



SEABROOK ISLAND  
*Property Owners Association*

# High Tides, Storm Surge, and Rain; A Discussion about Flooding

Get the Scoop Presentation

October 2, 2023

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## Goals for Today



Understand Why / How Flooding Occurs



Explore Available Resources



Explain What is Being Done



Answer Questions

## 3 Ways for Flooding to Occur



TIDAL FLOODING



STORM SURGE

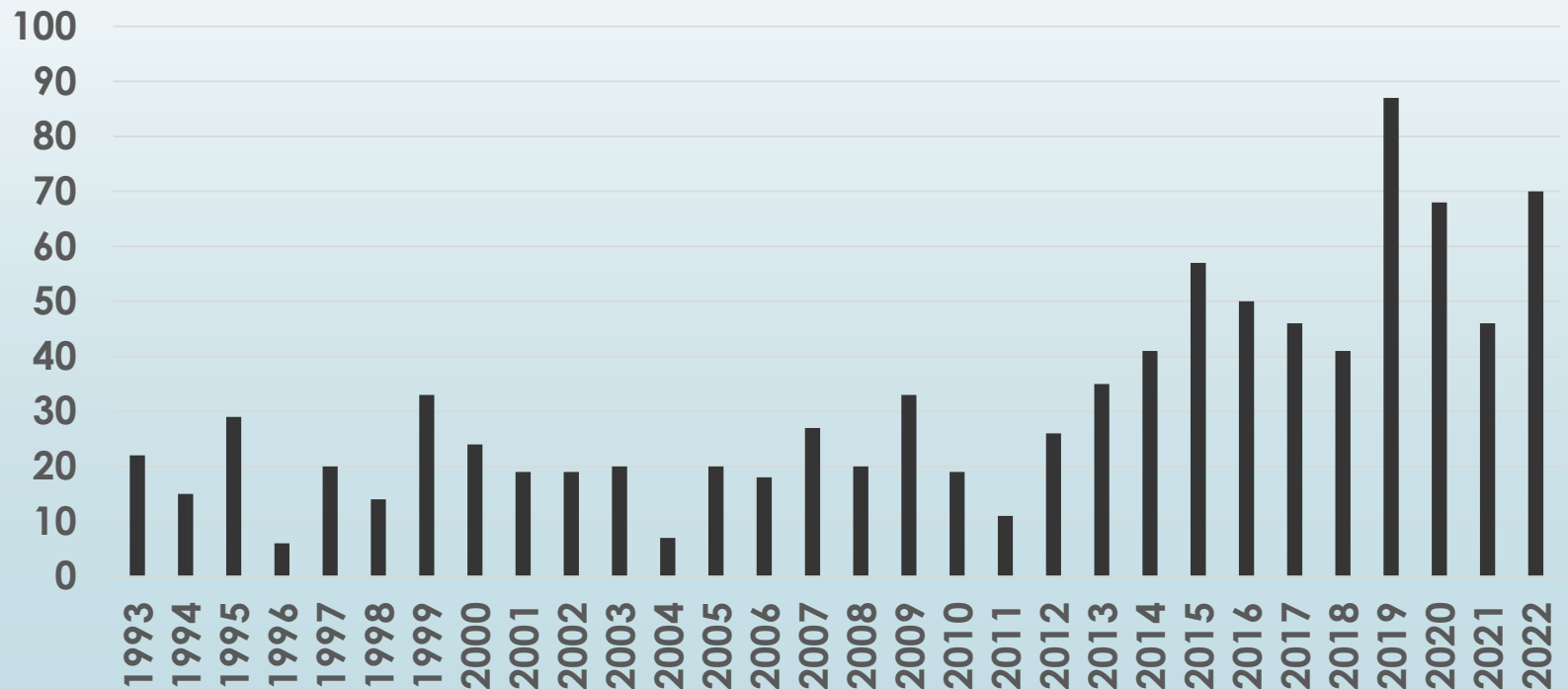


RAIN EVENT

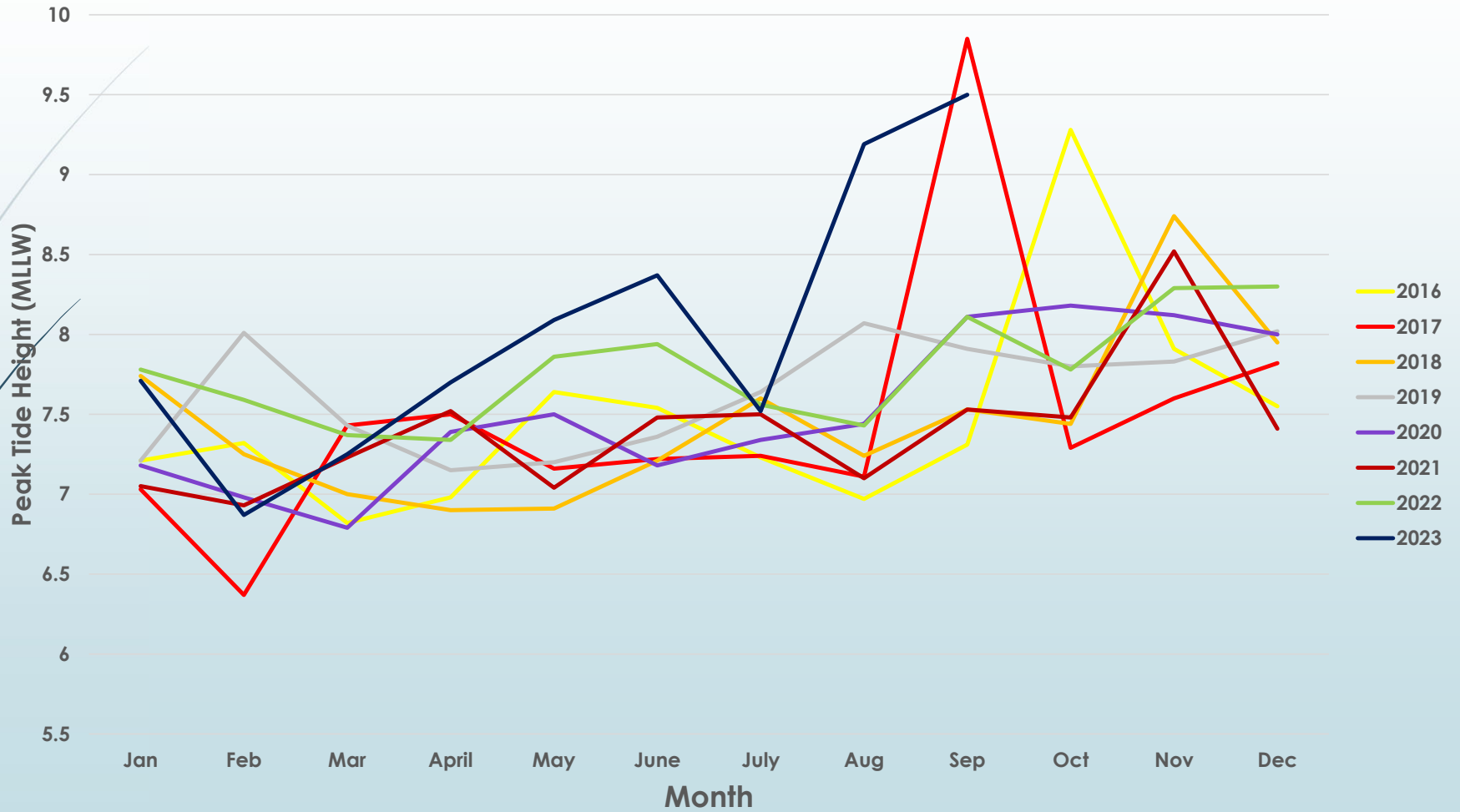
# What is Tidal Flooding?

- The average highest daily tide in Charleston Harbor is 5.76' MLLW
- Charleston County issues a Coastal Flood Advisory for any tide over 7.0'

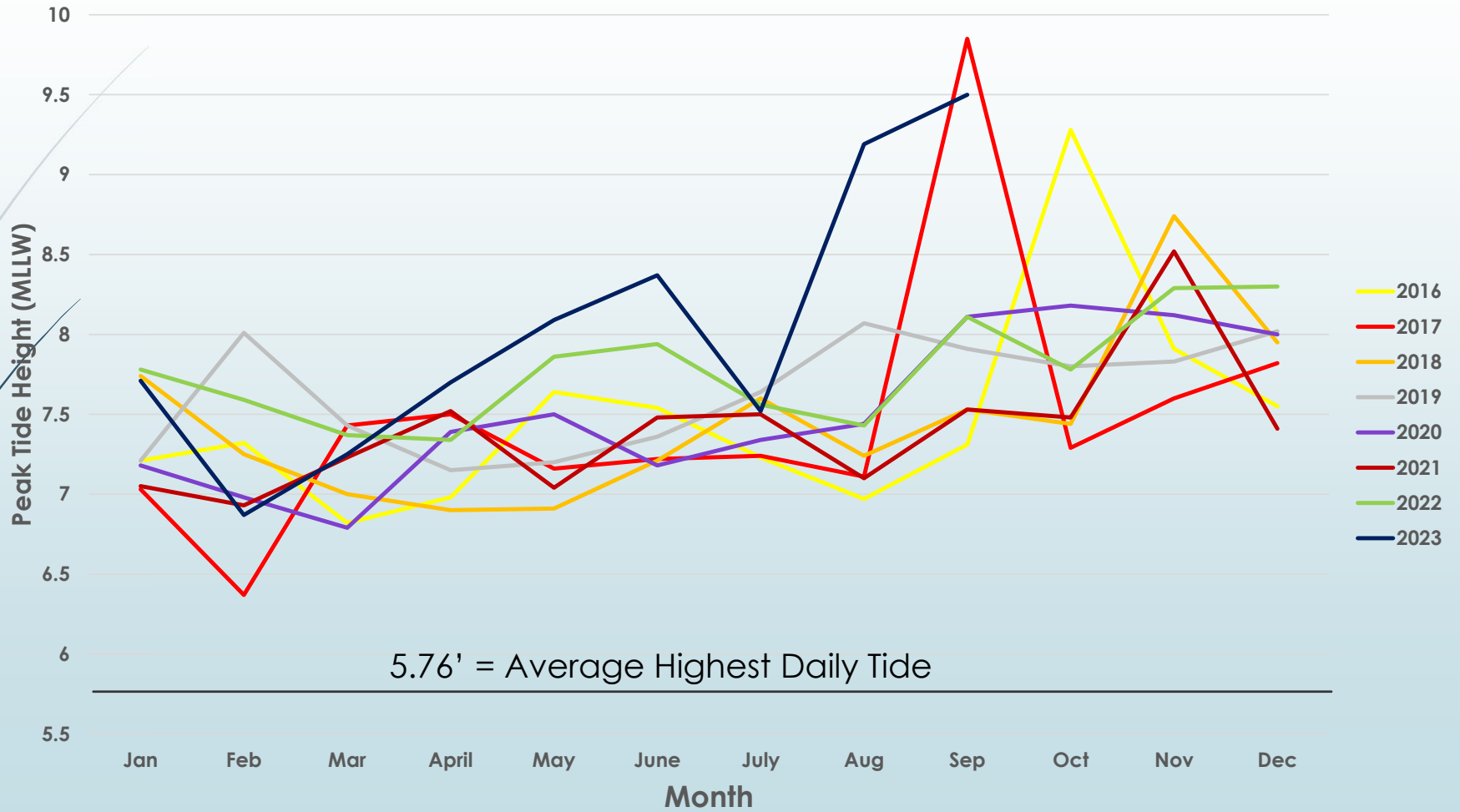
Charleston County Annual Tidal Flooding Days



# Charleston Harbor Tide Gauge Data

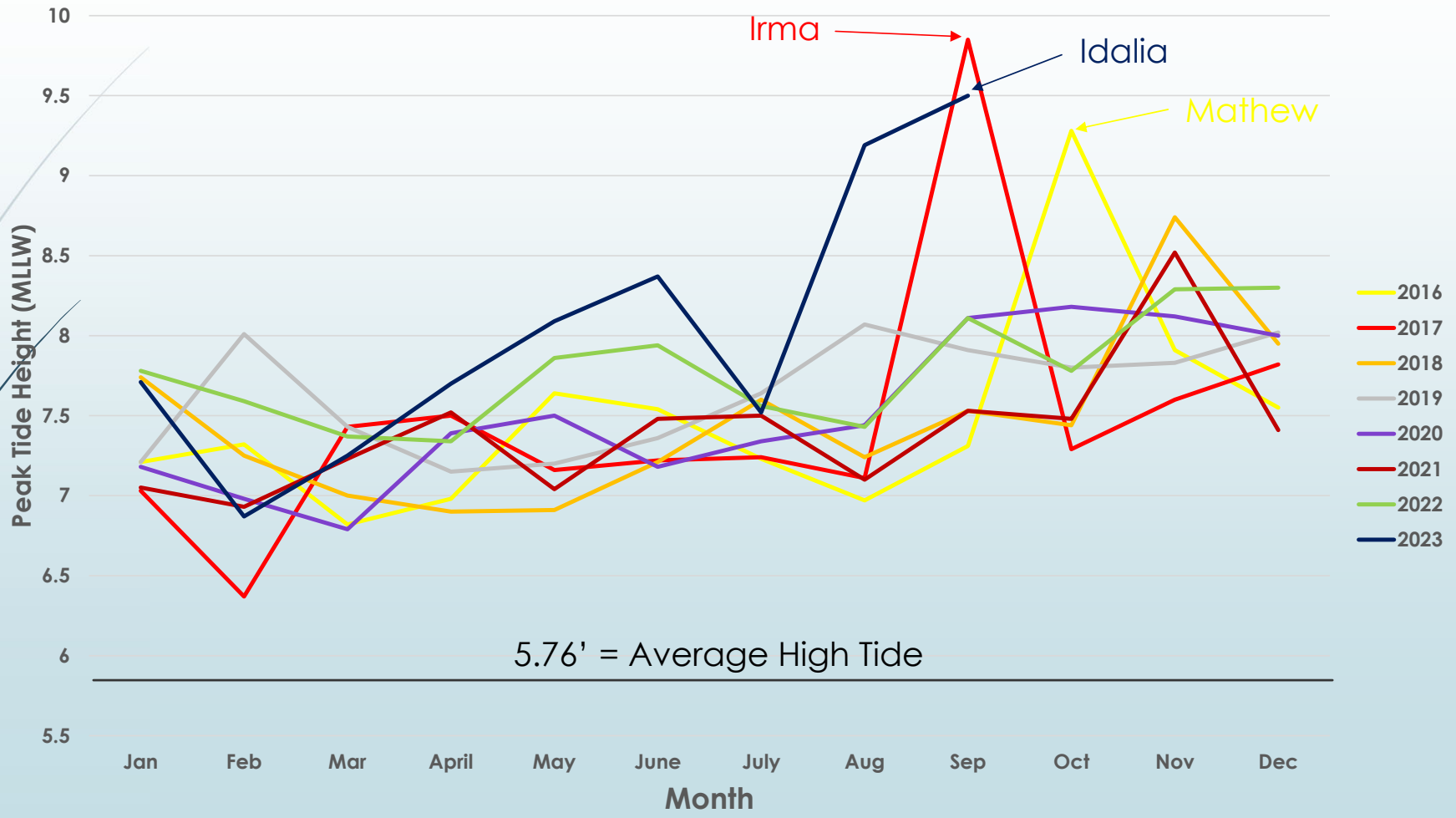


# Charleston Harbor Tide Gauge Data



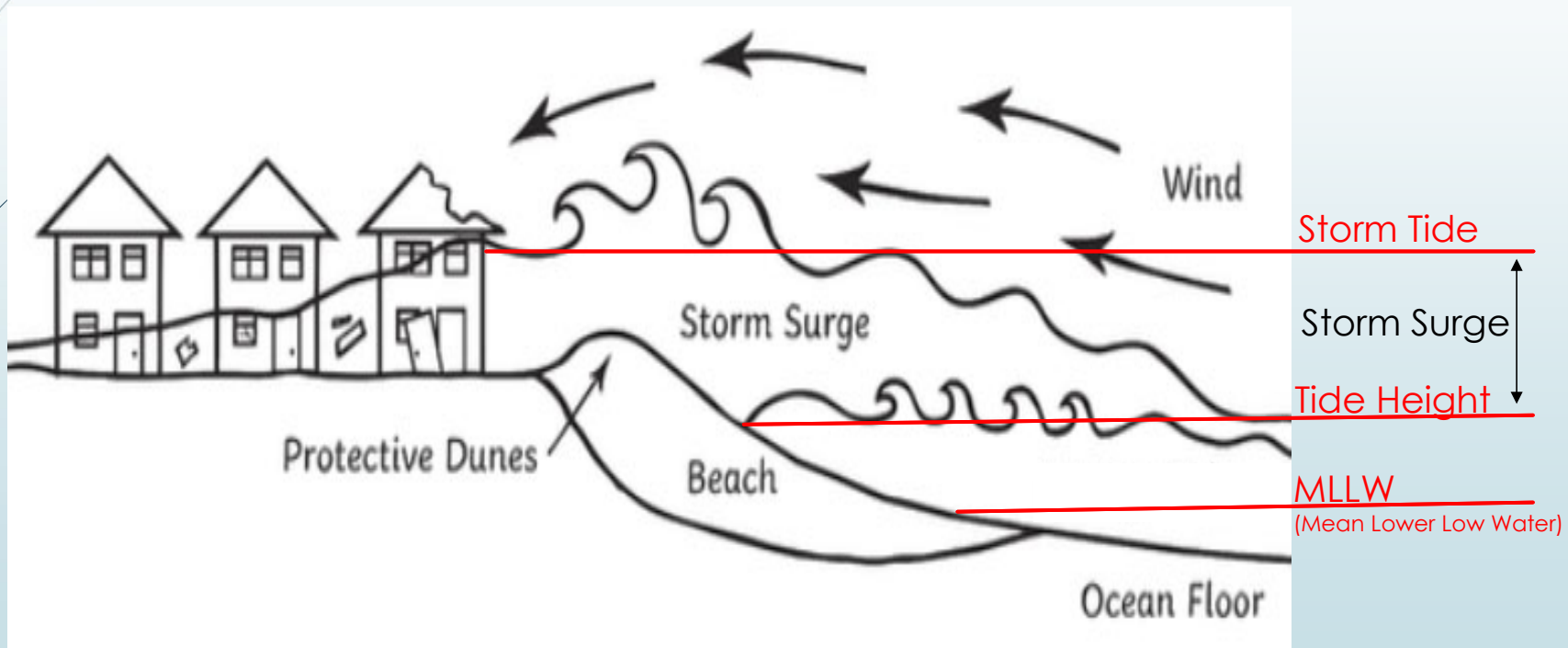
5.76' = Average Highest Daily Tide

# Charleston Harbor Tide Gauge Data



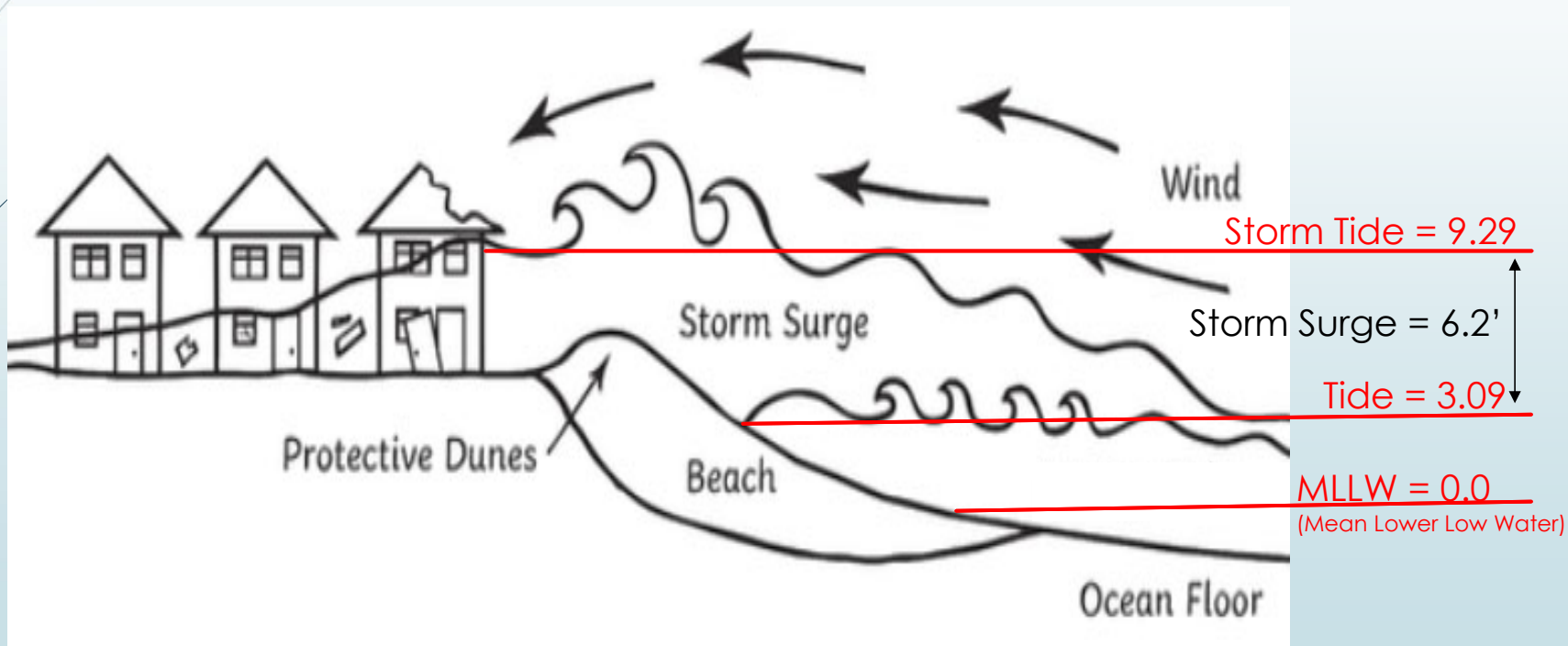
5.76' = Average High Tide

# What is Storm Surge?

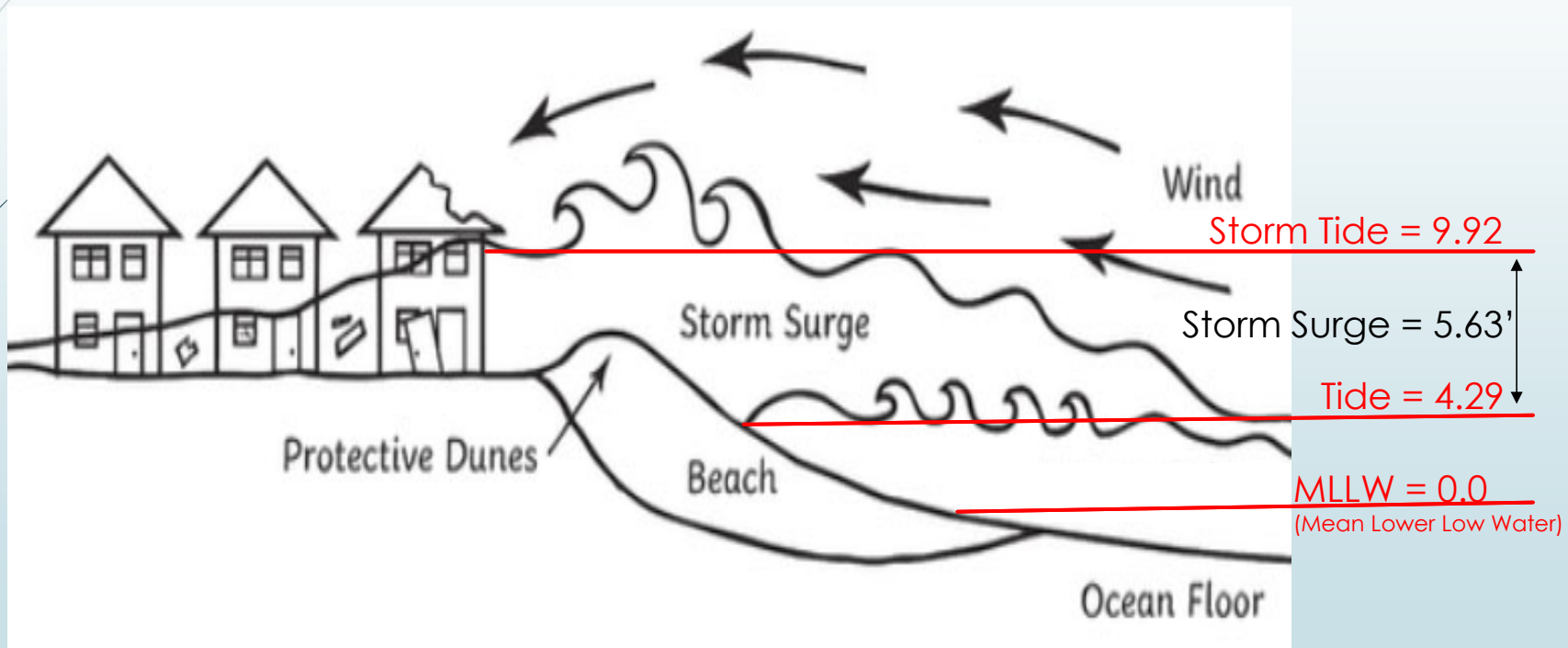




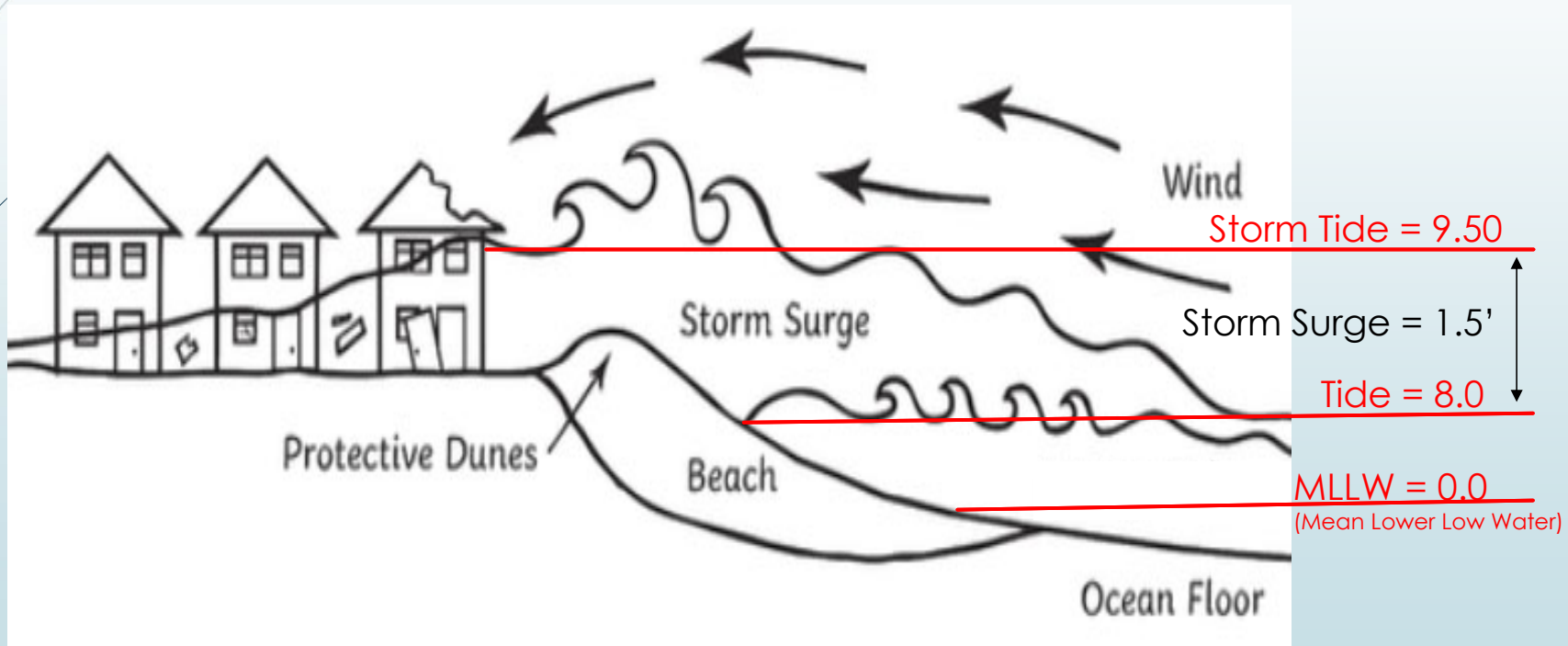
# Hurricane Matthew



# Hurricane Irma

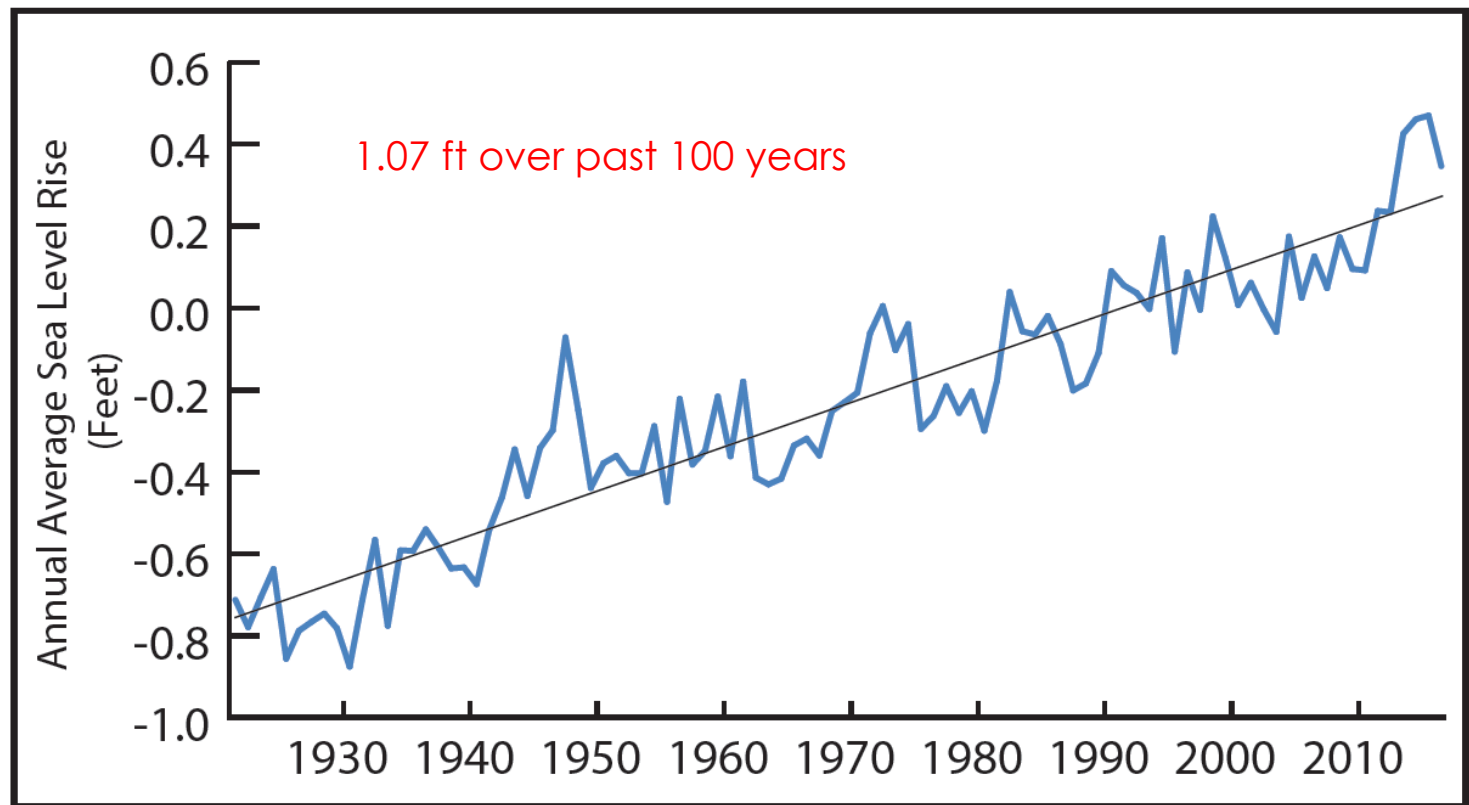


# Hurricane Idalia



# What is Sea Level Rise?

FIGURE 1: OBSERVED SEA LEVEL RISE IN CHARLESTON HARBOR<sup>(1)</sup>



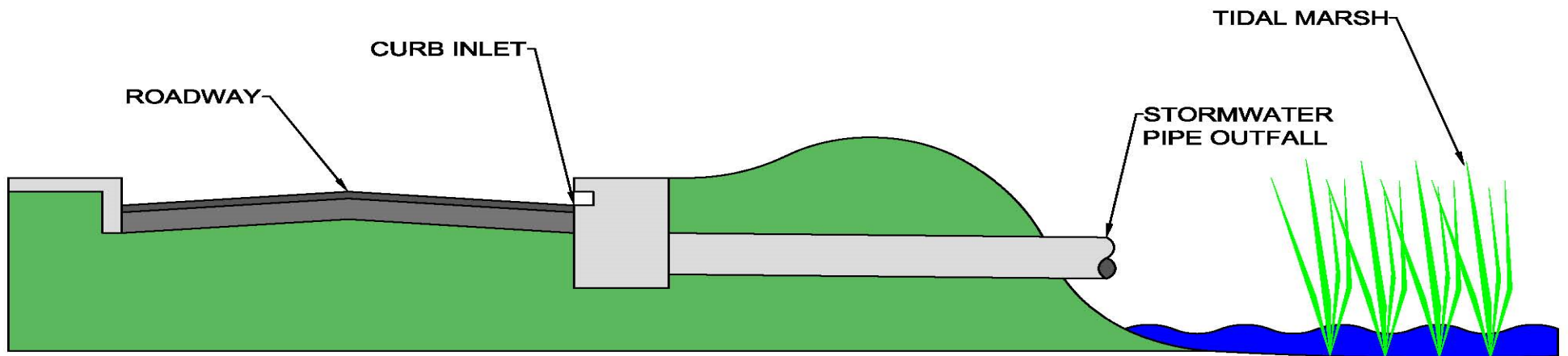
Source: City of Charleston 2019 Flooding and Sea Level Rise Strategy

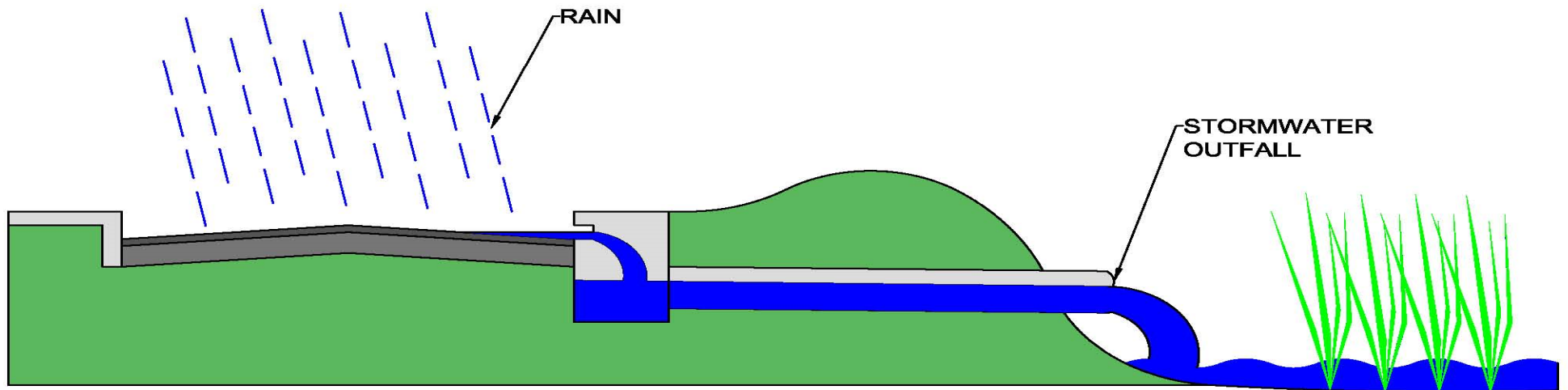
# Flooding from Rain

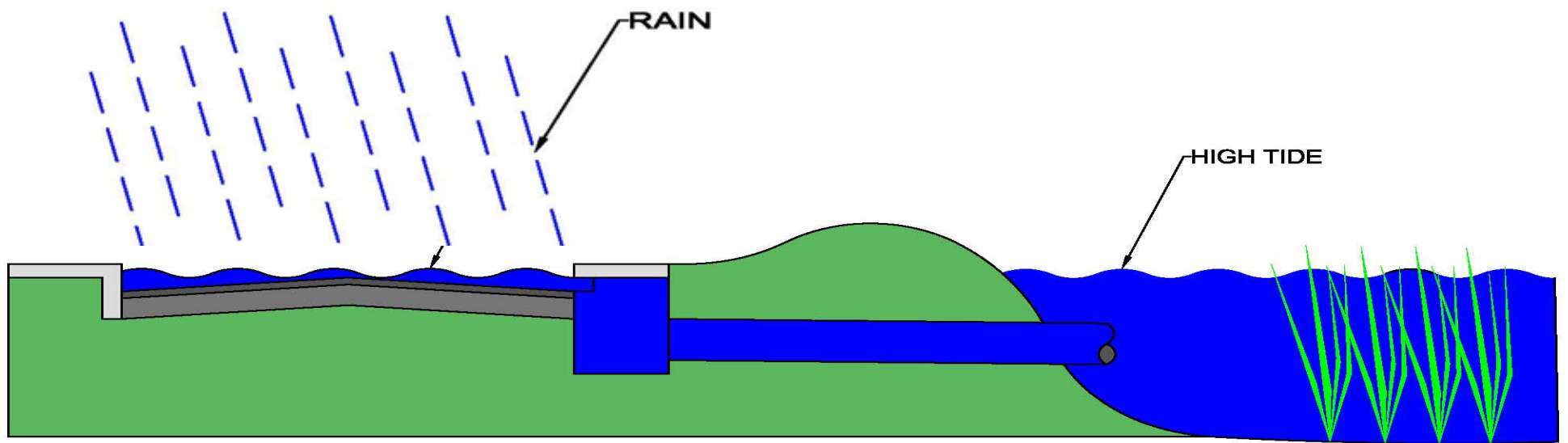
- In general, Seabrook Island is designed to accommodate a 10-yr rain event
- Charleston Stormwater Design Standards for 24-hour rain event

1-yr	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
3.5"	4.2"	5.5"	6.5"	7.9"	9.0"	10.3"

- Tropical Storm Joaquin (rainfall data from Charleston airport)
  - 5.1" on 10-3-15 (max tide height 8.14')
  - 9.1" on 10-4-15 (max tide height 8.16')
- **RAIN FLOODING CAN BE IMPACTED BY TIDE HEIGHT!**



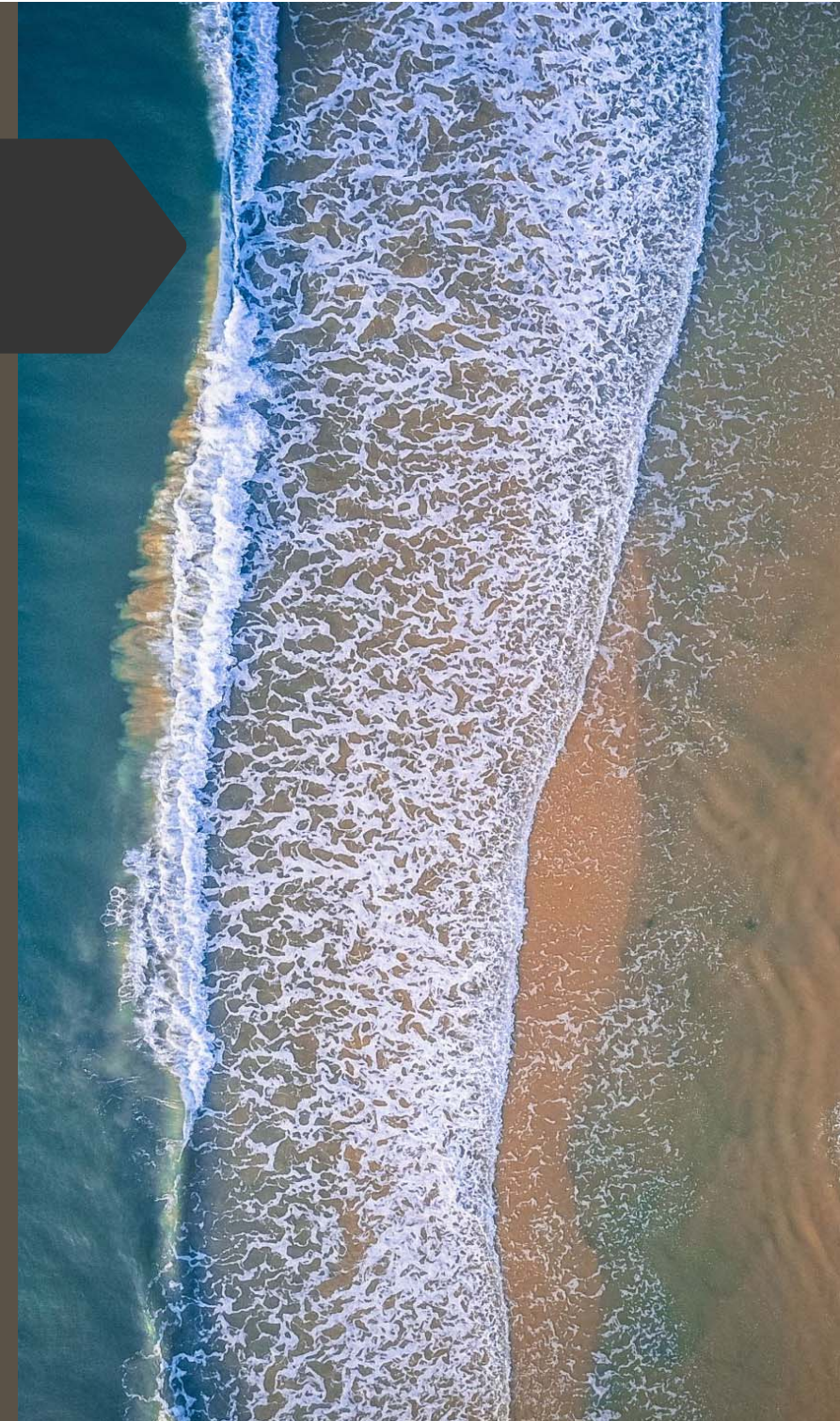




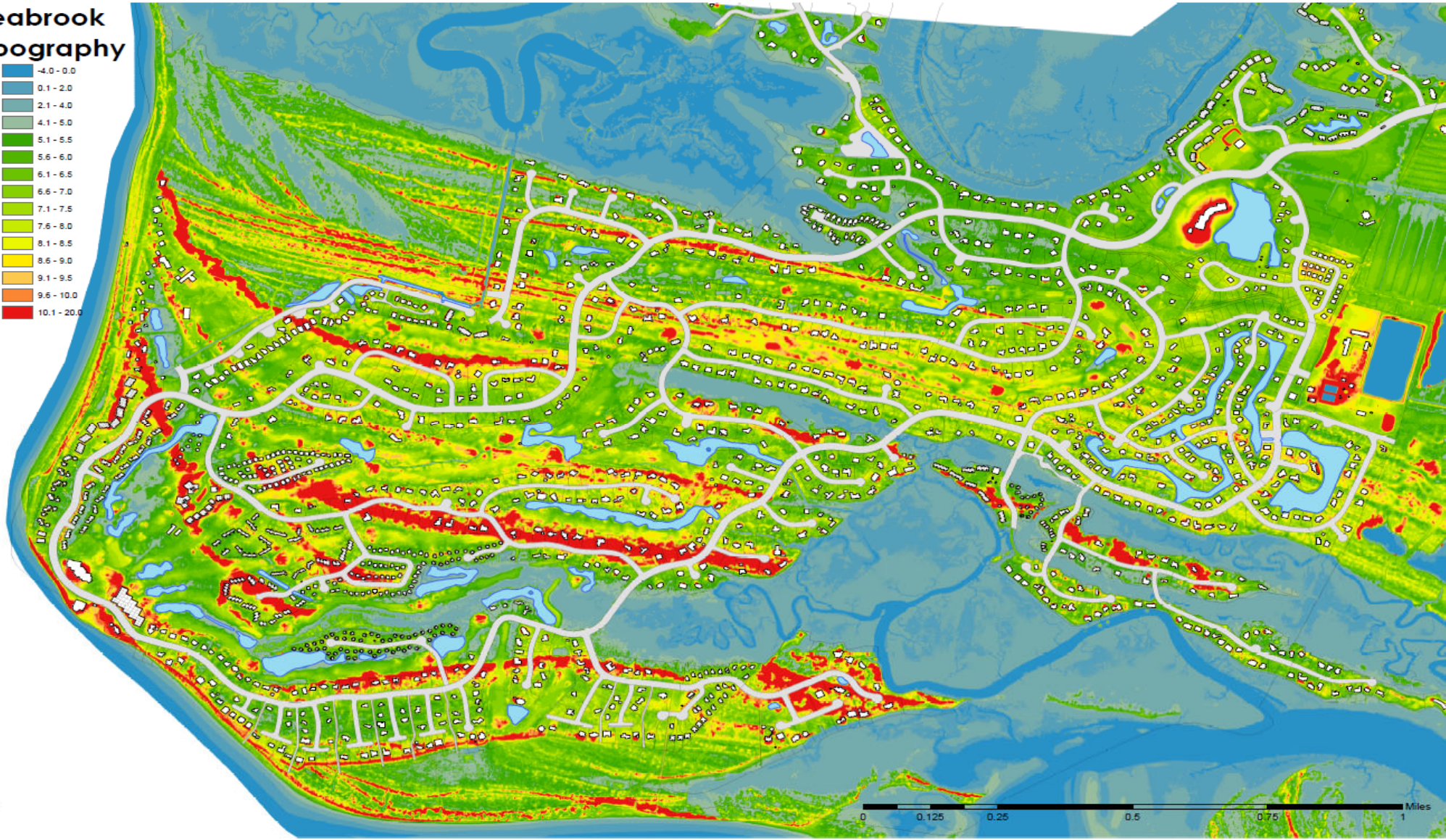
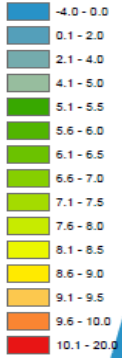


# Available Resources

- ▶ National
  - ▶ [NOAA Sea Level Rise Viewer](#)
  - ▶ [FEMA Flood Risk Maps](#)
- ▶ State and Local
  - ▶ [SCDHEC King Tides Initiative](#)
  - ▶ [Charleston Harbor Tide Gauge Station](#)
  - ▶ [City of Charleston Flooding and Sea Level Rise Strategy](#)
  - ▶ [Kiawah Flood Mitigation and Sea Level Rise Adaptation](#)
  - ▶ [Folly Beach Sea Level Rise Adaptation](#)
  - ▶ [Charleston Resiliency Network Toolkit](#)
  - ▶ [Charleston County Hurricane Preparedness Guidelines](#)
- ▶ Specific to Seabrook
  - ▶ Seabrook Island Topography
  - ▶ [Seabrook Island Tidal Flood and Storm Surge Viewer](#)
    - ▶ <https://arcg.is/1mLz01>



# Seabrook Topography



# What is being done?



MAINTAIN  
STORMWATER  
SYSTEM



CONDUCT ISLAND  
WIDE DRAINAGE  
STUDY



INSTALL  
STORMWATER  
CHECK VALVES



FEMA COMMUNITY  
RATING SYSTEM



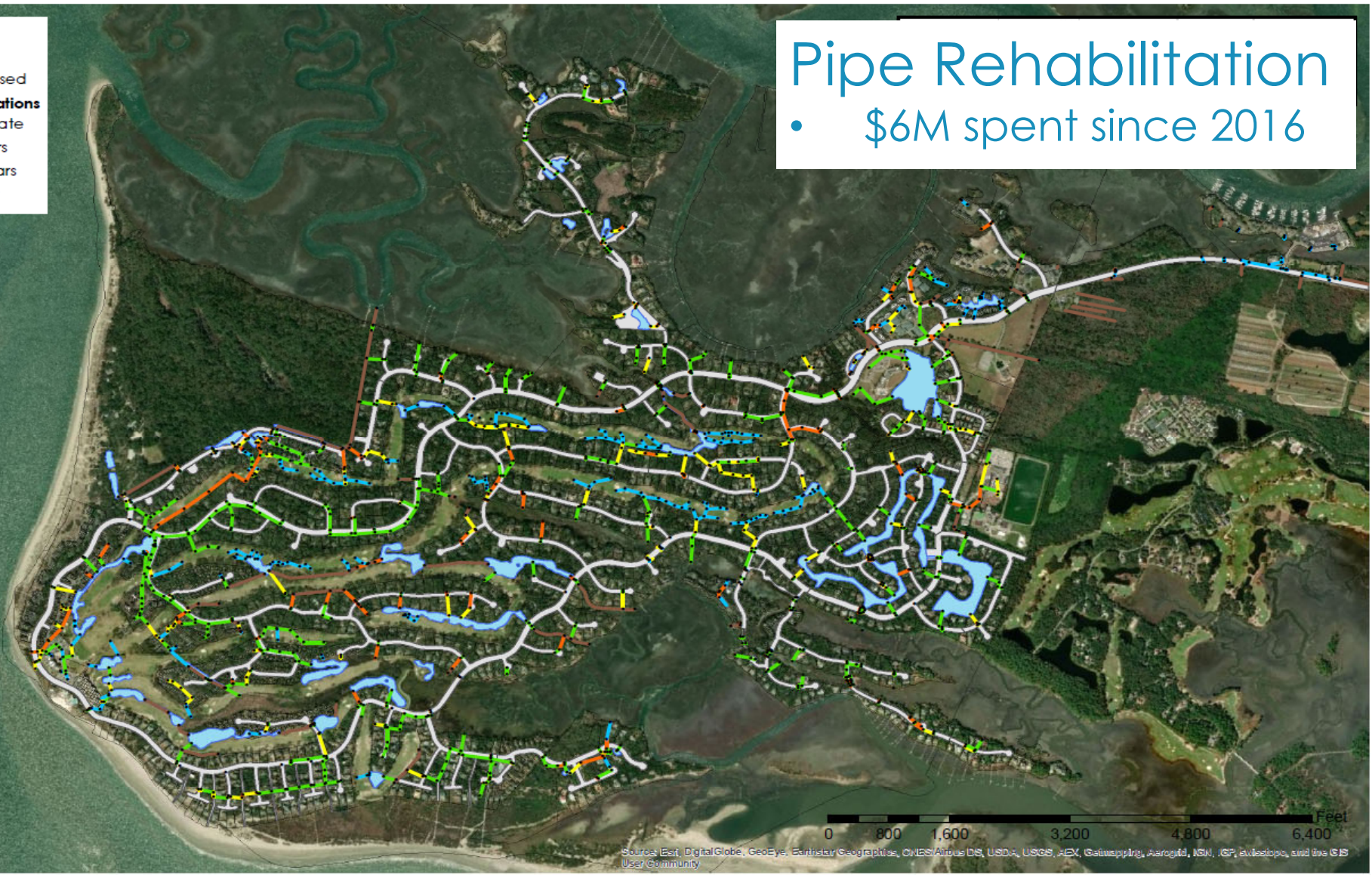
INSTALL LOCAL TIDE  
GAUGE STATION

**Legend**

- Ditch
- Unassessed
- Recommendations**
- Immediate
- 2-4 years
- 5-10 years
- Monitor

# Pipe Rehabilitation

- \$6M spent since 2016



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroX, Bing, GeoEye, IGN, Aerospac, and the GIS User Community

# Island Wide Drainage Study



STORMWATER  
CAPACITY  
ANALYSIS



TIDAL FLOOD  
MITIGATION



CRITICAL  
INFRASTRUCTURE  
CONDITION  
ASSESSMENT



CAPITAL PROJECT  
RECOMMENDATIONS



CAPITAL PROJECT  
COST ESTIMATES AND  
PRIORITIZATION

- ▶ Study completed in 2020
- ▶ 6 recommended stormwater projects completed since 2020
- ▶ Currently replacing stormwater pump station 2 at a cost of \$1.7M
- ▶ [Island Wide Stormwater Drainage Study](#)
- ▶ [Stormwater Pump Station #2 Replacement](#)
- ▶ [Ocean Winds #15 Tide Mitigation Structure](#)

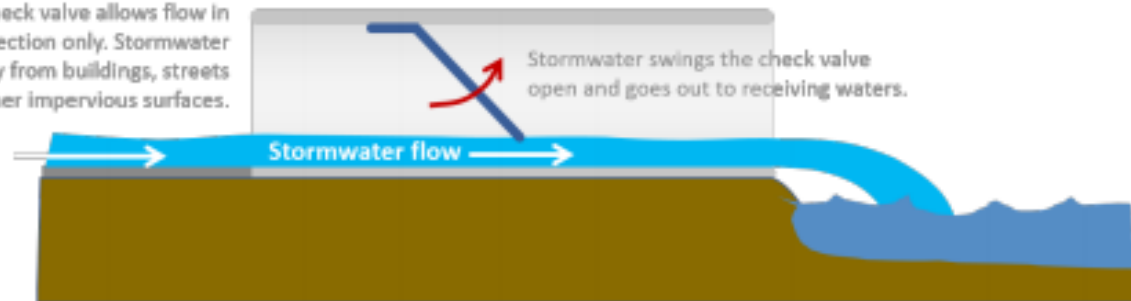
# Stormwater Check Valves

► Prevent tidal flooding of roadways

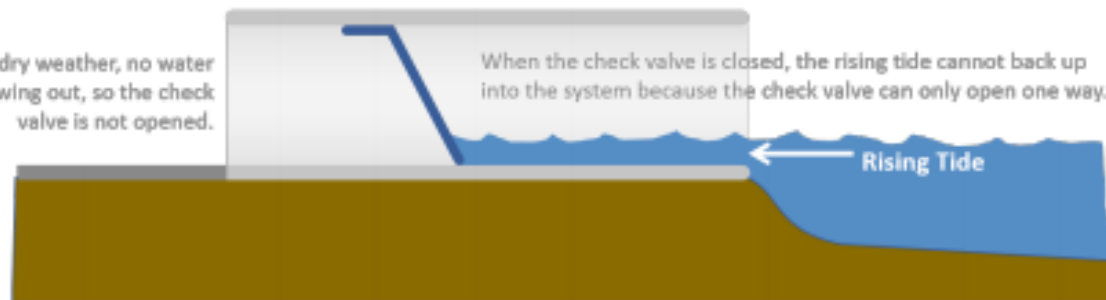
► Currently have 31 installed

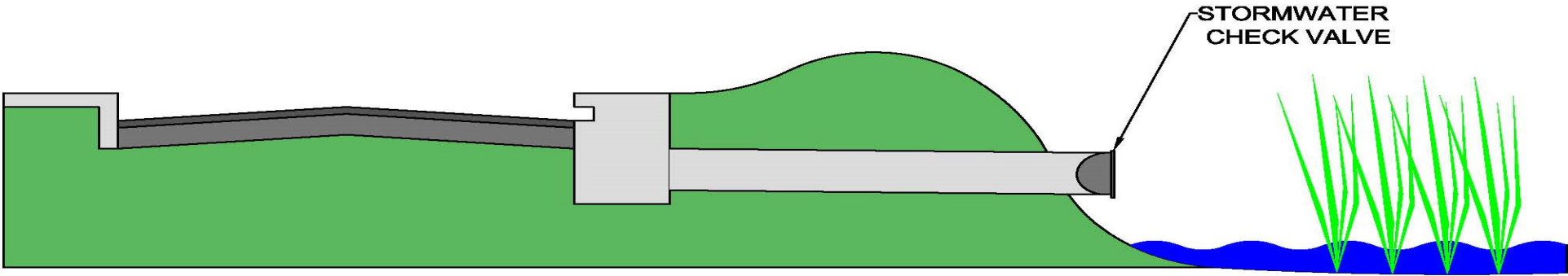
## HOW DOES AN IN-LINE CHECK VALVE WORK?

An in-line check valve allows flow in one direction only. Stormwater flows away from buildings, streets and other impervious surfaces.

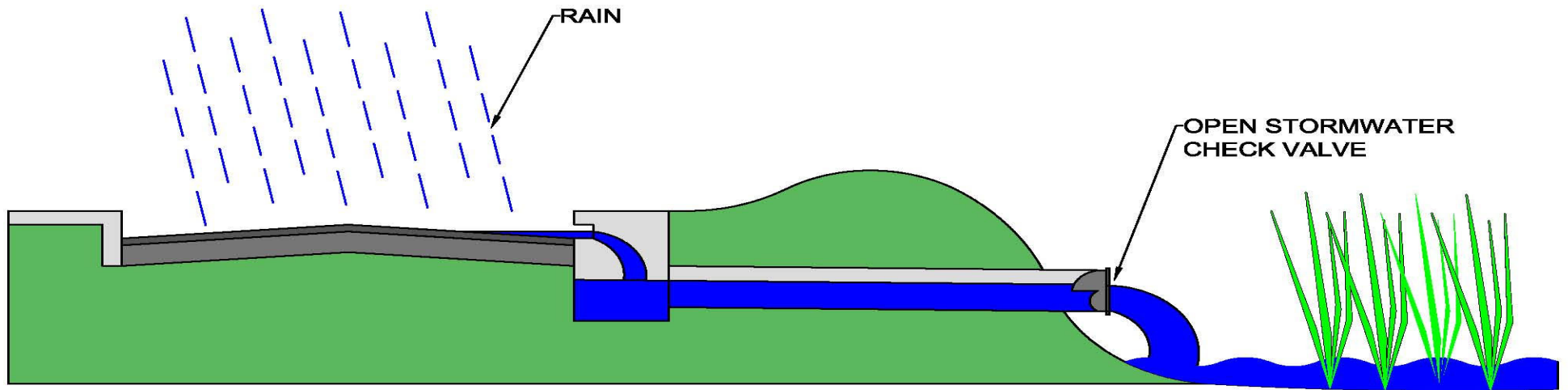


During dry weather, no water is flowing out, so the check valve is not opened.

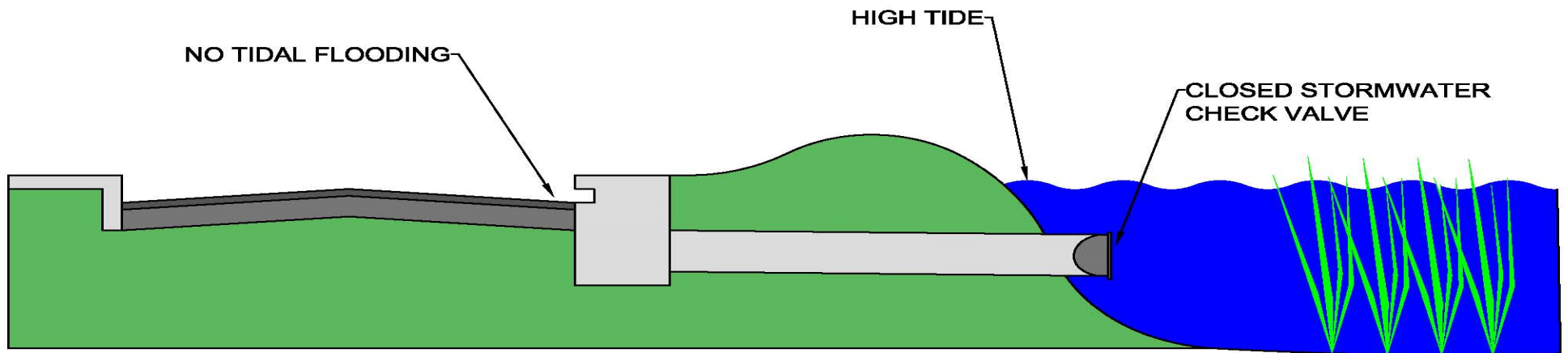




STORMWATER  
CHECK VALVE







## FEMA Community Rating System (CRS)

- Coordinated through the Town of Seabrook Island
- On May 1, 2016, Seabrook Island improved their rating under the CRS program from a class 6 to a class 5.
- Under the 5 rating, Seabrook Island receives a 25% flood insurance premium reduction, which is an average of \$188 per policy.



Table 110-1. CRS classes, credit points, and premium discounts.			
CRS Class	Credit Points (cT)	Premium Reduction	
		In SFHA	Outside SFHA
1	4,500+	45%	10%
2	4,000–4,499	40%	10%
3	3,500–3,999	35%	10%
4	3,000–3,499	30%	10%
5	2,500–2,999	25%	10%
6	2,000–2,499	20%	10%
7	1,500–1,999	15%	5%
8	1,000–1,499	10%	5%
9	500–999	5%	5%
10	0–499	0	0

*SFHA: Zones A, AE, A1–A30, V, V1–V30, AO, and AH*

*Outside the SFHA: Zones X, B, C, A99, AR, and D*

*Preferred Risk Policies are not eligible for CRS premium discounts because they already have premiums lower than other policies. Preferred Risk Policies are available only in B, C, and X Zones for properties that are shown to have a minimal risk of flood damage.*

*Some minus-rated policies may not be eligible for CRS premium discounts.*

*Premium discounts are subject to change.*

Source: City of Charleston 2019 Flooding and Sea Level Rise Strategy

# Tide Gauge Station

- Installed in 2020 at the kayak launch dock
- Provides local tide data for Seabrook Island
- <https://dashboard.hohonu.io/map-page/hohonu-37/SeabrookIsland,SC>

