City of Miami Beach – Public Works Department

Stormwater Modeling and Master Plan Update

Finance and Economic Resiliency Committee Meeting

October 16, 2023

AECOM

MIAMIBEACH

Agenda

1. Project Purpose
2. Stormwater Master Plan Tasks
3. Neighborhood Improvement Projects
4. Proposed Stormwater Infrastructure Summary
5. Water Quality Approach
6. Critical Needs Projects
7. Questions

Project Purpose

Update the City's stormwater program:

- 50-year Planning Horizon
- Identify Critical Needs focused on the Next 10 Years
- Incorporate Recent Studies and Update Water Quality Approach
- Update the Citywide Stormwater Model
- Update Construction Cost Estimates
- Prioritize Phasing and Create Implementation Plan

Stormwater Master Plan Tasks

Schedule

- **Notice to Proceed (NTP):** October 2022
- **Completion:** October 2023 (12-month timeline)

Data Collection

Reviewed/processed CMB data:

- Stormwater geodatabase
- Miami Beach LiDAR survey
- Resident Complaints and PW Work Orders (Cityworks)
- Recent studies

Analysis

- Prioritization criteria for Critical Needs Projects
- Geospatial analysis of flooding complaints
- Public and stakeholder engagement strategy
- “Drainage toolbox” for Critical Needs Projects

Stormwater Modeling

- Updated the City’s Master Drainage Model
- Stormwater infrastructure planning for the City’s Neighborhood Improvement Projects

Stormwater Master Plan Tasks

Stormwater Modeling Technical Memorandum

- Detailed description of the methods used to develop the City's Master Drainage Model

Prioritized Capital Improvement Plan (CIP) Report

- Updated Construction Cost Estimates for the City's Neighborhood Improvement Projects
- Identified Critical Needs Projects to be implemented for the next 10 years (supplemental to Neighborhood Improvement Projects)

Public Outreach Meeting

- Informed residents about Study results and obtained feedback (9/28/2023)
- Incorporated feedback into Final Draft

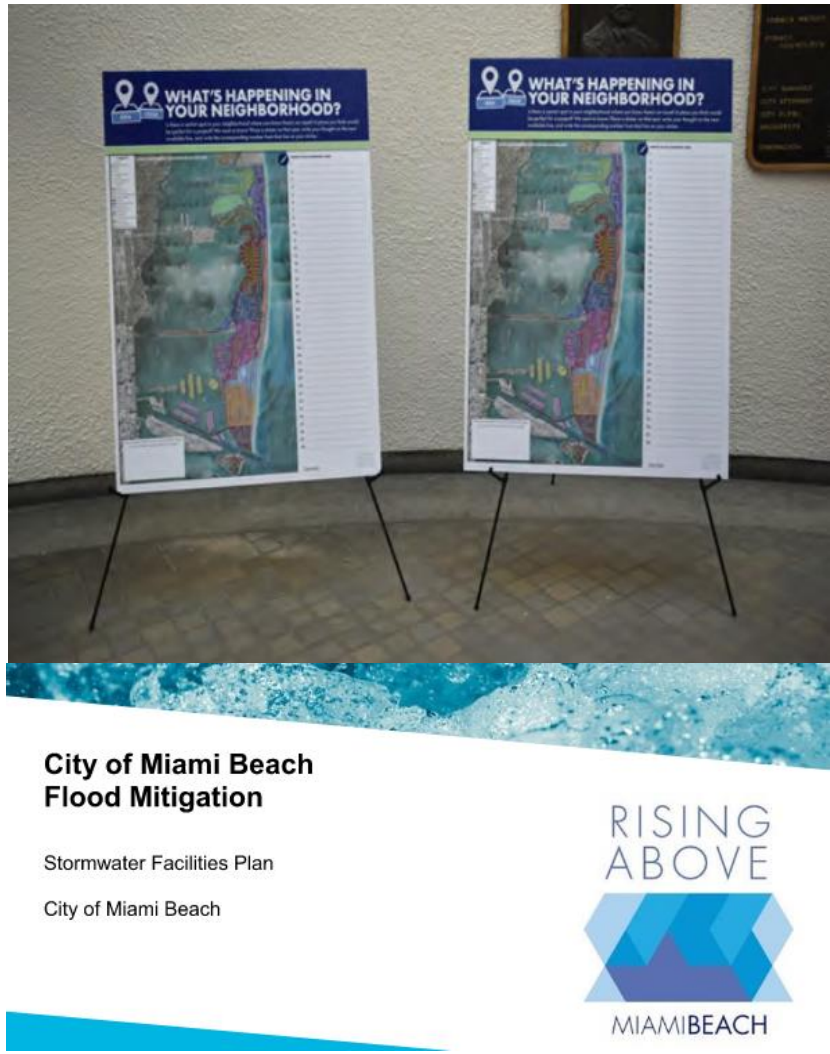
Presentation to FERC and to Commission

- Next Step:

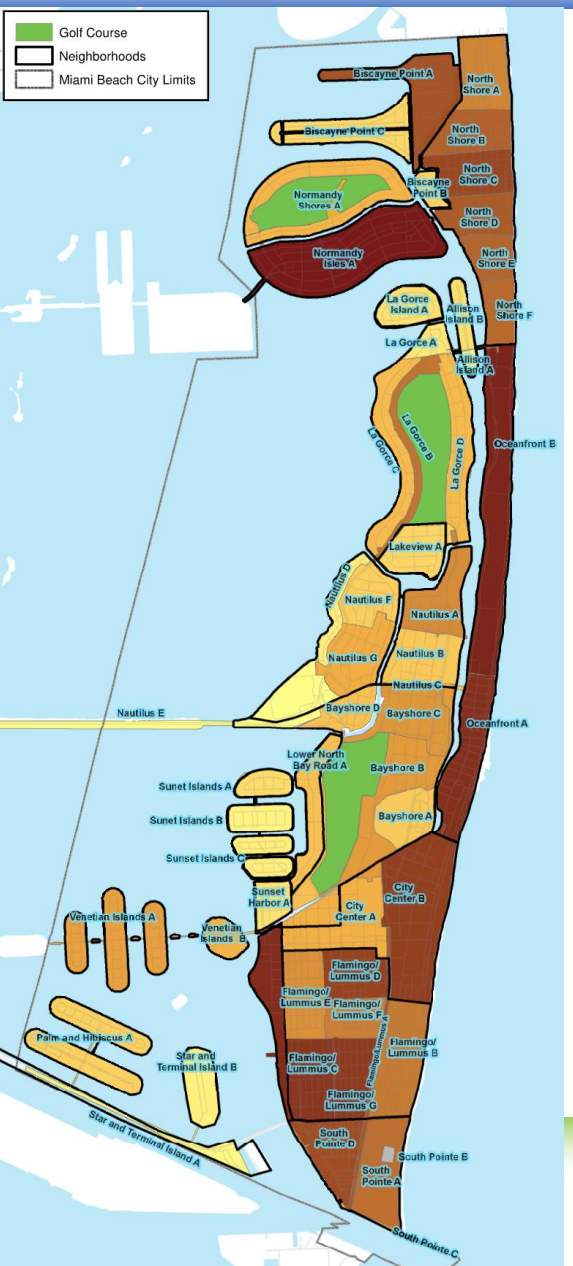
Approval and Adoption for Implementation

Previous and Ongoing Studies

- Road Elevation Strategy
- Neighborhood Project Prioritization
- Blue-Green Stormwater Infrastructure Concept Plan
- Stormwater Facilities Plan
- Seawall Prioritization Plan
- Basin Drainage Reports for the Flood Mitigation Study
- Stormwater 20-Year Needs Analysis (HB 53)
- Sea Level Rise Vulnerability Assessment and Adaptation Plan (ongoing)



Neighborhood Improvement Projects (NIPs)



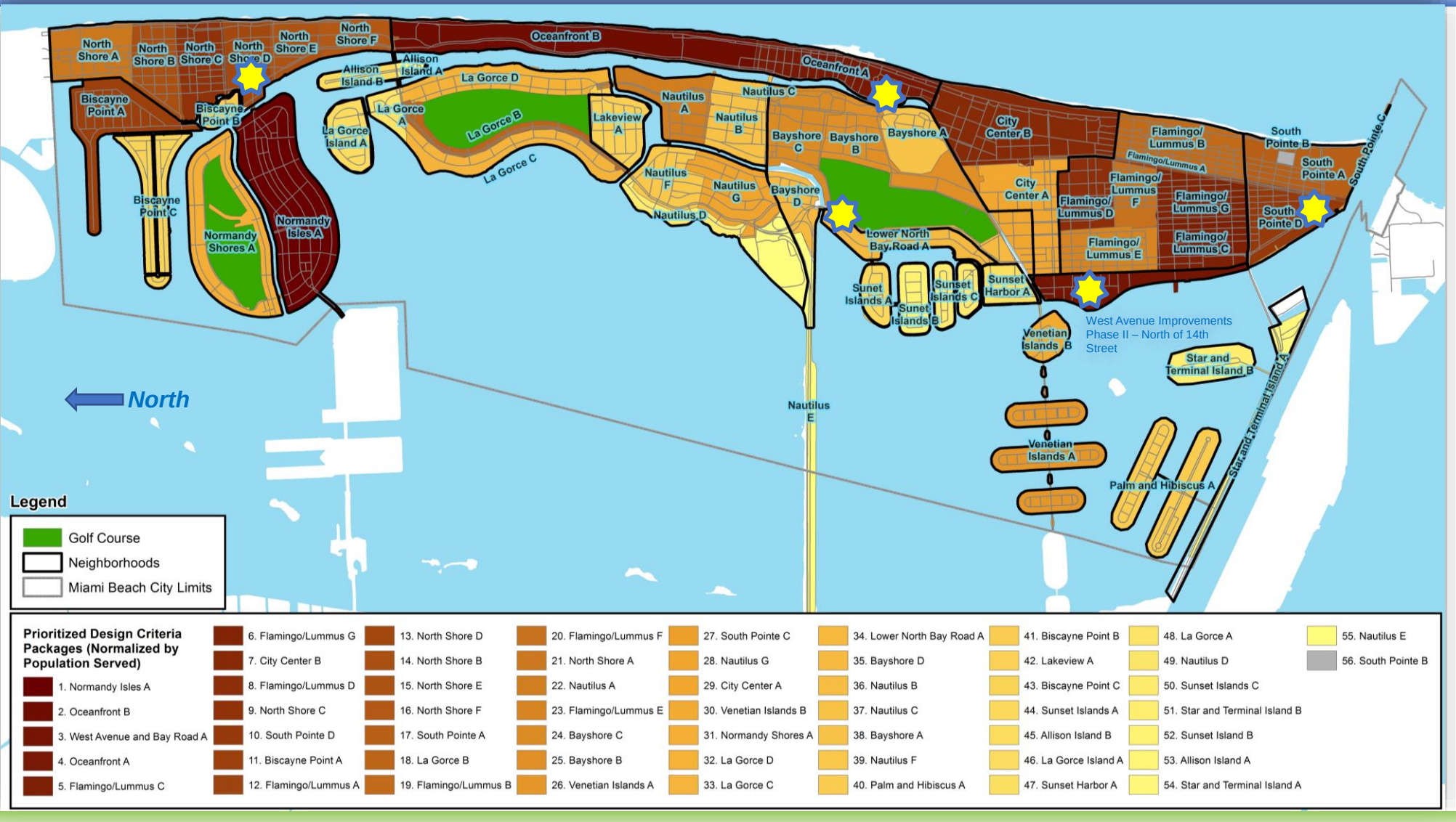
Holistic projects that involve multiple City services to enhance the quality of life in a neighborhood:

- Stormwater improvements (large pipes and pump station)
- Potable water and wastewater collection improvements
  Roadway improvements
- Aboveground components (sidewalks, street lighting, landscaping, etc.)

✓ NIPs provide comprehensive long-term tidal and rainfall flood mitigation.

✓ Prioritized NIPs List Adopted by Commission in 2020 and incorporated into this Master Plan.

Neighborhood Improvement Projects



Ongoing Projects:

1. Indian Creek Improvements
2. West Avenue Improvements Phase II – North of 14th St
3. FDOT Alton Road (Michigan Avenue to 43rd Street)
4. First Street and South Pointe Stormwater Improvements
5. North Shore D & Town Center Improvements

Current Level of Service

DESIGN STORM

10-year, 24-hour Storm

ROADWAY DESIGN LIFE/RESILIENCE

30 years

SEA LEVEL RISE PROJECTION

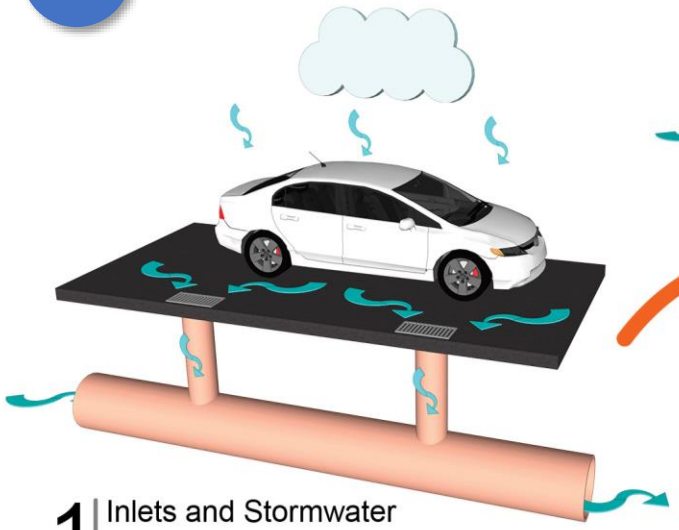
NOAA Intermediate High

Proposed Stormwater Infrastructure Summary

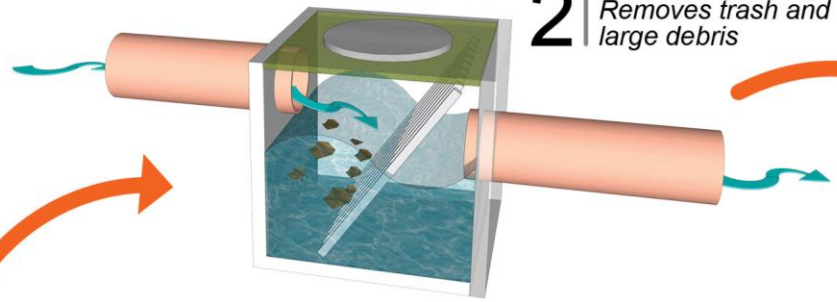
- 60 Stormwater Pump Stations
  - Including Best Management Practices (BMP) Water Quality Treatment Trains
- Approx. 104 miles of stormwater pipes and force mains
- 2023 Budgetary Estimate for the Proposed Neighborhood Improvement Projects: **$3.7 Billion**

*The Proposed Stormwater Infrastructure Board is available at our Neighborhood Improvement Projects Station

5 Water Quality Treatment Approach

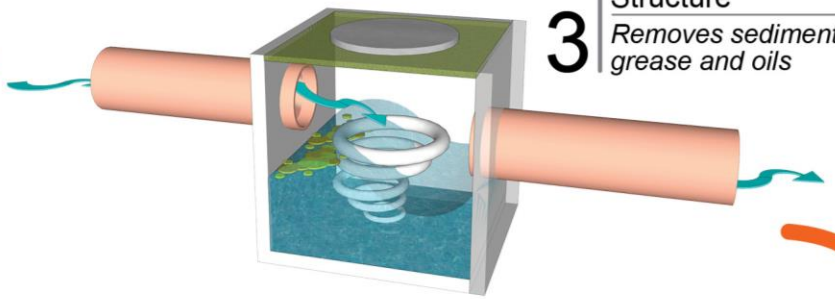


1 Inlets and Stormwater Collection System



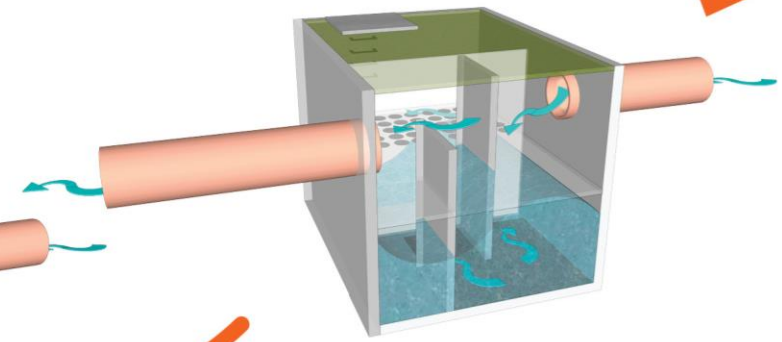
2 Bar Screen Trash Rack

Removes trash and large debris



3 Hydrodynamic Water Quality Treatment Structure

Removes sediments, grease and oils

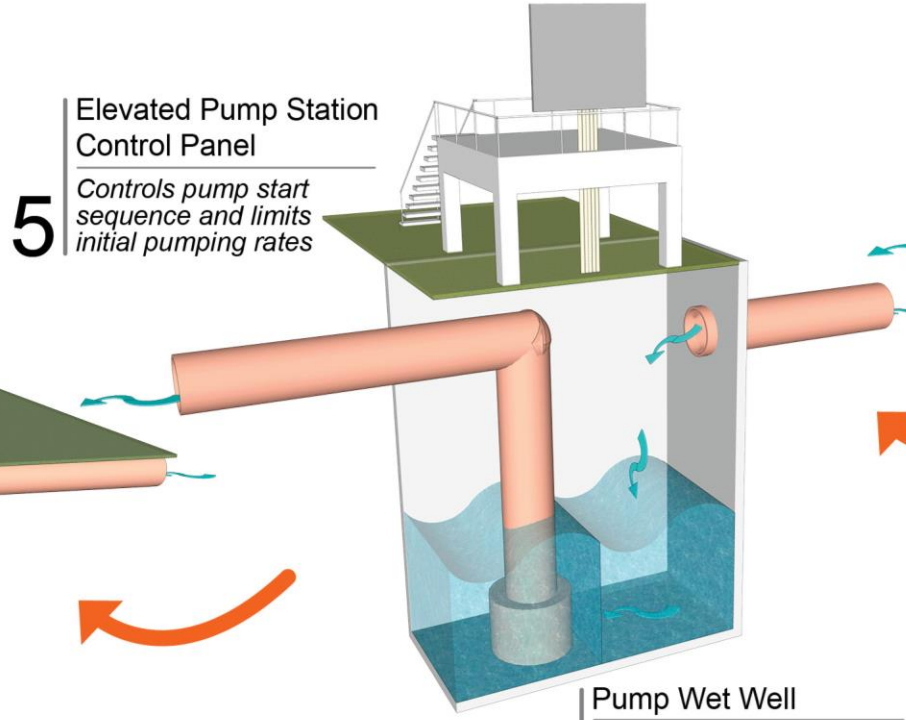


4 Membrane Filtration Water Quality Treatment Device

Removes dissolved nutrients - Total Phosphorus (TP) and Total Nitrogen (TN)

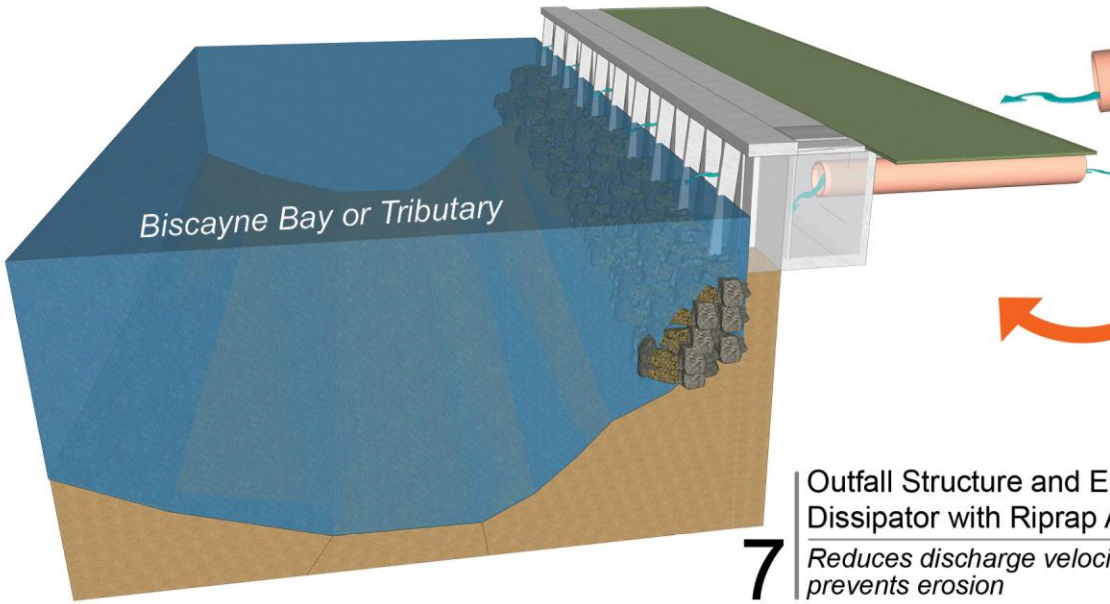
5 Elevated Pump Station Control Panel

Controls pump start sequence and limits initial pumping rates



6 Pump Wet Well

Includes both the necessary number of duty and redundant pumps



7 Outfall Structure and Energy Dissipator with Riprap Apron

Reduces discharge velocity - prevents erosion

Notes:

1. Standby / Emergency Generator Not Shown
2. Above Ground Equipment will be Aesthetically Screened or Placed within a Structure

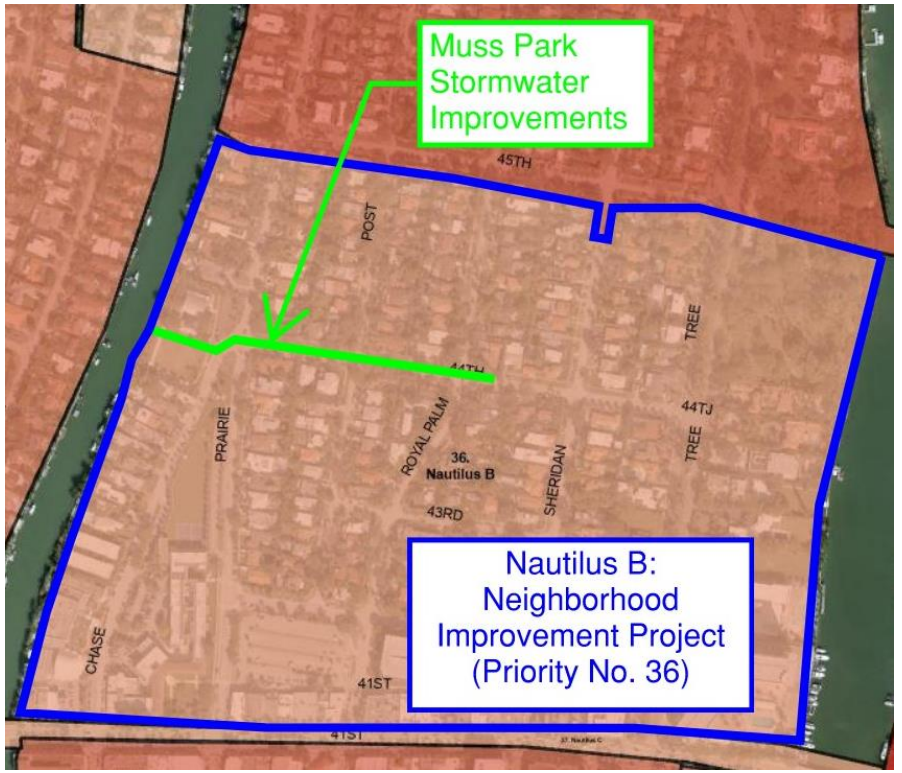
What is a Critical Needs Stormwater Project?

- Smaller project aimed at addressing nuisance flooding to provide both **beneficial** and **cost-effective** solutions within targeted areas.

- **Complimentary** and **adaptable** to the future Neighborhood Improvement Projects (not throw-away…)

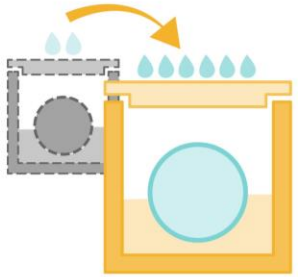
- Includes a variety of solutions available in the “Drainage Toolbox”.

For Example:

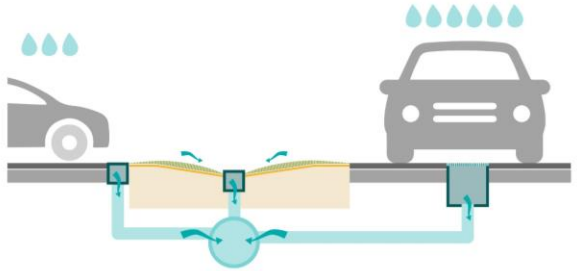


Drainage Toolbox for Critical Needs Projects

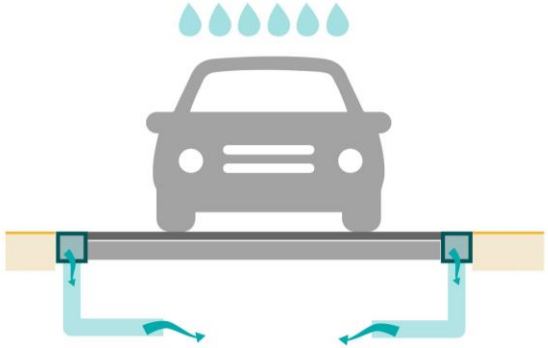
Regrading, Repaving, and Minor Road Raising



Upsizing Infrastructure

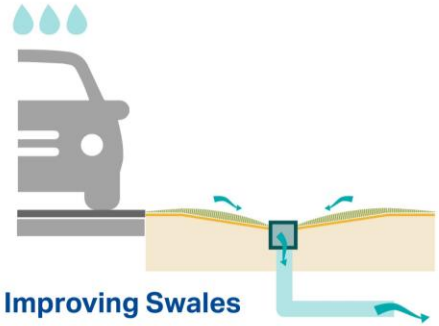


Connecting Drainage Areas

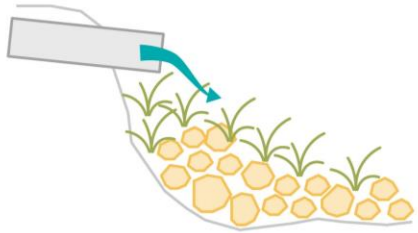


Adding Catch Basins

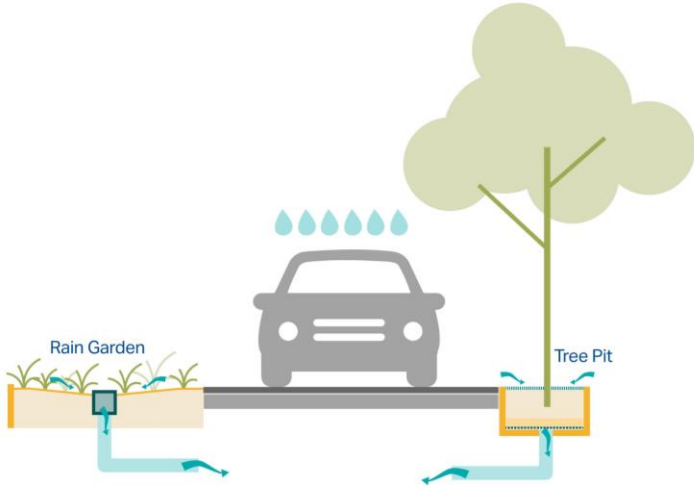
Water Quality Improvements



Improving Swales



Enhance Existing Outfalls



Implementing Blue-Green Infrastructure

Prioritization of Critical Needs Projects

AECOM

Stormwater Modeling and Master Plan Update
Critical Needs Projects and Flood Complaints

MIAMIBEACH

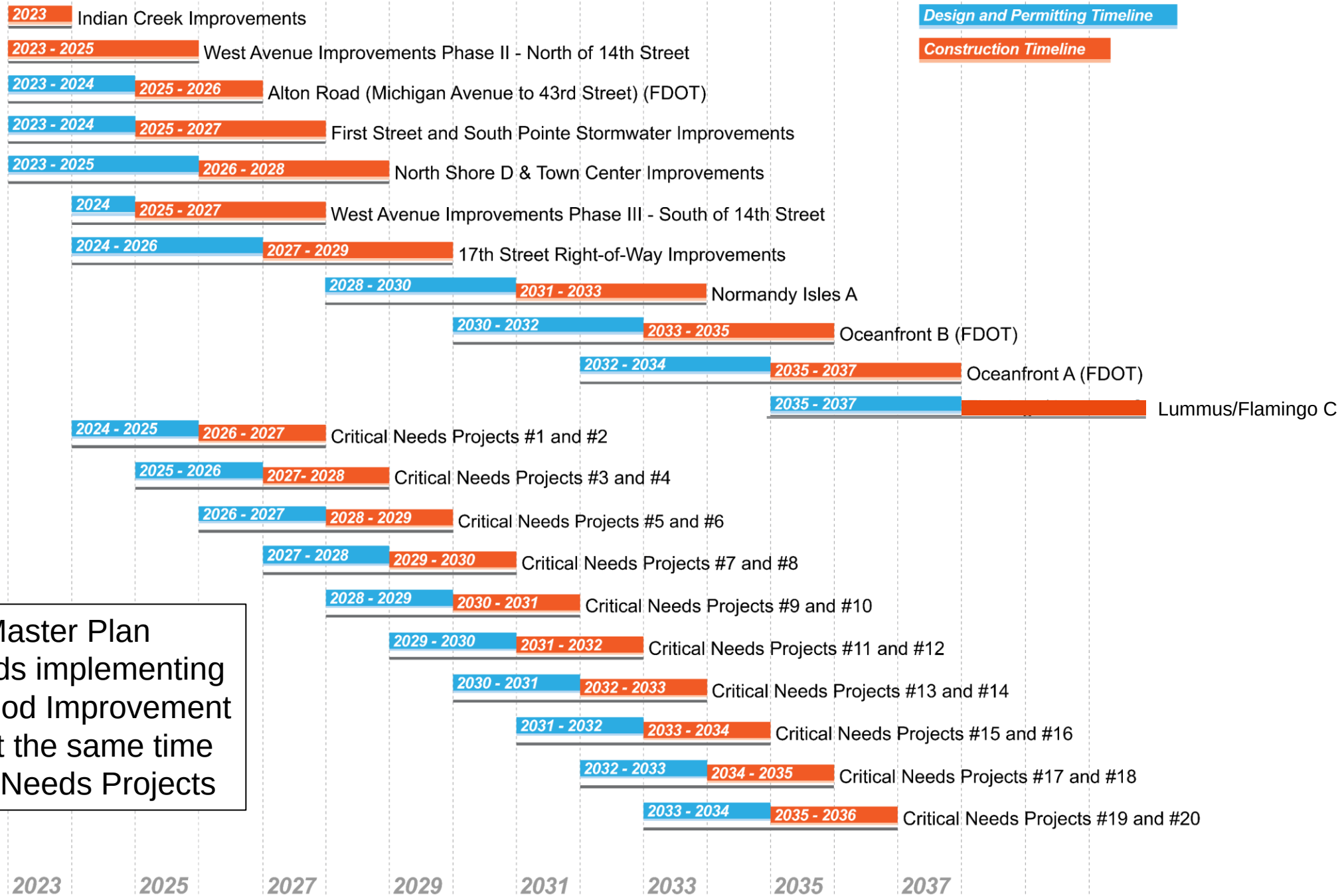
Criteria	Criteria Weighting
• Temporary Pumps Historically Deployed	7
• Low Topography / Tidal Inundation	7
• Flooding Complaints	7
• Constructability/ Ease of Implementation	7
• Neighborhood Improvement Project Ranking	6
• No Improvement Projects in the Last 10 Years	6
• Insufficient Drainage	4
• Exfiltration Trenches	4
• Drainage Wells	4
• Historic District	3
• Community and Emergency Facilities	3
• No Permitting Complexity	3
• No Connection to Outfalls	1
• 10-Year Design Storm Flooding	1

MIAMIBEACH

Recommended Critical Needs Projects

Critical Needs Rank	Neighborhood Improvement Project Rank	Critical Needs Project Name		Budgetary Estimate	Critical Needs Score
1	39	Nautilus F (North)	$	2,607,000.00	Ongoing
2	36	Nautilus B - Muss Park	$	4,389,000.00	254
3	33	La Gorce C - N Bay Rd 1	$	3,941,000.00	247
4	48	La Gorce A	$	3,356,000.00	243
5	33	La Gorce C - N Bay Rd 2	$	3,753,000.00	239
6	29	City Center A - Palm View	$	3,702,000.00	236
7	23	Flamingo/Lummus E - Lenox Ave	$	1,154,000.00	216
8	39	Nautilus F - Nautilus Dr	$	800,000.00	216
9	9	N Shore B & C - Dickens Ave	$	2,723,000.00	202
10	6	Flamingo/Lummus A - 6th St	$	1,732,000.00	200
11	21	North Shore A - Byron Ave	$	5,642,000.00	194
12	49	Nautilus D - N Bay Rd	$	3,934,000.00	192
13	5	Flamingo/Lummus C (North)	$	3,076,000.00	187
14	22	Nautilus A - Royal Palm Ave	$	2,520,000.00	187
15	42	Lakeview A (North)	$	3,383,000.00	185
16	28	Nautilus G - N Bay Rd	$	3,477,000.00	175
17	25	Bayshore B	$	4,171,000.00	170
18	31	Normandy Shores A - Shore Lane	$	1,146,000.00	170
19	34	Lower North Bay Rd A	$	2,229,000.00	167
20	36	La Gorce Island A	$	7,127,000.00	164
		TOTAL	**$**	**64,862,000.00**	

Conceptual Schedule



The Master Plan recommends implementing Neighborhood Improvement Projects at the same time as Critical Needs Projects


Thank You!