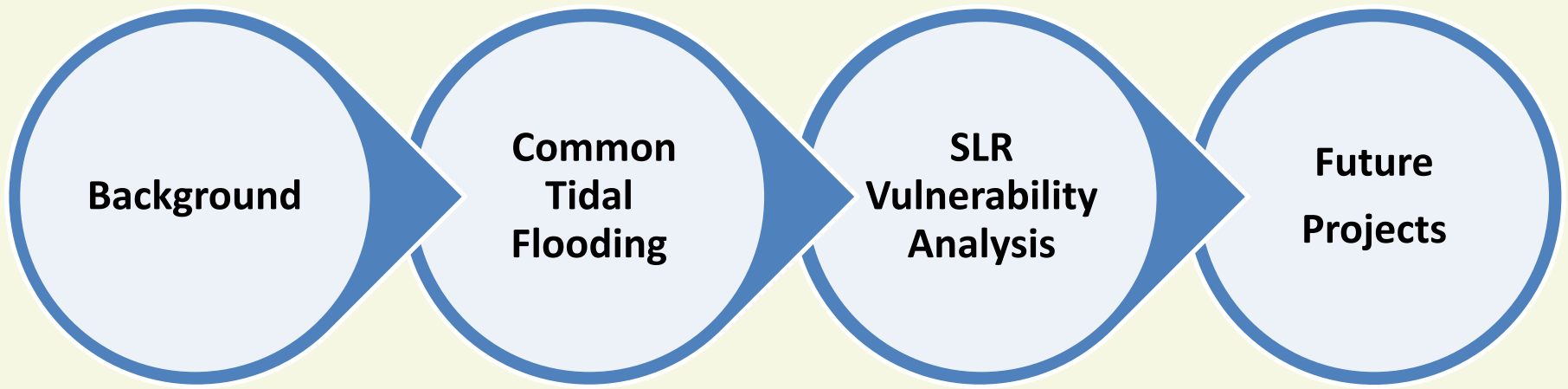


Sea-Level Rise Challenges, Planning & Responses



Sea-Level Rise: Assessing and Addressing Flooding and Liability for Local Governments – Sept. 23, 2016

Outline



Common Tidal Flooding in St. Augustine



Photos taken in October 2014 during a Nor'easter



Common Tidal Flooding in St. Augustine



Photos taken in October 2014 during a Nor'easter



Common Tidal Flooding in St. Augustine



Photos taken in October 2014 during a Nor'easter



Common Tidal Flooding in St. Augustine



Photos taken in October 2014 during a Nor'easter



Common Tidal Flooding in St. Augustine



Photos taken in October 2014 during a Nor'easter



FDEO Coastal Vulnerability Assessment

Used three flood hazard types for assessment (NAVD88):

- Mean Higher High Water (MHHW) @ 2-ft
- Nuisance Flooding @ 3.75-ft
- 1% Flood @ 6-10-ft

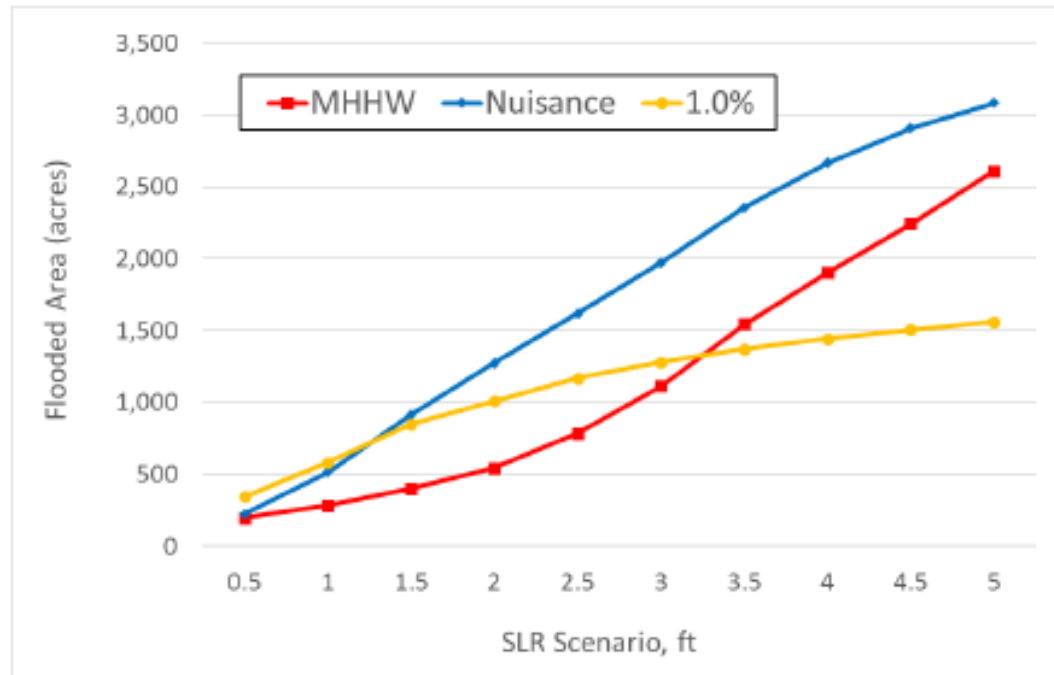


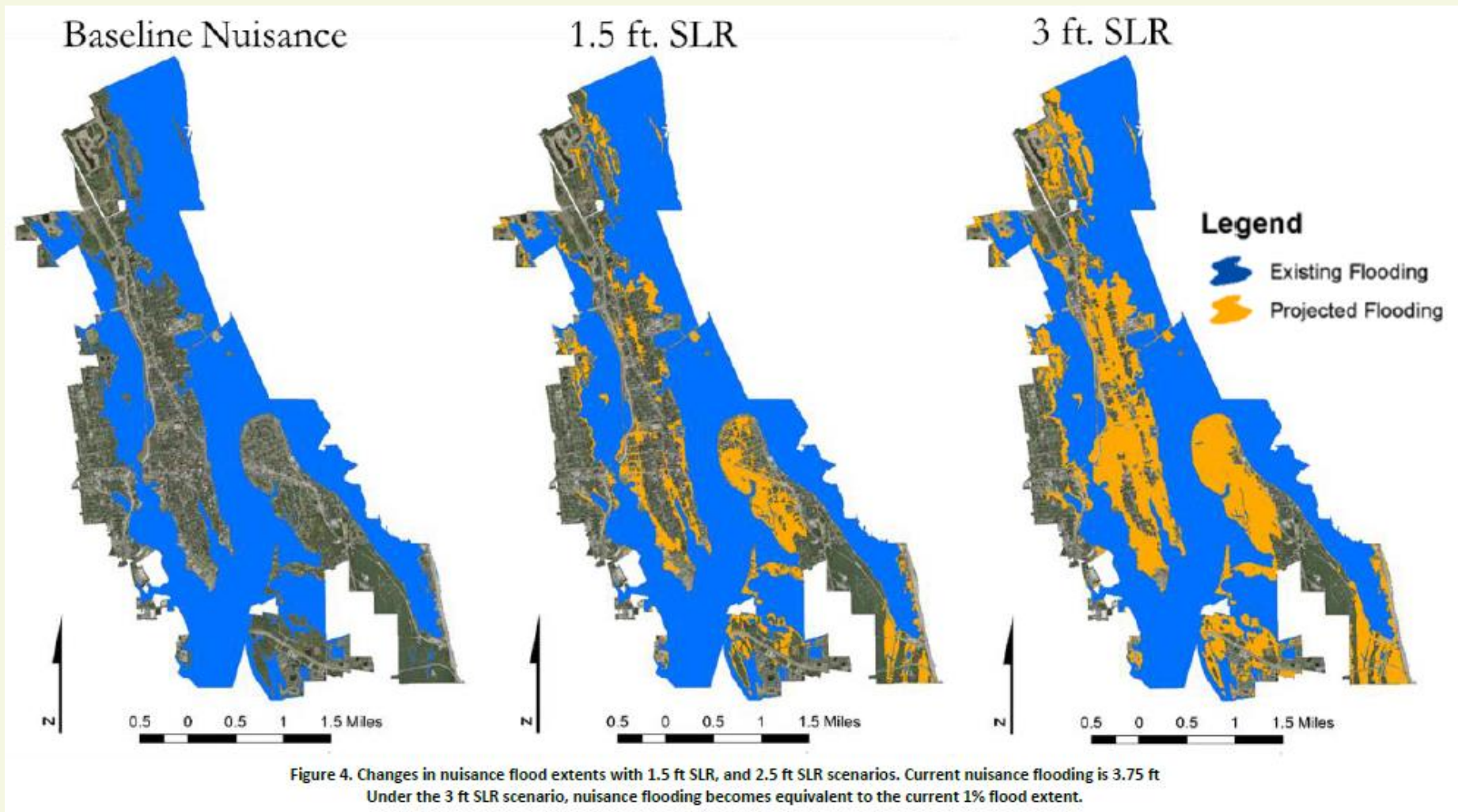
Figure 2. Changes in flooded area by flood type. Note rapid growth of nuisance flood areas, which is shared by MHHW after 2 ft of SLR. The 1% annual chance floodplain experiences slow growth after 1.5 ft of SLR.



How much more flooding is expected? Tipping points?



FDEO Coastal Vulnerability Assessment



What are the major pathways for future flooding?



FDEO Coastal Vulnerability Assessment



Legend




-  Nuisance flooding, baseline (3.75 ft)
-  Nuisance flooding, +1.5 ft SLR
-  Nuisance flooding, +3 ft SLR

Figure 16. Map depicting flood extents within St. Augustine Historic Districts.

What are the major pathways for future flooding?



FDEO Coastal Vulnerability Assessment

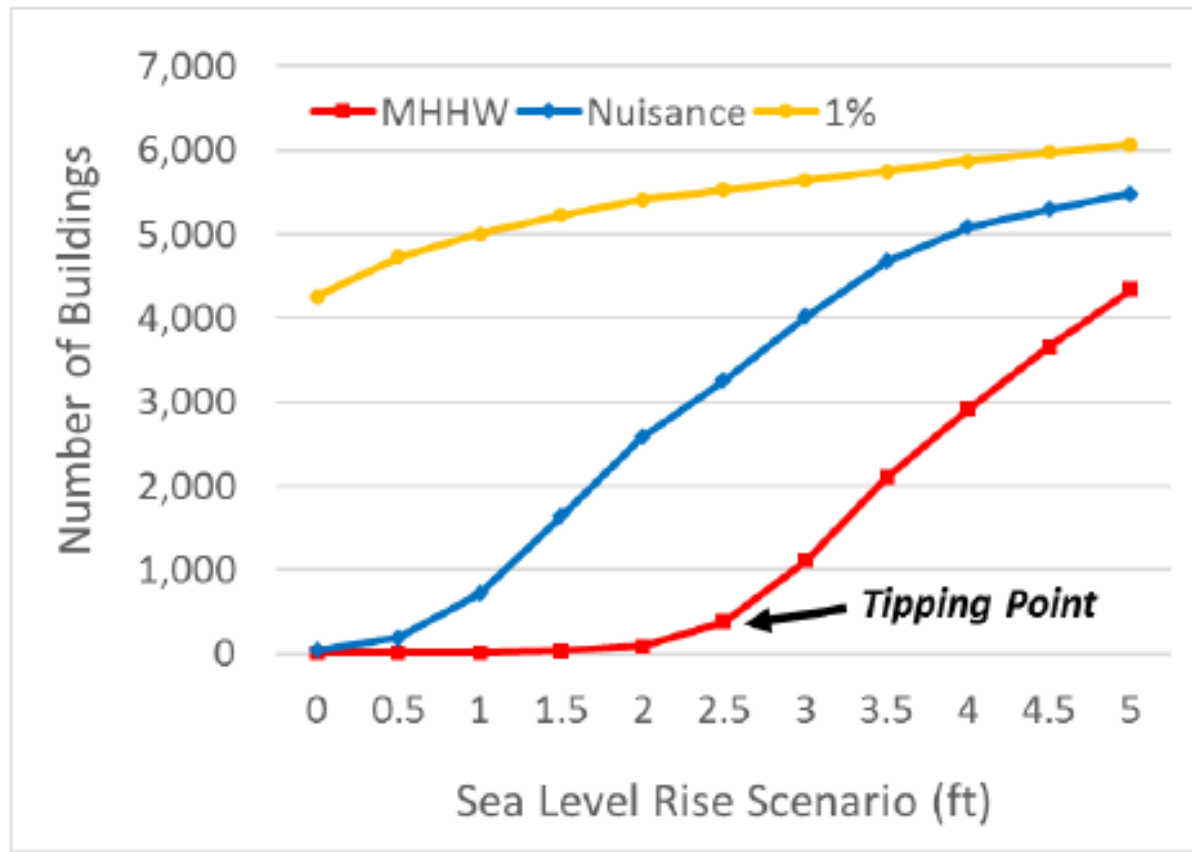


Figure 14. Number of buildings (commercial, residential and municipal) affected by MHHW, nuisance, and the 1% flood level in each SLR scenario.

How will building vulnerability to flooding change?



FDEO Coastal Vulnerability Assessment

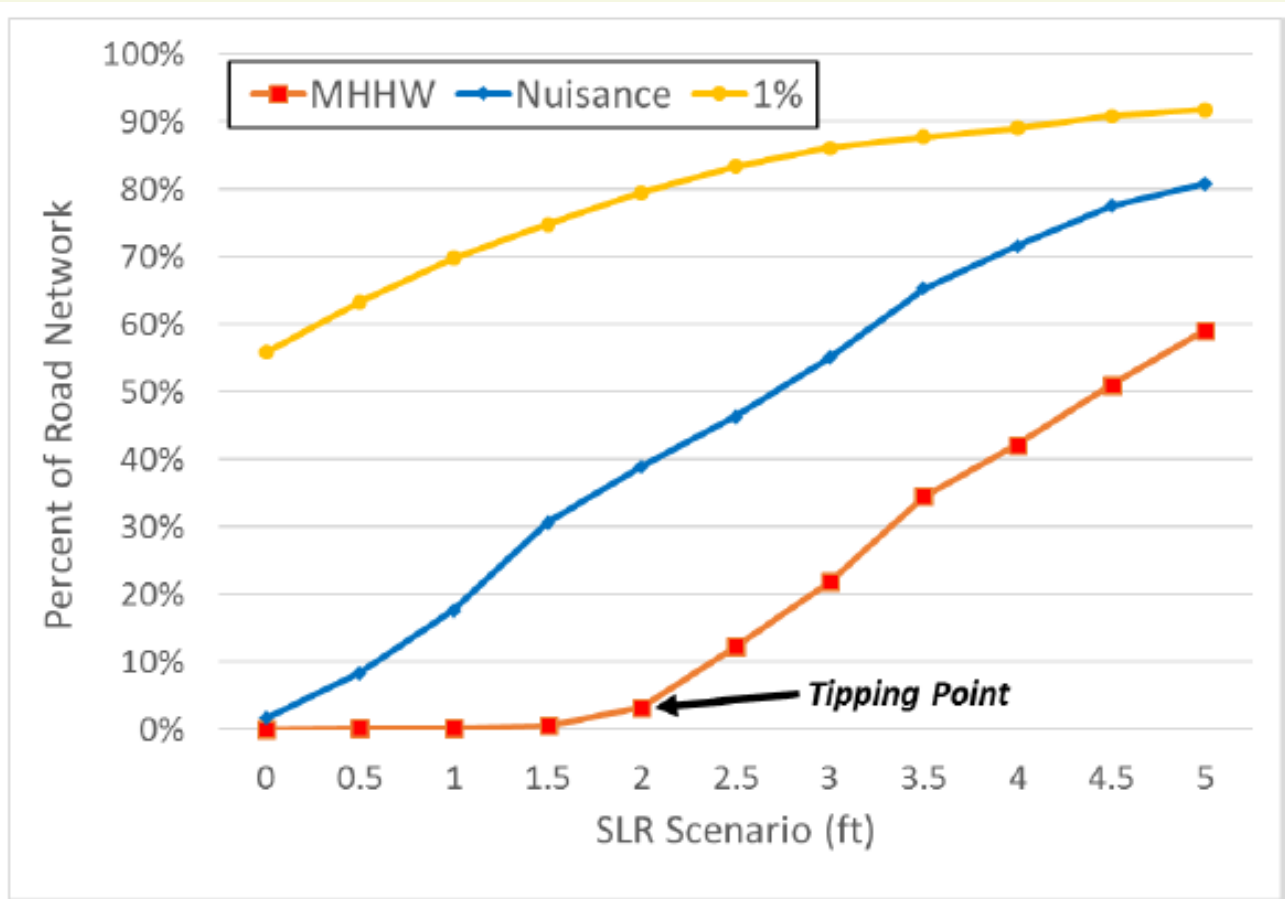


Figure 9. Percent of road network affected by MHHW, nuisance, and the 1% flood level for each SLR increment.

How will road vulnerability to flooding change?



FDEO Coastal Vulnerability Assessment

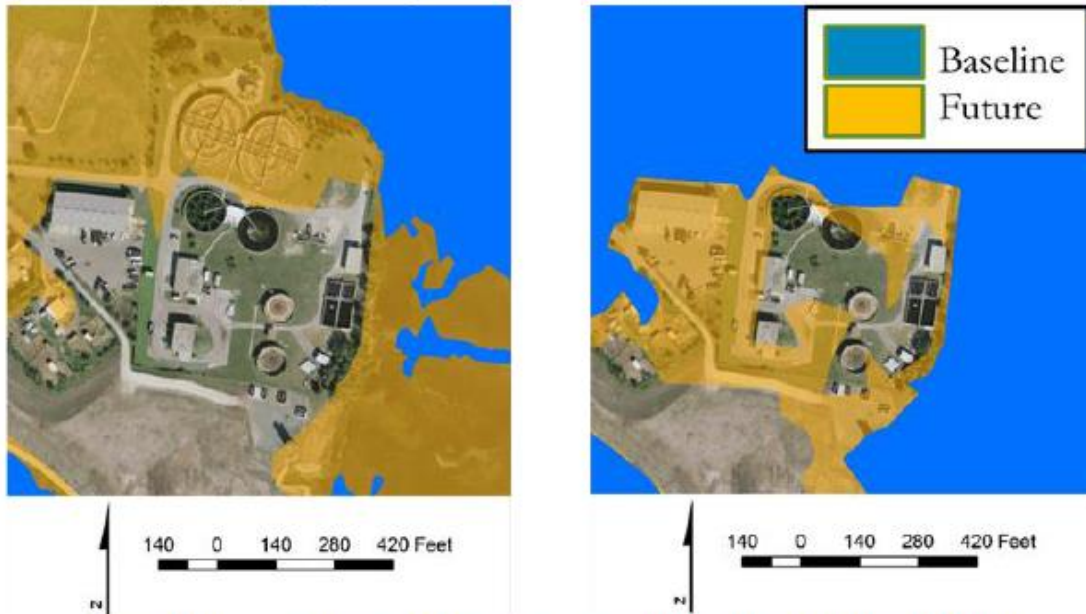


Figure 18. Wasterwater treatment plant structure exposure tipping points to MHHW + 5 ft SLR (left) and to the 1% Event + 1.0 ft SLR (right).

Table 11. Vulnerability of St. Augustine Wastewater Treatment Plant to each flood type and SLR scenario.

		MHHW	Nuisance	1%	
SLR Flood Elevation in Feet	0	None	None	Some	
	0.5			Major	
	1.0				
	1.5		Some	Total	
	2.0				
	2.5				
	3.0	Some	Some		
	3.5				
	4.0		Major		
	4.5				
5.0		Total			

	No flood impact
	Impact to some structures (<=3)
	Impact to the majority of structures
	Total encroachment

How will sea level rise impact water and wastewater facilities?



FDEO Coastal Vulnerability Assessment

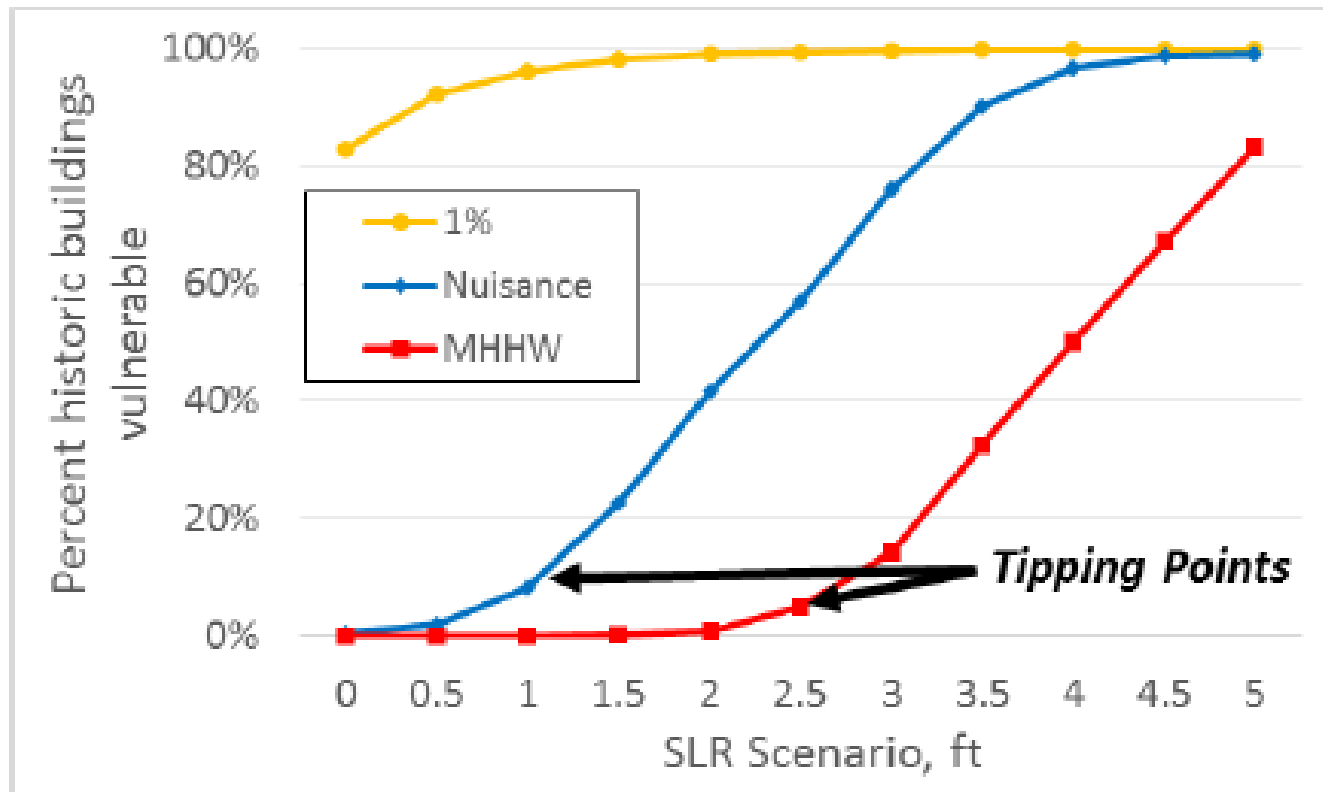


Figure 15. Percentage of buildings within Historic Districts affected by MHHW, nuisance, and the 1% flood level in each SLR scenario.

How will Historic District vulnerability to flooding change?



St. Augustine Town Plan Historic District *at Risk*

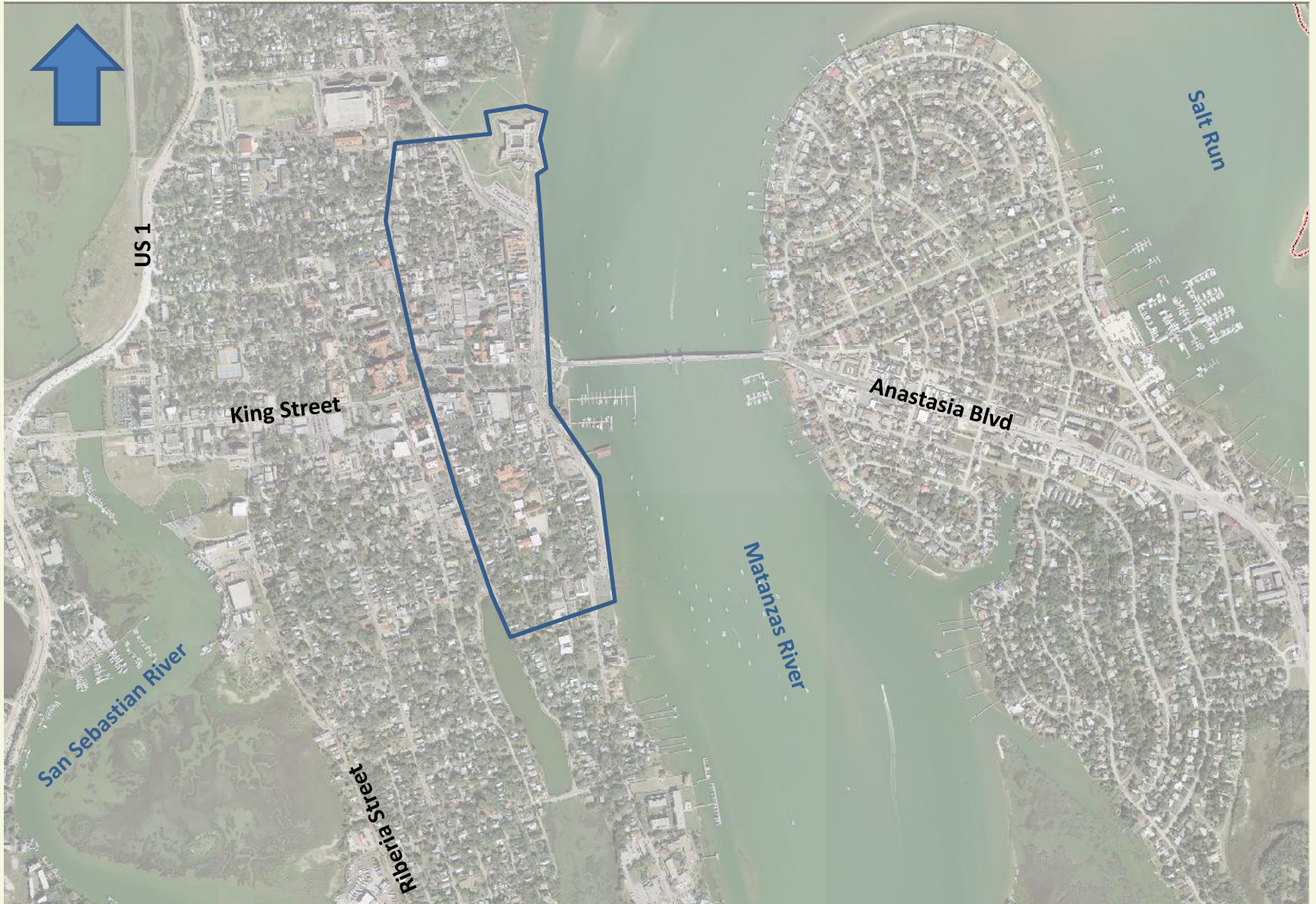


Located within the St. Augustine Town Plan Historic District, a National Historic Landmark generally bounded on the north by Castillo de San Marcos, on the south by St. Francis Barracks, on the west by Cordova Street and on the east by the Matanzas River.

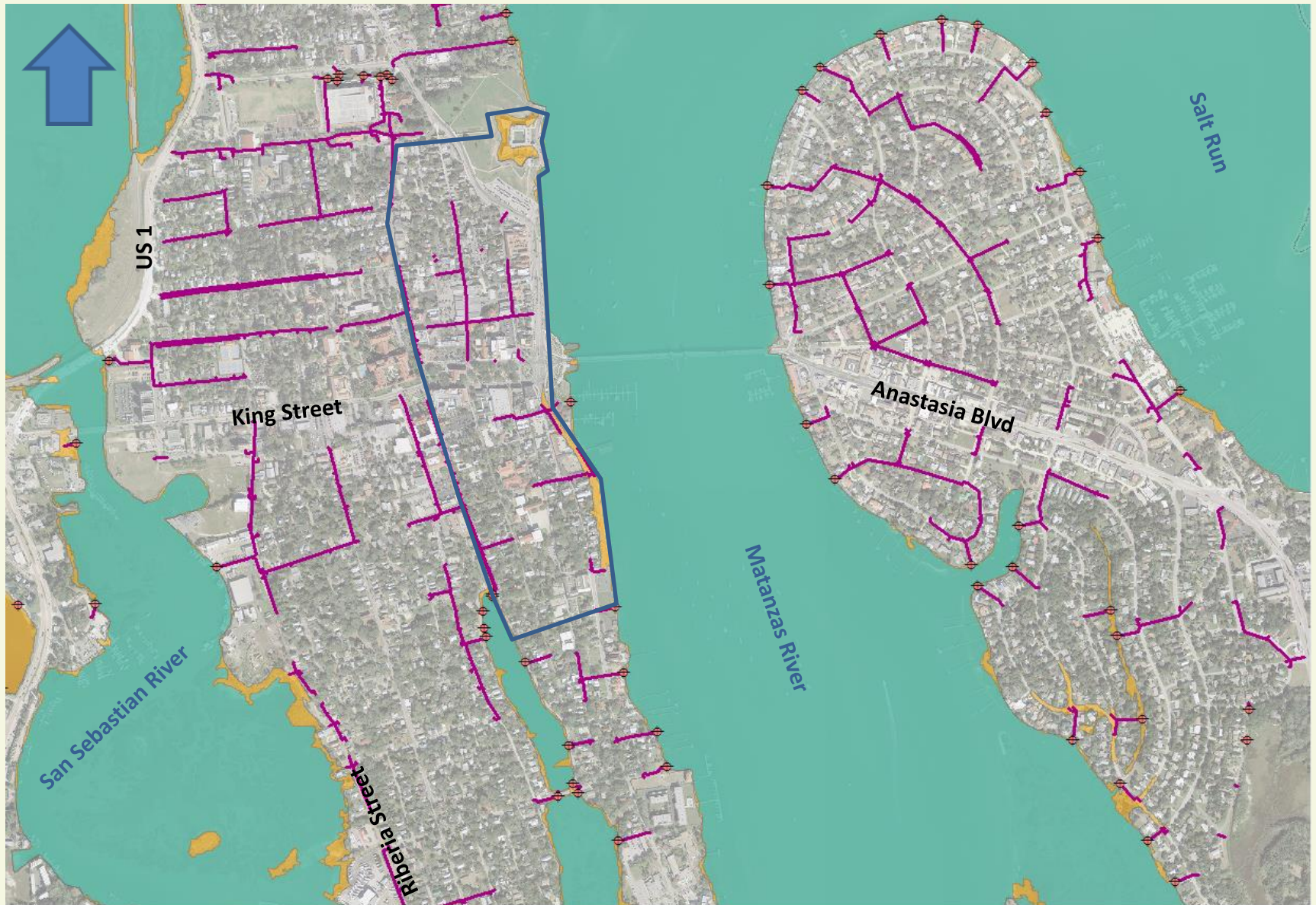
31 buildings contribute to the National Historic Registry



St. Augustine



St. Augustine



0-ft SLR: NUISANCE

MHHW



St. Augustine

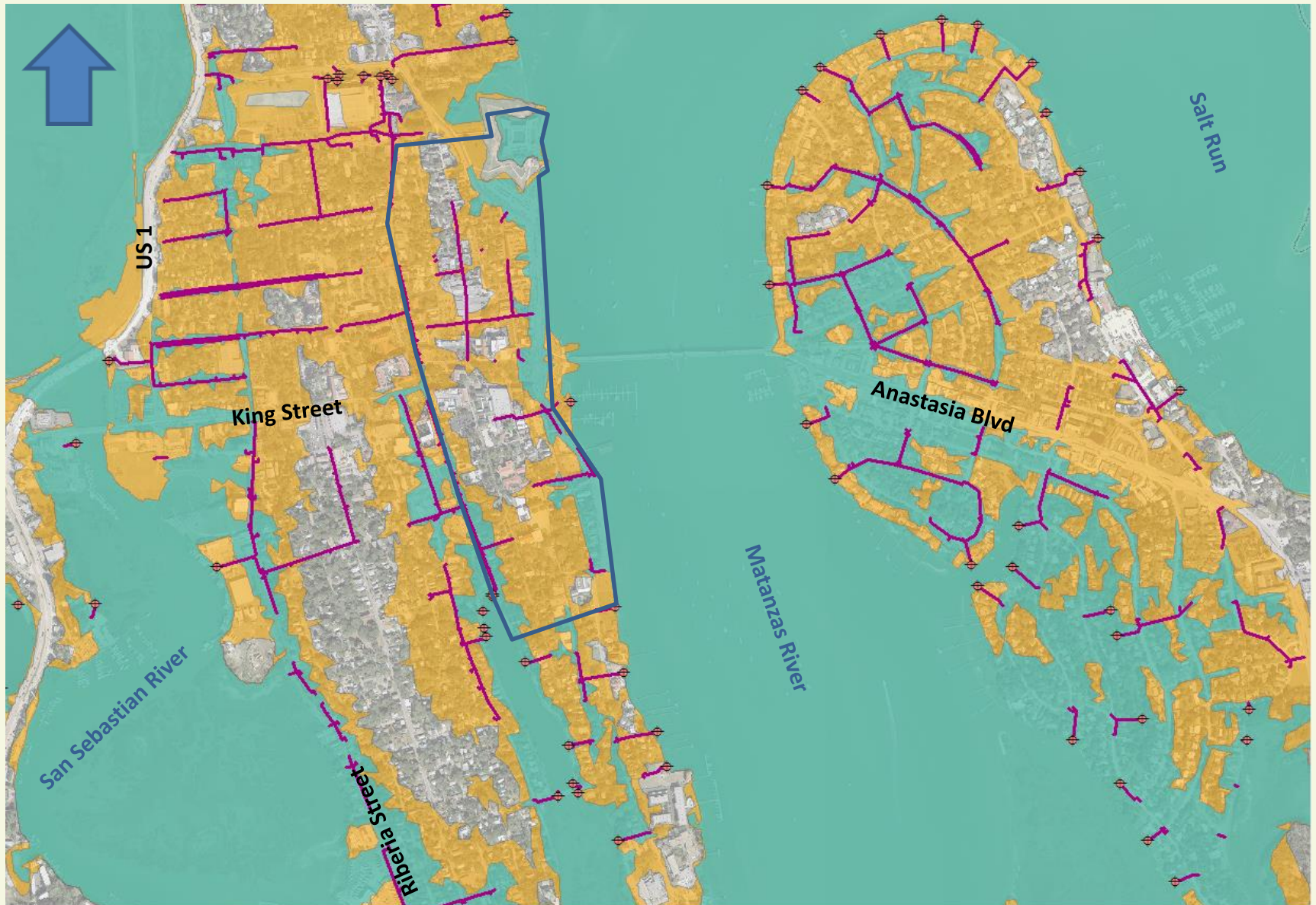


1-ft SLR: NUISANCE

MHHW



St. Augustine



3-ft SLR: NUISANCE

MHHW



Downtown Drainage Improvements

- Basin Area: 86 Acres
- Upsize collection system
- Underground storage vault with pump
- Inverted crown roadway at Cordova St. and Bridge St. Intersection to outfall
- Hardscaping along Granada, Bridge and Cordova St.
- Re-evaluate for SLR



City of St. Augustine
PUBLIC WORKS DEPARTMENT
P.O. Box 210, St. Augustine, FL 32085 Phone: (904) 825-1040

North Davis Shores Tideflex Valve Installation
Existing City Water & Sewer Utilities Map

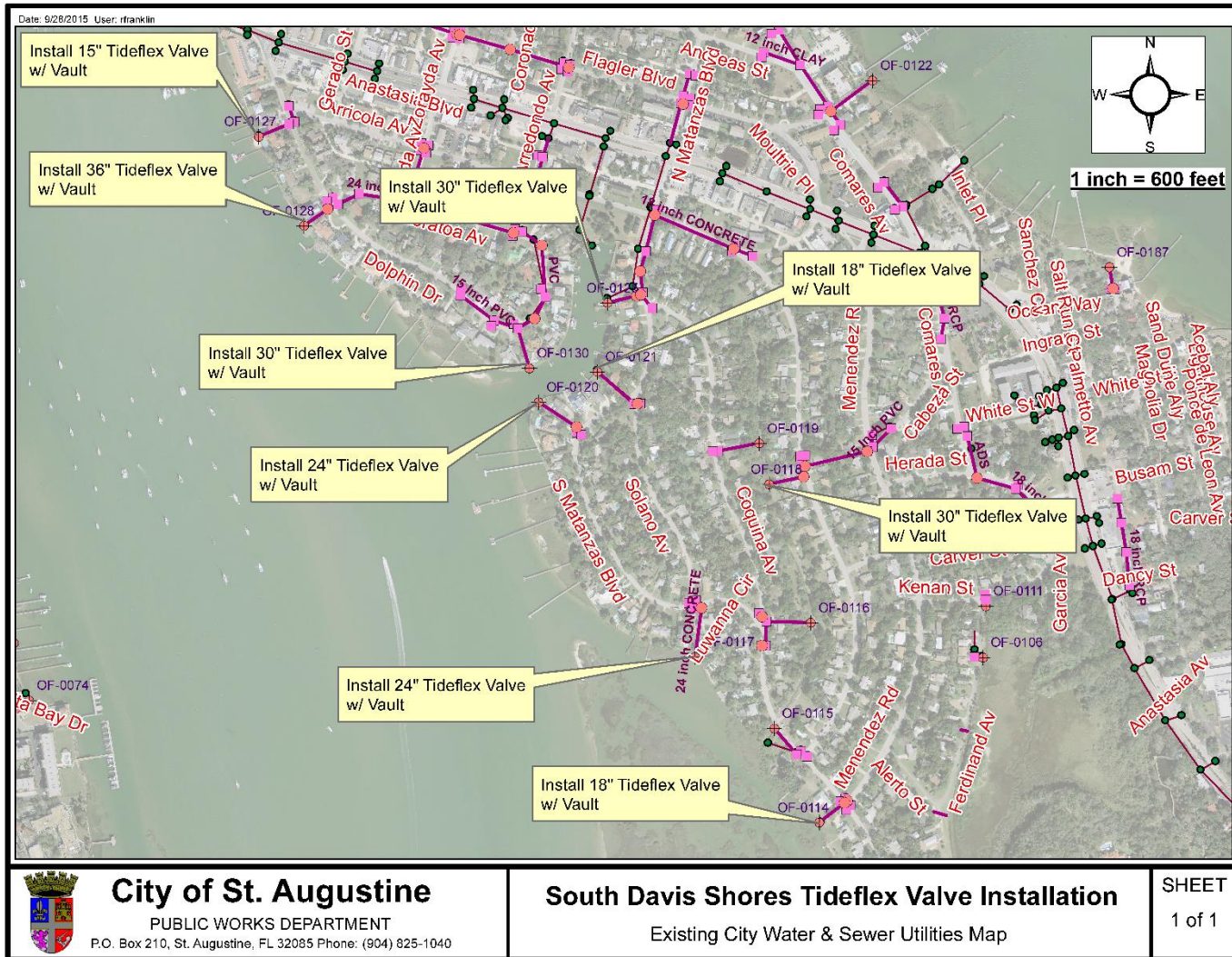
SHEET 1 of 1

Map Details:

- Scale:** 1 inch = 500 feet
- North Arrow:** Indicated in the top right corner.
- Streets:** Avista Cir, Murat St, Inlet Dr, Miruela Av, Arpieka Av, Alcazar St, Ribault St, N Matanzas Blvd, Comares Av, Andreas St, Coronado St, Zorayda Av, Flagler Blvd, Anastasia Blvd, Arricola Av, Gerardo St, Dolphin Dr, N St Augustine Blvd, Oglethorpe Blvd, Minorca Av, D'Ayillon Av, Montano Av, Arredondo Av.
- Valve Locations and Specifications:**
 - Install 36" Tideflex Valve w/ Vault (Callout 1)
 - Install 10" Tideflex Valve w/ Vault (Callout 2)
 - Install 30" Tideflex Valve w/ Vault (Callout 3)
 - Install 24" Tideflex Valve w/ Vault (Callout 4)
 - Install 15" Tideflex Valve w/ Vault (Callout 5)
 - Install 24" Tideflex Valve w/ Vault (Callout 6)
 - Install 15" Tideflex Valve w/ Vault (Callout 7)
 - Install 36" Tideflex Valve w/ Vault (Callout 8)
- Other Features:** Bridge of Lions, OF-0136, OF-0137, OF-0138, OF-0139, OF-0140, OF-0141, OF-0142, OF-0143, OF-0134, OF-0135, OF-0132, OF-0122.



Planned Backflow Prevention Projects





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Martha Graham, Jenny Wolfe, Bill Mendez, David
Birchim – City Staff

Reference

Coastal Vulnerability Assessment:
City of St. Augustine, Florida
June 24, 2016

Discussion / Questions

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THANK YOU!

