



# COASTAL RESILIENCE IN ACTION

## A Blueprint for Smarter Stormwater Management



# Introduction



**NICK CHARNAS, P.E.**  
Director, Water Resources

- **Vice President & Director of Water Resources** at Halff (Tampa), leading planning, design, and delivery of stormwater, flood mitigation, and water resources infrastructure projects.
- **Nearly 25 years of experience** in urban drainage, pump station design, and watershed planning.
- **Specialized focus on resilience**, improving system performance during extreme weather events.
- Double Gator, Double Boilermaker



**CAMDEN J. MILLS, P.E.**  
Director of Public Services

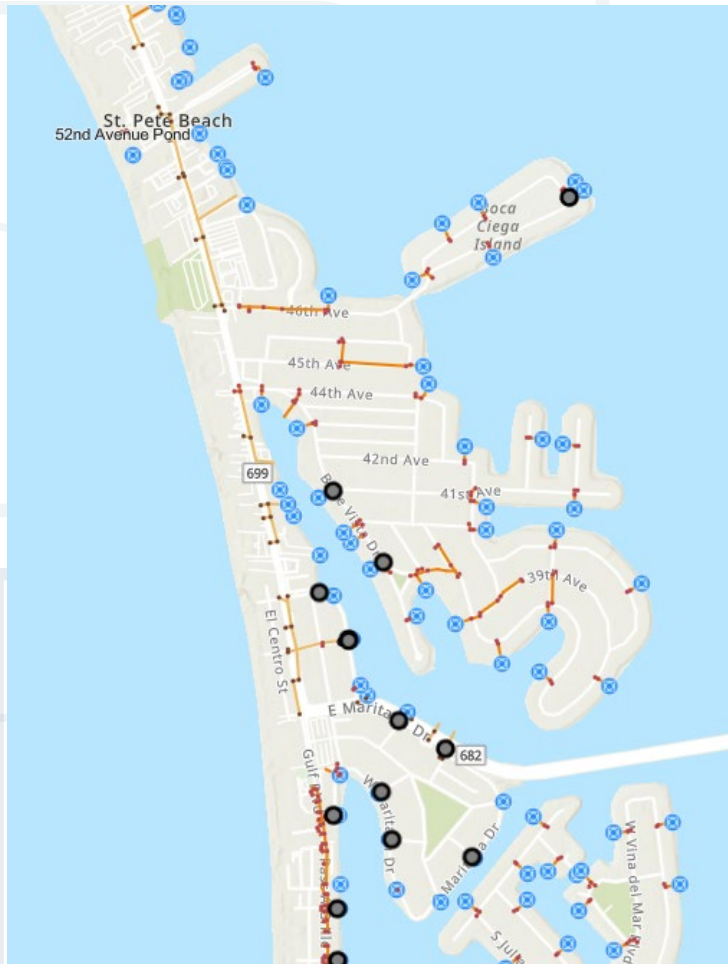
- **Camden J. Mills, P.E. serves as the Director of Public Services** for the City of St. Pete Beach, leading public works, infrastructure, and utility operations with a focus on resilience, accountability, and community trust
- **Licensed Professional Engineer and longtime Florida resident**, Camden has over nine years of experience delivering infrastructure improvements across Florida
- Received his **Bachelor of Science in Civil Engineering**, and, more recently, his **MBA** from the University of Florida

# Session Objectives

- Discuss the challenges of managing a coastal community
- Highlight initiatives to overcome challenges
- Discuss improvement projects and best practices

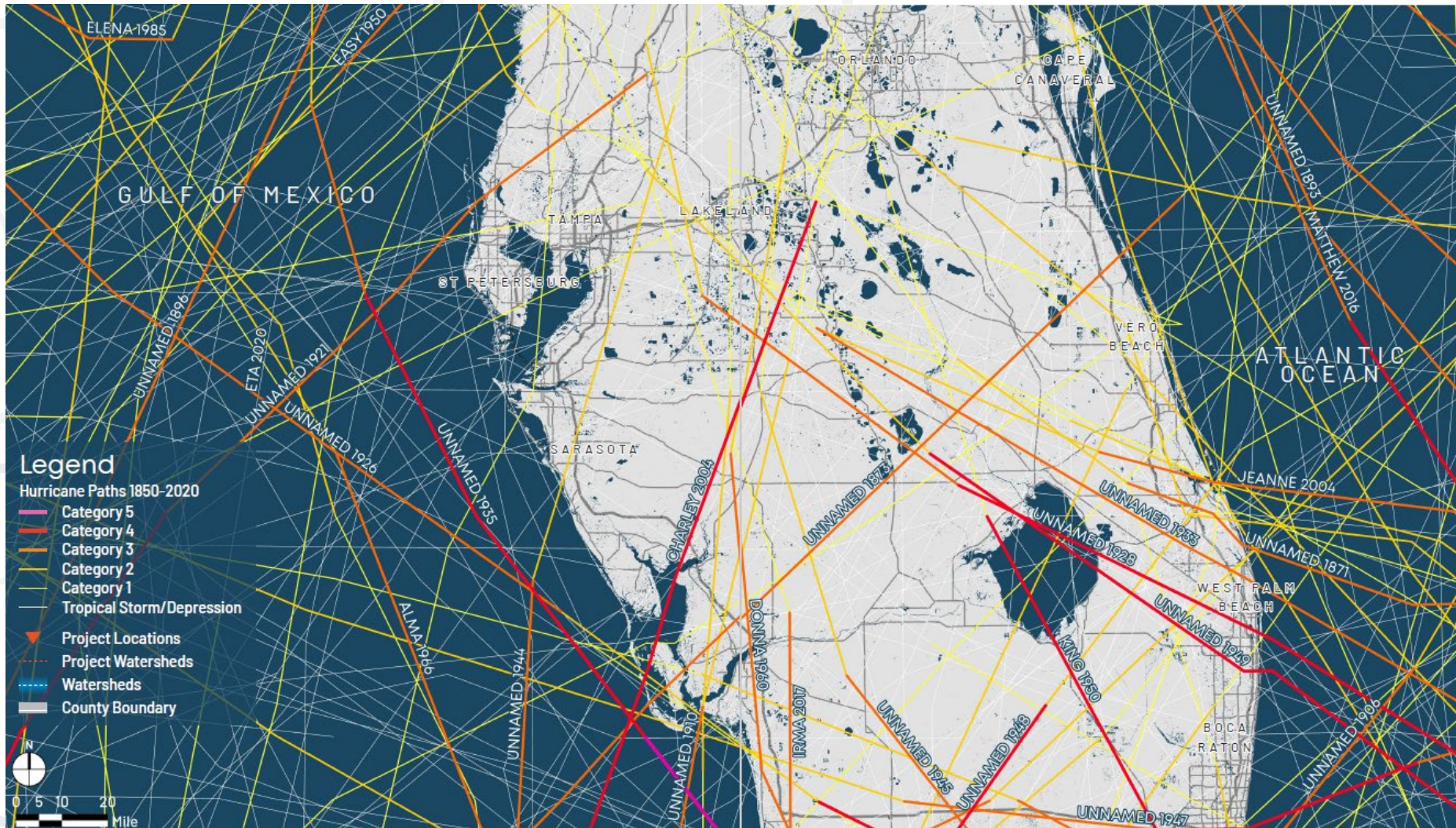


# Citywide Stormwater Inventory



- 1,107 structures
- 182 discharges
- 28 baffle structures
- 38 tide flex valves
- 25 manatee grates
- 9 stormwater ponds
- 16 miles of pipe
- 1 stormwater pump station
- 8,589 feet of seawall (10% public / 90% private)

# Hurricane Paths (1850-2020)



# FEMA FIS Coastal Transects

- Extrapolated 100% Annual Chance Stillwater Elevation: **3.2 feet NAVD**

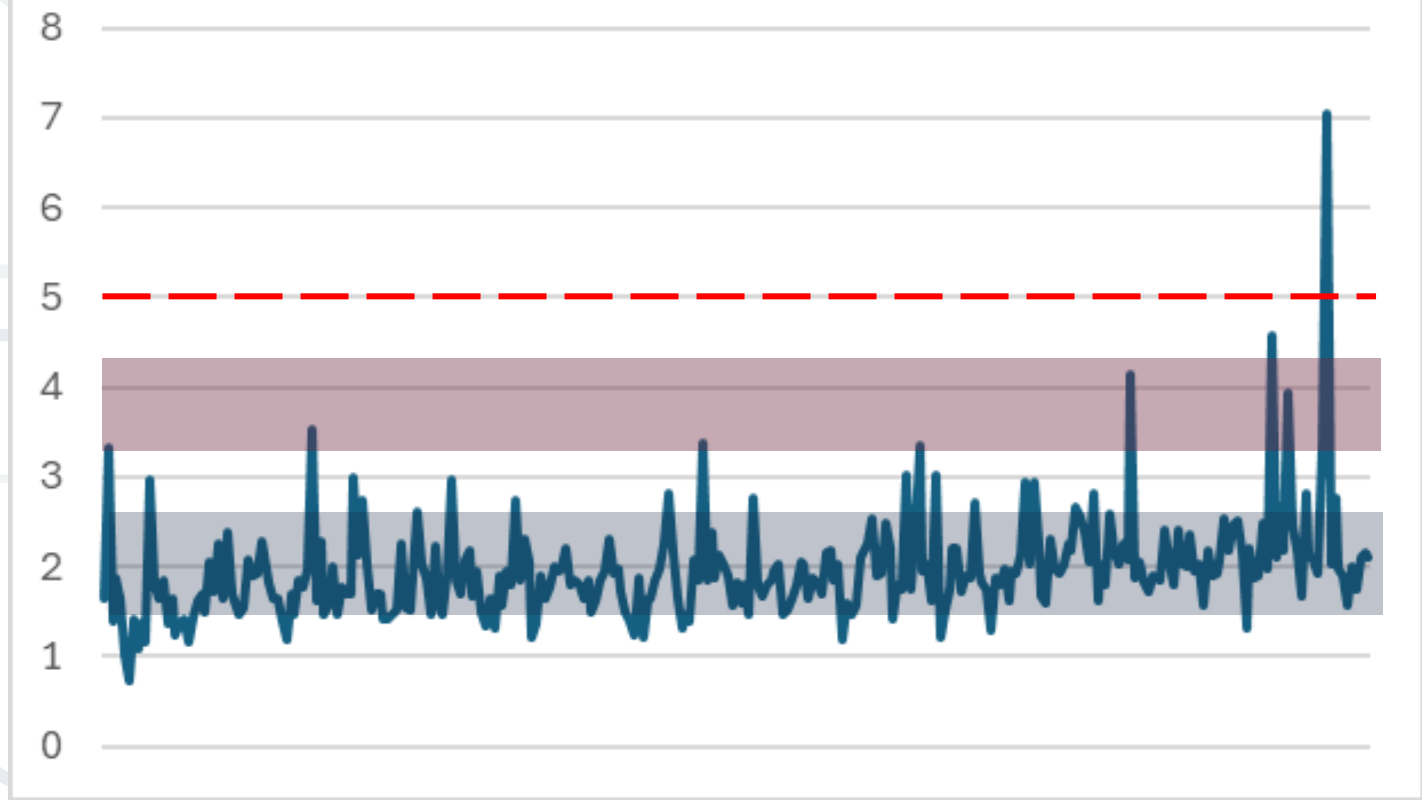
Table 16: Coastal Transect Parameters (continued)

| Flood Source   | Coastal Transect | Starting Wave Conditions for the 1% Annual Chance |  | Starting Stillwater Elevations (ft NAVD88)<br>Range of Stillwater Elevations (ft NAVD88) |                  |                  |                  |                     |
|----------------|------------------|---|--|--|------------------|------------------|------------------|---------------------|
|                |                  | Significant Wave Height<br>H <sub>s</sub> (ft)    | Peak Wave Period<br>T <sub>p</sub> (sec) | 10% Annual Chance  | 4% Annual Chance | 2% Annual Chance | 1% Annual Chance | 0.2% Annual Chance  |
|                |                  |   |  |  |                  |                  |                  |                     |
| Gulf of Mexico | 113              | 7.73  | 5.48                                     | 5.1<br>5.0 - 5.1   | 6.3<br>6.1 - 6.3 | 7.4<br>7.2 - 7.4 | 8.8<br>8.3 - 8.8 | 12.7<br>11.2 - 12.7 |
| Gulf of Mexico | 114              | 10.24   | 5.82                                     | 5.1<br>5.0 - 5.2   | 6.4<br>6.2 - 6.6 | 7.5<br>7.2 - 7.8 | 8.9<br>8.3 - 9.1 | 12.7<br>11.0 - 12.7 |
| Gulf of Mexico | 115              | 8.98  | 5.96                                     | 5.1<br>5.0 - 5.1   | 6.4<br>6.3 - 6.4 | 7.5<br>7.3 - 7.5 | 8.9<br>8.5 - 8.9 | 12.8<br>11.6 - 12.8 |
| Gulf of Mexico | 116              | 9.57  | 5.93                                     | 5.1<br>5.1 - 5.2   | 6.5<br>6.4 - 6.5 | 7.6<br>7.4 - 7.6 | 9.0<br>8.7 - 9.0 | 13.0<br>11.9 - 13.0 |
| Gulf of Mexico | 117              | 9.84  | 5.99                                     | 5.2<br>5.1 - 5.2   | 6.5<br>6.4 - 6.5 | 7.7<br>7.4 - 7.8 | 9.2<br>8.6 - 9.3 | 13.2<br>11.9 - 13.4 |
| Gulf of Mexico | 118              | 9.40  | 5.85                                     | 5.2<br>5.1 - 5.3   | 6.5<br>6.4 - 6.7 | 7.7<br>7.5 - 7.8 | 9.2<br>8.7 - 9.4 | 13.3<br>12.0 - 13.6 |
| Gulf of Mexico | 119              | 8.63  | 6.00                                     | 5.1<br>5.1 - 5.2   | 6.4<br>6.4 - 6.6 | 7.6<br>7.6 - 7.9 | 9.1<br>8.8 - 9.3 | 13.1<br>12.1 - 13.3 |

Effective Date: 8/24/21

# Historic Observed Tide Levels (Don CeSar Neighborhood)

Monthly Maximum Water Levels  
(2000-2025, NAVD88)



## Legend

--- Future Seawall Elevation

Average Lot Elevation Range

Average Street Elevation Range

# Tide Elevation at 0.9 feet NAVD



Alhambra  
Street Elevation = 1.15 NAVD



Alfonso  
Street Elevation = 1.13 NAVD



3107 Maritana  
Street Elevation = 1.80 NAVD



Don Jose  
Street Elevation = 1.30 NAVD



36<sup>th</sup> Ave  
Street Elevation = 1.30 NAVD

# Sunny Day Flooding – Tide Elevation at 1.5 feet NAVD



Alhambra  
Street Elevation = 1.15 NAVD



Alfonso  
Street Elevation = 1.13 NAVD



3107 Maritana  
Street Elevation = 1.80 NAVD



Don Jose  
Street Elevation = 1.30 NAVD



36<sup>th</sup> Ave  
Street Elevation = 1.30 NAVD

# Seawalls in Disrepair

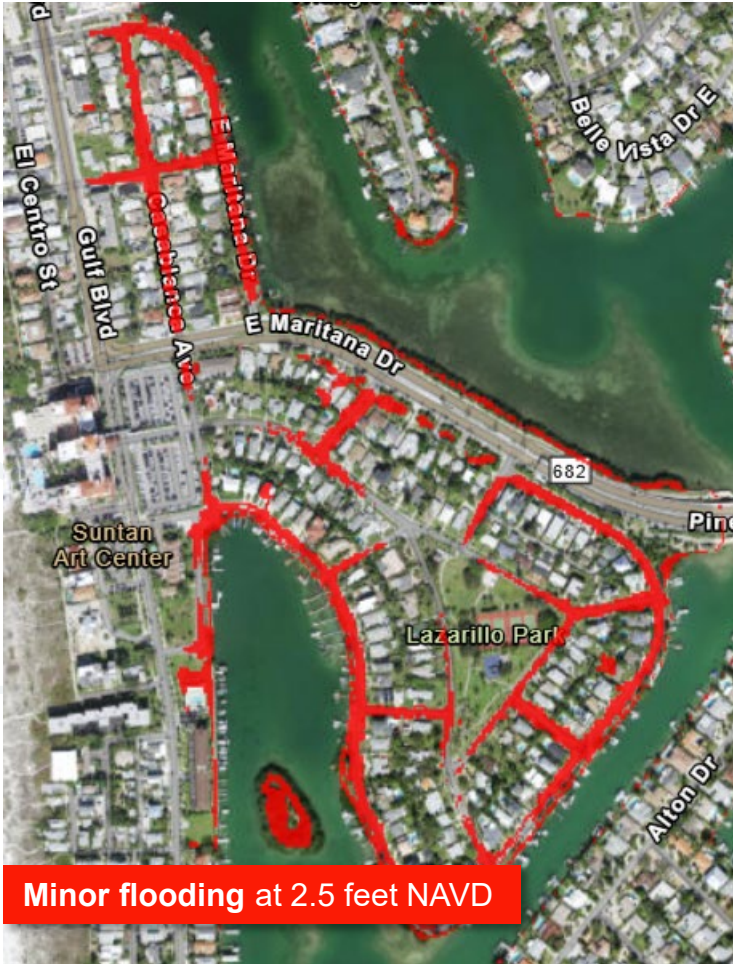


## Disrepair Defined:

A shoreline protection structure that allows erosion, material transfer or unimpeded tidal flow through it to adjacent properties or public rights-of-way. It also includes structures originally permitted below required elevation that have deteriorated, resulting in water flowing over them to nearby properties or public areas.

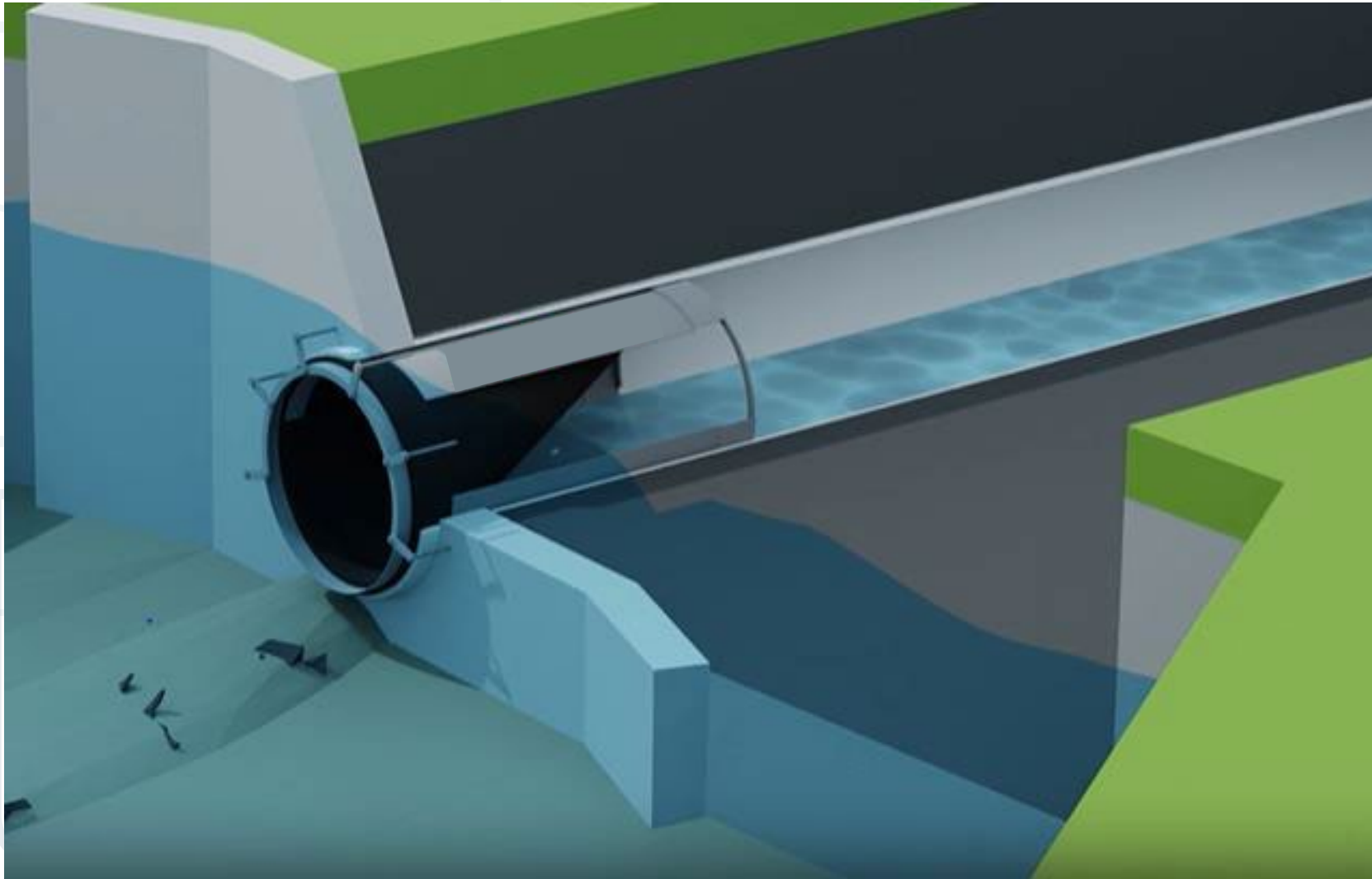
Approx. 8,600 feet of seawall owned by City (10% of all seawalls in the City)

# ■ | Flooding Scenario in a local neighborhood



Sea Level Rise and Coastal Flooding Impacts (NOAA)

# Existing Tide Check Valves Deployed (version 1.0)



# The Struggle is Real

| Location                             | Biological Coverage                                       |
|--------------------------------------|---|
| 36 <sup>th</sup> Ave & E Maritana Dr | 20% coverage  |
| 37 <sup>th</sup> Ave & E Maritana Dr | 80% coverage  |
| 3107 W Maritana Dr                   | 90% coverage  |
| Alfonso St & W Maritana Dr           | 90% coverage<br>1/8 <sup>th</sup> inch gap, 8 inches wide |
| Alhambra St & W Maritana Dr          | 50% coverage<br>1/8 <sup>th</sup> inch gap, 8 inches wide |
| Don Jose St & S Maritana Dr          | 70% coverage<br>Debris obstruction                        |

# Stormwater Outfall and Cleaning



# Infrastructure Impacting Operations

## Maintenance

- Reduce need for commercial diving contractors
- Maintain in-house with crane truck

## Functionality

- Access/inspect all sides of check valve device
- Catch debris with baffle structure



# Tools in the Toolbox



# Seawalls, Bulkhead and Retaining Wall Ordinance (No. 2024-02)

## What Does the Ordinance Do?

The ordinance updates resiliency standards for waterfront protection by increasing minimum shoreline heights and establishing maintenance requirements for shoreline protection structures.

## Why Was This Adopted?

St. Pete Beach faces risks from storms, tidal flooding, and sea level rise. Updated engineering and construction standards are necessary to protect properties, infrastructure, and neighboring areas.

## What Is Required?

- Property owners must maintain seawalls, bulkheads, living shorelines, or other shoreline protection structures or elements in good repair.
- New or substantially improved seawalls must meet updated elevation standards (*unless variance granted*).

## Updated Height Standard

- Bayfront properties: Minimum seawall elevation of 5 feet NAVD 88.

## When Does This Apply?

- New seawall is constructed
- Existing seawall is substantially repaired or improved
- Seawall is in disrepair and causing tidal flooding impacts

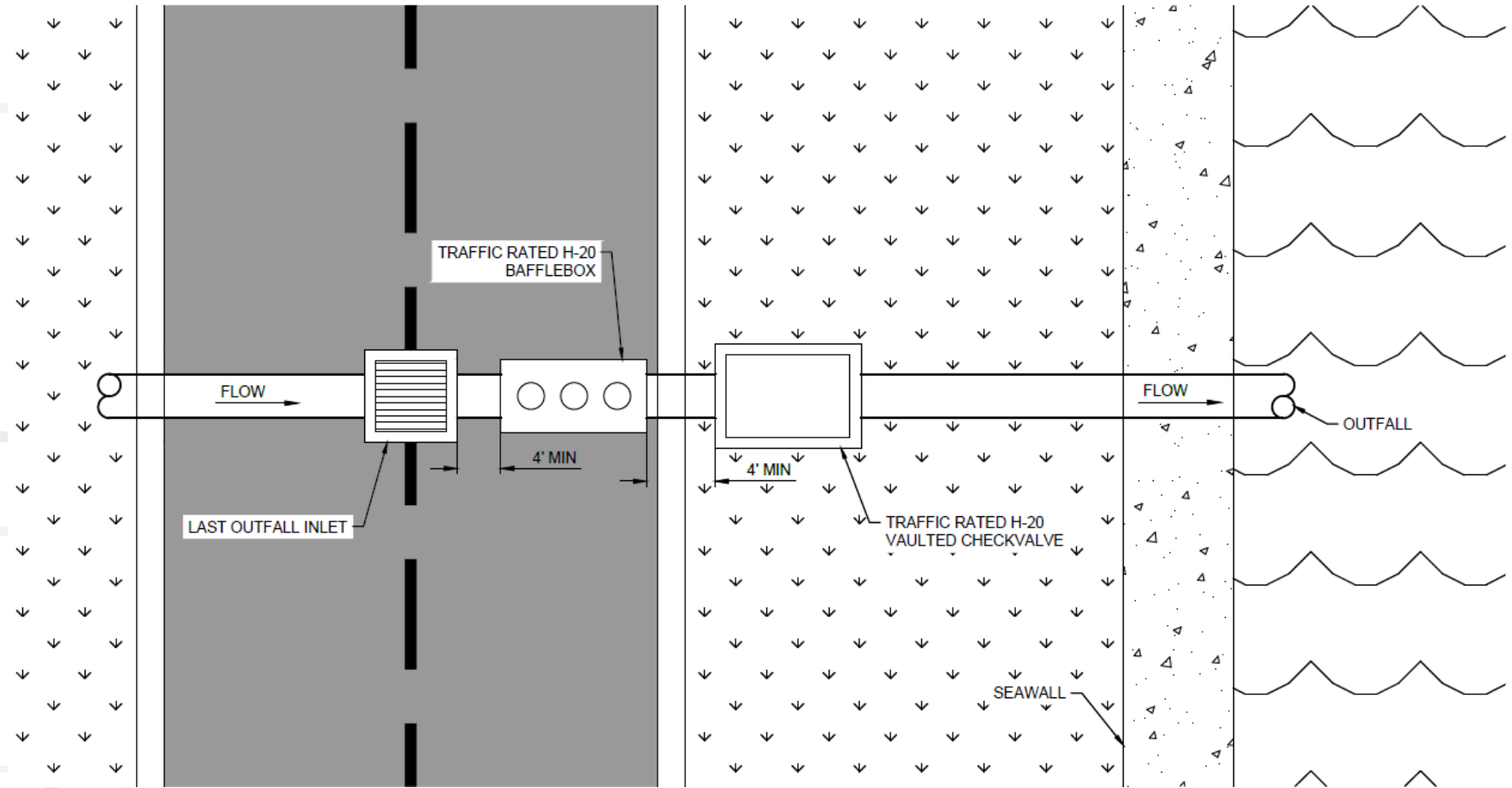
# Seawalls Ordinance - Appeals (No. 2024-02)

## Sec. 98-104

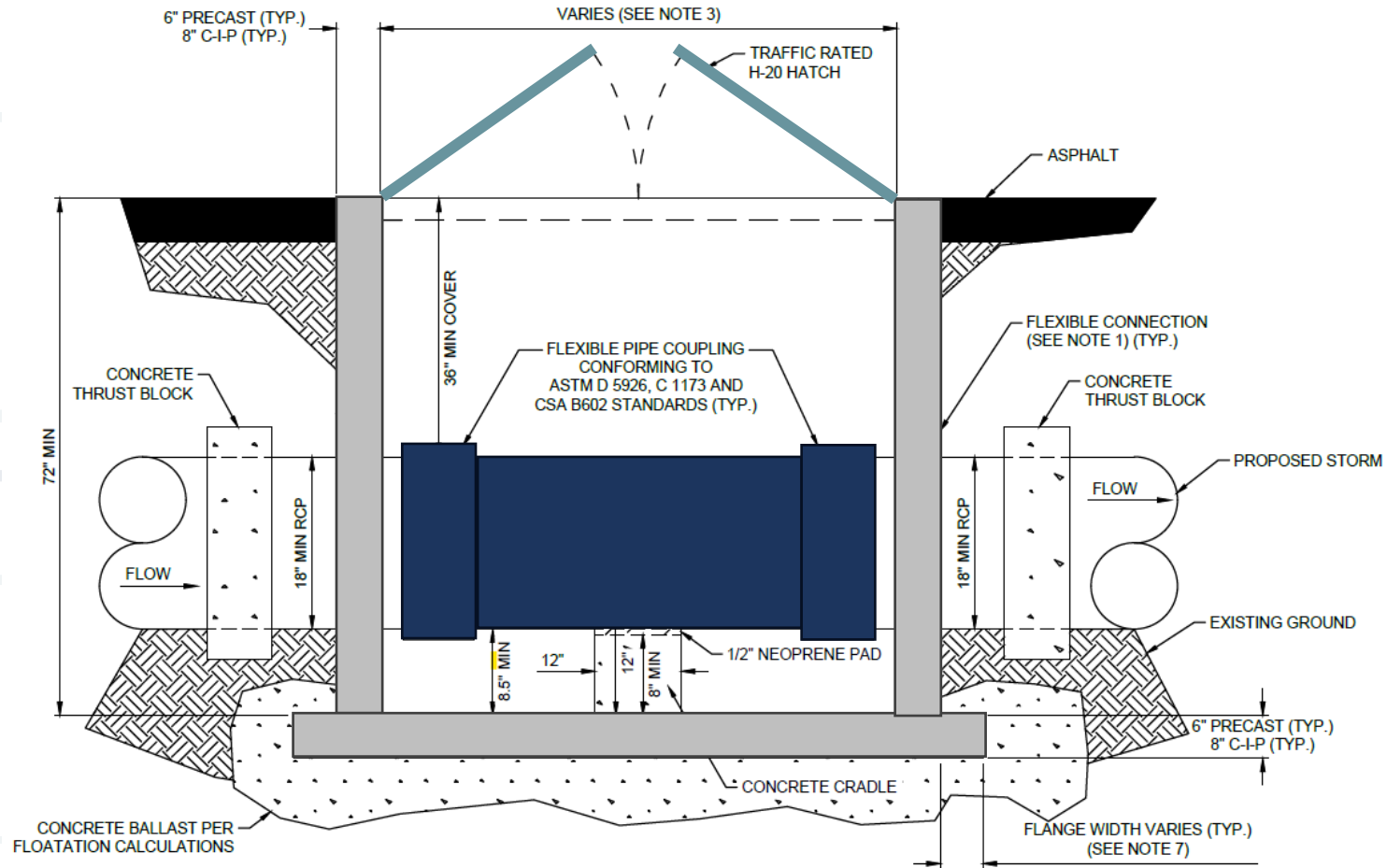
Relief from seawall bulkhead living shoreline, or retaining wall construction and elevation standards



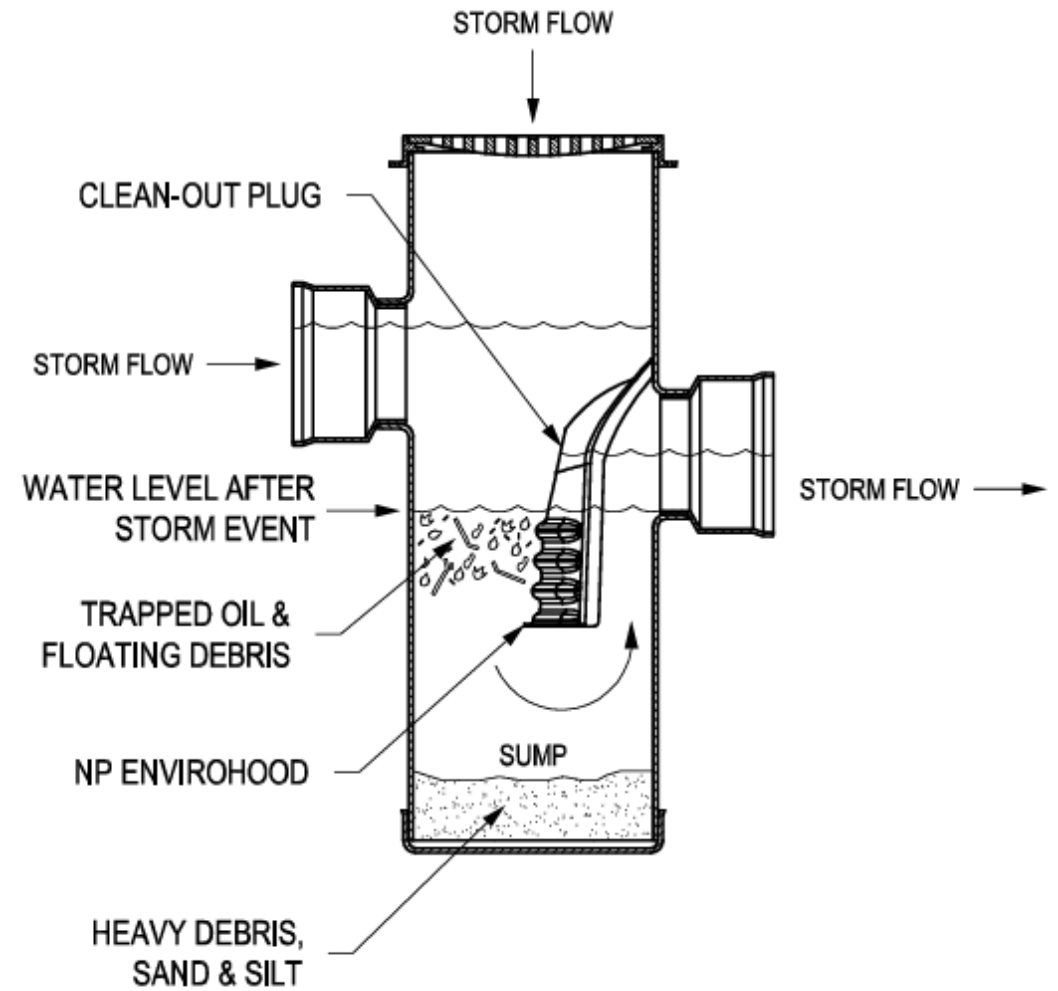
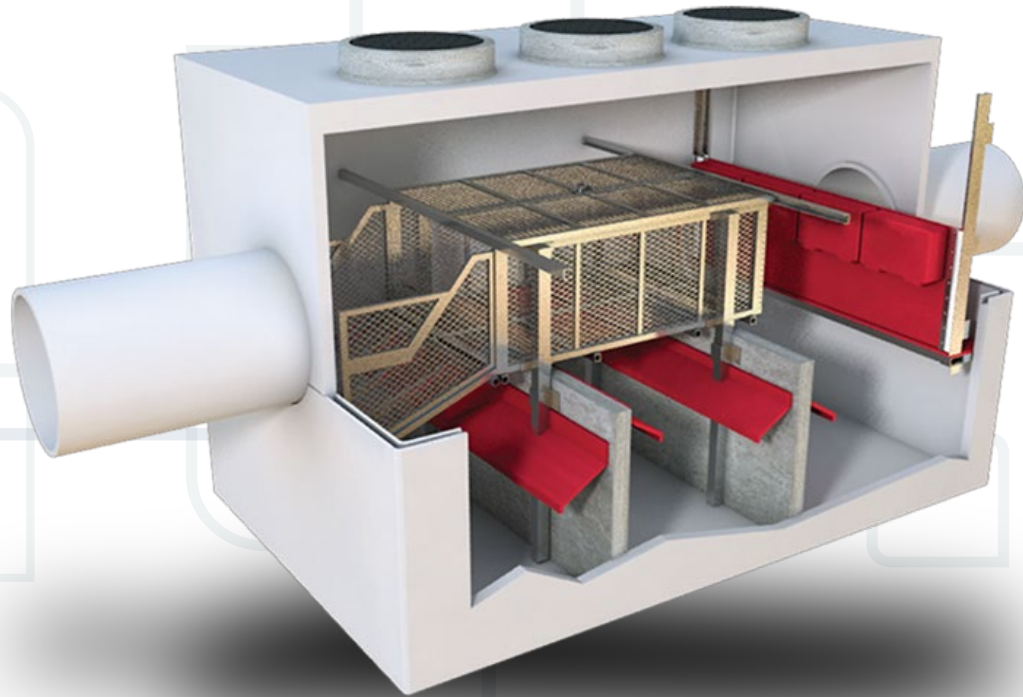
# Baffle Structure and Tide Check Valve Layout



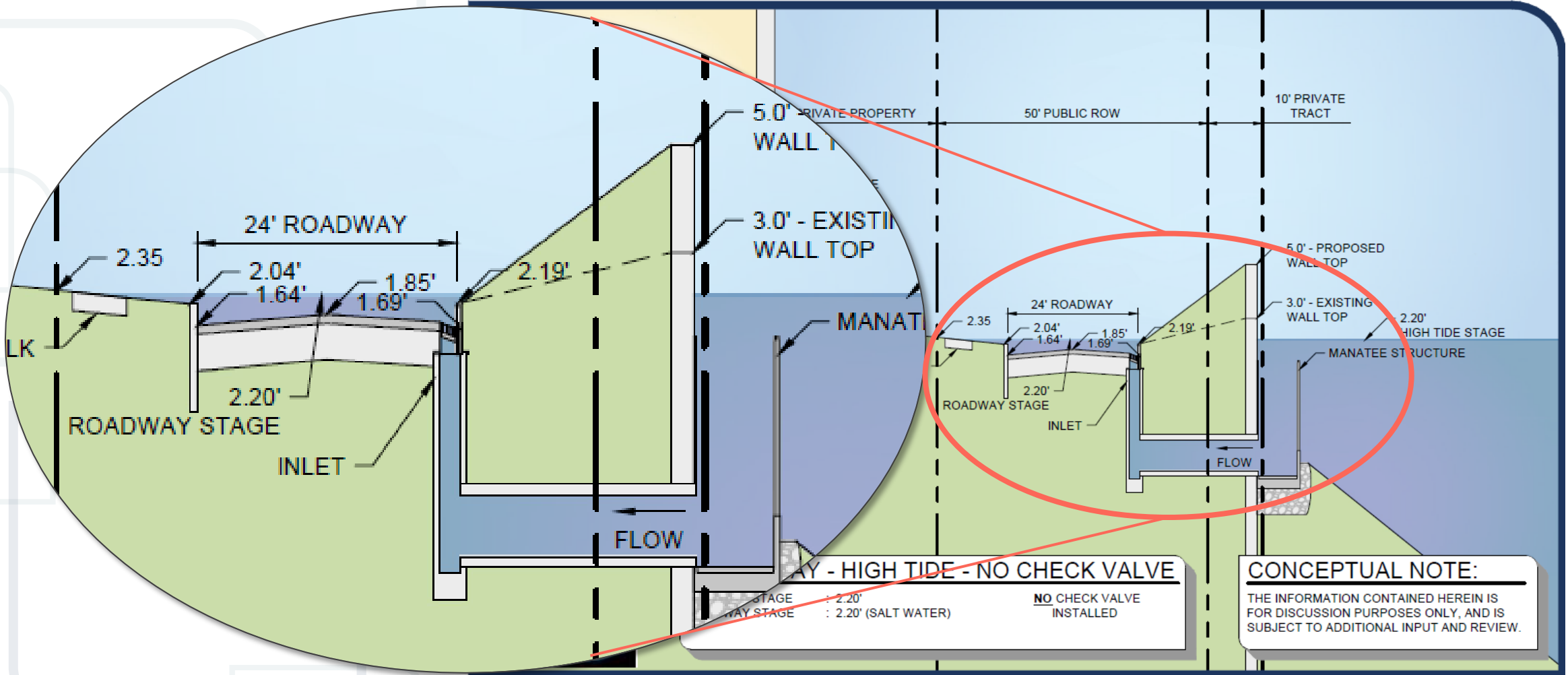
# Vaulted Tide Check Valve



# Implementing Baffle Structures



# Existing Conditions



**ROADWAY - HIGH TIDE - NO CHECK VALVE**

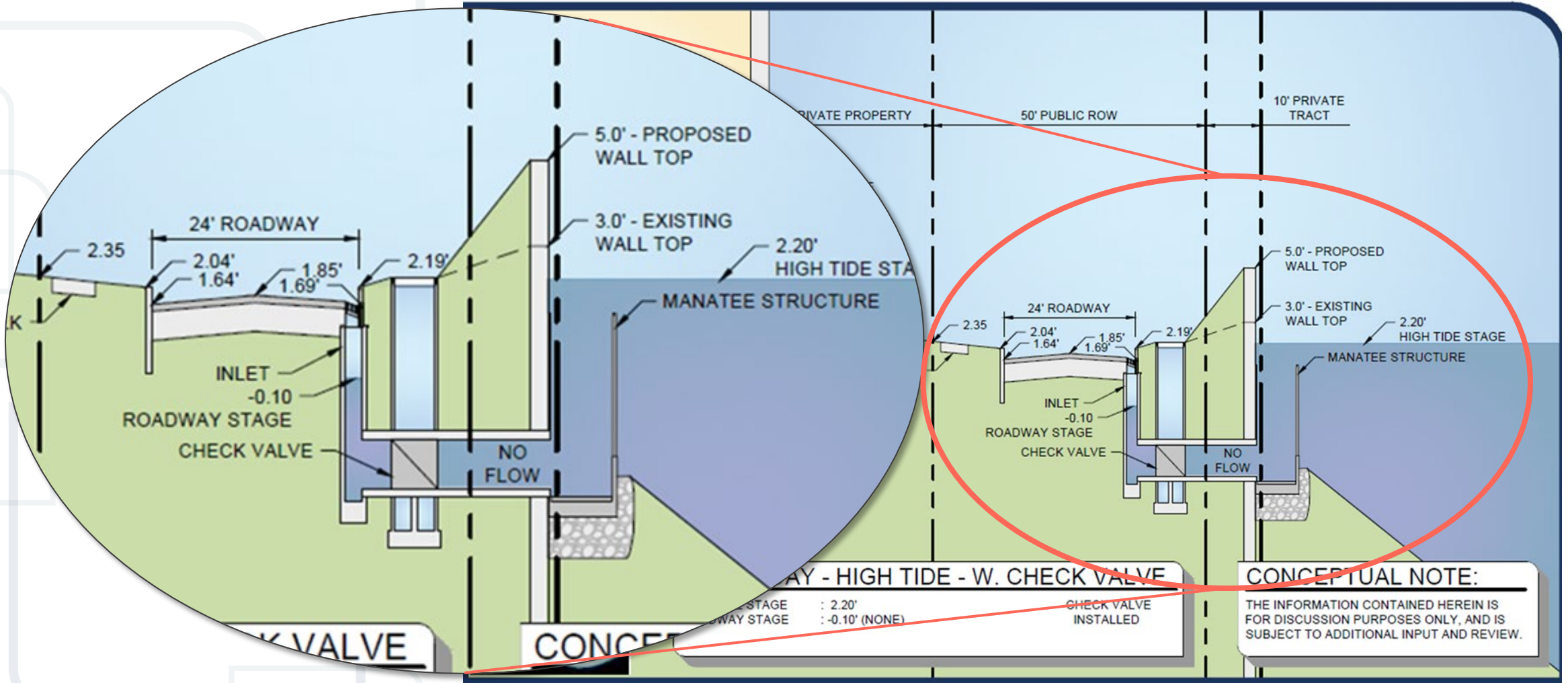
ROADWAY STAGE : 2.20'  
 ROADWAY STAGE : 2.20' (SALT WATER)

**NO CHECK VALVE INSTALLED**

**CONCEPTUAL NOTE:**

THE INFORMATION CONTAINED HEREIN IS FOR DISCUSSION PURPOSES ONLY, AND IS SUBJECT TO ADDITIONAL INPUT AND REVIEW.

# Future Conditions



# Sewer System Maintenance Project

- Reduce Emergency Repairs
- Improve Maintenance
- Plan for Long Term Upgrades



# ■ | Sewer System Maintenance Project Progress

- Pipe Cleaning: 27,925 LF complete / 90,975 LF total (~31% complete)
- CCTV: 16,193 LF complete / 90,975 LF total (~18% complete)
- Structure Inspections: 195 complete / 1,107 total (~18% complete)
- Projected Completion: August 2026 (est.)
- Key Issues:
  - Concrete inlet lid access
  - Diver-required outfall plugging
  - Extensive bypass/plugging

# Leveraging AI Technology

**PIONEER by SewerAI**

3022 Stormwater System Cleaning & Inspection

INSPECTIONS

Summary

Needs Attention 0

Updated: 1 week ago

Observations

| Time | Distance | Code | Clock From | Clock To | Dim. 1 | Dim. 2 | % | Joint | Remarks  | Continuous | Grade |
|------|----------|------|------------|----------|--------|--------|---|-------|----------|------------|-------|
| 0:00 | 0        | ACB  |            |          |        |        |   |       | STIN0385 |            |       |
| 0:06 | 0        | MWI  |            |          |        |        |   |       |          |            |       |

**PIONEER by SewerAI**

Inspection Maps

Search Address

Asset Id: 3022 Stormwater System Cleaning & Inspection

INSPECTIONS

Inspection Maps

Map Style

**PIONEER by SewerAI**

Risk Map

Stormwater Gravity Mains 2026

Showing: Inspected Assets, Uninspected Assets

You're viewing up to 10% of your risk data. Request an upgrade to full Risk & Rehab to see your entire network and prioritized Rehab Recommendations.

Legend

- Highest Risk - 5
- High Risk - 4
- Medium Risk - 3
- Low Risk - 2
- Lowest Risk - 1
- Not Available or 0

# Capital Improvement Projects

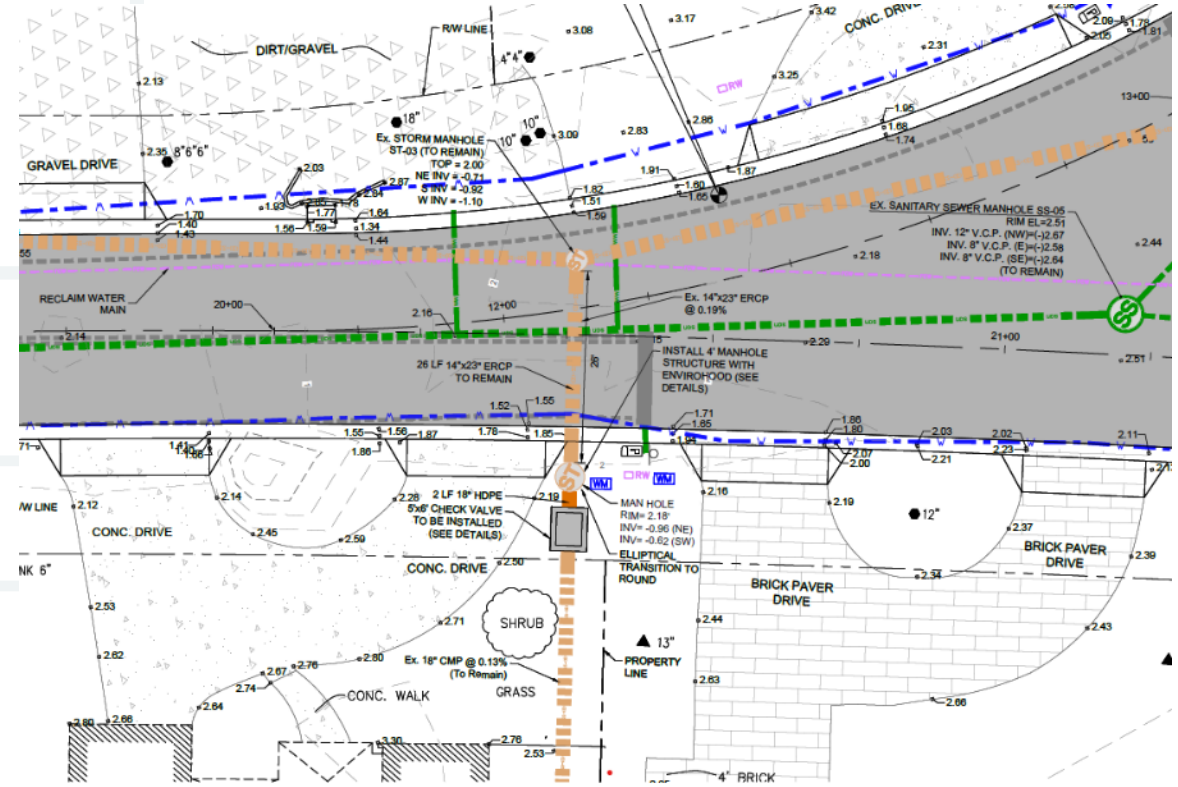
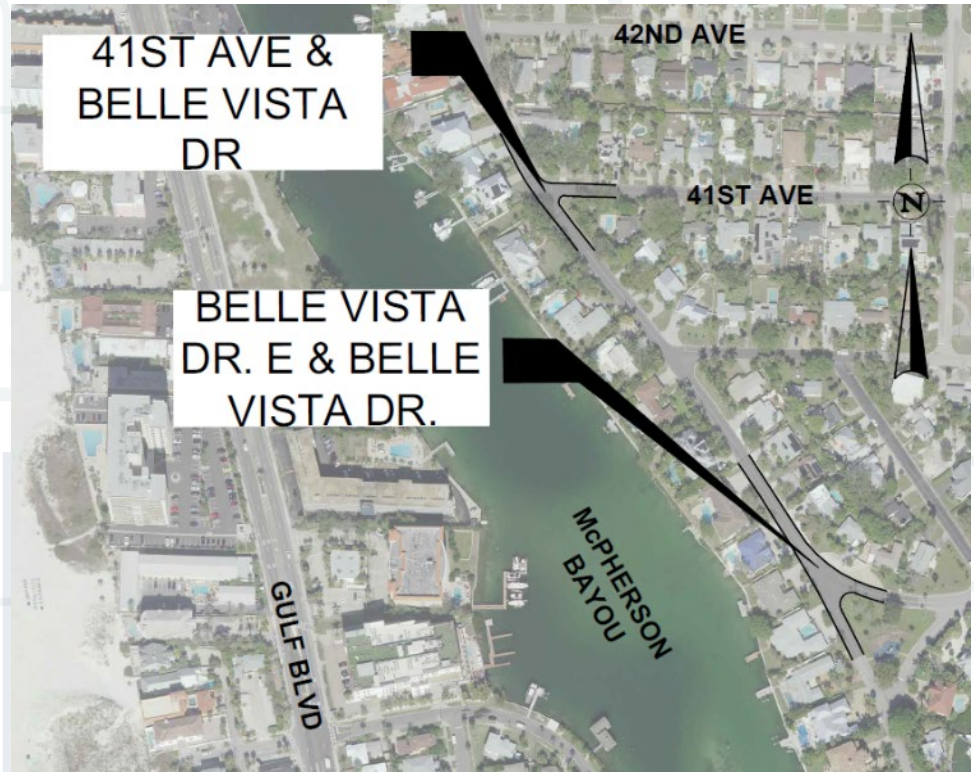


# Project Considerations



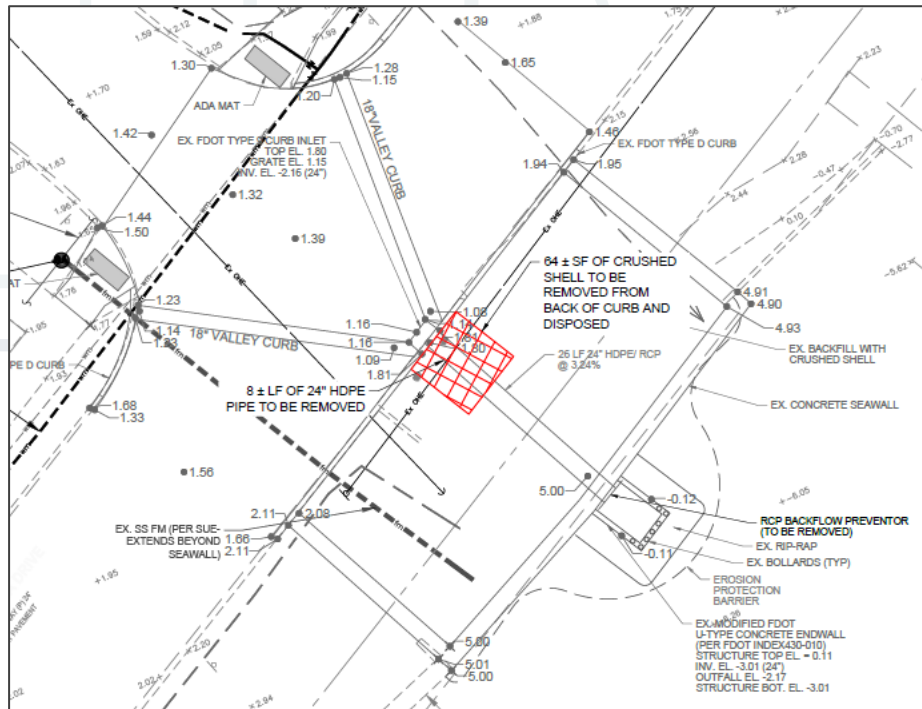
- Health and safety
- Transportation mobility
- Critical infrastructure protection
- Private property preservation
- Environmental impacts

# Project Location – Bella Vista



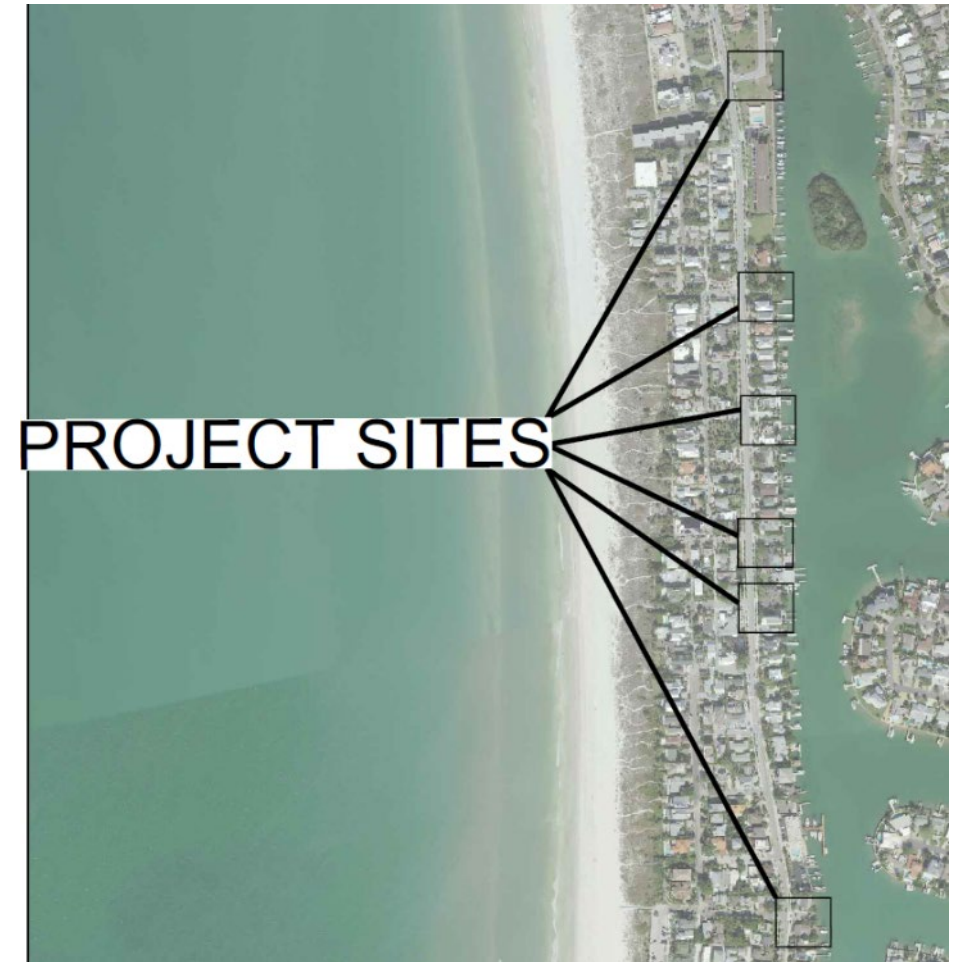
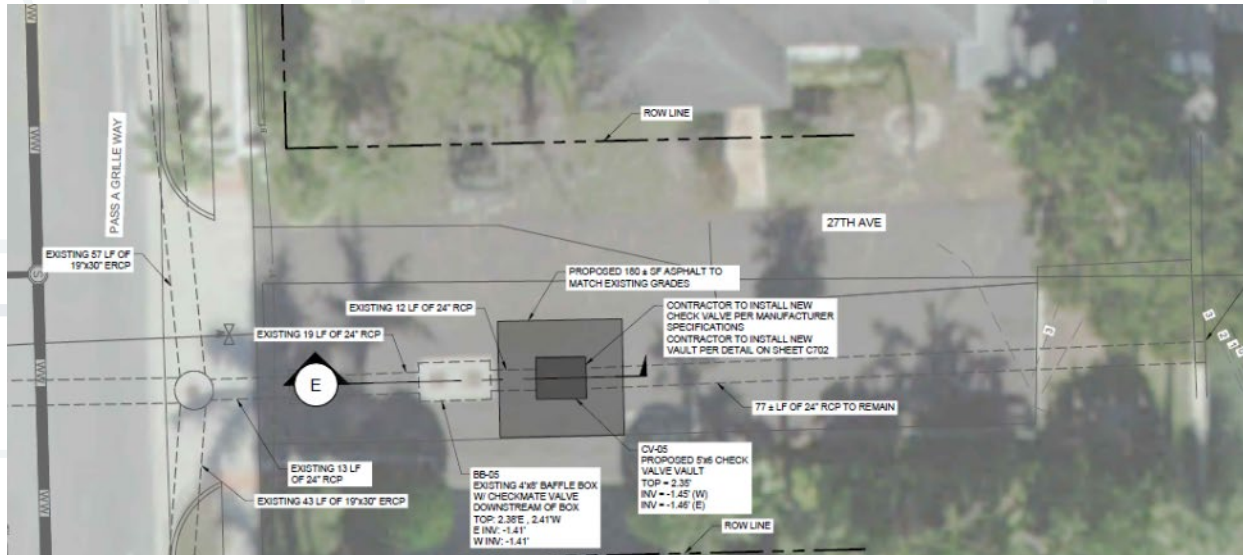
# Project Location – Don CeSar

- 37<sup>th</sup> Ave., Alhambra St., Alfonso St., 3107 W. Maritana Dr., and Don Jose St.



# Project Location – Pass-a-Grille

22<sup>nd</sup>, 27<sup>th</sup>, 28<sup>th</sup>, 29<sup>th</sup>, 30<sup>th</sup>, Cabrillo Aves.



# Before and After



3612 E Maritana Dr



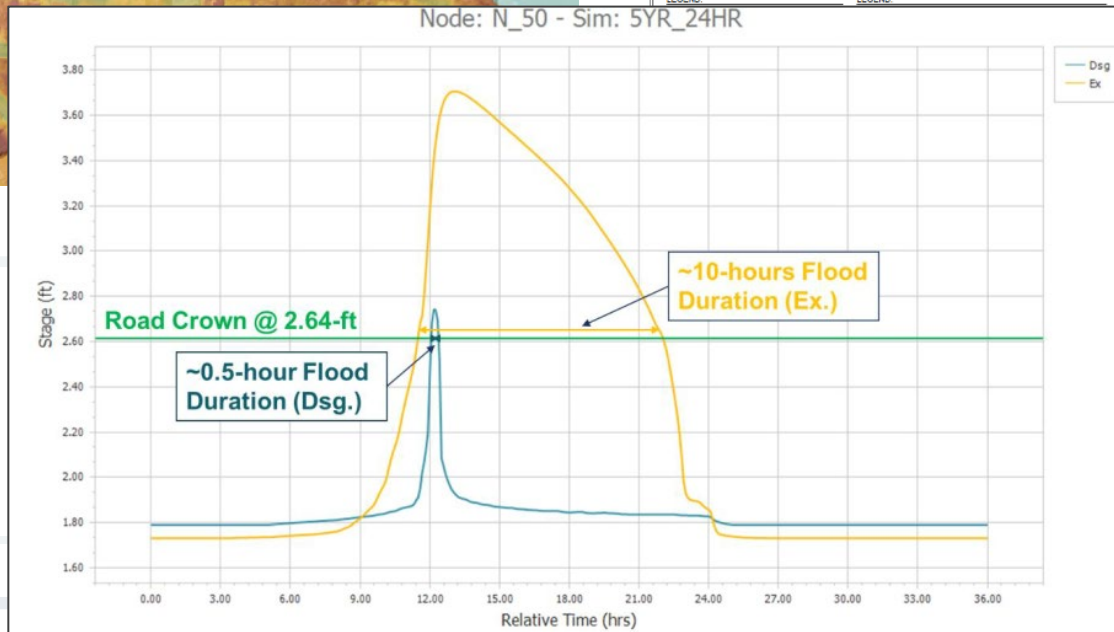
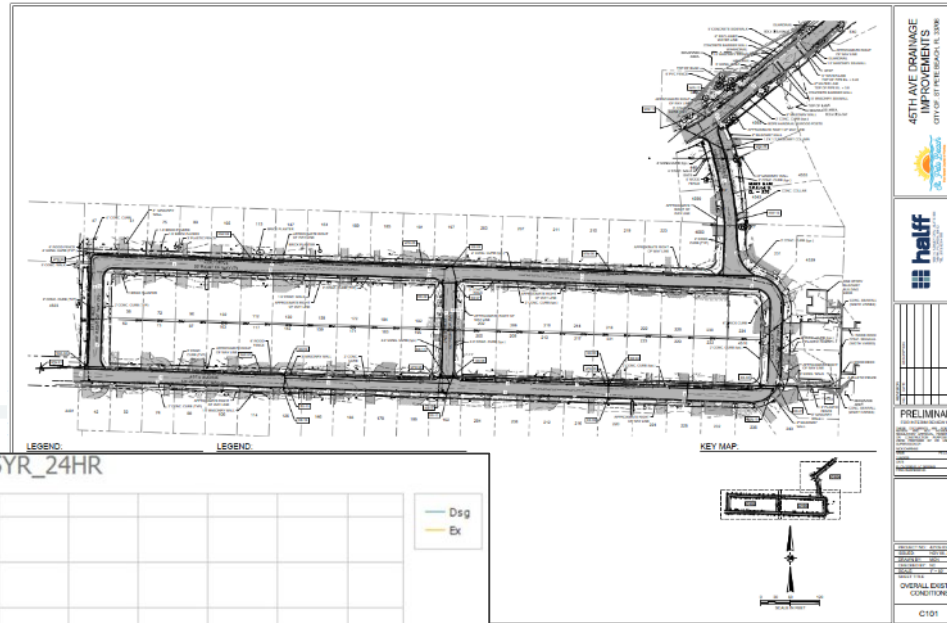
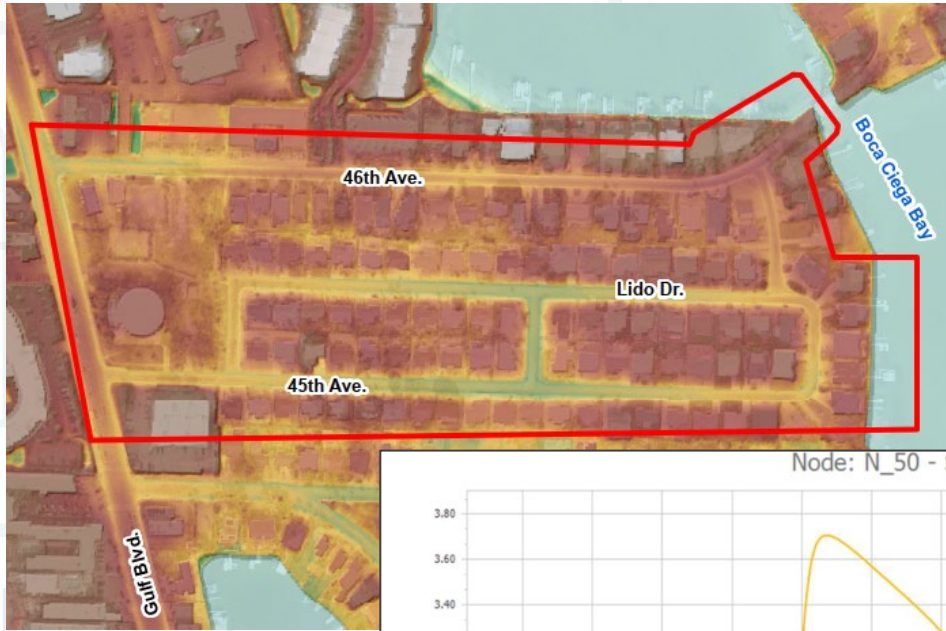
# Before and After



3107 W Maritana Dr



# 45TH AVENUE STORMWATER PUMP STATION





# COASTAL RESILIENCE IN ACTION

St. Pete Beach's Blueprint for Smarter Stormwater Management

