



# Flagler County Board of County Commissioners Workshop Agenda

**Monday, July 31, 2023 • 2:30 p.m.**

**Government Services Complex, 1769 E. Moody Blvd., Bldg 2, Board Chambers, Bunnell, FL 32110**

1. Call to Order
2. Pledge to the Flag and Moment of Silence
3. Welcome: Flagler County Board Chair
4. Stormwater Master Plan Discussion

*Link: [Flagler County Stormwater Information Page](#)*

5. Public Comment
6. Adjournment

While this is a workshop only and no decisions are expected to be made by any of the governmental bodies, if a person decides to appeal any matter that may be discussed for a future proceeding, a record of the workshop may be needed and, for such purposes, the person may need to ensure that a verbatim record of the workshop is made.

In accordance with the Americans with Disabilities Act, persons needing assistance to participate in this meeting should contact the (386) 313-4001 at least 48 hours prior to the meeting.



# Stormwater Master Plan

BOARD OF COUNTY  
COMMISSIONERS WORKSHOP

July 31, 2023



Geosyntec Consultants:

Mark Ellard, PE, CFM, D.WRE, ENV SP

Flagler County Engineering:

Faith Alkhatib, PE – County Engineer  
Richard Zion, PE, PG – Project Manager



# Meeting Goals

- Provide Update on Project
- Review Scope of Work
- Discuss Project Recommendations
- Project Schedule





# Why is this Project Important?

- Flagler County is a destination County
- Water resources are critical
  - Quality of life for residents
  - Recreation
  - Tourism
- Effective management of the stormwater program
  - Reduces flood risk
  - Improves water quality
  - Proactively prevents infrastructure problems through inspection, maintenance, and replacement program
  - Fiscally responsible
- Sustainability and resiliency



## Flood Risk



## Water Quality





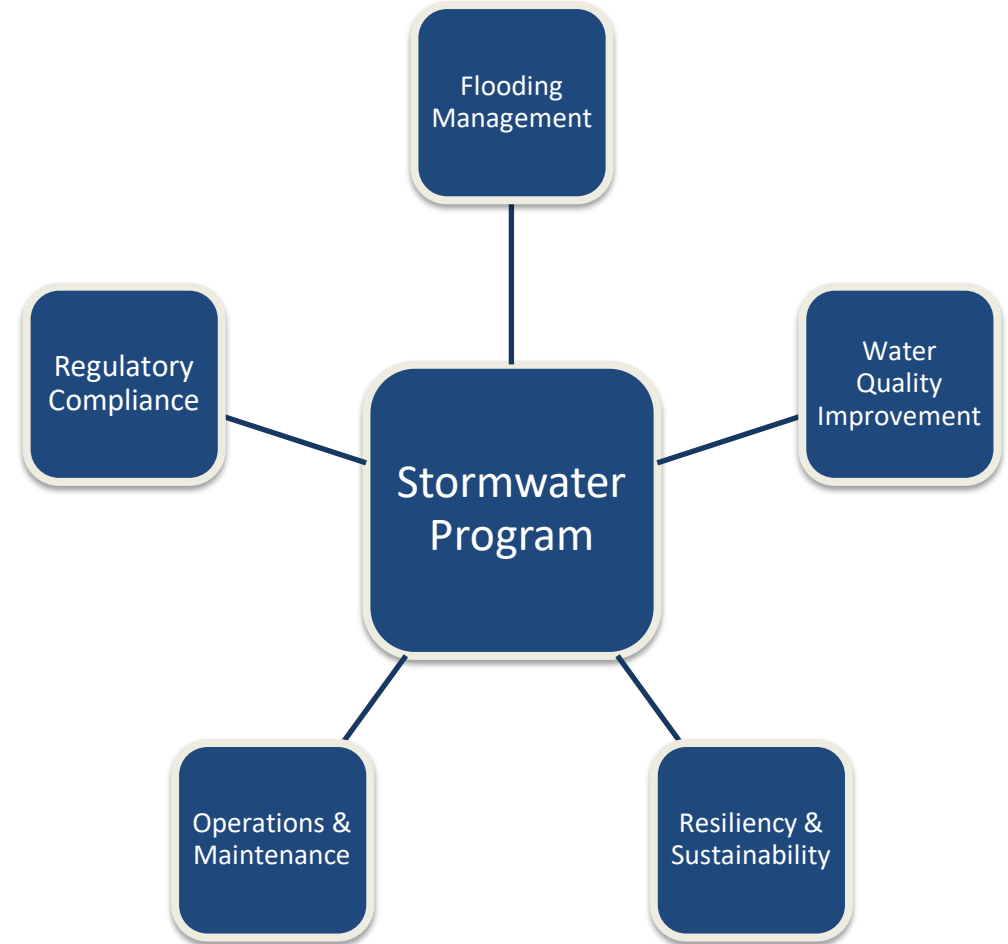
# Why Do We Need a Plan?

- County operates and maintains a stormwater system that collects and treats stormwater that benefits all properties within the County
- Public health, safety, and welfare are adversely affected by flooding and poor water quality
- Age and diminished capacity in the system over time requires improvements
- Existing infrastructure needs to be modernized to meet current governing drainage standards
- Existing infrastructure needs to be retrofitted for resiliency from sea level rise and more intense / frequent precipitation events
- The County is becoming a National Pollutant Discharge Elimination System (NPDES) permittee for Municipal Separate Stormwater Sewer System (MS4) and is required to meet levels of service established by the Environmental Protection Agency's Clean Water Act as delegated to the Florida Department of Environmental Protection
- The National Flood Insurance Program Community Rating System credits communities with master plans to discount premiums for flood insurance
- Prioritize available funding to provide the greatest public benefit County-wide



# Scope of Work

- A. Review Existing Program Data
- B. Code & Development Review
- C. Operations & Maintenance Program Review
- D. Drainage Infrastructure Inventory
- E. Flooding Assessment
- F. Water Quality Assessment
- G. Resiliency Evaluation
- H. Improvement Project Conceptualization
- I. Project Funding Evaluation
- J. Capital Improvement Program
- K. NPDES Permit Program Development

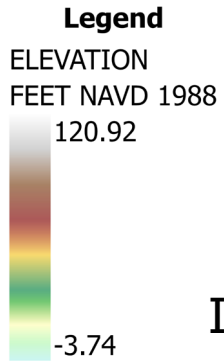
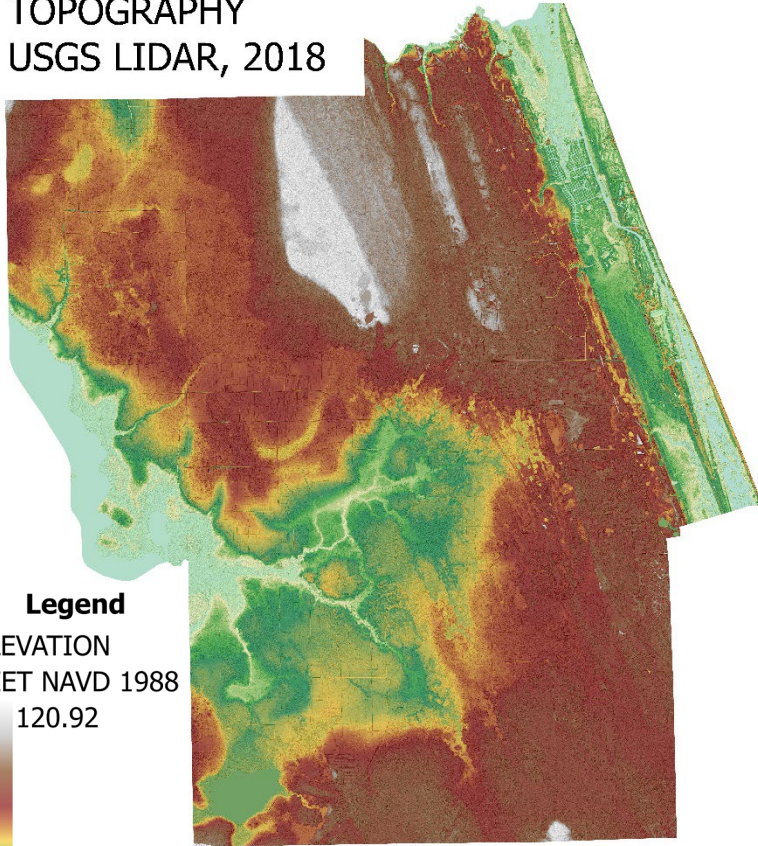






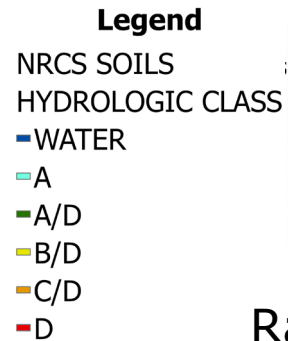
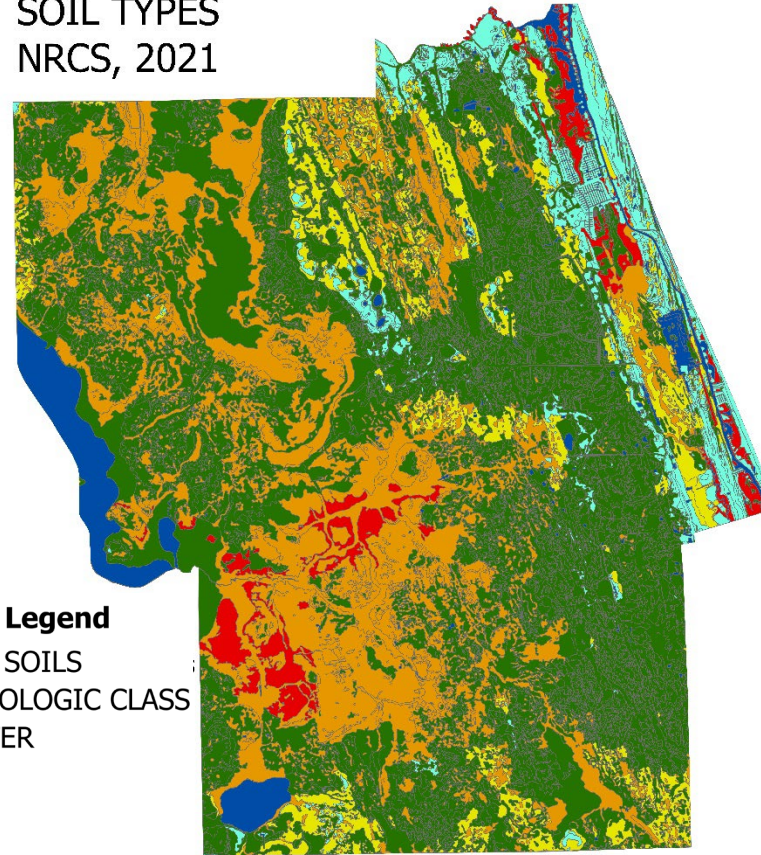
# Stormwater Characteristics

TOPOGRAPHY  
USGS LIDAR, 2018



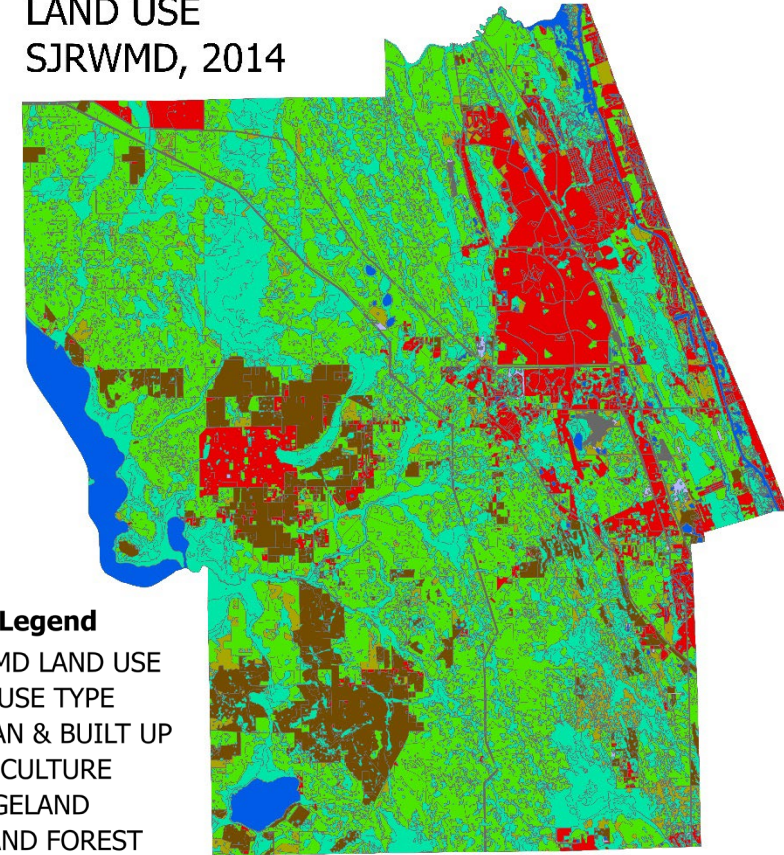
Influences Rate and Storage of Stormwater Runoff

SOIL TYPES  
NRCS, 2021



Rainfall Infiltration / Percolation Capacity

LAND USE  
SJRWMD, 2014



Relative Imperviousness which Drives Stormwater Runoff Volume

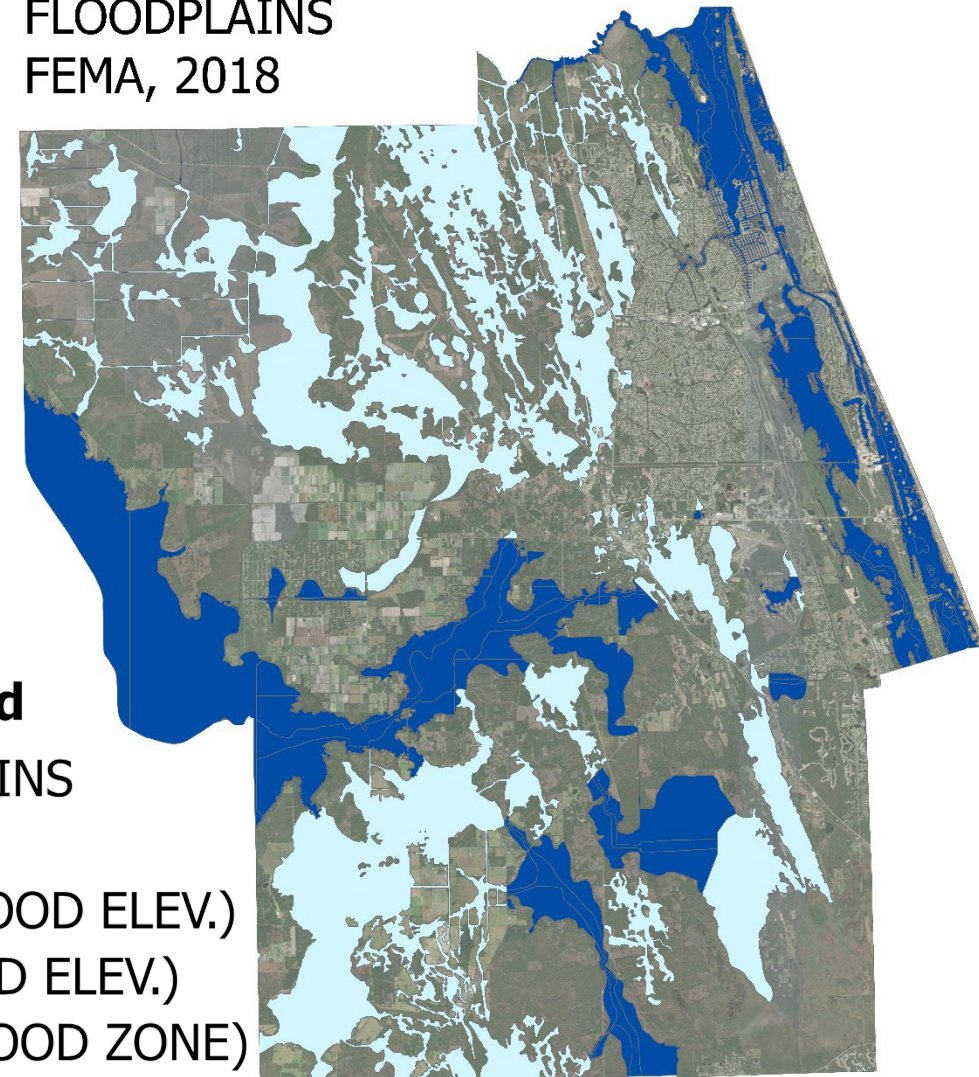




# Floodplains

- Depicts Flood Risk Throughout County
- Delineates Flood Prone Areas
  - Zone AE – Base Flood Elevations Defined
  - Zone A – No Base Flood Elevation
- Used for Flood Insurance Purposes
- Reflects Major Conveyances and Water Bodies
- Inland (Riverine) and Coastal Risks Mapped
- Maps Last Updated in 2018

FLOODPLAINS  
FEMA, 2018



## Legend

FEMA FLOODPLAINS  
FLOOD ZONE

□ A (NO BASE FLOOD ELEV.)

■ AE (BASE FLOOD ELEV.)

□ X (OUTSIDE FLOOD ZONE)





# Code & Development Regulatory Review

- Review of Relevant Rules and Codes
  - Comp Plan
  - LDC
  - St. Johns River Water Management District
  - FDOT
- Review Focused on:
  - Concurrency
  - Inconsistencies
  - Enhancement Needed
- Evaluate Impacts of New Development

--FLAGLER COUNTY CODE OF ORDINANCES  
Chapter 11 DRAINAGE

**Chapter 11 DRAINAGE<sup>1</sup>**

**ARTICLE I. IN GENERAL**

**Sec. 11-1. Short title.**  
This chapter shall be known as the "Flagler County Drainage Ordinance."  
(Ord. No. 98-03, § 1, 3-2-98)

**Sec. 11-2. Jurisdiction.**  
This chapter shall be in full force and effect within the unincorporated area of the county.  
(Ord. No. 98-03, § 2, 3-2-98)

**Sec. 11-3. Intent.**  
[The intent of this chapter shall be] to promote, protect and improve the health, safety and welfare of the citizens of the county. This chapter is for the purpose of reducing the effect of stormwater runoff on another and to provide for more positive drainage to outfall systems.  
(Ord. No. 98-03, § 3, 3-2-98)


**Sec. 11-4. Definitions.**  
Specific definitions of certain terms used in this chapter are:  
*Drainage* means the movement of stormwater from any point to a point lower in elevation.  
*Driveway* means an ingress/egress location from a public road to private property.  
*Right-of-way* means land in which the county owns the fee or has received a dedication for or has an easement devoted to, or required for, the use of a public road, the use of stormwater management, or any other public use.  
*Road* means and shall include streets, alleys, highways, sidewalks, bike paths, and any other ways open or unopened to travel by the public, including the road bed, right-of-way and all culverts, drains, ditches, inlets, embankments, bridges, retaining walls, guardrails or other appurtenances necessary for the maintenance of travel.  
*Stormwater* means water collected or collecting as a result of natural precipitation.

<sup>1</sup>Cross reference(s)—Buildings and construction, Ch. 8; stormwater management, § 13-71 et seq; land development code, Ch. 18; planning and development, Ch. 24; repair of swales affected by construction or development, § 26-2.  
State law reference(s)—Authority to provide for drainage, F.S. § 125.01(1)(j).

Flagler County, Florida, Code of Ordinances  
(Supp. No. 65) Created: 2021-11-19 11:20:24 (EST)

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PERMIT INFORMATION MANUAL



**June 1, 2018**

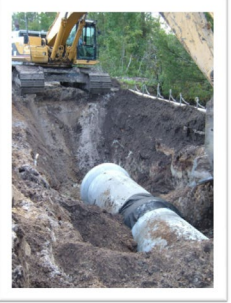
**ST. JOHNS RIVER WATER MANAGEMENT DISTRICT**  
4049 Reid Street  
Palatka, FL 32177-2529  
(386) 329-4500

Flagler County Comprehensive Plan 2010 to 2035



Flagler County Comprehensive Plan 2010-2035  
Flagler County, Florida

Infrastructure Element



Adopted July 6, 2011

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D-Infrastructure July 6, 2011 Page D-1



# NPDES Permit

- Required Program Elements
  - Development of appropriate BMPs and measurable goals for the six minimum control measures
    1. Public Education and Outreach on Stormwater Impacts
    2. Public Involvement/Participation
    3. Illicit Discharge Detection and Elimination
    4. Construction Site Stormwater Runoff Control
    5. Post-Construction Stormwater Management in New Development and Redevelopment
    6. Pollution Prevention/Good Housekeeping for Municipal Operations
  - Development of documentation and record keeping procedures to meet permit and annual reporting requirements
  - Addressing TMDLs, RAPs, and BMAPs
- Notice of Intent (NOI) Submitted to FDEP August 2022



Notice of Intent to Use National Pollutant Discharge Elimination System (NPDES) Two-Step Generic Permit for Discharge of Stormwater from Phase II Municipal Separate Storm Sewer Systems  
DEP Form 62-621.300(7)(b)  
Effective February 16, 2021

#### Part I. Instructions

This Notice of Intent (NOI) form shall be completed and submitted to the NPDES stormwater program as part of the request for coverage under the NPDES Two-Step Generic Permit for Discharge of Stormwater from Phase II Municipal Separate Storm Sewer (MS4) Systems subsection 62-621.300(7)(a), F.A.C. Applicants must be familiar with the Rule, Generic Permit, Appendix A, and instructions before completing this NOI form. **Attach information on separate sheets as necessary.**

- Submit this completed form, supporting documentation, and the permit fee to the NPDES Stormwater Notice Center, 2600 Blair Stone Rd., M.S. #3585, Tallahassee, FL 32399. Electronic submittal is preferred.
- Payment of the permit fee shall be in accordance with Rule 62-4.050(4)(d)(6), F.A.C., and may be mailed by check to the address listed above. Instructions for electronic payment of the permit fee can be obtained by contacting the NPDES Stormwater Notice Center at 850-245-7522 or 866-336-6312 (toll-free). **DEP will not process this form without submittal of the appropriate fee.**
- Provide public notice pursuant to subparagraph 62-620.550(3)(b), F.A.C.
- File the completed NOI by the appropriate deadline under subparagraph 62-624.800(1)(b), F.A.C.

#### Part II. MS4 Operator Information

MS4 Operator Name: Flagler County

Name of the Responsible Authority: Faith, Alkhatib, P.E., County Engineer

Title: Click or tap here to enter text.

Mailing Address (Street or P.O. Box): 1769 E Moody Blvd, Bldg 2

City: Bunnell Zip Code: 32110 County: Flagler

Phone Number: 386-313-4045 E-mail Address: falkhatib@flaglercounty.gov

Name of the Designated Phase II MS4 Stormwater Management Program Contact:

Richard Zion, P.E., P.G.

Title: Program Administrator

Mailing Address (Street or P.O. Box): 1769 E Moody Blvd, Bldg 2

City: Bunnell Zip Code: 32110

County: Flagler

Phone Number: 386-313-4051 E-mail Address: Rzion@flaglercounty.gov

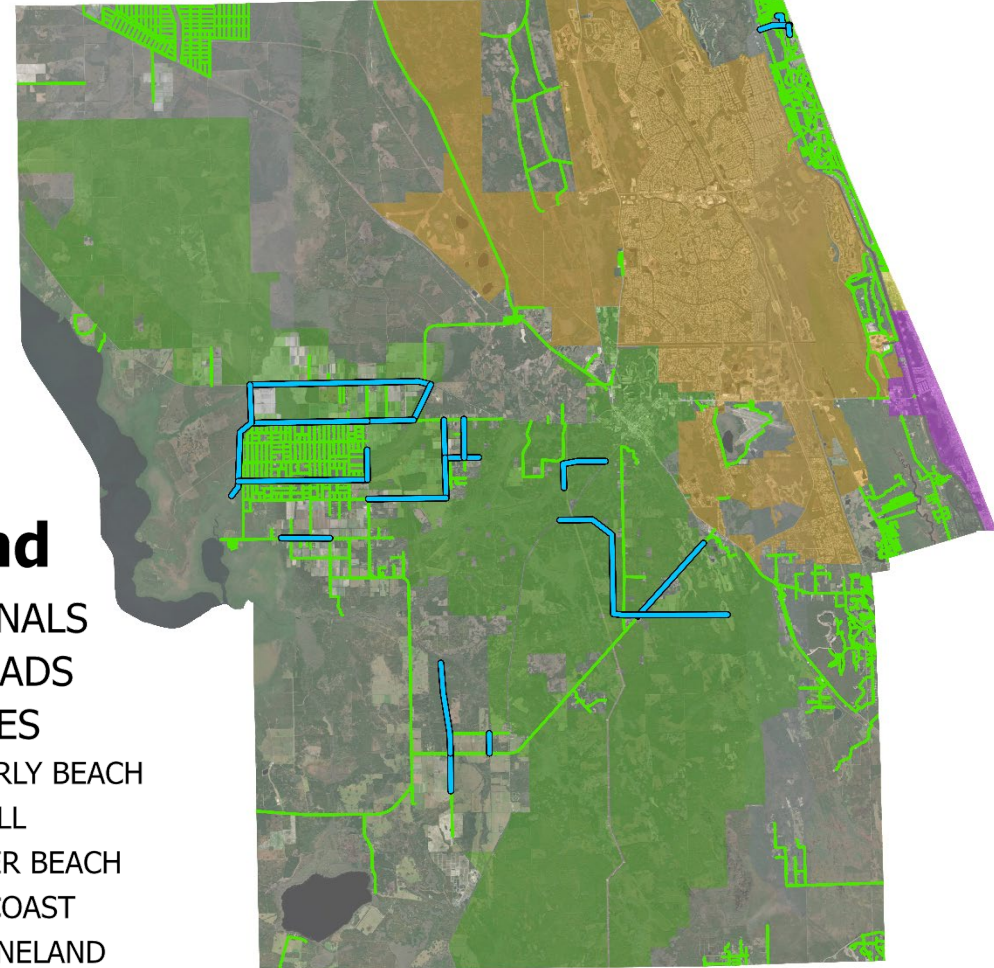
DEP Form 62-621.300(7)(b) incorporated in Rule 62-621.300(7), F.A.C.  
Effective February 16, 2021



# Operations & Maintenance Evaluation

- Review Program Resources
  - Maintenance Responsibilities
  - Staff / Equipment
  - Identify Shortfalls and Funding Needs
- Review Maintenance Frequency
  - Inspection
  - Routine Maintenance
  - Replacement
- Recommendations to Better Achieve Proactive Program Versus Reactive
- Identify Potential Revenue Sources

## COUNTY MAINTAINED DRAINAGE



### Legend

- COUNTY CANALS
- COUNTY ROADS
- MUNICIPALITIES
  - TOWN OF BEVERLY BEACH
  - CITY OF BUNNELL
  - CITY OF FLAGLER BEACH
  - CITY OF PALM COAST
  - TOWN OF MARINELAND

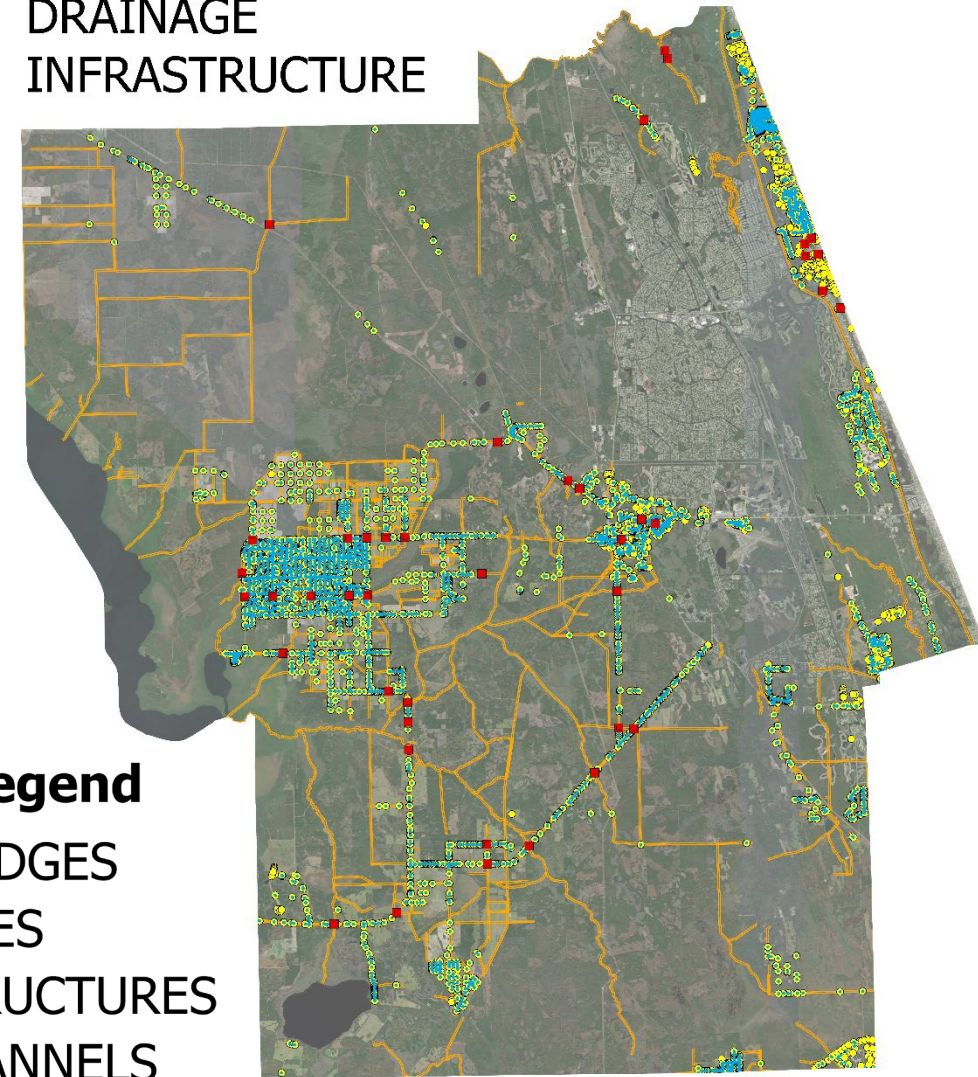




# Drainage Infrastructure Inventory

- Develop Inventory of Drainage Features
  - Structures (inlets, manholes, catch basins, pipe ends, etc.)
  - Pipes & Culverts
  - Channels (canals, ditches, etc.)
  - Bridges
- Developed in GIS for County's Benefit
  - Over 10,000 structures / over 5000 pipes captured
- Infrastructure Information Helps County:
  - Understand Inventory of Drainage Assets
  - Develop More Proactive Maintenance Strategies
  - Better Quantify Needed Resources – Staff & Equipment
  - Identify Easements Needed to Perform Activities

## DRAINAGE INFRASTRUCTURE



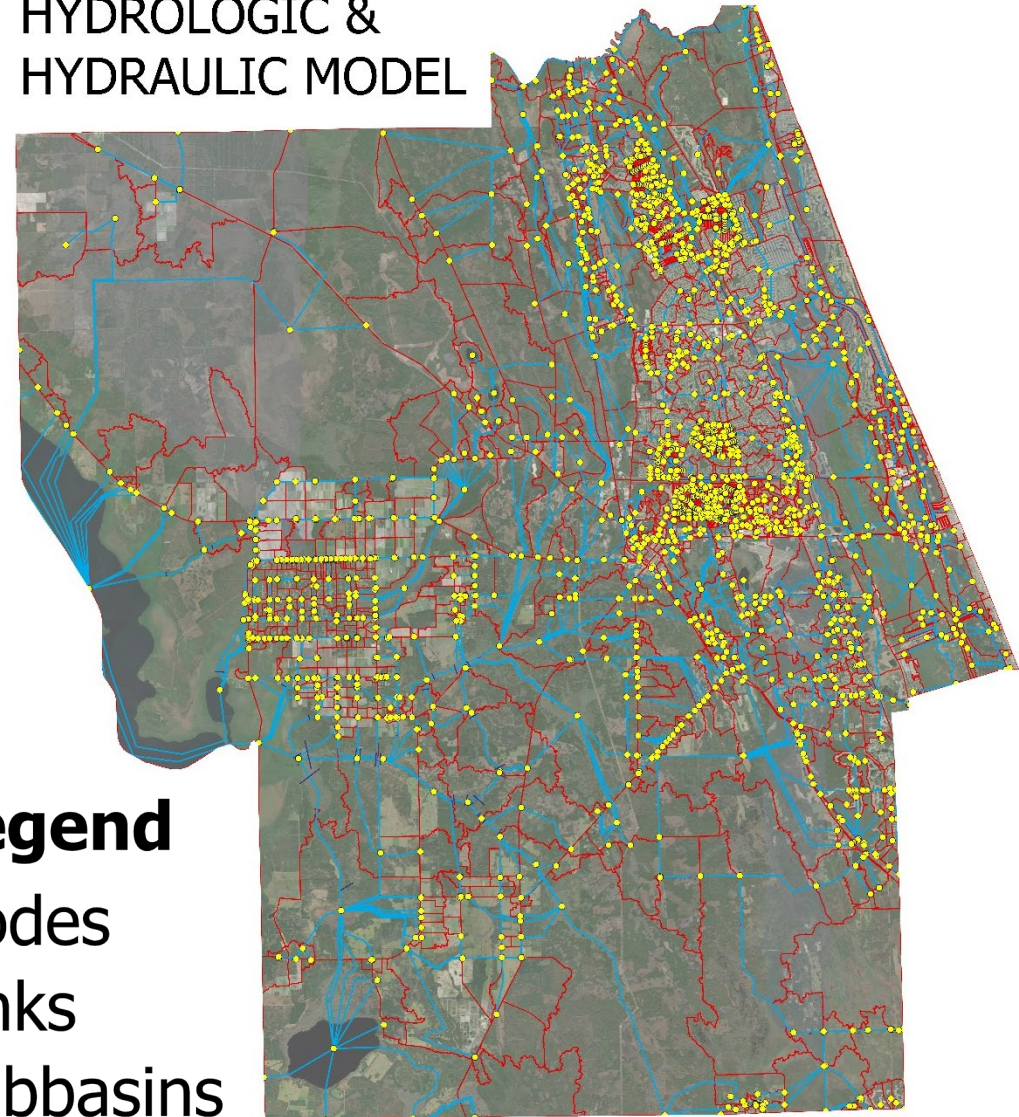
### Legend

- BRIDGES
- PIPES
- STRUCTURES
- CHANNELS

# Flood Assessment

- Identify CIP Targets
  - Floodplain Areas
    - Storage
    - Conveyance
  - Infrastructure Deficiencies
    - Primary Structural Conveyances
    - Primary Channel Conveyances
    - Secondary Conveyances (localized areas)
    - Outfall Locations
  - Consideration for Future Development
    - Regional Measures (considering water quality also)

HYDROLOGIC &  
HYDRAULIC MODEL



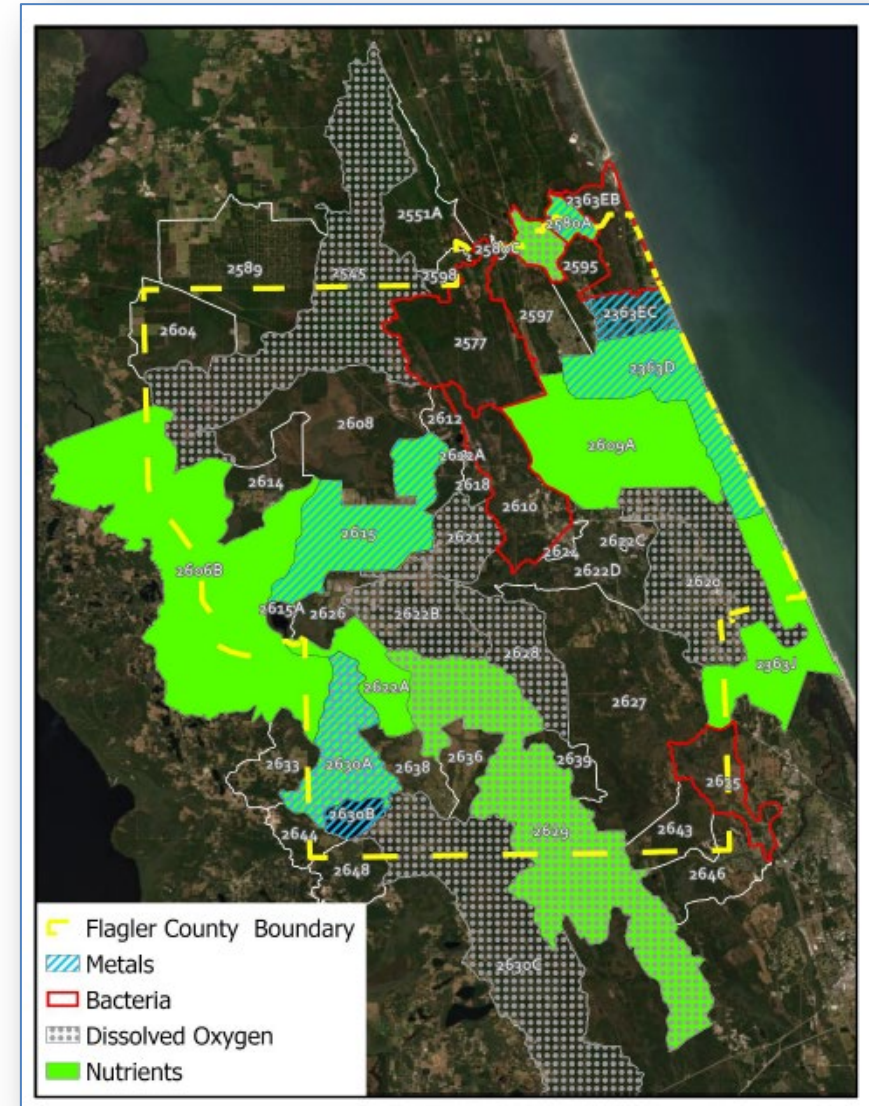




# Water Quality Assessment

- Identify CIP Targets
  - Contributing Areas to Impaired Waters
  - Older Areas Lacking treatment
    - Development Areas
    - County Roadway Corridors
  - NPDES Permit Requirements
  - Consideration for Future Development
    - Regional Measures (considering flooding also)

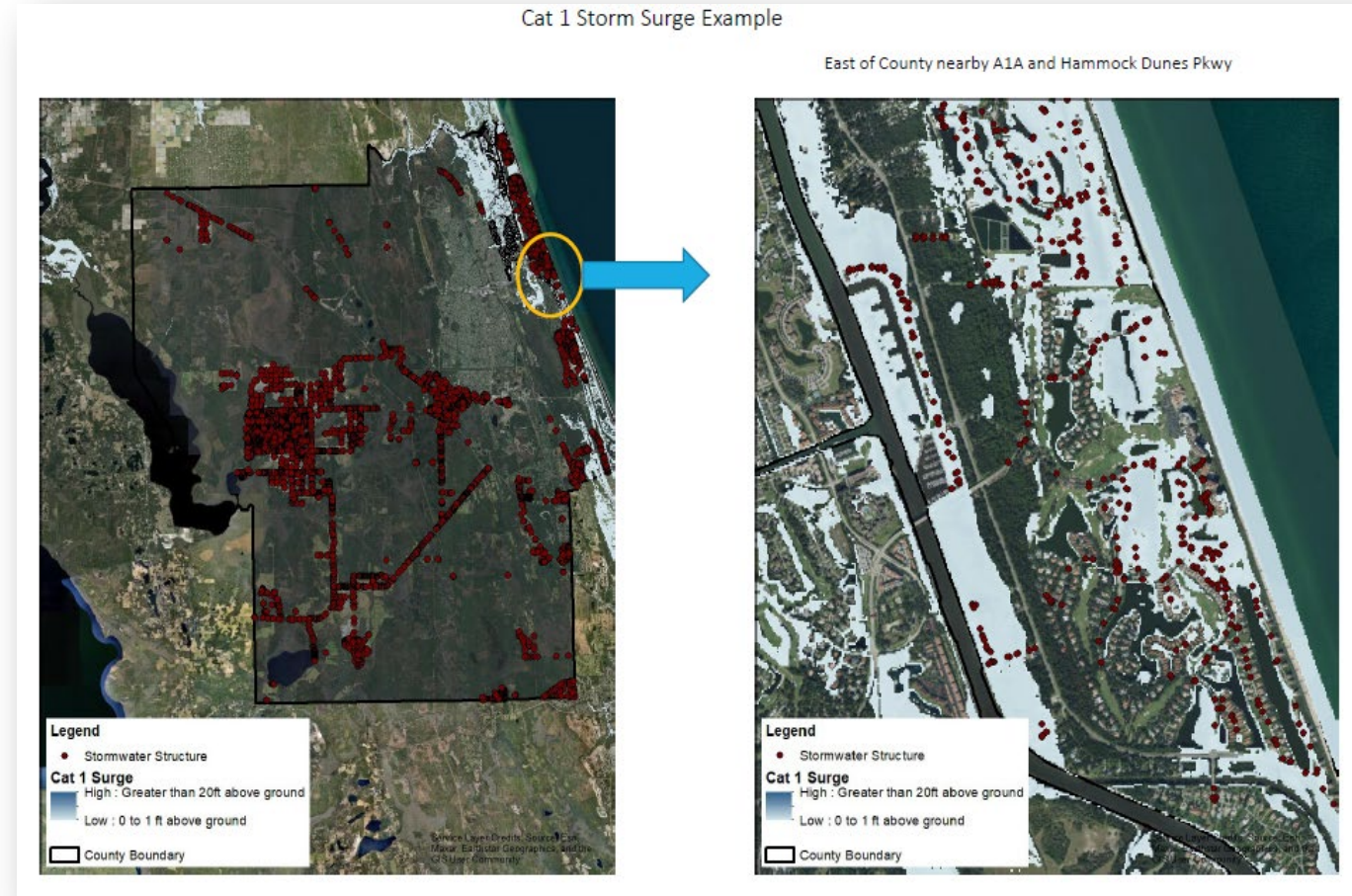
## Impaired Waterbodies Intersecting Flagler County





# Resiliency Strategies

- Enhance CIP Targets
  - Resiliency Strategies Considered in the proposed CIP
    - Reflect SLIP / Climate Review
    - Flooding Projects
    - Water Quality Projects
  - Planning for Vulnerable Infrastructure
    - Development Areas
    - County Roadway Corridors
    - Outfalls
  - Consideration for Future Development Design Standards
    - Revised Development Codes
    - Development Zones
    - Development Restrictions in Hazardous Environments
    - Retreat Strategy for Low Areas Frequently Flooded and Susceptible to Sea Level Rise



**Example Storm Surge Maps Impacted by Projected Sea Level Rise**



# CIP Recommendations

- CIP Long List of Recommended Project Opportunities
  - ~60 Projects identified, some with multiple alternatives
- Categories
  - Flood Storage & Attenuation (addressing reported and modeled deficiencies)
  - Water Quality Treatment (addressing TMDL and impaired receiving waters)
  - Flood and Water Quality (combination of above)
  - Conveyance Infrastructure (addressing substandard, inconsistent ditches/piping)
  - Resiliency Aspects Considered in Above as Appropriate
  - Existing County CIP Work Program Projects Potentially Augmented to Consider Aspects of the Above CIP Projects as Appropriate



# CIP Recommendations

- CIP Ranked Short List of ~20 for Detailed Conceptualization
  - Focused in Unincorporated Areas
  - Considered Geographical Distribution
  - Constructability (Utilities, special access, MOT, etc.)
  - Land Acquisition (Property Acquisition, easements)
  - Permitability (Coordination with SJRWMD)
  - Coordination Opportunities with Local Municipalities / FDOT
  - Costs (Preliminary Estimate ~\$32 million+)
    - Including Contingency
    - Including Property Acquisition, Right-of-Way, Easements
    - Including Allocation for Design, Permitting, CEI
- Concepts to be Presented in Fact Sheet Format



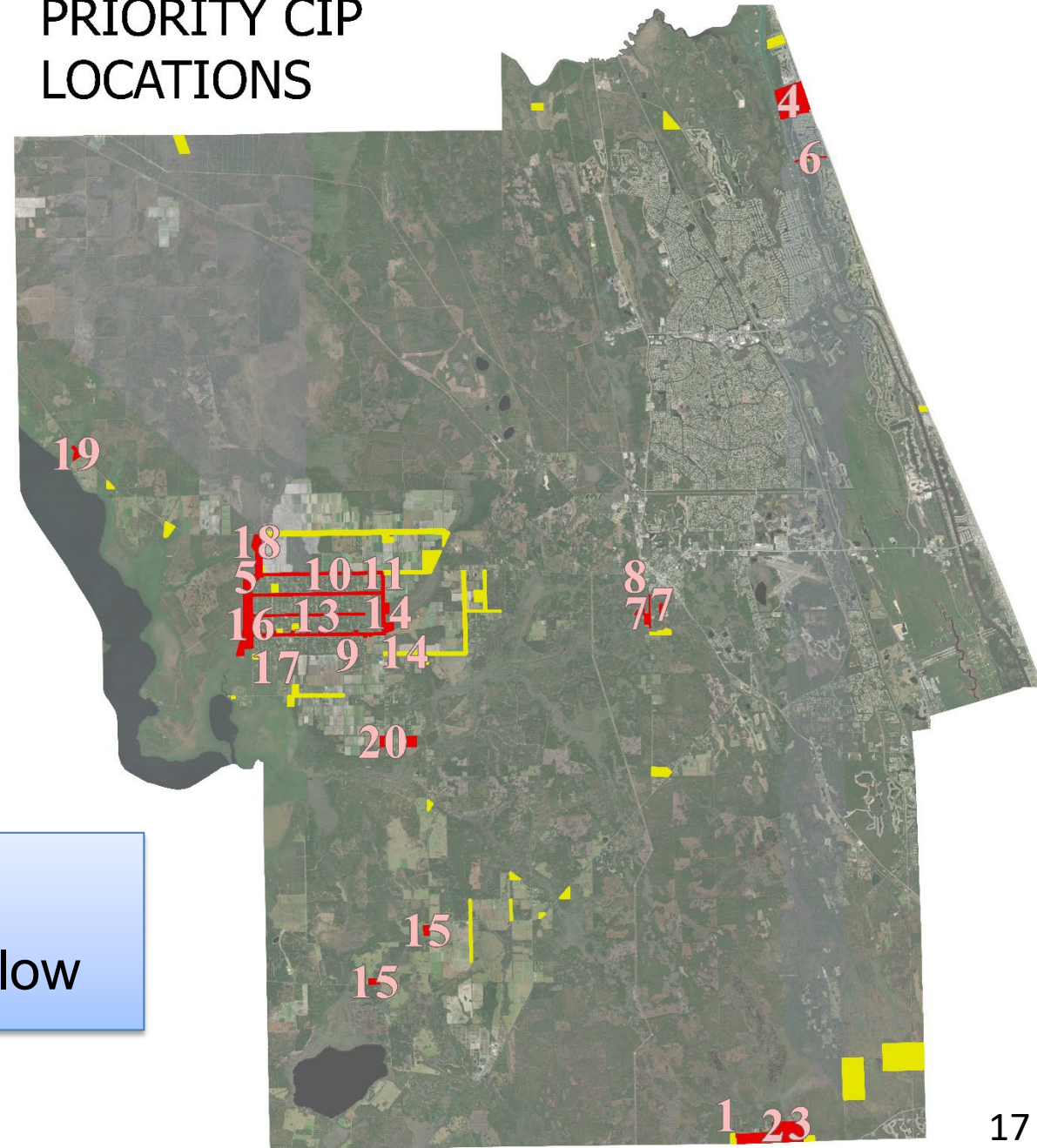


# CIP Recommendations

- Proposed Stormwater CIP Top 20
  - Focused in Unincorporated Areas
  - Reflects Geographical Distribution
  - ~40 Additional Lower Ranked Improvement Projects

CIP Top 20 in Red  
Lower Ranked in Yellow

## PRIORITY CIP LOCATIONS





# CIP Recommendations

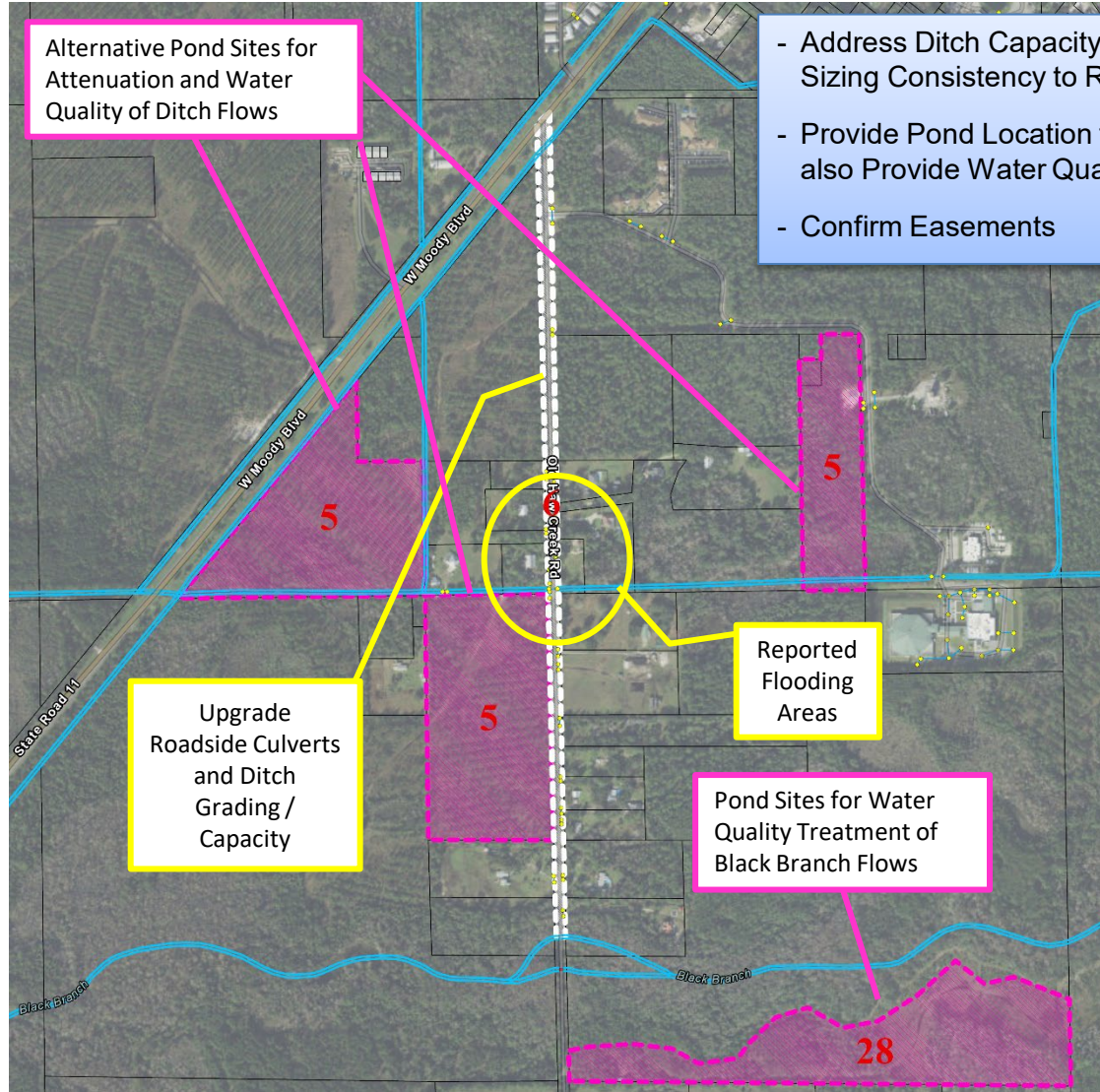
- Proposed Stormwater CIP Top 20
  - Focused in Unincorporated Areas
  - Reflects Geographical Distribution
  - Approximately \$40+ million for Top 20

Several Projects Have Alternatives

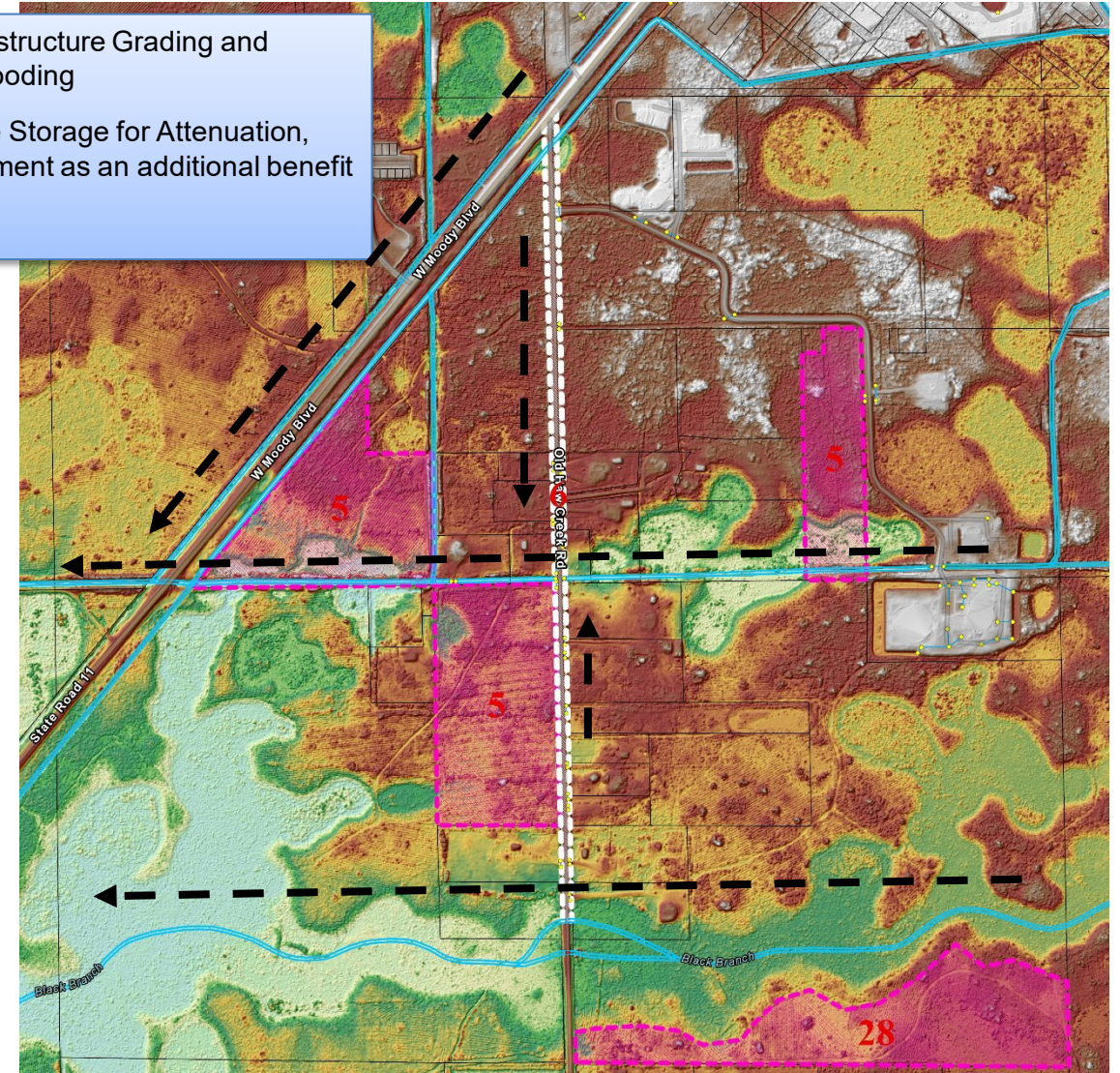
RANK	NAME	TYPE	DESCRIPTION
1	RIMA RIDGE WEST	FLOODING	REDUCE FLOODING, IMPROVE INFRASTRUCTURE
2	RIMA RIDGE CENTRAL	FLOODING	REDUCE FLOODING, IMPROVE INFRASTRUCTURE
3	RIMA RIDGE EAST	FLOODING	REDUCE FLOODING, IMPROVE INFRASTRUCTURE
4	A1A AND WASHINGTON OAKS OUTFALL	FLOODING	REDUCE FLOODING, IMPROVE INFRASTRUCTURE
5	WATER OAK CANAL	INFRASTRUCTURE, CONVEYANCE	CHANNEL UPGRADES, EASEMENTS
6	MALACOMPRA CANAL	INFRASTRUCTURE, CONVEYANCE	CHANNEL AND PIPING UPGRADES
7	OLD HAW CREEK RD / BLACK BRANCH NORTH ALT 1	FLOODING, WATER QUALITY	HAW CREEK IMPAIRMENT, CRESCENT LAKE TMDL
7	OLD HAW CREEK RD / BLACK BRANCH NORTH ALT 2	FLOODING, WATER QUALITY	HAW CREEK IMPAIRMENT, CRESCENT LAKE TMDL
7	OLD HAW CREEK RD / BLACK BRANCH NORTH ALT 3	FLOODING, WATER QUALITY	HAW CREEK IMPAIRMENT, CRESCENT LAKE TMDL
8	OLD HAW CREEK RD DITCH	INFRASTRUCTURE, CONVEYANCE	CHANNEL AND PIPING UPGRADES
9	FIRECRACKER CANAL CONVEYANCE	INFRASTRUCTURE, CONVEYANCE	CHANNEL AND PIPING UPGRADES
10	CANAL AVE CANAL CONVEYANCE	INFRASTRUCTURE, CONVEYANCE	CHANNEL AND PIPING UPGRADES
11	QUIGLEY BAY CANAL	INFRASTRUCTURE, CONVEYANCE	CHANNEL AND PIPING UPGRADES
12	MAHOGANY BLVD CONVEYANCE AND OUTFALL ENHANCEMENTS	INFRASTRUCTURE, CONVEYANCE	CHANNEL AND PIPING UPGRADES
13	WALNUT AVE CONVEYANCE AND OUTFALL ENHANCEMENTS	INFRASTRUCTURE, CONVEYANCE	CHANNEL AND PIPING UPGRADES
14	CR305 DITCH / BULL CREEK ALT 1	FLOODING, WATER QUALITY	BULL CREEK DITCHES / DEAD LAKE IMPAIRMENT, CRESCENT LAKE TMDL
14	CR305 DITCH / BULL CREEK ALT 2	FLOODING, WATER QUALITY	BULL CREEK DITCHES / DEAD LAKE IMPAIRMENT, CRESCENT LAKE TMDL
15	CR305 / LITTLE HAW CREEK ALT 1	WATER QUALITY	LITTLE HAW CREEK IMPAIRMENT, CRESCENT LAKE TMDL
15	CR305 / LITTLE HAW CREEK ALT 2	WATER QUALITY	LITTLE HAW CREEK IMPAIRMENT, CRESCENT LAKE TMDL
16	WATER OAK & WALNUT AVE CANALS	WATER QUALITY	BULL CREEK DITCHES / DEAD LAKE IMPAIRMENT, CRESCENT LAKE TMDL
17	WATER OAK & FIRECRACKER CANALS	WATER QUALITY	BULL CREEK DITCHES / DEAD LAKE IMPAIRMENT, CRESCENT LAKE TMDL
18	BIG CYPRESS SWAMP OUTFALL	FLOODING, WATER QUALITY	CRESCENT LAKE TMDL
19	SALT CREEK	WATER QUALITY	CRESCENT LAKE TMDL
20	CR305 / HAW CREEK NORTH ALT 1	WATER QUALITY	HAW CREEK IMPAIRMENT, CRESCENT LAKE TMDL
20	CR305 / HAW CREEK NORTH ALT 2	WATER QUALITY	HAW CREEK IMPAIRMENT, CRESCENT LAKE TMDL



# CIP Example - Old Haw Creek Road



- Address Ditch Capacity and Infrastructure Grading and Sizing Consistency to Reduce Flooding
- Provide Pond Location to Provide Storage for Attenuation, also Provide Water Quality Treatment as an additional benefit
- Confirm Easements







# CIP Example - Daytona North Area

Water Oaks Canal Obtain Easements for Maintaining Conveyance

Upgrade Roadside Culverts and Ditch Grading / Capacity

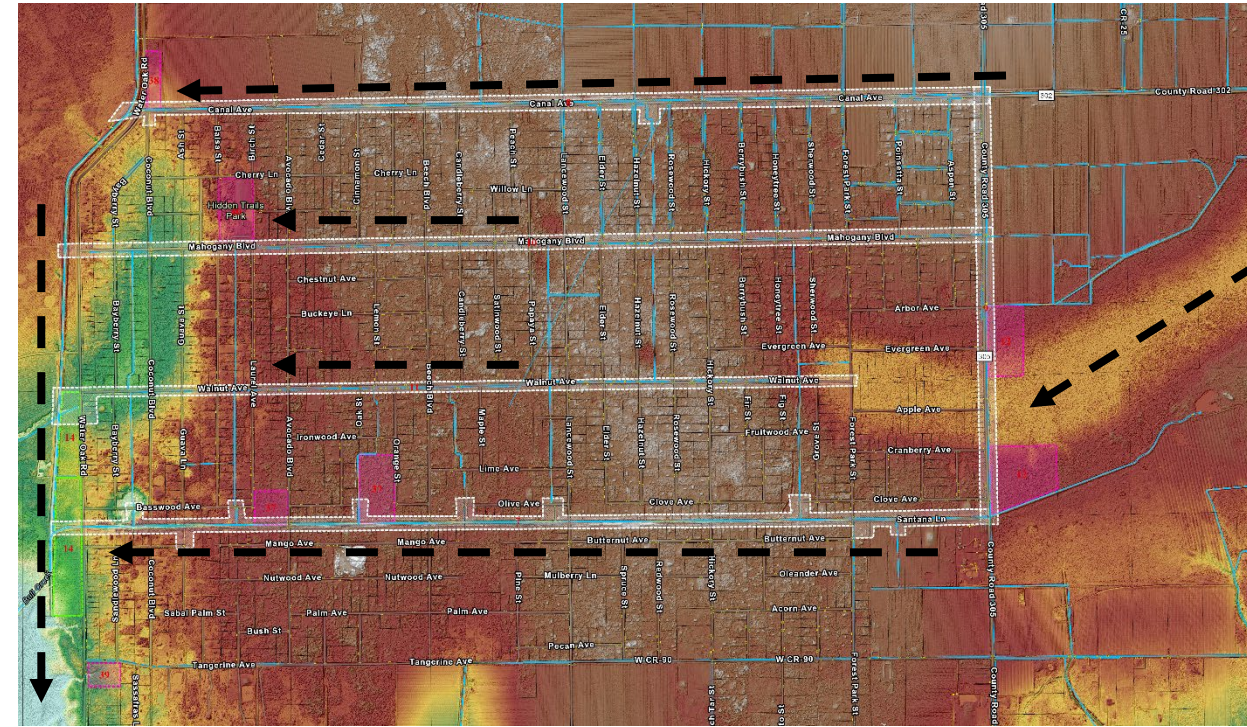
- Divided into 5 Infrastructure Improvement Projects, 7 flood/water quality pond opportunities, and 2 water quality pond opportunities
- Address grading along roadways to provide consistent positive drainage and conveyance capacity, replacing side drains as necessary. Upgrade cross-drain sizes/numbers as necessary.

Pond Site Opportunities for Attenuation and Water Quality Treatment

Priority Pond Sites for Water Quality Treatment

Upgrade Roadside Culverts and Ditch Grading / Capacity

Priority Pond Sites for Attenuation and Water Quality Treatment







# CIP Funding Evaluation

- Opportunities
  - FDOT
  - FDEP
    - Water Quality Improvement Grant
    - Nonpoint Source Management Grant
    - Resilient Florida Planning Grant
    - Resilient Florida Implementation Grant
    - EPA 319
  - SJRWMD
    - Districtwide Program
  - Florida Legislative Appropriation





# Public and Commission Meetings

- Public Presentations
  - Initial Public Meetings  
(February 22, 2022 at BCC Chambers and March 1, 2022 meeting at Hidden Trails Community Center)
    - Introduce Project to Citizens
    - Present Scope
    - Solicit Input on Flooding and Other Stormwater Issues
  - Final Public Meeting (July 31, 2023)
    - Present Final Results and Proposed Improvement Projects
    - Solicit Final Input
  - County Commission Workshop (July 31, 2023)
  - Final Commission Presentation (Sep/Oct 2023)







# Project Status Upcoming

- Next Steps to Completion
  - Draft Master Plan Report Submitted (July 2023)
  - Public Meeting (July 31)
  - Initial BCC Meeting (July 31)
  - Draft – Final Master Plan Report (August)
  - Final Plan Report (September / October)
  - Final BCC Meeting (September / October)





# Project Schedule

## Flagler County Stormwater Master Plan

The plan began in January 2022 and is scheduled to conclude in September 2023. The current project schedule is shown below.

Plan Task	2022												2023										
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	Jun	Jul	Aug	Sep	
Inventory and Problem Areas Identification	█																						
Engineering Drainage & Flood Assessment				█																			
Climate Change & Resiliency Eval. and Water Quality Review						█																	
Improvement Alternative Analysis											█												
Public Meetings			█																				█★
Board of County Commissioner Meetings																			█★	█			
Project Closeout																				█			

★ Current Project Milestone



# What is Next After the Master Plan?

- Capital Project Implementation
  - County will identify funding for capital projects
    - This will include grant and other external funding sources
    - Capital projects will be completed in priority order as funding allows
  - Capital projects will involve the following steps:
    - Preliminary design (feasibility) analysis
    - Final design and permitting (varies, 12-to-24-month process per project depending on the project complexity)
    - Construction
  - Capital projects implementation timeline:
    - 5 years to possibly greater than 10 years to complete construction of Capital Improvements Projects
- Master Plan to be revisited every 5 years to re-assess priorities





**Thank You !**

**Flagler County Stormwater Master Plan**