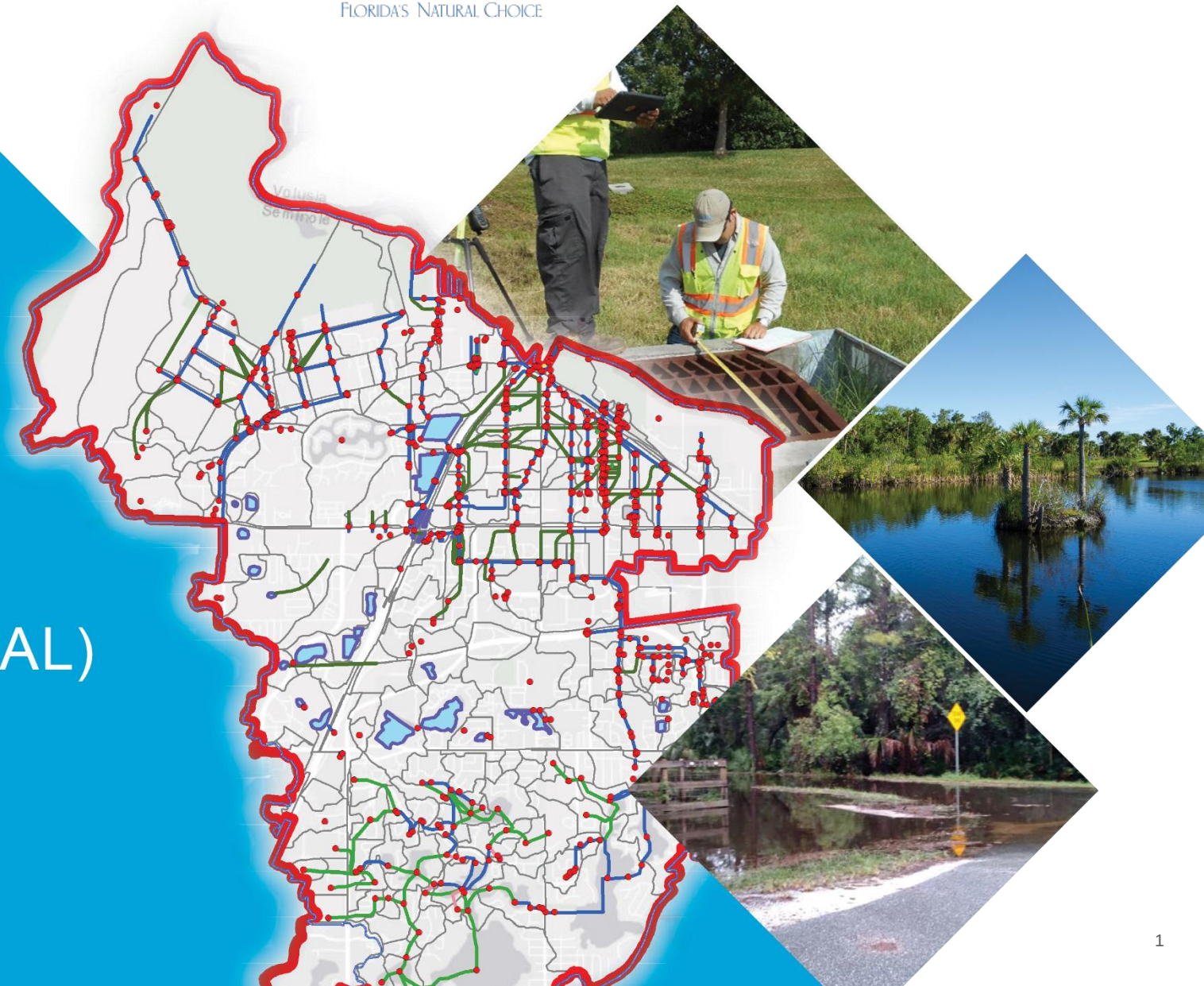
Presentation for

LAKE MONROE (LOCKHART-SMITH CANAL) BASIN STUDY

Board of County Commissioners Meeting

February 14, 2023



Meeting Goals

- Project overview
- FEMA Model Development
- Discuss input from residents
- Level of Service development & analysis
- Flood improvement project selection
- Current status of Conceptual CIPs
- Next steps
- Feedback and discussion

Project Overview

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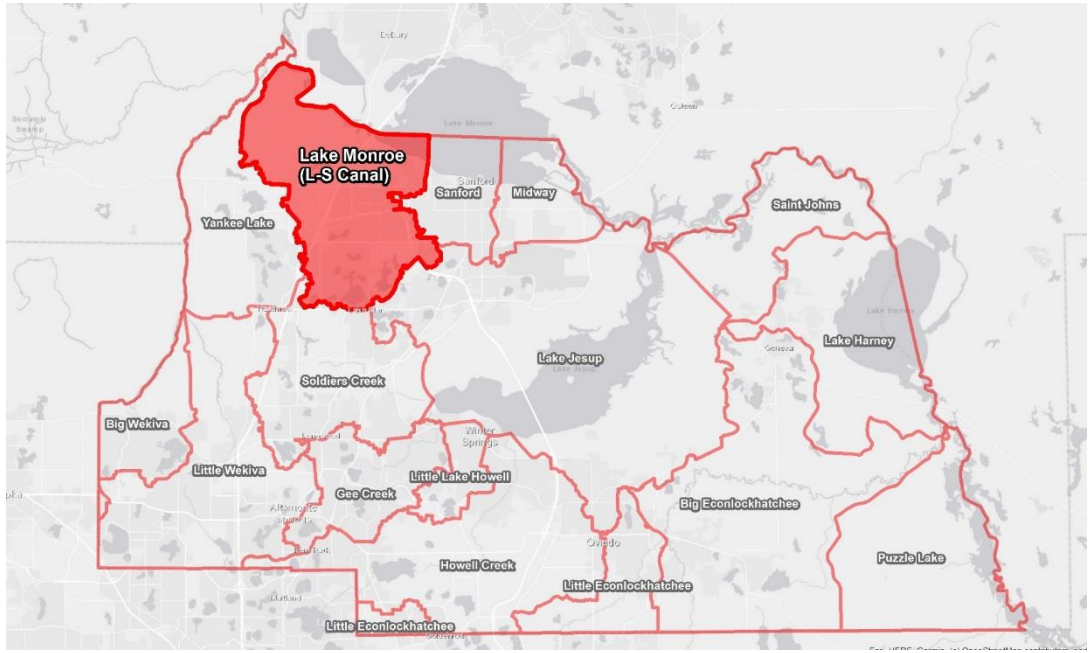
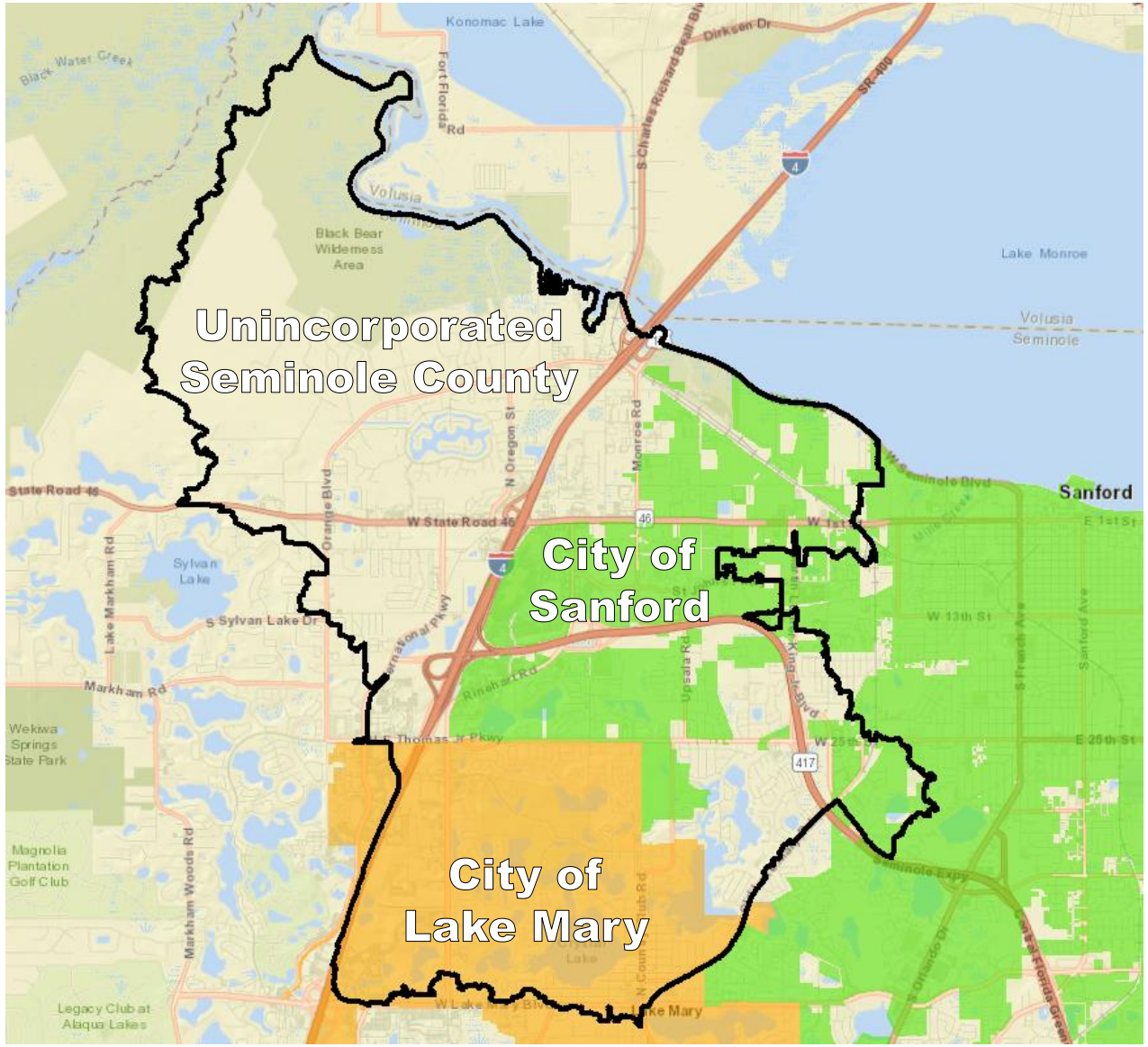
Lake Monroe Basin

- 24.9 square miles
- Cities of Sanford and Lake Mary





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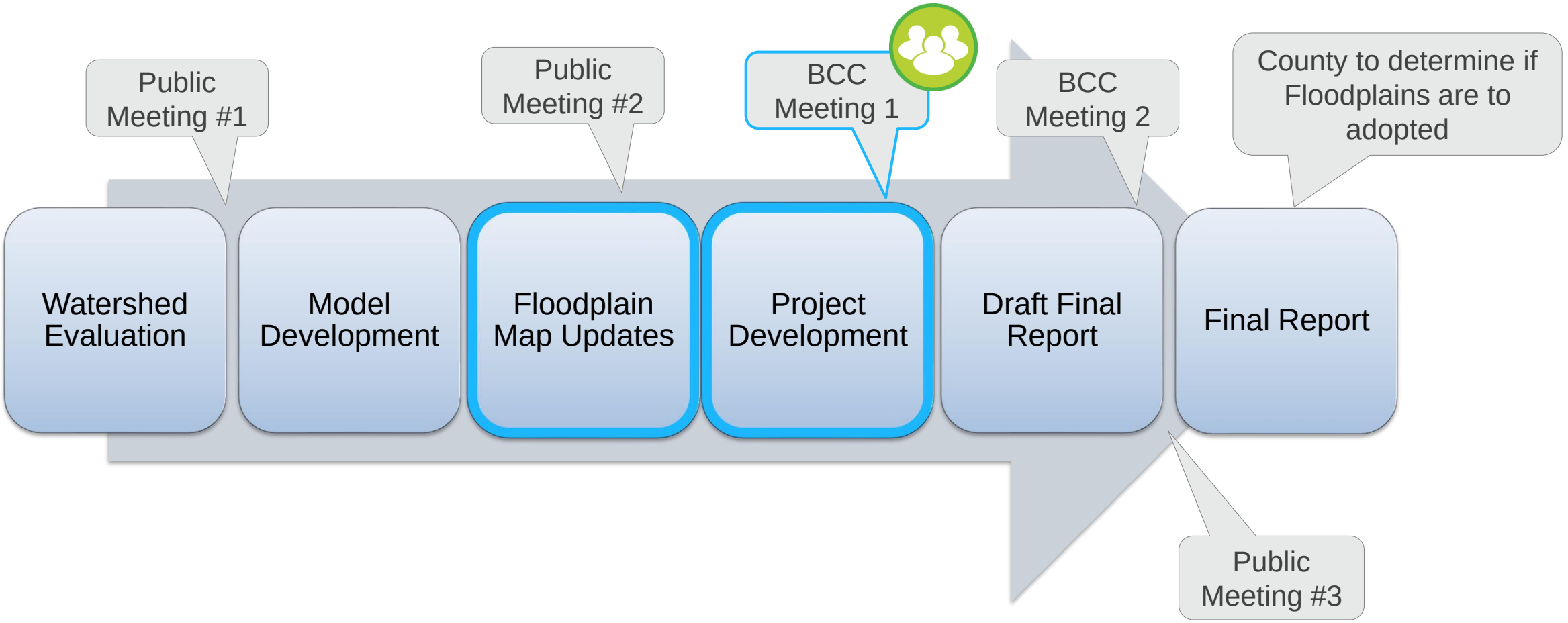
Project Goals

- Update the existing watershed model to incorporate new developments
- Public Meetings to involve stakeholders
- Identify and assess flooding problems (LOS Analysis)
- Develop conceptual improvements to reduce flooding
- Delineate 100-year floodplains and update FEMA maps

Where are we in the Project?



FEMA Model Development

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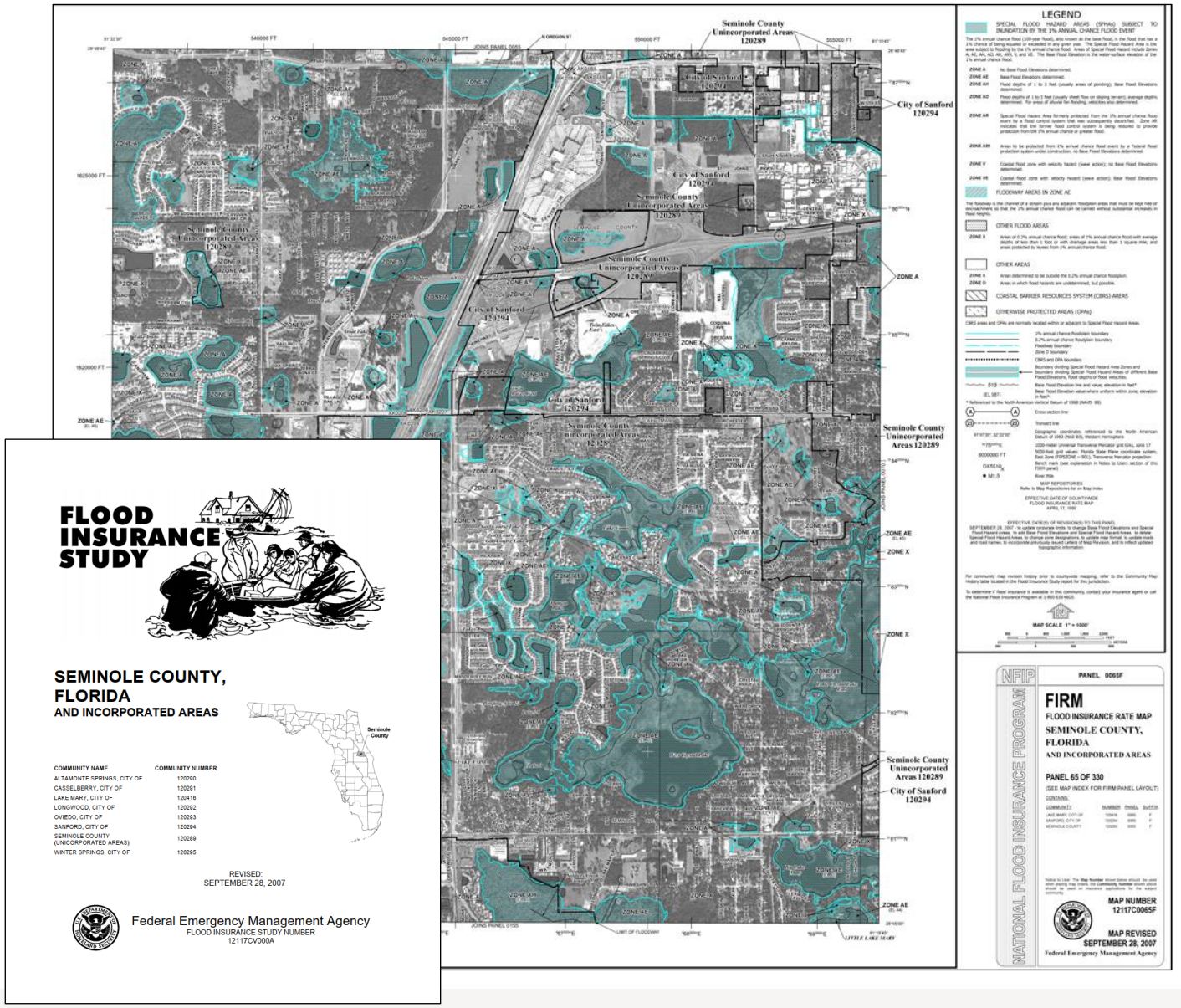
Effective Flood Maps

- Flood Insurance Study dated 2007
- Current maps can be obtained https://msc.fema.gov
- Flood maps based on a 100-year 4-day storm with 14.9 inches of rain
- 100-year stage for Lake Monroe and St. Johns River at elevation of 8 ft



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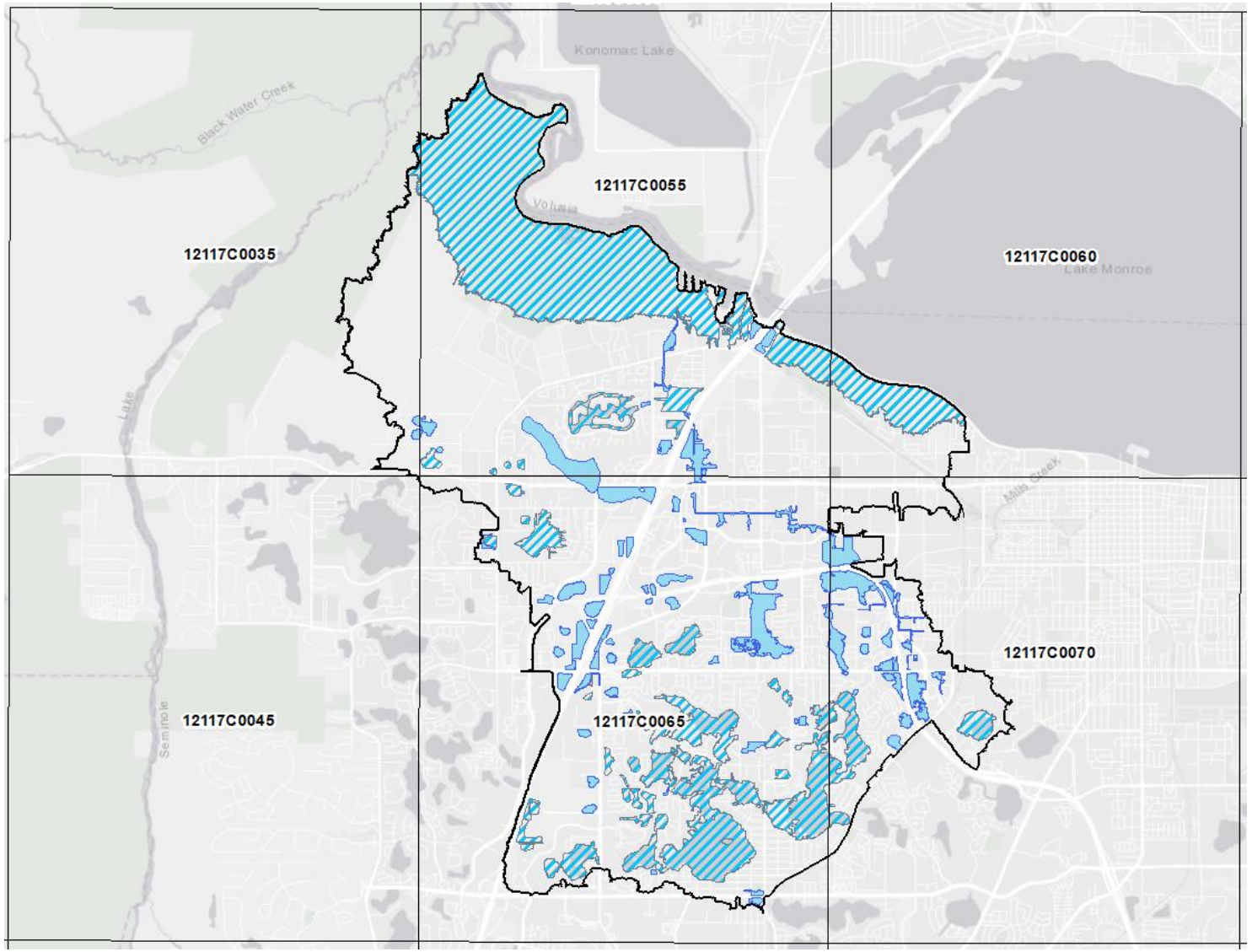
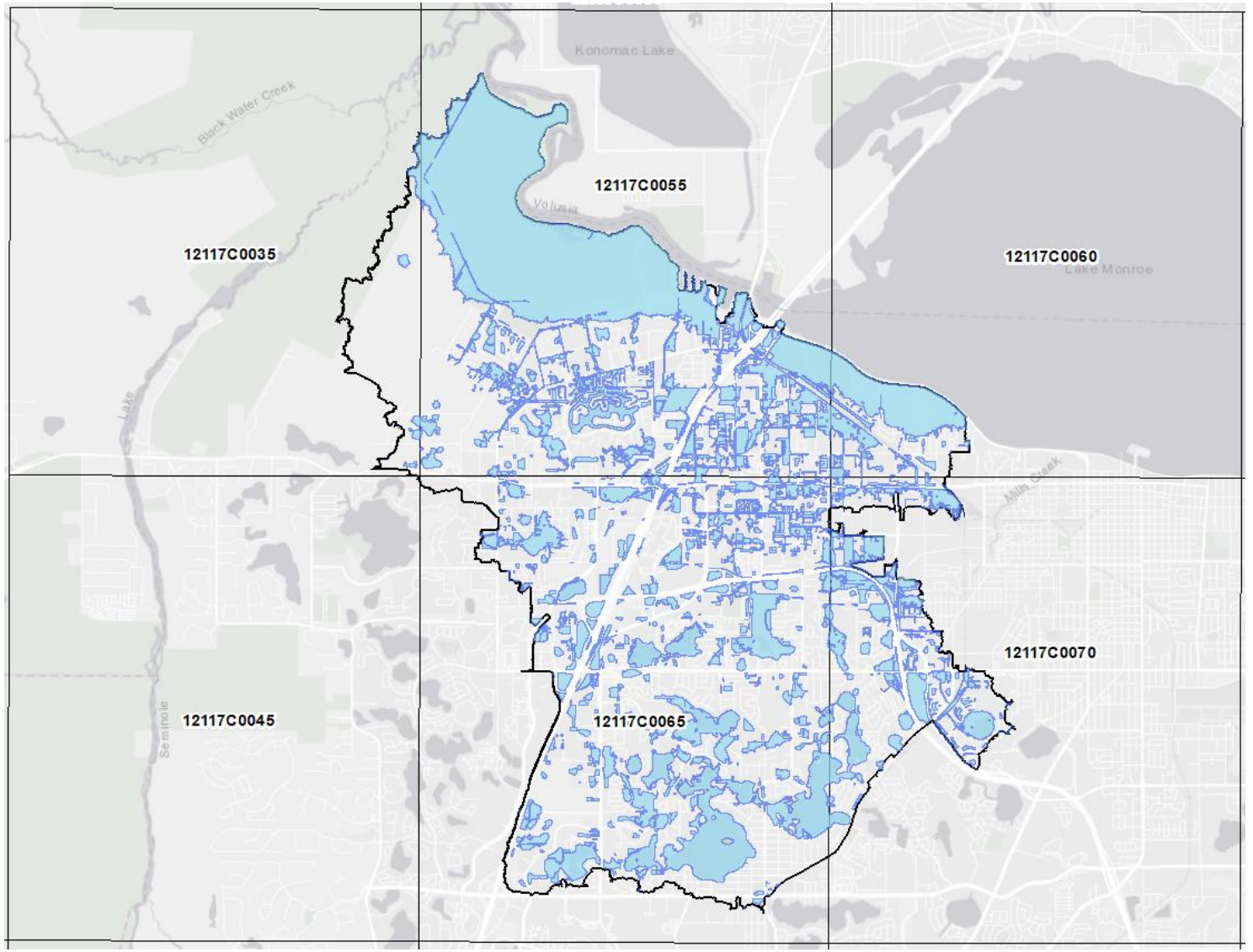
Effective Flood Maps

- 5 panels in the study area
  - 35, 55, 60, 65 and 70
- Mixture of Zone AE (hatched) and Zone A (blue)
- 6.9 square-miles of floodplain
  - 5.6 Sq. Miles Zone AE
  - 1.3 Sq. Miles Zone A
  - 3.6 Sq. Miles (52%) associated with St. Johns River and Lake Monroe

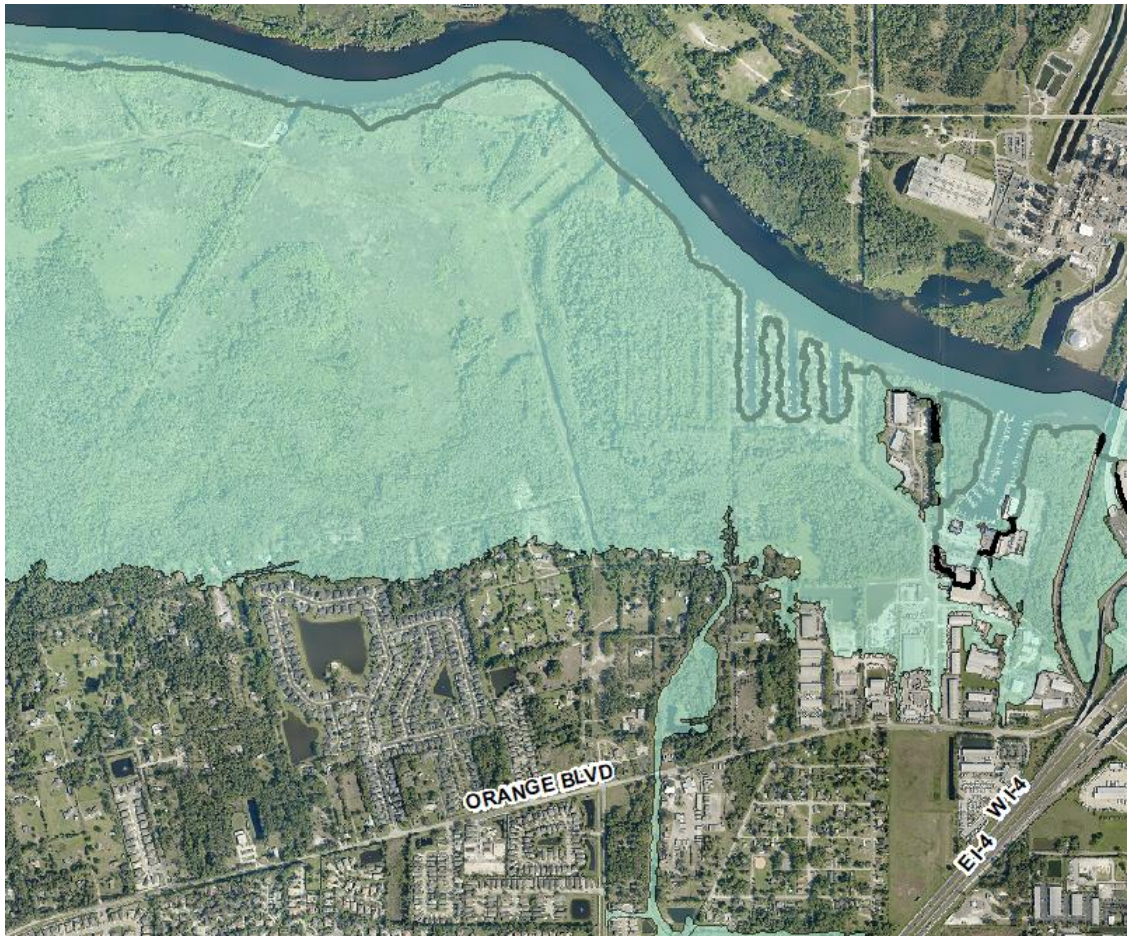


Preliminary Flood Maps

- Preliminary flood maps being refined based on FEMA criteria
- 9.2 square-miles of floodplain
  - 2.3 Sq. Miles additional floodplain
  - 33 % increase in flood area
- Largest changes in floodplains are north of SR-417 on both sides of I-4



Preliminary Floodplain Maps



Existing Floodplain Map

Preliminary Floodplain Map

North / North of Orange Blvd.

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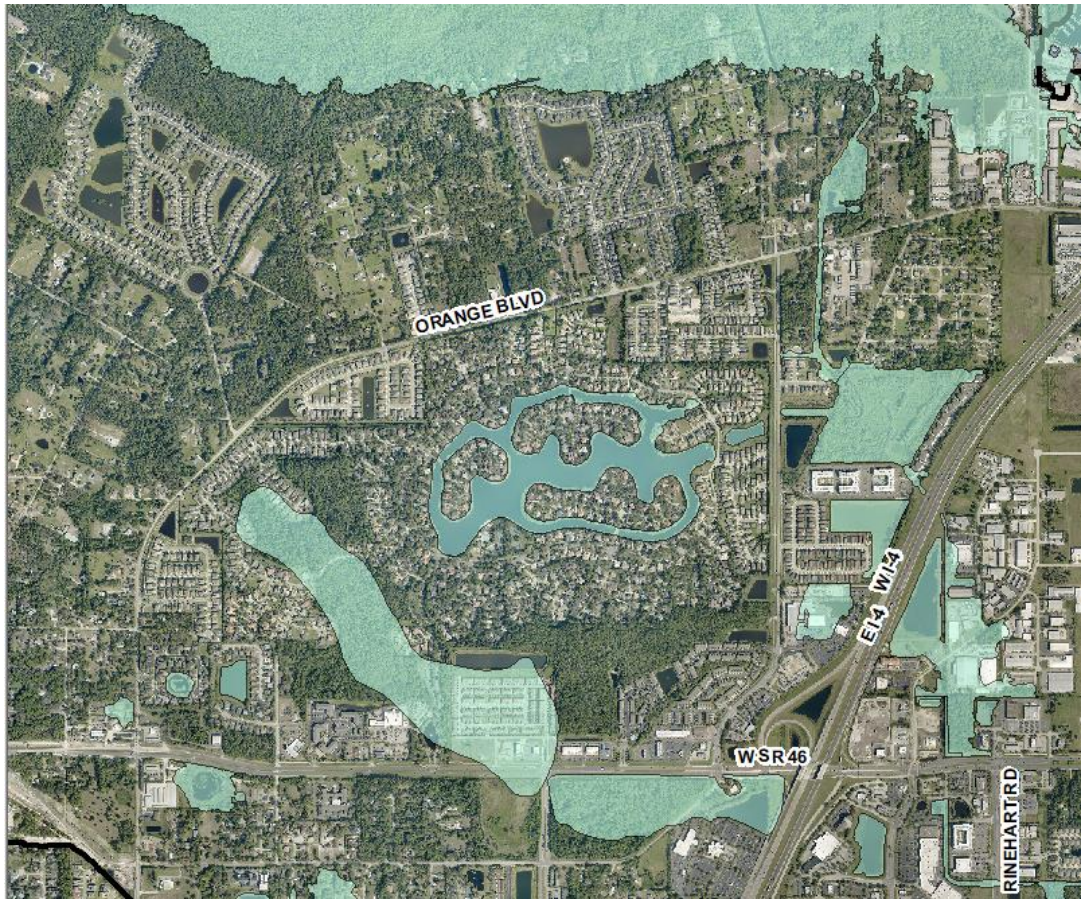
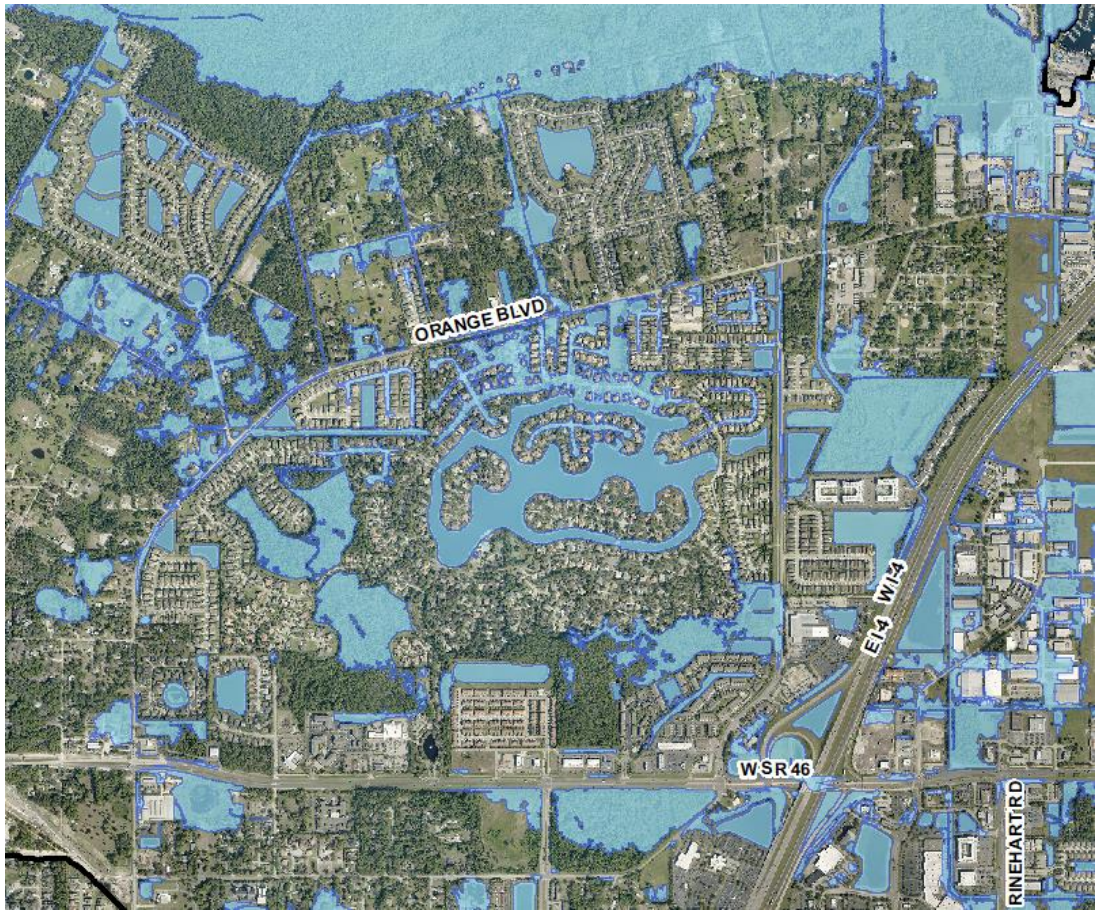
Preliminary Floodplain Maps



Existing Floodplain Map



Preliminary Floodplain Map

Northwest / Forest Lakes and Sub-divisions

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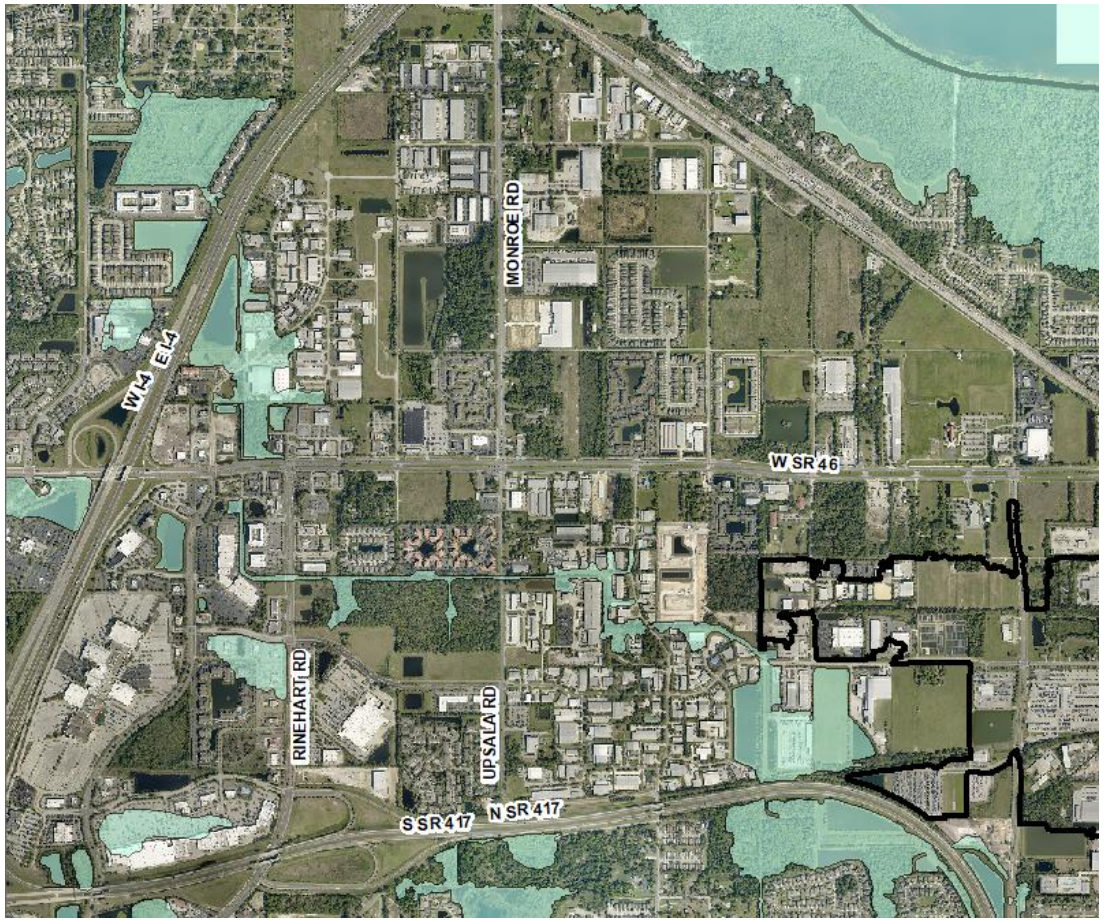
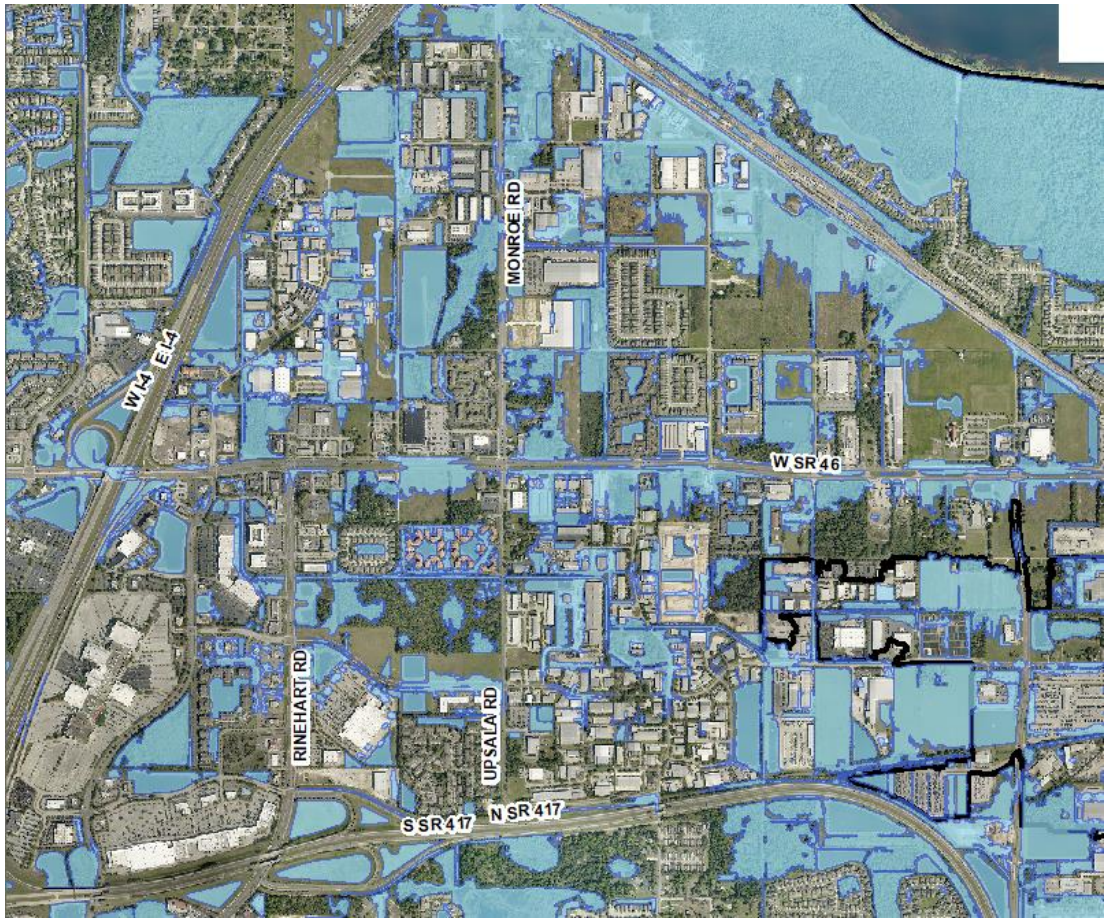
Preliminary Floodplain Maps



Existing Floodplain Map



Preliminary Floodplain Map

Northeast / Sanford Area

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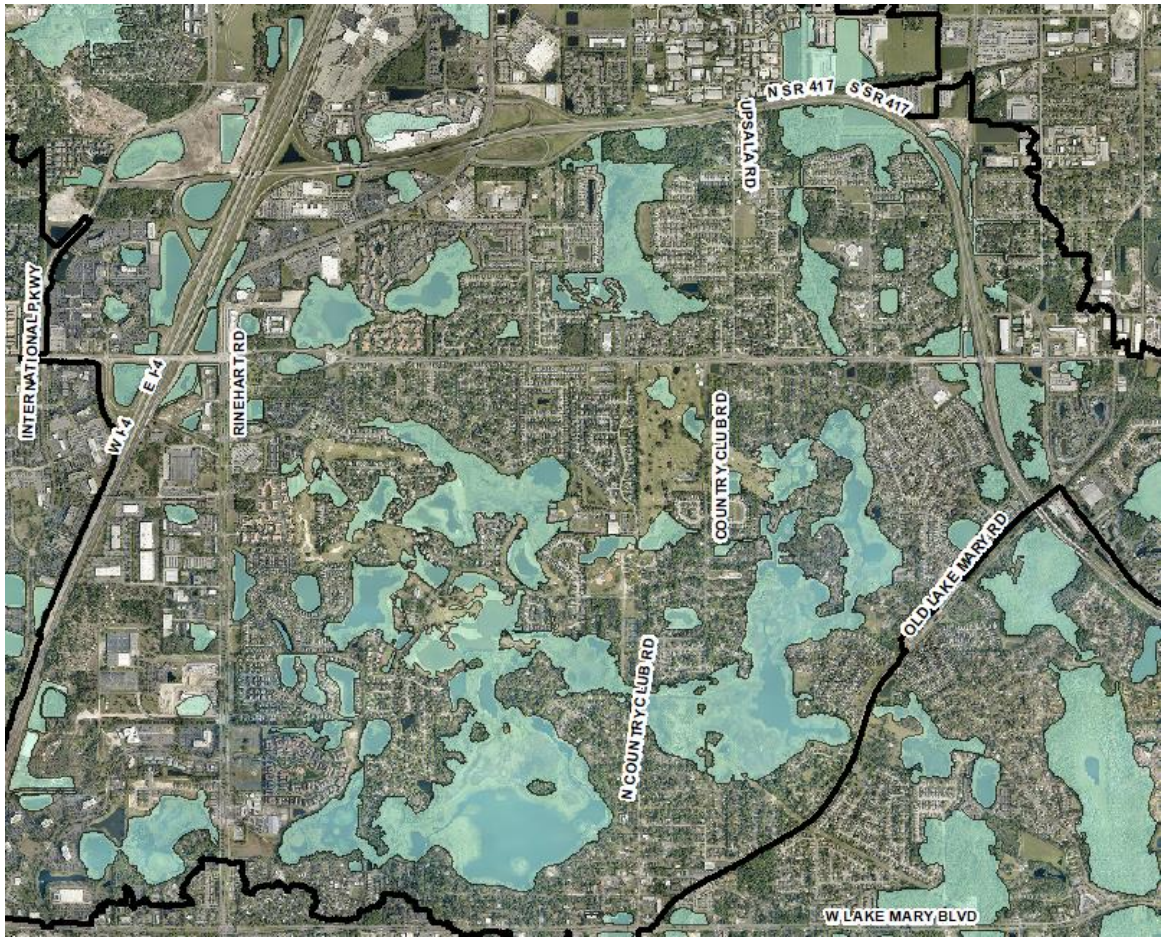
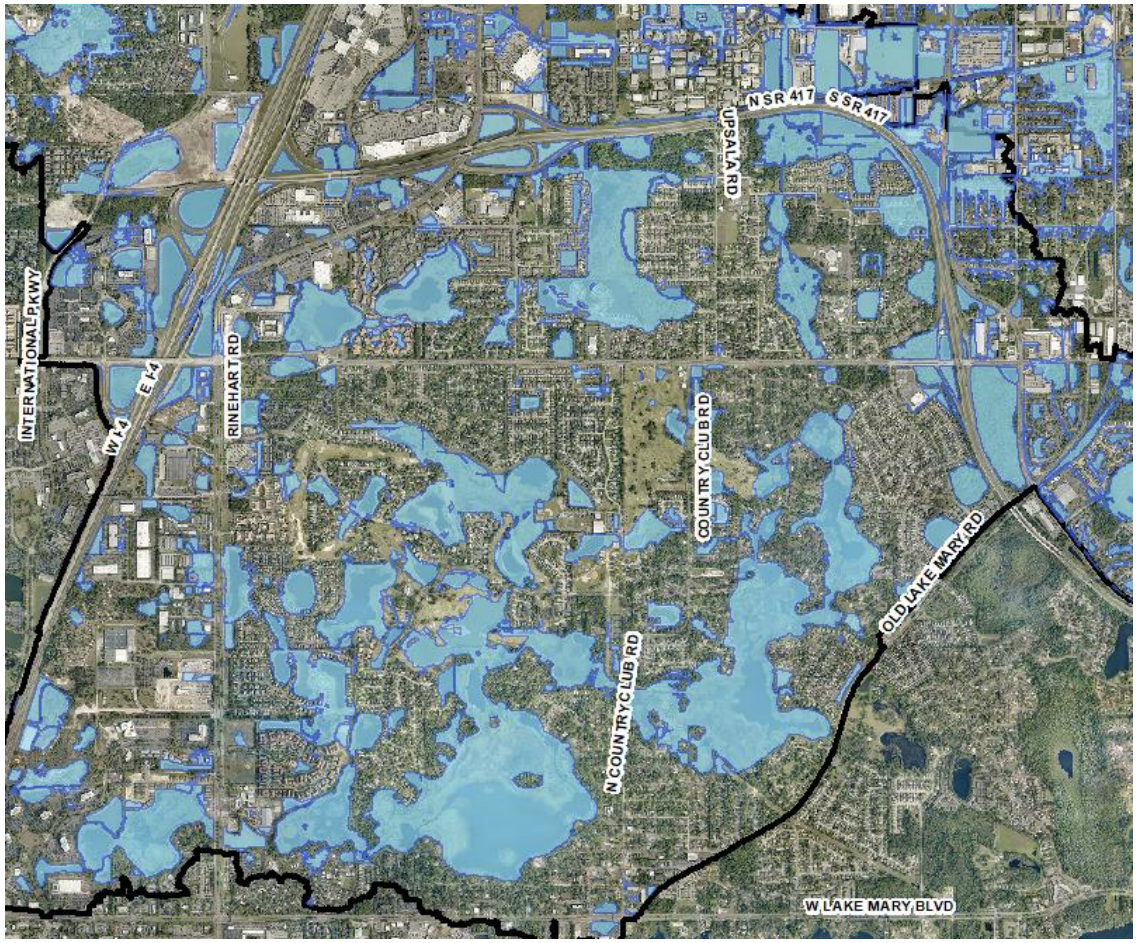
Preliminary Floodplain Maps



Existing Floodplain Map



Preliminary Floodplain Map

South / Lake Mary Area

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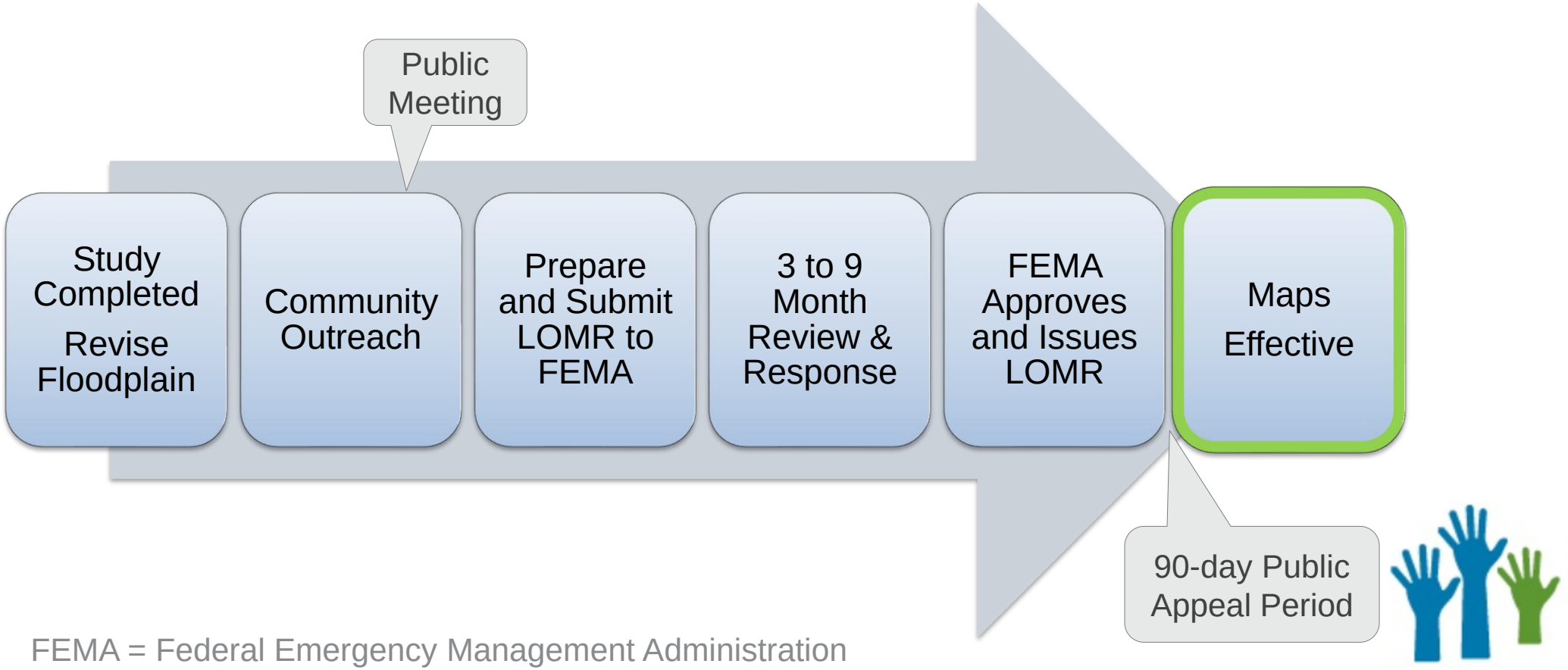
FEMA Update Process (Upon BCC Approval)



FEMA = Federal Emergency Management Administration
LOMR = Letter of Map Revision

Resident Input

Public Meetings

- Two public meetings were held:
  - 6/3/2021 Hybrid Meeting: 6 people in-person, 7 people virtual
  - 8/25/2022 Live: 14 people in-person
  - 9/20/2022 Virtual: 1 person

- Over 30 items of question or feedback generated via meeting or e-mail

* Separate meetings were held on8/25 and 9/20 due to an error with the County's web-page link accessing the virtual session of the 8/25 meeting

Big Take Aways…

- Does the model include recent constructions
- New developments are causing our area to flood
    - Lake Forest – private sub-division
    - Areas north of Orange Blvd and west of I-4
- How will the FEMA floodplain revisions affect me?

Level of Service Model Development

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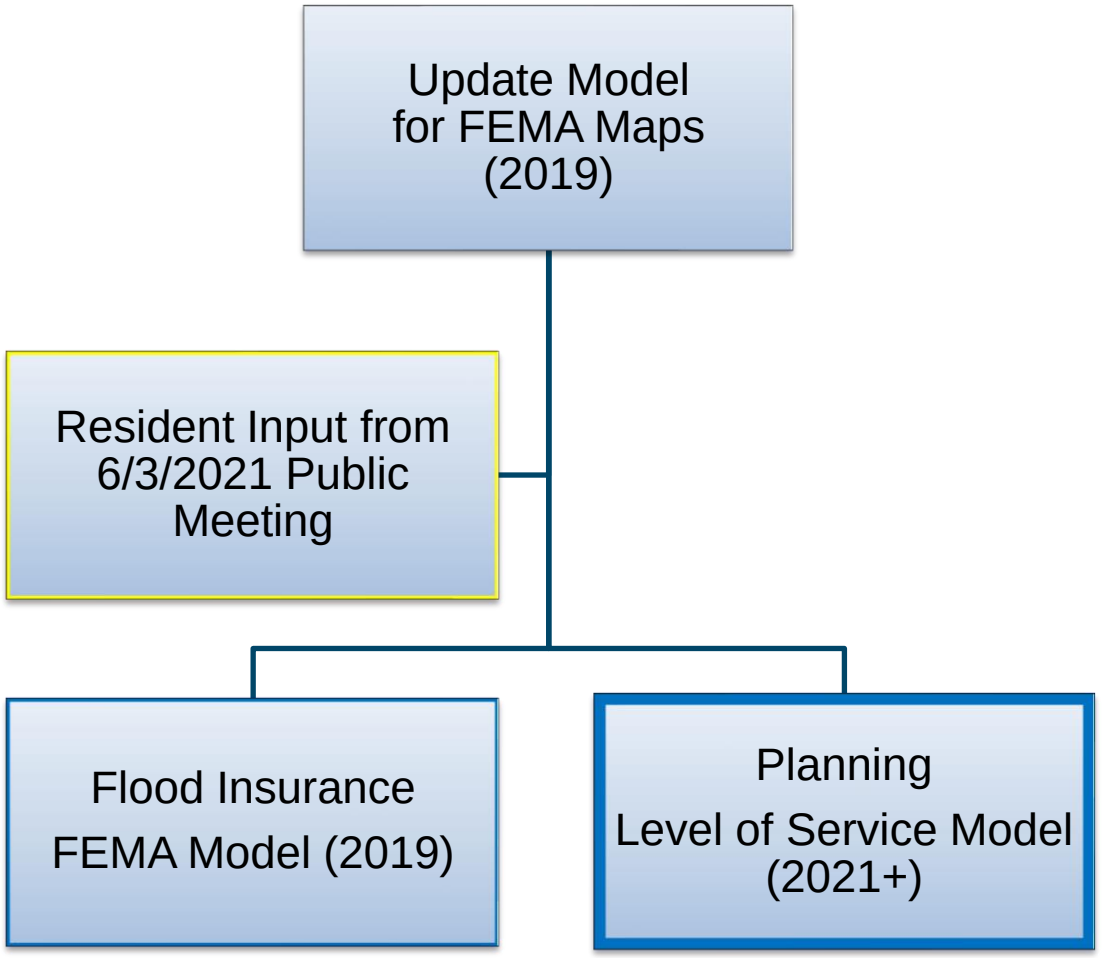
Stormwater Model Development

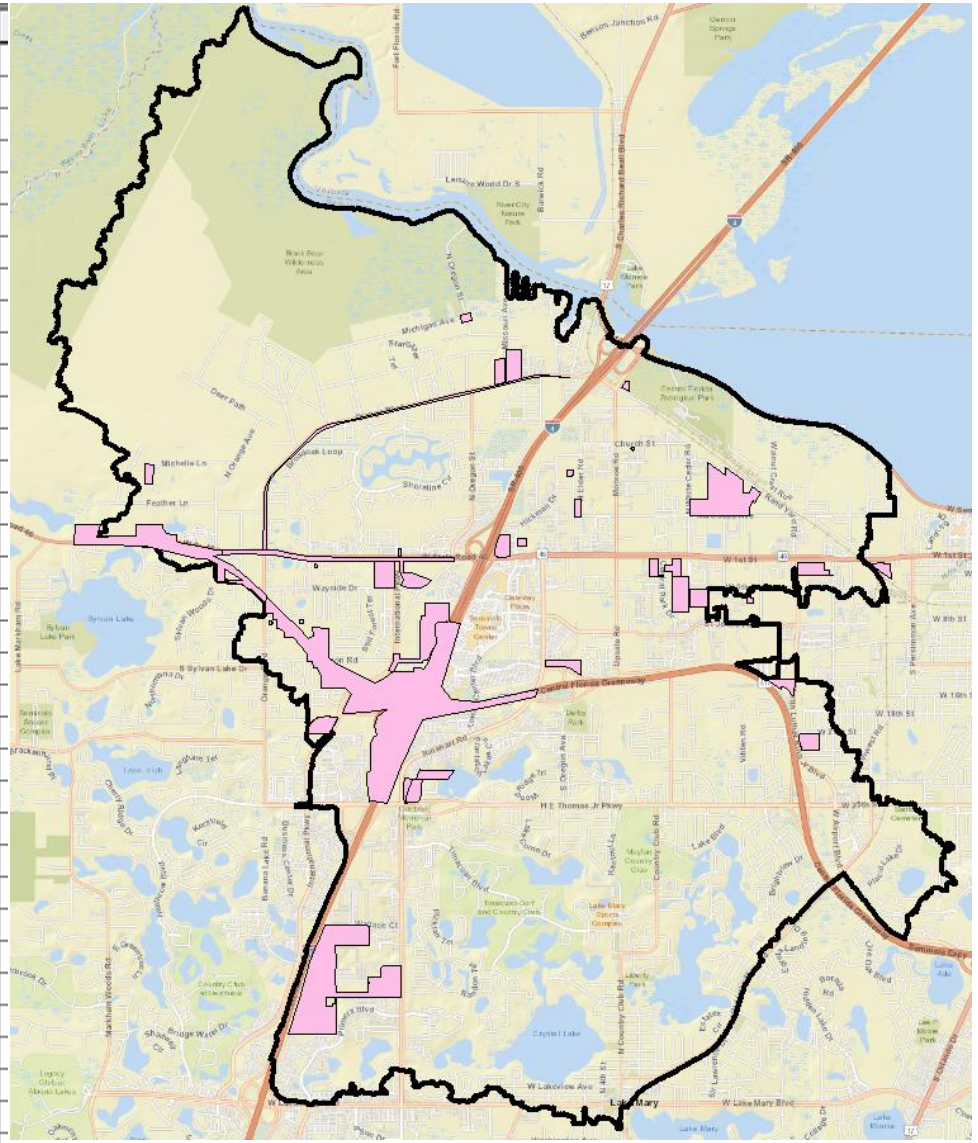


- Originally the project included development of one stormwater model based on 2019 data, used for both FEMA and Flood Reduction (Level of Service) projects
- The year 2019 was picked because the land survey used to develop the model has to be certified and cannot include future projects under development
- The County received feedback from residents that desired to know how projects being built (like Wekiva Pkwy or Orange Blvd) would affect their properties
- This led to the creation of two models, one for FEMA map updates, and one that would account for current projects under construction and future projects. We are calling that the Level of Service Model.

Additional Developments Added to Model

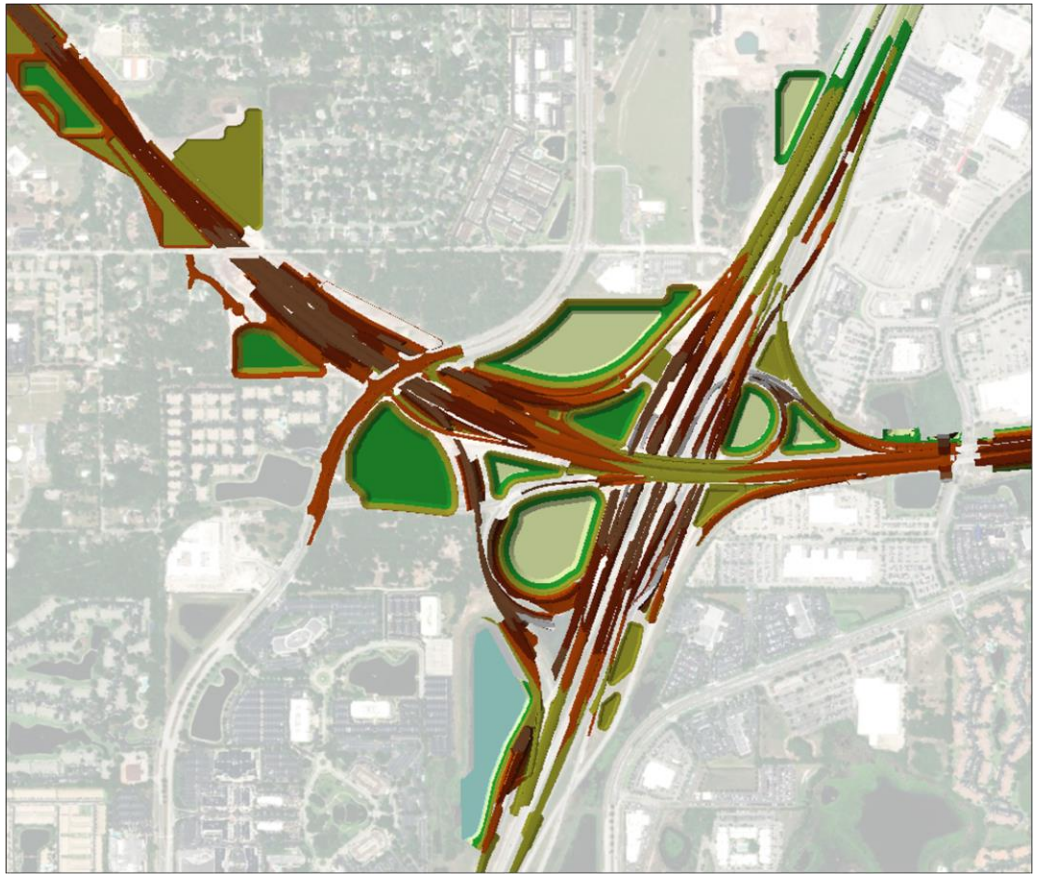
- 35 projects
- 86 acres
- Planned and Under-Construction projects
  - Orange Blvd
  - Wekiva Parkway
  - SR-46 Widening

SITE_NM
Tesoro Townhomes
Lake Monroe Commerce Center
Allure on the Parkway
Home2/HIX
Sanford Hyundai
Smokey Valley Stone Company
New Century Town Center
Rinehart-Greenway Commons
The Towns at White Cedar
Sunbelt Rentals Sanford
HCME Corporate Office
Broadstone Parkway
The Estuary at St. Johns
I-4 Industrial Park 5th Section
Woodsprings Hotel Hickman
Northport Industrial Park
GORDON INDUSTRIAL PARK
Tractor Supply Company - Sanford, FL
Marine Fasteners HQ
Reformation Bible College Student Learning Center
Northridge Meadow
Traditions at White Cedar
Integra Crossings
Sanford Station
The Goddard School, Sanford
Light Industrial Facility
Daycare Facility
SFR - Impacts storage
Wekiva Pkwy 7A
Wekiva Pkwy Interchange - Section 8
WEKIVA 7B - SR 46 WIDENING
I-4 Industrial Park 5th Section
Vintage North Apartments
Orange Blvd 90%
Oregon and Michigan Drainage Improvements



Updated Topography

Wekiva Section 8 (under construction)



Topography of Wekiva Section 8 Incorporated into the Model

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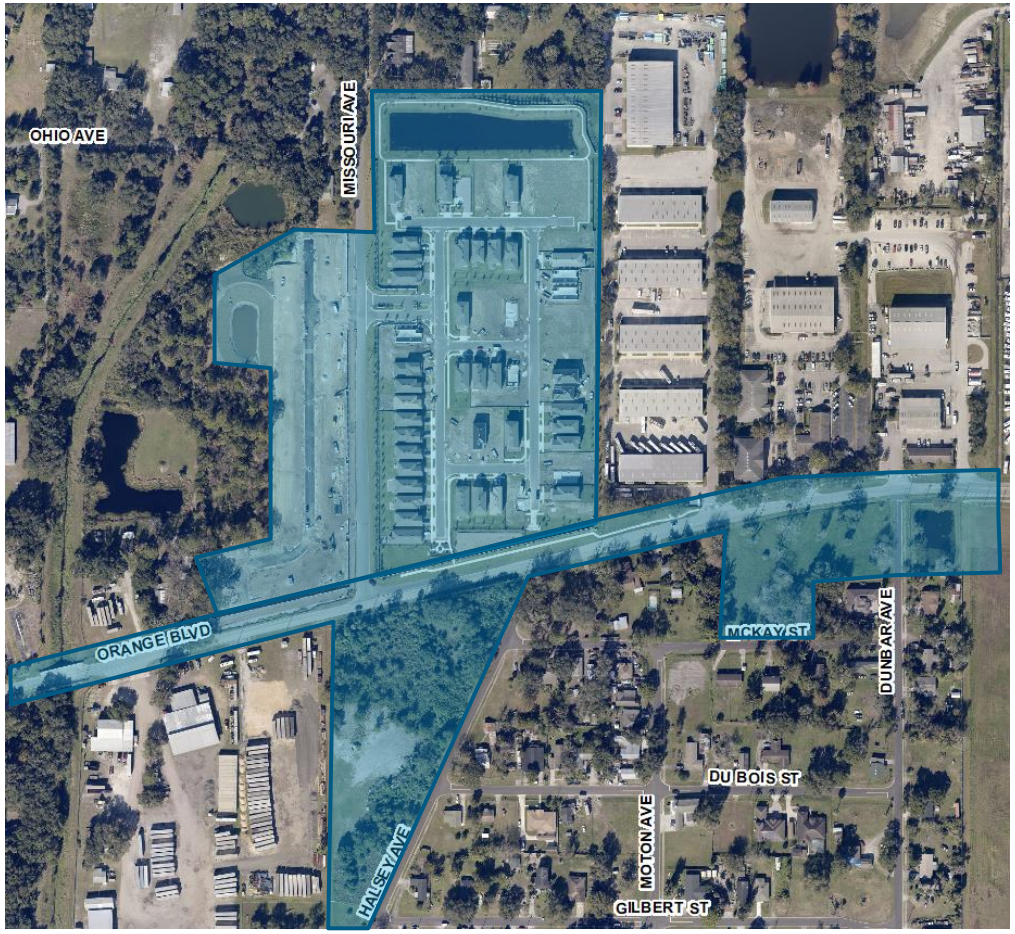
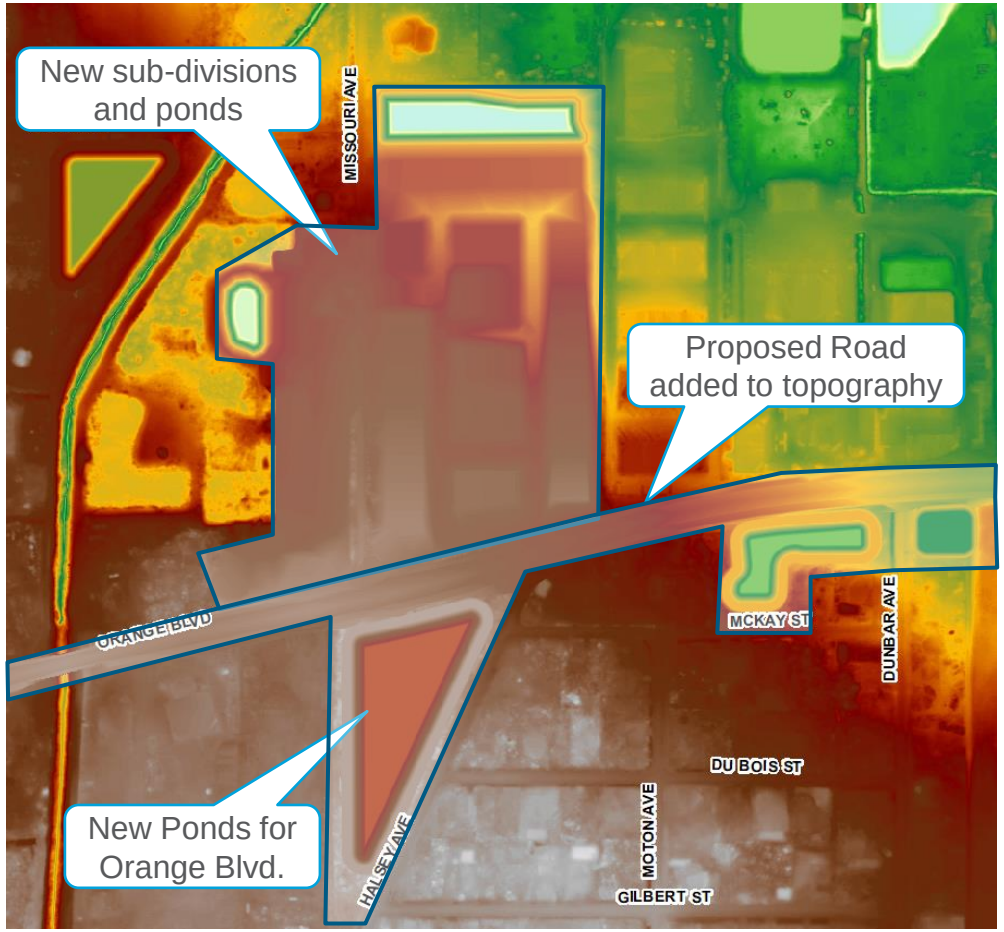
Updated Topography



Orange Blvd. at Missouri Ave. 2021



Topography of New Sub-divisions and Orange Blvd. Added to Model

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Orange Blvd. Density Increase

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Level of Service Analysis

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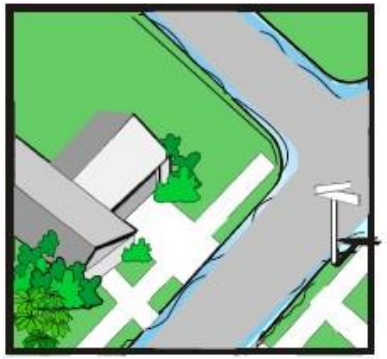
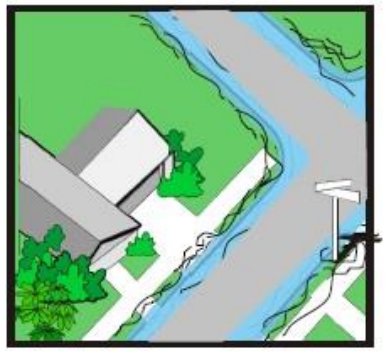
Flooding Level of Service



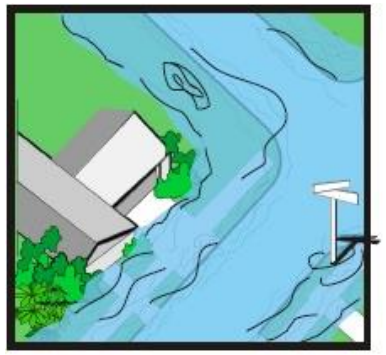
Service Level A

Flood contained within the storm drain systems
OR below EOP
Pond/Canals: Flood within TOB



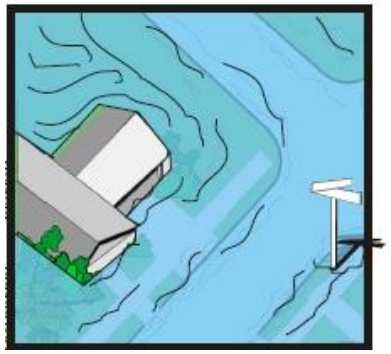
Service Level B

Flood above EOP AND within the ROW
Ponds/Canals: Flood above TOB but within ROW



Service Level C

Flood above road CL AND/OR outside ROW
Ponds/Canals: Flood above TOB AND/OR outside ROW



Service Level D

Structure Flooding for the 100yr-24hr
Storm (Flood above FFE)

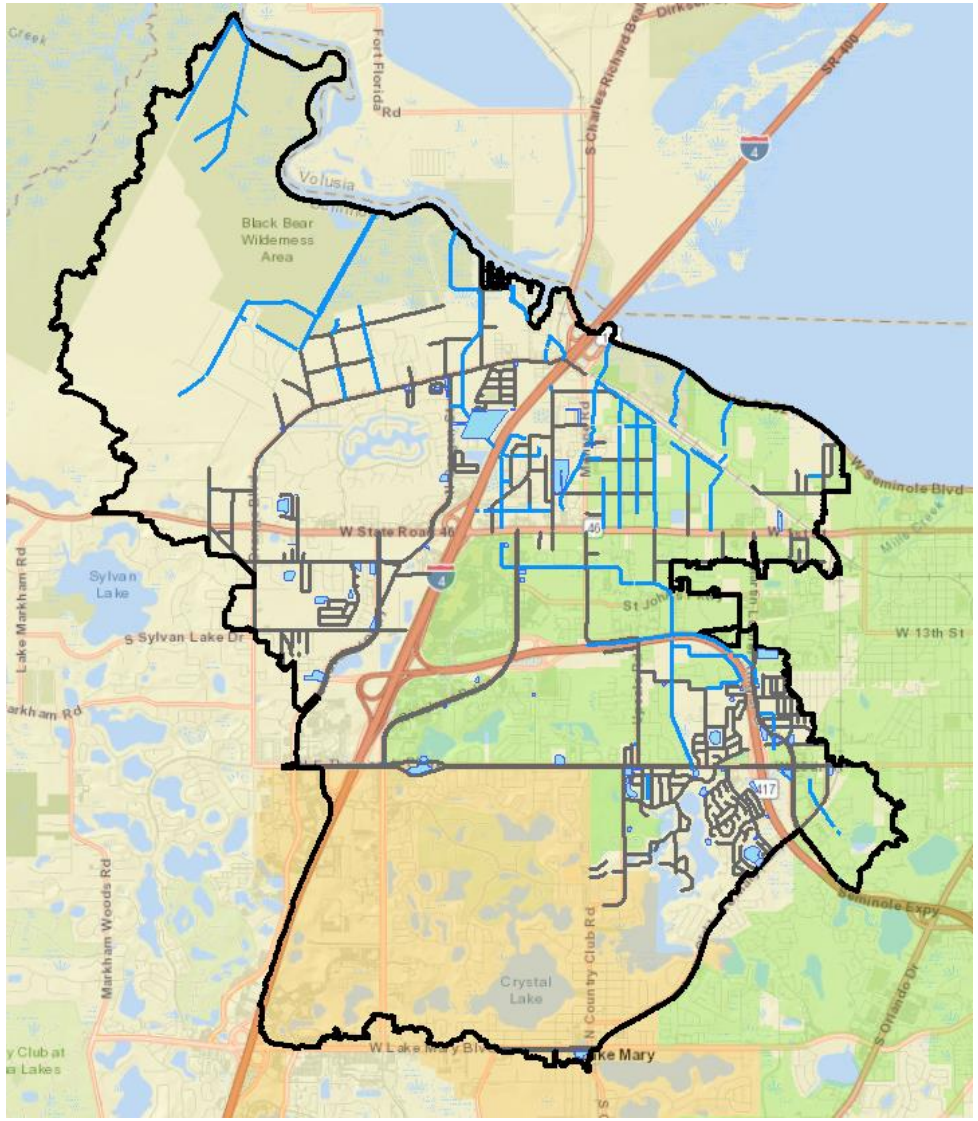
Legend:
CL: Center Line
EOP: Edge of Pavement
ROW: Right of way
TOB: Top of Bank

Rating System Used to Evaluate Design Performance of Drainage Infrastructure

Level of Service Analysis

- Includes:
  - County maintained
  - Roadways (10-yr storm)
  - Ponds (25-yr storm)
  - Canals (25-yr storm)

- All major infrastructure are included in the model, but LOS analysis was only performed for COUNTY maintained systems
- LOS Analysis does not include:
  - City infrastructure
  - FDOT roadways
  - Private sub-divisions
  - Private developments

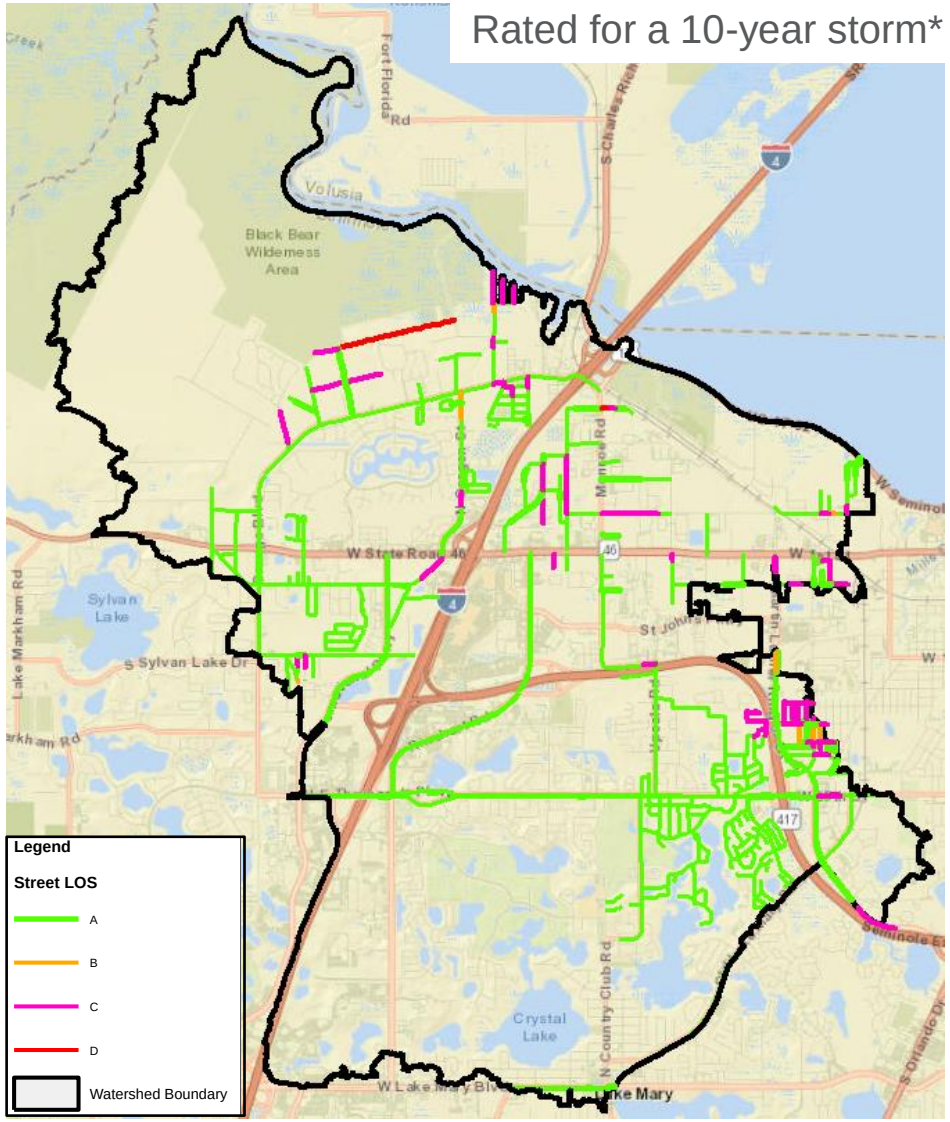


Level of Service Results

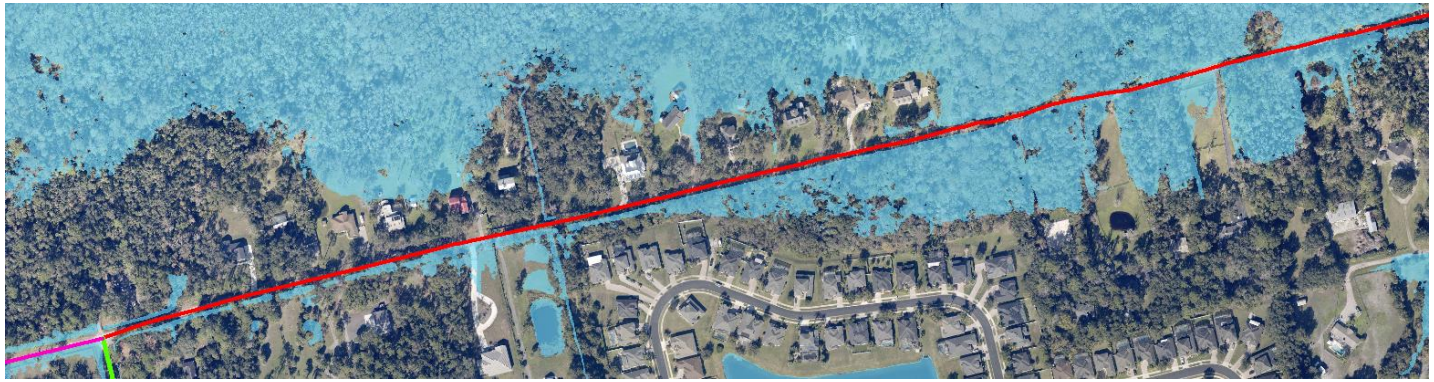
	Total - Within Watershed	Maintenance Type	LOS Classification Results				
			A	B	C	D	Notes
Streets	850*	County	777	9	73	2	*Different Streets segments
	11	County Emergency Only					Habitable structure flooding at Michigan Avenue caused by backwater from the St. Johns River
Canals	93*	County	56	14	23	-	*Different canal segment, including some ditches
Ponds	34	County	56	4	3	-	
	29	Functional					

Note:
1. Roadway segments based on the County's GIS database, divided based on intersections with other streets.
2. Canals segments are based on the County's GIS database.

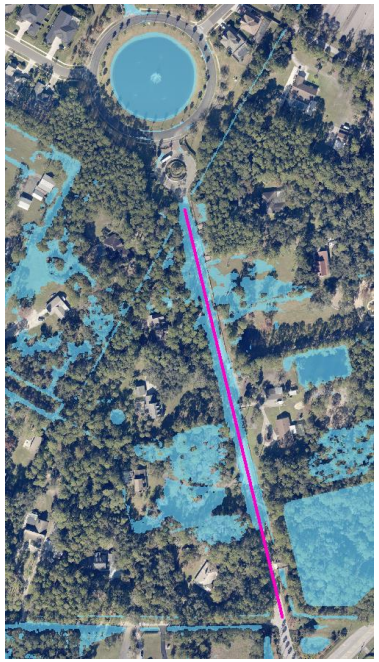
Rated for a 10-year storm*



Roadways LOS A-D



Michigan Ave. LOS D (due to St. Johns River) / LOS C (when river is low)



Maryland Ave. LOS C

Ravenna Park and Lincoln Heights LOS C

*Structures along roadways are checked for a 100-year event

* Additional details on the Michigan and Ravenna Park / Lincoln Heights areas will be shown in later slides.

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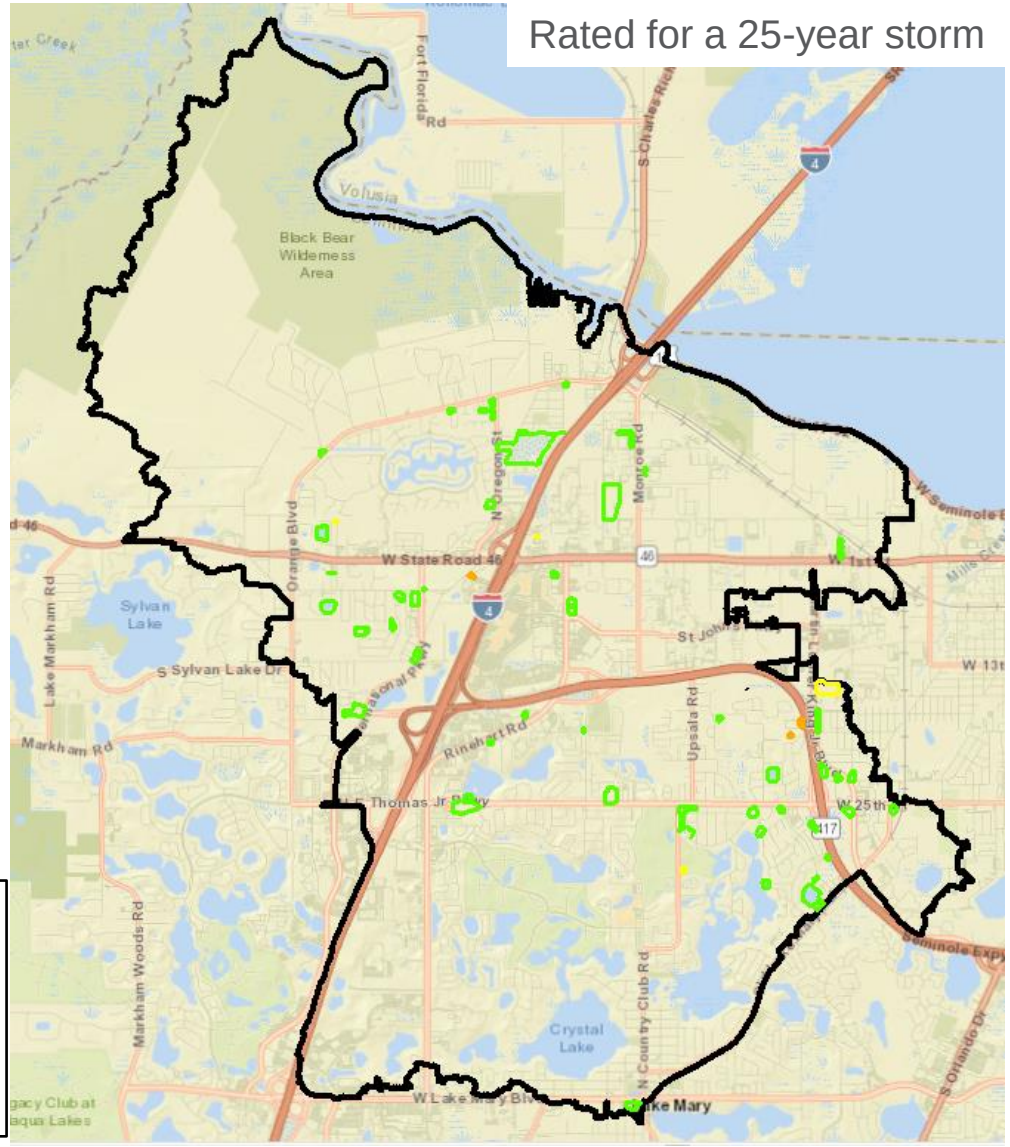
Rated for a 25-year storm



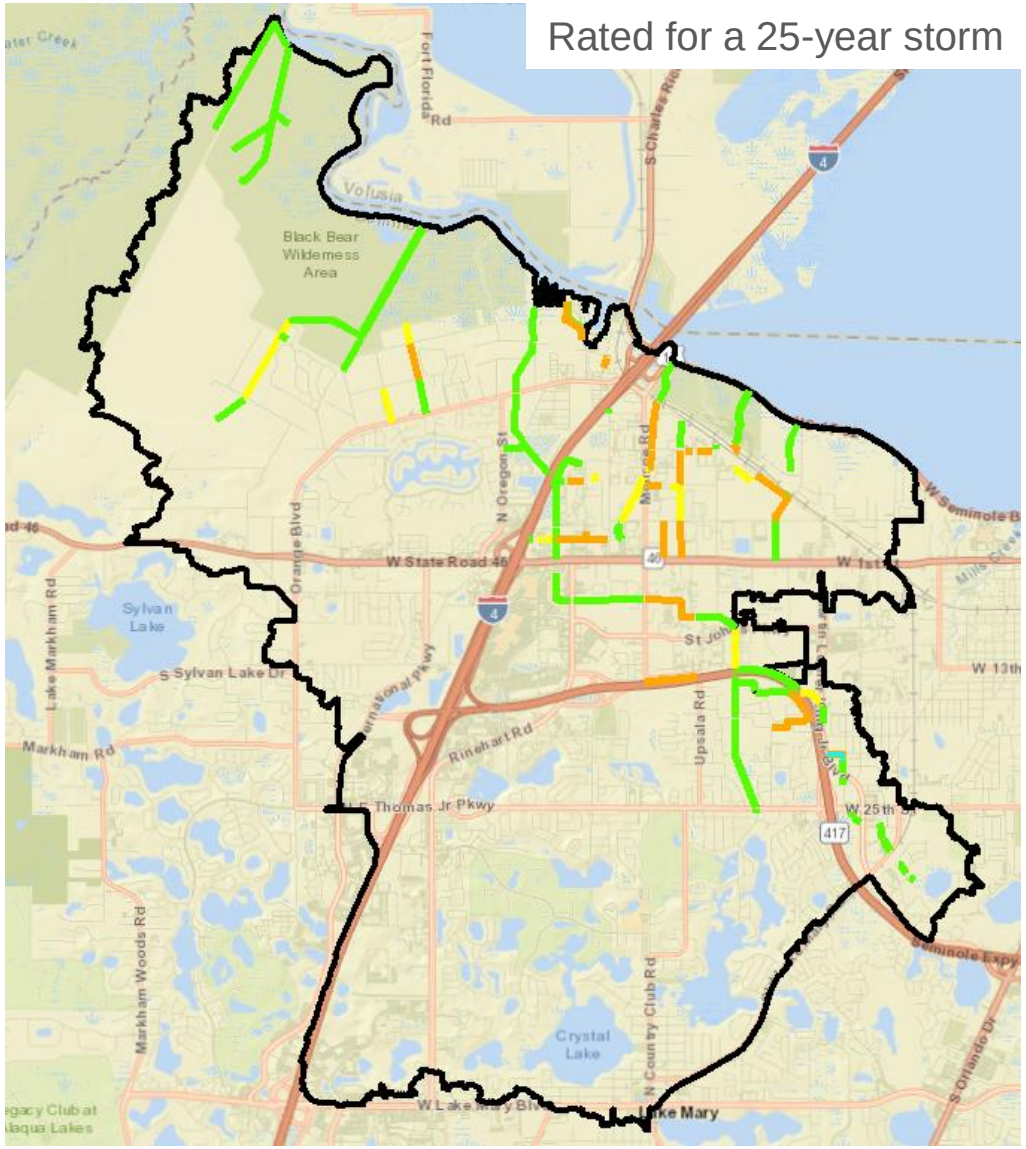
Legend

LOS Results

- A
- B
- C

Ponds LOS A - B

Rated for a 25-year storm



Canals LOS A-C*

**Majority of Canal showing LOS C (orange) are within large wetland areas and are not causing road and structure flooding. LOS C indicated because flow is out of main channel but still contained within wetland.*

Flood Improvement Project Selection

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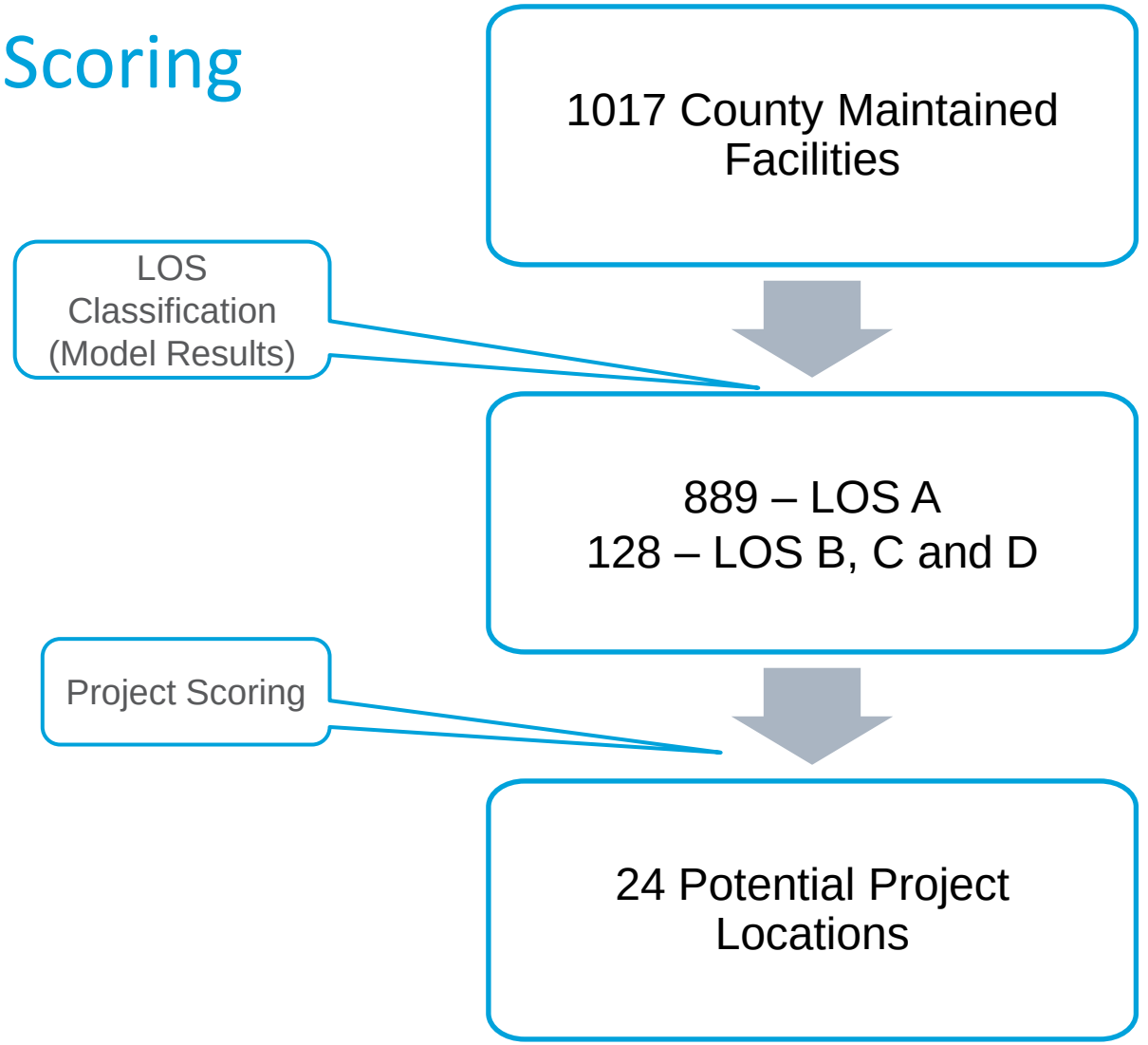
Improvement Project Selection: Scoring

- Criteria:
  - Flooding Severity (flood depth related to CL, EOP, ROW, parcel line and canal/pond top-of-bank)
  - Resident Input and Drainage Concerns
  - Visual inspection of flooding
  - Project feasibility
  - County Staff input
    - Engineering
    - Roads and Stormwater
    - Watershed Management



Improvement Project Selection

Atkins identified 42 Preliminary Locations

18 Eliminated

= 24 Potential Project Locations

Reasons for Elimination:

1- No Resident Complains
2- County Staff Input
3- Ongoing improvement projects at the location
4- Insignificant flooding / No flooding reported
5- Project feasibility

* Flooding due to the St. Johns River may make a project infeasible

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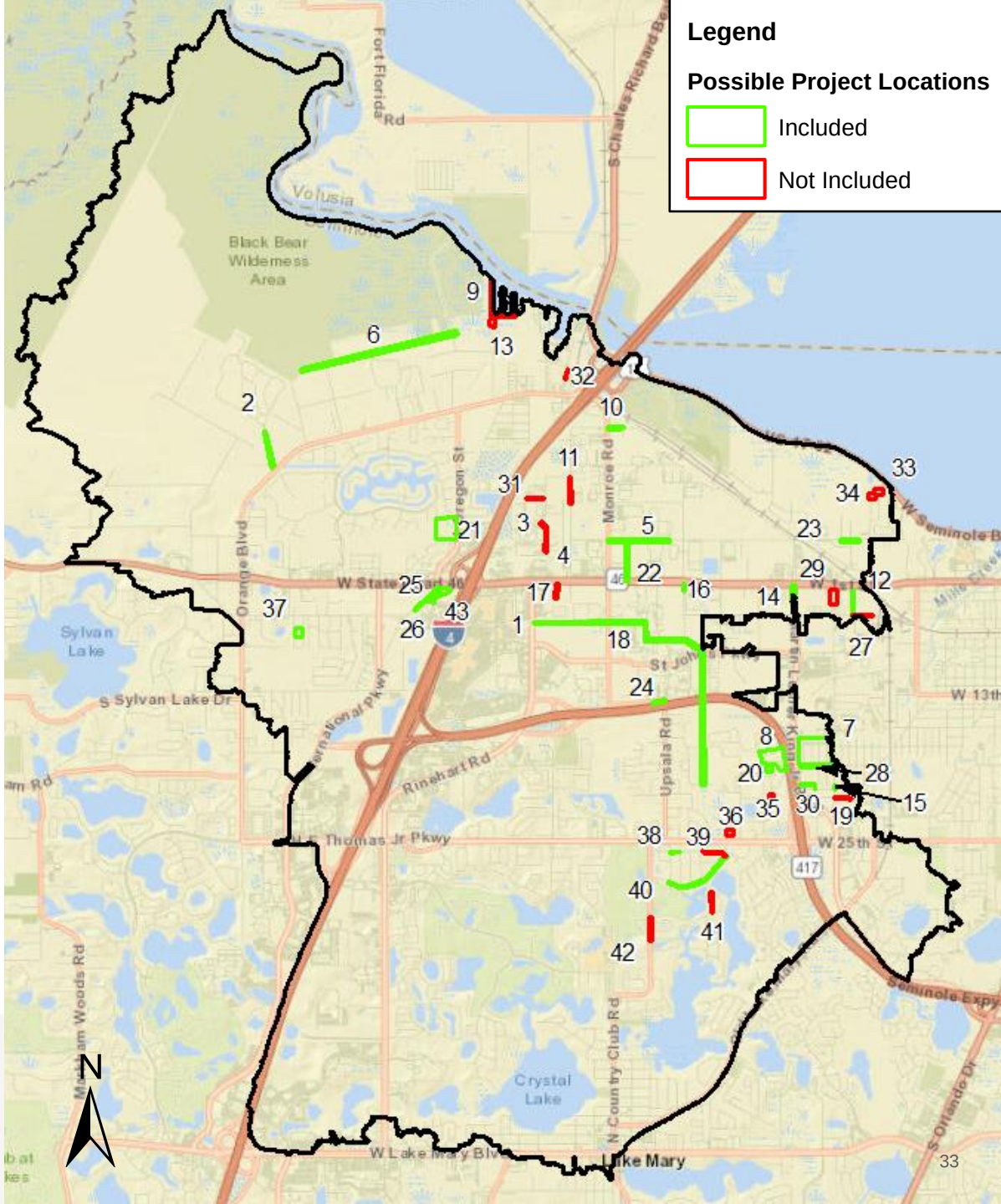

Improvement Project Selection

Ranking	Location	Comment	Street LOS	Canal LOS	Pond LOS	CL Flood (ft)	EOP Flood (ft)	ROW Flood (ft)	TOB Flood (ft)
1	Lockhart Smith Canal - Upstream of Rinehart Road	Evaluate Canal from Rinehart Rd Upstream.		C					
2	North Maryland Avenue	Resident Complaint.	C			0.95	1.1	0.97	
3	Narcissus Avenue	Resident Complaint.	C	C		0.6	0.7	3.73	
4	Michigan Avenue	Roadway flooding. Road and building within floodplain	C	C		0.36	0.7	4.38	
5	Lincoln Heights Tributary Area	Lincoln Heights storm improvements. Proj. Dated 10/2009	C	C					
6	Ravenna Park Tributary Area	Ravenna Park storm improvements. Proj. Dated 10/2009	C	C					
7	School Street	Building Flooding Potential. No Complaintts.	C	C		0.6	0.77	1.31	
8	Brown Avenue	Road flooding	C			0.4	0.58	1.66	
9	Martin Luther King Jr. Blvd.	Ditch overflows. Road flooding. Storm crosses SR. Assess area and provide to FDOT.	C			0.39	0.63	-0.18	
10	West Airport Blvd.	Road flooding.	C			0.32	0.72	0.33	
11	South White Cedar Rd.	Storm crosses SR. Minor flooding. No Complaintts. Assess area and provide to FDOT.	C			0.29	0.6	0.79	
12	Lock Harbor Ravenna Park Pond-2	Floods adj properties - visual only. Exist. proj in the area.	C		C				1.06
13	Lake Forest at Oregon Pond.	Resident Complaint.Flood reported behind Oregon Pond.	NA	NA	NA				
14	Palm Ter Ditch	Resident Complaint.	C	C					0.01
15	Narcissus Avenue	Resident Complaint.	C			-0.05	0.2	0.43	
16	Upsala Road	Road Flooding likely due to undersized cross-drain pipe	C			0.11	0.64	0.84	
17	Wayside	Road flooding. Pond overflows for the 10y storm.	C		C	-0.05	0.42	0.83	
18	First Team Ford Pond 1	Pond overtops TOB for 10y and 25y events.	C		C				1.2
19	West 20th Street	Road flooding caused by roadside ditch overflow.	C			0.12	0.83	2.95	
20	22nd Street Outfall	Canal overflows to adj pond.		C					1.72
21	Kimberly Ct	Resident Complaint. Flooding likely due to secondary system	NA	NA	NA				
22	Sunset Drive	Resident Complaint.Flooding likely due to secondary system	NA	NA	NA				
23	Lake Blvd.	Resident Complaint. Flooding likely due to secondary system	NA	NA	NA				
24	Firestation Access at Wayside Drive	Firestation access to Wayside Drive. No flooding shown in model; County reports flooding of access road.							

Current Status of Conceptual CIPs

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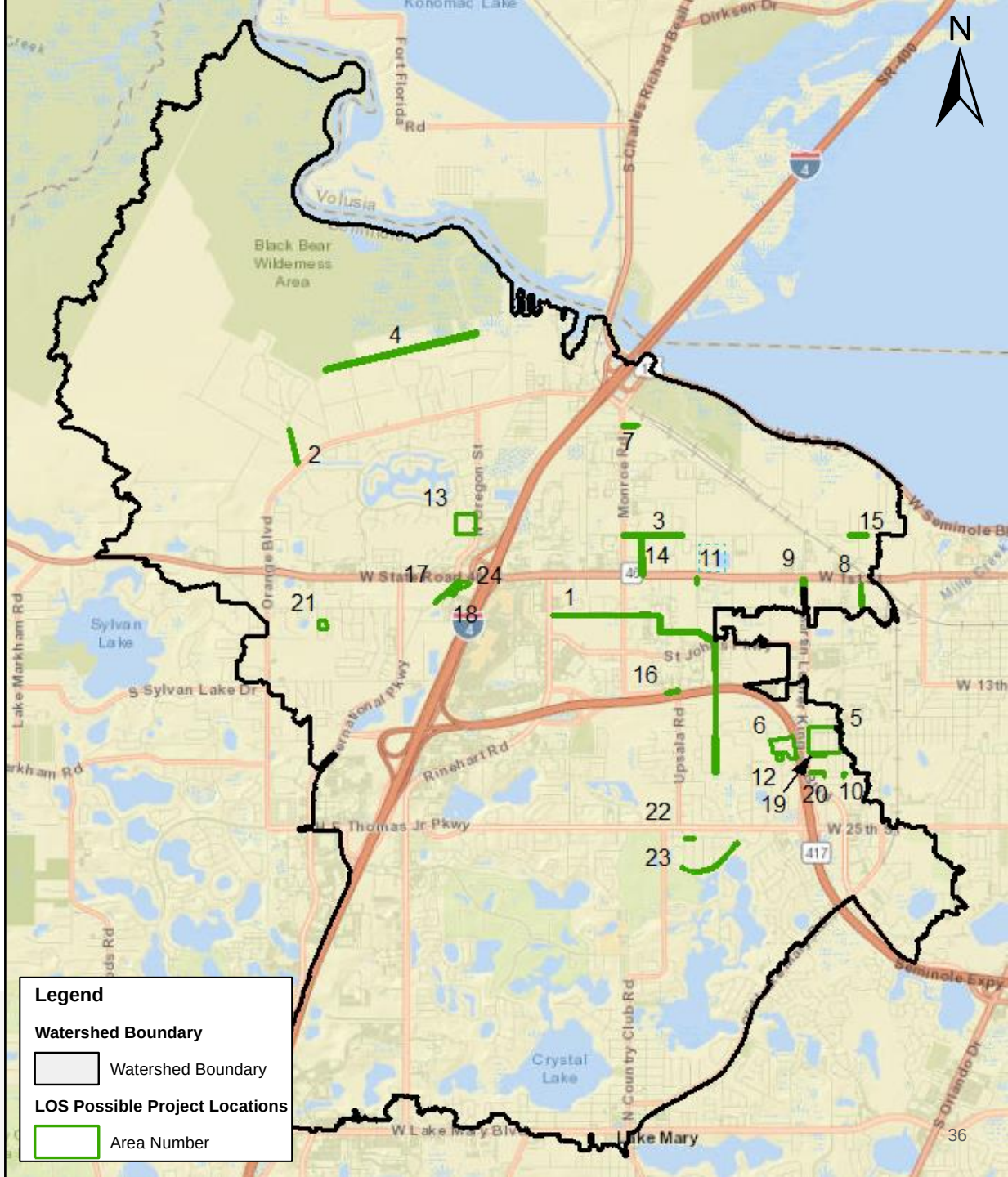
Improvement Projects

- 24 potential project locations
- 4 project concepts currently in development
- Concept developed
  - Michigan Ave.
- In-Progress
  - Lockhart-Smith Canal (Upstream of Rinehart Rd.)
  - Ravenna Park
  - Lincoln Heights



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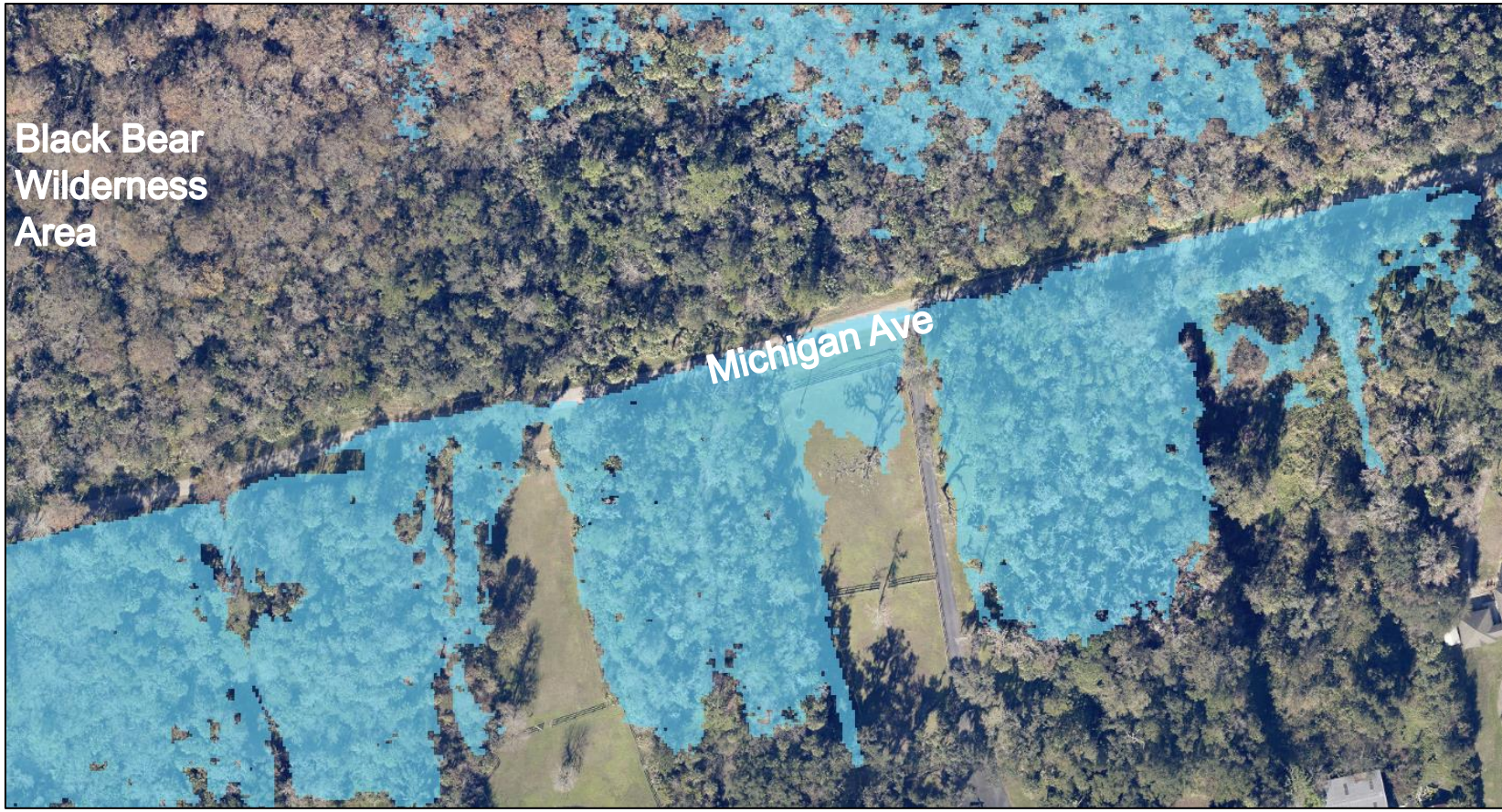
Improvement Project: Michigan Avenue

- Problem: Persistent Road flooding
  - Model indicates frequent flooding associated with St. Johns River backwater
  - Road floods for the mean-annual storm
  - Low roadway profile
  - Mismatched driveway culverts
  - Lack of outfall locations



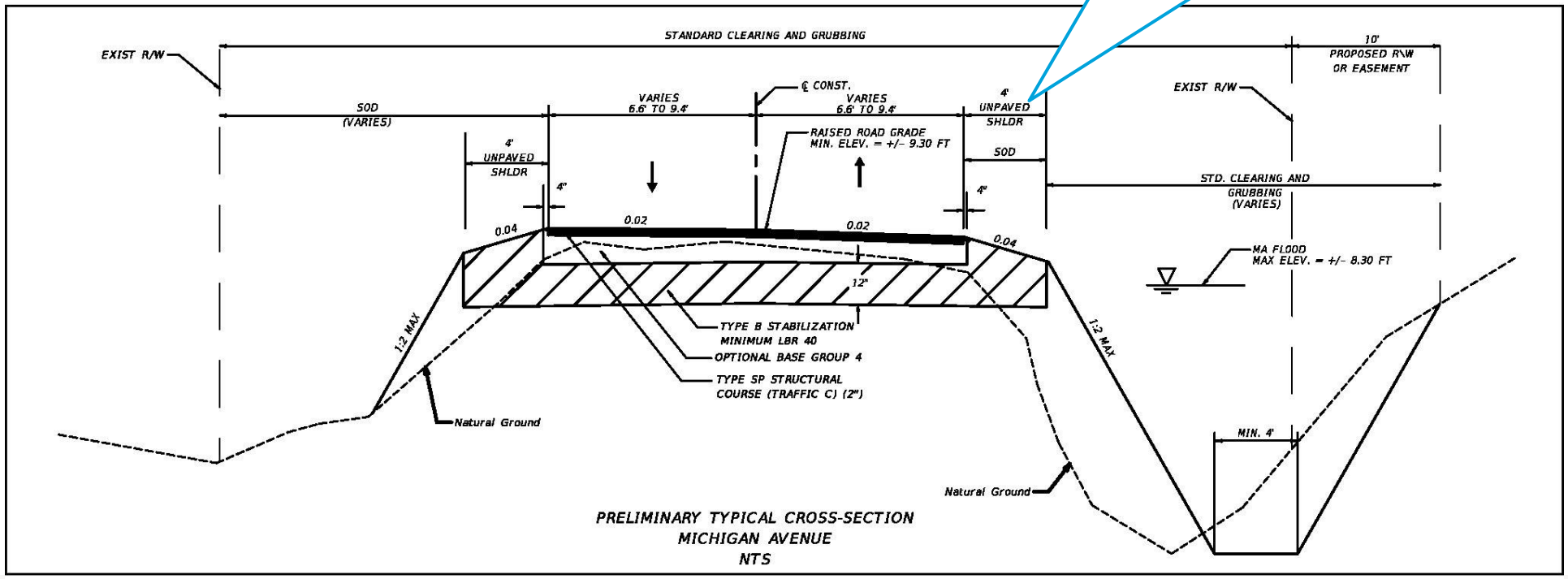
Mean-Annual Storm Floodplain

Improvement Project: Michigan Avenue

** Fill in 100-yr floodplain occurs with this improvement but will be offset and compensated for by proposed ditch excavation.*

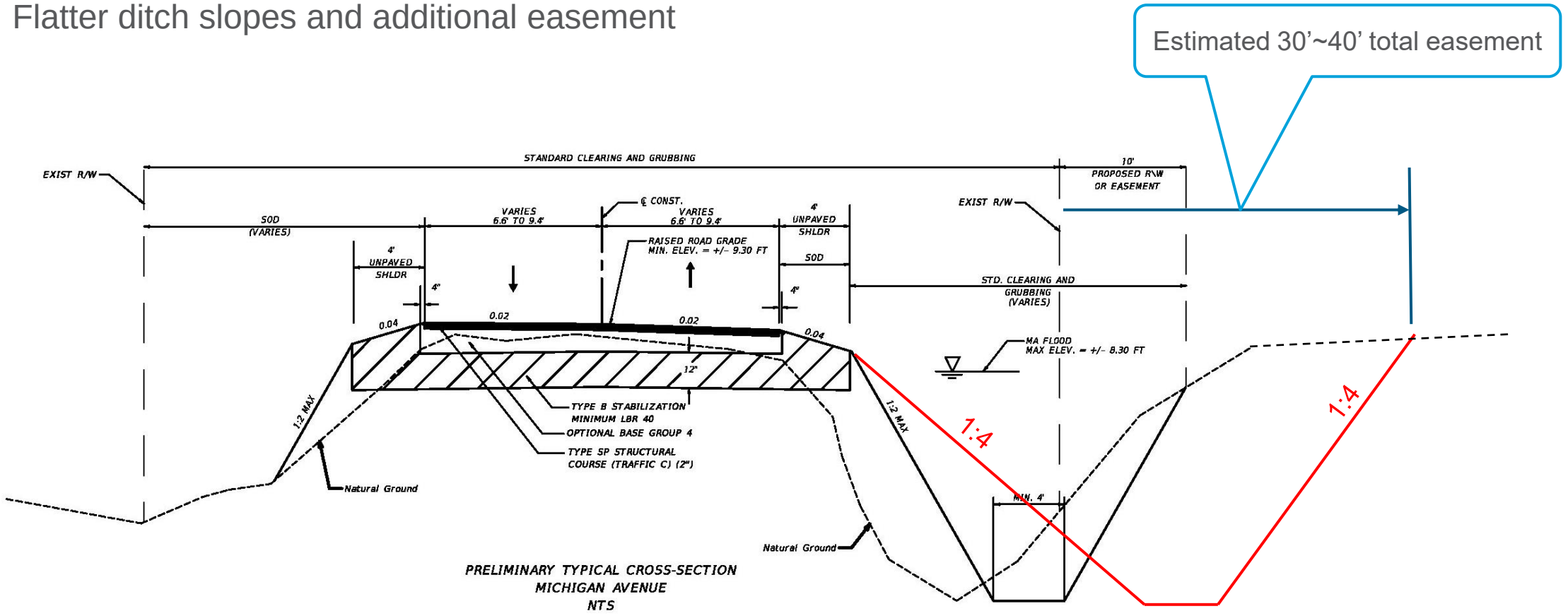
- Improvements:
  - Raise minimum road grade for some segments of the road
  - Upsize existing driveway culverts and cross-drains
  - Ditch regrading

Shoulder can be widened to provide additional walkable area



Improvement Project: Michigan Avenue

- Improvement Alternative:
  - Flatter ditch slopes and additional easement

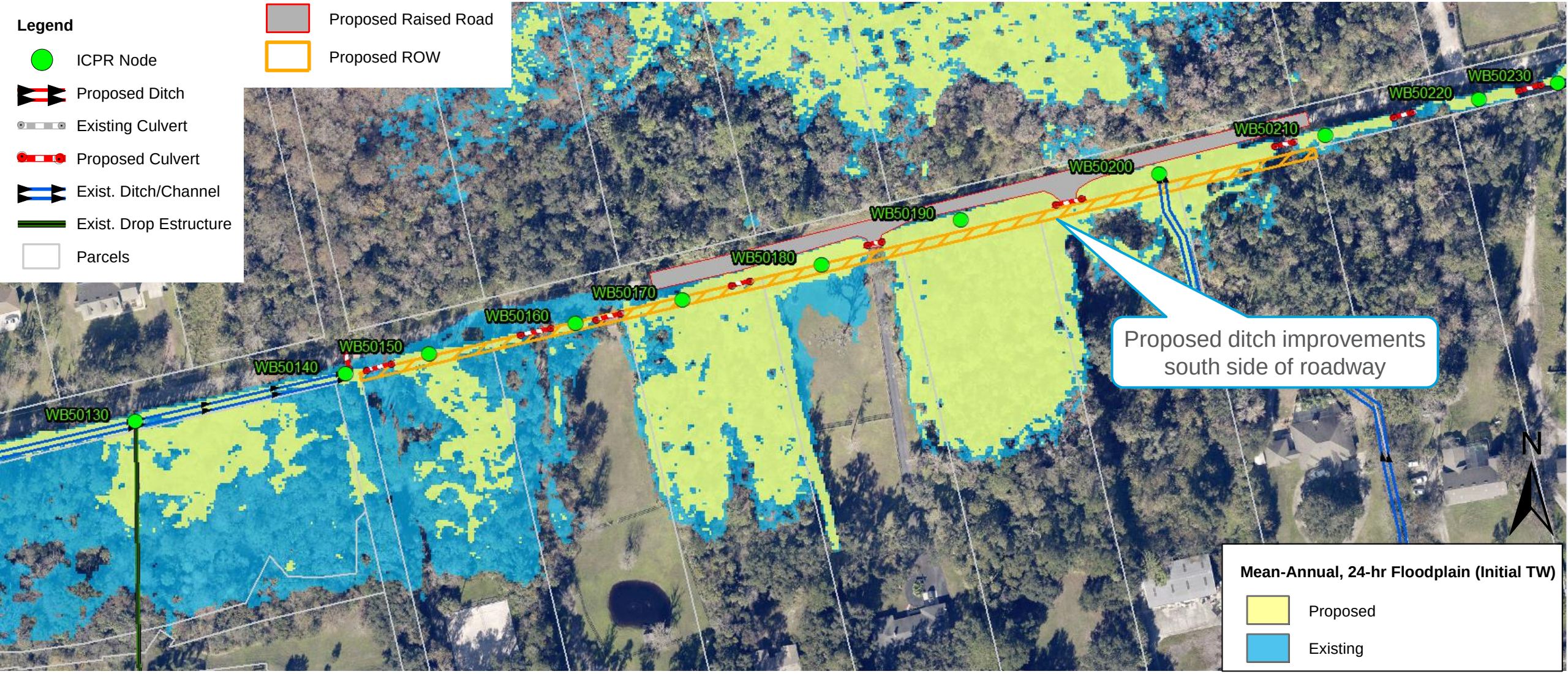


Improvement Project: Michigan Avenue

- Improvement Alternative:
  - Piping the ditch

- Feasibility is unlikely for the following reasons:
  - The open channel is quite large
  - Piping the channel will require large pipes
  - Due to the pipe hydraulics, it may require concrete box culvert
  - The length of the culvert required will be very expensive
  - Cost to benefit ratio from piping versus keeping an open ditch is unfavorable

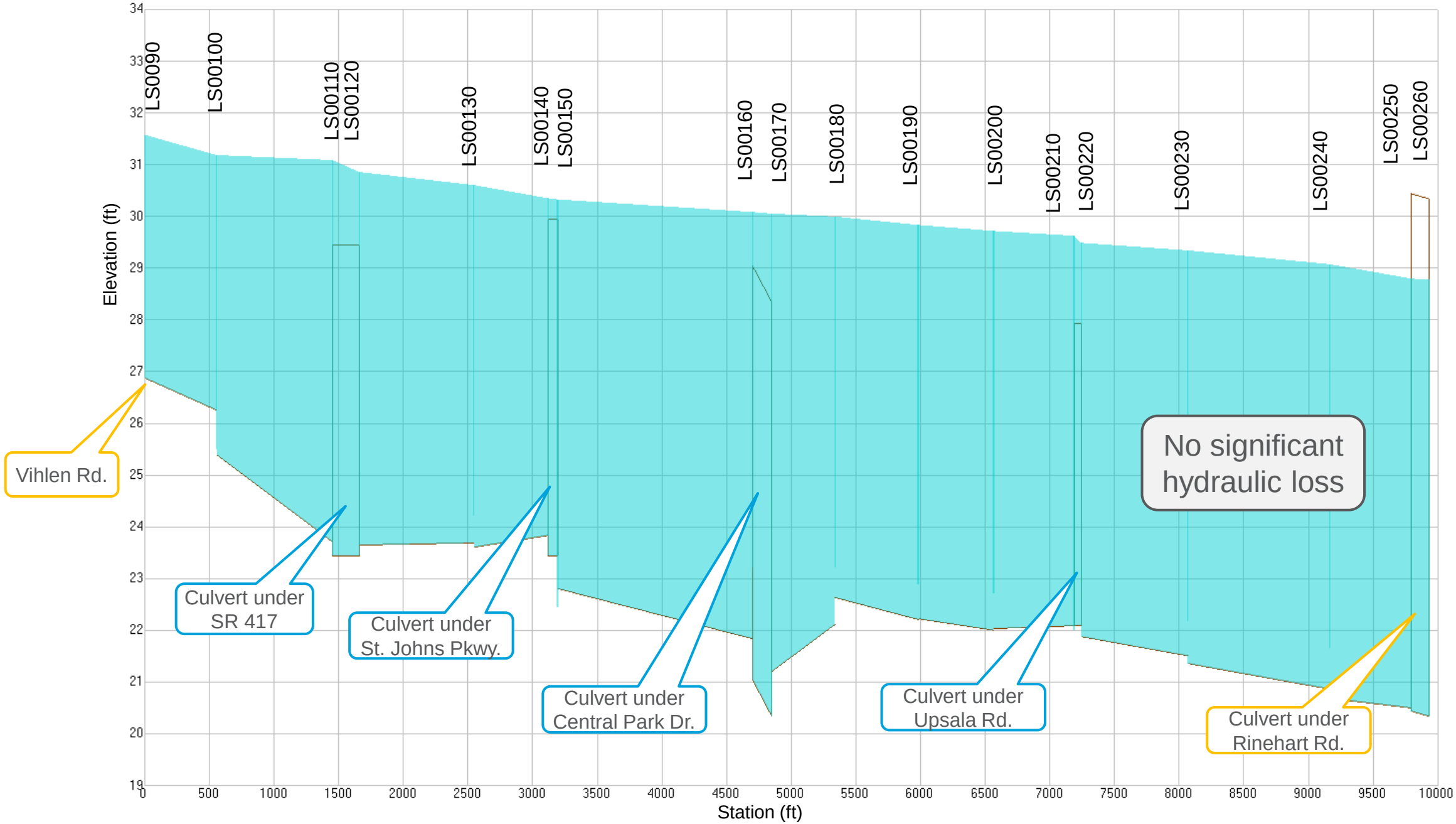
Improvement Project: Michigan Avenue



Improvement Project: L-S Canal

L-S Canal upstream of Rinehart Road

L-S Canal : 25yr/24hr Storm Water Surface Elevation Profile

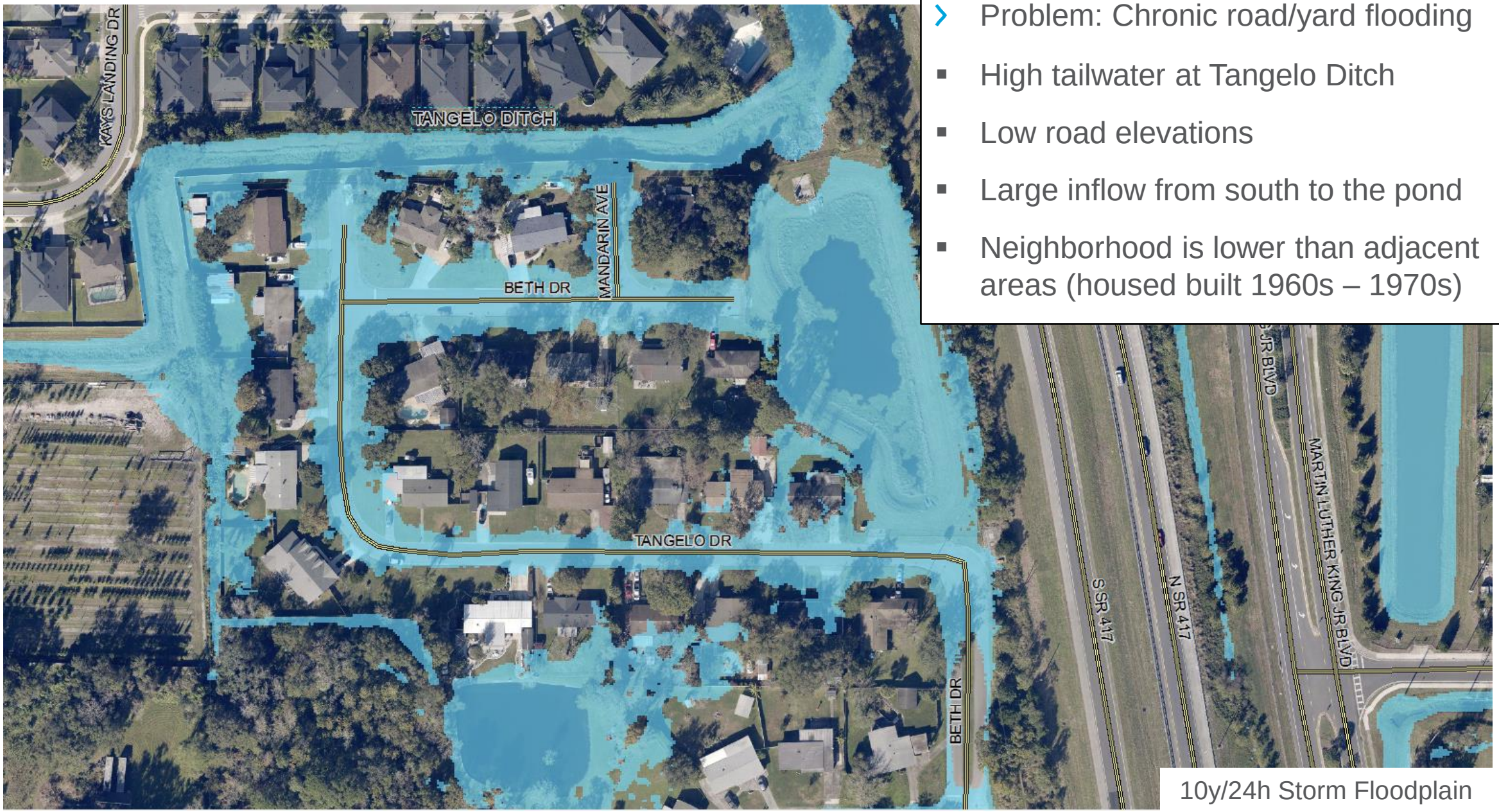


Improvement Project: Lockhart-Smith Canal (L-S Canal)

- Problem: Flood exceed TOB
  - Overall, the Canal was classified as LOS A and B
  - Segment between Central Park Dr and Upsala Rd shows flood elevation above TOB and ROW
  - Overtop caused by a low elevation along the access road
- Solution:
  - Canal regrading along the bend to raise the berm ~ 1.5 feet at the location of the overtopping

25y/24h Storm Floodplain

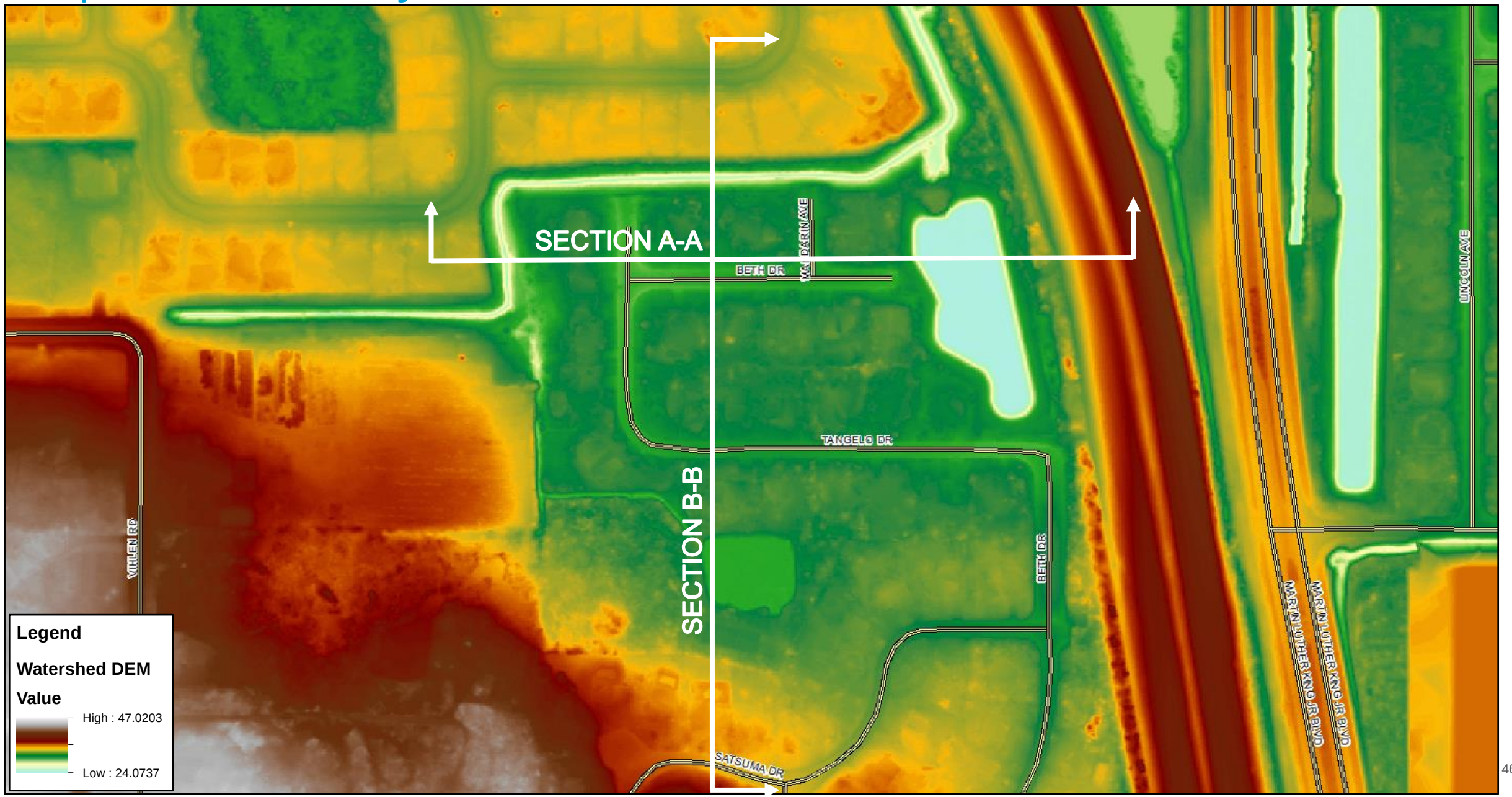
Improvement Project: Ravenna Park



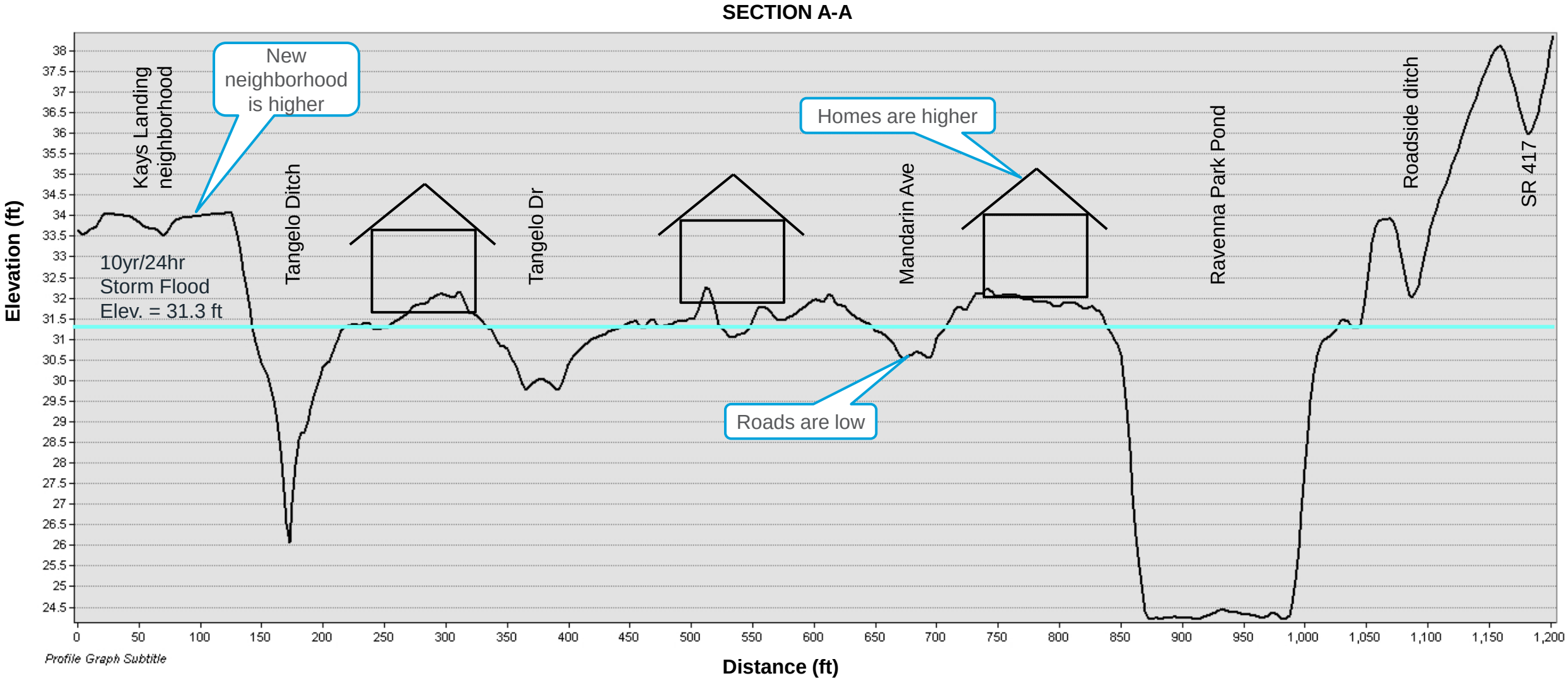
- Problem: Chronic road/yard flooding
  - High tailwater at Tangelo Ditch
  - Low road elevations
  - Large inflow from south to the pond
  - Neighborhood is lower than adjacent areas (housed built 1960s – 1970s)

10y/24h Storm Floodplain

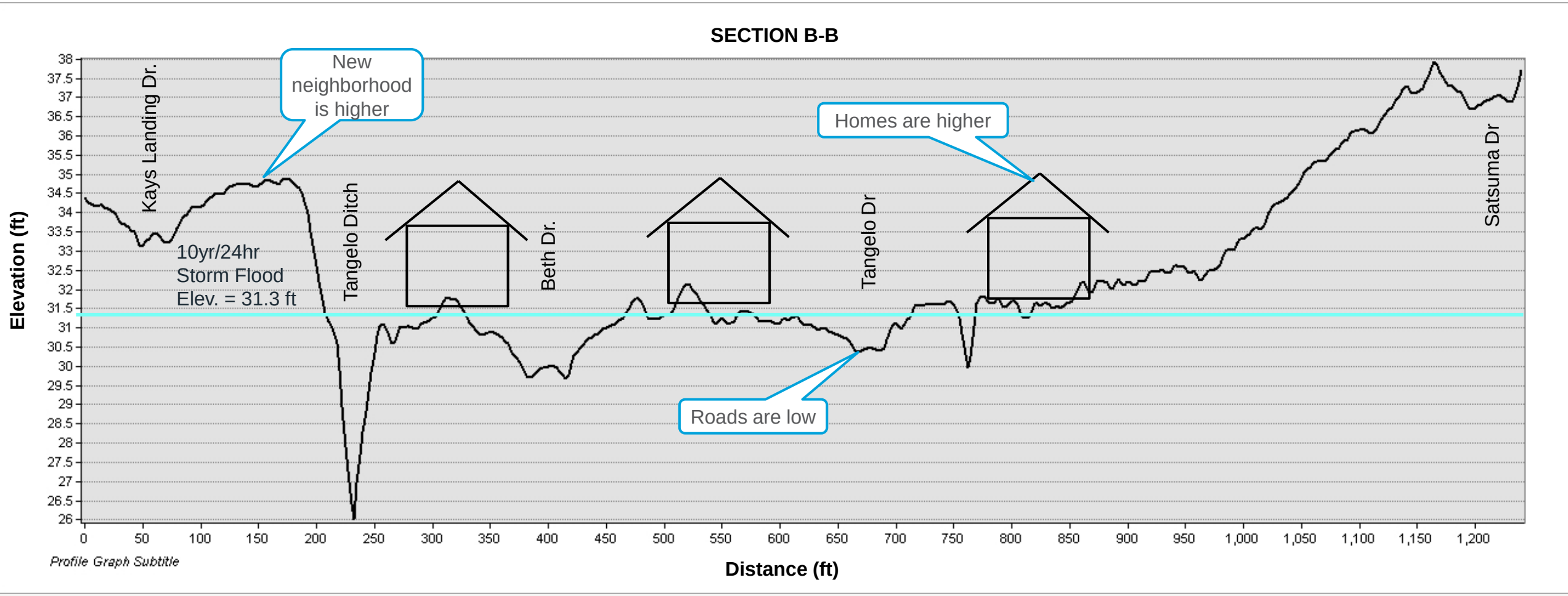
Improvement Project: Ravenna Park



Improvement Project: Ravenna Park



Improvement Project: Ravenna Park



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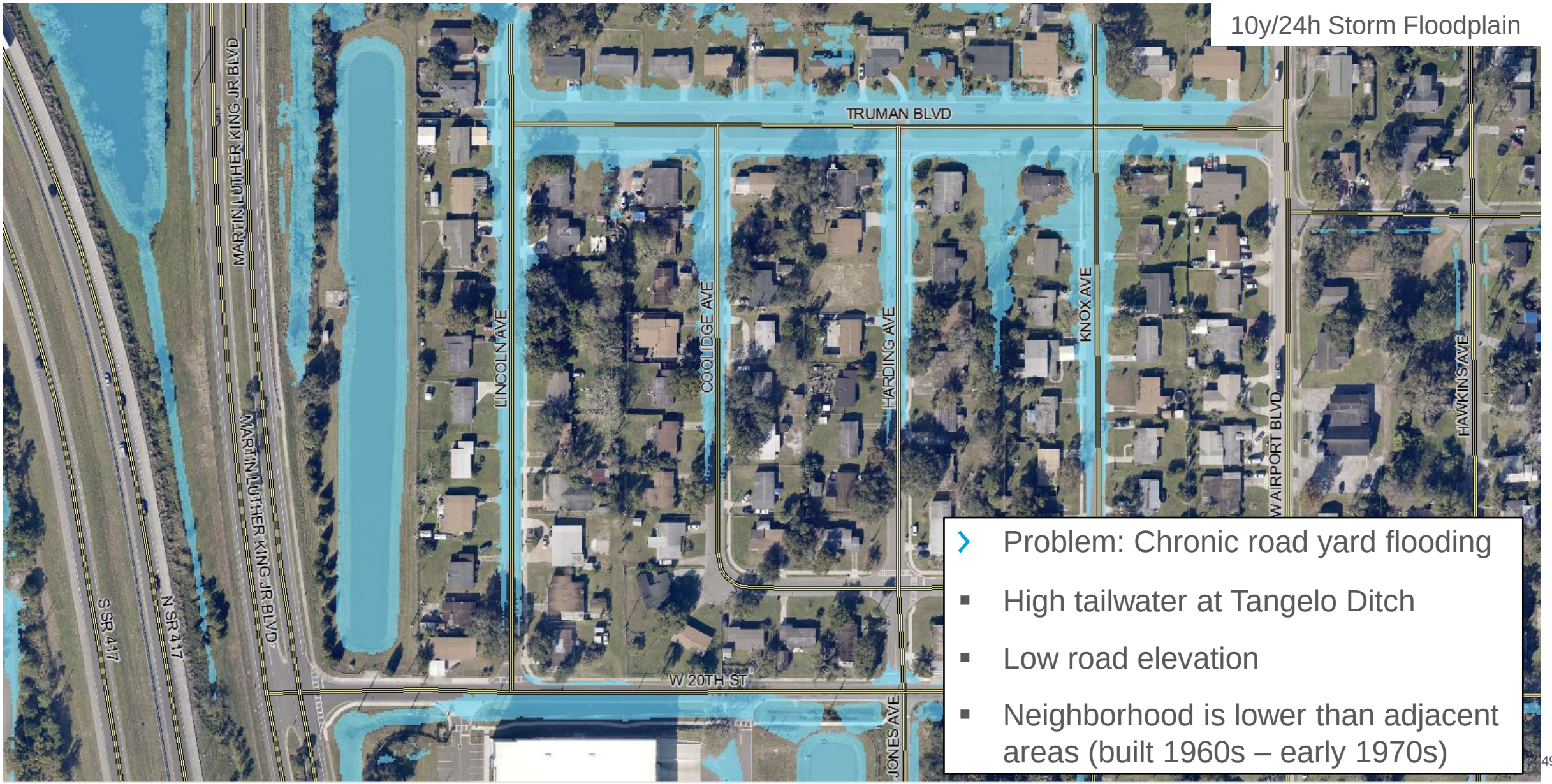
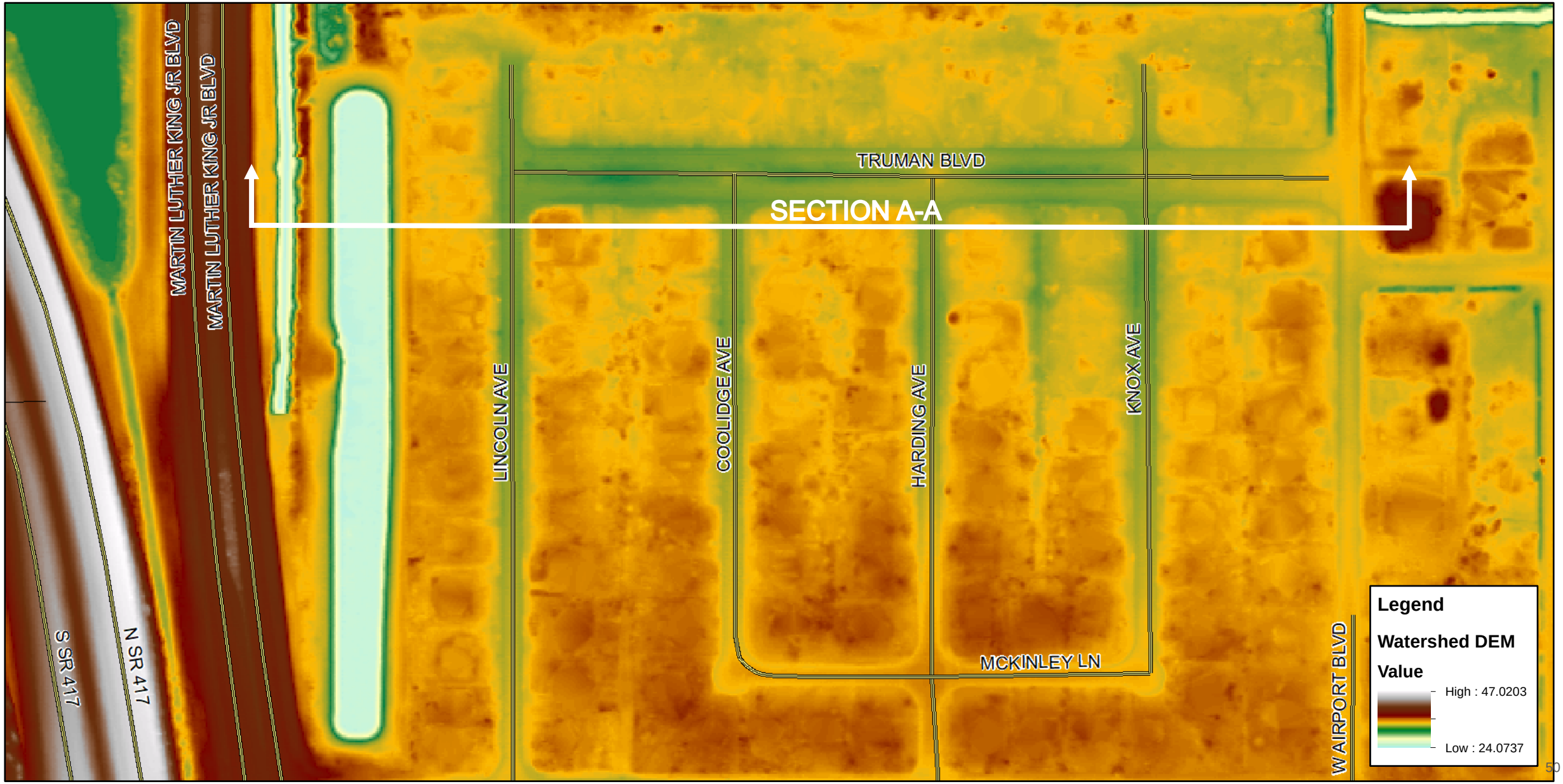
Improvement Project: Lincoln Heights

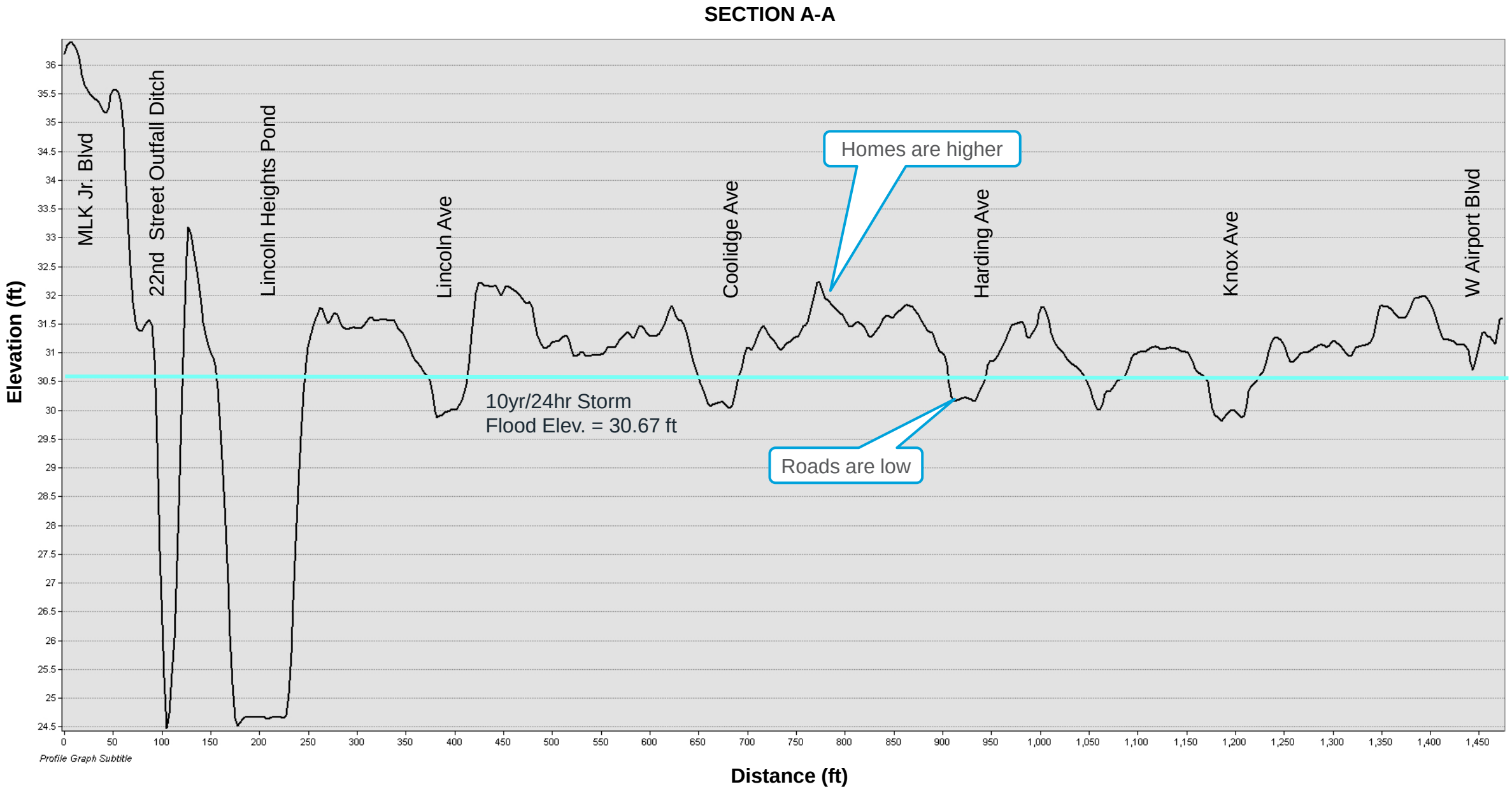


- Problem: Chronic road yard flooding
  - High tailwater at Tangelo Ditch
  - Low road elevation
  - Neighborhood is lower than adjacent areas (built 1960s – early 1970s)

Improvement Project: Lincoln Heights



Improvement Project: Lincoln Heights



Improvement Project: Ravenna Park & Lincoln Heights

- Evaluated Improvements:

  A) Increase berm elevation along the Tangelo Ditch in Ravenna Park

  B) Propose a 7 acres stormwater management pond to provide extra storage west of SR 417

- Conclusions with all improvements bundled together
  - Ravenna Park: No significant impact to the flood elevation for any of the evaluated improvements
  - Lincoln Heights: Flooding decreases about 0.60 ft for the 10yr/24hr storm with implementation of the stormwater management pond

Improvement Project: Ravenna Park & Lincoln Heights

Next Steps

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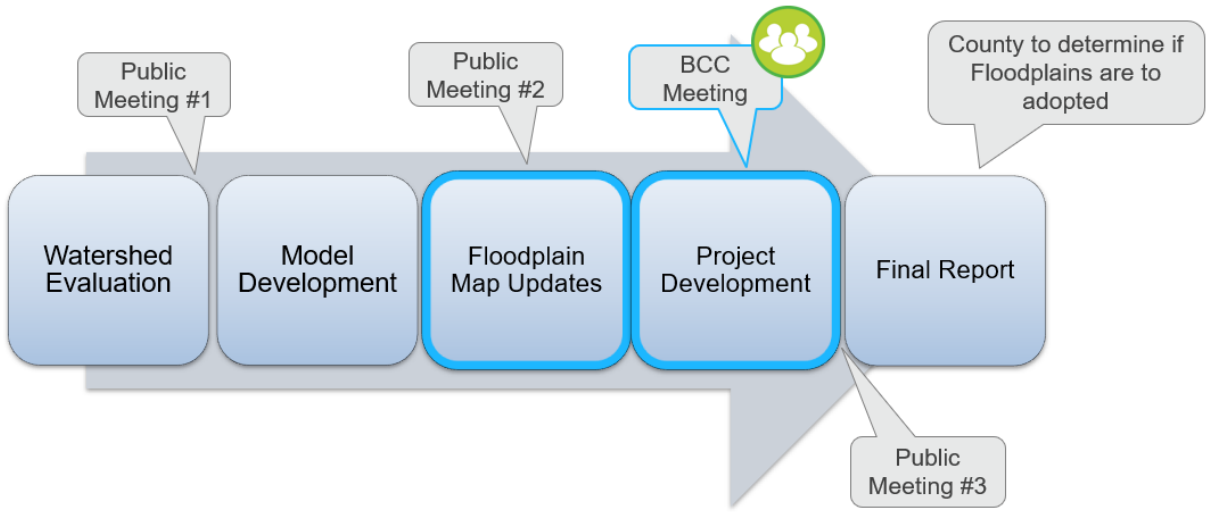
Next Steps

- On final approval of the proposed improvement projects Atkins will move forward with conceptual designs to alleviate flooding
- Once project concepts are completed and reviewed by County staff, Public Meeting # 3 will be held
- FEMA map revisions and Letter of Map Revision will be submitted with Final Report
- Submit Final Report



Feedback and discussion

ATKINS
Member of the SNC-Lavalin Group

Public Feedback

E-mail

- Subject: Lake Monroe Basin Study – Public Feedback
  - Seminole County Project Manager, Jeff Sloman, PE
    jsloman@seminolecountyfl.gov
  - Atkins Project Manager, Chris Thompson, PE, CFM
    chris.thompson@atkinsglobal.com

Phone

- Call 407-665-5572 and cite questions or comments under "Lake Monroe Basin Study – Public Feedback"

US Mail

- Seminole County Public Works – Engineering Division
  Re: Lake Monroe Basin Study, Public Feedback
  100 East 1st Street, Sanford, Fl 32771