MIAMI BEACH
URBAN FORESTRY MASTER PLAN

City Commission
September 16, 2020

Calvin, Giordano & Associates, Inc.
EXCEPTIONAL SOLUTIONS™

MIAMIBEACH
RISING
ABOVE

DAVEY
Resource Group

PROJECT TEAM

URBAN FORESTRY
MASTER PLAN

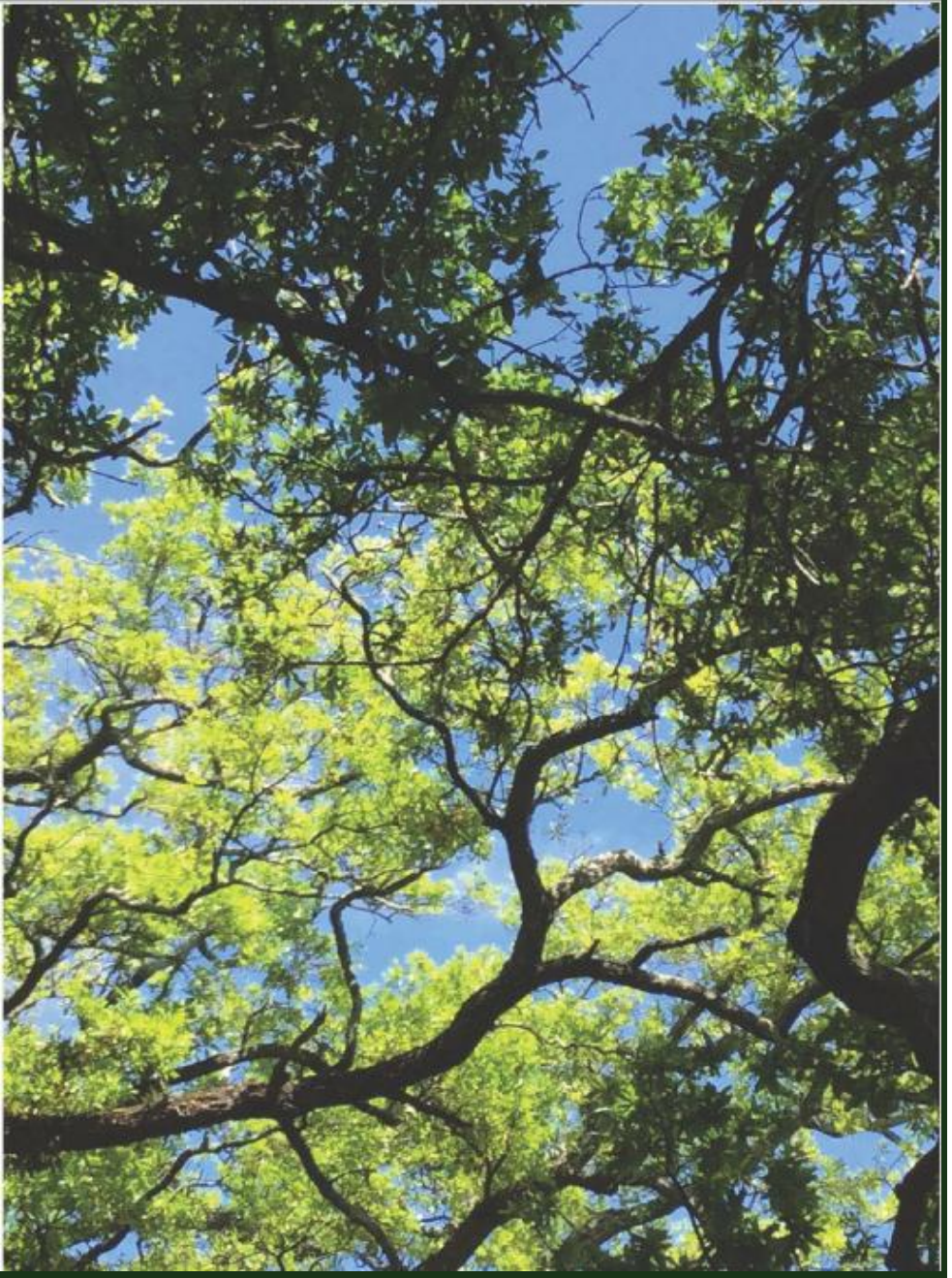
MIAMIBEACH

CITY STAFF MEMBERS

ELIZABETH WHEATON I ENVIRONMENTAL + SUSTAINABILITY DIRECTOR
OMAR LEON I URBAN FORESTER

DAVEY RESOURCE GROUP + CALVIN, GIORDANO & ASSOCIATES

KERRY GRAY/ DRG I URBAN FORESTRY CONSULTANT/PROJECT MANAGER
MICHAEL CONNER/ CGA I LANDSCAPE ARCHITECT
GIANNO FEOLI/ CGA I DIRECTOR OF LANDSCAPE URBANISM + DESIGN
SHIRLEY VAUGHN/ DRG I BUSINESS DEVELOPER
WILL AYERSMAN / DRG I GIS SERVICES COORDINATOR



MIAMIBEACH

OBJECTIVES & SCOPE

- Analyze the **existing conditions** of Miami Beach's urban forest
- Review **operational processes** within the city to understand how they affect the management of the urban forest
- Establish **goals and targets** for Miami Beach's urban forest
- Develop **recommendations & actions** for implementation
  - Day-to-day: Operations and contracting
  - Design: Implementation 'Toolkit'

URBAN FOREST MASTER PLAN

BENEFITS?

- Reduce and filter **stormwater**
- Improve air quality & sequester carbon
- Wildlife habitat
- Moderate local **climate**
- Increase **property values** & reduce energy costs
- Community character and aesthetics
- Improve **human health**

Without a Plan and with limited public resources, Miami Beach could ***lose*** more trees than it is replacing; **preservation is important!**

State of the Urban Forest

MIAMIBEACH

STATE OF THE URBAN FOREST

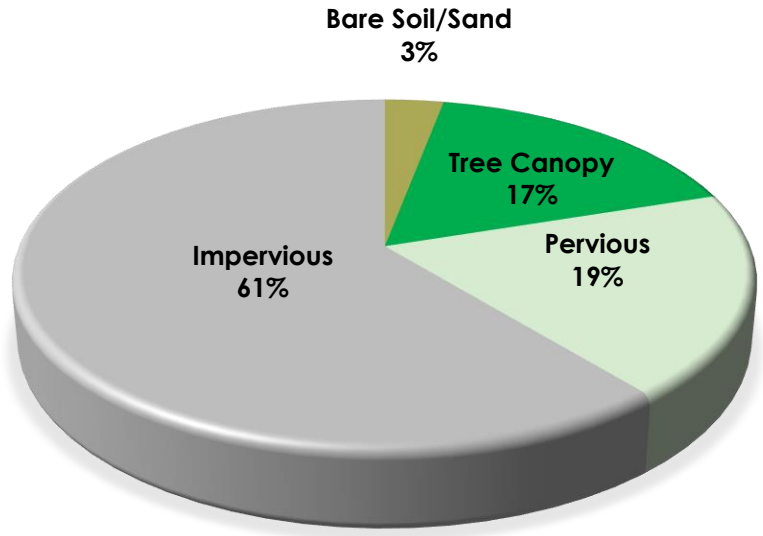
LAND COVER AND TREE CANOPY

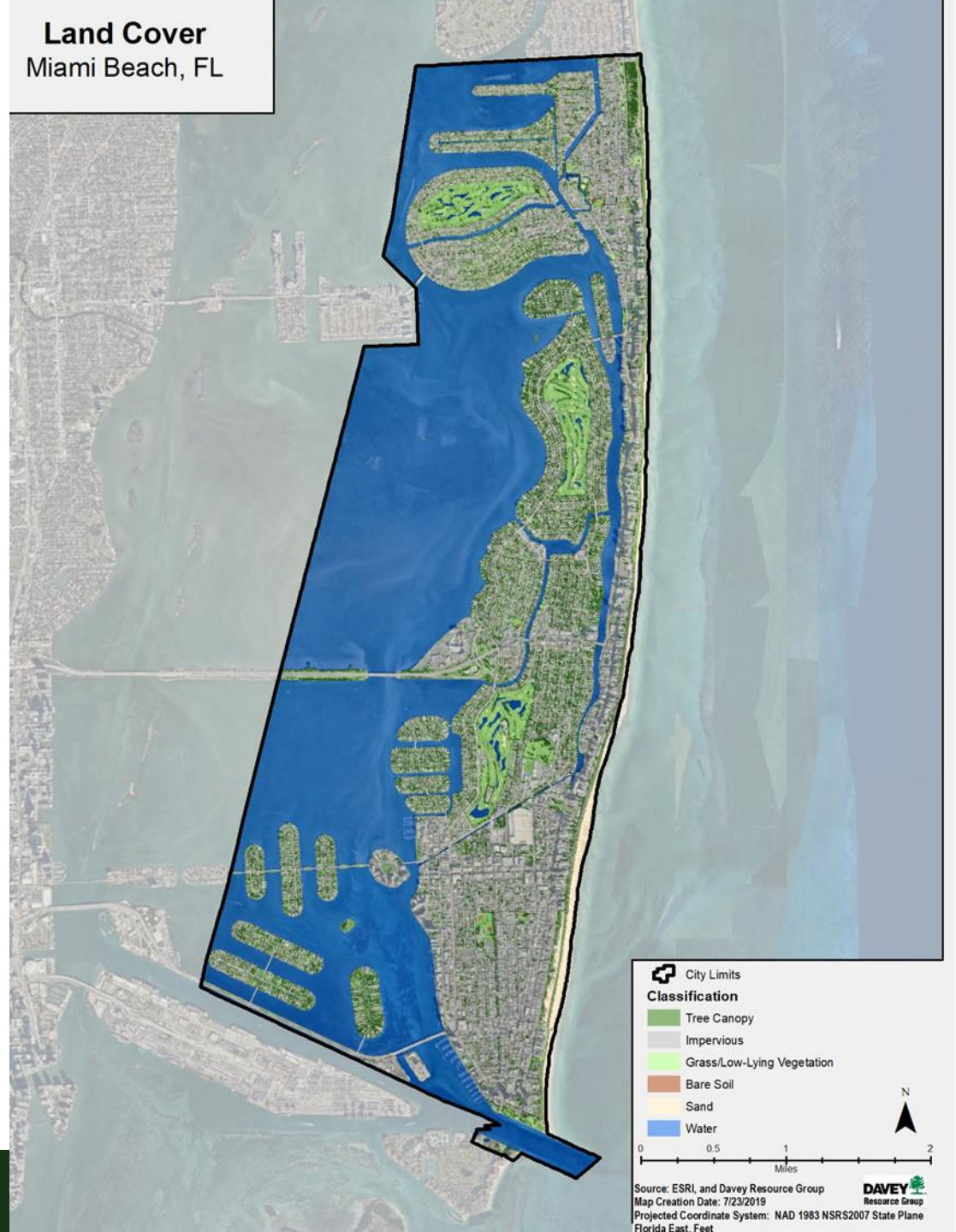
MIAMI BEACH LAND COVER:

Impervious Surfaces: 61%

Tree Canopy Cover: 17%

- 78% of tree canopy cover on private residential property





STATE OF THE URBAN FOREST

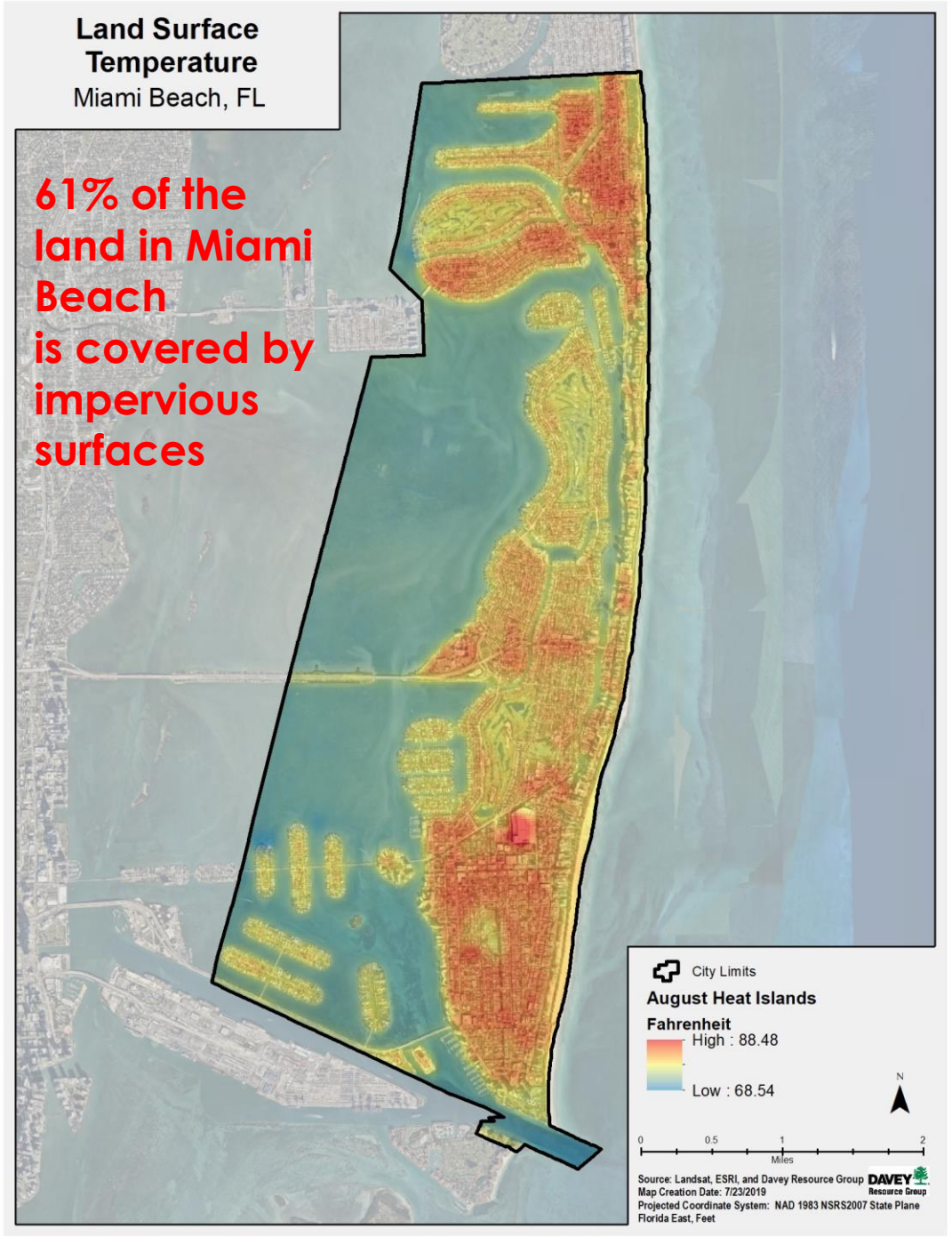
LAND COVER AND URBAN TREE CANOPY

CHALLENGE: URBAN HEAT ISLAND

Occurs when roads, buildings, and sidewalks (impervious surfaces) trap and retain heat causing the air temperature to be hotter than nearby areas that are less built up. Leading to:

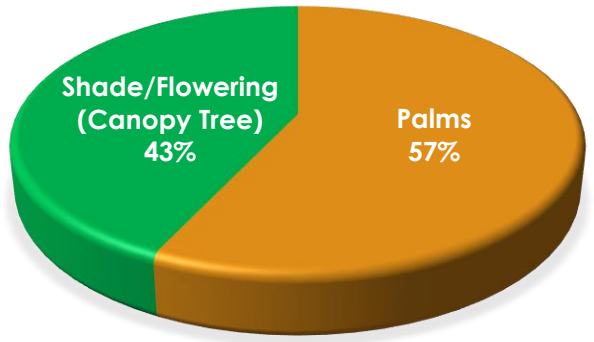
- Health Impacts (heat-related illnesses)
- Increased energy consumption
- Elevated air pollution and greenhouse gases

Trees reduce the urban heat island effect by shading impervious surfaces & reducing the amount of heat absorbed.



STATE OF THE URBAN FOREST

PUBLIC TREE AND PALM POPULATION



CHALLENGE: SPECIES DIVERSITY

Palms have shifted from an accent plant to a major component of Miami Beach's urban forest

48,600 Palms and Trees growing along Miami Beach streets and parks

- **Palms: 57% of population**
  - 90 different species
- **Shade/Flowering Trees: 43% of population**
  - 212 different species

Benefits*	**Shade Tree** Live Oak *(Quercus virginiana)*	**Palm** Cabbage/Sabal Palm *(Sabal palmetto)*
Carbon Dioxide (CO2) Sequestered (Absorbed)	510 pounds/year	2.71 pounds/year
Rainfall Intercepted	725 gallons/year	81 gallons/year
Ozone removed from the air	20 ounces/year	< 2 ounces/year
Energy Savings (A/C)	60 kWh	26 kWh
Carbon dioxide stored lifetime to date	3,214 pounds over lifetime	26 pounds over lifetime
Annual Value of Benefits	**$31.00**	**$6.48**

**Based on an analysis of a 16" diameter Quercus virginiana and Sabal palmetto utilizing the USDA Forest Service's i-Tree MyTree benefits tool – www.itreetools.org.*

Palms substantially underperform in all environmental benefits when compared to trees

STATE OF THE URBAN FOREST

UNIQUE CHALLENGES THE URBAN FOREST MASTER PLAN ADDRESSES

- **Species diversity**
  - Encouraging shade trees and shifting palms back to an accent plant
- **Tree species selection**
  - Selecting species resilient to sea level rise, flooding & increasing salinity, limited growing space, and increasing temperatures
- **Street tree maintenance and preservation**
  - Maximize the benefits Miami Beach's trees provide
- **Limited space for trees in the public right-of-way (ROW)**

57% of the public tree population is made up of palms

Tree Canopy

Current Tree Canopy Cover: 17%

Possible Tree Canopy Cover: 26%
(if ***all possible*** planting areas were planted)

Possible Planting Area = an area with grass or bare soil where a tree could potentially be planted.

26% canopy cover is **not** a realistic target

~50% of possible planting areas are suitable for tree planting.

Areas may be unsuitable for trees due to a variety of factors, including:

- Lack of Space
- Utilities: underground or overhead
- Inappropriate location
- Poor soil or drainage
- No access to water

22% canopy cover target is **a 5% increase from today** and takes into consideration that only about 50% of sites will be suitable for tree planting.

To achieve 22% canopy cover by 2040 will require planting ~1,300 trees per year (or 25,900 total trees) on private and public property.

DESIGN TOOLKIT

MIAMIBEACH

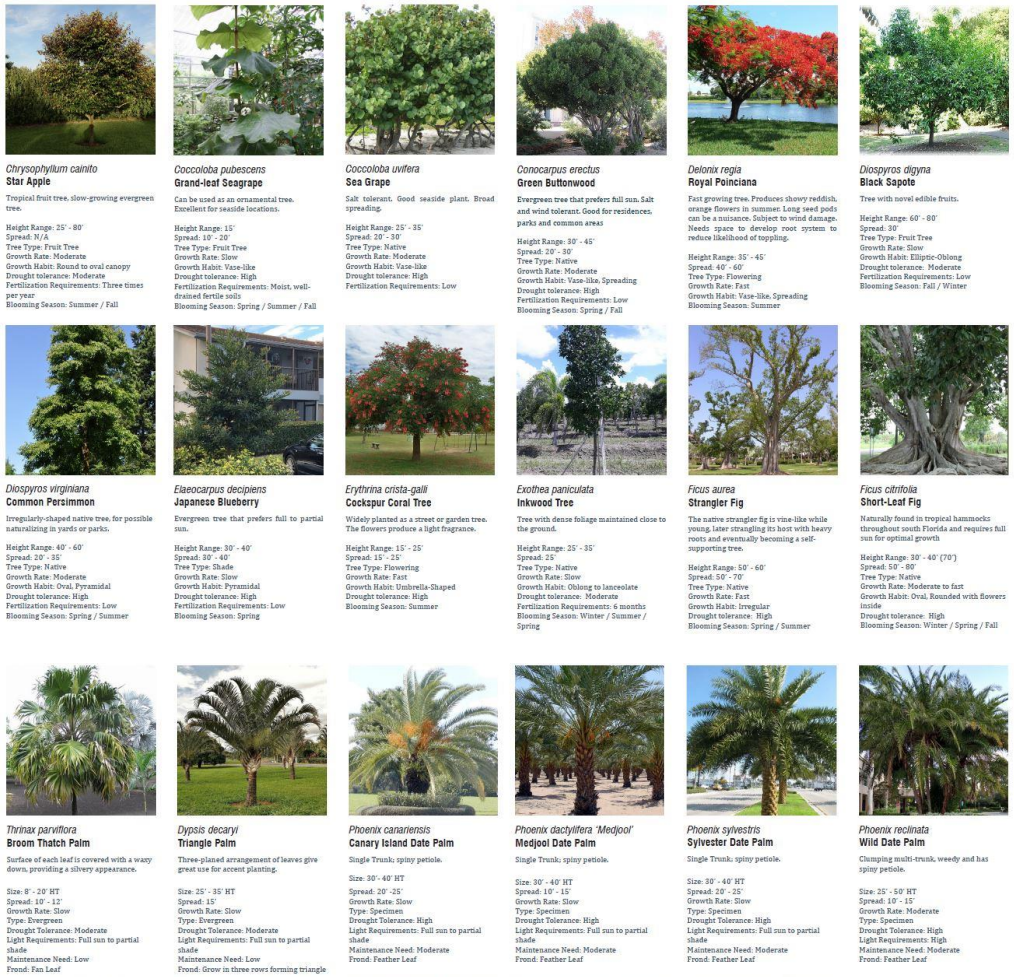
IMPLEMENTATION

SHAPING THE VEGETATION PALETTE IN MIAMI BEACH

- **Species Diversity**
  - Palms – moving back to an accent plant

- **Tree Species Selection**
  - Re-prioritize species to those that are more resilient to sea level rise, flooding & increasing salinity, limited growing space, and increasing temperatures

- **Highlights the characteristics of various species**
  - Can also be used by homeowners to make better species selection when planting trees on their private properties.



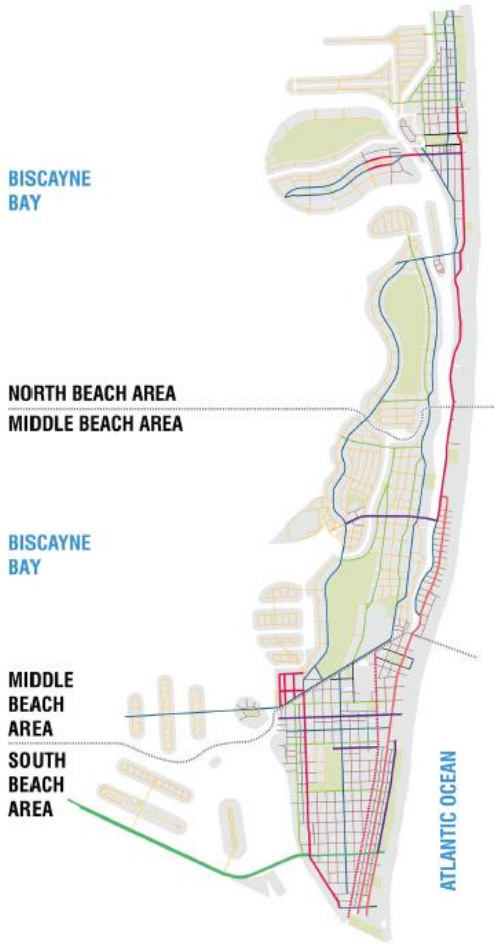
IMPLEMENTATION

PLANNING AND PRIORITIZING STREETS BY CHARACTER & USE

- **Planning for a city-wide approach**
  - Establishing a classification strategy for all streets within the City.

- **Street-by-Character**
  - Understanding that streets are not only about traffic movement, but also about experience; working in concert with abutting land uses.

- **Street tree species prioritization plan**
  - Identifying key species for specific street-types to build uniformity and wayfinding



IMPLEMENTATION

CASE-STUDIES ON UNIQUE CONDITIONS IN MIAMI BEACH

- **Pine Tree Drive**
  - How can we adapt to natural aging of canopy and changes in the climate without losing our history?
- **La Gorce Island**
  - How can we adapt neighborhoods in low-lying areas to meet the challenges of increased salinity in groundwater and still maintain an identity?
- **Meridian Avenue**
  - How can we keep the environmental benefits of large, established canopies when approaching the rising of streets?

IMPLEMENTATION

BRIDGING EFFORTS ACROSS URBAN FORESTRY, PUBLIC WORKS, CIP & PLANNING

- **Establishing Tactics for Street Tree Planting**
  - Key to maintain and promote trees in Miami Beach's urban condition is to **use appropriate green infrastructure**.
    - Increases short-term implementation costs but provides a better return on investment (ROI) over the long-term.
  - **Establishes goals** in order to budget appropriately for future projects
  - **Supports design coordination across city departments** for review and implementation
    - Minimizes conflicts during plan review and construction processes

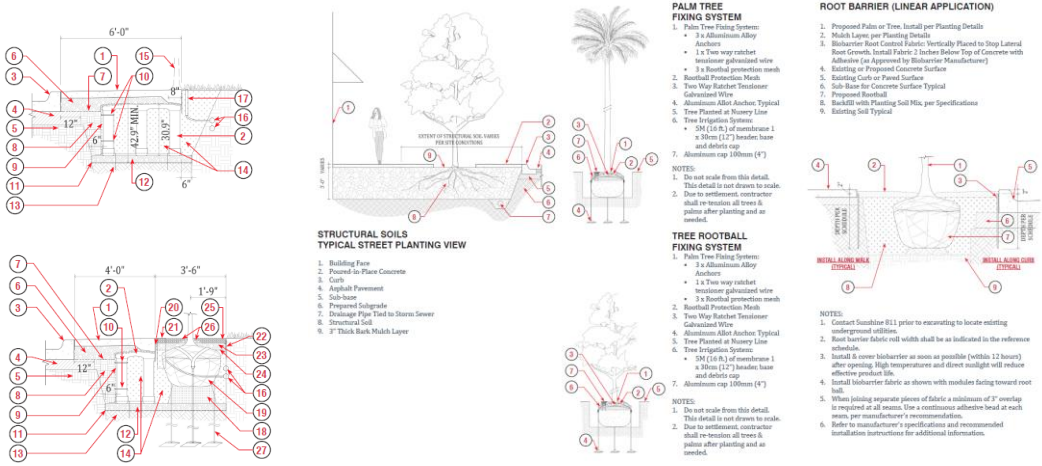
IMPLEMENTATION

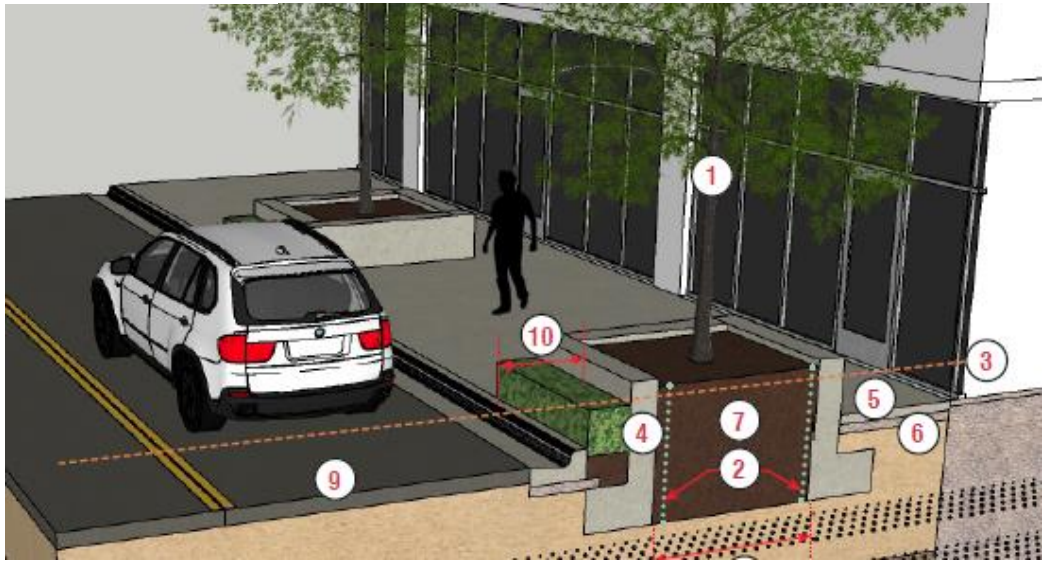
BRIDGING EFFORTS ACROSS URBAN FORESTRY, PUBLIC WORKS, CIP & PLANNING

- **Standardizes components of implementation**
  - Provides standard construction details to be incorporated into the City's PW manual and standard details

- **Establishes minimum metrics for soil volumes**
  - Helps ensure new trees thrive and reach their ideal mature size.

- **Provides strategies for a phased approach to street tree planting in light of sea level rise**
  - How to plan for trees today so that they are not negatively impacted by planned adaptation improvement projects in the future?





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Thank you for your time

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