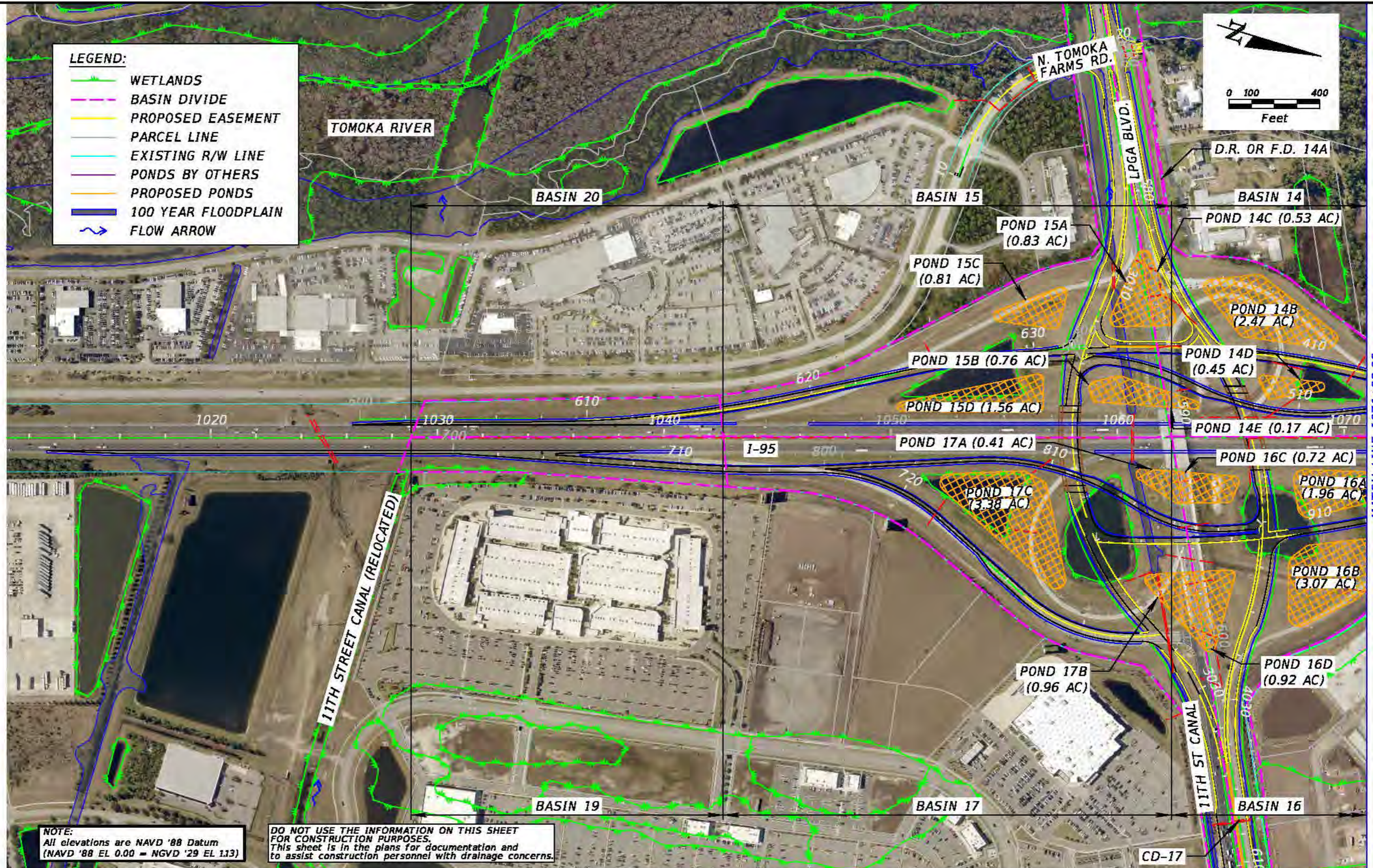
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REVISIONS		REVISIONS		ENGINEER OF RECORD		STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			PROPOSED DRAINAGE MAP	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION			ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
				ANGELA M. BARON-RUIZ LICENSE NUMBER: 76984 CHA CONSULTING, INC. 8935 NW 35TH LANE, SUITE 200 DORAL, FL 33172		LPGA	VOLUSIA	4484561201		

LEGEND:

- WETLANDS
- BASIN DIVIDE
- PROPOSED EASEMENT
- PARCEL LINE
- EXISTING R/W LINE
- PONDS BY OTHERS
- PROPOSED PONDS
- 100 YEAR FLOODPLAIN
- ↗ FLOW ARROW



NOTE:
All elevations are NAVD '88 Datum
(NAVD '88 EL 0.00 = NGVD '29 EL 1.13)

DO NOT USE THE INFORMATION ON THIS SHEET FOR CONSTRUCTION PURPOSES.
This sheet is in the plans for documentation and to assist construction personnel with drainage concerns.

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MATCH LINE 1071+00.00 THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE DIGITALLY SIGNED AND SEALED UNDER RULE 61G15-23.004, F.A.C.

REVISIONS		ENGINEER OF RECORD		STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION	ROAD NO.	COUNTY	FINANCIAL PROJECT ID	
				LPGA	VOLUSIA	44845615201	

PROPOSED DRAINAGE MAP

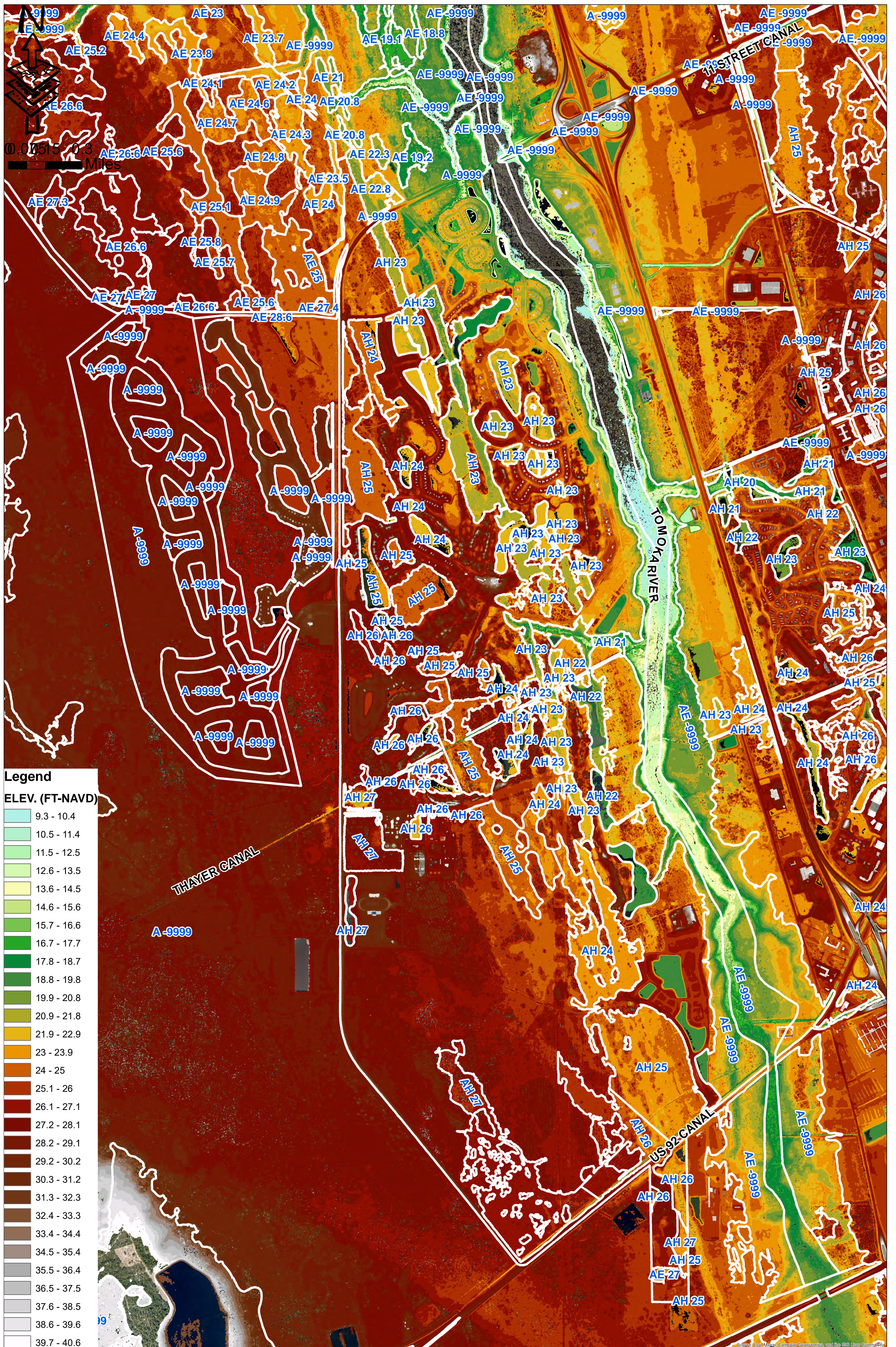
APPENDIX C
FLOODPLAIN ENCROACHMENT ANALYSIS



FLOODPLAIN ENCROACHMENT ANALYSIS								
SUMMARY OF FLOOD STAGES (FUTURE LAND USE)								
TOMOKA RIVER WATERSHED MANAGEMENT PLAN				FEMA		AVG. EXIST. GROUND ELEVATION WITHIN FLOODPLAIN ⁴ (FT-NAVD)	AVG. PROP. GROUND ELEVATION ⁵ (FT-NAVD)	REMARKS
LOCATION	JUNCTION NUMBER	10-YEAR FLOOD STAGE (FT-NAVD)	100-YEAR FLOOD STAGE (FT-NAVD)	FLOOD ZONE	ELEVATION (FT-NAVD)			
LPGA @ US 92 CANAL WEST	US125	26.77	27.57	A	N/A	28	31	NO PROP. ENCROACHMENT ¹
LPGA @ THAYER CHANNEL	TB107	22.07	23.77	-	-	27	31	MINIMUM ENCROACHMENT ⁶
	TB110	23.47	24.17	A	N/A	26	30	MINIMUM ENCROACHMENT ⁶
LPGA @ TOMOKA RIVER	1031	12.57	14.87	AE	15	18	19	BRIDGE REPLACEMENT
LPGA WEST OF I-95	36103	18.77	19.67	-	-	25	25	NO PROP. ENCROACHMENT ¹
LPGA EAST OF I-95	36	19.37	20.97	-	-	25	25	NO PROP. ENCROACHMENT ¹
LPGA WEST OF WILLIAMSON	351	23.07	24.17	-	-	25	25	NO PROP. ENCROACHMENT ¹
LPGA EAST OF WILLIAMSON	361	22.57	23.37	-	-	24	25	NO PROP. ENCROACHMENT ¹

Notes:

1. Existing ground elevations are higher than the 10-year and 100-year floodplain elevations therefore is no proposed encroachment
2. Existing ground elevations (NAVD88) are based on LIDAR data obtained from NOAA.
3. 10-year and 100-year flood stages were obtained from the Tomoka River Watershed Management Plan
4. Avg. existing ground elevations within floodplain correspond to the elevations of the areas of proposed widening
5. Proposed ground elevation is estimated to be the same as the existing elevation of the adjacent roadway
6. Encroachment into the 10-year floodplain assuming a NWL in the Thayer Canal of 20'
7. NAVD88 = NGVD29 - 1.13



**LPGA Boulevard from US 92 (SR 600) to Williamson Boulevard PD&E Study
 EXISTING TOPOGRAPHY & FEMA 100-YR FLOODPLAIN (NAVD)**



LEGEND

- EXTRAN CLOSED CONDUIT
- EXTRAN OPEN CHANNEL
- EXTRAN LINKING JUCTION
- EXTRAN STORAGE JUCTION
- (1100) RUNOFF HYDROGRAPH LOAD POINT
- RUNOFF CONDUIT

**RUNOFF & EXTRAN SCHEMATIC PART B
TOMOKA RIVER WATERSHED MANAGEMENT PLAN
VOLUSIA COUNTY, FLORIDA**

Page No. 427

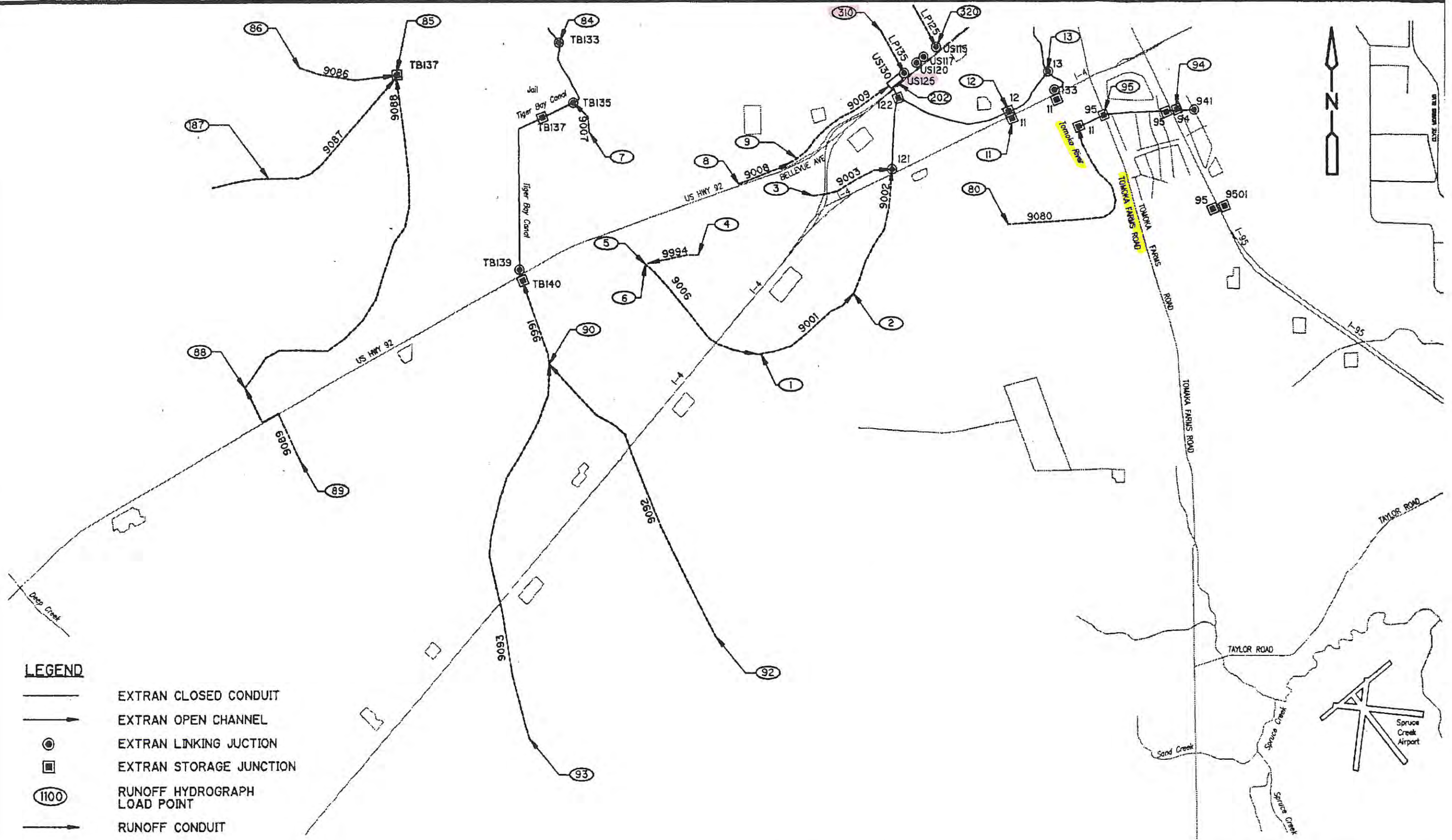
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LEGEND

- EXTRAN CLOSED CONDUIT
- EXTRAN OPEN CHANNEL
- EXTRAN LINKING JUNCTION
- EXTRAN STORAGE JUNCTION
- (1100) RUNOFF HYDROGRAPH LOAD POINT
- RUNOFF CONDUIT

RUNOFF & EXTRAN SCHEMATIC PART C
 TOMOKA RIVER WATERSHED MANAGEMENT PLAN
 VOLUSIA COUNTY, FLORIDA

TABLE 3-43
TOMOKA RIVER SOUTH OF 11th STREET
SUMMARY OF FLOOD STAGES AND PROBLEM AREAS (1)
PRESENT LAND USE

JUNCTION NUMBER	STREET NAME	TOP OF ROAD ELEV. (FT-NGVD)	LOW CHORD (FT-NGVD)	2-YEAR		10-YEAR		25-YEAR		100-YEAR		PROBLEM ID NUMBER(3)	ROADWAY TYPE (4)
				FLOOD STAGE (FT-NGVD)	ROAD (2) FLOODING (FT)	FLOOD STAGE (FT-NGVD)	ROAD FLOODING (FT)	FLOOD STAGE (FT-NGVD)	ROAD FLOODING (FT)	FLOOD STAGE (FT-NGVD)	ROAD FLOODING (FT)		
1031	11th Street	20.4	16.7	11.7	0.0	13.3	0.0	14.4	0.0	15.7	0.0		P
103				12.9		14.5		15.6		16.9			
104				15.1		16.9		17.9		19.1			
961	FPL Basement	17.7	17	16.3	0.0	18.1	0.4	18.7	1.0	19.4	1.7		
96				16.9		18.7		19.4		20.2			
962	FPL Basement	17.5	14.3	18.3	0.8	19.8	2.3	20.4	2.9	21.0	3.5		
963				18.6		20.3		20.9		21.7			
16				20.2		21.7		22.6		23.4			
161				21.6		23.1		23.9		24.8			
162				21.7		23.2		24.0		24.9			
131	U.S. 92	25.8	24	22.3	0.0	23.7	0.0	24.4	0.0	25.4	0.0		P
132				22.5		23.8		24.6		25.5			
13				23.7		24.4		24.9		25.7			
133				23.7		24.4		24.9		25.7			

- (1) - All stages and elevations are referenced to National Geodetic Vertical Datum of 1929 (FT-NGVD) unless otherwise noted.
- (2) - Road flooding stage is referenced to road crown elevation.
- (3) - Problem ID number is referenced to the associated Water Quantity Problem Area Figure.
- (4) - Road type descriptions are as follows:
P = Primary evacuation route.
S = Secondary evacuation route.

TABLE 3-44
TOMOKA RIVER SOUTH OF 11th STREET
SUMMARY OF FLOOD STAGES AND PROBLEM AREAS (1)
FUTURE LAND USE

JUNCTION NUMBER	STREET NAME	TOP OF ROAD ELEV. (FT-NGVD)	LOW CHORD (FT-NGVD)	2-YEAR		10-YEAR		25-YEAR		100-YEAR		PROBLEM ID NUMBER(3)	ROADWAY TYPE (4)
				FLOOD STAGE (FT-NGVD)	ROAD (2) FLOODING (FT)	FLOOD STAGE (FT-NGVD)	ROAD FLOODING (FT)	FLOOD STAGE (FT-NGVD)	ROAD FLOODING (FT)	FLOOD STAGE (FT-NGVD)	ROAD FLOODING (FT)		
1001	11th Street	20.4	16.7	12.1	0.0	13.7	0.0	14.7	0.0	16.0	0.0		P
103				13.2		14.9		15.9		17.2			
104				15.4		17.2		18.2		19.4			
961	FPL Basement	17.7	17	16.9	0.0	18.3	0.6	18.9	1.2	19.6	1.9		
96				17.4		18.9		19.6		20.4			
962	FPL Basement	17.5	14.3	18.7	1.3	20.0	2.5	20.5	3.0	21.2	3.7		
963				19.1		20.5		21.1		21.8			
16				20.5		21.9		22.8		23.6			
161				22.0		23.4		24.1		25.0			
162				22.0		23.4		24.2		25.0			
131	U.S. 92	25.8	24	22.7	0.0	23.9	0.0	24.6	0.0	25.3	0.0		P
132				22.9		24.0		24.7		25.6			
13				23.9		24.5		25.0		25.8			
133				23.9		24.5		25.0		25.8			

- (1) - All stages and elevations are referenced to National Geodetic Vertical Datum of 1929 (FT-NGVD) unless otherwise noted.
- (2) - Road flooding stage is referenced to road crown elevation.
- (3) - Problem ID number is referenced to the associated Water Quantity Problem Area Figure.
- (4) - Road type descriptions are as follows:
P = Primary evacuation route.
S = Secondary evacuation route.

NGVD 229-1.13 = NAVD 88

TABLE 3-46
11TH STREET CANAL
SUMMARY OF FLOOD STAGES AND PROBLEM AREAS (1)
PRESENT LAND USE

JUNCTION NUMBER	STREET NAME	TOP OF ROAD ELEV. (FT-NGVD)	LOW CHORD (FT-NGVD)	2-YEAR		10-YEAR		25-YEAR		100-YEAR		PROBLEM ID NUMBER(3)	ROADWAY TYPE (4)
				FLOOD STAGE (FT-NGVD)	ROAD (2) FLOODING (FT)	FLOOD STAGE (FT-NGVD)	ROAD FLOODING (FT)	FLOOD STAGE (FT-NGVD)	ROAD FLOODING (FT)	FLOOD STAGE (FT-NGVD)	ROAD FLOODING (FT)		
36103				18.2		18.4	19.6	20.1		20.7			
36	I-95	27.6	21.9	18.4	0.0	18.4	20.0	20.8	0.0	20.5	21.7	0.0	P
361				22.4		22.2	23.4	23.8		23.1	24.3		
351	Williamson Blvd.	28.0	22.7	22.7	0.0	22.6	23.8	24.4	0.0	23.7	25.0	0.0	P
BC125				23.0		24.2		24.8		25.3			
BC127				23.1		24.4		25.0		25.5			
BC130	Clyde Morris Blvd.	28.0	20.8	23.4	0.0	24.9	0.0	25.6	0.0	26.4	0.0		
BC135				23.5		25.0		25.8		26.5			
BC137				23.6		25.1		25.9		26.6			
BC140	11th St.	27.6	19.2	23.3	0.0	24.5	0.0	25.3	0.0	26.1	0.0		
BC145				23.3		24.5		25.3		26.1			

- (1) - All stages and elevations are referenced to National Geodetic Vertical Datum of 1929 (FT-NGVD) unless otherwise noted.
- (2) - Road flooding stage is referenced to road crown elevation.
- (3) - Problem ID number is referenced to the associated Water Quantity Problem Area Figure.
- (4) - Road type descriptions are as follows:
P = Primary evacuation route.
S = Secondary evacuation route.

TABLE 3-47
11TH STREET CANAL
SUMMARY OF FLOOD STAGES AND PROBLEM AREAS (1)
FUTURE LAND USE

JUNCTION NUMBER	STREET NAME	TOP OF ROAD ELEV. (FT-NGVD)	LOW CHORD (FT-NGVD)	2-YEAR		10-YEAR		25-YEAR		100-YEAR		PROBLEM ID NUMBER(3)	ROADWAY TYPE (4)
				FLOOD STAGE (FT-NGVD)	ROAD (2) FLOODING (FT)	FLOOD STAGE (FT-NGVD)	ROAD FLOODING (FT)	FLOOD STAGE (FT-NGVD)	ROAD FLOODING (FT)	FLOOD STAGE (FT-NGVD)	ROAD FLOODING (FT)		
36103				18.9		18.3	19.9	20.4		20.8			
36	I-95	27.6	21.9	19.2	0.0	19.3	20.5	21.2	0.0	20.9	22.1	0.0	P
361				23.1		23.2	23.7	24.0		23.5	24.5		
351	Williamson Blvd.	28.0	22.7	23.5	0.0	23.0	24.2	24.7	0.0	24.1	25.3	0.0	P
BC125				23.8		24.6		25.0		25.6			
BC127				23.9		24.8		25.2		25.7			
BC130	Clyde Morris Blvd.	28.0	20.8	24.3	0.0	25.4	0.0	26.0	0.0	26.7	0.0		
BC135				24.4		25.6		26.1		26.8			
BC137				24.5		25.7		26.2		26.9			
BC140	11th St.	27.6	19.2	23.7	0.0	24.8	0.0	25.5	0.0	26.2	0.0		
BC145				23.7		24.8		25.5		26.2			

- (1) - All stages and elevations are referenced to National Geodetic Vertical Datum of 1929 (FT-NGVD) unless otherwise noted.
- (2) - Road flooding stage is referenced to road crown elevation.
- (3) - Problem ID number is referenced to the associated Water Quantity Problem Area Figure.
- (4) - Road type descriptions are as follows:
P = Primary evacuation route.
S = Secondary evacuation route.

TABLE 3-61
TIGER BAY CANAL/THAYER CHANNEL
SUMMARY OF FLOOD STAGES AND PROBLEM AREAS (1)
PRESENT LAND USE

JUNCTION NUMBER	STREET NAME	TOP OF ROAD ELEV. (FT-NGVD)	LOW CHORD (FT-NGVD)	2-YEAR		10-YEAR		25-YEAR		100-YEAR		PROBLEM ID NUMBER(3)	ROADWAY TYPE(4)
				FLOOD STAGE (FT-NGVD)	ROAD (2) FLOODING (FT)	FLOOD STAGE (FT-NGVD)	ROAD FLOODING (FT)	FLOOD STAGE (FT-NGVD)	ROAD FLOODING (FT)	FLOOD STAGE (FT-NGVD)	ROAD FLOODING (FT)		
TB103				19.2		21.0		22.0		22.7			
TB105				20.3		22.3		23.6		24.6			
TB107				21.3		22.8		23.8		24.6			
TB110	11th St.	33.5	24.7	24.1	0.0	24.9	0.0	24.8	0.0	25.2	0.0		P
TB115				24.5		25.2		25.8		26.6			
TB117				26.6		27.0		27.2		27.4			
TB120	Dirt Road	31.3	30.3	26.7	0.0	27.0	0.0	27.2	0.0	27.4	0.0		
TB123				28.2		28.6		28.7		29.0			
TB125				29.8		30.4		30.6		30.9			
TB127				30.2		30.9		31.3		31.8			
TB130	Dirt Road	36.3	32.1	30.2	0.0	31.0	0.0	31.5	0.0	32.2	0.0		
TB133				30.7		31.3		31.7		32.4			
TB138				31.4		31.9		32.3		33.0			
TB137				34.6		35.8		36.7		37.6			
TB139				36.1		37.3		38.0		38.9			
TB140	U.S. 92	40.7	37.6	36.1	0.0	37.3	0.0	38.1	0.0	38.9	0.0		P

- (1) - All stages and elevations are referenced to National Geodetic Vertical Datum of 1929 (FT-NGVD) unless otherwise noted.
 (2) - Road flooding stage is referenced to road crown elevation.
 (3) - Problem ID number is referenced to the associated Water Quantity Problem Area Figure.
 (4) - Road type descriptions are as follows:
 P = Primary evacuation route.
 S = Secondary evacuation route.

TABLE 3-62
TIGER BAY CANAL/THAYER CHANNEL
SUMMARY OF FLOOD STAGES AND PROBLEM AREAS (1)
FUTURE LAND USE

JUNCTION NUMBER	STREET NAME	TOP OF ROAD ELEV. (FT-NGVD)	LOW CHORD (FT-NGVD)	2-YEAR		10-YEAR		25-YEAR		100-YEAR		PROBLEM ID NUMBER(3)	ROADWAY TYPE(4)
				FLOOD STAGE (FT-NGVD)	ROAD (2) FLOODING (FT)	FLOOD STAGE (FT-NGVD)	ROAD FLOODING (FT)	FLOOD STAGE (FT-NGVD)	ROAD FLOODING (FT)	FLOOD STAGE (FT-NGVD)	ROAD FLOODING (FT)		
TB103				19.6		21.4		22.2		22.9			
TB105				20.8		22.9		23.9		24.9			
TB107				21.6		23.2		24.0		24.9			
TB110	11th St.	33.5	24.7	24.2	0.0	24.6	0.0	24.9	0.0	25.3	0.0		P
TB115				24.6		25.3		26.0		26.9			
TB117				26.7		27.0		27.2		27.4			
TB120	Dirt Road	31.3	30.3	26.7	0.0	27.1	0.0	27.2	0.0	27.4	0.0		
TB123				28.2		28.4		28.7		29.0			
TB125				29.8		30.4		30.6		30.9			
TB127				30.2		30.9		31.3		31.8			
TB130	Dirt Road	36.3	32.1	30.2	0.0	31.0	0.0	31.5	0.0	32.2	0.0		
TB133				30.6		31.4		31.9		32.4			
TB135				31.4		31.8		32.4		33.0			
TB137				34.6		35.4		36.7		37.6			
TB139				36.1		37.3		38.0		38.9			
TB140	U.S. 92	40.7	37.6	36.1	0.0	37.3	0.0	38.1	0.0	38.9	0.0		P

- (1) - All stages and elevations are referenced to National Geodetic Vertical Datum of 1929 (FT-NGVD) unless otherwise noted.
 (2) - Road flooding stage is referenced to road crown elevation.
 (3) - Problem ID number is referenced to the associated Water Quantity Problem Area Figure.
 (4) - Road type descriptions are as follows:
 P = Primary evacuation route.
 S = Secondary evacuation route.

TABLE 3-70
U.S. 92 CANAL - WEST
SUMMARY OF FLOOD STAGES AND PROBLEM AREAS (1)
PRESENT LAND USE

JUNCTION NUMBER	STREET NAME	TOP OF ROAD BLEV. (FT-NGVD)	LOW CHORD (FT-NGVD)	2-YEAR		10-YEAR		25-YEAR		100-YEAR		PROBLEM ID NUMBER(3)	ROADWAY TYPE (4)
				FLOOD STAGE (FT-NGVD)	ROAD (2) FLOODING (FT)	FLOOD STAGE (FT-NGVD)	ROAD FLOODING (FT)	FLOOD STAGE (FT-NGVD)	ROAD FLOODING (FT)	FLOOD STAGE (FT-NGVD)	ROAD FLOODING (FT)		
US105				24.6		25.6		26.4		27.2			
US110	Wooden Bridge	28.5	23.8	24.6	0.0	25.6	0.0	26.4	0.0	27.2	0.0		
US115				25.8		26.9		27.8		28.5			
US117				26.3		27.3		27.9		28.6			
US120	Wooden Bridge	29	25.3	26.5	0.0	27.7	0.0	28.2	0.0	28.7	0.0		
US125				26.7		27.8		28.3		28.7			
US130	11th Street	29.7	26	26.8	0.0	28.0	0.0	28.6	0.0	29.1	0.0		P

- (1) - All stages and elevations are referenced to National Geodetic Vertical Datum of 1929 (FT-NGVD) unless otherwise noted.
- (2) - Road flooding stage is referenced to road crown elevation.
- (3) - Problem ID number is referenced to the associated Water Quantity Problem Area Figure.
- (4) - Road type descriptions are as follows:
P = Primary evacuation route.
S = Secondary evacuation route.

TABLE 3-71
U.S. 92 CANAL WEST
SUMMARY OF FLOOD STAGES AND PROBLEM AREAS (1)
FUTURE LAND USE

JUNCTION NUMBER	STREET NAME	TOP OF ROAD BLEV. (FT-NGVD)	LOW CHORD (FT-NGVD)	2-YEAR		10-YEAR		25-YEAR		100-YEAR		PROBLEM ID NUMBER(3)	ROADWAY TYPE (4)
				FLOOD STAGE (FT-NGVD)	ROAD (2) FLOODING (FT)	FLOOD STAGE (FT-NGVD)	ROAD FLOODING (FT)	FLOOD STAGE (FT-NGVD)	ROAD FLOODING (FT)	FLOOD STAGE (FT-NGVD)	ROAD FLOODING (FT)		
US105				24.7		25.6		26.4		27.3			
US110	Wooden Bridge	28.5	23.8	24.7	0.0	25.7	0.0	26.4	0.0	27.3	0.0		
US115				25.9		27.0		27.9		28.6			
US117				26.4		27.3		28.0		28.6			
US120	Wooden Bridge	29	25.3	26.6	0.0	27.7	0.0	28.2	0.0	28.7	0.0		
US125				26.8		27.9		28.3		28.7			
US130	11th Street	29.7	26	26.9	0.0	28.1	0.0	28.7	0.0	29.1	0.0		P

- (1) - All stages and elevations are referenced to National Geodetic Vertical Datum of 1929 (FT-NGVD) unless otherwise noted.
- (2) - Road flooding stage is referenced to road crown elevation.
- (3) - Problem ID number is referenced to the associated Water Quantity Problem Area Figure.
- (4) - Road type descriptions are as follows:
P = Primary evacuation route.
S = Secondary evacuation route.

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The community map repository should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations (BFEs)** and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0' North American Vertical Datum of 1988. Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Florida State Plane East zone (FIPS zone 0901). The **horizontal datum** was the North American Datum of 1983 (NAD 83), GRS1980 Spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at <http://www.ngs.noaa.gov> or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, NINGS12
National Geodetic Survey
SSMC-3, #6202
1315 East-West Highway
Silver Spring, Maryland, 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at (301) 713-3242, or visit its website at <http://www.ngs.noaa.gov/>.

Base Map information shown on this FIRM was provided in digital format by the Volusia County, Florida GIS Department at a scale of 1:12,000 or larger from photography dated 2006 or later.

Based on updated topographic information, this map reflects more detailed and up-to-date **stream channel configurations and floodplain delineations** than those shown on the previous FIRM for this jurisdiction. As a result, the Flood Profiles and Floodway Data tables may reflect stream channel distances that differ from what is shown on the map. Also, the road to floodplain relationships for unreviewed streams may differ from what is shown on previous maps.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

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VOLUSIA COUNTY UNINCORPORATED AREAS 125155

VOLUSIA COUNTY UNINCORPORATED AREAS 125155



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the "base flood", is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A No Base Flood Elevations determined.

ZONE AE Base Flood Elevations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE AR Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently derelictified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.

ZONE A99 Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.

ZONE V Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

Floodplain Boundary
Floodway Boundary
Zone D Boundary
CBRS and OPA boundary
Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
Limit of Moderate Wave Action
513 Base Flood Elevation line and value; elevation in feet*
EL 987 Base Flood Elevation value where uniform within zone, elevation in feet*
*Referenced to the North American Vertical Datum of 1988

(A) (A) Cross section line
(23) (23) Transect line
- - - - - Culvert
= = = = = Bridge
= = = = = Footbridge

45° 02' 08", 93° 02' 12" Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere
9800000 N 1000-meter Universal Transverse Mercator grid ticks, zone 17
4999000 FT 5000-foot grid values; Florida State Plane coordinate system, East zone (FIPS Zone 0901), Lambert Conformal Conic
DX5510 X Bench mark (see explanation in Notes to Users section of this FIRM panel)
M1.5 River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTY/WIDE FLOOD INSURANCE RATE MAP
APRIL 15, 2002

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
February 19, 2014 - to update corporate limits, to reflect updated topographic information, to add and change Base Flood Elevations, to add floodways, to add and change Special Flood Hazard Areas, to incorporate previously issued Letters of Map Revision, and to change zone designations.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in 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.

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0363H

FIRM
FLOOD INSURANCE RATE MAP

VOLUSIA COUNTY, FLORIDA AND INCORPORATED AREAS

PANEL 363 OF 930
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
DAYTONA BEACH, CITY OF	125099	0363	H
VOLUSIA COUNTY	125155	0363	H

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

MAP NUMBER
12127C0363H
MAP REVISED
FEBRUARY 19, 2014

Federal Emergency Management Agency

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The community map repository should be consulted for possible updated or additional flood hazard information.

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Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 'Flood Protection Measures' of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Florida State Plane East zone (FIPS zone 0901). The **horizontal datum** was the North American Datum of 1983 (NAD 83). GRS1980 Spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at <http://www.ngs.noaa.gov/> or contact the National Geodetic Survey at the following address:

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National Geodetic Survey
SSMC-3, #6202
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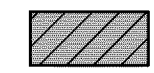

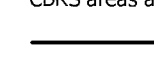


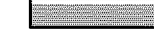


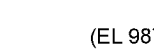

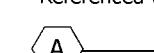

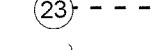
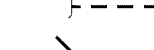
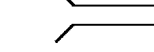
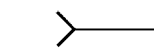
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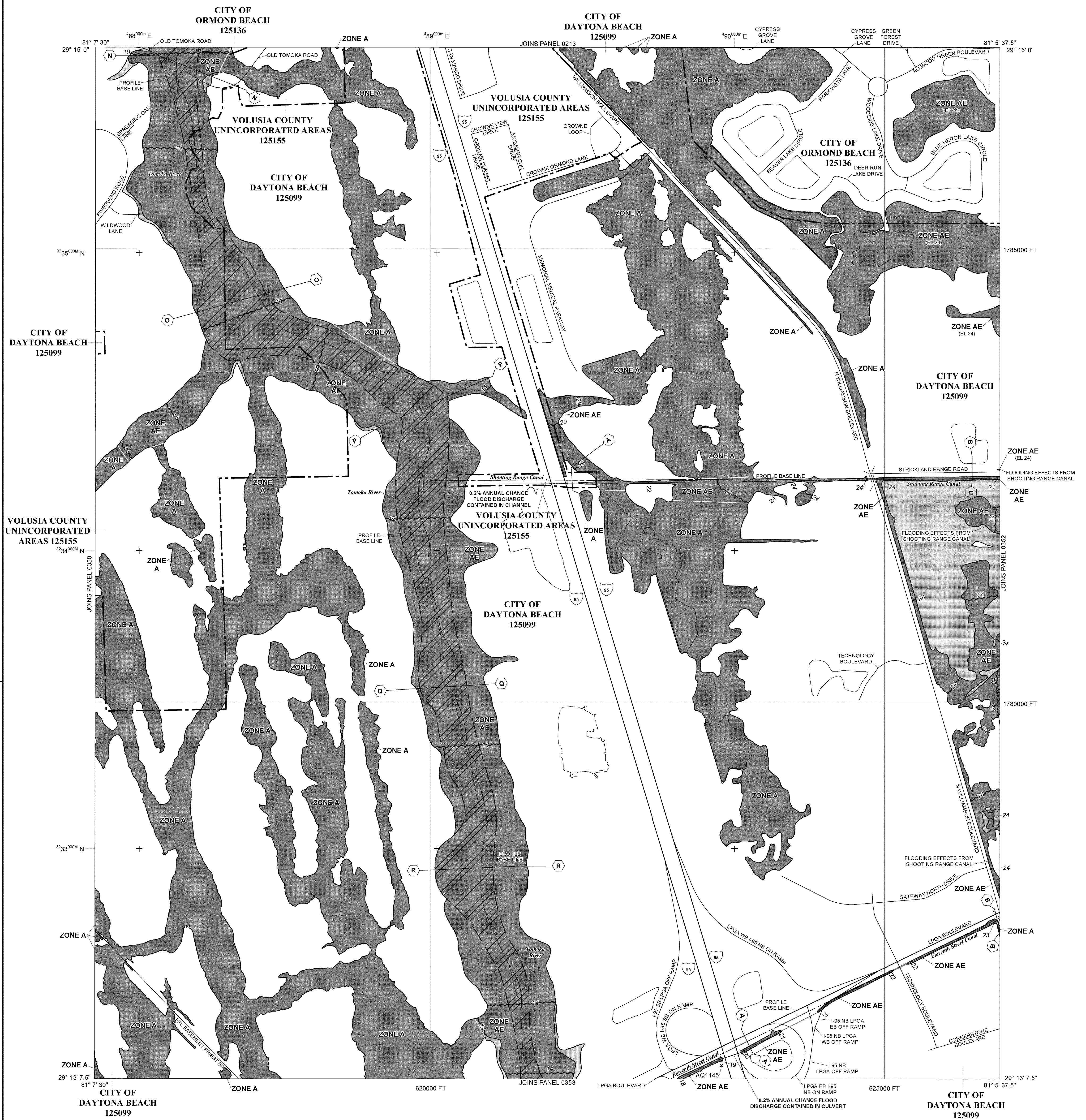
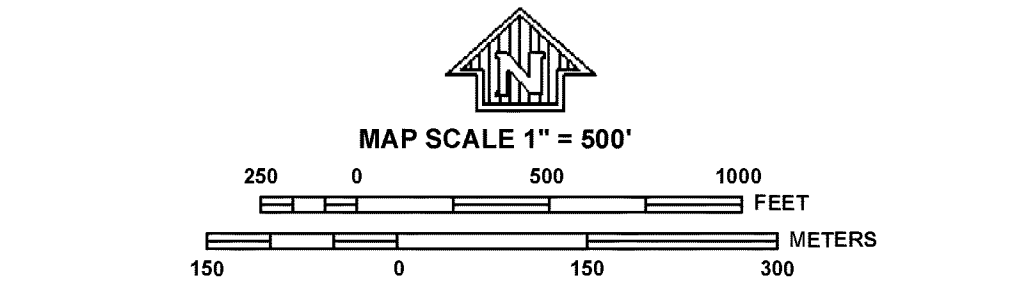
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LEGEND

-  SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD
- The 1% annual chance flood (100-year flood), also known as the "base flood," is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.
- ZONE A** No Base Flood Elevations determined.
- ZONE AE** Base Flood Elevations determined.
- ZONE AH** Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
- ZONE AO** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- ZONE AR** Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
- ZONE A99** Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
- ZONE V** Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
- ZONE VE** Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.
-  FLOODWAY AREAS IN ZONE AE
- The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.
- OTHER FLOOD AREAS**
- ZONE X** Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.
- OTHER AREAS**
- ZONE X** Areas determined to be outside the 0.2% annual chance floodplain.
- ZONE D** Areas in which flood hazards are undetermined, but possible.
-  COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS
-  OTHERWISE PROTECTED AREAS (OPAs)
- CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.
-  Floodplain Boundary
-  Floodway Boundary
-  Zone D Boundary
-  CBRS and OPA boundary
-  Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
-  Limit of Moderate Wave Action
-  Base Flood Elevation line and value; elevation in feet*
-  Base Flood Elevation value where uniform within zone, elevation in feet*
- *Referenced to the North American Vertical Datum of 1988
-  Cross section line
-  Transect line
-  Culvert
-  Bridge
-  Footbridge
- Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere
- 1000-meter Universal Transverse Mercator grid ticks, zone 17
- 5000-foot grid values: Florida State Plane coordinate system, East zone (FIPS Zone 0901), Lambert Conformal Conic
- Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M 1.5
- River Mile
- MAP REPOSITORIES
- Refer to Map Repositories list on Map Index
- EFFECTIVE DATE OF COUNTY/WIDE FLOOD INSURANCE RATE MAP
- APRIL 15, 2002
- EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
- February 19, 2014 - to update corporate limits, to reflect updated topographic information, to add and change Base Flood Elevations, to add floodways, to add and change Special Flood Hazard Areas, to incorporate previously issued Letters of Map Revision, and to change zone designations.
- For community map revision history prior to countywide mapping, refer to the Community Map History table located in 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.



PANEL 0351H

FIRM
FLOOD INSURANCE RATE MAP


VOLUSIA COUNTY, FLORIDA AND INCORPORATED AREAS

PANEL 351 OF 930
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:	COMMUNITY	NUMBER	PANEL	SUFFIX
	DAYTONA BEACH, CITY OF	125099	0351	H
	ORMOND BEACH, CITY OF	125136	0351	H
	VOLUSIA COUNTY	125155	0351	H

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

MAP NUMBER
12127C0351H
MAP REVISED
FEBRUARY 19, 2014

 Federal Emergency Management Agency

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- ZONE X** Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.
- OTHER AREAS**
- ZONE X** Areas determined to be outside the 0.2% annual chance floodplain.
- ZONE D** Areas in which flood hazards are undetermined, but possible.
- COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS
- OTHERWISE PROTECTED AREAS (OPAs)
- CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.
- Floodplain Boundary
- Floodway Boundary
- Zone D Boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- Limit of Moderate Wave Action
- 513 (EL 587) Base Flood Elevation line and value; elevation in feet*
- Base Flood Elevation value where uniform within zone, elevation in feet*
- *Referenced to the North American Vertical Datum of 1988
- Cross section line
- Transect line
- Culvert
- Bridge
- Footbridge
- Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere
- 1000-meter Universal Transverse Mercator grid ticks, zone 17
- 5000-foot grid values: Florida State Plane coordinate system, East zone (FIPS Zone 0901), Lambert Conformal Conic
- Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M 1.5 River Mile

Refer to MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
APRIL 15, 2002

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
February 19, 2014 - to update corporate limits, to reflect updated topographic information, to add and change Base Flood Elevations, to add floodways, to add and change Special Flood Hazard Areas, to incorporate previously issued Letters of Map Revision, and to change zone designations.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in 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.

MAP SCALE 1" = 500'

250 0 500 1000 FEET
150 0 150 300 METERS



NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0352H

FIRM
FLOOD INSURANCE RATE MAP

VOLUSIA COUNTY, FLORIDA AND INCORPORATED AREAS

PANEL 352 OF 930
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
DAYTONA BEACH, CITY OF	125099	0352	H
HOLLY HILL, CITY OF	125112	0352	H
ORMOND BEACH, CITY OF	125136	0352	H
VOLUSIA COUNTY	125155	0352	H

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

MAP NUMBER 12127C0352H
MAP REVISED FEBRUARY 19, 2014

Federal Emergency Management Agency

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The community map repository should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations (BFEs)** and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood-elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0' North American Vertical Datum of 1988. Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Florida State Plane East zone (FIPS zone 0901). The **horizontal datum** was the North American Datum of 1983 (NAD 83), GRS1980 Spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at <http://www.ngs.noaa.gov> or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, NINGS12
National Geodetic Survey
SSMC-3, #6202
1315 East-West Highway
Silver Spring, Maryland, 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at (301) 713-3242, or visit its website at <http://www.ngs.noaa.gov/>.

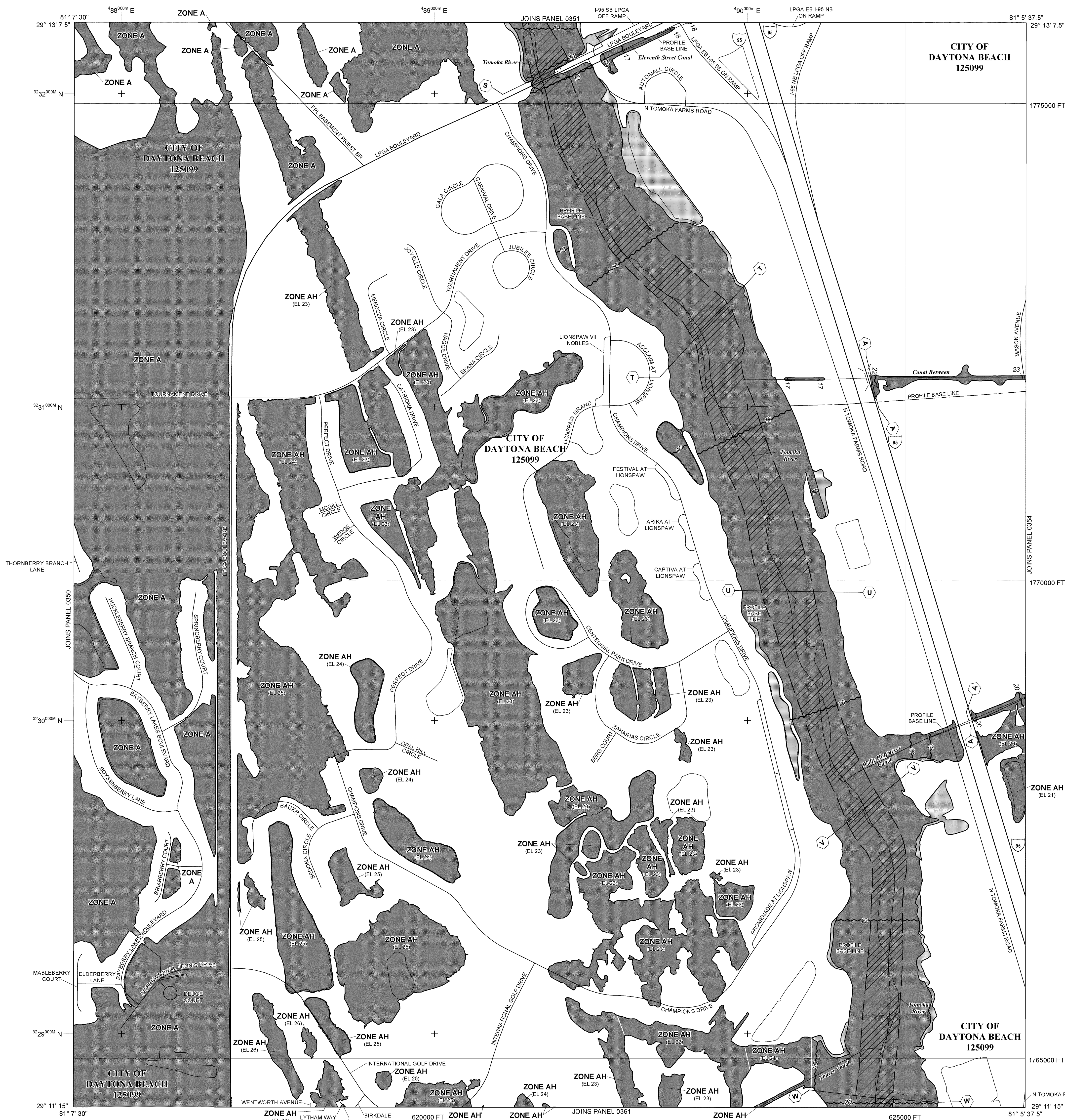
Base Map information shown on this FIRM was provided in digital format by the Volusia County, Florida GIS Department at a scale of 1:12,000 or larger from photography dated 2006 or later.

Based on updated topographic information, this map reflects more detailed and up-to-date **stream channel configurations and floodplain delineations** than those shown on the previous FIRM for this jurisdiction. As a result, the Flood Profiles and Floodway Data tables may reflect stream channel distances that differ from what is shown on the map. Also, the road to floodplain relationships for unreviewed streams may differ from what is shown on previous maps.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

For information and questions about this map, available products associated with this FIRM including historic versions of this FIRM, how to order products or the National Flood Insurance Program in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Map Service Center website at <http://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. Users may determine the current map date for each FIRM panel by visiting the FEMA Map Service Center website or by calling the FEMA Map Information eXchange.



LEGEND

- SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD
- The 1% annual chance flood (100-year flood), also known as the "base flood," is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.
- ZONE A** No Base Flood Elevations determined.
- ZONE AE** Base Flood Elevations determined.
- ZONE AH** Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
- ZONE AO** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- ZONE AR** Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently derelictified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
- ZONE A99** Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
- ZONE V** Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
- ZONE VE** Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.
- FLOODWAY AREAS IN ZONE AE
- The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.
- OTHER FLOOD AREAS
- ZONE X** Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.
- OTHER AREAS
- ZONE X** Areas determined to be outside the 0.2% annual chance floodplain.
- ZONE D** Areas in which flood hazards are undetermined, but possible.
- COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS
- OTHERWISE PROTECTED AREAS (OPAs)
- CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.
- Floodplain Boundary
- Floodway Boundary
- Zone D Boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- Limit of Moderate Wave Action
- Base Flood Elevation line and value; elevation in feet*
- Base Flood Elevation value where uniform within zone; elevation in feet*
- *Referenced to the North American Vertical Datum of 1988
- Cross section line
- Transect line
- Culvert
- Bridge
- Footbridge
- Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere
- 1000-meter Universal Transverse Mercator grid ticks, zone 17
- 5000-foot grid values; Florida State Plane coordinate system, East zone (FIPS Zone 0901), Lambert Conformal Conic
- Bench mark (see explanation in Notes to Users section of this FIRM panel)
- River Mile
- MAP REPOSITORIES
- Refer to Map Repositories list on Map Index
- EFFECTIVE DATE OF COUNTY-WIDE FLOOD INSURANCE RATE MAP
- APRIL 15, 2002
- EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
- February 19, 2014 - to update corporate limits, to reflect updated topographic information, to add and change Base Flood Elevations, to add floodways, to add and change Special Flood Hazard Areas, to incorporate previously issued Letters of Map Revision, and to change zone designations.
- For community map revision history prior to countywide mapping, refer to the Community Map History table located in 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.

PANEL 0353H

FIRM
FLOOD INSURANCE RATE MAP

VOLUSIA COUNTY, FLORIDA AND INCORPORATED AREAS

PANEL 353 OF 930
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:	COMMUNITY	NUMBER	PANEL	SUFFIX
	DAYTONA BEACH, CITY OF	125099	0353	H

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

MAP NUMBER
12127C0353H
MAP REVISED
FEBRUARY 19, 2014

Federal Emergency Management Agency

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The community map repository should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations (BFEs)** and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood-elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0' North American Vertical Datum of 1988. Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Florida State Plane East zone (FIPS zone 0901). The **horizontal datum** was the North American Datum of 1983 (NAD 83), GRS1980 Spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at <http://www.ngs.noaa.gov> or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, NINGS12
National Geodetic Survey
SSMC-3, #6202
1315 East-West Highway
Silver Spring, Maryland, 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at (301) 713-3242, or visit its website at <http://www.ngs.noaa.gov/>.

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Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

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LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD
The 1% annual chance flood (100-year flood), also known as the "base flood," is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

- ZONE A** No Base Flood Elevations determined.
- ZONE AE** Base Flood Elevations determined.
- ZONE AH** Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
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- ZONE A99** Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
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- ZONE VE** Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE
The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS
ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS
ZONE X Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS
OTHERWISE PROTECTED AREAS (OPAs)
CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

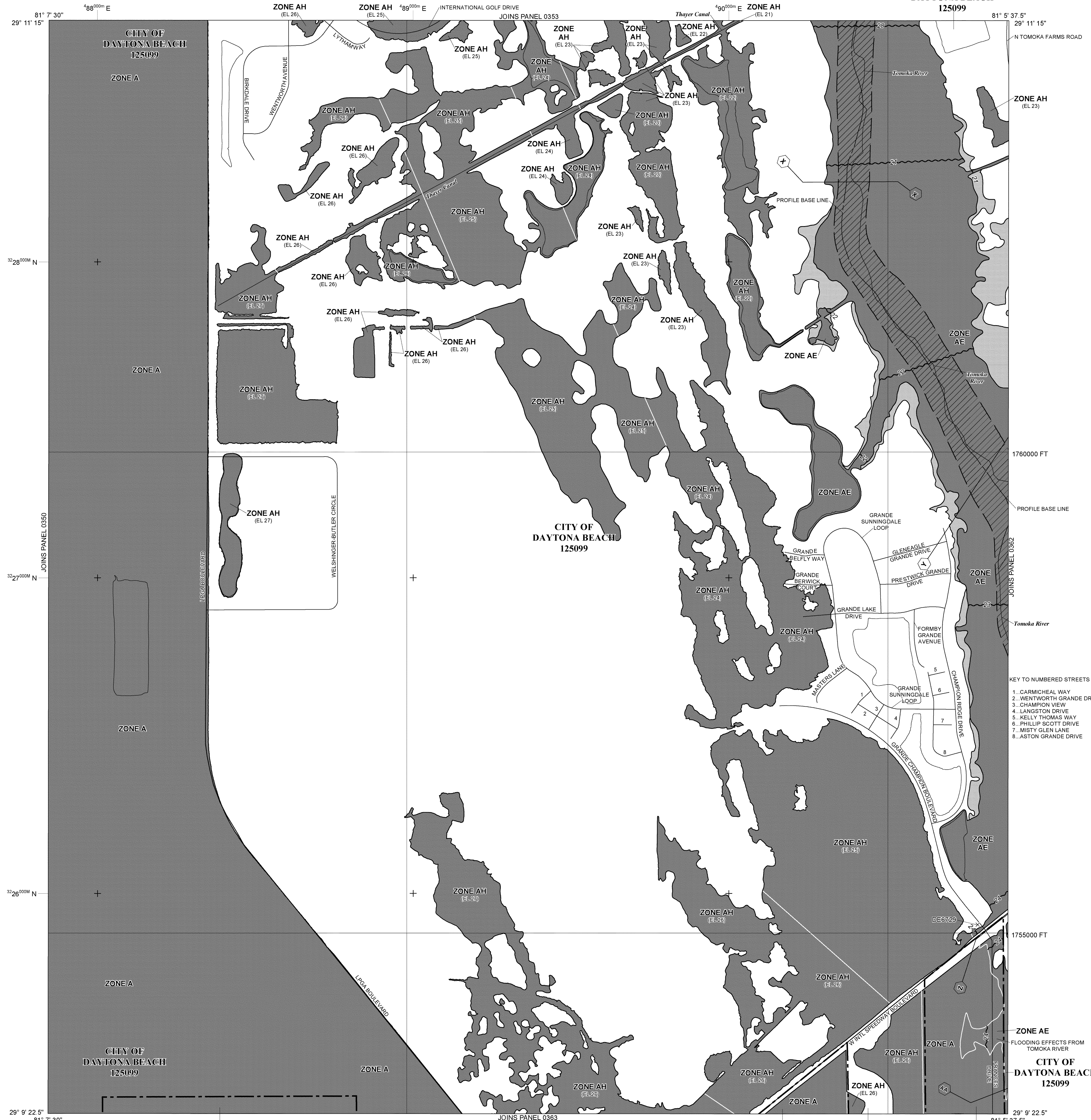
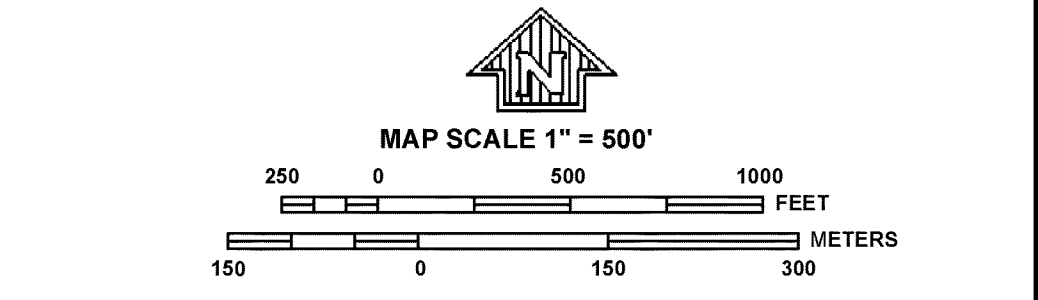
- Floodplain Boundary
- Floodway Boundary
- Zone D Boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- Limit of Moderate Wave Action
- Base Flood Elevation line and value; elevation in feet* (EL 987)
- Base Flood Elevation value where uniform within zone, elevation in feet*

- *Referenced to the North American Vertical Datum of 1988
- Cross section line
- Transect line
- Culvert
- Bridge
- Footbridge

- Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere
- 1000-meter Universal Transverse Mercator grid ticks, zone 17
- 5000-foot grid values: Florida State Plane coordinate system, East zone (FIPS Zone 0901), Lambert Conformal Conic
- Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M 1.5 River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index
EFFECTIVE DATE OF COUNTY/WIDE FLOOD INSURANCE RATE MAP
APRIL 15, 2002
EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
February 19, 2014 - to update corporate limits, to reflect updated topographic information, to add and change Base Flood Elevations, to add floodways, to add and change Special Flood Hazard Areas, to incorporate previously issued Letters of Map Revision, and to change zone designations.
For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

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PANEL 0361H

FIRM FLOOD INSURANCE RATE MAP

VOLUSIA COUNTY, FLORIDA AND INCORPORATED AREAS

PANEL 361 OF 930 (SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:	COMMUNITY	NUMBER	PANEL	SUFFIX
	DAYTONA BEACH, CITY OF	125099	0361	H
	VOLUSIA COUNTY	125155	0361	H

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

MAP NUMBER 12127C0361H
MAP REVISED FEBRUARY 19, 2014

Federal Emergency Management Agency





Florida Department of Transportation District 5

Environmental Management Office

719 S. Woodland Blvd.

DeLand, FL 32720