



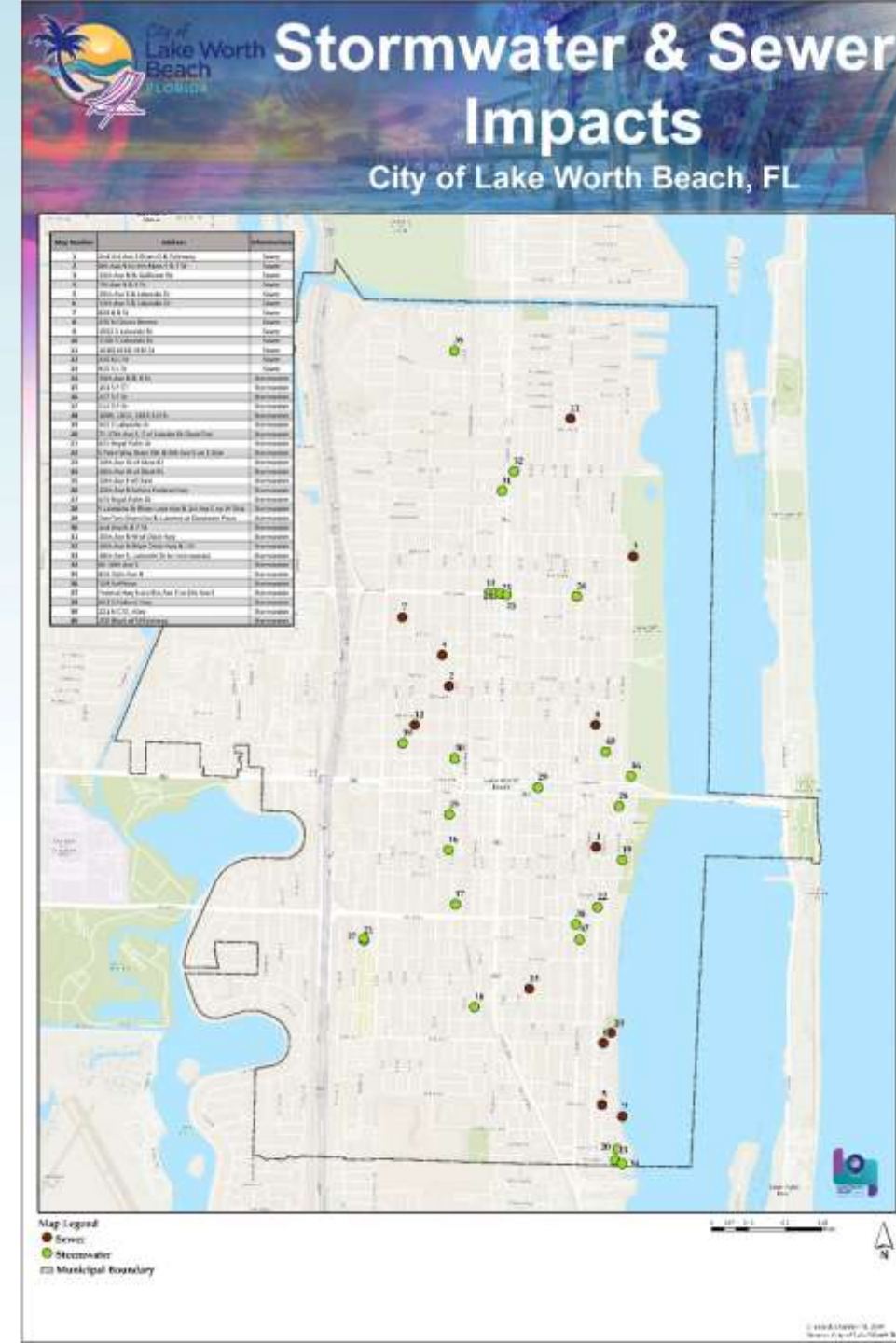
## Stormwater and Sanitary Sewer Resiliency

Julie Parham, P.E.  
Assistant Water Utilities Director



## Recent Extreme Storm Event:

- Stormwater and Sanitary Sewer Impacts from Hurricane Zeta 10/24-25/20, over 8 inches of rain
- 100-year flood event– means 1% annual chance of flooding occurring in the FEMA designated 100-year floodplain
- Followed King Tides that occurred Oct 14-21
- Experienced sanitary sewer overflows and flooding in several areas of City, as did many municipalities around CLWB
- City ROW and stormwater system designed to handle 3-year storm. SFWMD guidance allows 25-year storm to accumulate in ROW and must recede within 72 hours; water receded in less than 24 hours!



# Stormwater

## Issues & Mitigation Strategies

### Issue:

- STORMWATER FLOODING – Near 100-year storm event, system is designed for 3-year event. Takes system longer to drain the more intense and less frequent storm, so water finds way to sanitary system and other places until it can be drained

### Mitigation Strategies for Worst Areas:

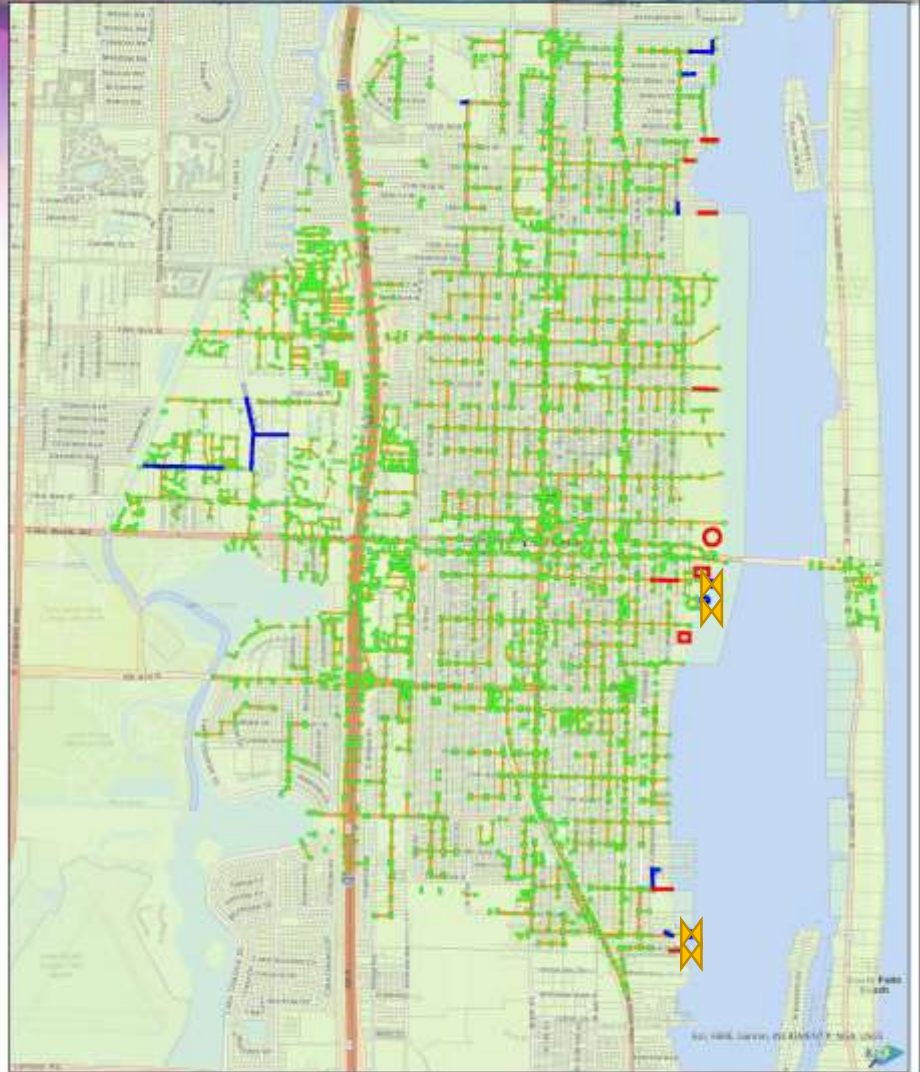
- Installation of tidal check valves to prevent king tide influence on storm system
- Reevaluate storm systems – check for blockages, televise lines.
- Stormwater pump stations, additional retention areas, underground storage chambers





# Stormwater Projects

Water Utilities Department



## Map Legend

LW\_STORMWATER

- LakeWorth.DBO.STORM\_INLET\_STRUCTURES
- LakeWorth.DBO.STORM\_GRAVITY\_MAIN\_PIPES
- Completed Projects
- Future Projects
- ⊗ TIDAL CHECK VALVE

# Stormwater

## Recent Projects:

- Tidal outfall check valve installations
- Drainage upgrades as part of Neighborhood Road Program:
  - District 2: 22<sup>nd</sup> Avenue North and N D St;
  - District 3: Duke Drive and Holy Cross Lane, Georgia Lane and Furman Lane; 16<sup>th</sup> Ave N and N Lakeside
  - District 4: S Lakeside Drive & 15<sup>th</sup> Ave S and Lakeside Palms Ct; 17<sup>th</sup> Ave S east of S Lakeside
- Stormwater Assessment Master Plan Update 2016 by CDM Smith



# Stormwater

## Future Projects:

- Stormwater Master Plan updated in 2016. Projects identified based on historical problem flood areas, modeling of system and stormwater quality improvements to reduce nutrient discharges to the Intracoastal and Lake Osborne - \$21 million; portion of remaining projects are stormwater quality improvements
- Projects' components:
  - Underground storage at Bryant Park
  - Increase lake size on golf course
  - New outfall and upgrades to existing
  - New inlets, culverts, catch basins, exfiltration trench, weirs
- Annual budget of \$50k for tidal check valve install, repair, maintenance
- CLWB has consistently pursued grants and filed for state assistance for projects
- CLWB part of Coastal Resilience Partnership and Climate Change Compact that provide guidance on best management practices and collaboration and information sharing



# Stormwater

## Capital Projects:

Project	Location	Capital Cost	Status
	North Lakeside Drive, Duke Drive, Notre Dame Drive and 1 Wellesley Drive, Federal Highway	\$ 3,196,000	Complete
	2 15th Avenue North and N Dixie Highway	\$ 574,000	
	3 10th Avenue North to 13th Avenue North, E and F Streets	\$ 735,000	
	4 3rd Avenue North to 6th Avenue North and N F Street	\$ 2,076,000	
	5 6th Avenue South and South A Street	\$ 380,000	
	2nd Avenue North to 1st Avenue South, South F Street 6 and Dixie Highway	\$ 2,983,000	
	Lake Avenue, 1st Avenue South, South M Street and 7 Golfview Road	\$ 3,011,000	
	3rd Avenue South, 5th Avenue South, South Palmway and 8 South Lakeside Drive	\$ 3,411,000	
	9 6th Avenue South and South F Street	\$ 229,000	
10	10th Avenue South and South G Street	\$ 759,000	
11	10th Avenue South and Dixie Highway	\$ 528,000	
12	10th Avenue South and South N Street	\$ 528,000	
13	18th Avenue South and South Palmway		
14	Palmetto Avenue and South Pine Street	\$ 171,000	
15	15th Ave South, Lakeside Drive, 18th Avenue South	\$ 2,373,000	
16	16th Avenue North, 8th Avenue North, North Golfview Road	\$ 601,000	Partially Complete
17	1st Avenue South storm repairs	\$ 300,000	
	<b>TOTAL:</b>	<b>\$ 21,855,000</b>	

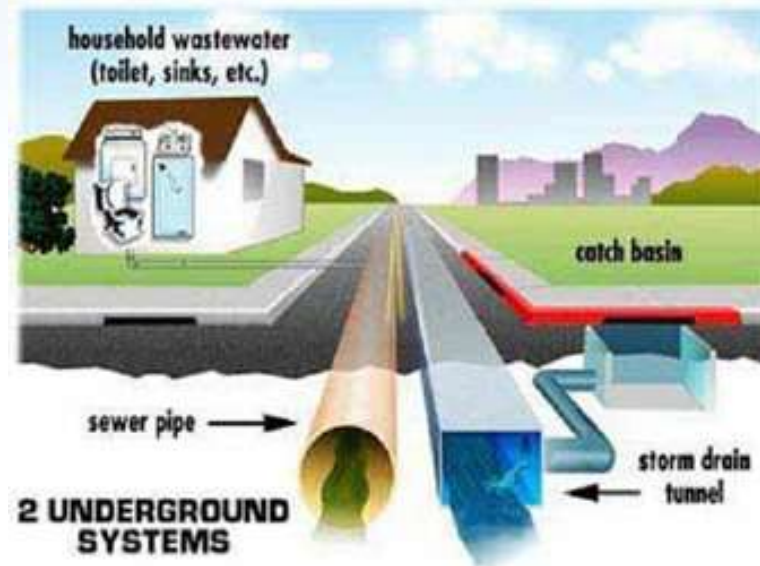


# **Sanitary Sewer Resiliency**

# Sanitary Sewer

## Local & Sub-Regional System

- Wastewater/Sanitary Sewer – what is it?
- CLWB collects flow from 7 surrounding municipalities: CLWB, Lantana, Atlantis, Manalapan, South Palm Beach, Seminole Manor, PBSC, Palm Springs
- 6 of these systems are collected at Master Pump Station (MPS)
- Most all municipalities also experienced peak flows



<https://www.concordnc.gov/Departments/Stormwater-Services/Stormwater-Pollution/Where-Does-It-Go>





# Sanitary Sewer

## Issues & Mitigation Strategies

### Issues:

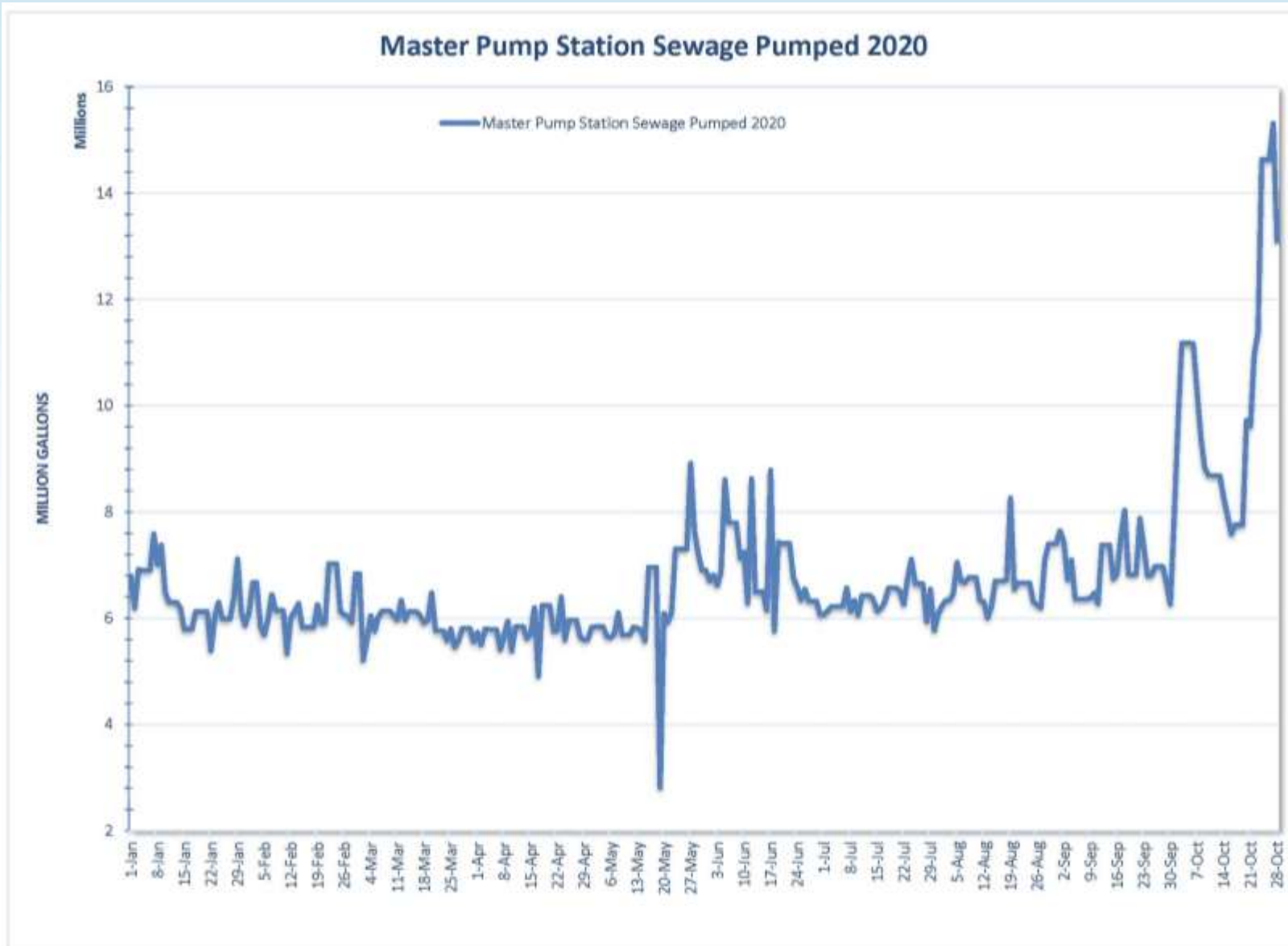
- SANITARY OVERFLOW - Inflow & Infiltration (I&I) from stormwater into sanitary:
  - Stormwater flows into sanitary sewer system through manholes and cleanouts when storm drain is overwhelmed
  - High groundwater from king tides and heavy rains pushes excess water to sanitary system
  - System is overwhelmed and flow cannot be conveyed to pump stations quickly enough, so overflows at manholes.

### Mitigation Strategies:

- Cured-In-Place Pipe lining of sanitary sewer mains to prevent I&I from stormwater
- Reevaluate storm & sanitary systems – check for blockages, televise lines.



# Sanitary Sewer

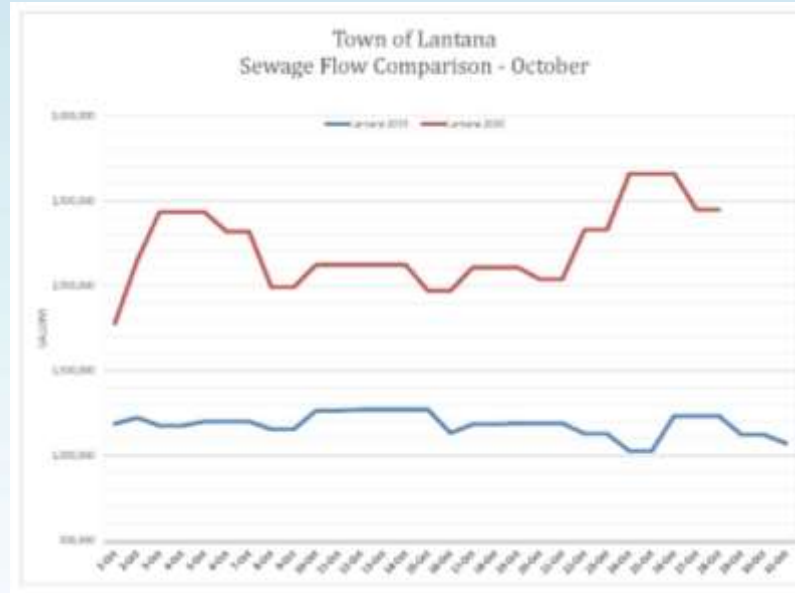


- Extreme flows seen at Sanitary Sewer Master Pump Station during hurricane Zeta
- MPS collects flow from CLWB, Lantana, Atlantis, Manalapan, South Palm Beach, Seminole Manor, PBSC
- Most all also experienced peak flows

# Sanitary Sewer

## Sewer Flows:

- Month of October shown, red is 2020, blue is 2019





# Lined Sanitary Sewer Mains

Water Utilities Department



## Map Legend

- |                               |                                 |
|-------------------------------|---------------------------------|
| LW_SANITARY_LIFT_STATIONS     | LINED SANITARY MAIN             |
| LW_SANITARY_MANHOLES          | LW_SANITARY_GRAVITY_MAINS_PIPES |
| LW_SANITARY_FORCE_MAINS_PIPES |                                 |

# Sanitary Sewer

## Recent Projects:

- Cured-In-Place pipe lining of several collector trunk sanitary sewer mains
- Installation of ~3000 inflow inserts at manholes to prevent I&I
- Gravity Sanitary Sewer Condition Assessment of all mains up to 12"
- I&I Phase 2 Study of coastal sewer collection areas



# Sanitary Sewer

## Future Projects:

- Infiltration & Inflow (I&I) mitigation - \$200k per year as part of Annual I&I program for lining sanitary sewer pipe and manhole rehab to prevent excess stormwater and ground water in sewer system
  - Have asked sub-regional partners about I&I mitigation and acknowledged DEP oversees
  - I&I Phase 2 study completed and identified sewer lines to be rehabbed - results showed generally sewer lines within 1,500 ft of Intracoastal would be best to start with as worst offenders of I&I (\$5 million)
- Inspection & repair/lining on S Lakeside Dr (15<sup>th</sup> Ave S to Bryant Park) sanitary sewer gravity main - FY 2021 and future years
- Inspection & repair/lining of 36" interceptor main in Bryant Park coming into Master Pump Station – FY 2021



# Sanitary Sewer

## Capital Projects:

Project	Location	Capital Cost
1	Lining - LS 3, LS 1 (MPS), LS 4 basins	\$ 5,000,000
2	Lift Station Rehab Annually	\$ 350,000
3	I&I Projects (Lining) Annually	\$ 200,000
4	Manhole Rehab Annually	\$ 150,000
5	<u>Sub-Regional</u> - Lining S Lakeside Dr-15th Ave S to Bryant Park	\$ 360,000
6	<u>Sub-Regional</u> - Lining 36" interceptor Bryant Park into MPS	\$ 250,000
	TOTAL:	<b>\$ 6,310,000</b>





Questions?  
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