

Town of Palm Beach Water Supply Feasibility Study

Meeting
April 12, 2022

Overview

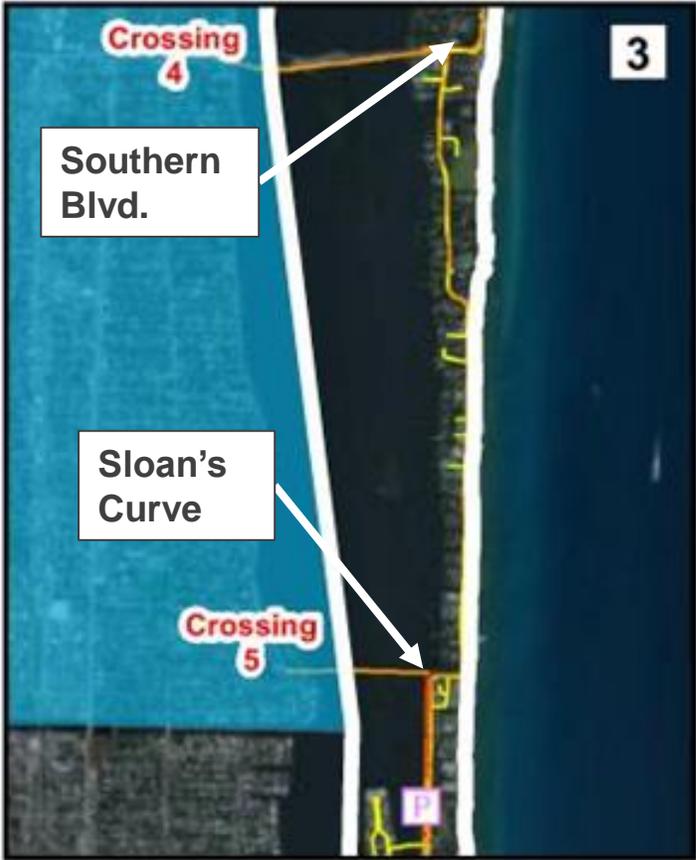
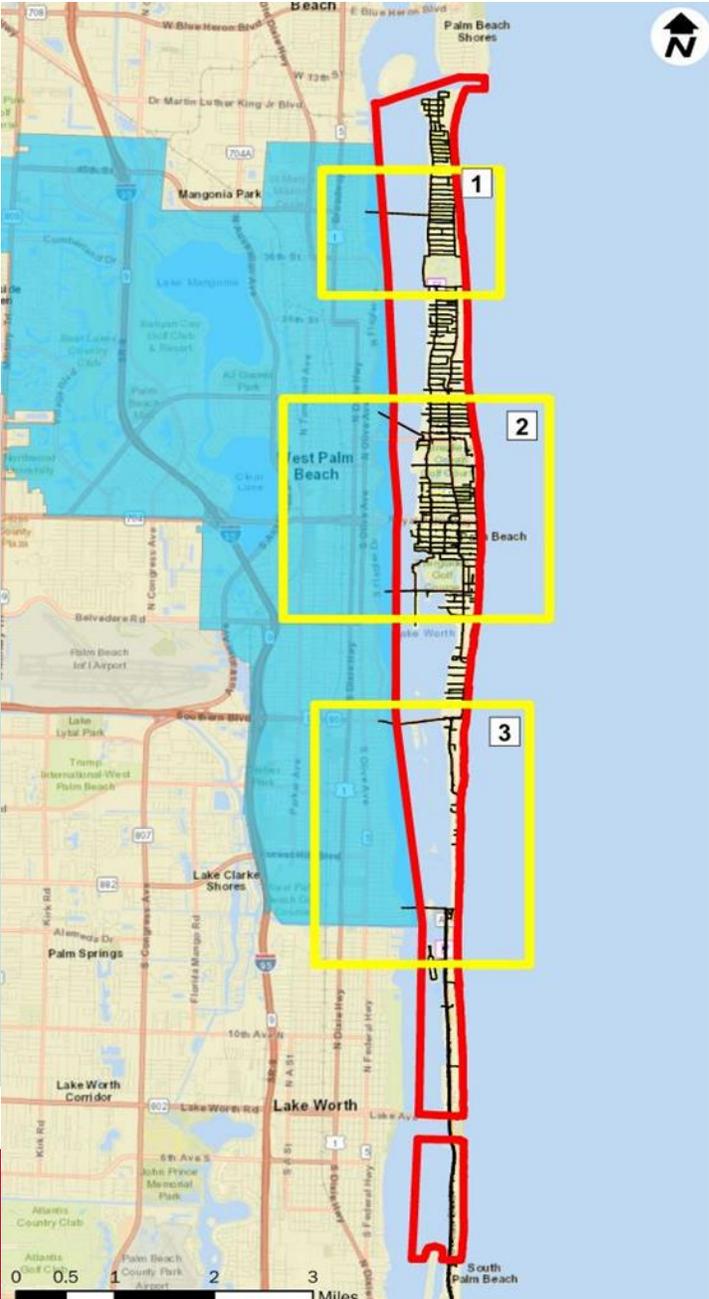
- Completed in 3 phases
- 1st Phase – Identification and Overview of Potential Alternative Potable Water Service and Utility Provider
- 2nd Phase - Evaluation of Alternatives
- 3rd Phase - Evaluation of Additional Town Selected Alternatives

Evaluation of Existing System

Level Of Service	
Parameter	Existing System
Maximum Day Demand (MDD) ¹ Model Output	6,900 gpm (10 MGD) 9.93 MGD
Town of Palm Beach Average Pressure	72 psi
Number of Tie in Locations	Five ICW Crossings 16-inch @ Orange Grove Rd. 24-inch @ Flagler Bridge (Royal Poinciana Way) 20-inch @ Island Rd. 16-inch @ Southern Blvd. 16-inch @ Sloan's Curve

1. MDD rounded to nearest 100 gpm

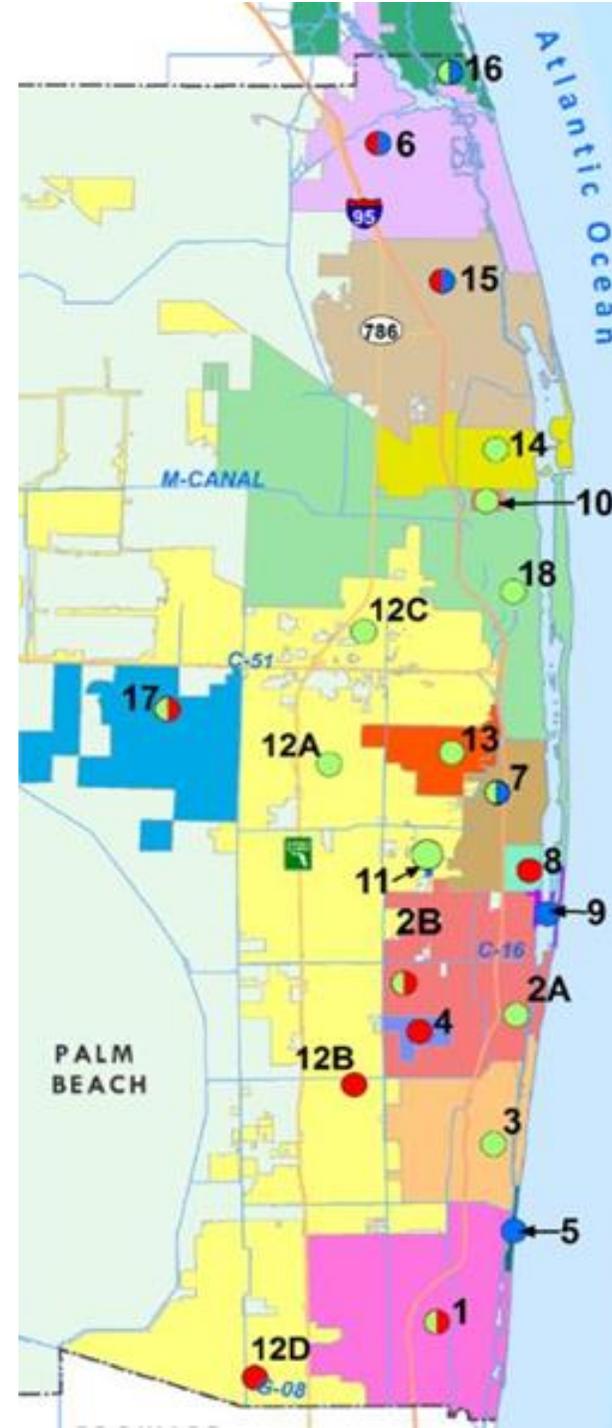
Evaluation of Existing System



Existing Local Utilities

- 1. Boca Raton, City of
- 2A. Boynton Beach, City of (East)
- 2B. Boynton Beach, City of (West)
- 3. Delray Beach WSD, City of
- 4. Golf, Village of
- 5. Highland Beach, Town of
- 6. Jupiter, Town of
- 7. Lake Worth Utilities, City of
- 8. Lantana, Town of
- 9. Manalapan, Town of
- 10. Mangonia Park, Town of
- 11. Maralago Cay
- 12A-D. Palm Beach County WUD Plants 2, 3, 8, & 9
- 12E. Palm Beach County WUD Western Region
- 13. Palm Springs, Village of
- 14. Riviera Beach, City of
- 15. Seacoast Utility Authority
- 16. Tequesta, Village of
- 17. Wellington Public Utilities Department
- 18. WPB Public Utilities, City of

- Water Treatment Plant Methods (≥0.1 mgd)**
- Lime Softening
 - Nanofiltration
 - Reverse Osmosis



Source: SFWMD

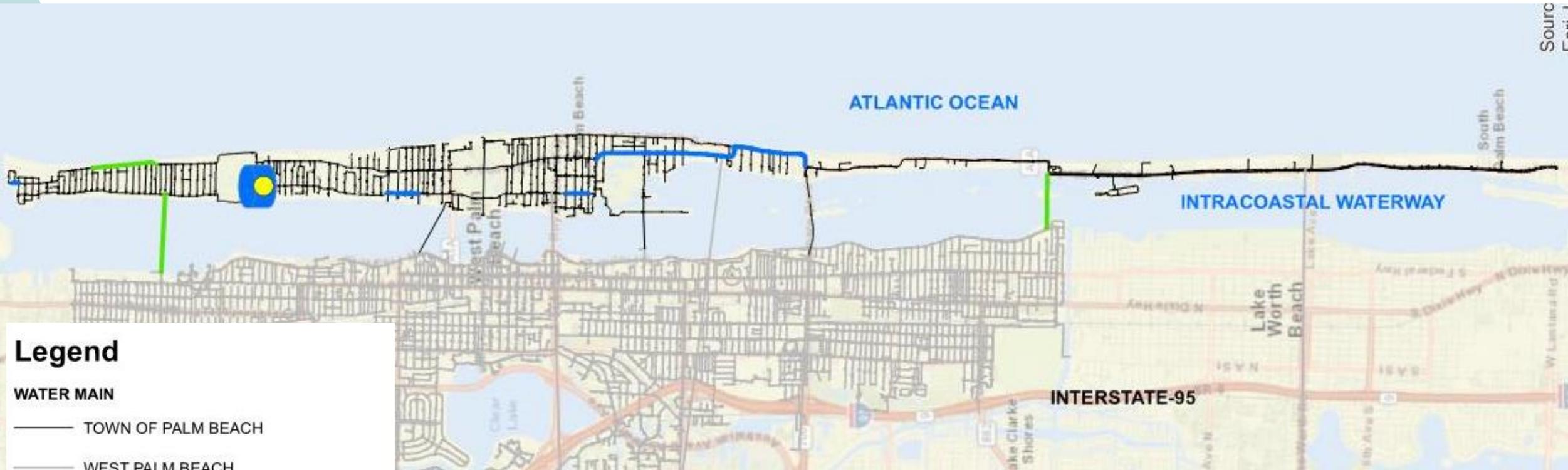
Phase 1 Conclusion

- The collection of data necessary to perform analysis.
- The establishment of the hydraulic baseline for evaluation of the Town's potable water system and potential potable water supply alternatives.
- The identification of 12 potential water supply alternatives.
- The preliminary screening and identification of four (4) potable water supply alternatives to be evaluated in Phase 2.



Phase 1 Questions?

Alternative 1: Renew Current City of WPB Agreement



Alternative 1: Renew Current City of WPB Agreement

Alternative 1 Conceptual Order of Magnitude Opinion of Capital Costs		
ITEM	ITEM OF WORK	SUBTOTAL
1	Franchise Agreement Pipeline Replacements	\$13,250,000
2	Critical Pipeline Improvements Per Masterplan	\$15,660,000
SUBTOTAL CAPITAL IMPROVEMENTS:		\$28,910,000
Engineering/Administration (20%)		\$5,782,000
SUBTOTAL CAPITAL, ENGINEERING AND ADMINISTRATION:		\$34,692,000
Contingency (35%)		\$12,143,000
SUBTOTAL CAPITAL, ENGINEERING ADMINISTRATION, AND CONTINGENCY:		\$46,834,000
LEVEL 5 ENGINEERS OPINION OF PROBABLE COST (0% - + 50%):		\$47,000,000 to \$70,000,000

Alternative 2A: Town Owned Floridian Aquifer Source



Legend

BOOSTER PUMPS

- EXISTING
- EXISTING STORAGE TANK
- ★ PROPOSED WTP

WATER MAIN

- TOWN OF PALM BEACH
- WEST PALM BEACH
- PROPOSED PIPE IMPROVEMENTS
- FRANCHISE AGREEMENT WATER MAIN
- CRITICAL WATER MAIN

Alternative 2A: Town Owned Floridian Aquifer Source

Alternative 2A Conceptual Order of Magnitude Capital Costs		
ITEM	ITEM OF WORK	SUBTOTAL
1	Phipps Park Water Supply and Treatment System (7.5 MGD)	\$79,030,000
2	Quadrille Water Supply and Treatment System (2.5 MGD)	\$36,784,000
3	Pipeline Improvements	\$62,253,000
4	Franchise Agreement Pipeline Replacements	\$10,248,000
5	Critical Pipeline Improvements Per Masterplan	\$3,100,000
SUBTOTAL CAPITAL IMPROVEMENTS:		\$191,415,000
Engineering/Administration (20%)		\$38,283,000
SUBTOTAL CAPITAL, ENGINEERING AND ADMINISTRATION:		\$229,698,000
Contingency (35%)		\$80,394,300
SUBTOTAL CAPITAL, ENGINEERING, ADMINISTRATION, AND CONTINGENCY:		\$310,093,000
LEVEL 5 ENGINEERS OPINION OF PROBABLE COST (0% - + 50%):		\$310,000,000 to \$465,000,000

Alternative 2B: Town Owned Seawater Source



Legend

BOOSTER PUMPS

- EXISTING
- EXISTING STORAGE TANK
- PROPOSED WTP

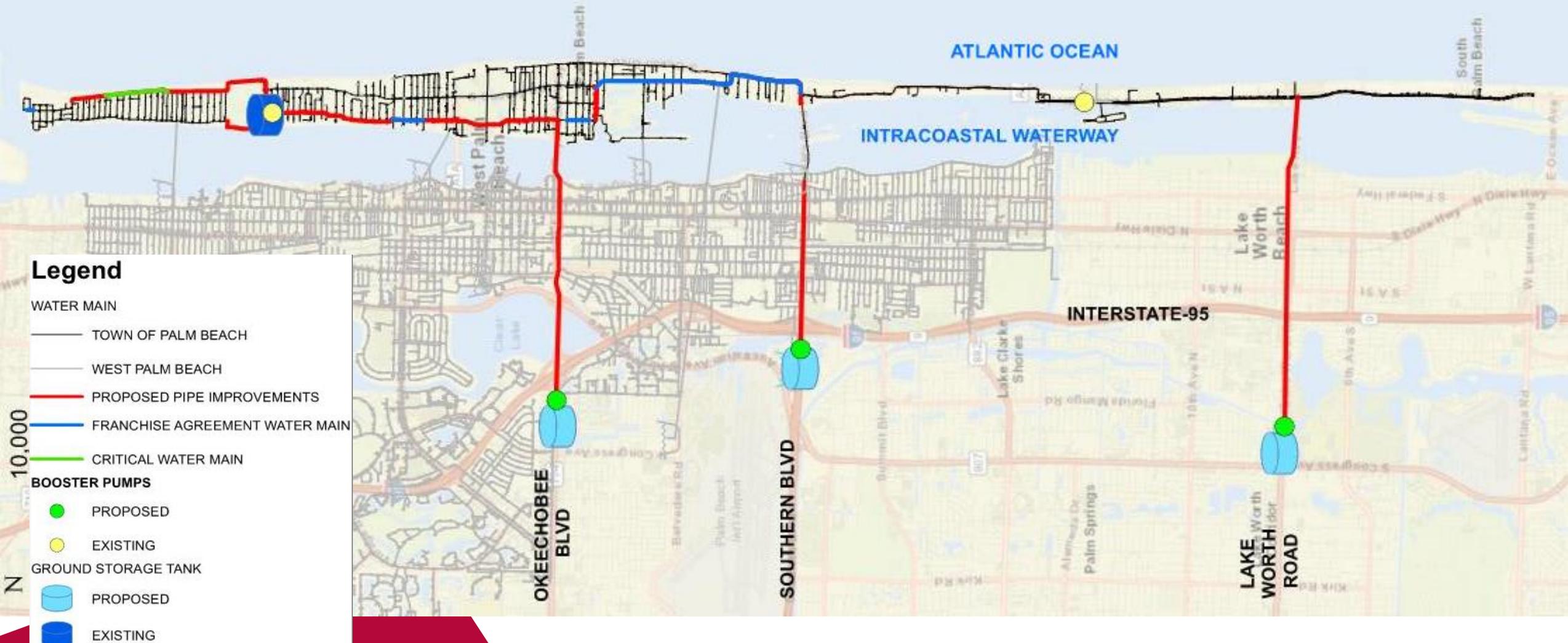
WATER MAIN

- TOWN OF PALM BEACH
- WEST PALM BEACH
- FRANCHISE AGREEMENT WATER MAIN
- CRITICAL WATER MAIN
- PROPOSED PIPE IMPROVEMENTS

Alternative 2B: Town Owned Seawater Source

Alternative 2B Conceptual Order of Magnitude Capital Costs		
ITEM	ITEM OF WORK	SUBTOTAL
1	Phipps Park Water Supply and Treatment System (10.0 MGD)	\$122,435,000
2	Pipeline Improvements	\$59,117,600
3	Franchise Agreement Pipeline Replacements	\$10,248,000
4	Critical Pipeline Improvements Per Masterplan	\$3,100,000
SUBTOTAL CAPITAL IMPROVEMENTS:		\$194,900,600
Engineering/Administration (20%)		\$38,981,000
SUBTOTAL CAPITAL, ENGINEERING AND ADMINISTRATION:		\$233,882,000
Contingency (35%)		\$81,859,000
SUBTOTAL CAPITAL, ENGINEERING, ADMINISTRATION, AND CONTINGENCY:		\$315,741,000
LEVEL 5 ENGINEERS OPINION OF PROBABLE COST (0% - + 50%):		\$316,000,000 to \$474,000,000

Alternative 3: Palm Beach County



Alternative 3: Palm Beach County

Alternative 3- Conceptual Order of Magnitude Capital Costs		
ITEM	ITEM OF WORK	SUBTOTAL
1	Interconnection 1 - Okeechobee Blvd	\$18,680,000
2	Interconnection 2 - Southern Blvd	\$12,560,000
3	Interconnection 3 - Lake Worth Road	\$28,130,000
4	Pipeline Improvements	\$23,865,000
5	Franchise Agreement Pipeline Replacements	\$10,794,000
6	Critical Pipeline Improvements Per Masterplan	\$2,480,000
SUBTOTAL CAPITAL IMPROVEMENTS:		\$96,509,000
Engineering/Administration (20%)		\$19,301,800
SUBTOTAL CAPITAL, ENGINEERING AND ADMINISTRATION:		\$115,810,800
Contingency (35%)		\$40,533,800
SUBTOTAL CAPITAL, ENGINEERING, ADMINISTRATION, AND CONTINGENCY:		\$156,342,000
LEVEL 5 ENGINEERS OPINION OF PROBABLE COST (0% - + 50%):		\$156,000,000 to \$235,000,000

Estimated Connection Fees: \$209M +/-

Alternative 4: City of Lake Worth Beach



Legend

BOOSTER PUMPS

- PROPOSED
- EXISTING
- PROPOSED STORAGE TANK

WATER MAIN

- TOWN OF PALM BEACH
- WEST PALM BEACH
- FRANCHISE AGREEMENT WATER MAIN
- CRITICAL WATER MAIN
- PROPOSED PIPE IMPROVEMENTS
- LAKE WORTH BEACH

Alternative 4: City of Lake Worth Beach

Legend

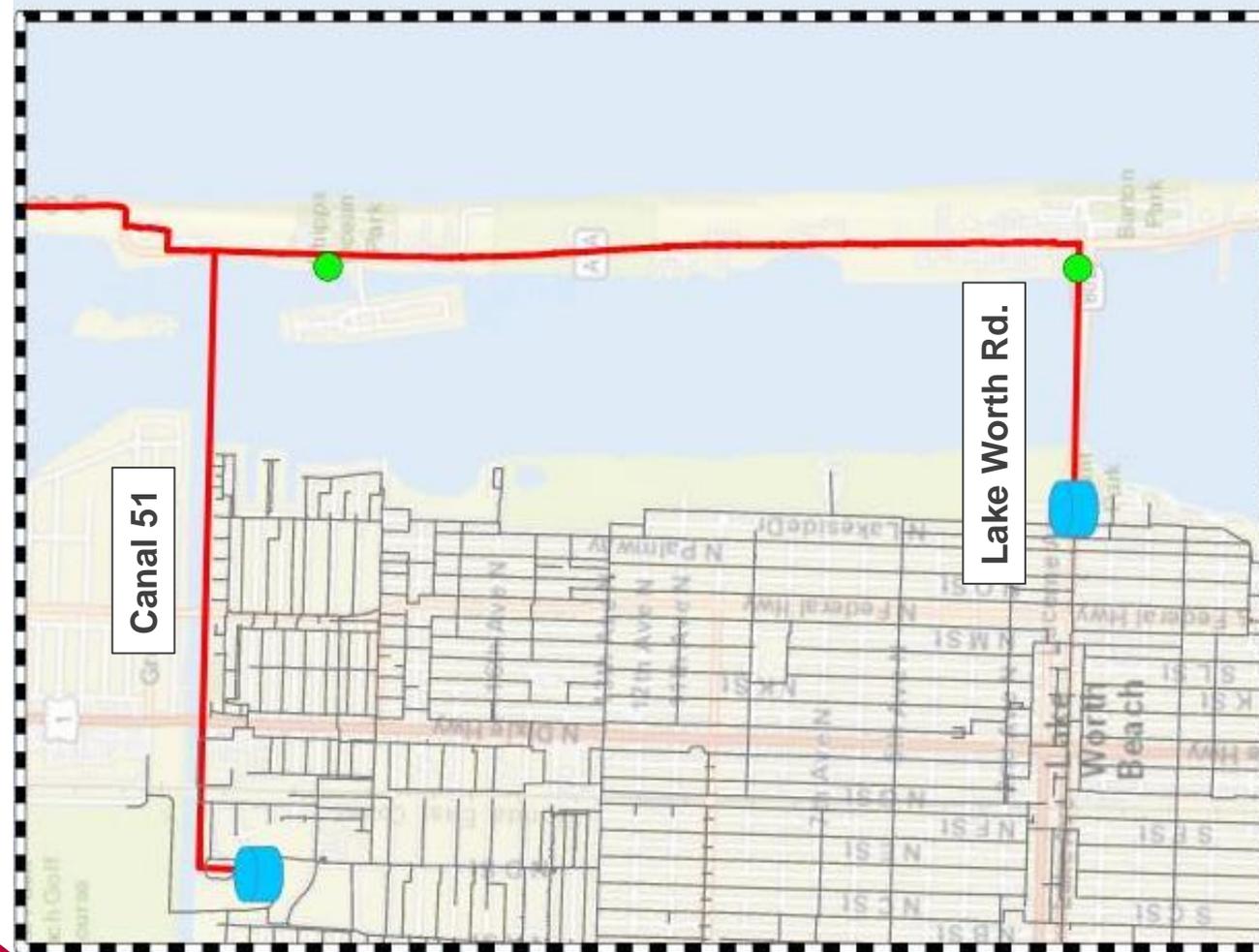
BOOSTER PUMPS

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WATER MAIN

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- PROPOSED PIPE IMPROVEMENTS
- LAKE WORTH BEACH



Alternative 4: City of Lake Worth Beach



Legend

BOOSTER PUMPS

- PROPOSED
- EXISTING
- PROPOSED STORAGE TANK

WATER MAIN

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- PROPOSED PIPE IMPROVEMENTS
- LAKE WORTH BEACH

Alternative 4: City of Lake Worth Beach

Alternative 4 - Conceptual Order of Magnitude Capital Costs		
ITEM	ITEM OF WORK	SUBTOTAL
1	Lake Worth WTP Upgrades	\$81,000,000
2	Interconnection 1 - C-51 Canal	\$17,200,000
3	Interconnection 2 - Lake Worth Road	\$11,400,000
4	Town Distribution System Improvements	\$39,800,000
5	Franchise Agreement Pipeline Replacements	\$10,250,000
6	Critical Pipeline Improvements Per Masterplan	\$2,800,000
SUBTOTAL CAPITAL IMPROVEMENTS:		\$162,450,000
Engineering/Administration (20%)		\$32,490,000
SUBTOTAL CAPITAL, ENGINEERING AND ADMINISTRATION:		\$194,940,000
Contingency (35%)		\$68,229,000
SUBTOTAL CAPITAL, ENGINEERING, ADMINISTRATION, AND CONTINGENCY:		\$263,169,000
LEVEL 5 ENGINEERS OPINION OF PROBABLE COST (0% - + 50%):		\$263,000,000 to \$395,000,000

Phase 2 Conclusion

- Alternatives are considered feasible
- Capital cost elements were developed
- Town directed two additional alternatives be evaluated, and one existing alternative be evaluated in greater detail
- Town directed the next Phase evaluate the cost to produce potable water for each of the three alternatives



Phase 2 Questions?

Phase 3 Overview

- Phipps Park Desalination Plant
- Quadrille Membrane Plant
- West Palm Beach Treatment Process Upgrade
- Evaluate Comparative Costs to Produce
- Summary of Alternatives

Phipps Park Desalination Plant



Phipps Park

ATLANTIC OCEAN

INTRACOASTAL WATERWAY

INTERSTATE-95

Legend

BOOSTER PUMPS

- EXISTING
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- PROPOSED WTP

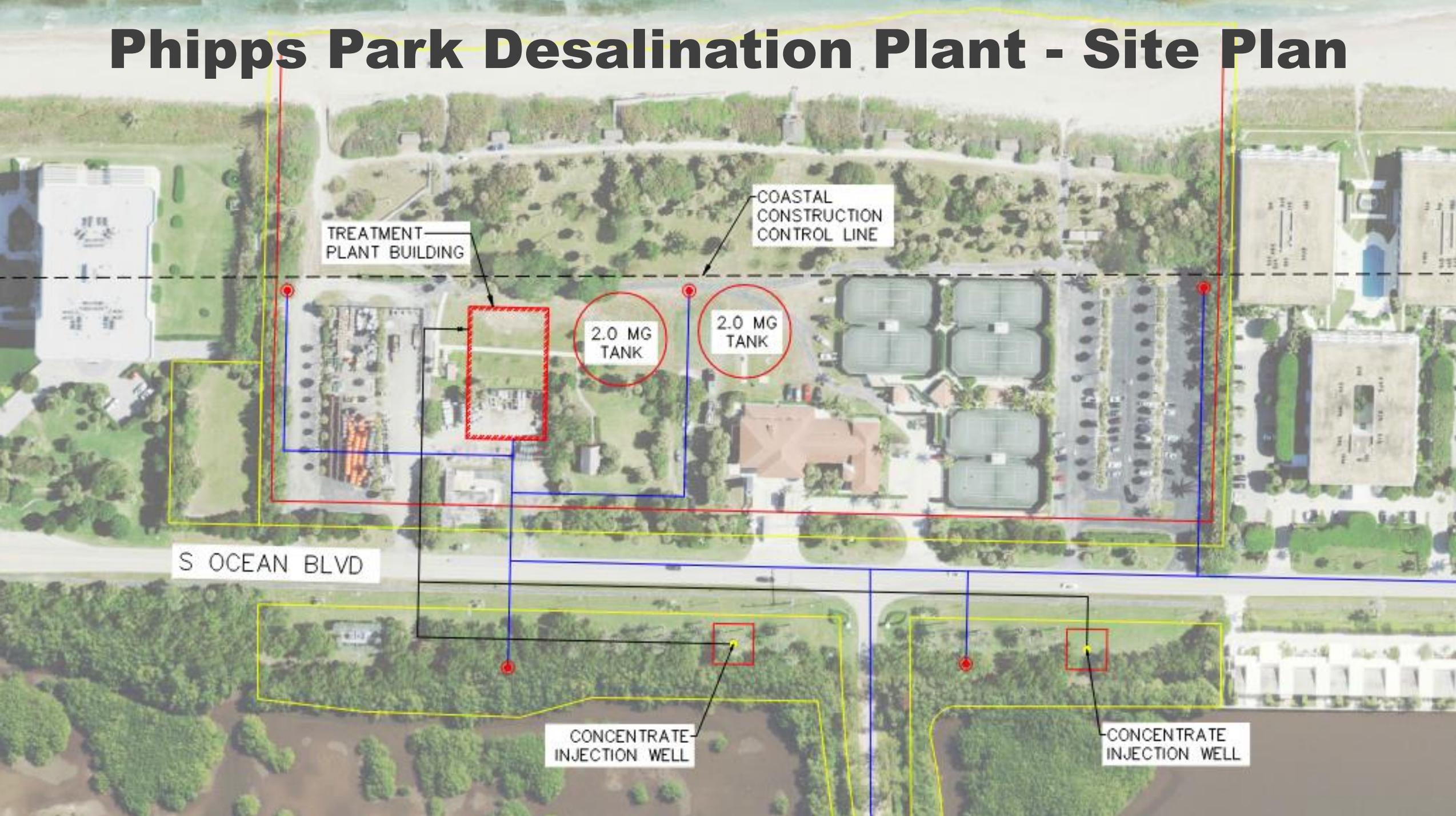
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Phipps Park Desalination Plant



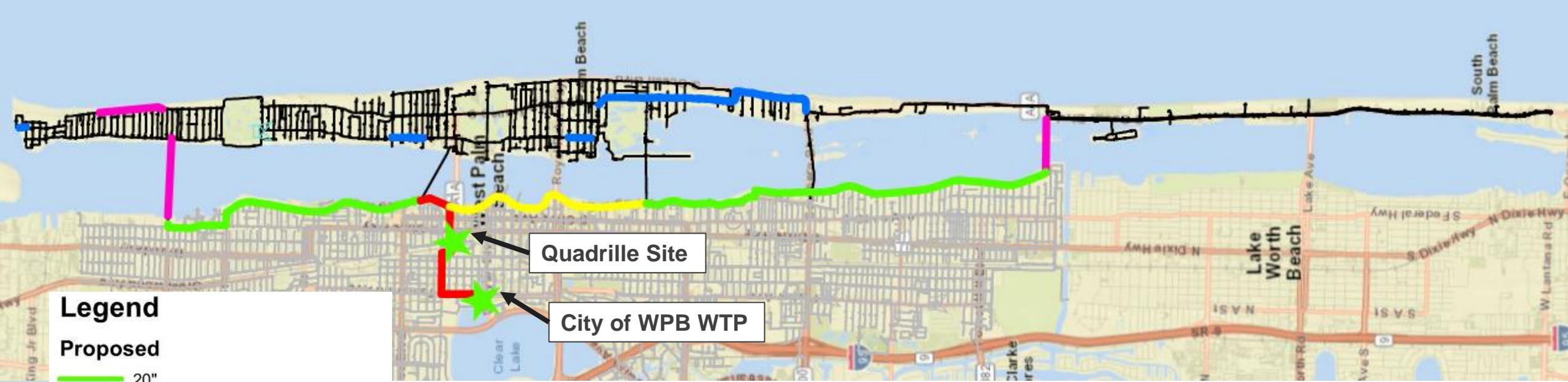
Phipps Park Desalination Plant - Site Plan



Phipps Park Desalination Plant Examples



Quadriple Nanofiltration Treatment Plant



Legend

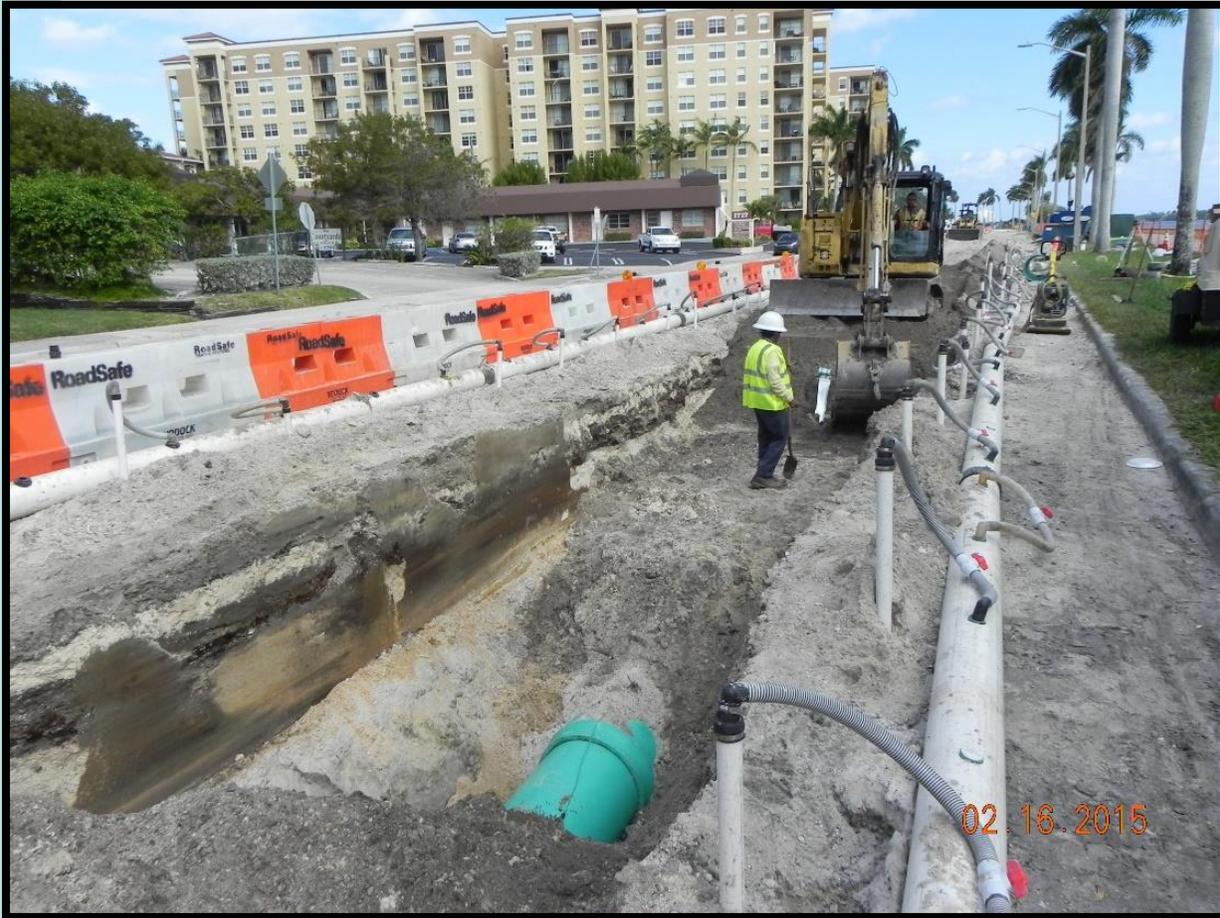
Proposed

- 20" (green line)
- 24" (yellow line)
- 30" (red line)
- Franchise Agreement Water Main (blue line)
- Critical Water Main (magenta line)

Pipe

- TOPB (black line)
- City of WPB (grey line)

Similar Construction Along Flagler Dr.





7TH STREET

CONCENTRATE
INJECTION WELL

2.0 MG
TANK

2.0 MG
TANK

TREATMENT
PLANT BUILDING

N QUADRILLE BLVD.

U.S. HWY 1

6TH STREET

CONCENTRATE
INJECTION WELL

Quadrille Membrane Plant - Site Plan

City of WPB Treatment Plant Upgrade



Opinion of Construction Duration

- Phipps Park Desalination Plant estimated completion 2031
- Quadrille Membrane Plant estimated completion 2030
- City of WPB Treatment Plant Upgrade estimated completion 2027

Evaluation of Comparative Costs to Produce

- Evaluated Total Project Cost
 - Per 1,000 gal (\$/1,000 gal)
 - Net Present Worth Capital Costs
 - 30-yr Municipal Bond Yield Rate – 2.4%*
 - Annual Expenditures

*Bond Yield Rate as of Feb. 25, 2022

Summary of Capital Costs

	10 MGD Phipps Park and Pipelines		10 MGD Quadrille and Pipelines		47 MGD City of WPB and Pipelines	
	Low	High	Low	High	Low	High
Capital Cost	\$351,000,000	\$527,000,000	\$268,000,000	\$402,000,000	\$547,000,000*	\$821,000,000*

*Total for 47 MGD Capacity plant for City service area, including the Town

- Alternative 1
 - Town owned
 - Town financial responsibility - paid for by customers in the Town service area
- Alternative 2
 - Town owned
 - Town financial responsibility - paid for by customers in the Town service area
- Alternative 3
 - City owned
 - City financial responsibility – paid for by customers within service area, including the Town

Summary of Current Costs to Produce 1,000 gallons

- Baseline - \$5.73 / 1,000 gal
 - 2021 Water Sales / Average Annual Demand
 - Operation, Maintenance, and Administration

Summary of Costs to Produce 1,000 Gallons

	10 MGD Phipps Park		10 MGD Quadrille		47 MGD City of WPB Phased Upgrade		47 MGD City of WPB 1 Program Upgrade	
	Low	High	Low	High	Low	High	Low	High
Capital Cost-WTP, Supply, and Pipelines	\$5.34	\$8.03	\$4.08	\$6.14	\$2.96	\$4.43	\$2.02	\$3.02
Plant Operations and Maintenance	\$3.78	\$3.78	\$2.32	\$2.32	\$5.73*	\$5.73*	\$5.73*	\$5.73*
Distribution Operation and Maintenance	\$0.50	\$0.50	\$0.55	\$0.55				
Pipeline Renewal Program- 75 year	\$2.29	\$2.29	\$2.78	\$2.78	\$2.25	\$2.25	\$2.25	\$2.25
Treatment Plant Renewal Program-50 year	\$1.60	\$1.60	\$1.03	\$1.03	\$0.93	\$0.93	\$0.93	\$0.93
Bulk Water Purchase	NA	NA	\$3.81**	\$3.81**	NA	NA	NA	NA
Total \$/1,000 gal	\$13.50	\$16.20	\$14.58	\$16.64	\$11.87	\$13.35	\$10.93	\$11.93

*Based on 2021 Water Sales and Actual Cost

**Based on current SWA Agreement



Phase 3 Questions?