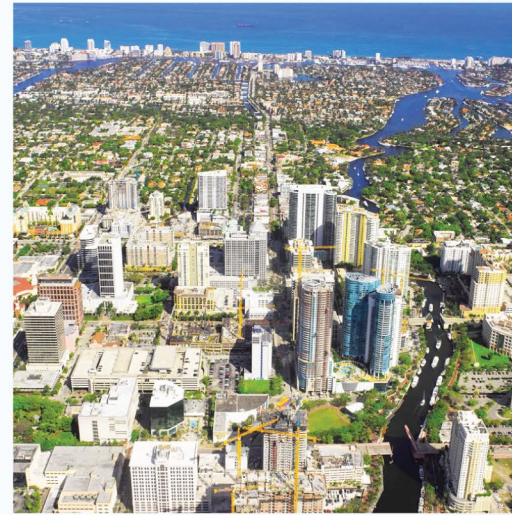




# Fortify Lauderdale

Building a Resilient Future  
in Fort Lauderdale

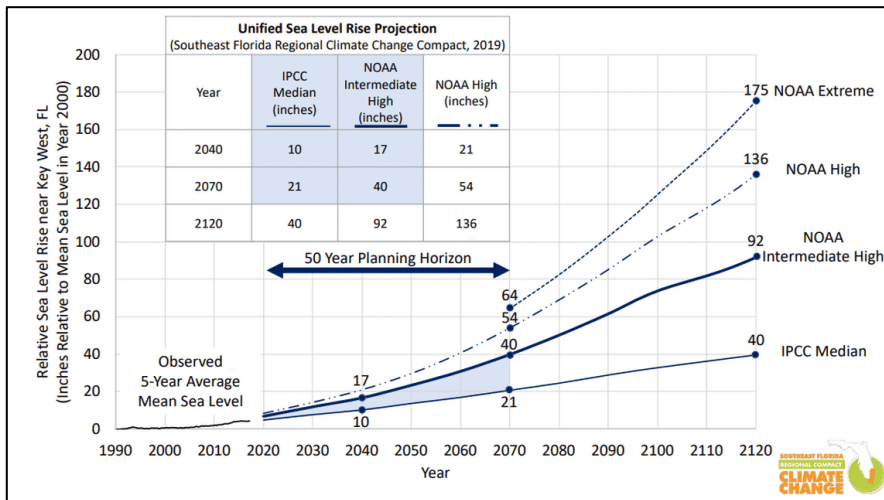


# Climate Resilience

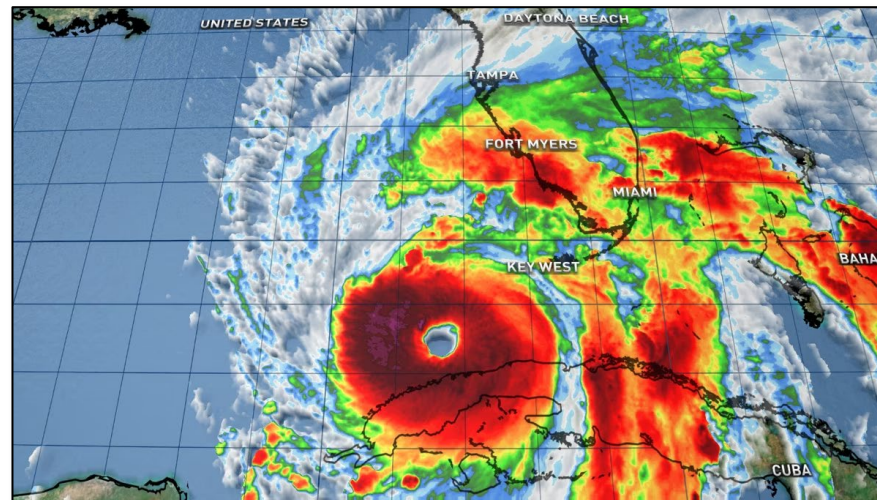
*"The ability to anticipate, prepare for, and respond to hazardous events, trends, or disturbances related to climate."*

Improving climate resilience involves [assessing](#) how climate change will create new, or alter current, climate-related risks, and [taking steps](#) to better cope with these risks.

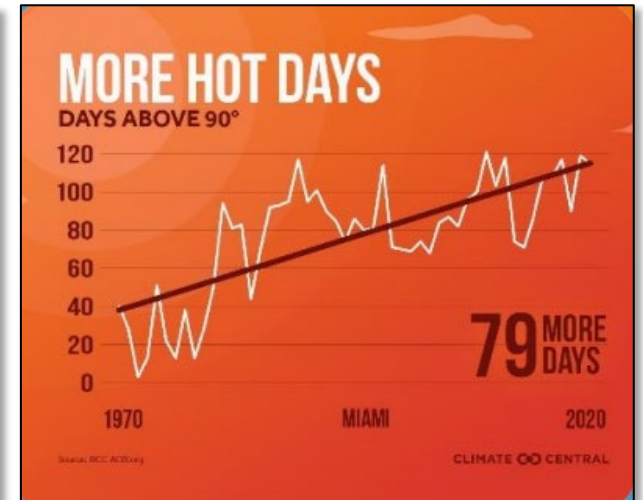
## Sea Level Rise



## More Frequent & Intense Weather Events



## Increasing Temperatures

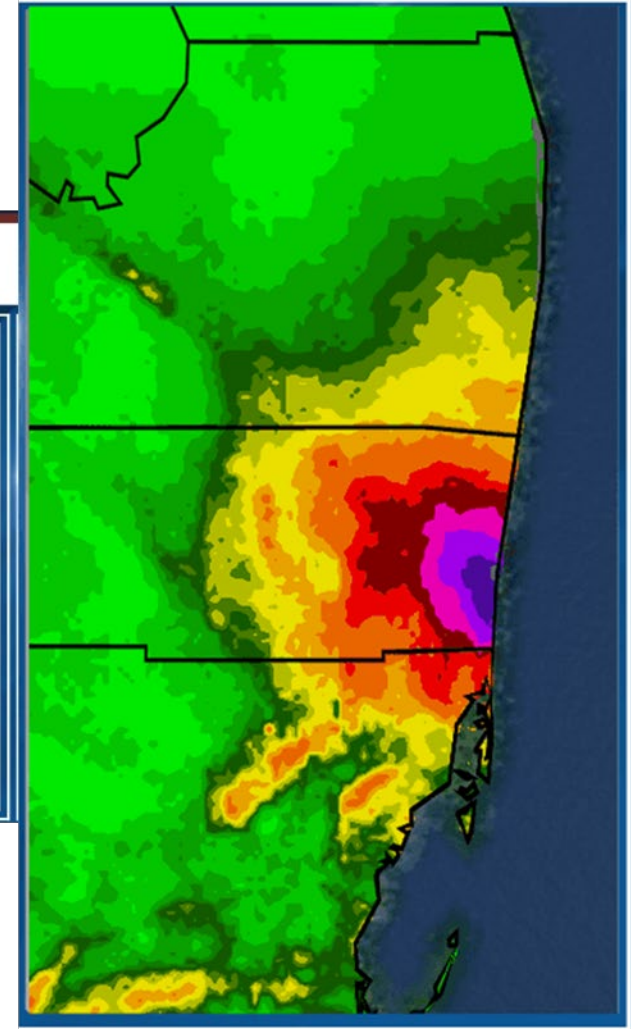


# Rain Event: April 12 – 13, 2023



## > TOP RAIN TOTALS » YESTERDAY

Fort Lauderdale	25.91"
Hollywood	18.16"
Dania Beach	17.30"
Plantation	15.06"
Lauderhill	14.58"
Coconut Grove	13.15"



# Impacts of Flash Flood



# Impacts of Flash Flood



# Impacts of Flash Flood

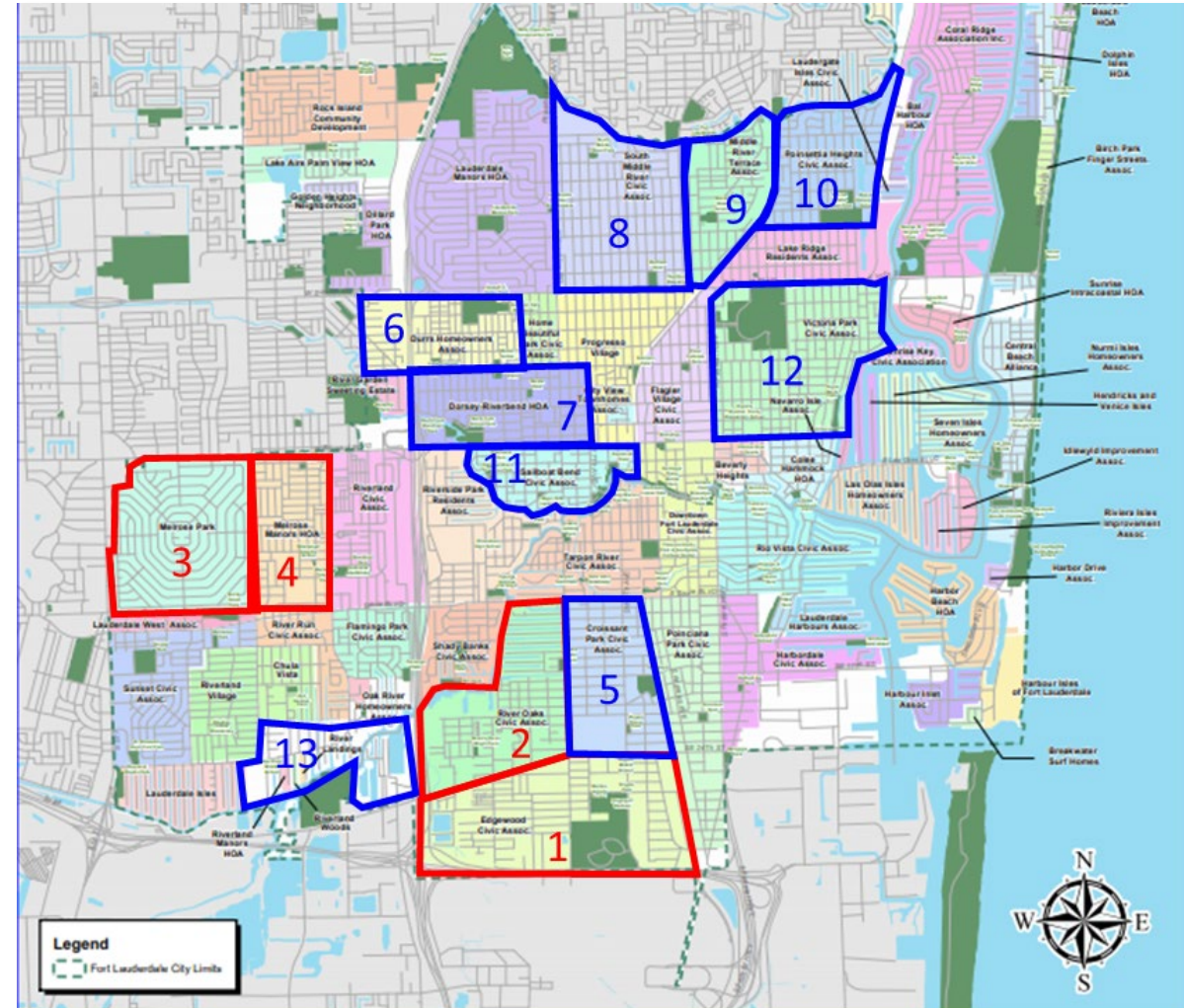


# Neighborhoods Initially Reporting Major Impacts - April 13, 2023

## Initial Flooding Assessment – Heavily Impacted Neighborhoods

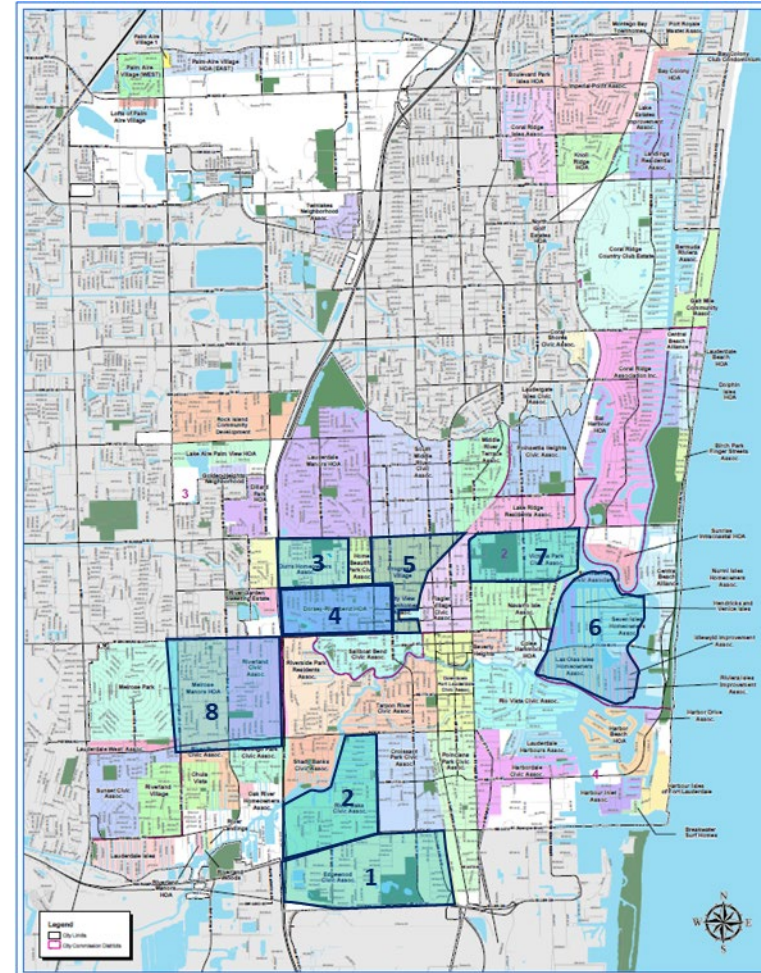
- |                     |                         |
|---------------------|-------------------------|
| 1) Edgewood         | 8) South Middle River   |
| 2) River Oaks       | 9) Middle River Terrace |
| 3) Melrose Park     | 10) Poinsettia Heights  |
| 4) Melrose Manors   | 11) Sailboat Bend       |
| 5) Croissant Park   | 12) Victoria Park       |
| 6) Durrs            | 13) River Landing       |
| 7) Dorsey Riverbend |                         |

- All neighborhoods experienced some degree of flooding, but many neighborhoods returned to normal conditions by April 14, 2023 even after an additional 3-inch rain event on April 13, 2023.
- Heavily impacted neighborhoods have undersized or little/no stormwater infrastructure and were highly influenced by groundwater levels and/or lack of discharge capacity.



# Stormwater Master Plan – Tranche I Status

1. Edgewood: In Construction
2. River Oaks: In Construction
3. Durrs: Design Complete; In Bidding
4. Dorsey-Riverbend: Design Complete; Bidding Nov 2023
5. Progresso Village: Design being updated; Bidding Oct 2024
6. Southeast Isles: Design being updated; Bidding May 2025
7. Victoria Park: Design being updated; Bidding Feb 2025
8. Melrose Manors/Riverland Civic: In Design; estimated completion of design in Dec 2024





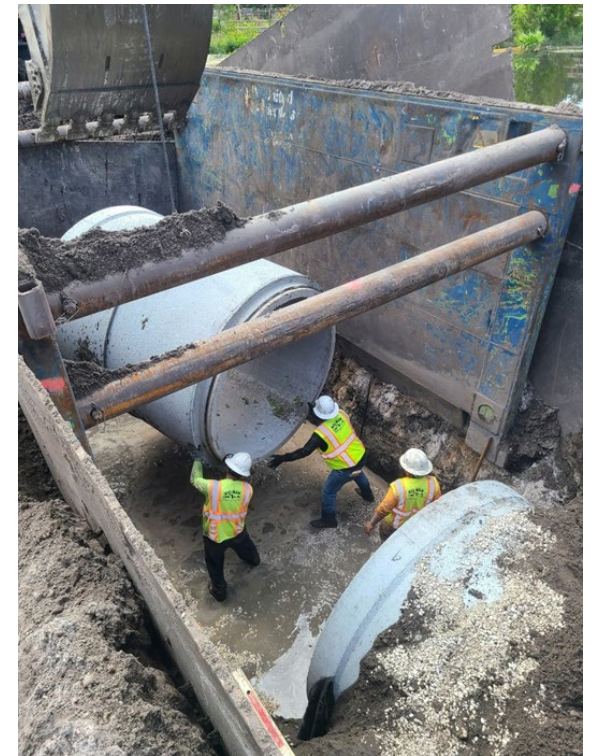
# Fortify Lauderdale

## Goal

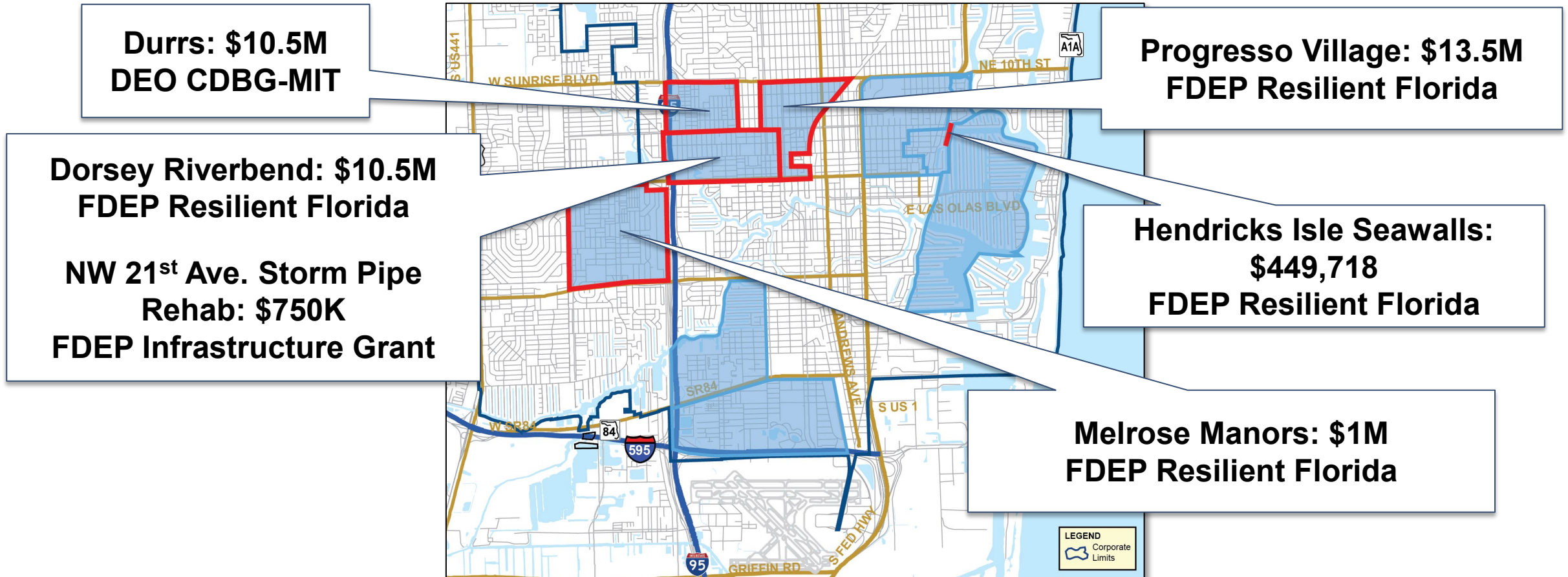
Improve Resilience to Impacts of Climate Change Within Our Most Vulnerable Neighborhoods and Communities

## Public Investments

- Citywide vulnerability assessment
- ULI panel to develop policy recommendations associated with low elevations and roadways
- Accelerate [\\$500M](#) in stormwater infrastructure improvements in [17 neighborhoods](#) with all construction to be completed in [10 years](#)
- Increased funding for seawalls, roadways, and bridges
- Improved resilience standards for existing stormwater infrastructure
- Increased staffing and prioritization of stormwater program



# The City is working diligently to leverage its stormwater/resilience investment dollars



... having already secured \$36.7 million in grants for Tranche 1 projects

# Fortify Lauderdale

## Goal

Improve Resilience to Impacts of Climate Change Within Our Most Vulnerable Neighborhoods and Communities

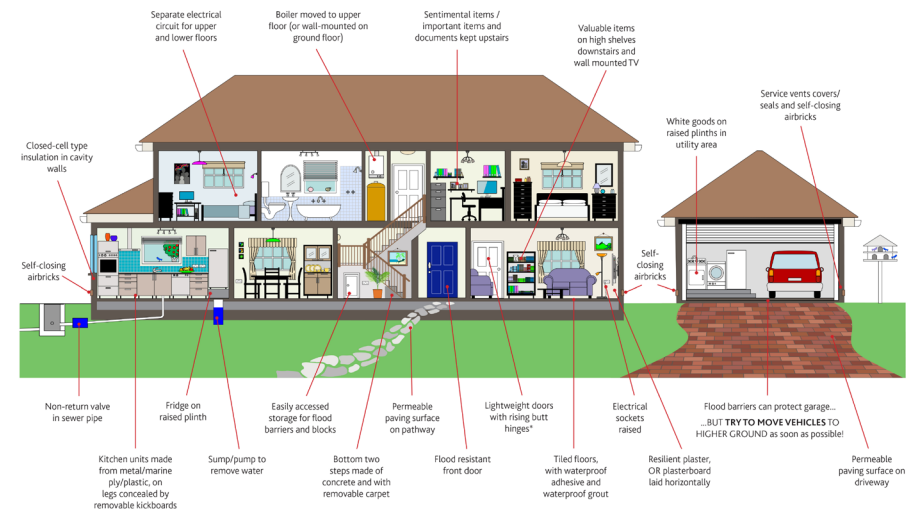
## Private Investments

- Resilient Home Improvements Education campaign for residents
  - Drywall, windows, doors, drainage, HVAC
  - Private grants and funding opportunities
- Flood Insurance awareness campaign
- Increased efforts to improve CRS score within floodplain management program

## Protecting Your Property

### Combined resistance and resilience measures

- keeping water out for as long as possible buys valuable time to raise / move your belongings



\* For fire safety purposes not suitable in all house/building types; if in doubt contact your local building standards service

[www.scottishfloodforum.org](http://www.scottishfloodforum.org)



# Increasing Capacity – Resource and Budget Implications

## Accelerated Stormwater System Improvements

### Stormwater Engineering

Current: 1 x SPM and 4 x PM II

FY25: Increase 1 x Division Manager, 1 x SPM, 4 x PM II

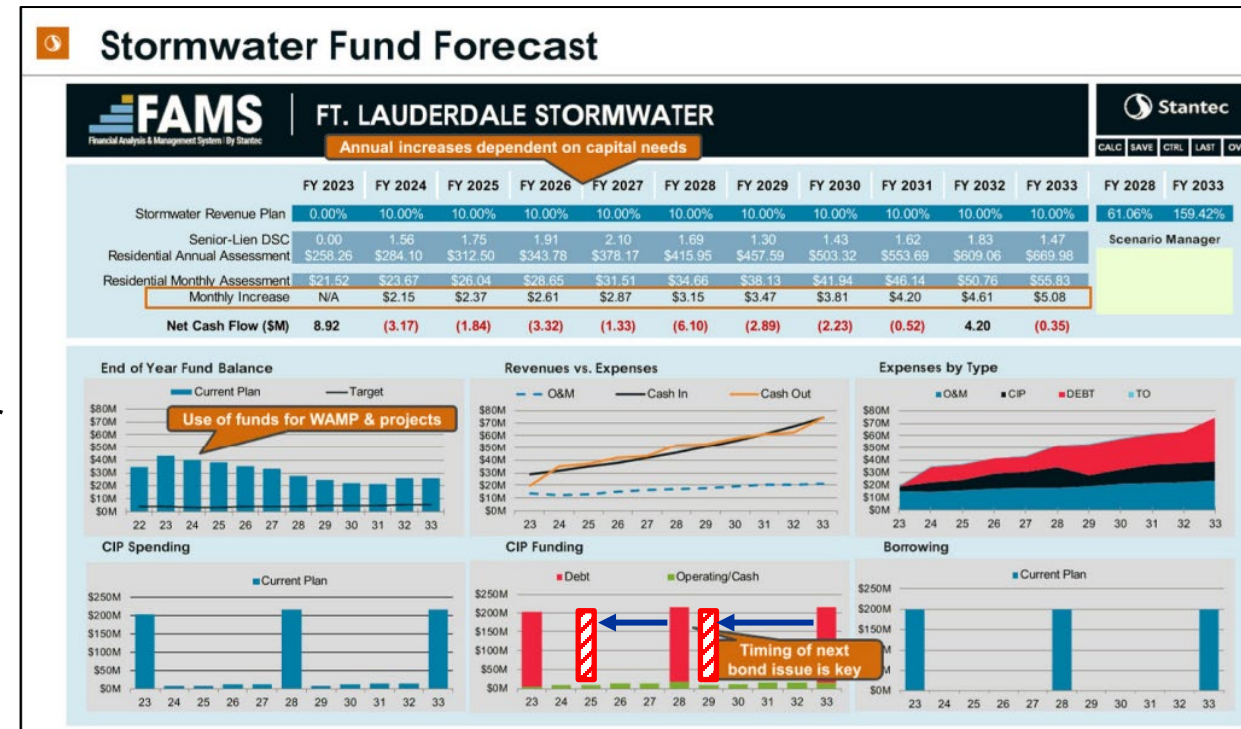
### Contractual

Increase Operational project budget \$1M to \$2M per year

Increase seawall funding from \$1.25 to \$3M per year

### Funding

Accelerate \$200M bond tranches



# Increasing Capacity – Resource and Budget Implications



## Operations, Maintenance, and Emergency Response

### Stormwater Operations

Currently 33 FTE

FY25-27: Increase 10 x FTE (\$80,000/FTE)

2 x Pump Trucks, 2 x portable pumps (\$1,500,000)

Additional \$200,000 annual overtime budget

Initiate Construction of Stormwater Operations Facility (\$10M)

### Sustainability

FY25: Resilience Manager for Private Property program (\$100,000)

(General Fund)

### Contractual

Emergency response contract: \$2M per year

### Funding

Seed money for Private Property Program match (General funding)



# Due to impacts of recent flooding, previous scope and schedule of neighborhood improvements has been updated.

	Original Plan	Revised Plan
<b>Tranche 1 Neighborhoods</b>		
Number	7	8
Start*	2017	2017
<b>Tranche 2 Neighborhoods</b>		
Number	7	17
Start	2025	2023

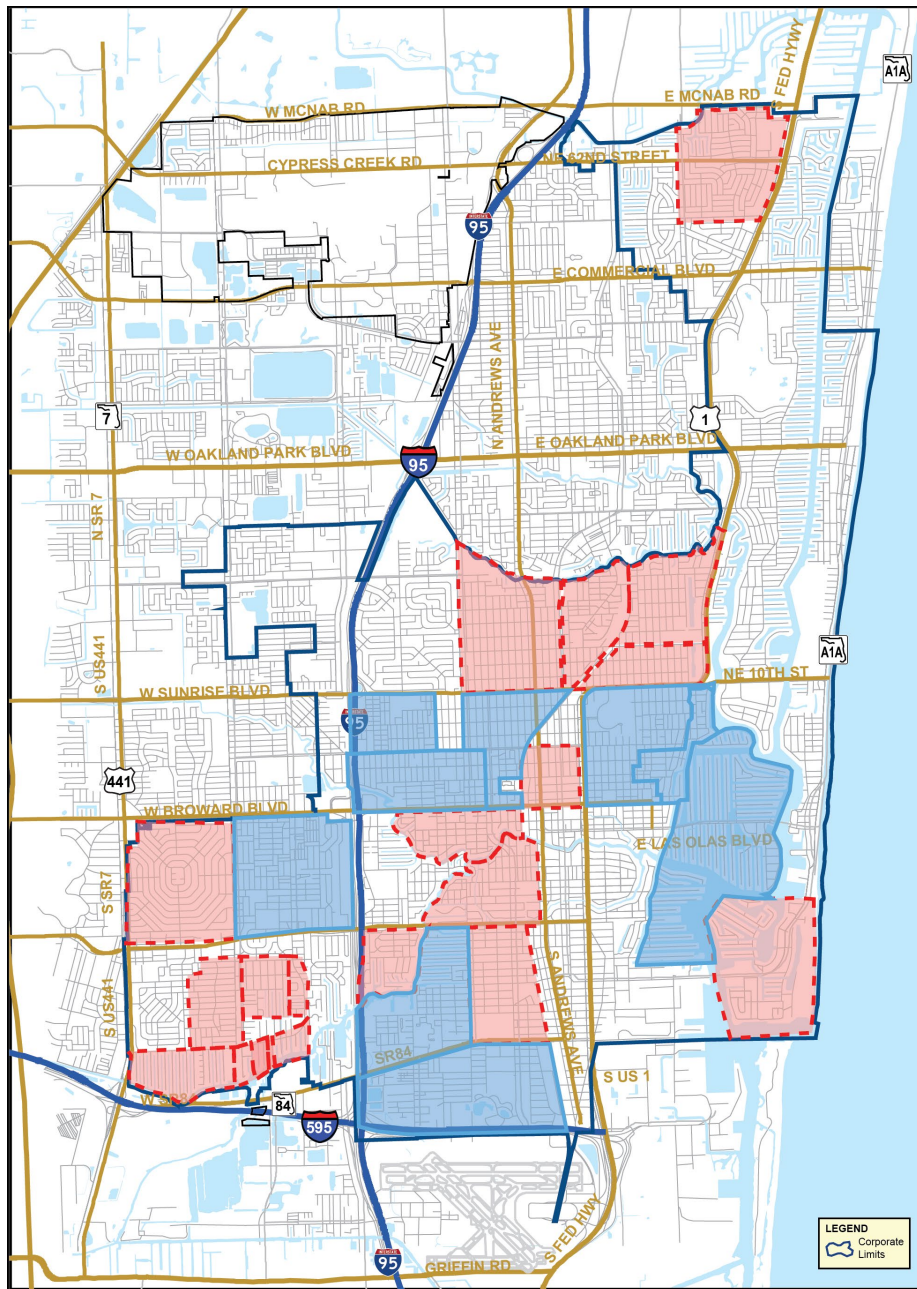
\*Includes Funding Approach and Stormwater Assessment Development

# Tranche 1 projects are under way and it is time to start planning Tranche 2

## Tranche 1 Projects



- Victoria Park
- Southeast Isles
- River Oaks
- Progresso
- Edgewood
- Durrs
- Dorsey-Riverbend
- Melrose Manors/Riverland Civic Association

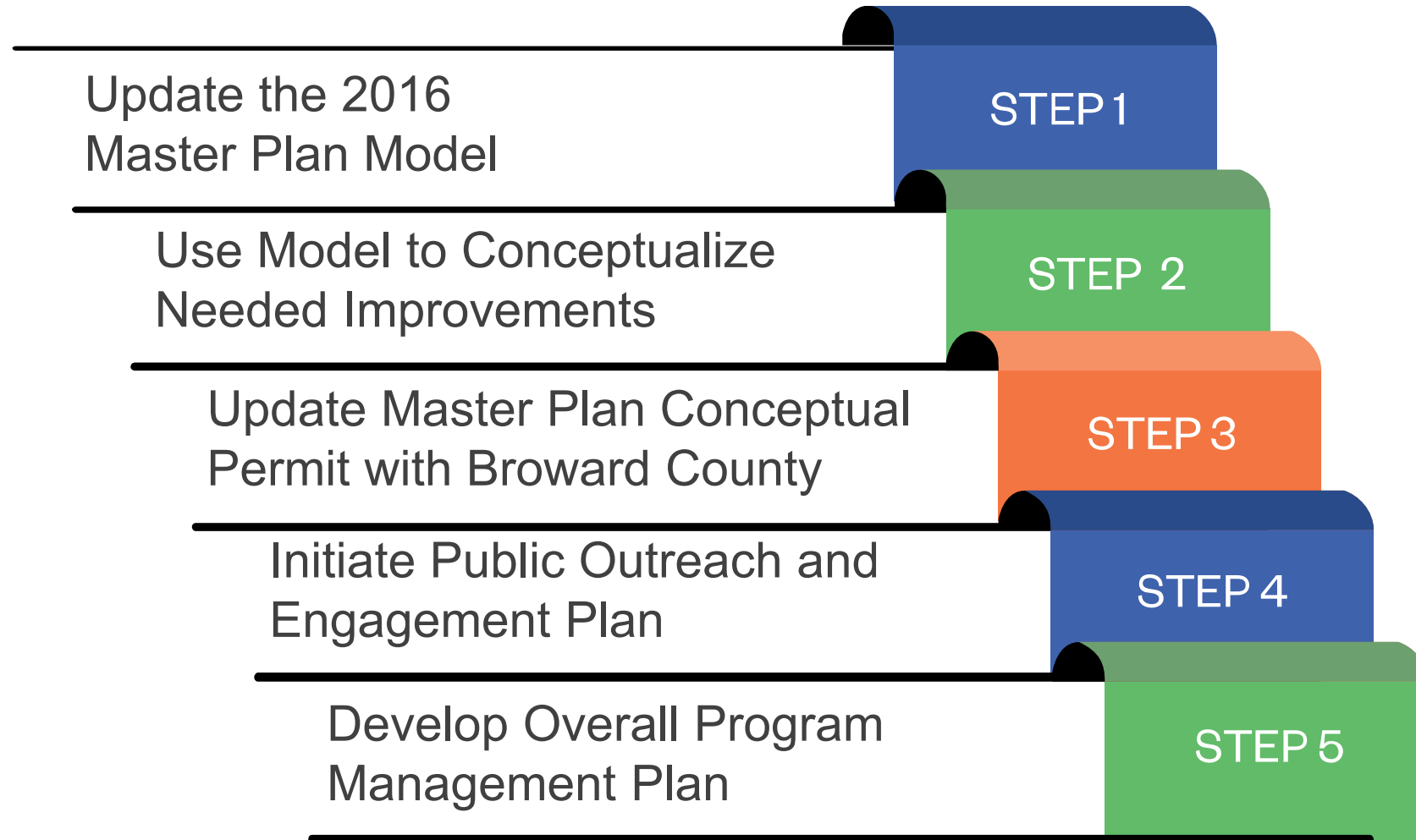


## Proposed Tranche 2 Projects



- Riverland Landings
- Sailboat Bend
- Tarpon River
- Flagler Village
- Harbor Isles/Inlet
- Poinsettia Heights
- South Middle River
- Melrose Park
- Shady Banks
- Croissant Park
- Middle River Terrace
- Imperial Point
- Lake Ridge
- Riverland Manors/Woods
- Chula Vista
- Riverland Village
- Lauderdale Isles

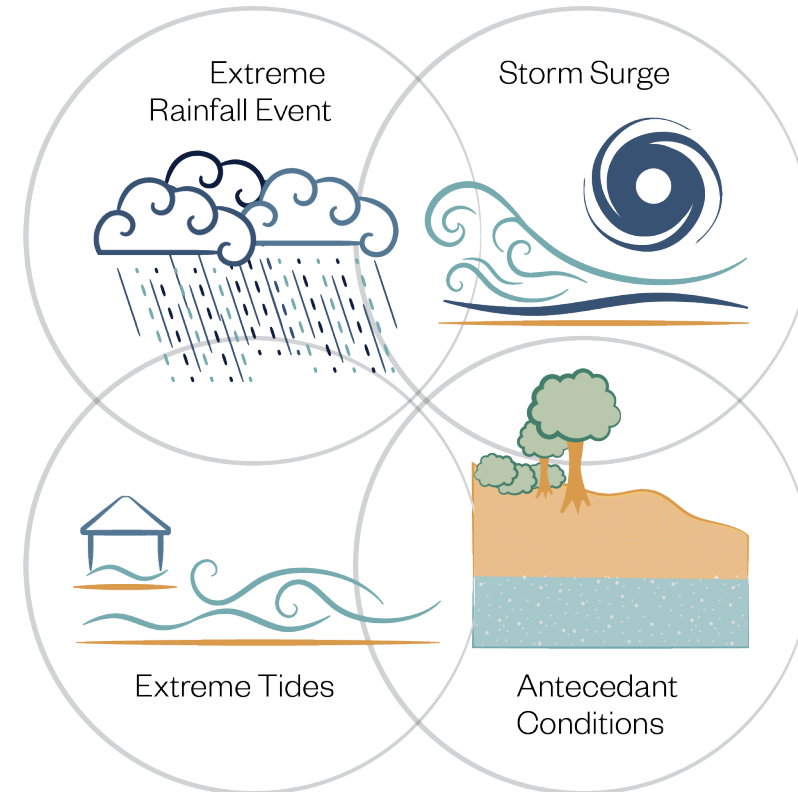
# Key steps to advance the Tranche 2 areas include:





# Capturing advancements in resilience planning is prudent to address future conditions.

- Model conditions and parameters consistent with FS 380.093 (Resilient Florida Grant Program)
- Incorporation of future “extreme rainfall change factors”
- Incorporation of future groundwater conditions
- Consideration of regional water management operations



**Re-evaluating to a higher standard**

# Florida Statute 380.093

F.S. 380.093 - Resilient Florida Grant Program; comprehensive statewide flood vulnerability and sea level rise data set and assessment; Statewide Flooding and Sea Level Rise Resilience Plan; regional resilience entities

Except from s. 380.093

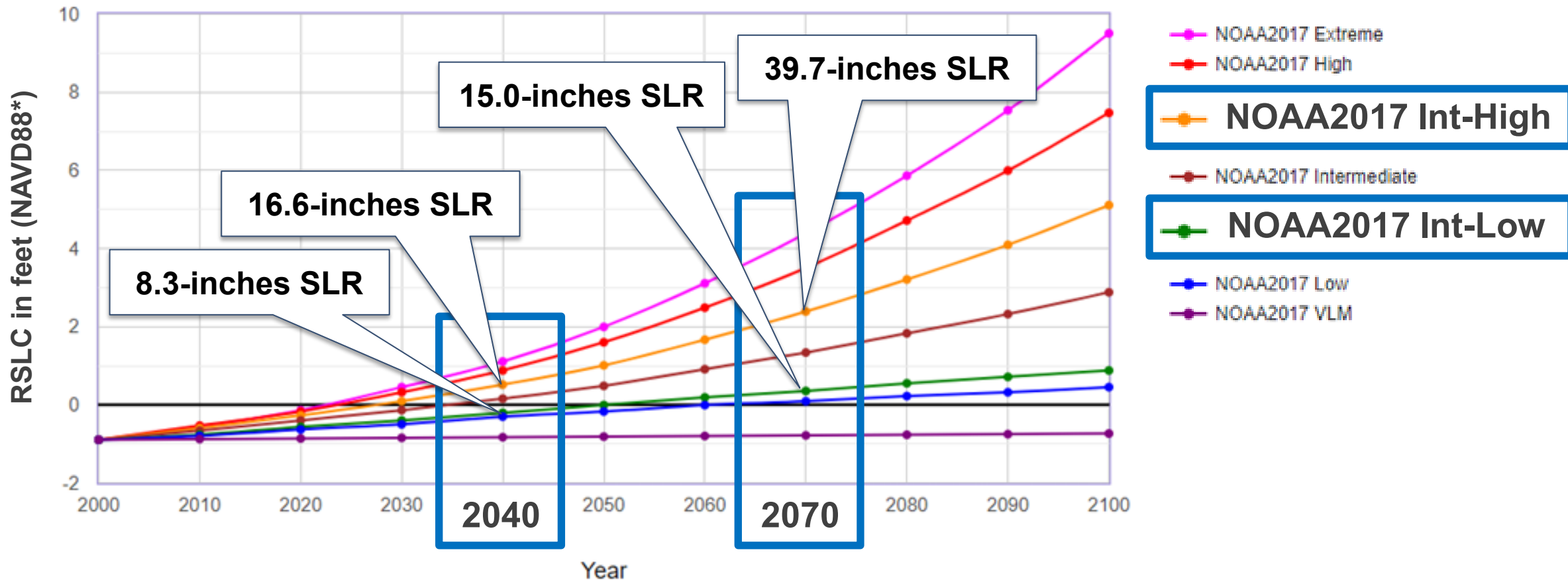
As defined in s. 380.093, F.S., the following scenarios and standards should be used for the exposure analysis:

- All analyses performed in North American Vertical Datum of 1988 (NAVD88).
- If applicable, at least two local sea-level rise scenarios, including the **2017 NOAA Intermediate-Low and Intermediate-High** sea-level rise projections.
- At least two planning horizons that include planning horizons for the years **2040 and 2070**.

**Help maximize opportunities for grant funding**



# Sea Level Rise and Planning Horizons compliant with s. 380.093



# It is important to capture the impact of more frequent intense rainfall events

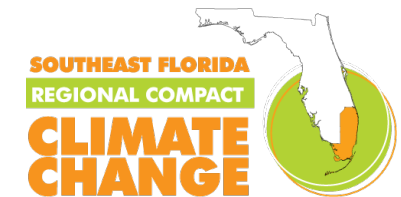
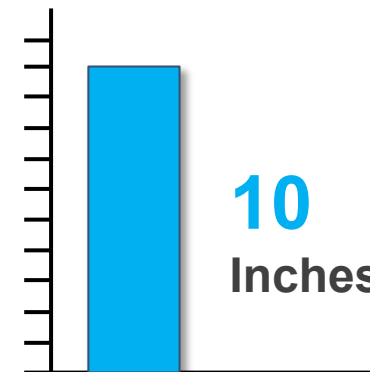
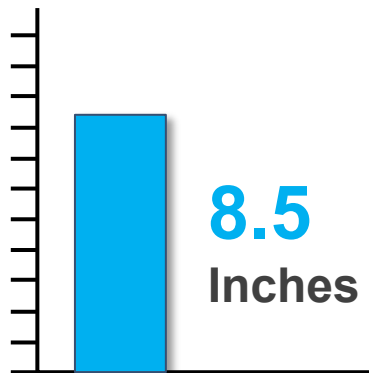
- The SFWMD, in collaboration with the USGS and FIU, developed a set of Rainfall Change Factors to account for the effect of Climate Change on Maximum Rainfall values.



**Current/Historic  
10-yr Rainfall**

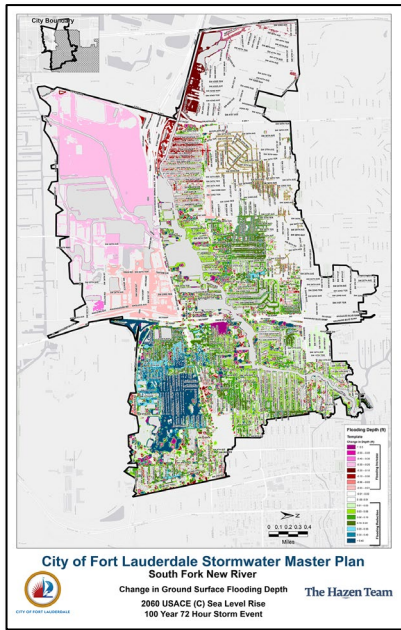
**Change  
Factor**

**Future  
10-yr Rainfall**

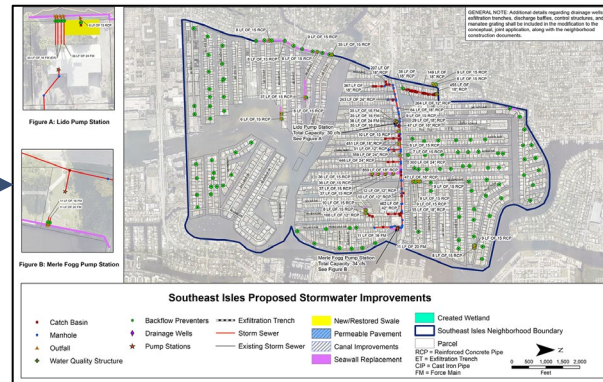


**We will consider these rainfall change factors in the updated model.**

# The updated Model will drive Conceptual Design and Permitting



## Conceptual Design



- Siting/Sizing
- Routing
- Constructability
- Land Needs

Updated Modeling  
and LOS Analysis

Conceptual Permit  
Modification

**BROWARD COUNTY FLORIDA**

Environmental Protection and Growth Management Department  
ENVIRONMENTAL ENGINEERING AND PERMITTING DIVISION  
Water and Environmental Licensing Section  
1 North University Drive, Mailbox 201, Plantation, Florida 33324  
Phone \* 954-519-1483 Fax \* 954-519-1412

December 04, 2018  
City of Fort Lauderdale  
Attention: Rares Petrica  
100 N Andrews Ave  
Fort Lauderdale, FL 33301

RE: Fort Lauderdale Stormwater Master Plan Conceptual  
City of Fort Lauderdale, S/T/R (01-50-42)

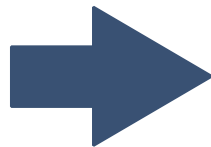
This is to notify you of the Environmental Protection and Growth Management Department's (EPGMD) action concerning your application received 04/16/2018. The application has been reviewed for compliance with the following requirements:

**ERP Review - GRANTED**

EPGMD has the authority to review the project for compliance with the provisions of Chapter 373, Part IV, Florida Statutes pursuant to an agreement between EPGMD, DEP and the SFWMD. The agreement is outlined in a document entitled "DELEGATION AGREEMENT AMONG THE FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION, THE SOUTH FLORIDA WATER MANAGEMENT DISTRICT, AND BROWARD COUNTY".

Based on the information submitted, Environmental Resource Permit No. 06-80003-P was issued on 12/04/2018.

Should you object to the conditions of the Environmental Resource Permit, please refer to the attached "Notice of Rights" which addresses the procedures to be followed if you desire a public hearing or other review of the proposed action. Please contact this office if you have any questions concerning this matter. If we do not hear from you in accordance with the attached "Notice of Rights", we will assume you concur with the action taken by EPGMD.



## Preliminary Funding Option Considerations

# We will also address City Stormwater policies and guidelines

- Appropriate Level of Service standards (rainfall depth based or statistical recurrence based)
- Facilitate implementation of infrastructure upgrades
- Development and redevelopment standards



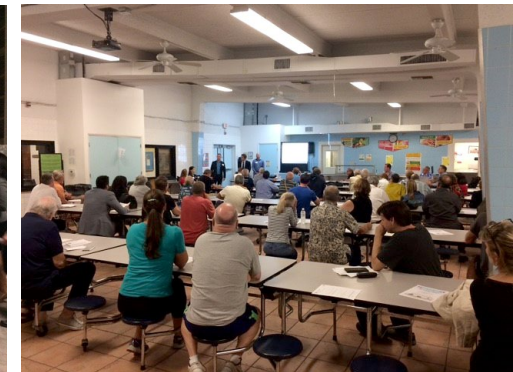
# Outreach and Stakeholder engagement will be critical

- Direct connection with Tranche 2 Neighbors (planning, design, construction)
- Broader Citywide engagement relative to private property resilience



Residents

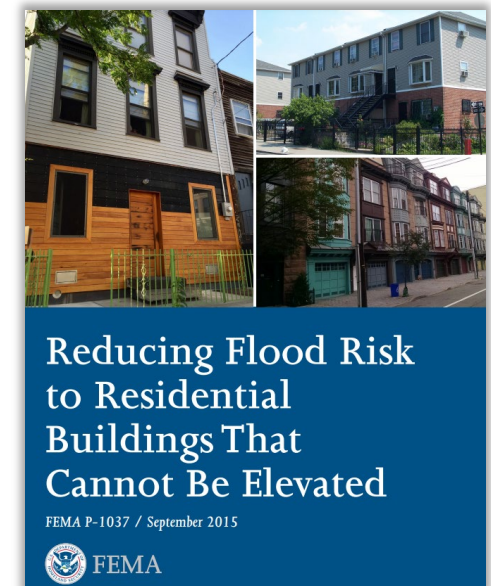
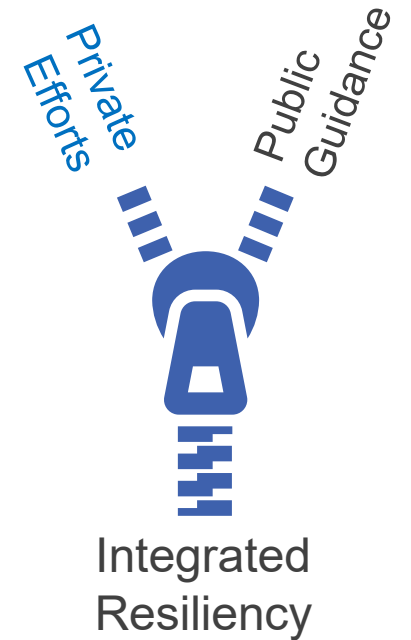
**“Best results achieved  
via collaboration”**



# Private Property Resilience – Research and Review

Developing guidance for private property resiliency efforts so private efforts and public infrastructure can integrate effectively

- Review of existing programs to aid private property resilience
  - Ex: FEMA guidance on flood protection
- Review best practices for cost-share and grant programs
- Develop a presentation highlighting key findings





# Private Property Resilience – Outreach and Guidance Development

- Three outreach meetings tailored to different stakeholder groups to facilitate private resilience and guidance needs
  - Home and business owners
  - Development community
  - City staff
- Guidance document for residential and commercial properties
  - Measures to cover flood protection and post-flood recovery
  - Guidance to cover typical considerations, example application, local design criteria



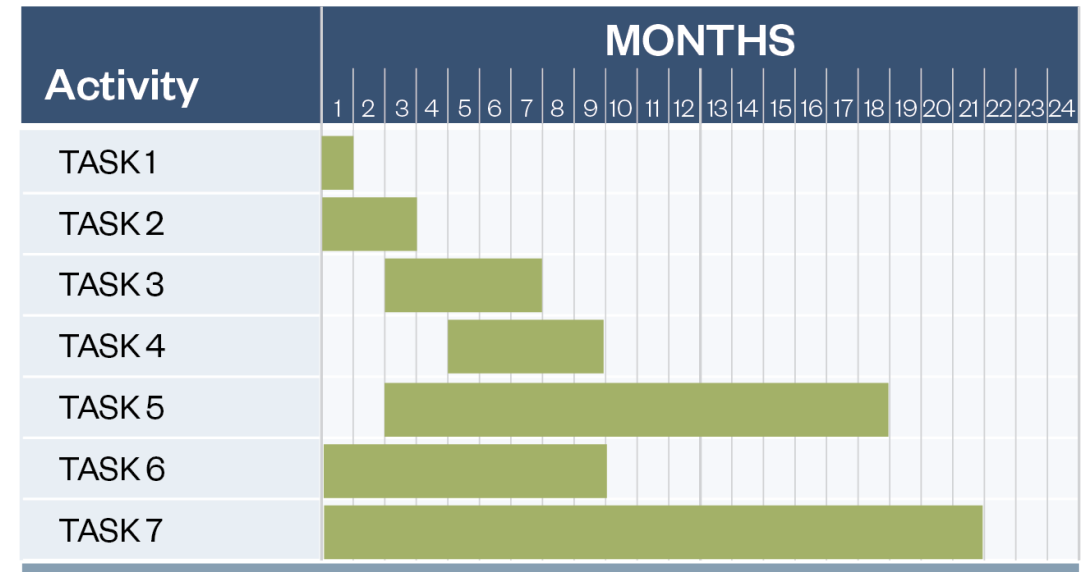
# Private Property Resilience – Cost-Share Opportunities and Resilience Resources

- Evaluate feasibility and develop a concept for a grant or cost-share program
- Focus on improvements that not only protect private property but also provide broader public benefit
- Provide direction toward “Resilience Resources” for neighbors

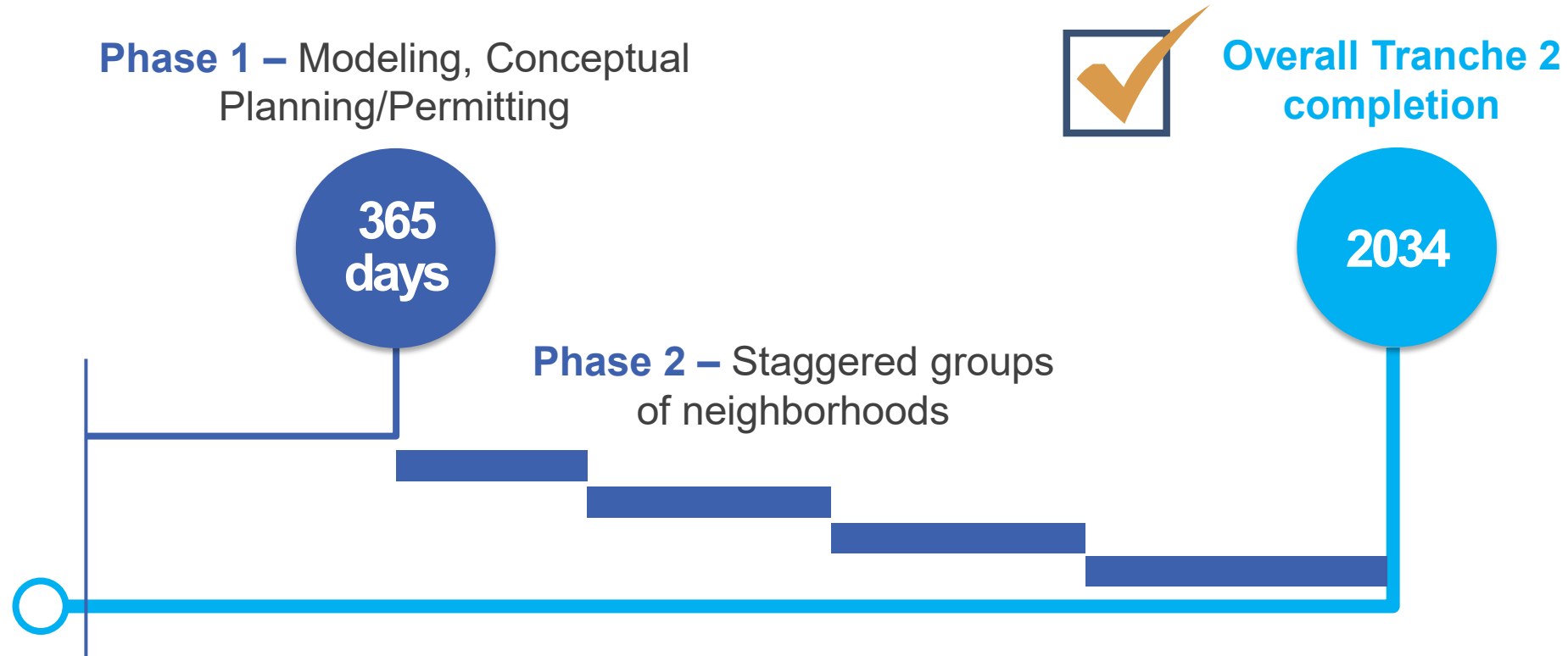


# Program Management provides oversight for Overall Plan Implementation

- Maintains design and construction consistency over multiple projects
  - Standard details/specification
  - Design guidelines/checklists
  - Cost estimating database
- Development and monitoring of Master Program Schedule and Phasing
- Routine updates on implementation progress



# Overall Program Cost/Timeline



City's preliminary estimate of cost ~ \$500M (to be updated in Phase 1)



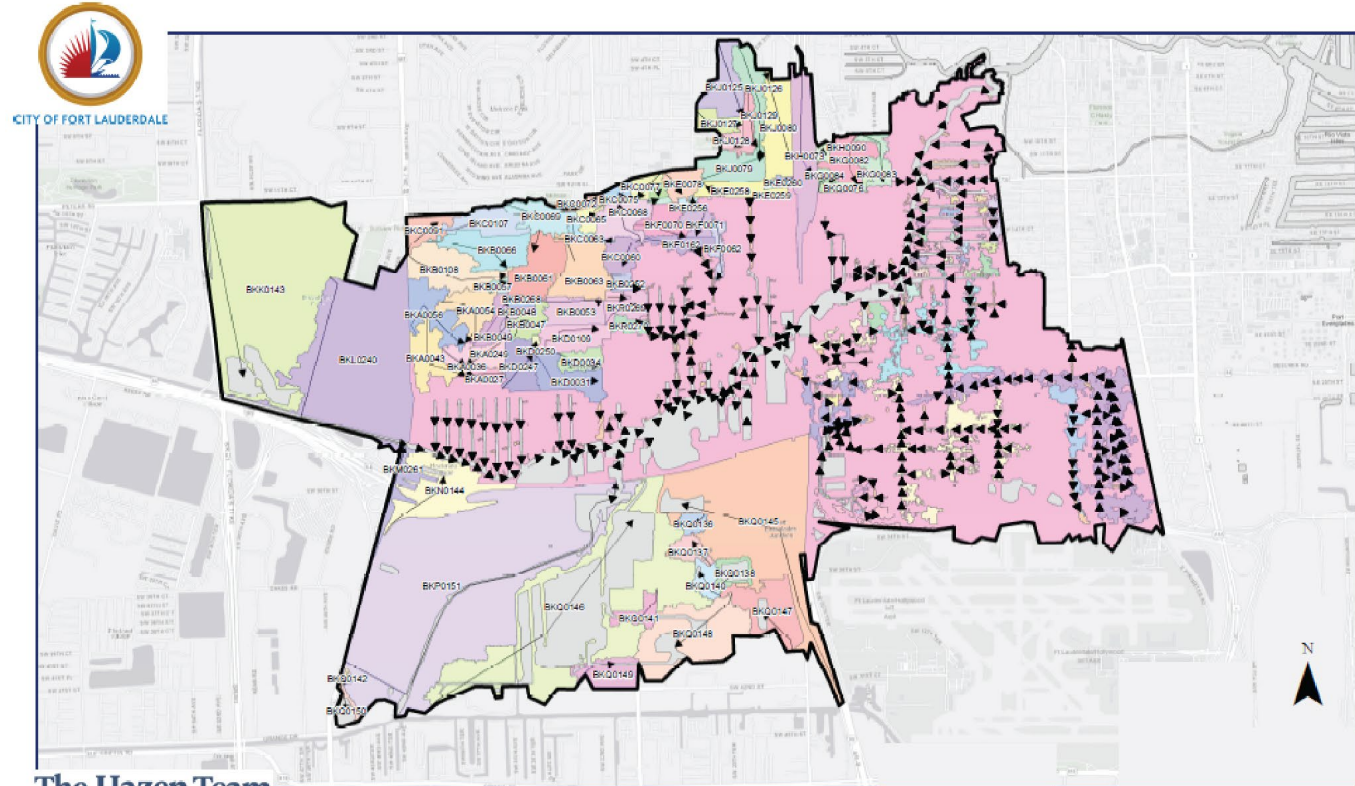
# Fortify Lauderdale

Building a Resilient Future  
in Fort Lauderdale

## Questions?

# Capturing advancements in resilience planning is prudent to address future conditions

- Re-evaluating to a higher standard
- Model conditions and parameters consistent with FS 380.093 (Resilient Florida Grant Program)
- Incorporation of future “extreme rainfall change factors”
- Incorporation of future groundwater conditions
- Consideration of regional water management operations



The Hazen Team

South Fork New River  
Post-Development Drainage