



CITY OF  
**ST AUGUSTINE**  
EST. 1565



# RESILIENCY & ADAPTATION AT THE CITY OF ST. AUGUSTINE

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UF WATER INSTITUTE SYMPOSIUM

FEBRUARY 26, 2020

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CHIEF RESILIENCE OFFICER, CITY OF ST. AUGUSTINE



# PROGRESSION OF PLANNING FOR RESILIENCY / ADAPTATION / SUSTAINABILITY

- ❖ **Stormwater Master Plan - 1992, Update – 2013**
- ❖ **Coastal Vulnerability Assessment – 2016**
- ❖ **Fla Community Resiliency Initiative Adaptation Plan – 2017**
- ❖ *Hurricane Matthew - 2016, Hurricane Irma – 2017, Hurricane Dorian - 2019*
- ❖ **Keeping History Above Water Conference (KHAW) – May, 2019**
- ❖ **Comprehensive Plan Update – December, 2019**



# STORMWATER MASTER PLAN - 1992 UPDATE – 2013

- ❖ Developed Watershed Models to Evaluate Options
- ❖ Defined Levels of Service
- ❖ Stormwater Utility Evaluation and Recommendations
- ❖ 3 Pilot Projects Featured
  - Lake Maria Sanchez
  - South Dixie Highway
  - Sidney Street

STORMWATER MASTER PLAN UPDATE  
PHASE 1

FINAL REPORT

## STORMWATER UTILITY FEE UPDATE

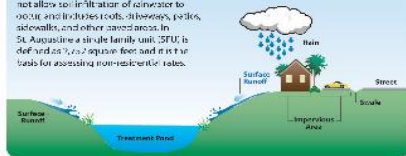
### NEW STORMWATER RATES ON UTILITY BILLS

Stormwater rates will be changing starting on your April 2014 utility bill. Some rates will be lower, some higher, depending on the size of your home or developed property. Residential customers will pay a flat rate, while non-residential properties are computed based on developed, impervious area.

Small home (3,000 sq-ft) with 1,000 sq-ft of impervious area	\$34.46/month
Four-plex home (10,000 sq-ft) with 4,000 sq-ft of impervious area	\$71.46/month
Large home (20,000 sq-ft) with 8,000 sq-ft of impervious area	\$143.26/month
Multi-family unit (condo, townhome, duplex, etc.)	\$24.46/month
Mobile home	\$15.46/month
Non-residential customers	\$7.46/100 sq-ft of impervious area

Why does the city need a stormwater fee? The fee goes to cover the cost of maintaining and improving the City's stormwater collection and treatment system.

What is an impervious area? An impervious area is any surface that does not allow for infiltration of water to occur and includes roofs, driveways, patios, sidewalks, and other paved areas. In St. Augustine a single family unit (SFU) is defined as 7,500 square feet and is the basis for assessing non-residential rates.



### NON-RESIDENTIAL RATE EXAMPLE

$$\frac{9,000 \text{ sq-ft} + 10,000 \text{ sq-ft}}{2,752 \text{ sq-ft}} = 6.90 \text{ SFUs}$$

$$6.90 \text{ SFUs} \times \$7.00/\text{month} = \$48.32/\text{month}$$

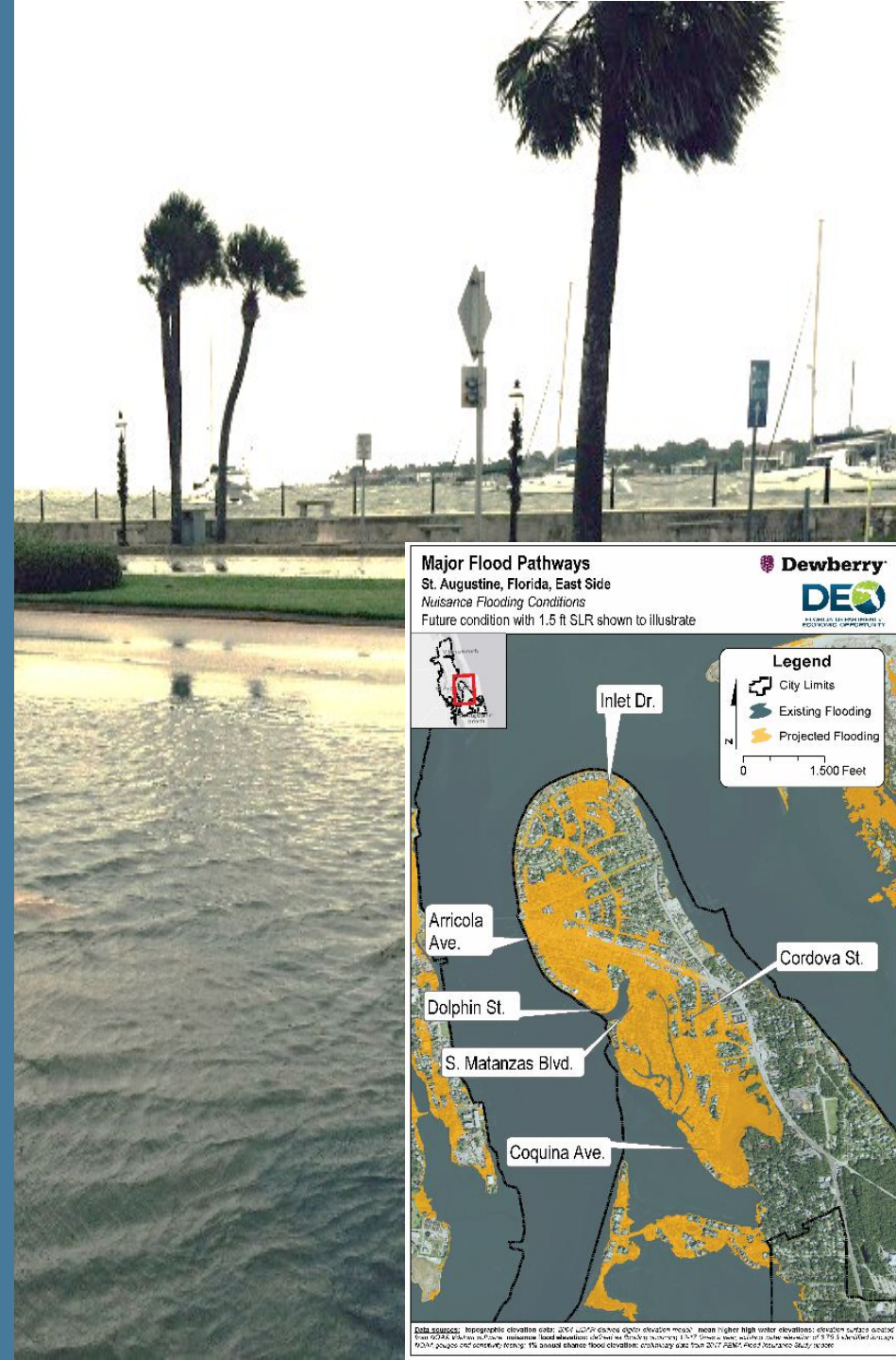
**MARCH 2014**

**Our Mission**  
The Department of Public Works is responsible for operating and maintaining our stormwater infrastructure to meet the criteria of the permit administered by the Florida Department of Environmental Protection. Your fees pay for repairs of roadway drainage, sewer projects, equipment, and administration of the program.

For more information on stormwater and other water resource services, please visit [www.StAugSW.com](http://www.StAugSW.com) or contact us at 904-825-1049.

# COASTAL VULNERABILITY ASSESSMENT – JUNE, 2016

- ❖ Dept of Economic Opportunity (DEO) funded by NOAA
- ❖ Evaluated flooded areas, roads, bridges, buildings, (2,550 historic and archeological resources), water and wastewater plants, water supply
- ❖ 3 Scenarios
  - Mean Higher High Water – daily inundation about 2' NAVD88
  - Nuisance Flooding – 12-17 times per year, 3.75' NAVD88
  - 1% annual chance flood event – 26% chance in 30 years, 6-10' NAVD88





# ***HURRICANE MATTHEW – OCTOBER 7, 2016***

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# FLORIDA COMMUNITY RESILIENCY INITIATIVE - ADAPTATION PLAN

MAY, 2017

## ACHIEVED PROGRESS...

- ❖ Educate the Public about SLR and Policy Responses
- ❖ Develop Baseline Budgets – Stormwater, Utility and Paving CIP's
- ❖ Work with FEMA, Learn from Matthew (7' elevation), and Irma.
- ❖ Targeted Upgrades to City's Stormwater System –
  - 31 Tide Flex Valves Installed
  - Include Stormwater Improvements in Utility Upgrade Projects
- ❖ Wastewater Treatment Plant Options for Resiliency
- ❖ Lift Station Resiliency Designs
- ❖ Historic Preservation Comp Plan for Hazard Mitigation

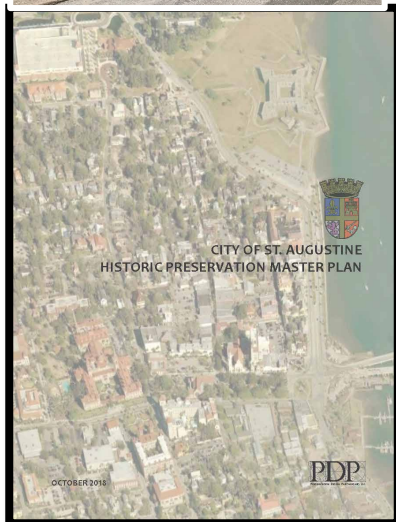


# HURRICANE IRMA – SEPTEMBER 10, 2017

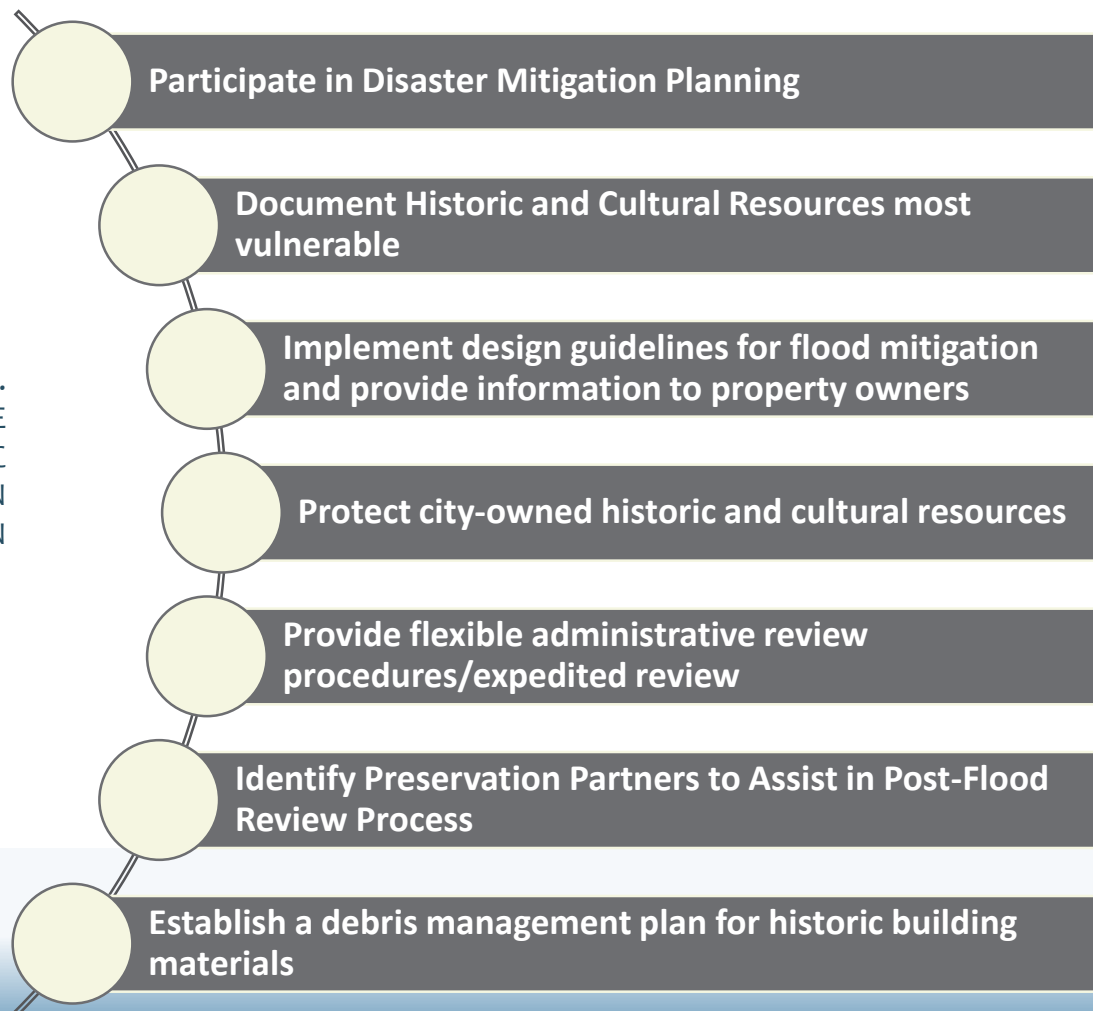




# HISTORIC PRESERVATION MASTER PLAN: Hazard Mitigation Chapter



CITY OF ST.  
AUGUSTINE  
HISTORIC  
PRESERVATION  
MASTER PLAN

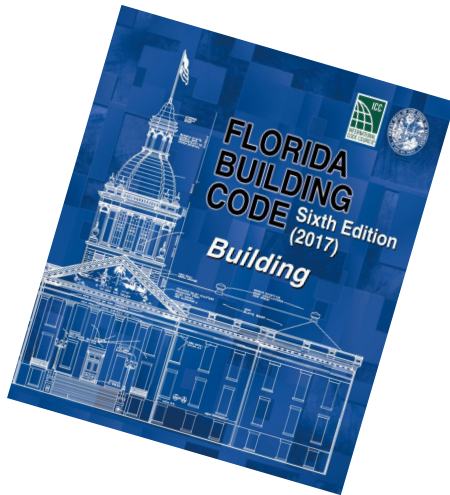


Adopted October 2018





# Building Division Guidance & Assistance



- Implemented the updated Florida Building Codes that meet or exceed FEMA's requirements for flood-resistant construction.
- Implemented the new Flood Insurance Rate Maps that have updated engineering data.
- Adopted higher regulatory standards to the floodplain management ordinance:
  - Requires finished floor elevation for all structures have at least one foot above the base flood elevation.
  - Stricter requirements for construction documents, ensures structures are designed to resist flood loads and comply with requirements of flood-resistant construction.
  - Structures built outside special flood hazard area must have the lowest habitable floor at least one foot above the road crown.
- Provide site visits, with the City Stormwater Engineer, to provide advice and guidance to mitigate flood damage to structures and improve property drainage.



# KEEPING HISTORY ABOVE WATER CONFERENCE

MAY 5 - 8, 2019  
in St. Augustine

- **Fourth KHAW Conference**

Flagler College  
University of Florida  
City of St. Augustine  
Newport Restoration Foundation  
Casa Monica Hotel

- **Conference Chairs**

Dr. Leslee Keys  
Morris (Marty) Hylton III

- **Historic Preservation, Sustainability**
- **Business, Culture, Tourism, Economics**
- **Urban Planning, Environment**
- **Design, Engineering and Public Policy**

[historyabovewater.org](http://historyabovewater.org)

# KEEPING HISTORY

# ABOVE WATER

MAY 5-8, 2019 | ST. AUGUSTINE, FLORIDA

75TH ANNIVERSARY SEASON – NORTH ATLANTIC HURRICANE OF 1944

An International, Multi-disciplinary Conference  
Providing Strategies and Techniques to Save  
Cultural and Natural Resources  
Impacted by Sea Level Rise

KEEPING HISTORY ABOVE WATER™ IS NEWPORT RESTORATION FOUNDATION'S CLIMATE CHANGE INITIATIVE



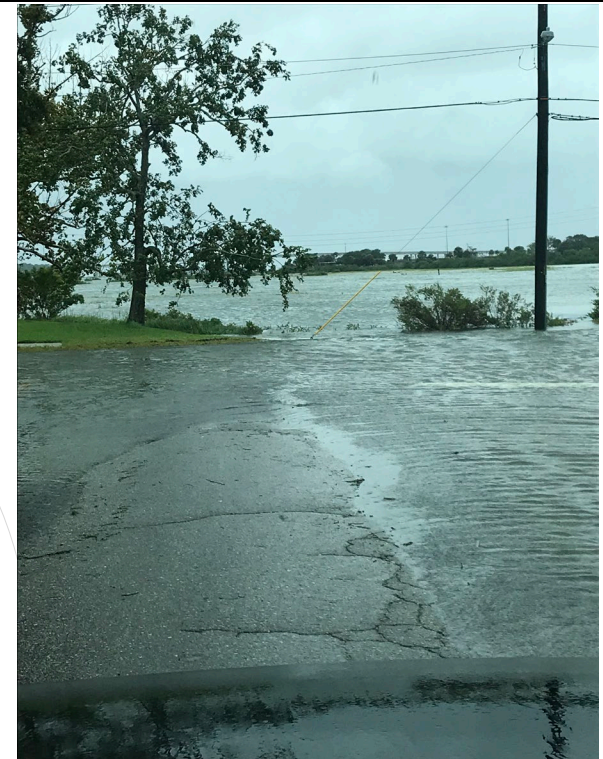
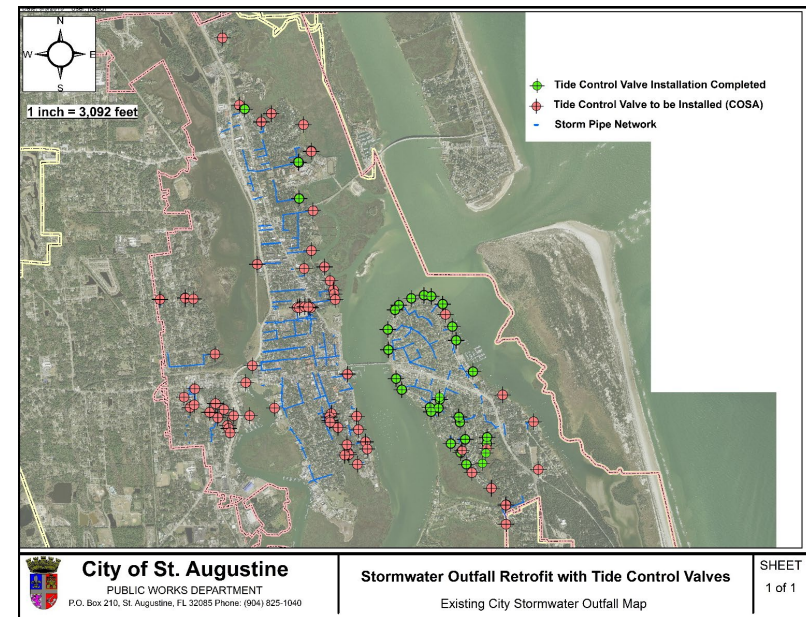
# 2019 COMPREHENSIVE PLAN PERILS OF FLOOD

## ❖ Selected Nuisance Flood + 1.5 ft SLR in Vulnerability Report

- High Estimate for 2040 Comp Plan Horizon
- Could be as late as 2100 for Low Estimate
- Tide Check Valves are Major Plan Component

## ❖ Selected 1% Storm in Vulnerability Report

- ❖ Estimated 6.9' will imperil most of the City, no SLR
- ❖ Step One, Protect Oldest Portion of the Oldest City
  - ❖ South – Lake Maria Sanchez Project, South Street Sheet Pile 7.0' - Under Design
  - ❖ East - Restored Seawall – 7.0' Elevation Now
  - ❖ West - MLK Boulevard – Natural 7.0' Elevation Now
  - ❖ North – Raise Road Speed Tables from 5.8' to 7.0'





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## Progress in 2019

- ❖ **Acquired First Property to deal with Nuisance flooding and Neighborhood Park (Coquina Park)**
- ❖ **Created Chief Resilience Officer**
- ❖ **All City Commissioners Support Resilience**
  - ❖ **American Flood Coalition, Mayor's Summit**
  - ❖ **Co-Chair Resiliency Florida**
  - ❖ **League of Cities**
  - ❖ **Management Advisory Group, Tolomato, Guana, Matanzas, National Estuarine Research Reserve**
  - ❖ **Building Code Revisions**
- ❖ **31 tide check valves, 10 more in 2020**
- ❖ **Acquired Fish Island Conservation Area**



# Major Projects in Detailed or Final Design

## Design Milestones Achieved

- ❖ **Lake Maria Sanchez Stormwater Project**
  - Detailed Design phase
- ❖ **South Whitney Street Box Culvert and West King Street Flood Mitigation**
  - Progressed to Final Design last quarter
  - Combined City and County Road Improvements
- ❖ **Hurricane Matthew FEMA Lift Station Rehab (13 stations) CMAR Project**
  - Final Design phase

# Lake Maria Sanchez Flood Mitigation – Coastal Flood Level of Protection





# Individual Projects and Typical Maintenance

- ❖ **Coquina Creek Upstream >> Maintenance**
- ❖ Storm inlet maintenance
- ❖ One-way tidal valve installation
- ❖ Coquina Park culvert headwall replacement
- ❖ **Coquina Park Nuisance >> Flooding Problem and Future Neighborhood Park**





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# Individual Project Progress

## ❖ Coquina Park construction >>

- First phase of nuisance flooding construction complete

## ❖ Obtained construction easements for improvements to adjacent nuisance flooding - Coquina Ave.

## ❖ Ferdinand Avenue maintenance:

- Storm inlet and pipe cleaning complete

## ❖ City installed tide check valve >>

in FDOT outfall near Arredondo & Arricola Avenues



*Coquina Park grading work*



*City installation of one-way tidal valve in FDOT outfall*



*Nuisance flooding prior to one-way tidal valve installation*



*Dry roadway after one-way tidal valve installation*





# Fish Island Conservation Area Acquisition

## Many Partners Participated

- ❖ Senator Bradley and Rep. Cummings, North Florida Land Trust, Governor and Cabinet - Florida Forever, Matanzas River Keeper, Friends of Fish Island , City of St. Augustine – O & M commit
- ❖ **Conserving 59 Upland Acres from Residential Development**
- ❖ **1750's era Jesse Fish Plantation Archaeologic Site**





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## SUMMARY AND CONCLUSIONS

- ❖ **The City of St. Augustine Has Been Planning for Resiliency and Adaptation > 25 years**
- ❖ **Capital Improvement Plan Committed to Annually....**
  - Reduce Nuisance Flooding & Improve Stormwater Treatment
  - Protect Utilities (Pump stations, WWTP) & Maintain and Protect Roadways
  - Address Social Equality, Community Redevelopment Areas (CRA)
- ❖ **Historic Preservation Plan and Building Codes**
- ❖ **Moving Forward . . .**
  - ❖ **Comprehensive Plan – Perils of Flood, Under State Review**
  - ❖ **USACE – Back Bay Feasibility Study – (3 x 3) Authorized, Lobbying Congress for 50/50 Cost Share Funding**



*City Commission Presentation, February 24, 2019*  
*91/93 Coquina Ave. Property Acquisition*



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