



Storm Resiliency & Infrastructure Development Review Committee

Public Works Overview Existing Drainage Systems

**Department of Public Works
March 29, 2019**

Agenda



- Existing Drainage System
- Challenged System Components & Areas
- Potential “Hardening” of Drainage System

Existing Drainage System Components



□ Components

- 840 square-miles of area
- 3,869 miles of Roads
- 1,513 miles of Pipes
- 72,253 Drainage Structures (inlets-manholes-control structures)
- 345 Stormwater Management Facilities “Ponds”
(over 10,000 “privately maintained” additional Ponds in Jax)
- 1,203 miles of Outfalls/Ditches
 - 209 miles of Major Outfalls
 - 994 miles of Ditches (including road-side)
- 10 Stormwater Pump Stations

Existing Drainage System



- **Pipes (1,513 miles)** - Primarily located under roadways and other paved areas. Majority of stormwater pipes convey stormwater flow to a pond, pump station or other stormwater management facility prior to discharge to surface water.
- **Drainage Structures (72,253)** - Curb Inlets are primarily located along roadway curb and gutter and low points in parking lots and other paved areas. Collects stormwater runoff to stormwater pipes to convey stormwater to stormwater ponds or point of discharge. Manholes are located at stormwater pipe junction points at roadway intersections, along roadways. Also provides access to stormwater conveyance pipes for routine maintenance/cleaning and inspection.



Existing Drainage System



- **Stormwater Management Facility “Pond” (345)** - Collects and temporarily stores stormwater to allow for Water Quality improvements (enables the settling of sediment and other particulate pollutants) and Water Quantity management (attenuation) prior to discharge from the site.
- **Control Structure** - Most commonly located at outlet of ponds and just prior to discharge to a surface water or wetland. Controls rate of stormwater flow and reduces discharge of debris, litter and other pollutants.

Control Structure



Existing Drainage System



- **Major Outfall (209 miles)** - The end of a 36" or greater pipe, or ditch that discharges stormwater to a drainage system, surface water or wetland.



Existing Drainage System



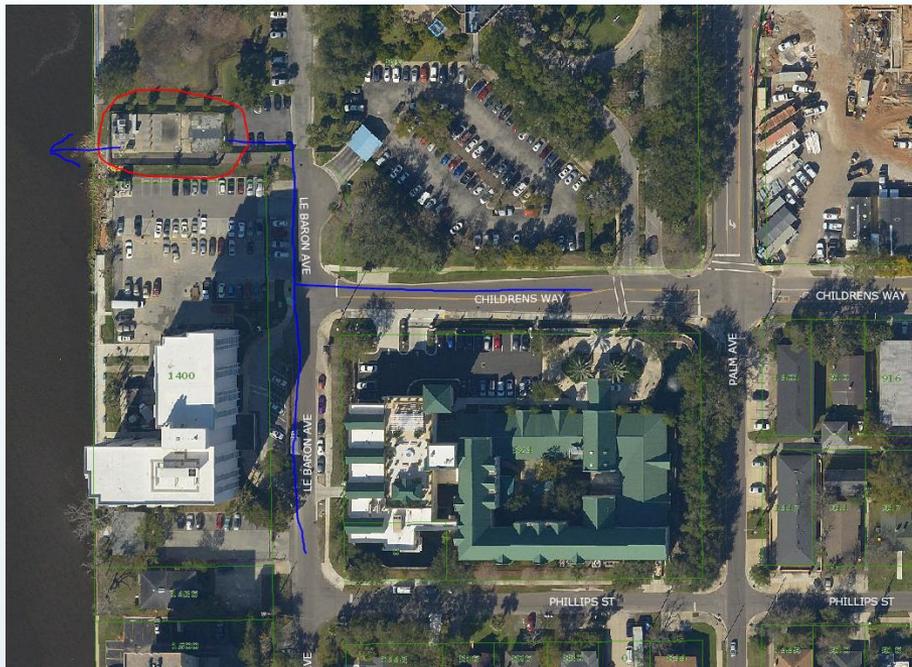
- **Ditch (994 miles)** - An open maintained channel that conveys stormwater to a control structure, pond, or point of discharge to a surface water or wetland. The three types of ditches are:
 - **Roadside ditch** - Primarily located along roadways without curb and gutter in rural and older residential areas of the city
 - **Swales** - Shallow grassed ditches with gradual side slopes primarily located in residential neighborhoods. Swale gradient slows flow of stormwater to permit some absorption of stormwater
 - **Outfall ditch** - Commonly located along rear yards and discharges to surface waters or wetlands



Existing Drainage System

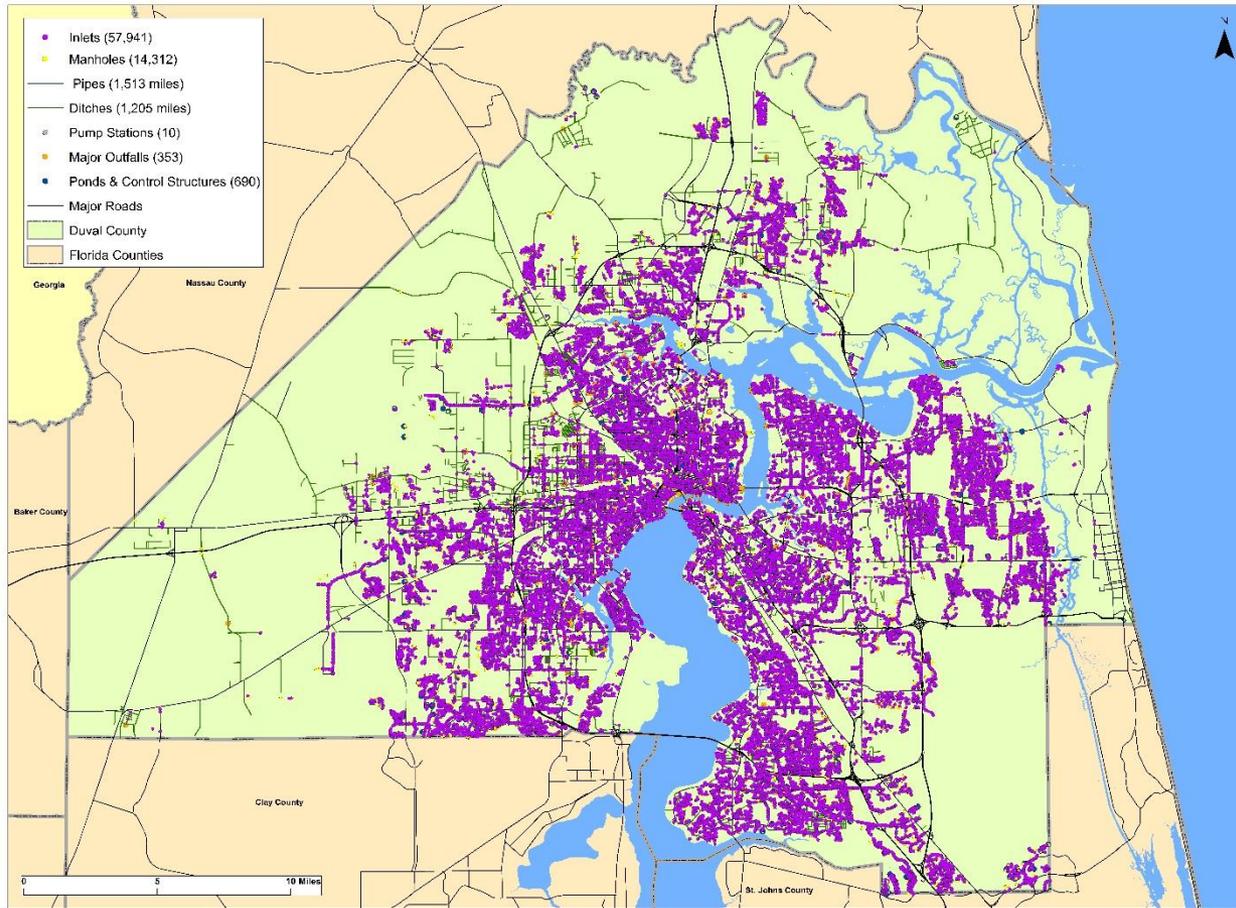


- **Stormwater Pump Stations (10)** - Collects stormwater and provides positive discharge from a low area utilizing a Lift Station.



PUMP STATION NAME	ADDRESS
Hillman Drive (Treetop Estates)	6053 Hillman Dr
San Marco	1800 San Marco Blvd
Independent Drive	98 Independent Dr
Myrtle Avenue	51 Myrtle Ave
Hilly Road	2341 Hilly Rd
Bradley Road	9768 Bradley Rd
Jessie Street (lower Eastside)	1500 blk Jessie Street
Children's Way	807 Children's Way
McGrit's Creek Park (Lew Brantle)	8435 118th St
Sandalwood Canal	Alden Rd

Existing Drainage System - INLETS



Existing Drainage System Age



□ Age

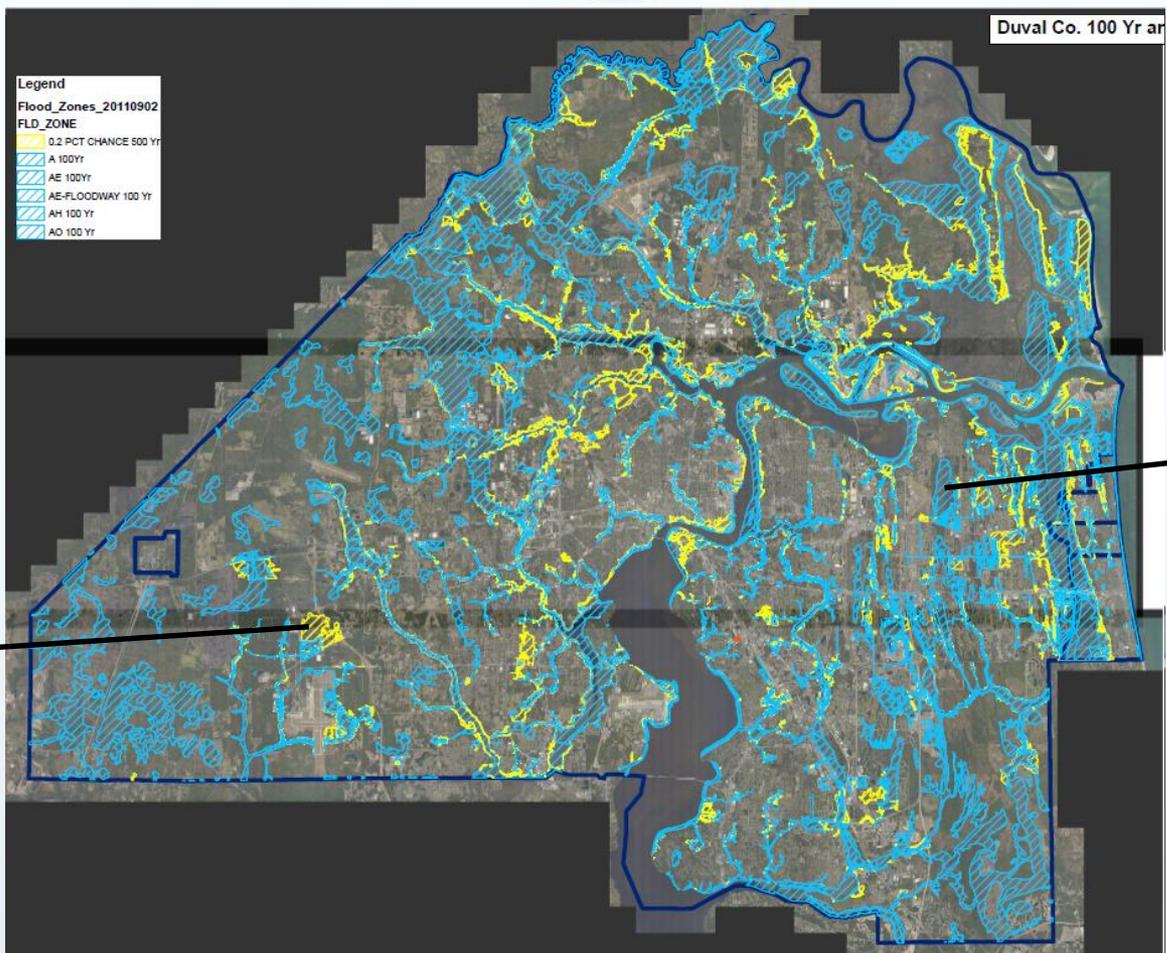
- DPW doesn't have records concerning specific system age
- In general, our oldest systems are in the downtown, nearby to downtown and areas very close to waterways:
 - Riverside
 - San Marco
 - Springfield (Hogan's Creek)
 - Ortega
 - Along McCoy's Creek
 - Along Trout River
 - Along Ribault River
 - Along Cedar River
 - Along Broward River
- Older System challenges
 - Brick Pipe
 - Four Foot Joint Concrete Pipe
 - Corrugated Metal Pipe

Challenged System Components & Areas



- ❑ **Stormwater System Weaknesses**
(Critical components – Storm Events/Storm Surge/Increased Tide Level)
 - Impacts on Low Areas
 - Flood Zones
 - Hurricane Irma impacts

DUVAL COUNTY SPECIAL FLOOD HAZARD AREA MAP (AE 100 Yr. & 500 Yr.)



500 YR

AE 100 YR



Flood Zone Areas:

There are two type of flood hazard areas:

1. **Coastal Flood Hazard Area-** Flood area that is established by river or ocean hurricane “surge” storm modeling. Storm surge analyses for FEMA coastal flood studies are often performed using the [ADCIRC](#) (ADvanced CIRCulation) model in conjunction with the [Simulating Waves Nearshore](#) (SWAN) model.
2. **Riverine Flood Hazard Area –** Inland flooding area that is established by utilizing riverine stormwater model. COJ’s SWMM model was used for the Duval County riverine flood maps.

Most Common Flood Zones:

- Zone AE** - An area inundated by 1% annual storm chance flooding. Most commonly referred to as the 100 year storm (100 %/100 yr. = 1% chance of occurring each year).
- Zone X** - An area inundated by 0.2% annual storm chance flooding. Most commonly referred to as the 500-year storm (100% / 500 yr.) = 0.2% chance of occurring each year)

FEMA Flood Zone Definitions:



DEFINITIONS OF FEMA FLOOD ZONE DESIGNATIONS

Flood zones are geographic areas that FEMA has defined according to varying levels of flood risk. These zones are depicted on a community's Flood Insurance Rate Map (FIRM). Each zone reflects the severity or type of flooding in the area. For more information on the FEMA flood insurance program, visit the FEMA website at www.fema.gov.

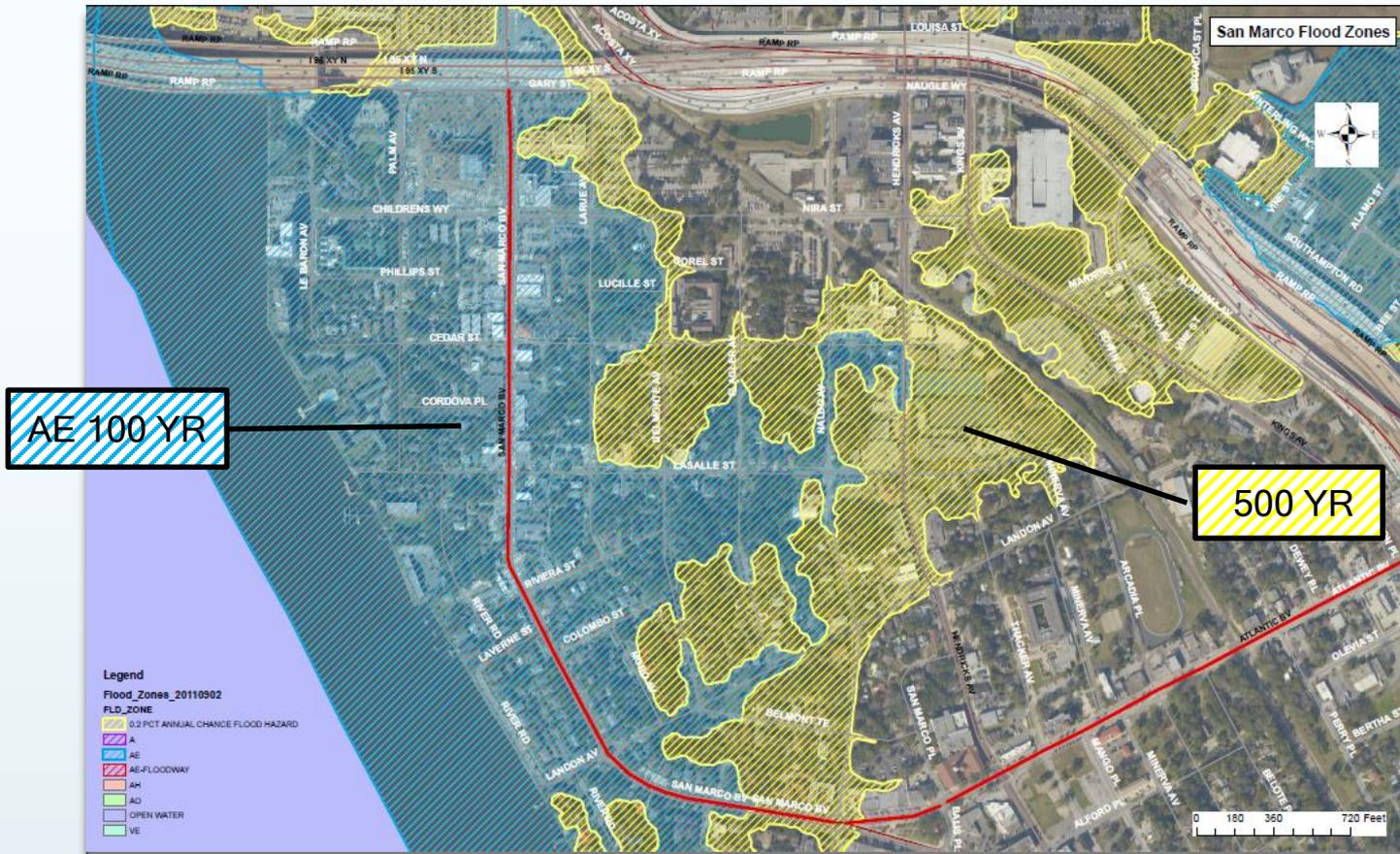
MODERATE TO LOW RISK AREAS

ZONE	DESCRIPTION
X_500	Area of moderate flood hazard or 0.2% annual chance of flooding, usually the area between the limits of the 100 year and 500 year flood plains
X	Areas of minimal flood hazard, determined to be outside the 500 year flood plain

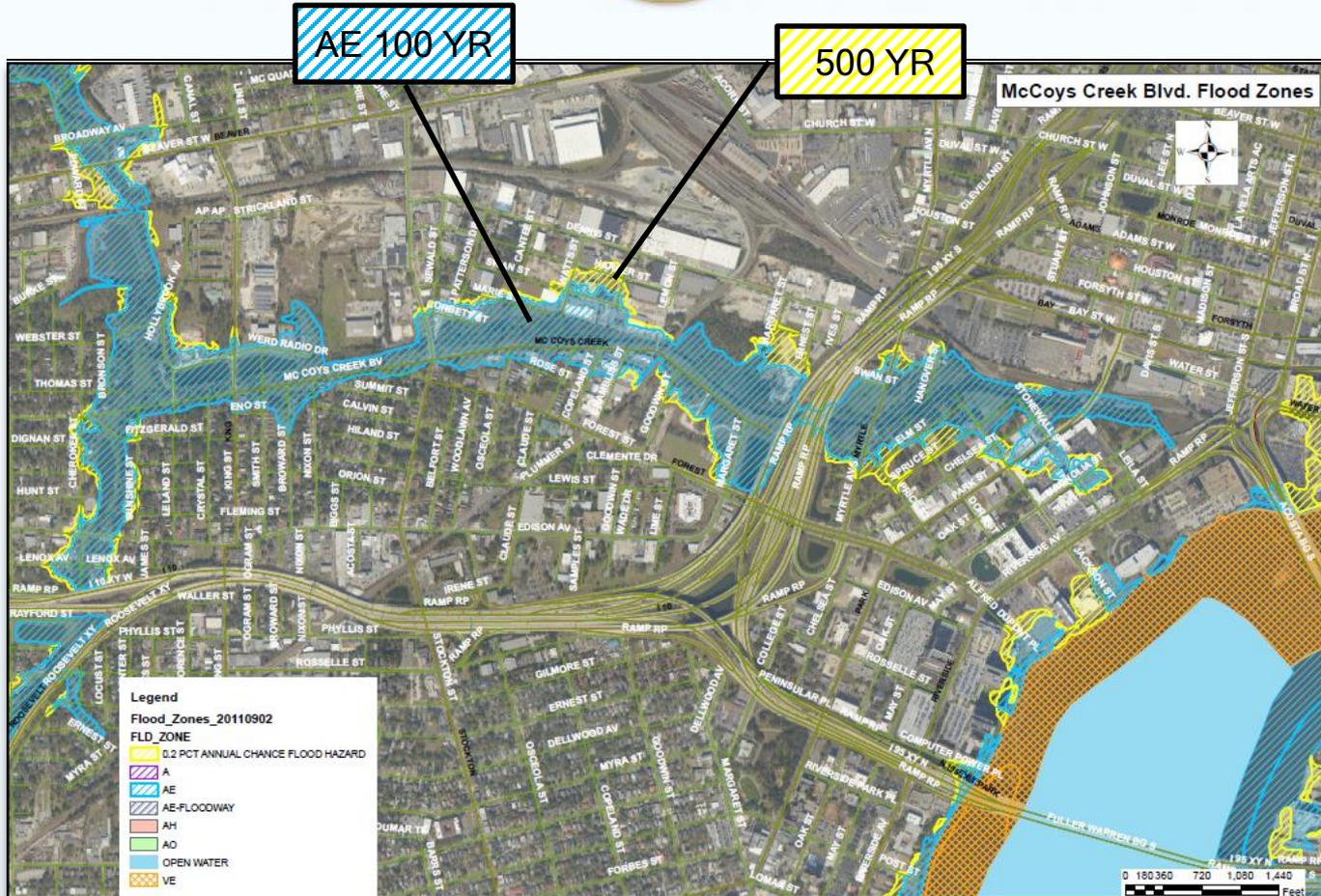
HIGH RISK AREAS

ZONE	DESCRIPTION
A	Areas with a 1% annual chance of flooding and a 26% chance of flooding over the life of a 30 year mortgage. Base flood elevations (BFE) are not available for these zones.
AE	Areas with a 1% annual chance of flooding and a 26% chance of flooding over the life of a 30 year mortgage. Base flood elevations (BFE) and flood hazard factors are determined.
AH	Areas with a 1% annual chance of flooding, usually in the form of a pond, with an average depth ranging from 1 to 3 ft. Base flood elevations (BFE) and flood hazard factors are determined.
VE	Coastal areas with a 1% or greater chance of flooding and an additional hazard associated with storm waves. These areas have a 26% chance of flooding over the life of a 30 year mortgage. Base flood elevations (BFE) derived from detailed analyses are shown at selected intervals within these zones.
A99	Areas with a 1% annual chance of flooding that will be protected by a Federal flood control system where construction has reached specified legal requirements.

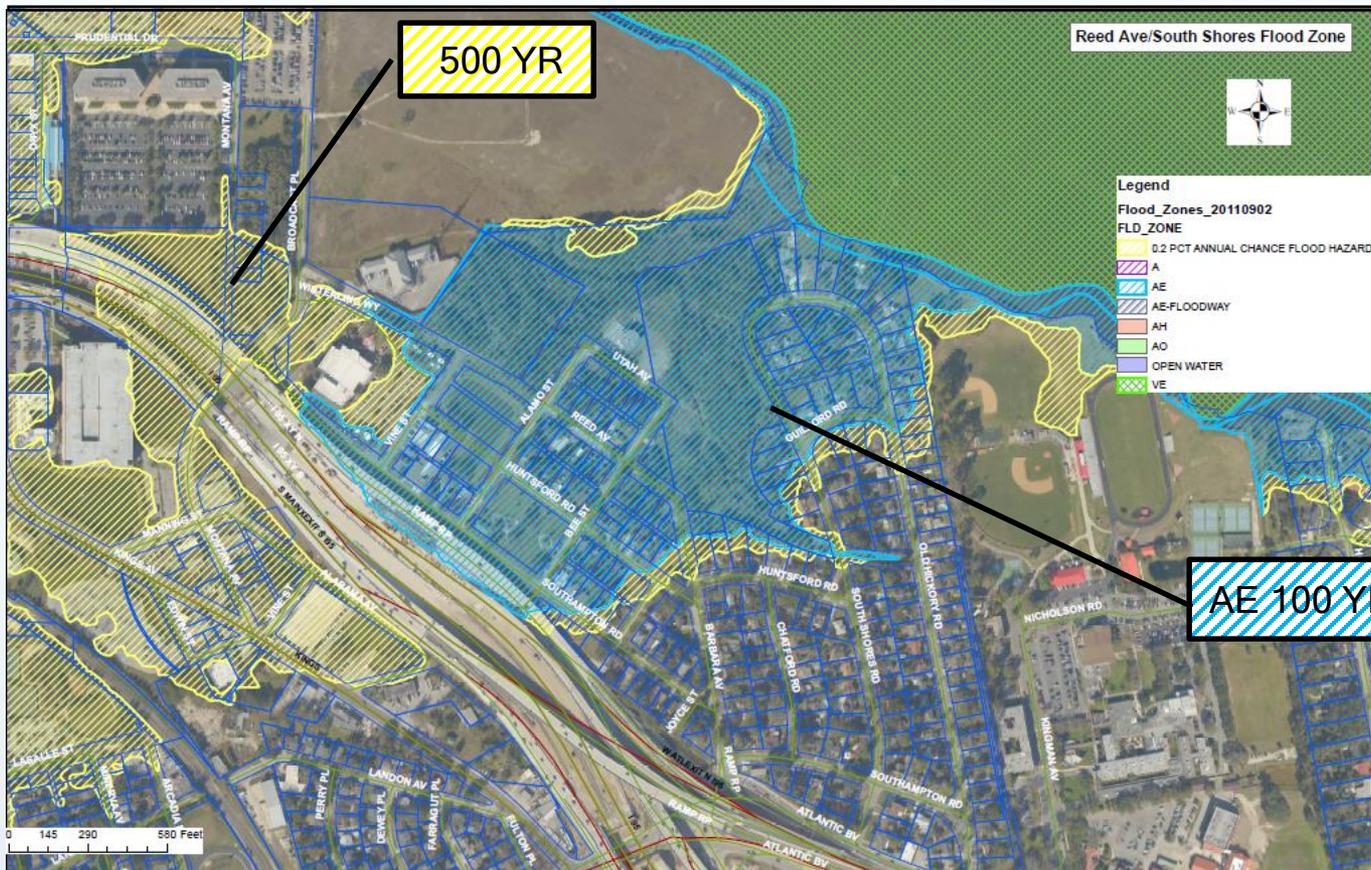
SAN MARCO SPECIAL FLOOD HAZARD AREA MAP



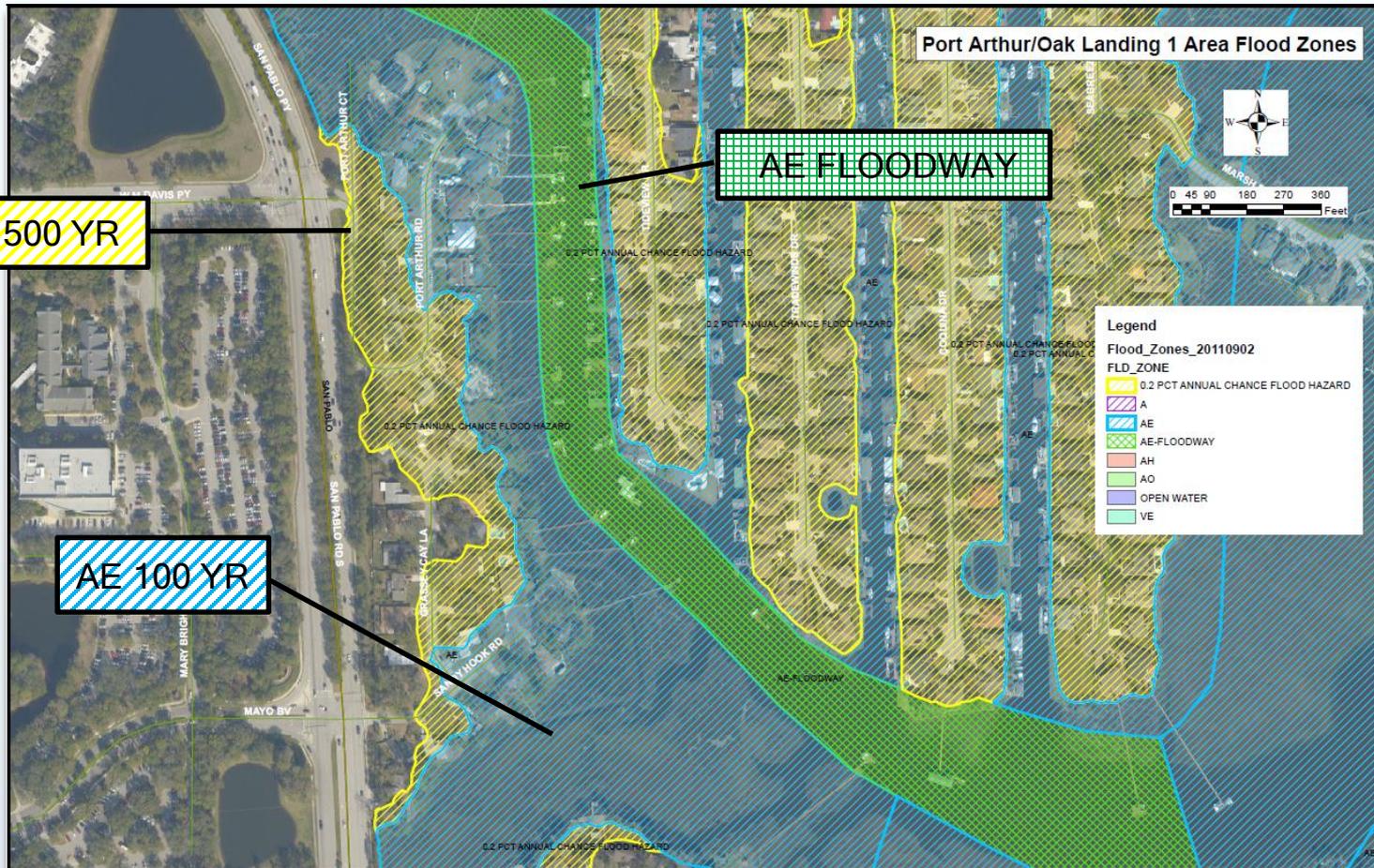
McCoy's Creek Special Flood Hazard Area



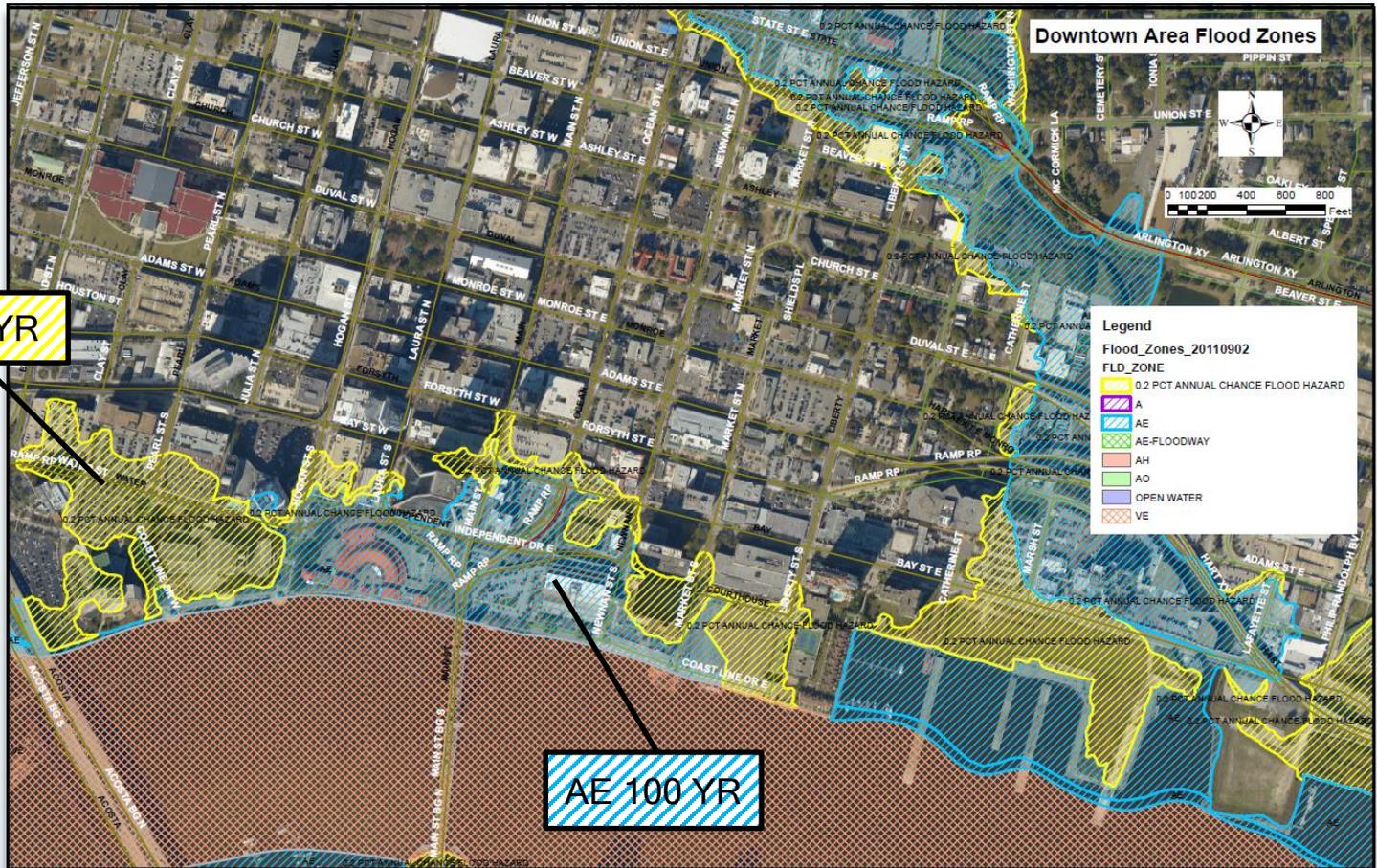
South Shores "South Hampton" Special Flood Hazard Area



Port Arthur Special Flood Hazard Area



Downtown Special Flood Hazard Area



500 YR

AE 100 YR

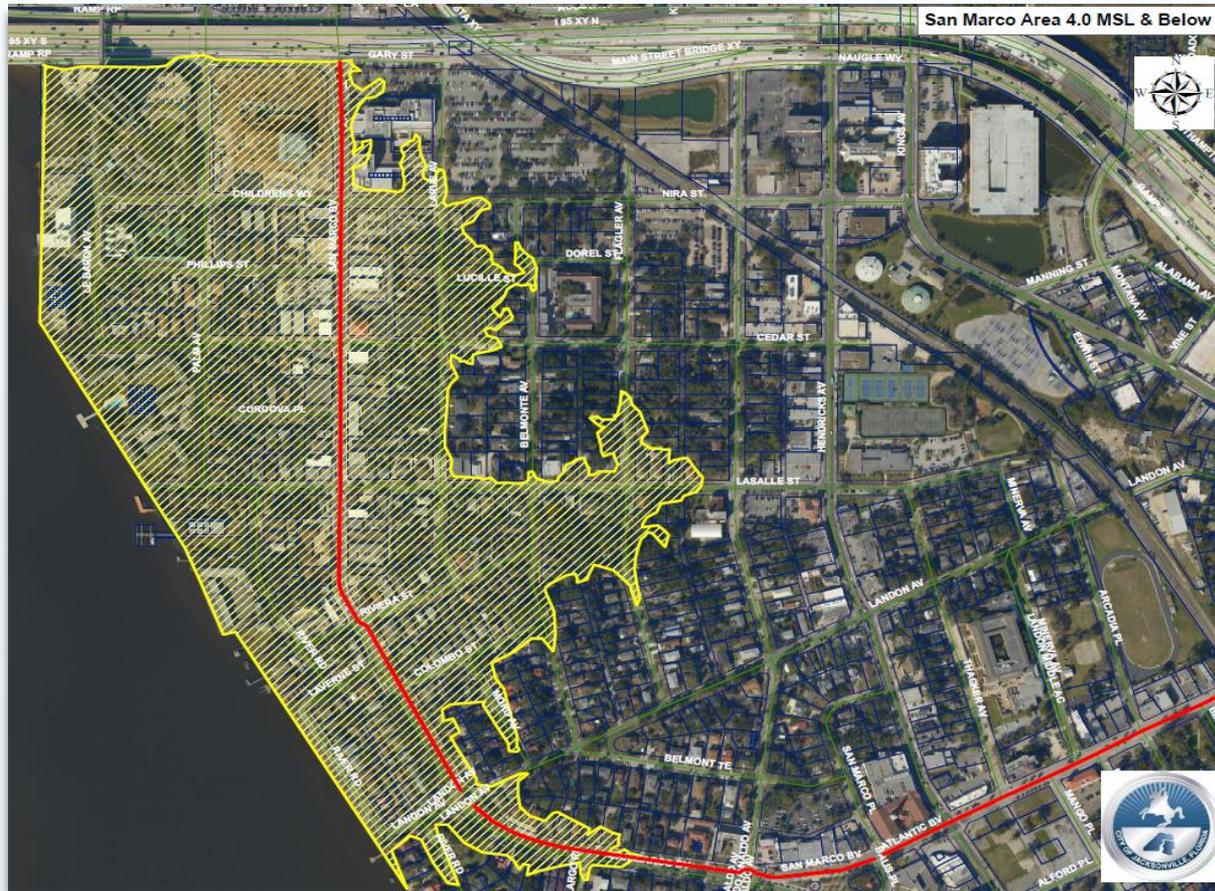
Challenged System Components & Areas



- ❑ **Stormwater System Weaknesses**
(Critical components – Storm Events/Storm Surge/Increased Tide Level)
 - Impacts from Creeks/Rivers/Ocean
 - Bulkheads (COJ & Private)
 - Elevation
 - Drainage System (backflow from Tides)



San Marco once Bulkhead Elevation 4.7 is Overtopped.



Potential “Hardening” of Drainage System



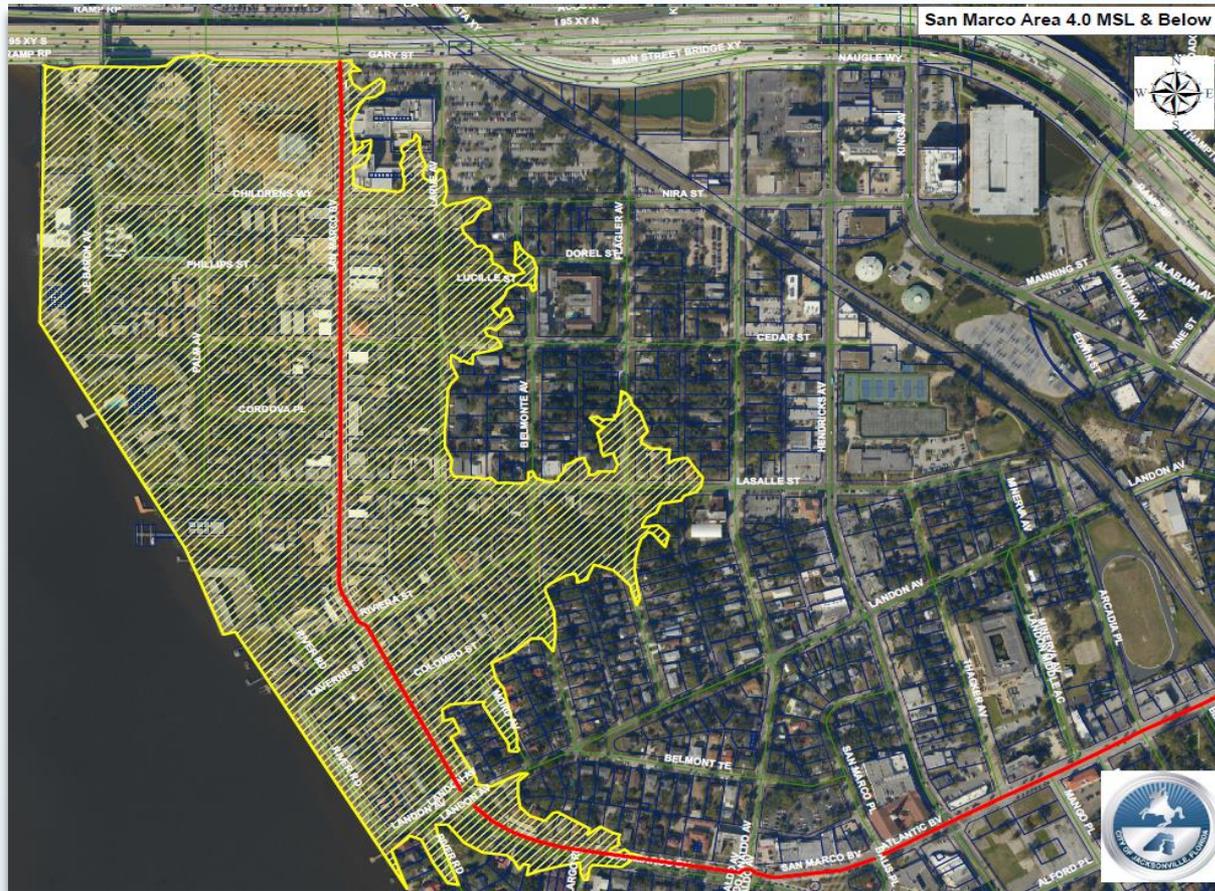
□ Potential “Hardening” of Drainage System

- Protection from Creeks/Rivers/Ocean
 - Modify drainage existing drainage system infrastructure (TideFlex valve)
 - Bulkhead Improvements (potential to raise)
 - Stormwater Pump Stations
 - Beach Renourishment (increase template)

- Impacts on Low Areas
 - Improvements to outfall system (increase capacity)
 - Increase new development restrictions within low areas (increase development elevations)
 - Removal of existing development in low areas



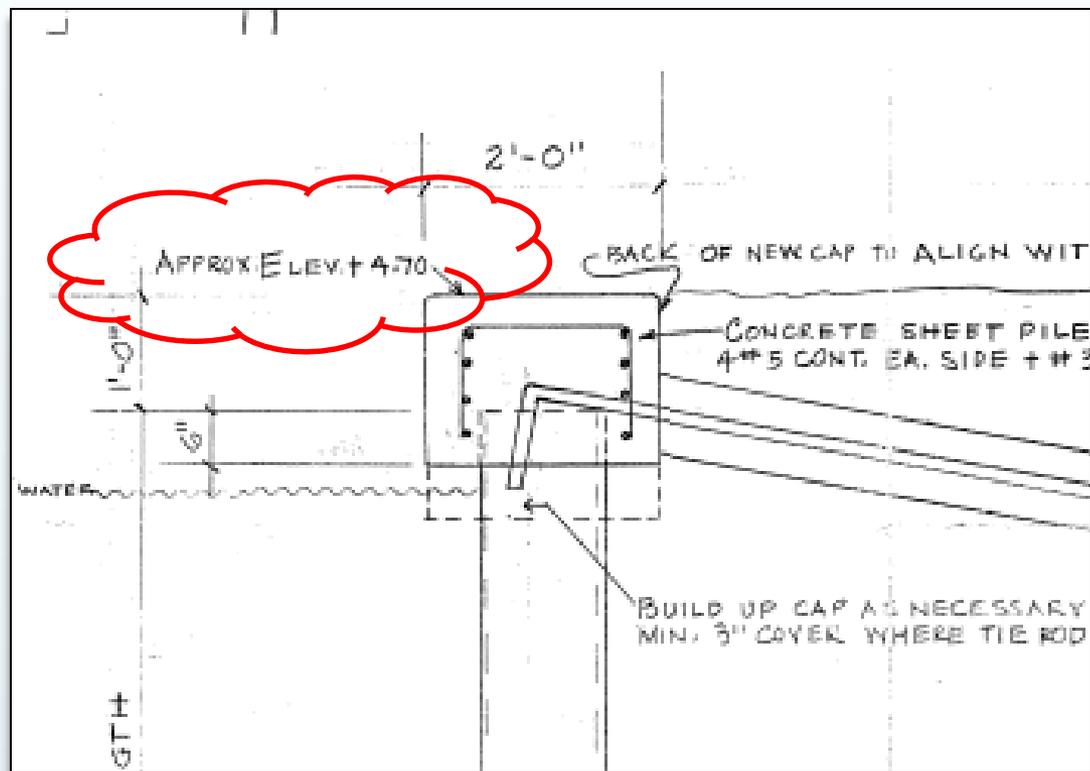
San Marco once Bulkhead Elevation 4.7 is Overtopped.





San Marco Bulkhead:

- ❖ Existing Condition Bulkhead elevation at 4.7 feet NGVD-1929 Datum



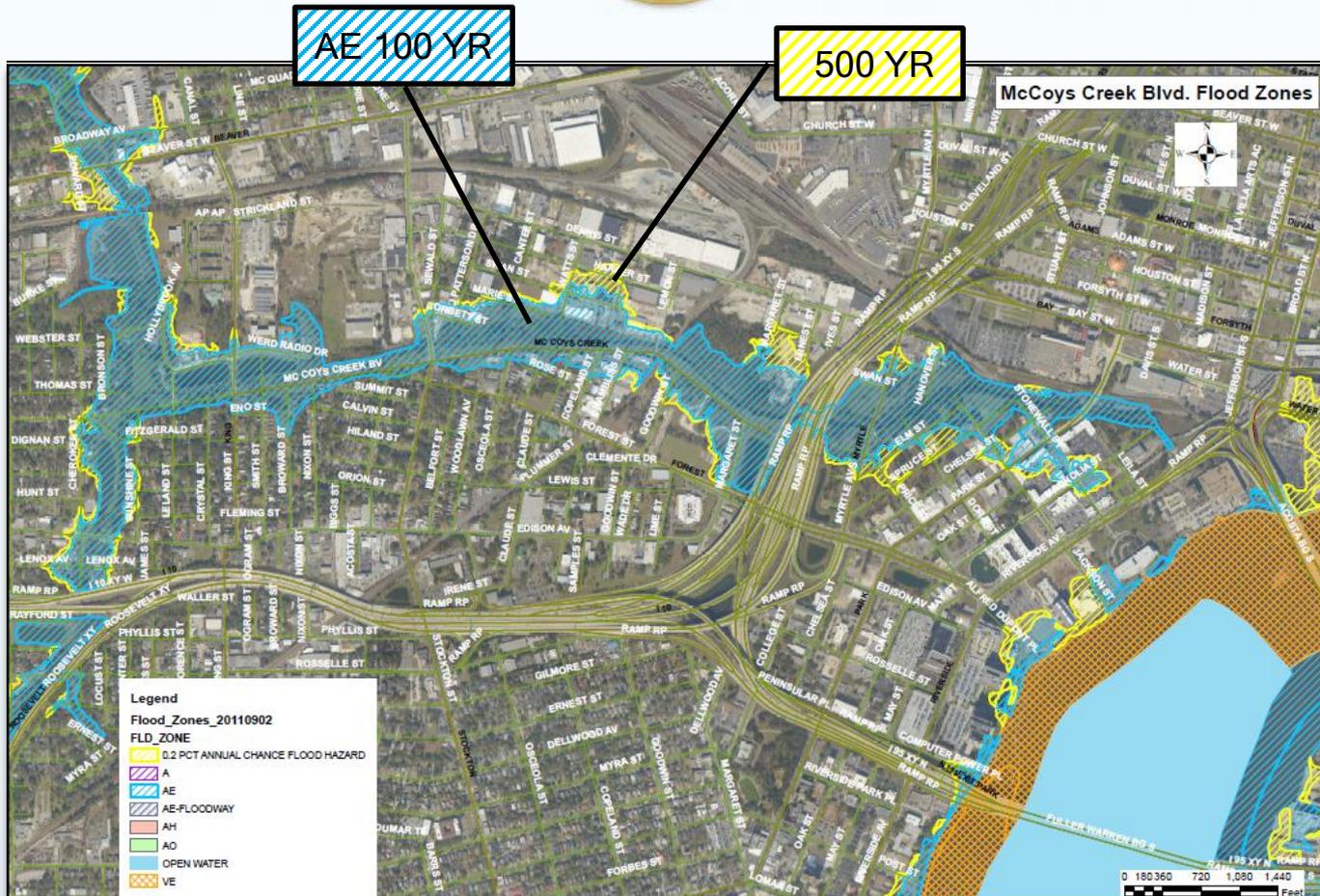
Infrastructure Improvements



SAN MARCO:

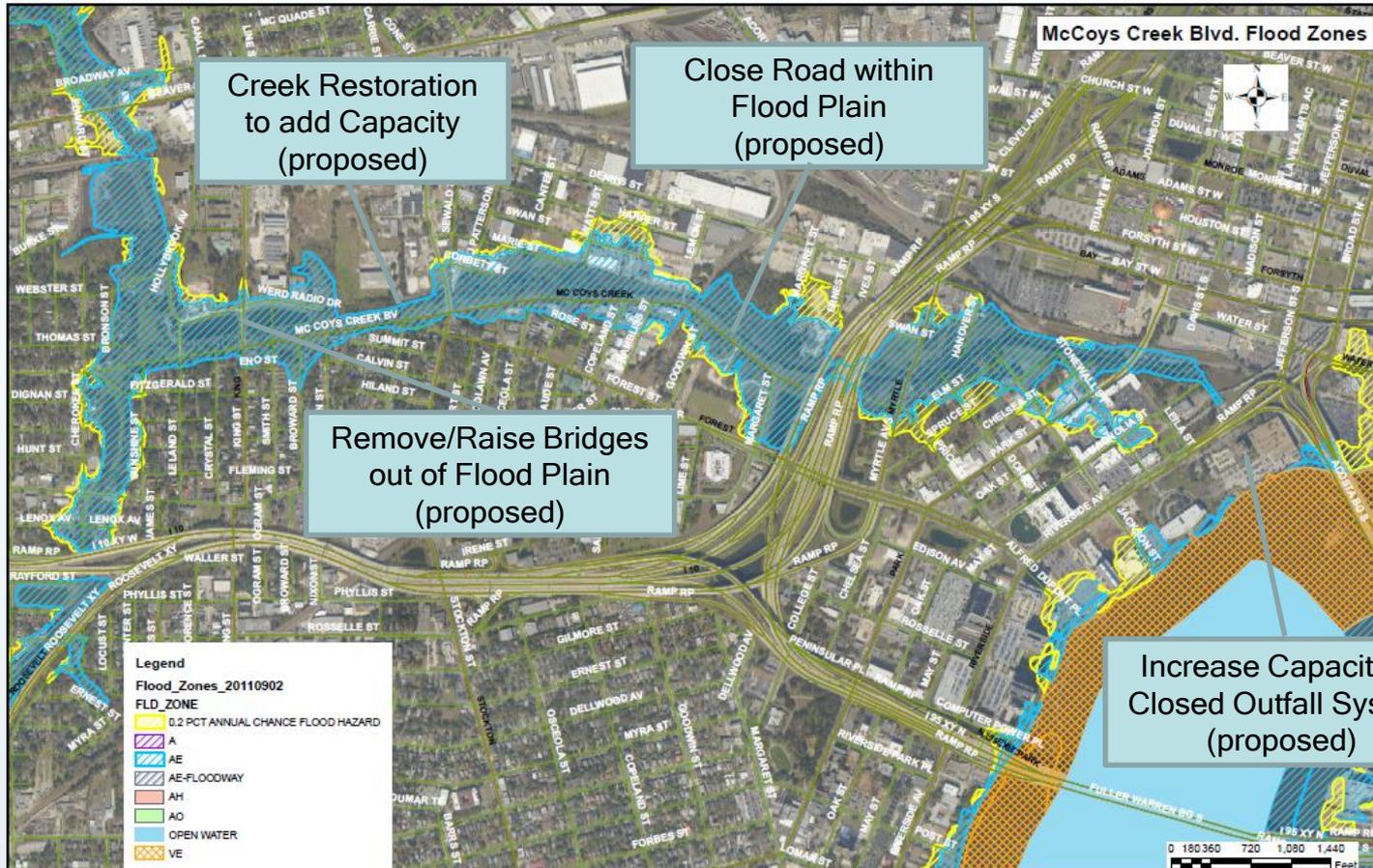


McCoy's Creek

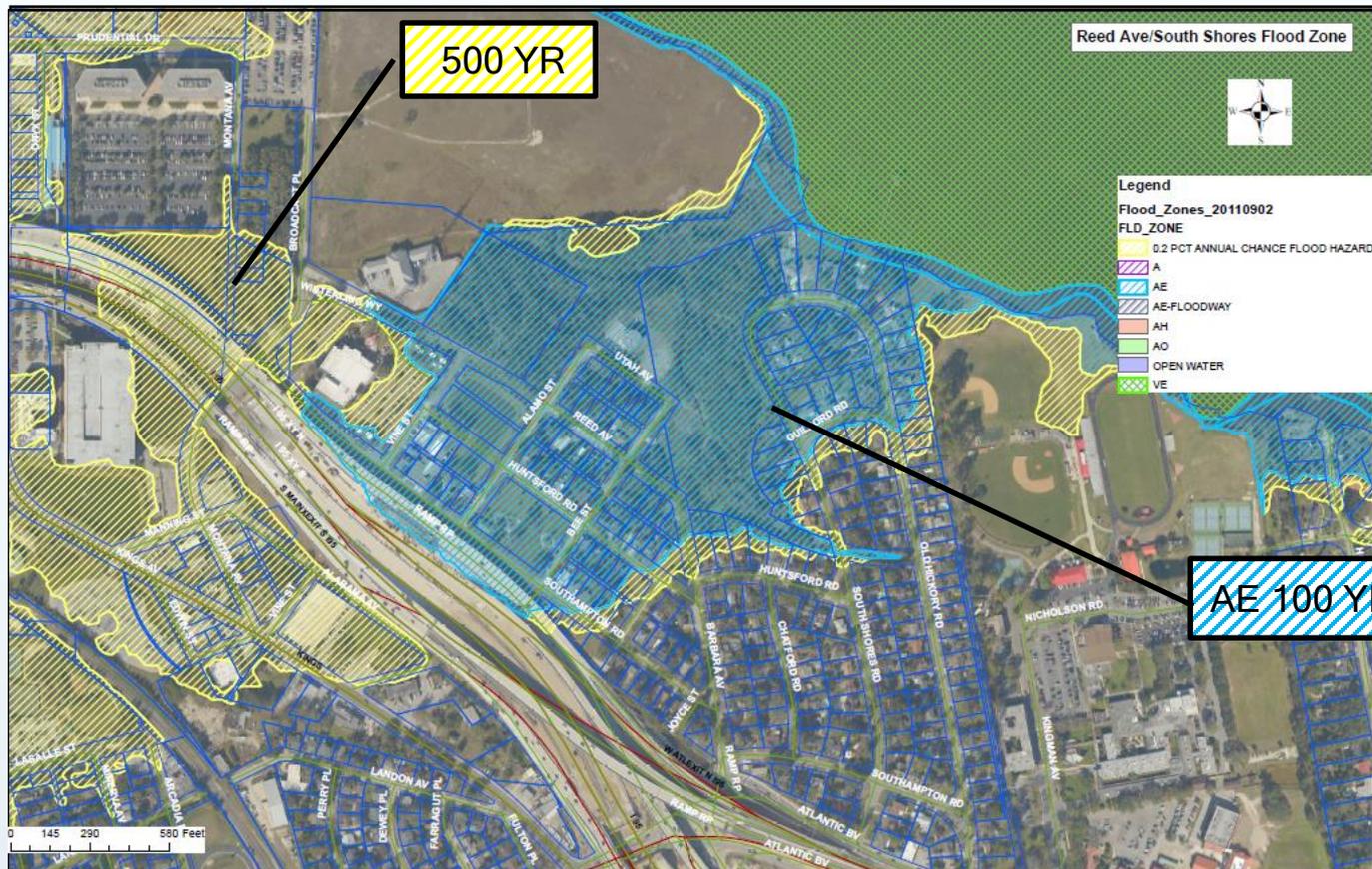




McCoy's Creek:



South Shores "South Hampton" – Low Area



Potential “Hardening” of Drainage System



Counter measures put in place to address resiliency:

- **San Marco**
 - Two active Pump Stations (Landon and Children's Way)
 - One Tideflex valve
 - Additional Pump Station (LaSalle) is under design
- **McCoy's Creek:**
 - Stream Restoration project will lower flood stages as much as 2+feet in some locations
- **Port Arthur:**
 - Tideflex valve has been installed to address seasonal and higher than normal tides
- **South Hampton:**
 - Moving forward with proposing to purchasing properties (voluntary) and return area to floodplain



JACKSONVILLE

STORMWATER PONDS:

PRE/POST - SCS 25 yr. 24 hr. storm

Sites under 10 acres – Rational 100 yr. storm

PIPES SYSTEMS:

5 yr. 24 hr. Rational storm event

Minimum pipe size 15-inch

MAJOR OUTFALLS OPEN CHANNEL:

SCS 25 yr. 24 hr. storm event

STORMWATER POND FREEBOARD:

1-Foot

PALM COAST

PRE/POST - SCS 5 yr. 24 hr. storm

5 yr. 24 hr. Rational storm event

Minimum pipe size 15-inch

SCS 25 yr. 24 hr. storm event

6-inches



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Questions?