Stormwater Master Plan and Rate Study

Presentation

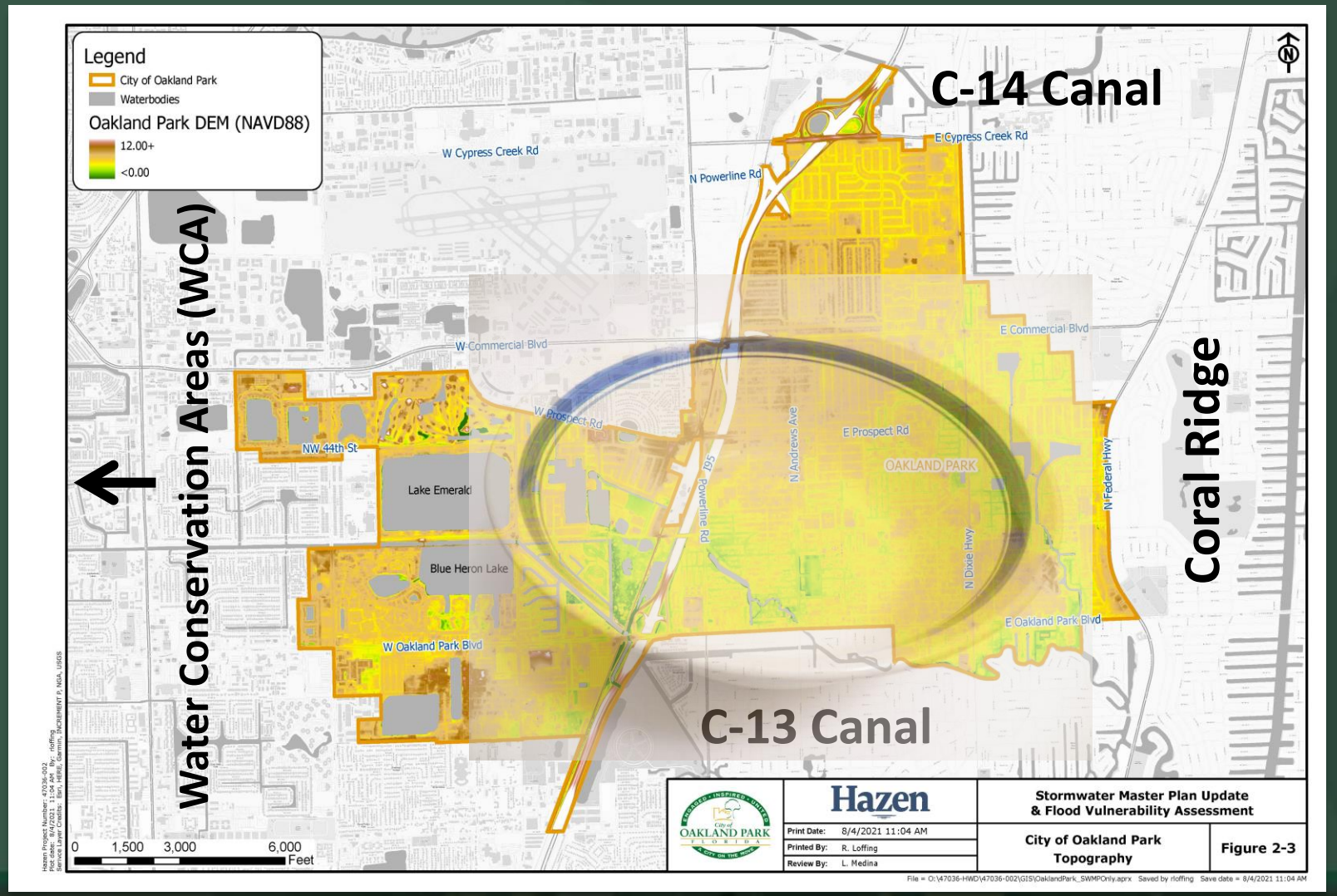
June 1, 2022

Background

The City operates three Utility Infrastructure System: Water, Wastewater (Sewer), & Stormwater

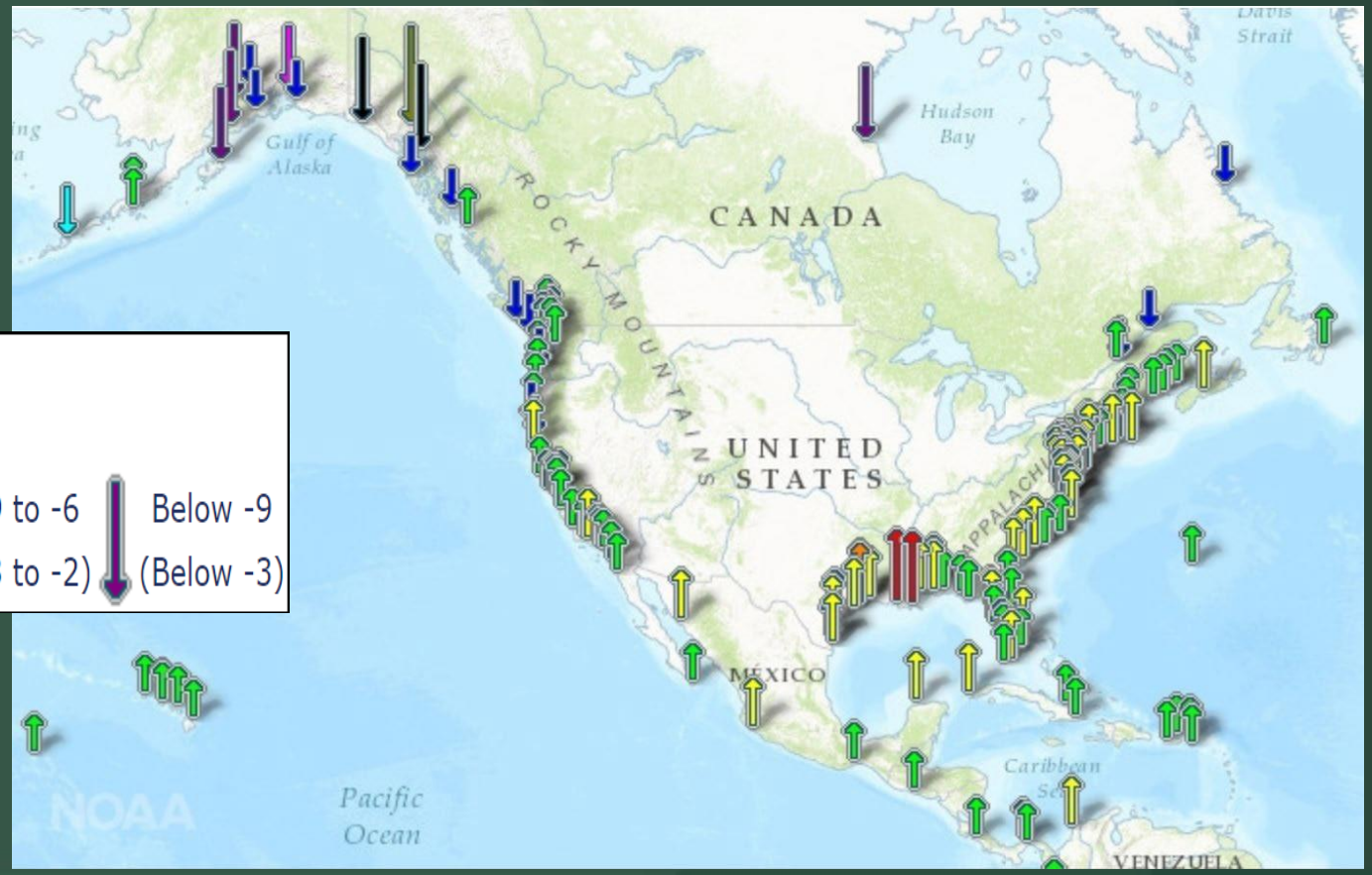
- **Stormwater System =** *Water from Rain*
  - Swales
  - Catch Basins Inlets
  - Exfiltration Pipes
  - Transmission Pipes
  - Receiving Waters
  - Lakes
  - Streams
  - Canals

City Elevations



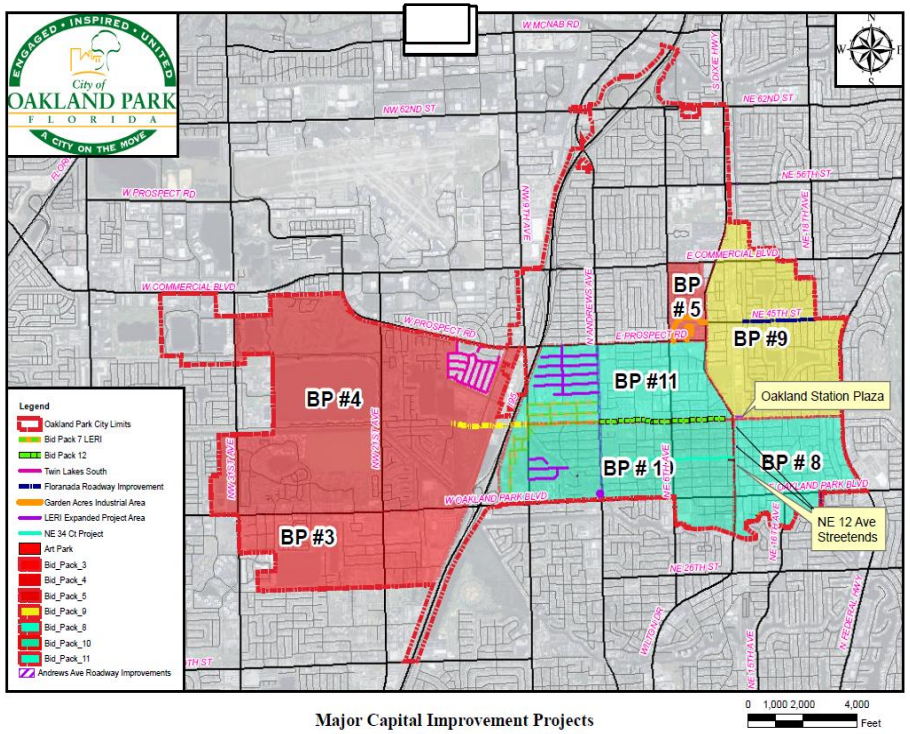
Sea Level Rise Impact on Drainage

Using at least 30 years of observations from 142 long-term water level stations NOAA has calculated mean sea level trends relative to a fixed place on land.



City Stormwater Infrastructure Improvements

- Bid Pack Projects
- Sewer Lining
- Upgraded Pump Stations
- Swale Upgrades
- Water and Sewer Line Upgrades
- Roadway Projects with Drainage Upgrades
- Dredging
- Stormwater System Cleaning
- Catch Basin Inspections
- Lake Maintenance



Major Capital Improvement Projects

Stormwater Master Plan Update

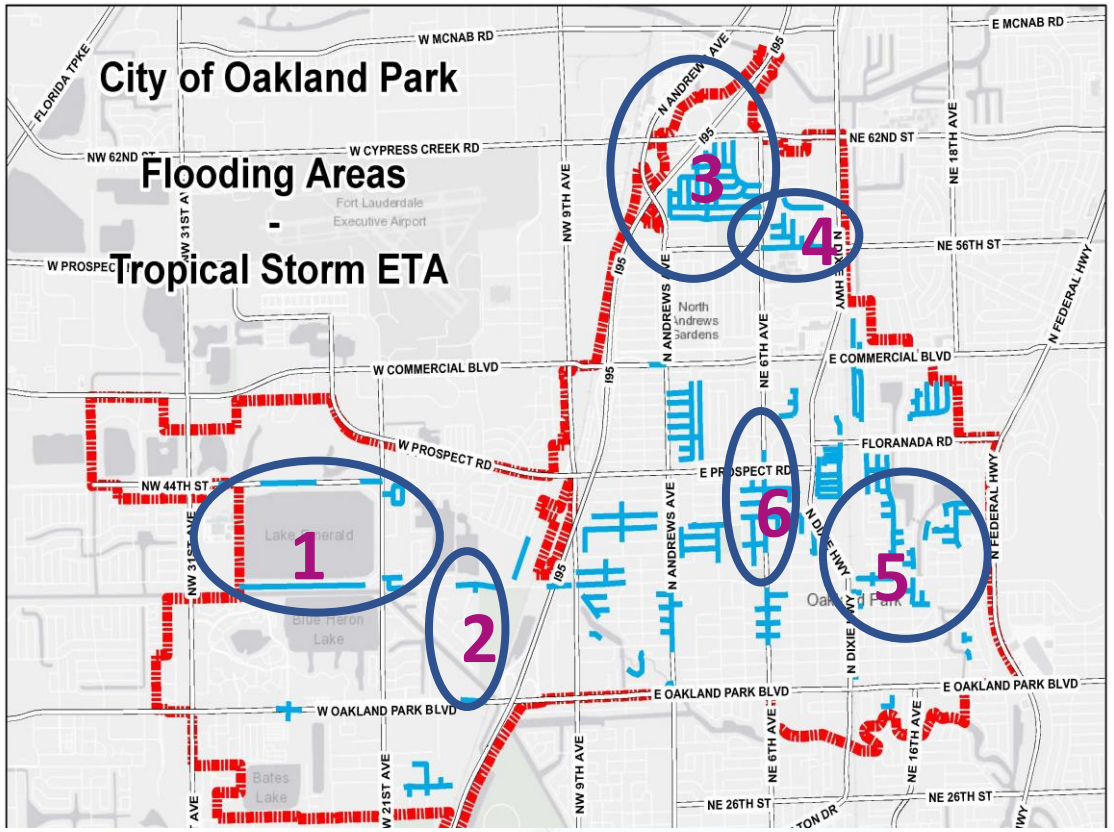
February 5, 2020:
Master Plan and Vulnerability Assessment Work Authorization

July 2020:
Vulnerability Assessment completed

November 2020:
Incorporated Hurricane Eta findings into Master Plan

February 2022:
Stormwater Rate Sufficiency in conjunction with Master Plan Study

July 2021:
Budget Message includes anticipated rate adjustments for FY 23



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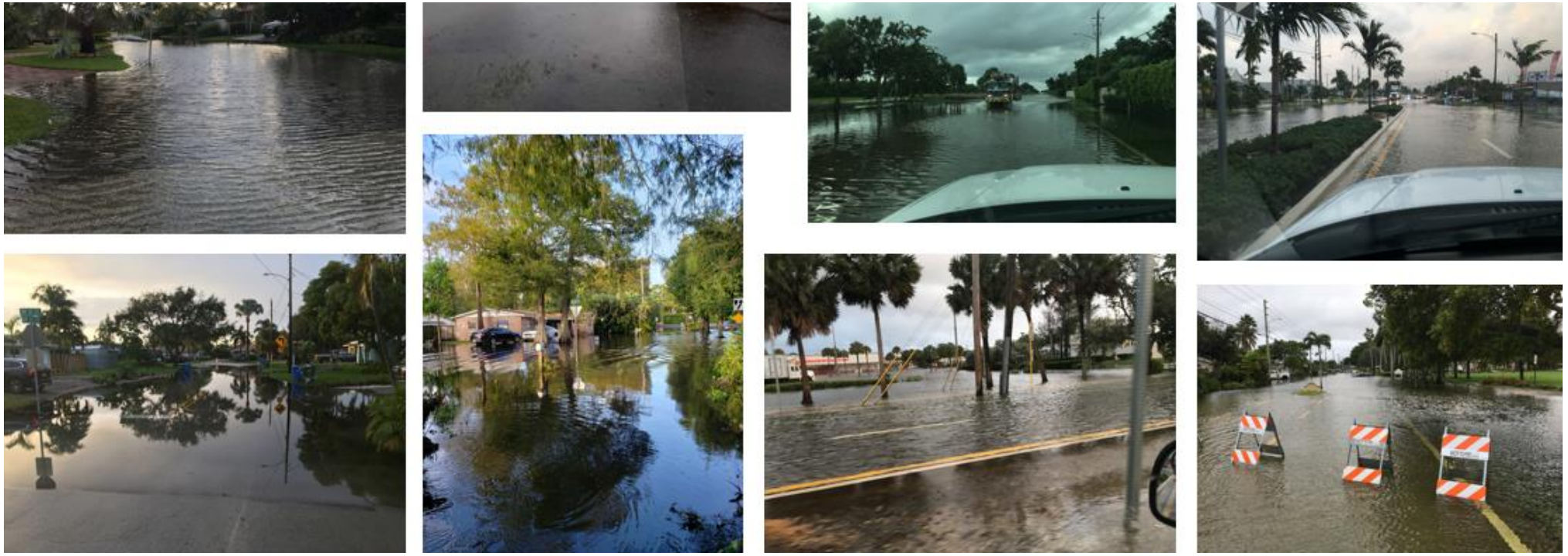


City of Oakland Park Stormwater Master Plan

June 1, 2022

Background/Purpose of the Study

Project Phases

- Data Collection
- Modeling
- CIP Development
- Funding Source Identification
- Permitting Methodology
- Review of Recent Flooding

Stormwater Master Plan Update and Flood Vulnerability Assessment Scope of Services	Task Completed
Stormwater Inventory/Data Collection	✓
As-built Data Conversion & GIS Database Update	✓
Existing H&H Model (development, execution, and post-processing)	✓
Level of Service Analysis	✓
Develop Capital Improvement Projects (CIPs)	✓
Proposed H&H Model (development, execution, and post-processing)	✓
Finalize Recommendations and Cost Estimates	✓
Evaluation of CIP Impacts on Stormwater Utility Rates	✓
Identify Framework for Stormwater Asset Management Plan	✓
Finalize Master Plan Report (and additional deliverables)	✓
Flood Vulnerability Assessment (2020)	✓
Climate Change Adaptation Strategies (2020)	✓
Comprehensive Plan Draft Updates Development (2020)	✓

Data Collection and Modeling

Software & Tools

- ArcGIS
- Arc Hydro
- GWIS
- Model Builder
- ICPR (version 4)
  - 1D Hydraulics w/ Overland Flow Weirs
  - 2D Groundwater Module

Modeling Methodology and Parameterization

Topography

- Aerials Imagery, BCPA
- Digital Elevation Model (DEM)
- Watershed/Subbasin Delineation

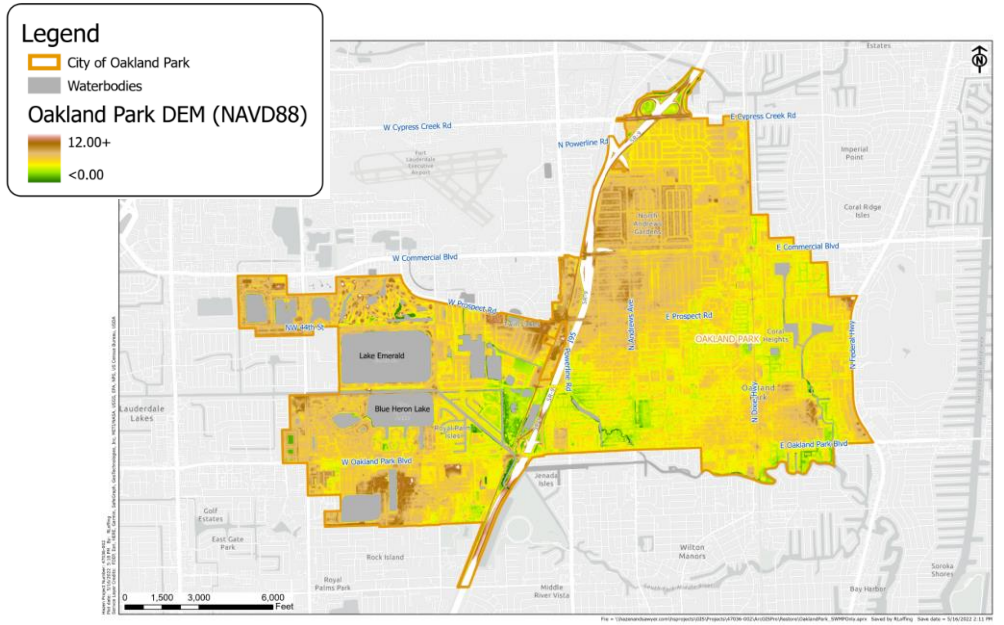
Hydrology

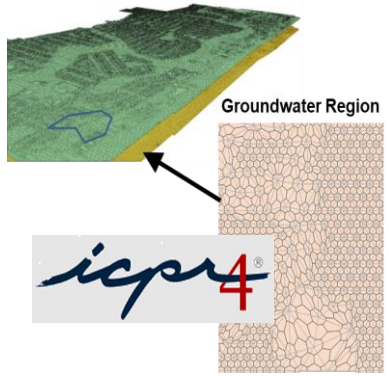
- Rainfall (with Broward County Change Factors)
- Land Use/ Land Cover (Current/Future)
- Soils, NRCS SSURGO database

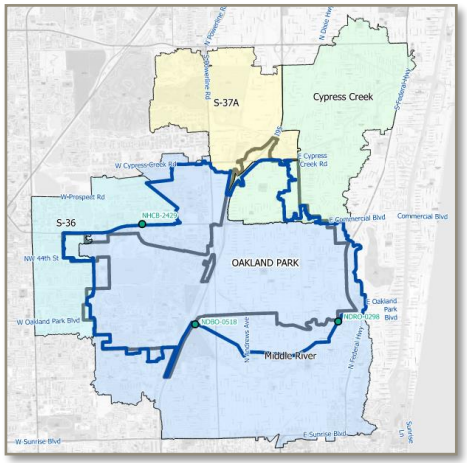
Hydrogeology

- Bathymetry
- Groundwater Parameterization (Current/Future)

Design Storm	SFWMD Mean Depth (inches)	Rainfall Percent Increase	Modeled Rainfall Depth (inches)
5-year, 24-hour	7.7	9%	8.39
10-year, 24-hour	8.7	9%	9.50
25-year, 24-hour	11.1	12%	12.42
25-year, 72-hour	15.1	12%	16.98
100-year, 72-hour	18.6	13%	21.07







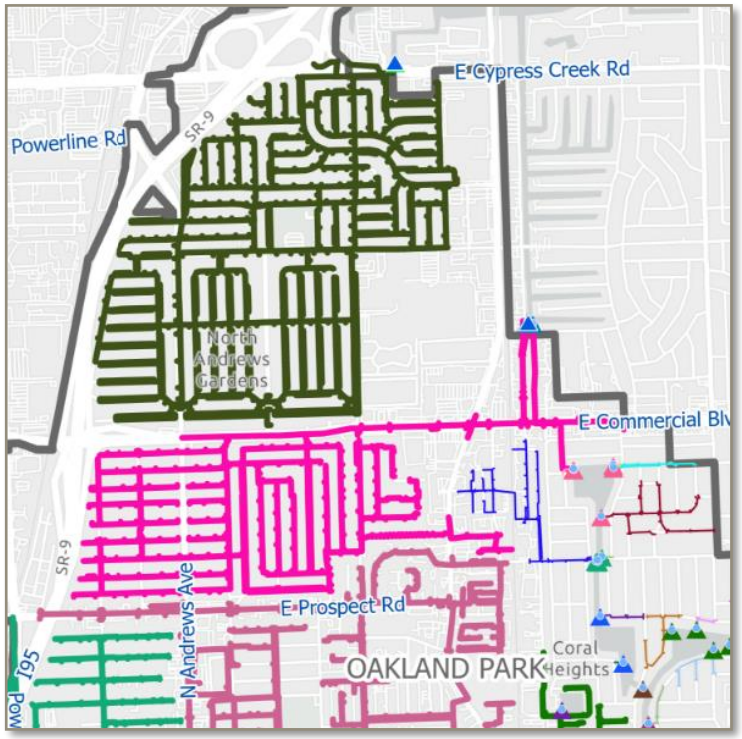
Modeling Methodology and Parameterization

Hydraulics

- As-builts (GIS Conversion)
- Stormwater GIS Database/Atlas
- Drainage System Identification

Boundary Conditions

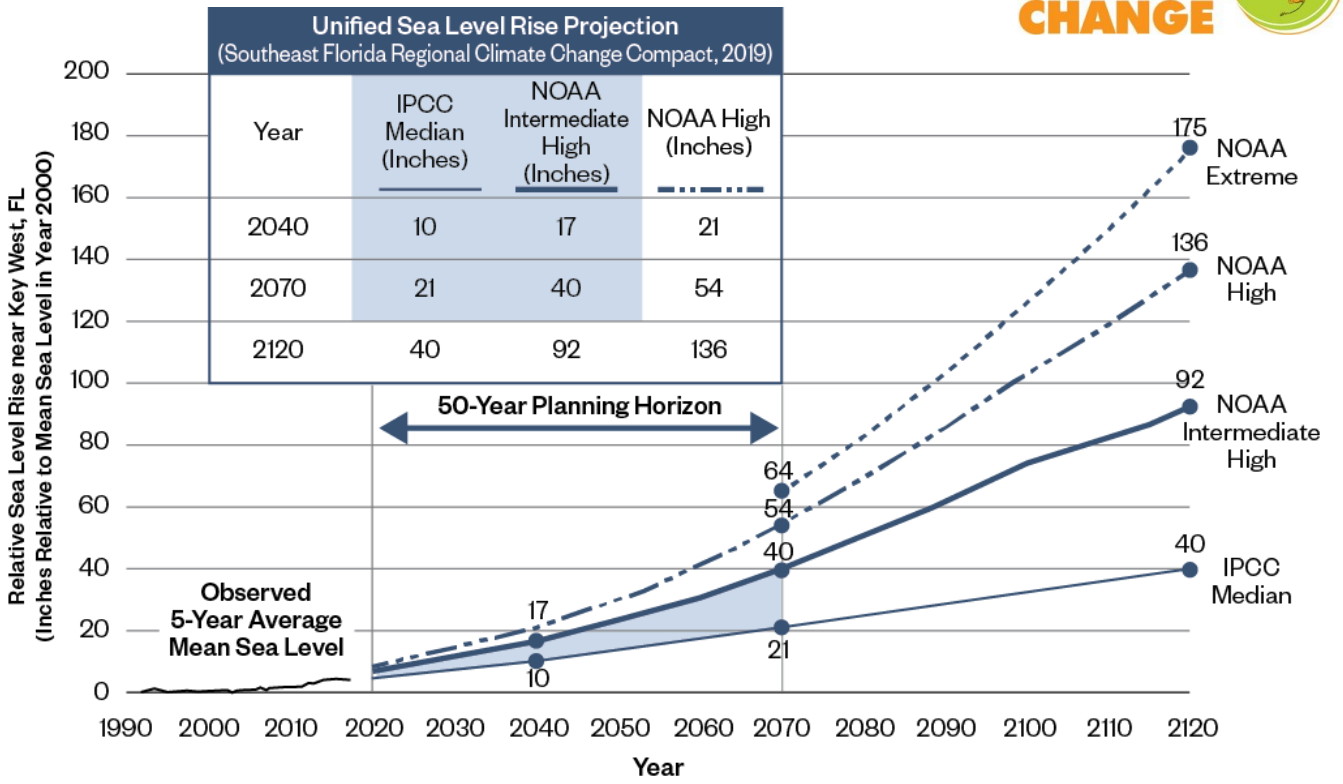
- External Inflows (S-36)
- Tidal Conditions & SLR
- Intra-watershed Nodes



SOUTHEAST FLORIDA REGIONAL COMPACT CLIMATE CHANGE

Unified Sea Level Rise Projection
(Southeast Florida Regional Climate Change Compact, 2019)

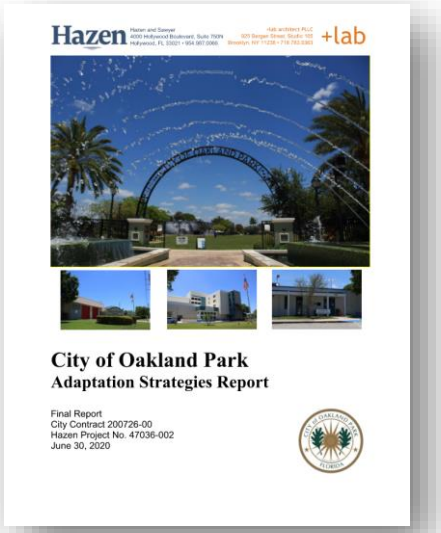
Year	IPCC Median (Inches)	NOAA Intermediate High (Inches)	NOAA High (Inches)
2040	10	17	21
2070	21	40	54
2120	40	92	136

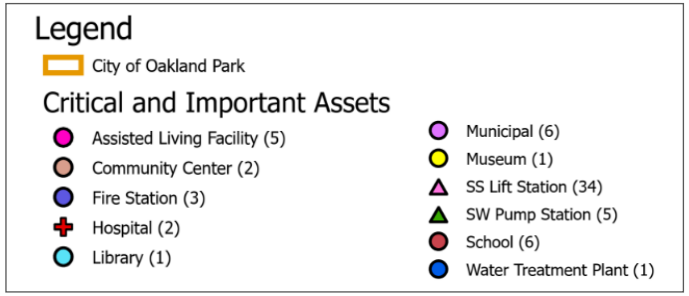


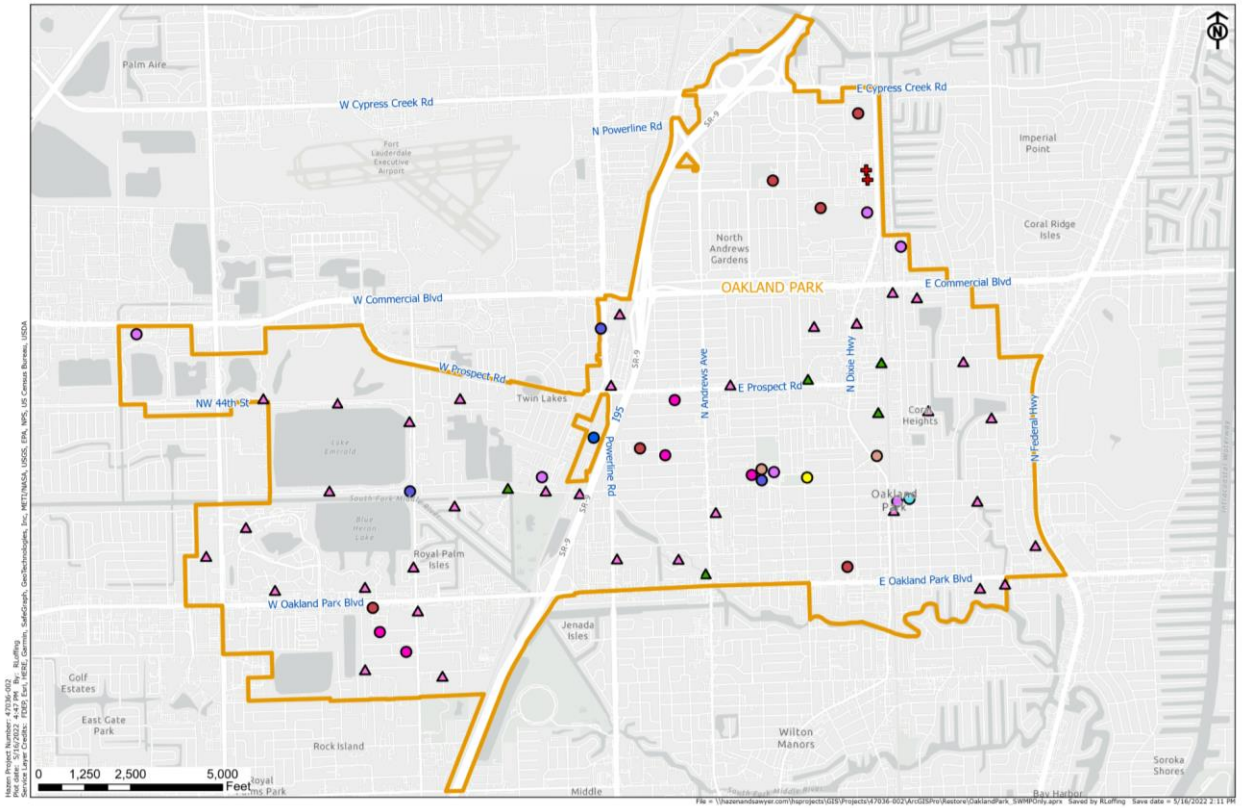
Modeling Methodology and Parameterization

Insights

- Repetitive Losses and Historical Complaints
- City's Internal Knowledge, Records & Photographs
- Critical and Important Facilities
- Flood Vulnerability Assessment and Adaptation Report (2020)

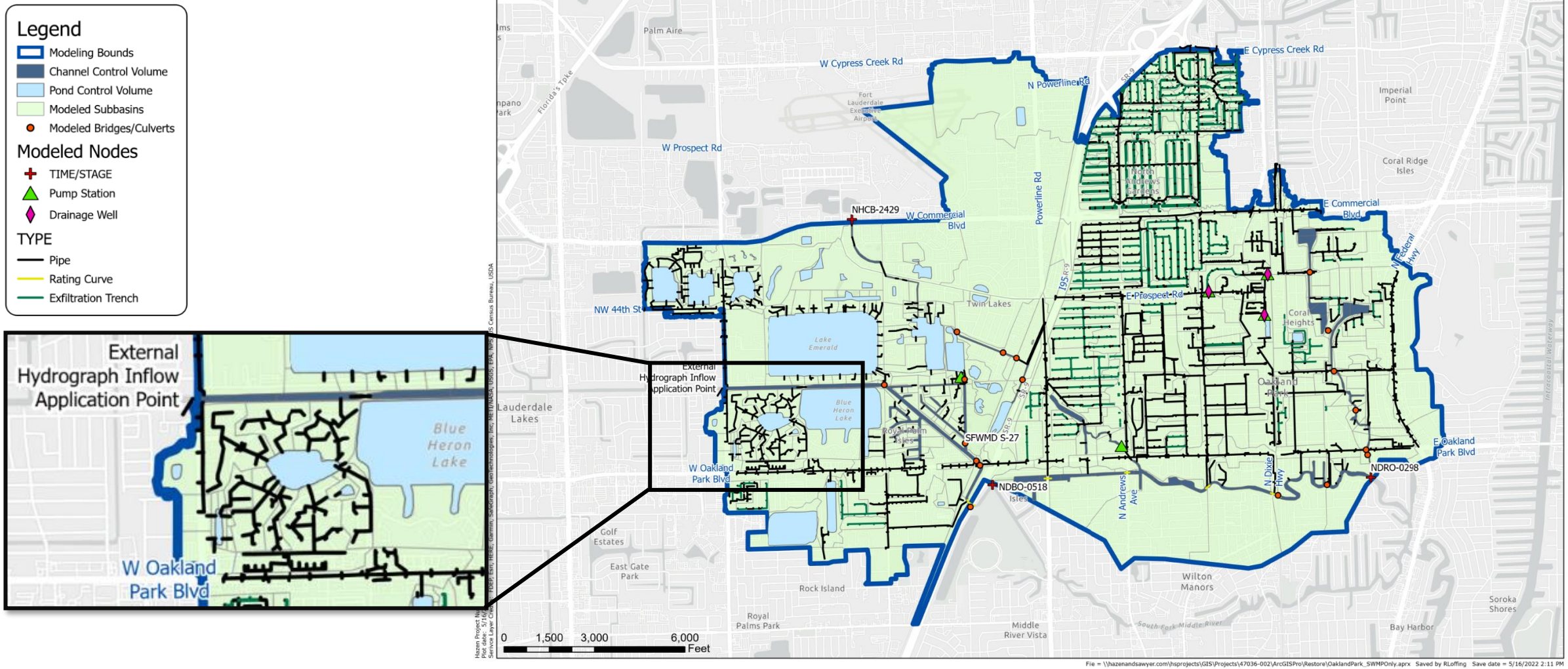




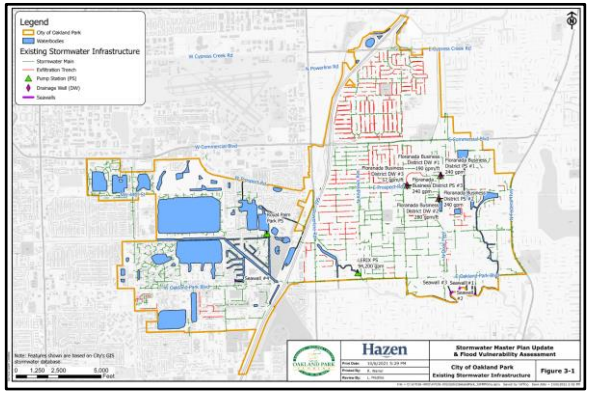


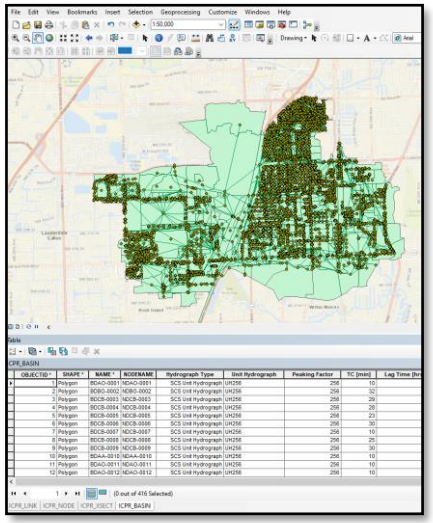
Modeling Methodology and Parameterization

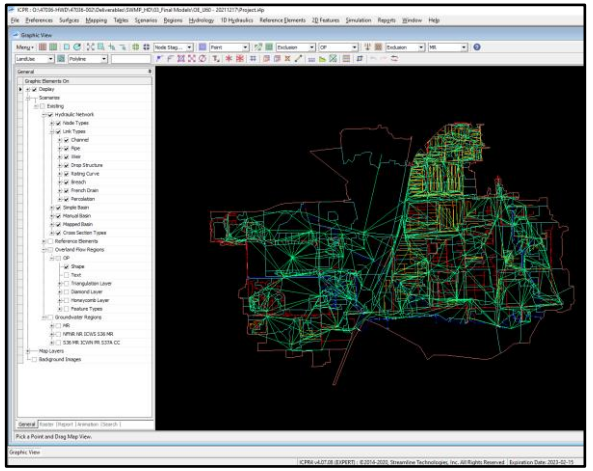
Modeling Schematic

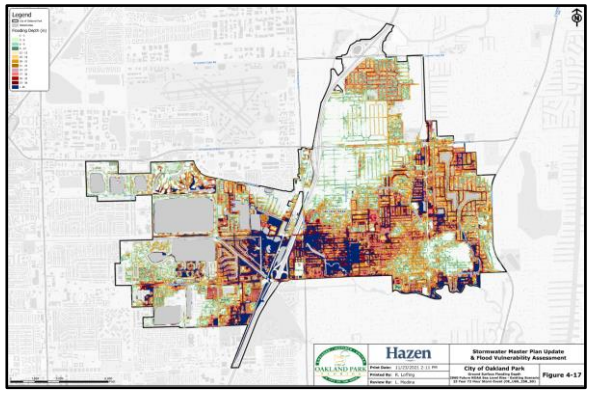


Modeling Workflow



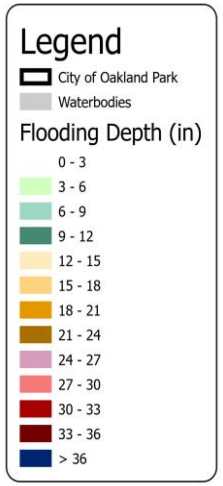


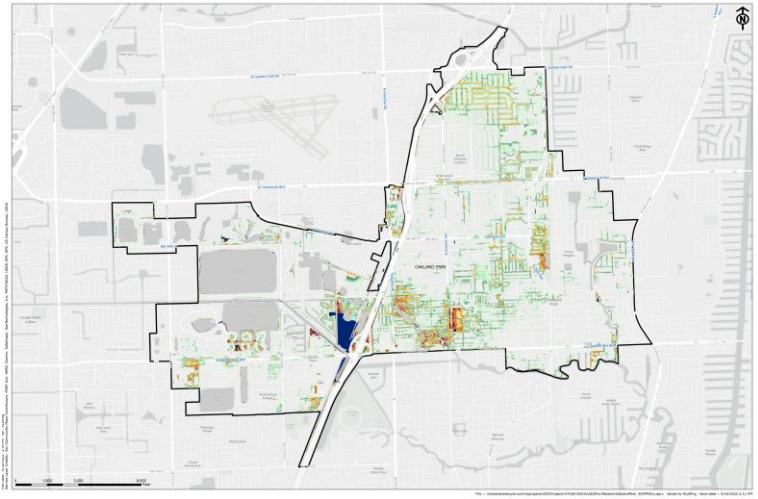




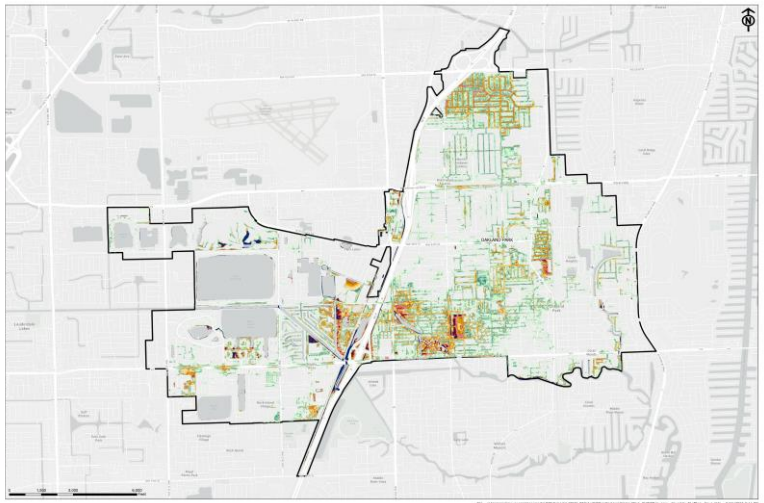
Stormwater GIS Database → GWIS Database → H&H Model (ICPRv4) → Modeling Results & Inundation Rasters

Flood Risk Modeling Results

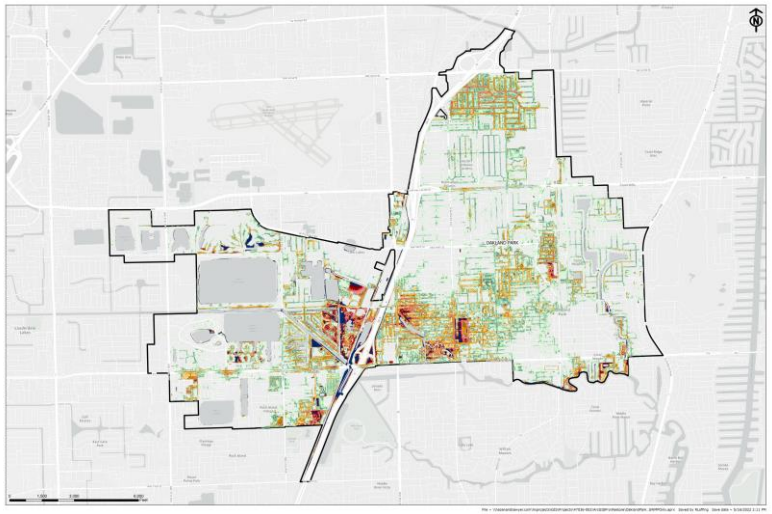




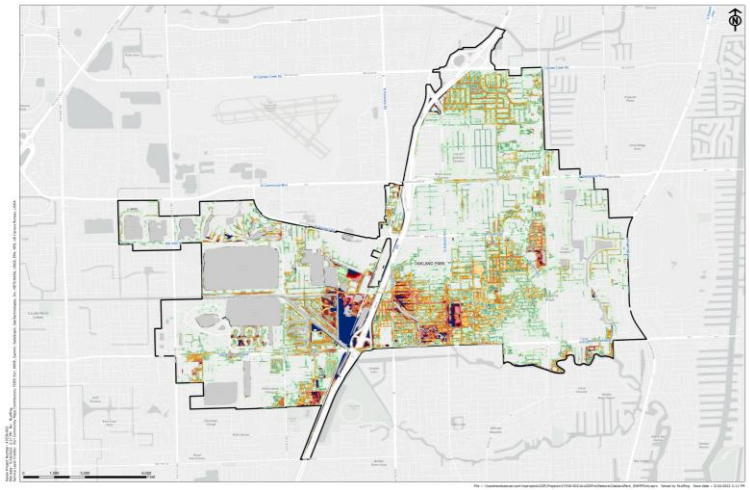
Current 10yr-24hr, 2020 SLR



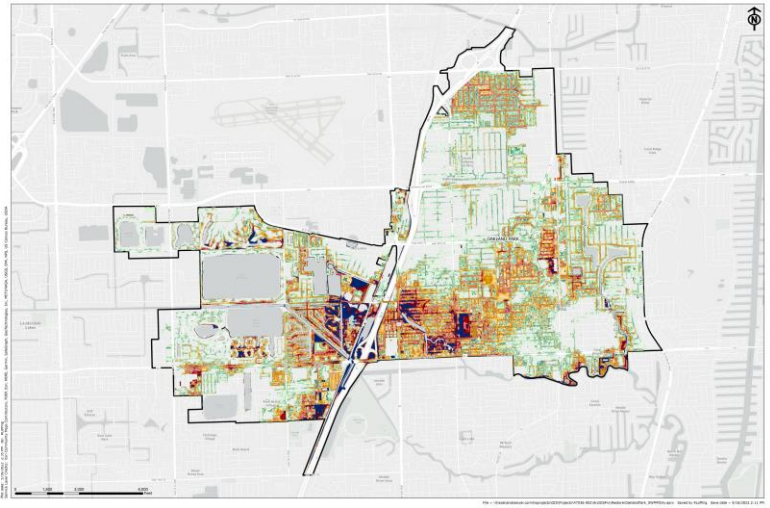
Future 10yr-24hr
2035 NOAA Intermediate SLR



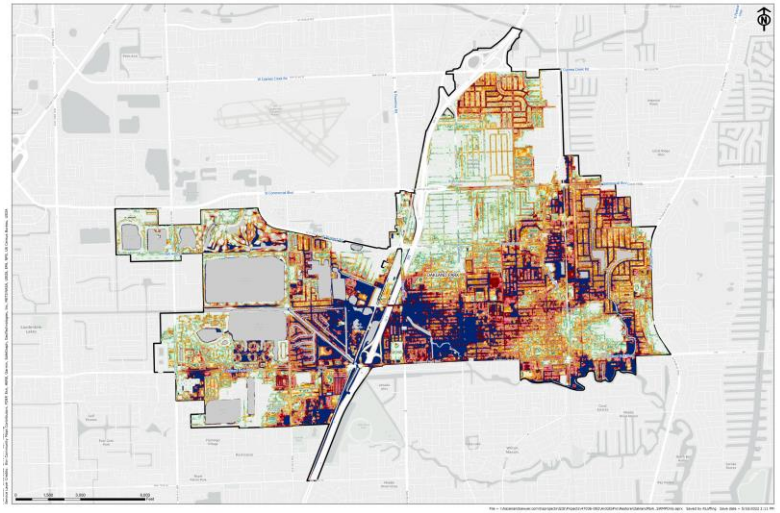
Future 10yr-24hr,
2060 NOAA Intermediate SLR



Current 100yr-72hr, 2020 SLR



Future 100yr-72hr
2035 NOAA Intermediate SLR



Future 100yr-72hr
2060 NOAA Intermediate SLR

Identification of Flood Prone Areas

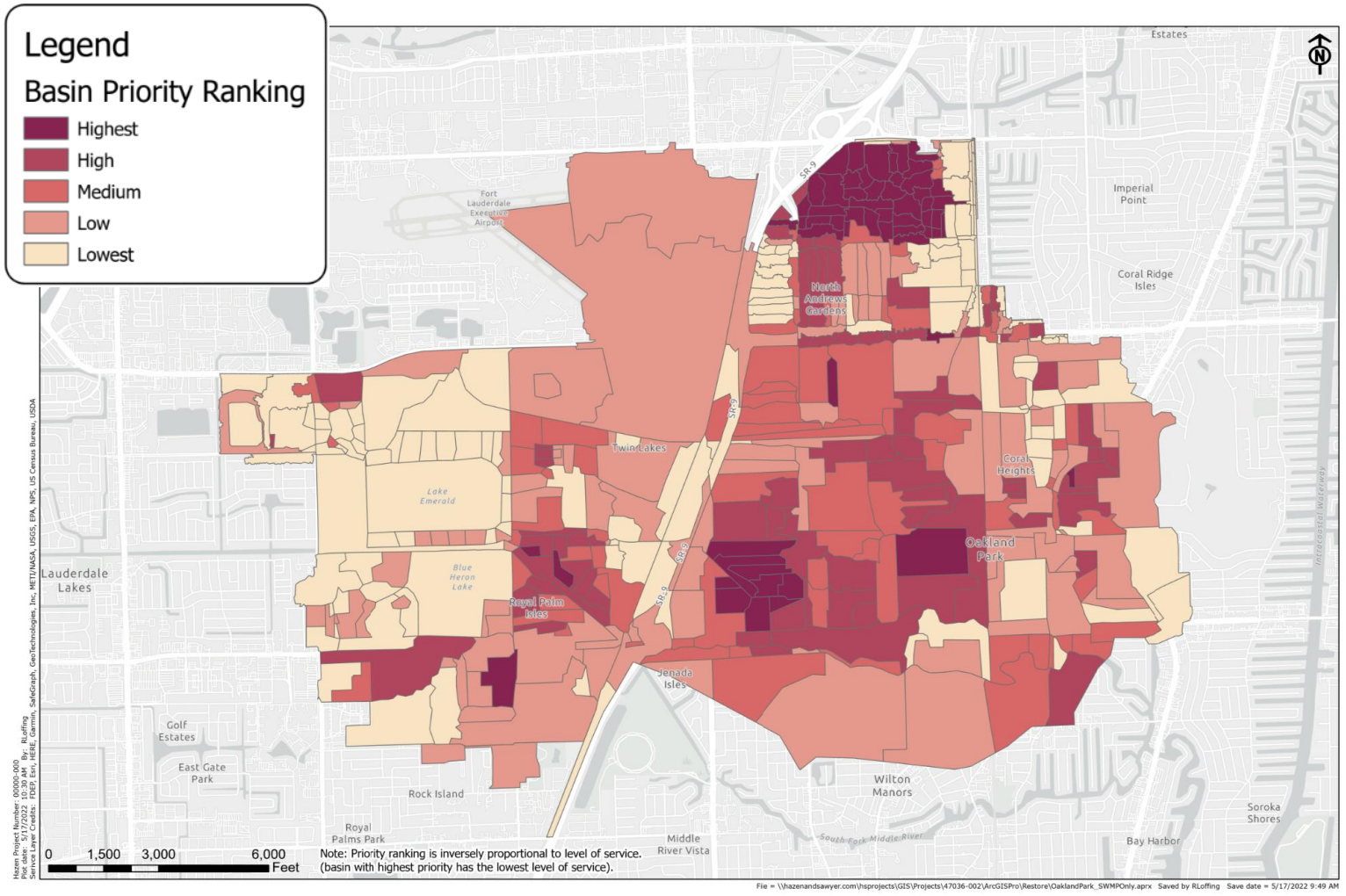
Level of Service Analysis (LOS)

LOS Criteria

- Roadways: 10-year, 24-hour Design Storm
- Structures: 100-year, 72-hour Design Storm

	Performance Parameter	Performance Measure	Weight Factor
Score Based on Flooded Structures	Critical Structures	*Number of structures/acre impacted in 100-year 72-hour flood*	1000
	Important Structures	*Number of structures/acre impacted in 100-year 72-hour flood*	875
	Residential/Non-Residential Structures	*Number of structures/acre impacted in 100-year 72-hour flood*	750
	Repetitive Loss Areas	*Number of RLAs/acre impacted in 100-year 72-hour flood*	875
	Critical Structures	*Number of structures/acre impacted in 10-year 24-hour flood*	2000
	Important Structures	*Number of structures/acre impacted in 10-year 24-hour flood*	1500
	Residential/Non-Residential Structures	*Number of structures/acre impacted in 10-year 24-hour flood*	1000
	Repetitive Loss Areas	*Number of RLAs/acre impacted in 10-year 24-hour flood*	1500

	Performance Parameter	Performance Measure	Weight Factor
Score Based on Flooded Roads	Evacuation Routes	*Linear feet(LF)/acre inundated in the 10-year 24-hour flood*	20
	Evacuation Routes	*LF/acre inundated in the 100-year 72-hour flood*	10
	Arterial	*LF/acre inundated in the 10-year 24-hour flood*	5
	Arterial	*LF/acre inundated by 6-inches or more in the 100-year 72-hour flood*	2
	Collector	*LF/acre inundated in the 10-year 24-hour flood*	5
	Collector	*LF/acre inundated by 9-inches or more in the 100-year 72-hour flood*	2
	Local	*LF/acre inundated in the 10-year 24-hour flood*	1
	Emergency Access (any street)	*LF/acre inundated by 3-feet or more in the 100-year 72-hour flood*	50

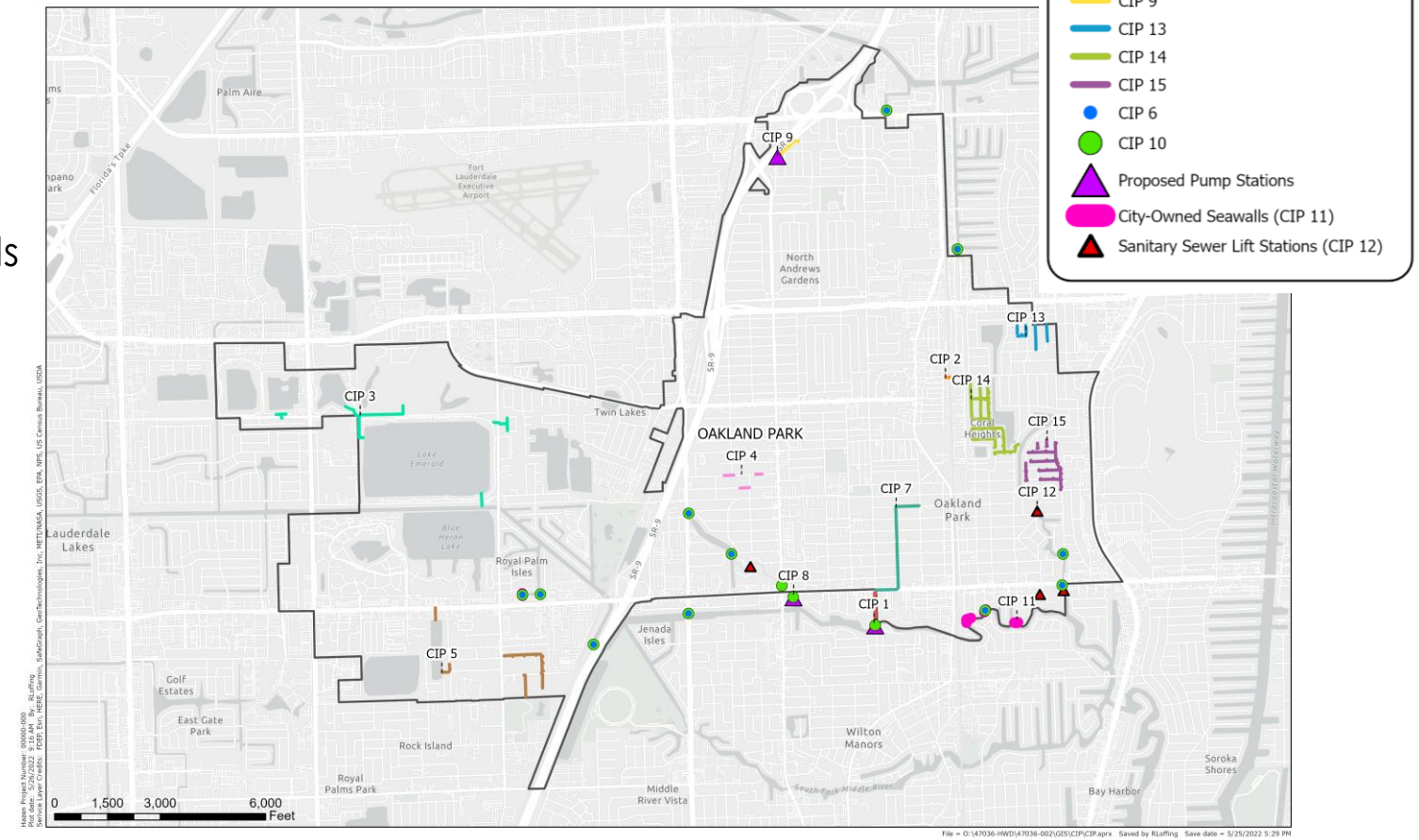


Proposed Capital Improvement Program

CIP Summary

- Total No. of Projects Identified: 15
- Estimated Cost: 48.8M (2021 dollars)
- Estimated Duration: 10 - 15 years
- Additional Recommendations

1. NE 6th Avenue Outfall
2. Floranada Pump Stations and Drainage Wells
3. Emerald Lakes Basin
4. Lake Tahoe
5. Interconnecting Drainage System
6. Critical Outfall Structures
7. NE 6th Avenue Pump Station
8. N. Andrews Ave & Oakland Park Boulevard
9. N. Andrews Gardens Study
10. Tidal Valves
11. Raining and Replacing Flood Barriers
12. Protecting Sanitary Sewer Lift Stations
13. NE 48th and NE 15tyh Way/NE 16th Ave.
14. West Coral Lake
15. East Coral River



Grant Funding Received

Previous

Sleepy River Stormwater Pump Station - $7.9M

Stormwater Vulnerability Assessment - $75K

NE 3rd Ave Drainage Improvements (Bid Pack 11) - $156K

Bid Pack 8 Drainage - $100K

North Andrews Gardens County Surtax Project. - $2.0M

Current

North Andrews Gardens County Surtax Project. - $2.0M

NE 6th Ave Drainage Improvements - $5M

NE 13th Ave Drainage Improvements - $ 1.9M

City of Oakland Park

Stormwater Revenue Sufficiency Study

RAFTELIS

RAFTELIS

- Develop a funding strategy to pay for stormwater system operations, maintenance, and capital improvements
  - Specifically, to fund the identified stormwater master plan projects over the forecast period
- Estimate revenue requirements to be recovered from stormwater rates
- Identify the need for rate adjustments over the forecast period, FY 2023 to FY 2027
  - Based on projected revenues, operating expenses, capital requirements, and debt service coverage requirements

Existing Stormwater Assessment

- $84.00 per equivalent residential unit (ERU)
  - Residential: $84.00 x number of dwelling units
  - Non-residential: $84.00 x (impervious area (sq ft) ÷ 1,507 sq ft)
  - Undeveloped: $84.00 x 0.12 x (total area (sq ft) ÷ 1,507 sq ft)
- Rate has not been adjusted since FY 2016
  - $72.00 from 2003 to 2015
- School Board stopped making payments in FY 2019, creating a loss of approximately $200,000 a year in revenue
- Revenues at existing rate projected at $3.4 million per year

FY 2022 Revenue Sufficiency

Description	FY22 Projected
Gross Revenues	$3.48m
Operating Expenses	(2.72m)
Debt Service	(0.77m)
Capital	(0.51m)
Surplus/(Deficiency)	**($0.52m)**

Projected Operating Expenses

- Based on the adopted fiscal year 2022 budget
- Projections for fiscal year 2023 through 2027 were adjusted based on the following adjustment factors:
  - Labor: 5.0% per year
  - Health Insurance: 5.0% per year
  - Repair & Maintenance: 3.0% per year
  - Electricity / Fuel: 5.0% per year
  - General Inflation: average of 3.5% per year
- The projected annual average increase in operating expenses over the forecast period is estimated at 3.75% per year

Capital Improvement Plan

- The City Commission has adopted approximately $9.1 million in stormwater capital improvements through fiscal year 2026
  - This includes $1.9 million in prior period carryforward projects funded from operating reserves
  - Public Works Operations Facility - $2.1 million-22
  - NE 13th Avenue Infrastructure Improvements - $2.7 million
  - Lady Lake Trail - $0.3 million
  - Other renewal & replacements projects and vehicle purchases
- Hazen and Sawyer has identified approximately $48.8 million in master plan projects
  - Staff has prioritized $20.5 million of these projects to be funded through fiscal year 2027 based on funding availability
  - Debt funding recommended to provide resources needed (State Revolving Loan Fund)

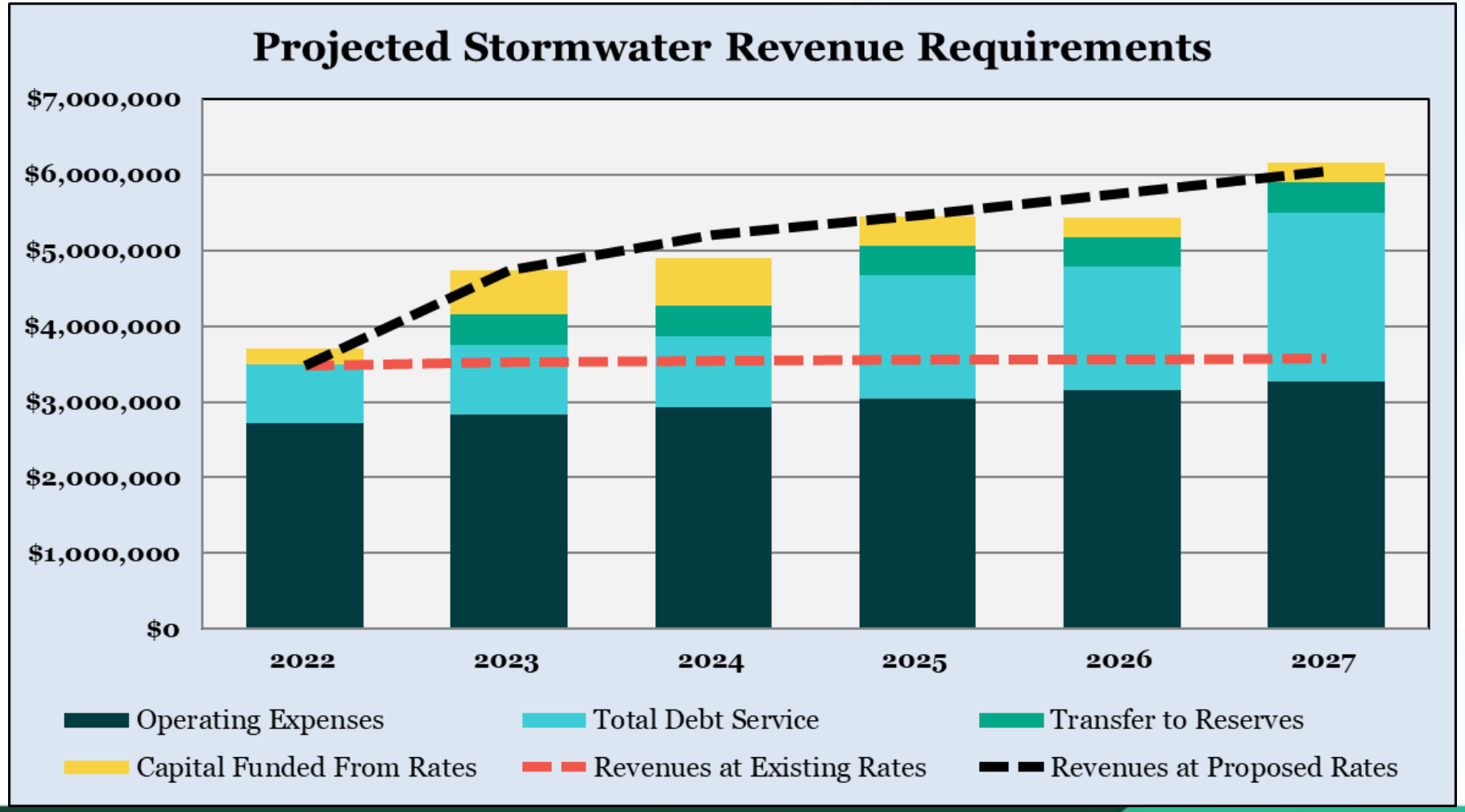
Historical & Proposed Stormwater Rates

Recommended Future Rates

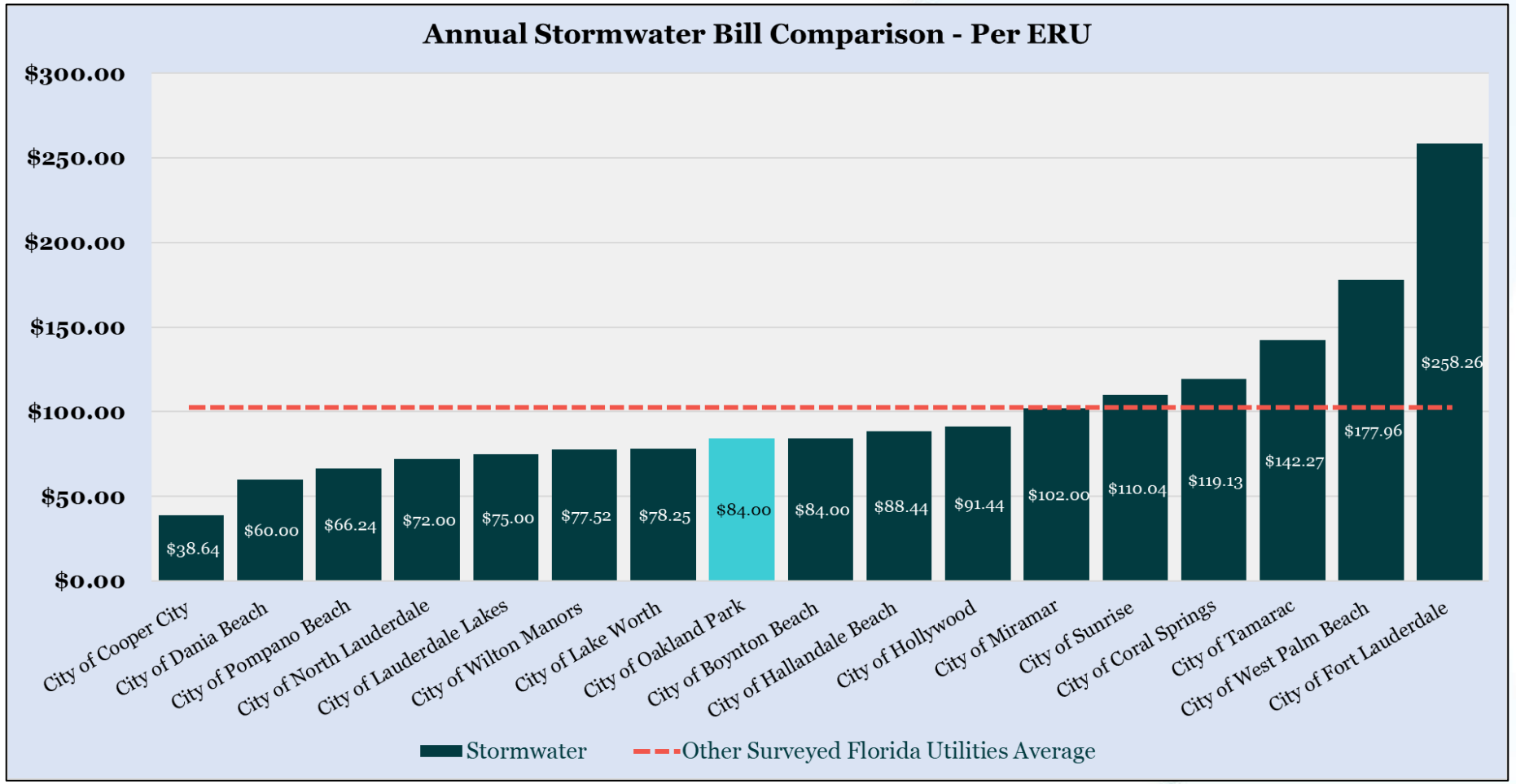
Current Rate

Fiscal Year	2003	2016	2023	2024	2025	2026	2027
Annual Charge per EDU	$72.00	$84.00	$114.00	$125.00	$131.00	$138.00	$145.00
Annual Increase		$12.00	$30.00	$11.00	$6.00	$7.00	$7.00
Monthly Increase		$1.00	$2.50	$0.92	$0.50	$0.58	$0.58

Revenue Requirements



Stormwater Rate Comparison



Conclusions & Recommendations

- Consider the proposed rate adjustments and include in the fiscal year 2023 budget.
- The proposed rate adjustments achieve the following:
  - Funds continuing operations, the adopted CIP, and the identified master plan projects
- The proposed rates are recommended to become effective October 1, 2022 and each October 1st thereafter.
- Recommend updating this study every 3 to 5 years.


CITY of OAKLAND PARK
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