

# Stormwater Master Plan PUBLIC MEETING

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





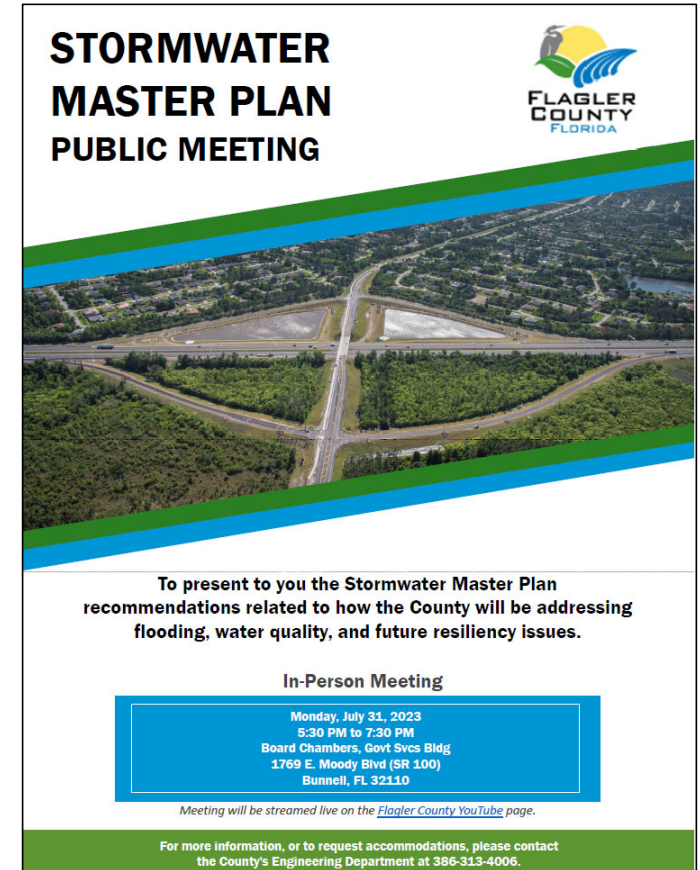
# Agenda

- |                 |                      |
|-----------------|----------------------|
| 5:30 pm:        | Meeting Begins       |
| 5:30 – 5:45 pm: | Informal Discussions |
| 5:45 – 6:15 pm: | Formal Presentation  |
| 6:15 – 7:30 pm: | Questions & Answers  |
| 7:30 pm:        | Meeting Adjourns     |



# Meeting Goals


- Provide Update on Project
- Review Scope of work
- Discuss Project Recommendations
- Project schedule
- Solicit final input from public and stakeholders



**STORMWATER  
MASTER PLAN  
PUBLIC MEETING**



**FLAGLER  
COUNTY  
FLORIDA**



To present to you the Stormwater Master Plan recommendations related to how the County will be addressing flooding, water quality, and future resiliency issues.

**In-Person Meeting**

Monday, July 31, 2023  
5:30 PM to 7:30 PM  
Board Chambers, Govt Svcs Bldg  
1769 E. Moody Blvd (SR 100)  
Bunnell, FL 32110

*Meeting will be streamed live on the [Flagler County YouTube page](#).*

For more information, or to request accommodations, please contact the County's Engineering Department at 386-313-4006.



# 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







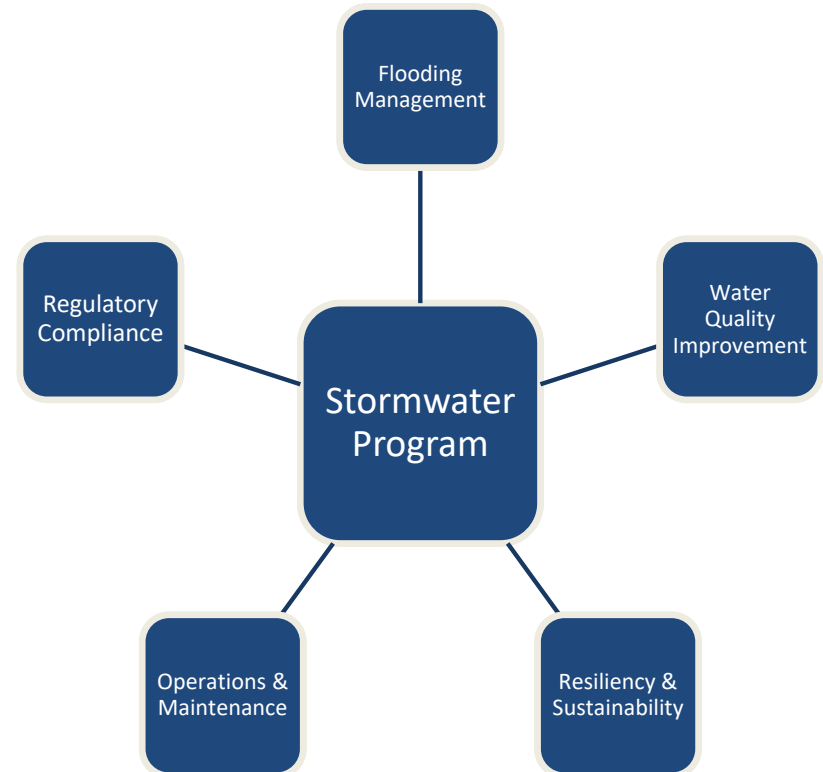
# Why Do We Need a Plan?

- **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

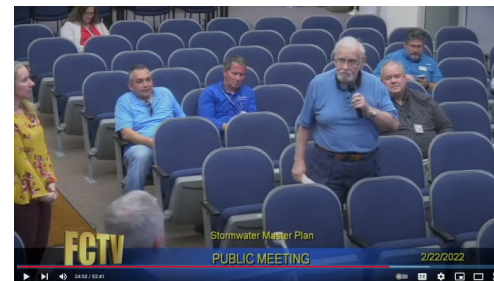
- A. Review Existing Program Data
- B. Code & Development Review
- C. Operations & Maintenance Program Review
- D. Drainage Infrastructure Inventory
- E. Flooding Assessment
- F. Water Quality Assessment
- G. Resiliency Evaluation
- H. Improvement Project Conceptualization
- I. Project Funding Evaluation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





# Public 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 2023)

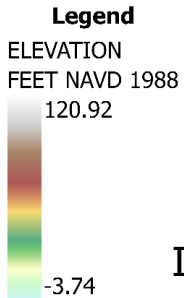
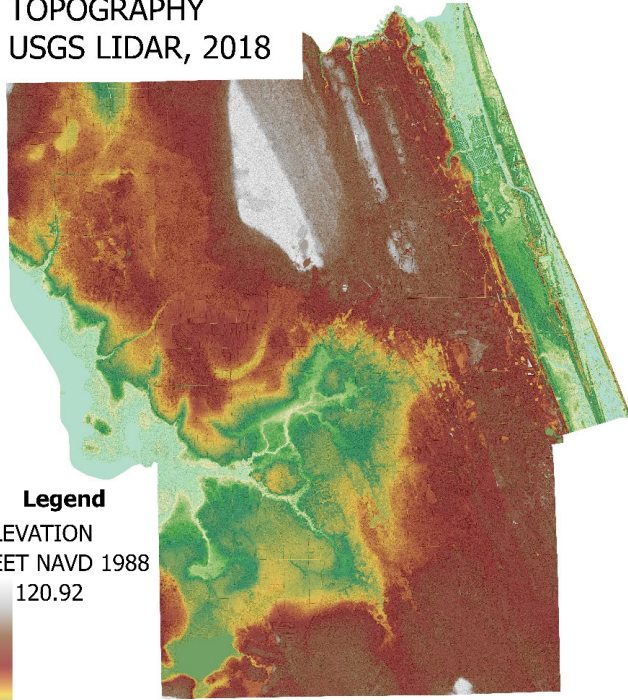






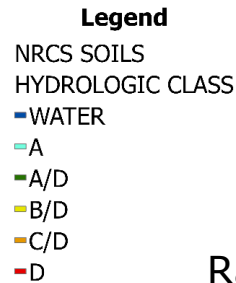
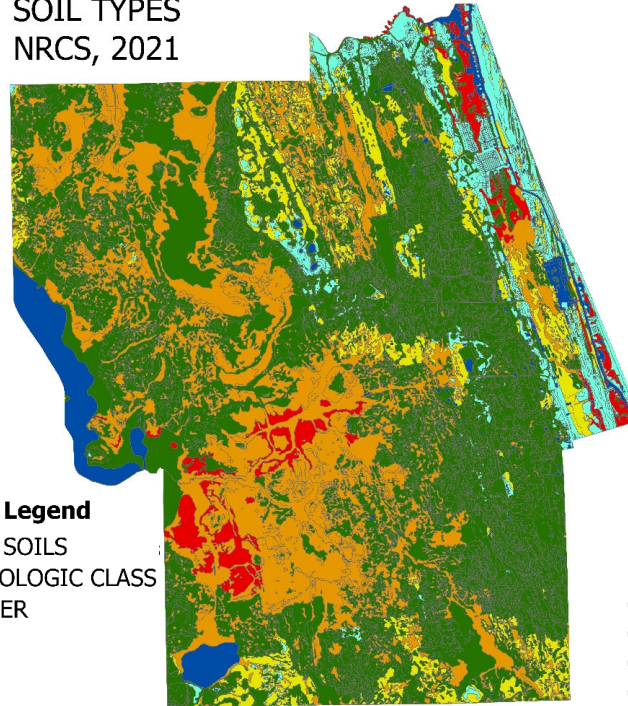
# Stormwater Characteristics

TOPOGRAPHY  
USGS LIDAR, 2018



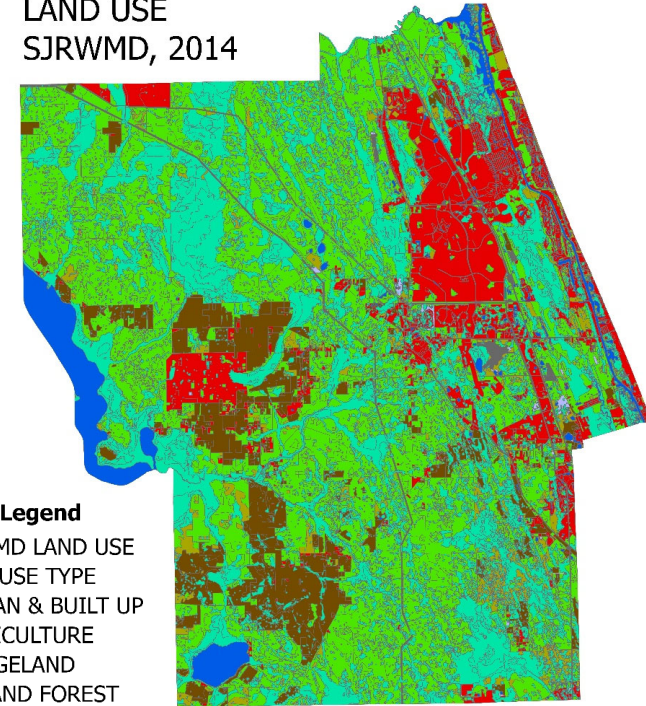
Influences Rate and Storage of Stormwater Runoff

SOIL TYPES  
NRCS, 2021



Rainfall Infiltration / Percolation Capacity

LAND USE  
SJRWMD, 2014



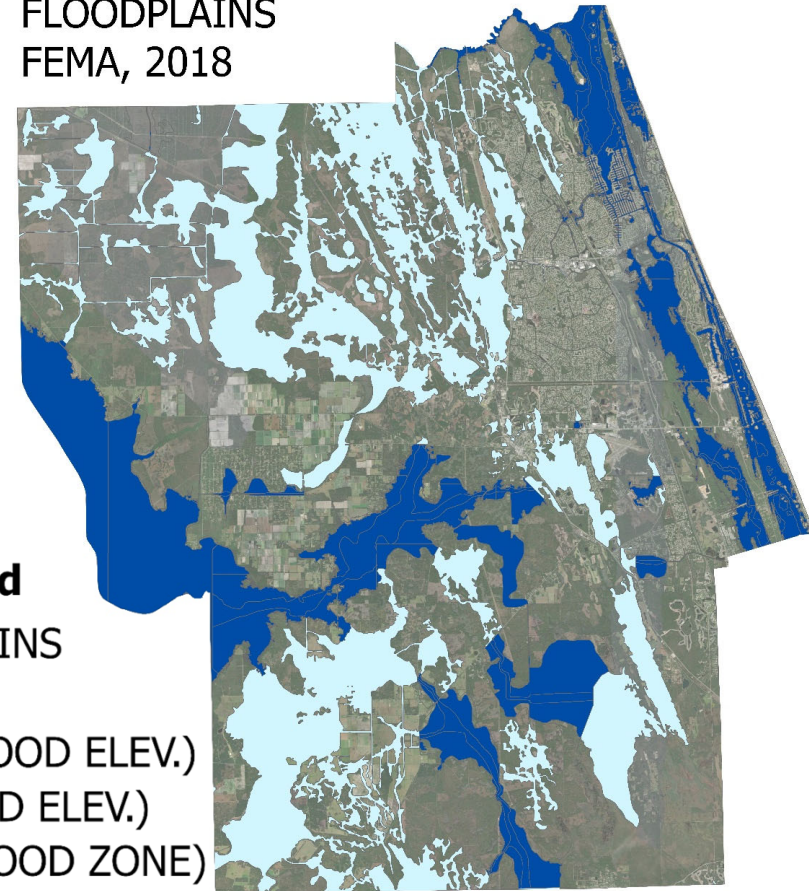
Relative Imperviousness which Drives Stormwater Runoff Volume



# 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, 4-2-98)

**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 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, L.S. § 125.01(1)(j).

Flagler County, Florida, Code of Ordinances      Ordinance: 2003-12-18 31:29:14 12372  
Cross: No. 023

Page: 1 of 6


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

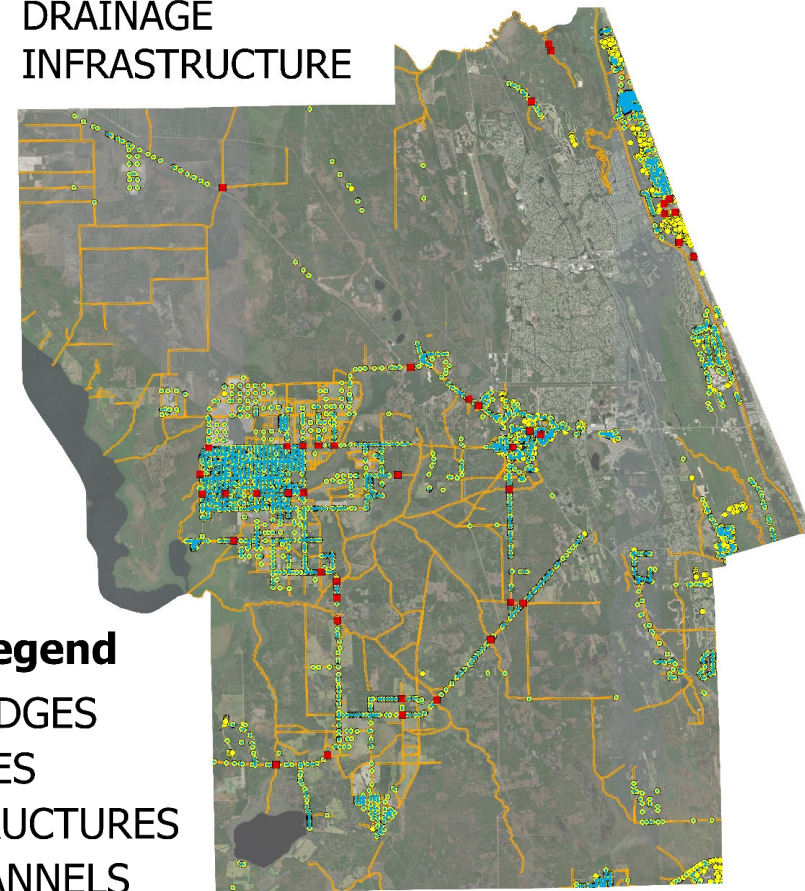
D-Infrastructure      July 6, 2011      Page D-1



# 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

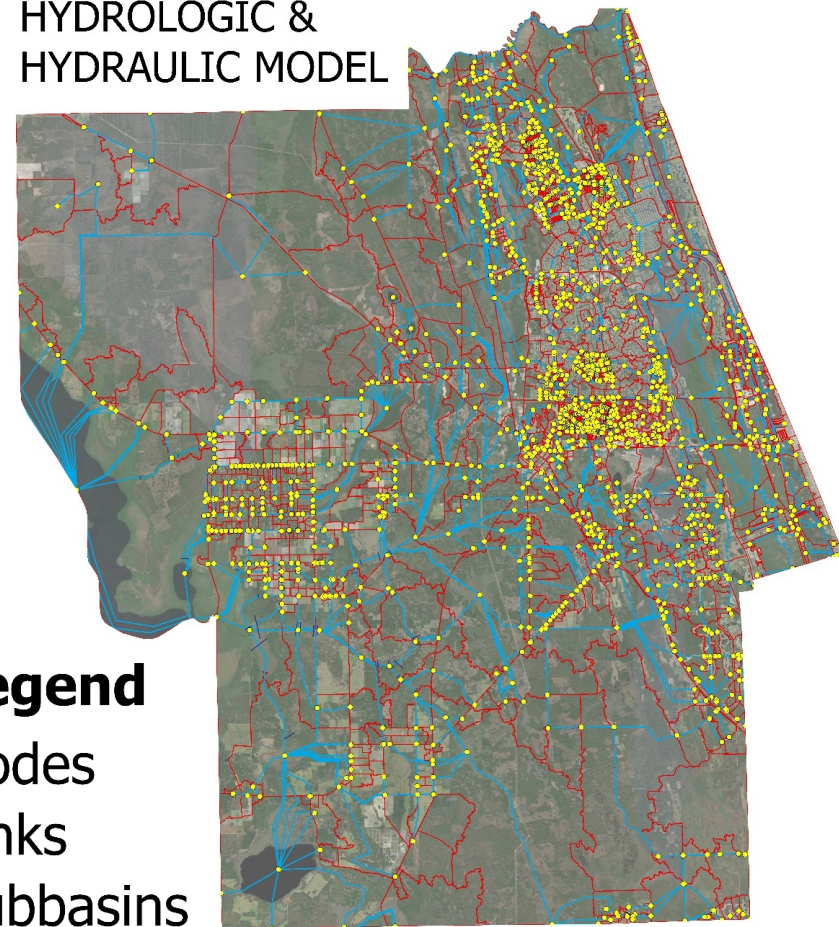
- BRIDGES
- PIPES
- STRUCTURES
- CHANNELS



# 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



## Legend

- Nodes
- Links
- Subbasins

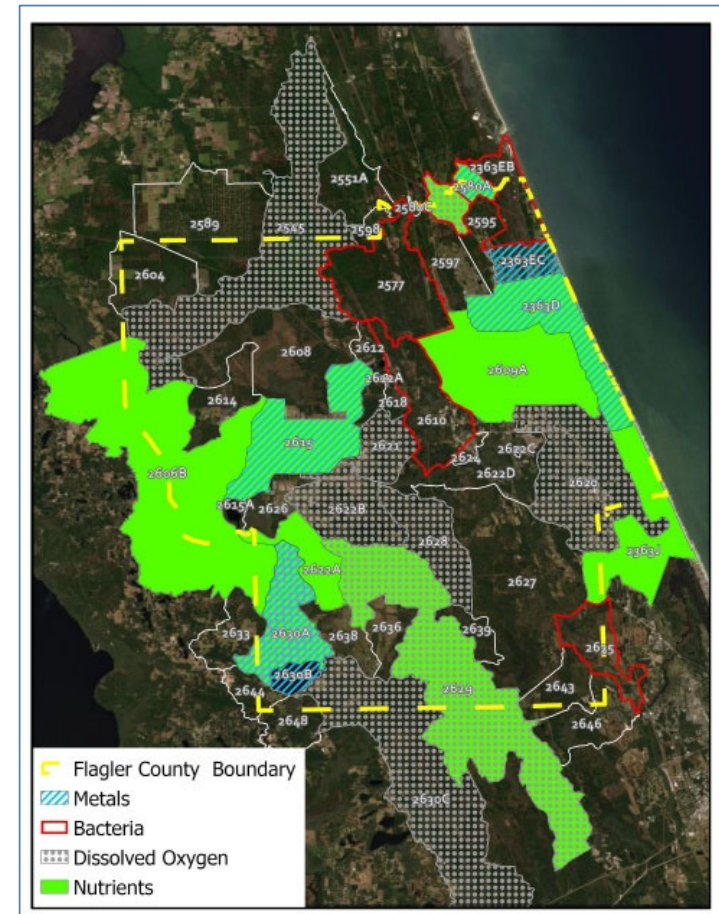




# Water Quality Assessment

- 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



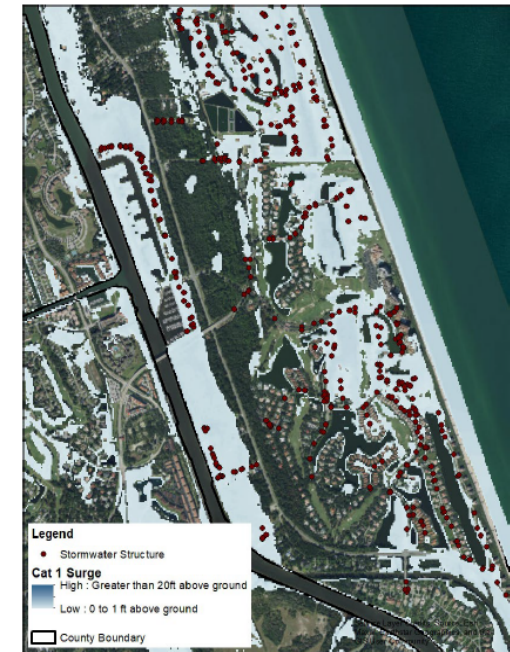
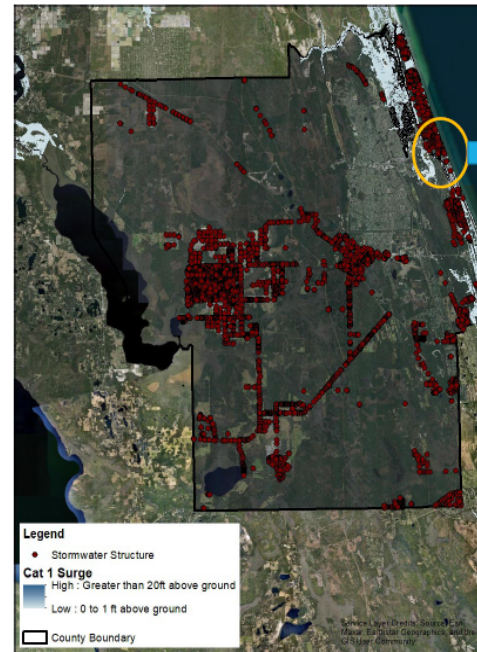


# Resiliency Strategies

- 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

Cat 1 Storm Surge Example

East of County nearby A1A and Hammock Dunes Pkwy



**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

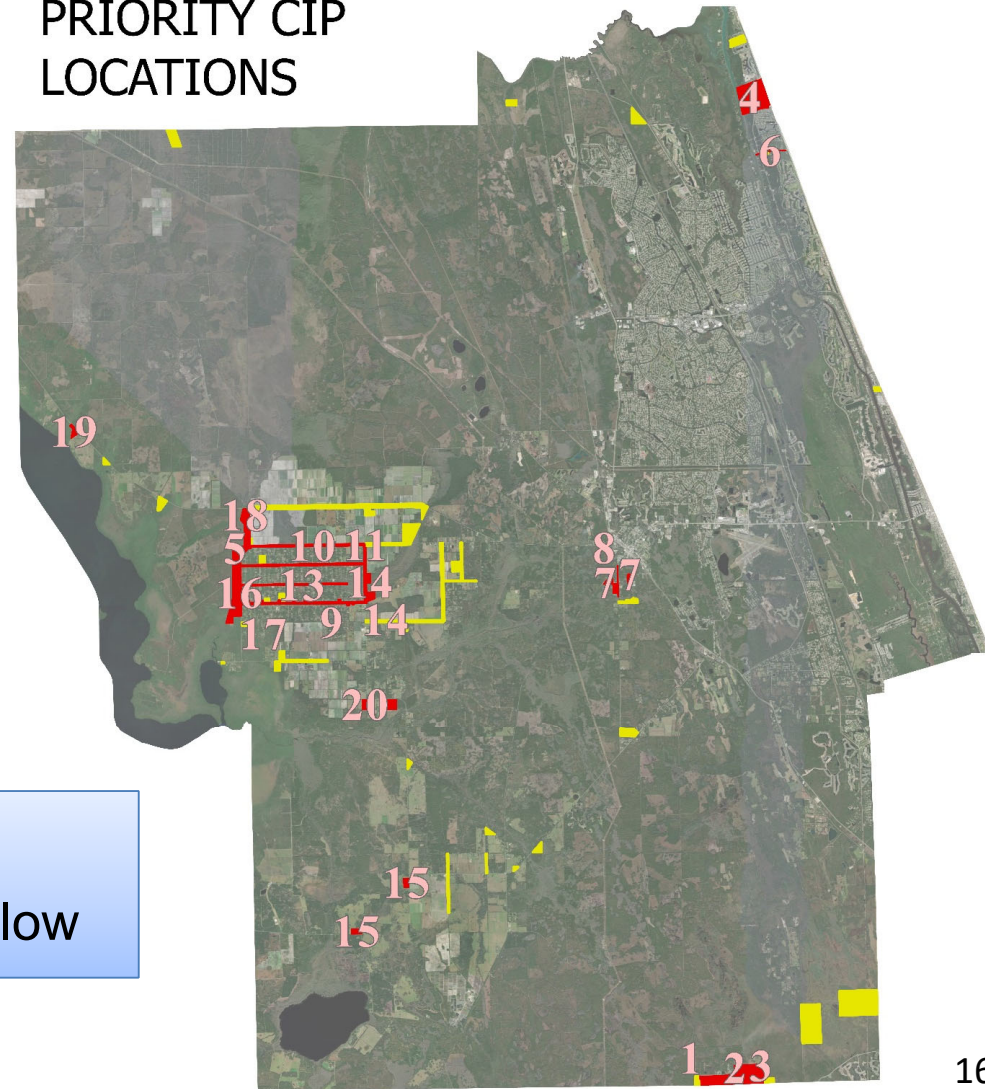


# CIP Recommendations

- 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 CONVEYANCE	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



# 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





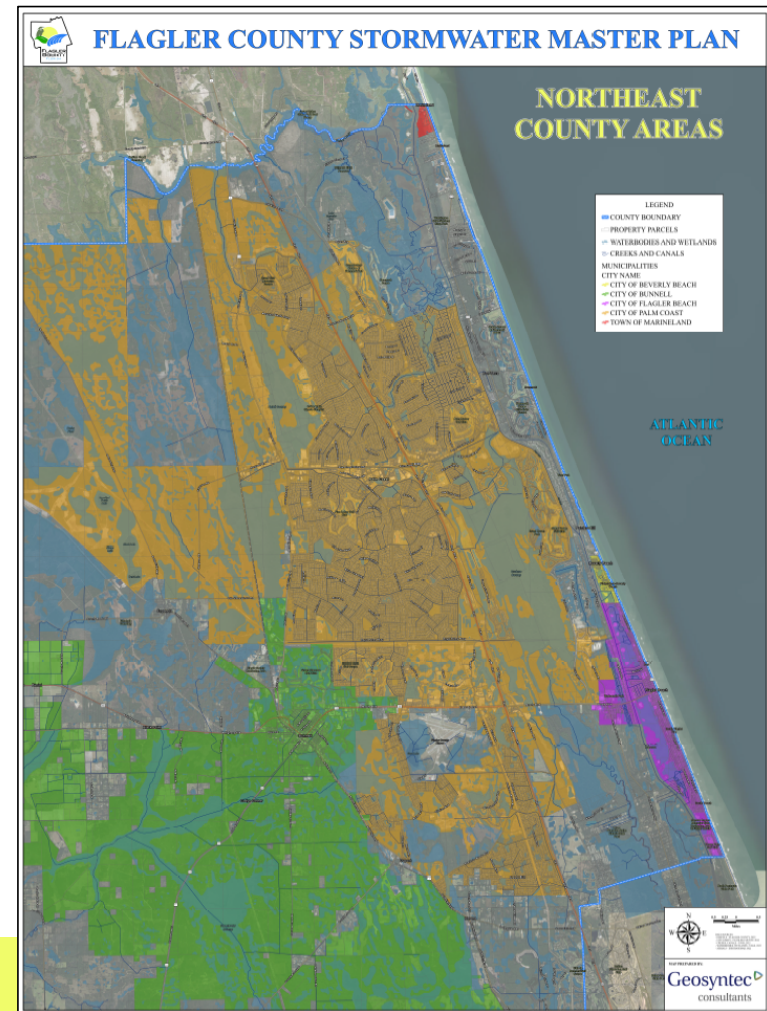
# What is Next After the Master Plan?

- 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



# Public Comments and Feedback

- Informal Discussions:
  - Map Stations Setup
  - Speak with County representatives and consultant staff regarding problems, issues, general questions





# Public Comments and Feedback

- Comment form
  - Manual Form – copies available at sign-in desk
  - Web version of form can be found: [www.flaglercounty.gov/departments/engineering/stormwater-master-plan](http://www.flaglercounty.gov/departments/engineering/stormwater-master-plan)
  - Same content on each
- County Stormwater Web Page: [www.flaglercounty.gov/departments/engineering/stormwater-master-plan](http://www.flaglercounty.gov/departments/engineering/stormwater-master-plan)
- Consultant Contact:

Geosyntec Consultants, Inc.  
 c/o Cathy Foerster, AICP  
 2201 NW 40th Terrace  
 Gainesville, FL 32605  
[cfoerster@geosyntec.com](mailto:cfoerster@geosyntec.com)

<b>COMMENT FORM</b> <span style="float: right;">Geosyntec consultants</span> <small>Flagler County Stormwater Master Plan Public Meeting Date: Monday, July 31, 2023</small>	
Name:	
Address:	
Phone No.	
Email	<small>(What is your preference on how we may reach you?)</small>
<b>Your input is greatly appreciated!</b>	
<b>Flooding Issues</b>	
<b>Are you aware of flooding issues or flood prone areas near your residence, place of work, or other location in Flagler County? If so, please provide:</b>	
a.	Location (street address or vicinity)
b.	When (date, if possible, or indicate frequency [daily, weekly, monthly])
c.	Description (i.e., yard flooded, road flooded, seawall overtopped, canal overflowing, etc.)
d.	Categorize type of flooding (circle type below) i. Storm or surge flooding ii. Tidal or sunny day flooding iii. Rainstorm flooding iv. Other (i.e., drainage ditch clogged, stormwater pipe or culvert not operating as intended)
<b>Water Quality Issues</b>	
<b>Are you aware of water quality issues in Flagler County? If so, please provide:</b>	
a.	Location (street address or vicinity)
b.	When (date, if possible, or indicate frequency [daily, weekly, monthly])
c.	Description (i.e., lake, stream, sanitary sewer overflow, clogged stormwater drains, pipe discharges, leaking septic systems, etc.)

*Please flip page for more information/opportunity for input.*  
 Page 1 of 2

<b>COMMENT FORM</b> <span style="float: right;">Geosyntec consultants</span> <small>Flagler County Stormwater Master Plan Public Meeting Date: Monday, July 31, 2023</small>	
<b>Other</b>	
<b>Are there other items/thoughts you would like to share with the project team? Please share here. We would love to receive photos or other documentation that is relevant. Please send via email or U.S. Mail. Please note that we are unable to return any materials that are provided.</b>	
<p>You may enter your comments on this form or <b>online</b> at:  <a href="https://www.flaglercounty.gov/departments/engineering/stormwater-master-plan">https://www.flaglercounty.gov/departments/engineering/stormwater-master-plan</a></p> <p><b>Please provide the hardcopy form to the County or Geosyntec representative present at the public meeting. If you prefer, you can submit a copy via email to <a href="mailto:cfoerster@geosyntec.com">cfoerster@geosyntec.com</a> or via U.S. Mail to:</b></p> <p>Cathy Foerster, AICP            Geosyntec Consultants, Inc.            2201 NW 40th Terrace            Gainesville, FL 32605</p>	

Page 2 of 2





**Thank You !**

**Flagler County Stormwater Master Plan**