Thank you to our Patrons

AMERICAN ACADEMY OF ENVIRONMENTAL ENGINEERS & SCIENTISTS®

GHD

Geosyntec consultants

AECOM

SCS ENGINEERS
Environmental Consultants and Contractors

The Metropolitan Water District of Southern California

OCSAN
ORANGE COUNTY SANITATION DISTRICT

carollo

BLACK & VEATCH

CDM Smith

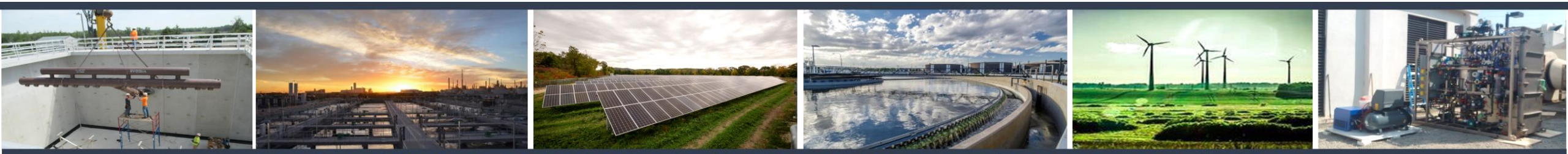
DSWA
DELAWARE SOLID WASTE AUTHORITY

LOS ANGELES COUNTY SANITATION DISTRICTS
Converting Waste Into Resources

Stanley Consultants

LA DWP Los Angeles Department of Water & Power

We will begin our presentation in a few minutes…



Using a GIS Total Model to Quantitatively Analyze Pipeline Route Alternatives

AAEES Webinar, Wednesday October 23, 2024

Douglas H. Eckmann, P.E., BCEE, BC.WRE, F.ASCE
assisted by Jordan Miller, E.I.

Peace River Manasota
Regional Water Supply Authority

Kimley»Horn

AAEES 2024 Excellence in Environmental Engineering

Webinar Outline

Part 1 – Introduction and Initial Screening of Routes

Part 2 – Quantitative Analysis of Feasible Routes

Part 3 – Results

Peace River Manasota
Regional Water Supply Authority

Kimley»Horn

AAEES 2024 Excellence in Environmental Engineering

Opening Statement

In performing this routing study, the goal was to make the evaluation and priority ranking of route alternatives as objective and quantitative as possible. The key to this was to establish non-direct cost criteria, that is, factors that do have a cost, but the cost is hard to define, and not directly related to construction, therefore identified as “non-direct” costs. The team collected, combined, and evaluated GIS data from multiple sources (Sarasota County, Charlotte County, City of North Port, FDOT, SWFWMD, FDEP, and property appraisers) into a custom GIS database. Field reconnaissance was performed to augment the GIS data with additional information not available in agency GIS. The possible route alternatives were prescreened and broken down into manageable route segments for detailed analysis. Each segment was analyzed for intersections with pertinent GIS information and a calculated score for non-direct cost factors was determined for each segment as well as the comparative direct cost. The individual segments were then combined into feasible routes providing maximum regional benefit. The shortlisted routes were then ranked by the resulting score for regional benefit, non-direct cost, and direct cost. The result was a robust and defensible quantitative analysis and ranking of alternatives.

Kimley-Horn and Associates, Inc. in cooperation with the
Peace River Manasota Regional Water Supply Authority

Project Summary

The PRMRWSA is expanding its regional interconnecting pipelines to serve member utilities, customers, and partners in four counties in SW Florida. Kimley-Horn performed a *Feasibility and Routing Study for the Regional Integrated Loop Phase 2B and 2C Pipelines Project*. The goal was to make the evaluation of alternative routes objective and quantitative. The team combined GIS data from multiple sources into a custom *Total GIS* database. Route segments were identified for detailed analysis. Field reconnaissance added missing data. Segments were checked for intersections with GIS information and a calculated score was determined. The result was a robust and defensible ranking of alternatives for an alignment of a large diameter regional pipeline in an urbanized area.

Speaker:

Douglas H. Eckmann. P.E., BCEE, BC.WRE, F.ASCE

Douglas.Eckmann@kimley-horn.com

Contributors to the routing study and the analytical procedure:
Heather Ripley, P.E.
Jordan Miller, E.I.

WELCOME TO THE

Peace River Manasota

Regional Water Supply Authority

Our goal is to ensure every customer has access to a safe and reliable water supply.

Our Mission

To provide the region with a high-quality, safe drinking water supply that is reliable, sustainable, and protective of our natural resources now and into the future.

Our Vision

Through cooperation and collaboration, the Authority and its Customers shall create, maintain, and expand a sustainable, interconnected regional water supply system.

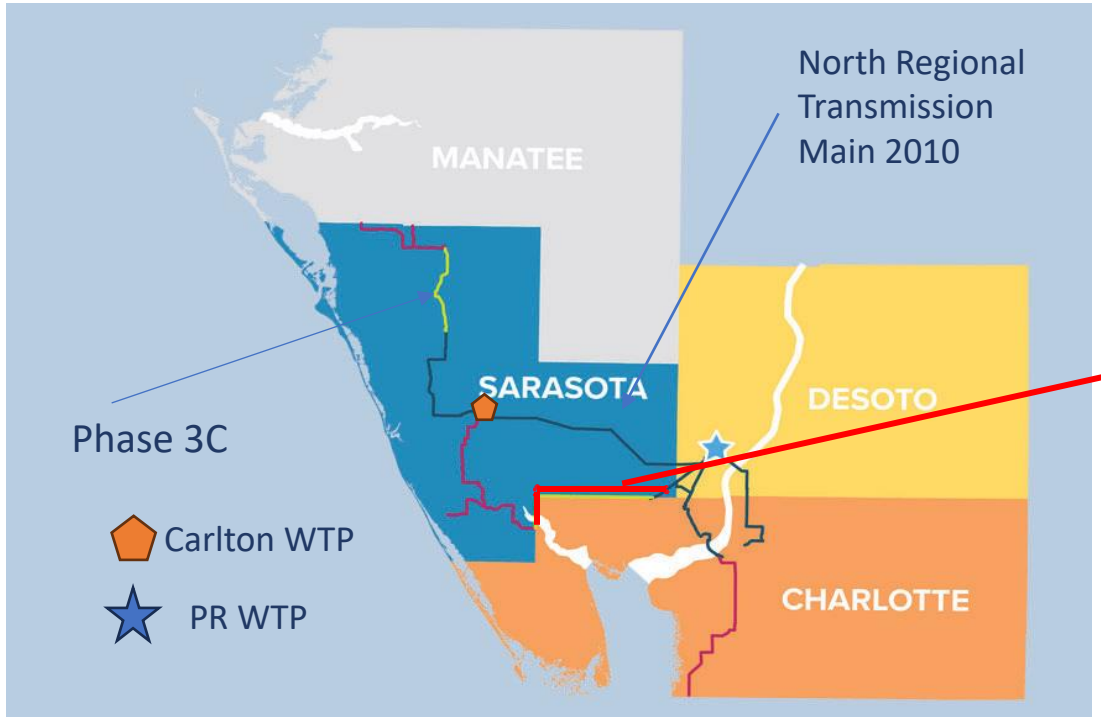
Source:

www.regionalwater.org

Peace River Manasota
Regional Water Supply Authority

The Peace River Manasota Regional Water Supply Authority is a regional water supplier that provides wholesale drinking water supporting the region's economic growth and quality of life. The Authority provides the platform for its four member counties to collaboratively plan the region's water supply benefitting from an economy of scale, shared expertise, and environmental stewardship. Since 1991, we have provided drinking water to more than 900,000 people across Charlotte, DeSoto, Manatee, and Sarasota counties. Every day, we supply an average of 26 million gallons of water per day (MGD) to our members.

Source:
www.regionalwater.org



Source:
www.regionalwater.org
(notes added)

INTERCONNECT PROJECTS UNDER CONSTRUCTION

PHASE 3C

7.3 miles of 42-inch diameter transmission main to serve Northeast Sarasota County

PHASE 2B

13 miles of 42-inch diameter transmission main to serve Western Charlotte County
Supports future interconnection of the two largest drinking water systems in the region
Interconnects alternative water supplies providing regional connectivity and reliability
Increases resiliency to drought, hurricanes, floods and climate change
Improves drinking water quality to residents.

CURRENT PROJECTS - TOTAL CAPITAL COST

Estimated at $ 157.7 Million

Primary objectives of the Phase 2 Interconnect:

1. Provide a back-up for the NRTM, a 23-mile cross country transmission main connecting the Carlton EDR WTP and the Peace River Surface WTP (north loop).
2. Provide about 30 MGD of additional capacity to transfer potable water to regional customers.
3. Increase resiliency in the regional public water supply.

The Peace River Facility is being expanded by 24 MGD to 75 MGD finished water production capacity.

Challenges to a route recommendation

Challenges for preparation of the Regional Integrated Loop System Phase 2B and Phase 2C Feasibility and Routing Study.

1. Feasible routes would likely pass through Charlotte County, Sarasota Country, the City of North Port and the City of Sarasota.
2. Easements would likely be needed.
3. Approval of the recommended route requires acceptance by the local governments as well as the four-member Authority Board comprised of Commissioners from Manatee, DeSoto, Sarasota and Charlotte Counties.
4. Costs are shared by proportional benefit. Different routes have differing proportions of benefits.
5. The Authority has four member counties, of which three are direct customers for wholesale water; the City of North Port as fourth customer; and the Englewood Water District and the City of Venice as Partners for interlocal agreements to share potable water in emergencies.
6. The recommended route must be acceptable to the *Southwest Florida Water Management District* (SWFWMD) providing significant funding support for <u>regionally beneficial</u> water systems.

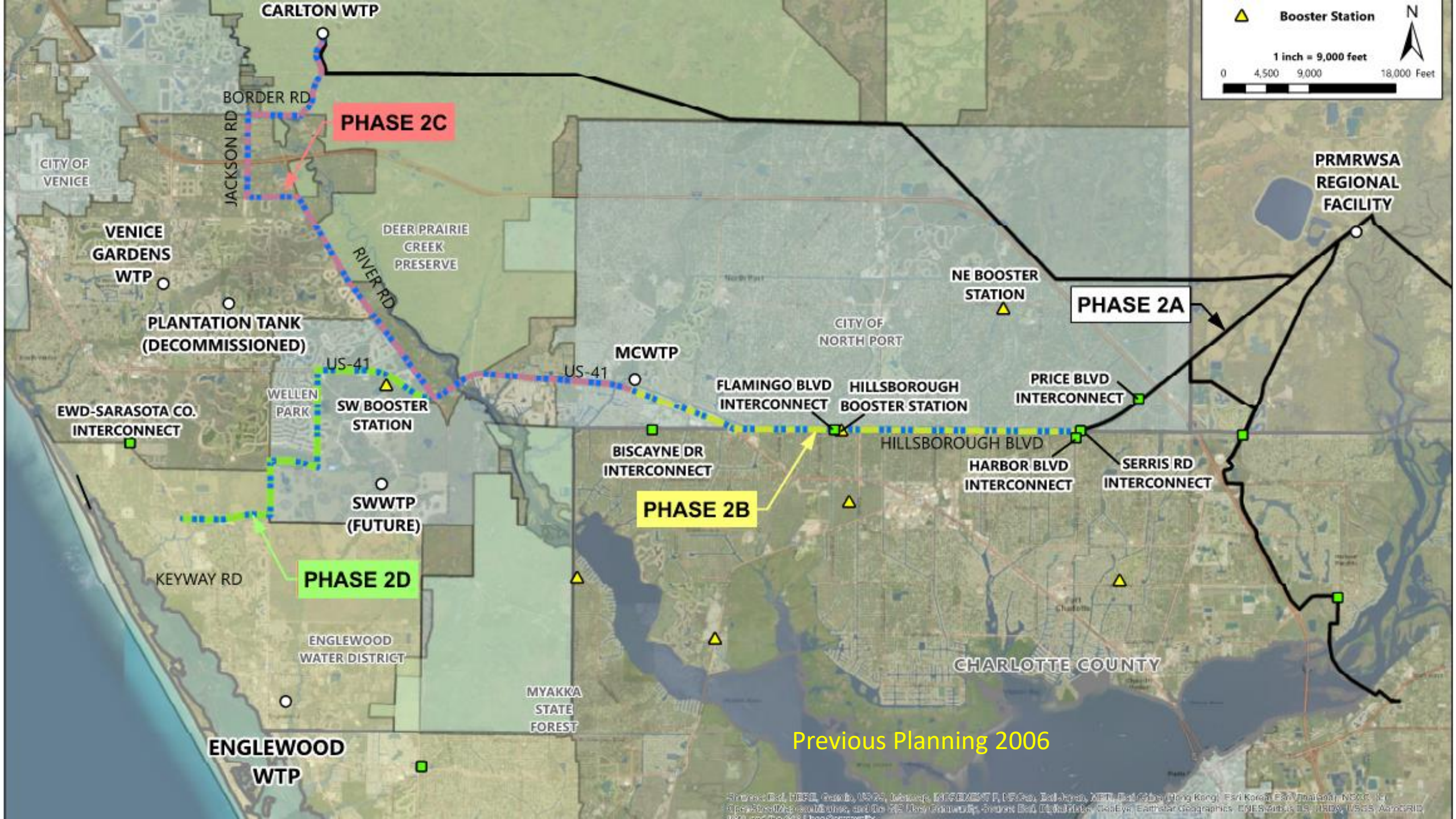
Initial Presentation of Routes to Authority

Presented routes including the alternatives considered in a 2006 study, along with additional routes identified by others in various documents provided by the Authority.

The intent was to initiate the review process with all routes considered.

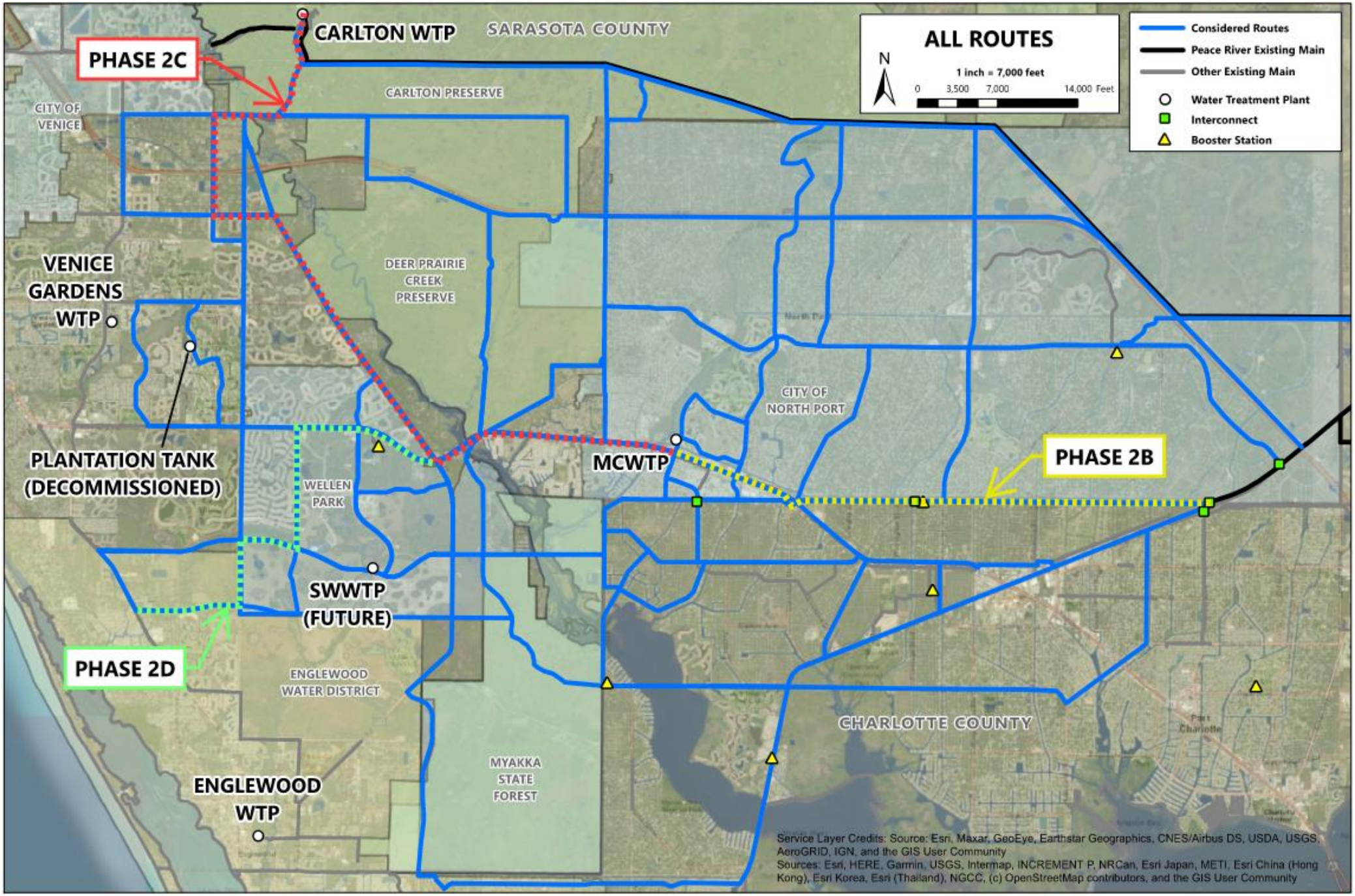
To conceptualize the wide array of alignment possibilities, routes were grouped according to their source and geographical characteristics:

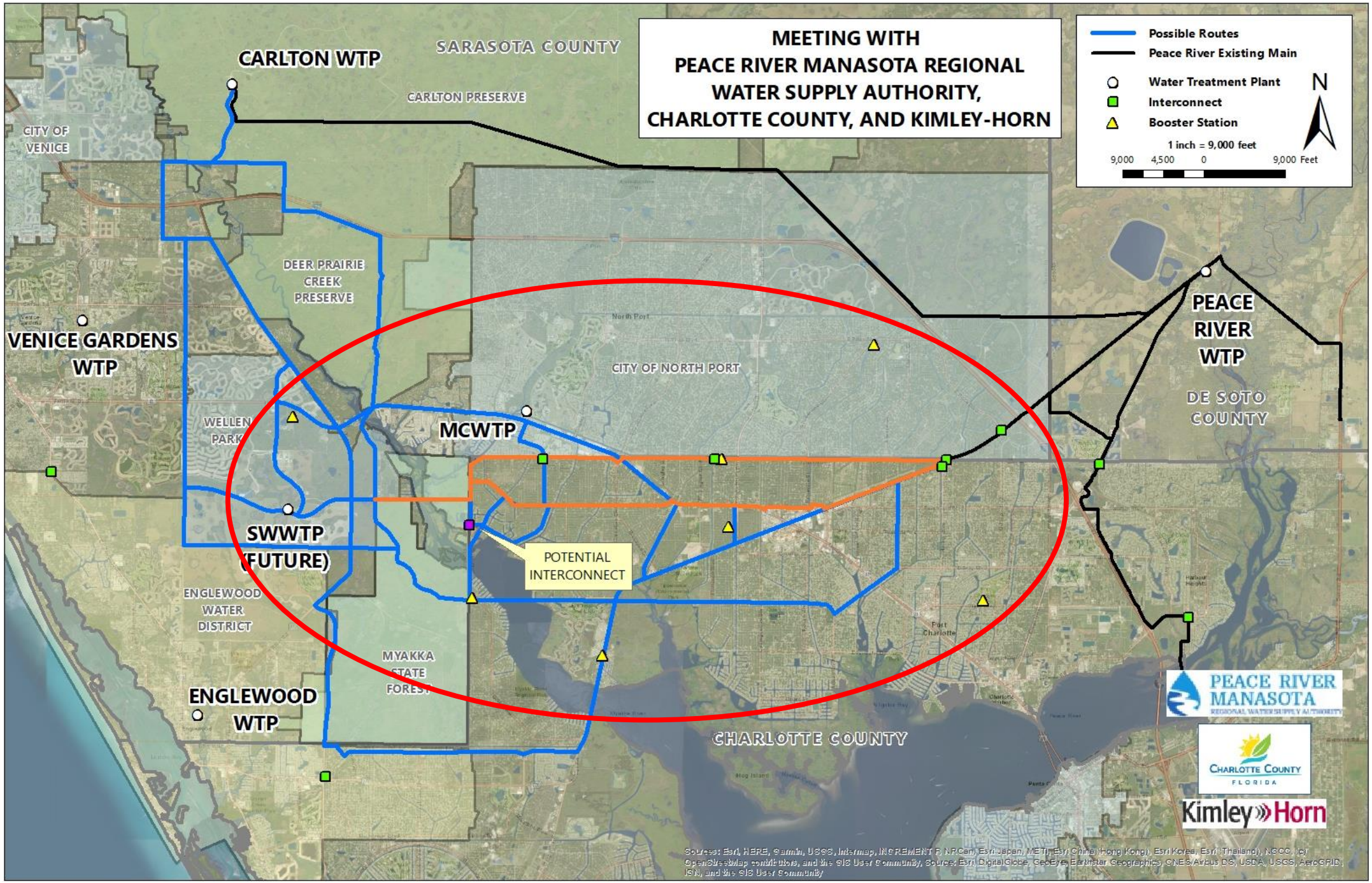
- Northern Routes – routes parallel to or close to the existing Authority-owned NRTM (north loop).
- Routes through City of North Port (east) – routes lying primarily in the eastern portion of North Port
- Routes through City of North Port (west) – routes lying primarily in the western portion of North Port, but east of the Myakka River
- Routes near or crossing the Myakka River – routes crossing the Myakka River at US-41 or utilizing a previously-studied alignment in Deer Prairie slough immediately east of the River.

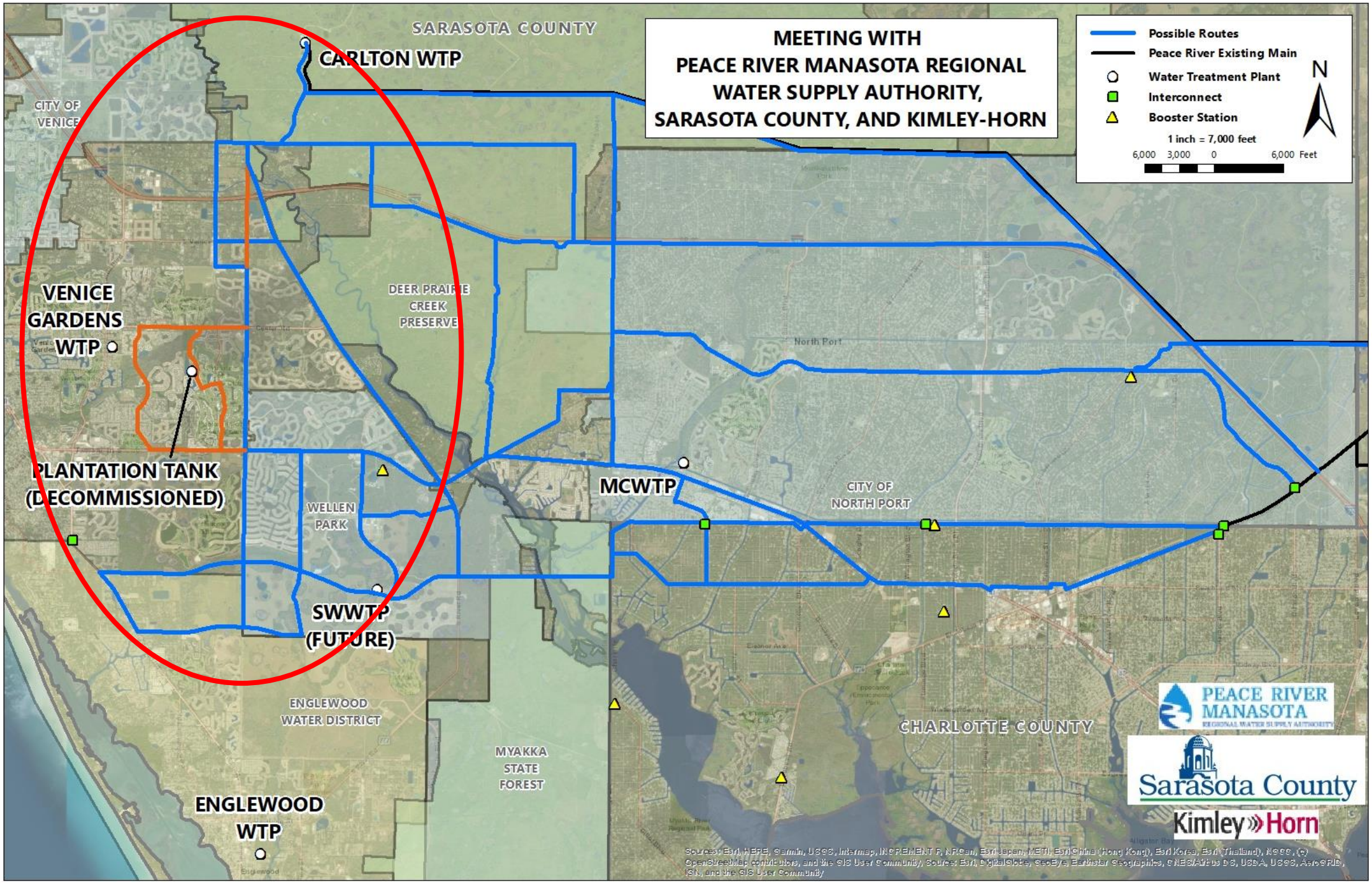

CARLTON WTP
BORDER RD
JACKSON RD
PHASE 2C
CITY OF VENICE
VENICE GARDENS WTP
PLANTATION TANK (DECOMMISSIONED)
DEER PRAIRIE CREEK PRESERVE
RIVER RD
US-41
WELLEN PARK
SW BOOSTER STATION
EWD-SARASOTA CO. INTERCONNECT
SWWTP (FUTURE)
KEYWAY RD
PHASE 2D
ENGLEWOOD WATER DISTRICT
ENGLEWOOD WTP
MYAKKA STATE FOREST
MCWTP
US-41
BISCAYNE DR INTERCONNECT
FLAMINGO BLVD INTERCONNECT
HILLSBOROUGH BOOSTER STATION
PHASE 2B
CITY OF NORTH PORT
NE BOOSTER STATION
PHASE 2A
PRICE BLVD INTERCONNECT
HILLSBOROUGH BLVD
HARBOR BLVD INTERCONNECT
SERRIS RD INTERCONNECT
PRMRWSA REGIONAL FACILITY
CHARLOTTE COUNTY
Booster Station
N
1 inch = 9,000 feet
0 4,500 9,000 18,000 Feet
Previous Planning 2006

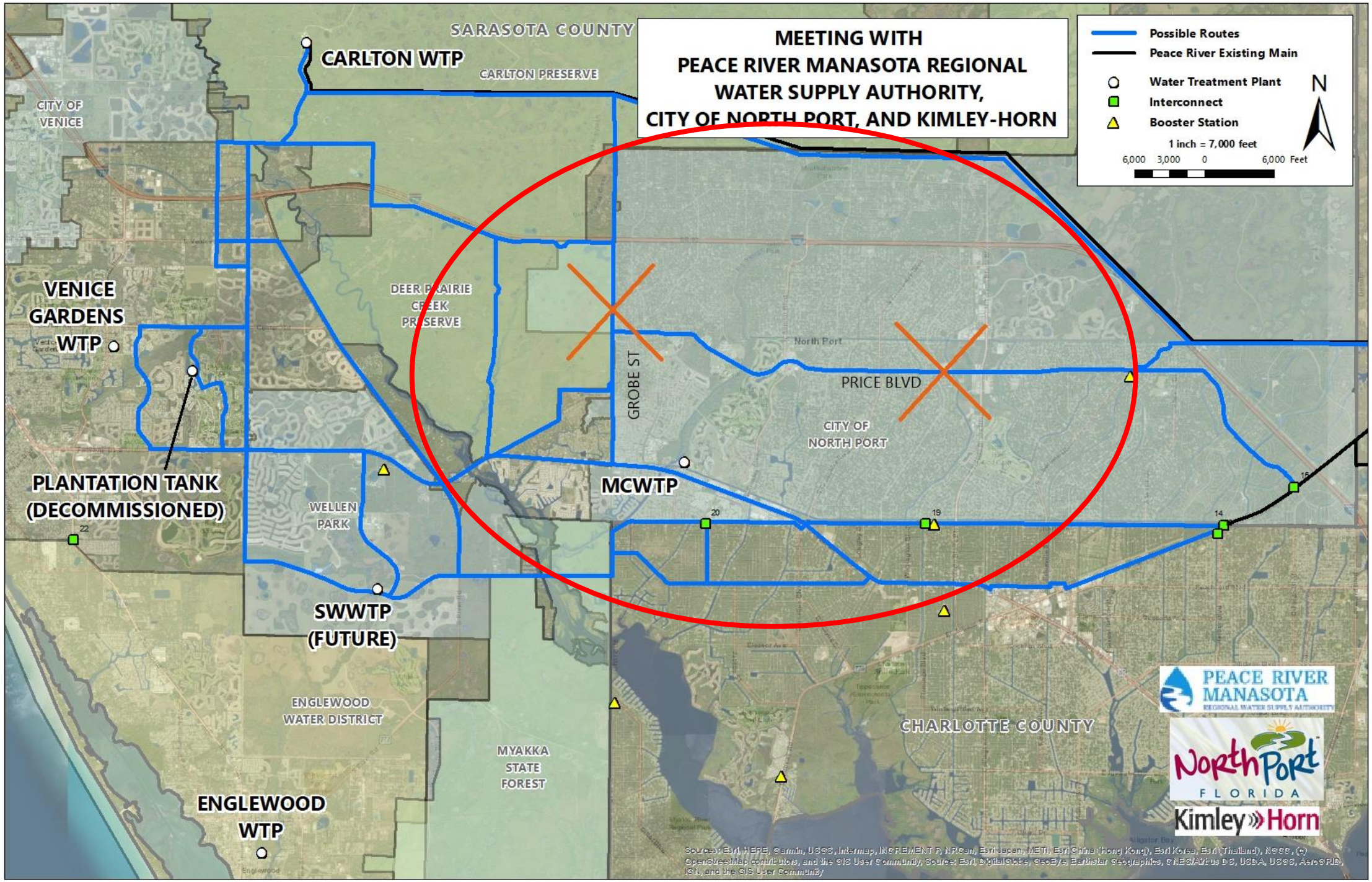
Potential Routes

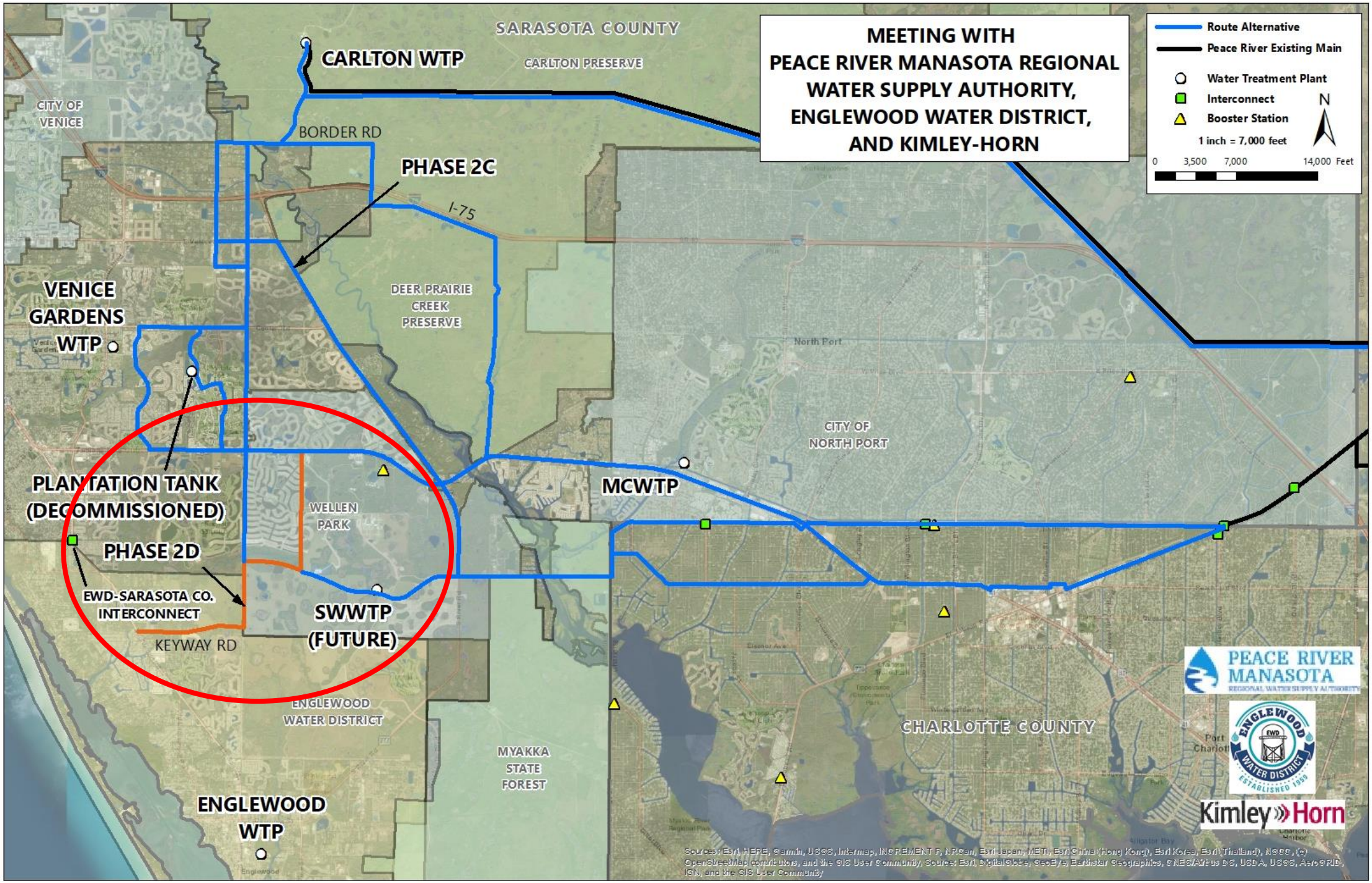
- All potential routes identified in previous studies.
- Authority, Members, Customers, Partners Collaboration
- No stone unturned

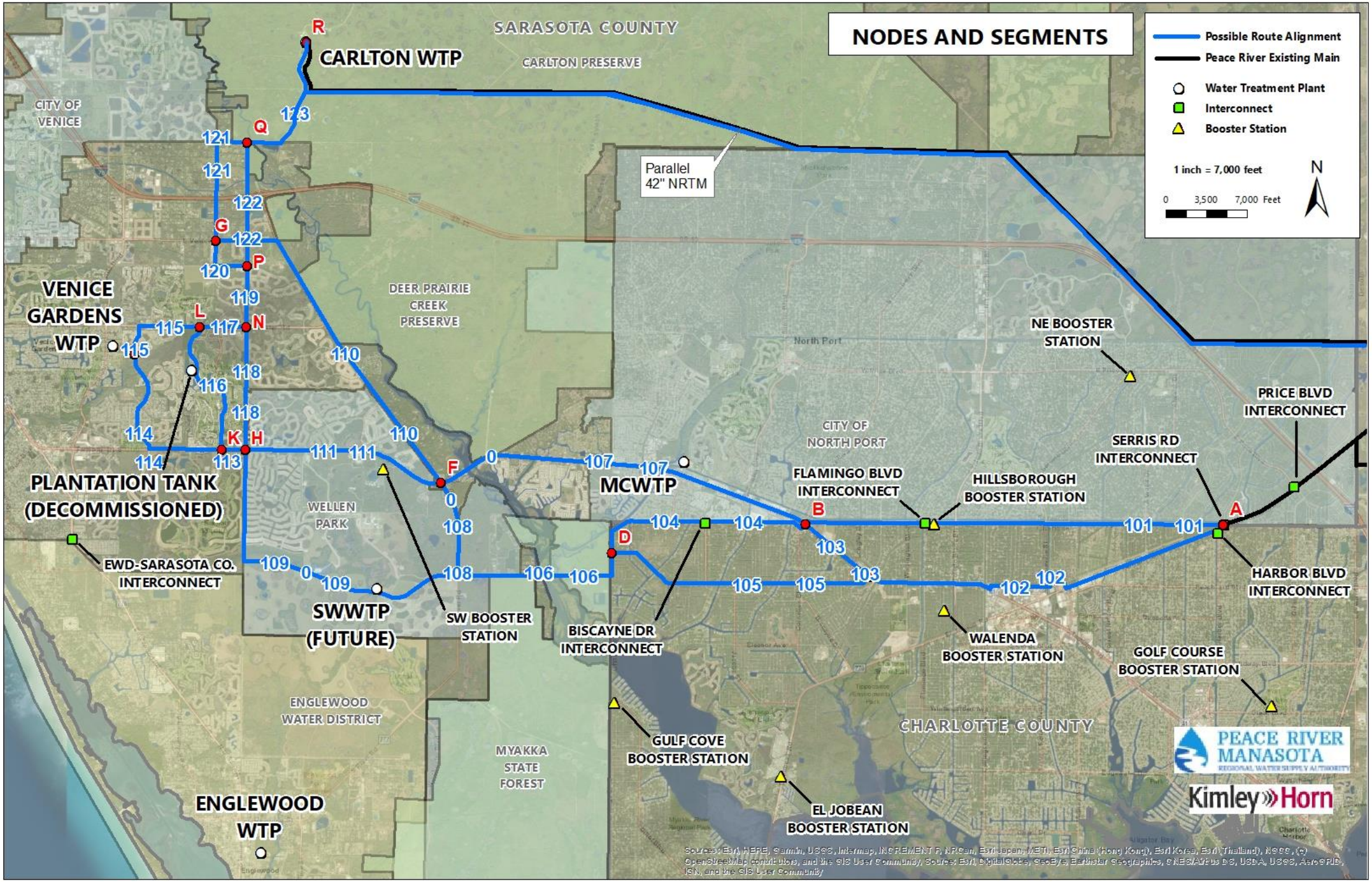



MEETING WITH
PEACE RIVER MANASOTA REGIONAL
WATER SUPPLY AUTHORITY,
CHARLOTTE COUNTY, AND KIMLEY-HORN
Possible Routes
Peace River Existing Main
Water Treatment Plant
Interconnect
Booster Station
N
1 inch = 9,000 feet
9,000 4,500 0 9,000 Feet
CARLTON WTP
SARASOTA COUNTY
CARLTON PRESERVE
CITY OF VENICE
DEER PRAIRIE CREEK PRESERVE
VENICE GARDENS WTP
CITY OF NORTH PORT
MCWTP
PEACE RIVER WTP
DE SOTO COUNTY
SWWTP (FUTURE)
POTENTIAL INTERCONNECT
ENGLEWOOD WATER DISTRICT
MYAKKA STATE FOREST
ENGLEWOOD WTP
CHARLOTTE COUNTY
PEACE RIVER MANASOTA
REGIONAL WATER SUPPLY AUTHORITY
CHARLOTTE COUNTY FLORIDA
Kimley»Horn
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri Thailand, NGCC, (c) OpenStreetMap contributors, and the GIS User Community, Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community


MEETING WITH
PEACE RIVER MANASOTA REGIONAL
WATER SUPPLY AUTHORITY,
SARASOTA COUNTY, AND KIMLEY-HORN
Possible Routes
Peace River Existing Main
Water Treatment Plant
Interconnect
Booster Station
N
1 inch = 7,000 feet
6,000 3,000 0 6,000 Feet
SARASOTA COUNTY
CARLTON WTP
CITY OF VENICE
VENICE GARDENS WTP
DEER PRAIRIE CREEK PRESERVE
North Port
PLANTATION TANK (DECOMMISSIONED)
WELLEN PARK
MCWTP
CITY OF NORTH PORT
SWWTP (FUTURE)
ENGLEWOOD WATER DISTRICT
MYAKKA STATE FOREST
CHARLOTTE COUNTY
ENGLEWOOD WTP
PEACE RIVER MANASOTA
REGIONAL WATER SUPPLY AUTHORITY
Sarasota County
Kimley»Horn
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri Thailand, NGCC, (c) OpenStreetMap contributors, and the GIS User Community, Sources: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community


MEETING WITH
PEACE RIVER MANASOTA REGIONAL
WATER SUPPLY AUTHORITY,
CITY OF NORTH PORT, AND KIMLEY-HORN
Possible Routes
Peace River Existing Main
Water Treatment Plant
Interconnect
Booster Station
1 inch = 7,000 feet
6,000 3,000 0 6,000 Feet
N
SARASOTA COUNTY
CARLTON WTP
CARLTON PRESERVE
CITY OF VENICE
VENICE GARDENS WTP
DEER PRAIRIE CREEK PRESERVE
GROBE ST
North Port
PRICE BLVD
CITY OF NORTH PORT
PLANTATION TANK (DECOMMISSIONED)
MCWTP
WELLEN PARK
SWWTP (FUTURE)
ENGLEWOOD WATER DISTRICT
MYAKKA STATE FOREST
ENGLEWOOD WTP
CHARLOTTE COUNTY
PEACE RIVER MANASOTA
NorthPort FLORIDA
Kimley»Horn


MEETING WITH
PEACE RIVER MANASOTA REGIONAL WATER SUPPLY AUTHORITY, ENGLEWOOD WATER DISTRICT, AND KIMLEY-HORN
Route Alternative
Peace River Existing Main
Water Treatment Plant
Interconnect
Booster Station
N
1 inch = 7,000 feet
0 3,500 7,000 14,000 Feet
SARASOTA COUNTY
CARLTON PRESERVE
CARLTON WTP
CITY OF VENICE
BORDER RD
PHASE 2C
I-75
DEER PRAIRIE CREEK PRESERVE
VENICE GARDENS WTP
North Port
CITY OF NORTH PORT
PLANTATION TANK (DECOMMISSIONED)
WELLEN PARK
MCWTP
PHASE 2D
EWD-SARASOTA CO. INTERCONNECT
SWWTP (FUTURE)
KEYWAY RD
ENGLEWOOD WATER DISTRICT
CHARLOTTE COUNTY
MYAKKA STATE FOREST
ENGLEWOOD WTP
PEACE RIVER MANASOTA
REGIONAL WATER SUPPLY AUTHORITY
ENGLEWOOD WATER DISTRICT
ESTABLISHED 1959
Kimley»Horn
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community, Sources: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community


NODES AND SEGMENTS
Possible Route Alignment
Peace River Existing Main
Water Treatment Plant
Interconnect
Booster Station
1 inch = 7,000 feet
0 3,500 7,000 Feet
N
SARASOTA COUNTY
CARLTON PRESERVE
CARLTON WTP
CITY OF VENICE
Parallel 42" NRTM
DEER PRAIRIE CREEK PRESERVE
VENICE GARDENS WTP
PLANTATION TANK (DECOMMISSIONED)
EWD-SARASOTA CO. INTERCONNECT
WELLEN PARK
SWWTP (FUTURE)
SW BOOSTER STATION
ENGLEWOOD WATER DISTRICT
ENGLEWOOD WTP
MYAKKA STATE FOREST
MCWTP
CITY OF NORTH PORT
North Port
NE BOOSTER STATION
PRICE BLVD INTERCONNECT
SERRIS RD INTERCONNECT
FLAMINGO BLVD INTERCONNECT
HILLSBOROUGH BOOSTER STATION
HARBOR BLVD INTERCONNECT
BISCAYNE DR INTERCONNECT
WALENDA BOOSTER STATION
GOLF COURSE BOOSTER STATION
GULF COVE BOOSTER STATION
EL JOBEAN BOOSTER STATION
CHARLOTTE COUNTY
PEACE RIVER MANASOTA
REGIONAL WATER SUPPLY AUTHORITY
Kimley»Horn
R
Q
G
P
L
N
K
H
F
D
B
A
123
121
122
120
119
115
117
116
118
114
113
111
110
0
107
108
109
106
104
103
105
102
101

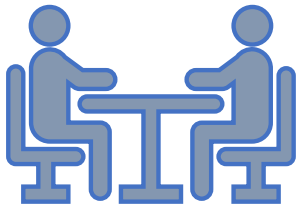
Part 2 – Quantitative Analysis of Feasible Routes

Peace River Manasota
Regional Water Supply Authority

Kimley»Horn

AAEES 2024
Excellence in
Environmental
Engineering

Peace River Manasota Regional Water Supply Authority Workshops



Members, Customers, and Partners Meetings

Very Productive

Potential Routes to Consider

No Stone Unturned

Refined Routes to Evaluate

Where is Growth Anticipated

Greatest Benefit to Region, PRMRWSA, Members, and Customer - **All Things Considered**

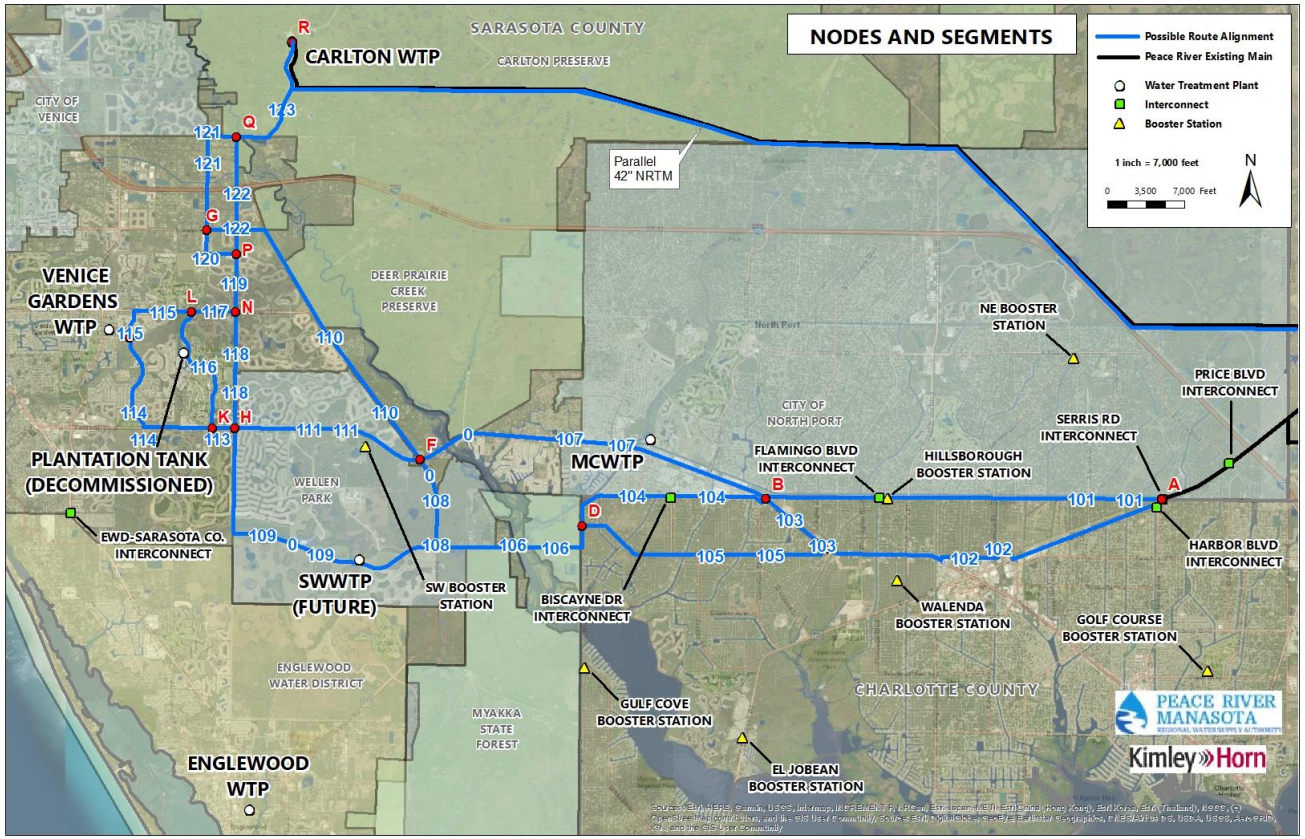
What is a GIS Total Model

To put it simply, a GIS Total Model is a GIS database, assembled from multiple sources, that contains any and all pertinent information that has to do with a project. This data is then condensed and utilized in the route selection. It can be modified and used for any project that uses or needs GIS and has proven to be successful when used for a route study.

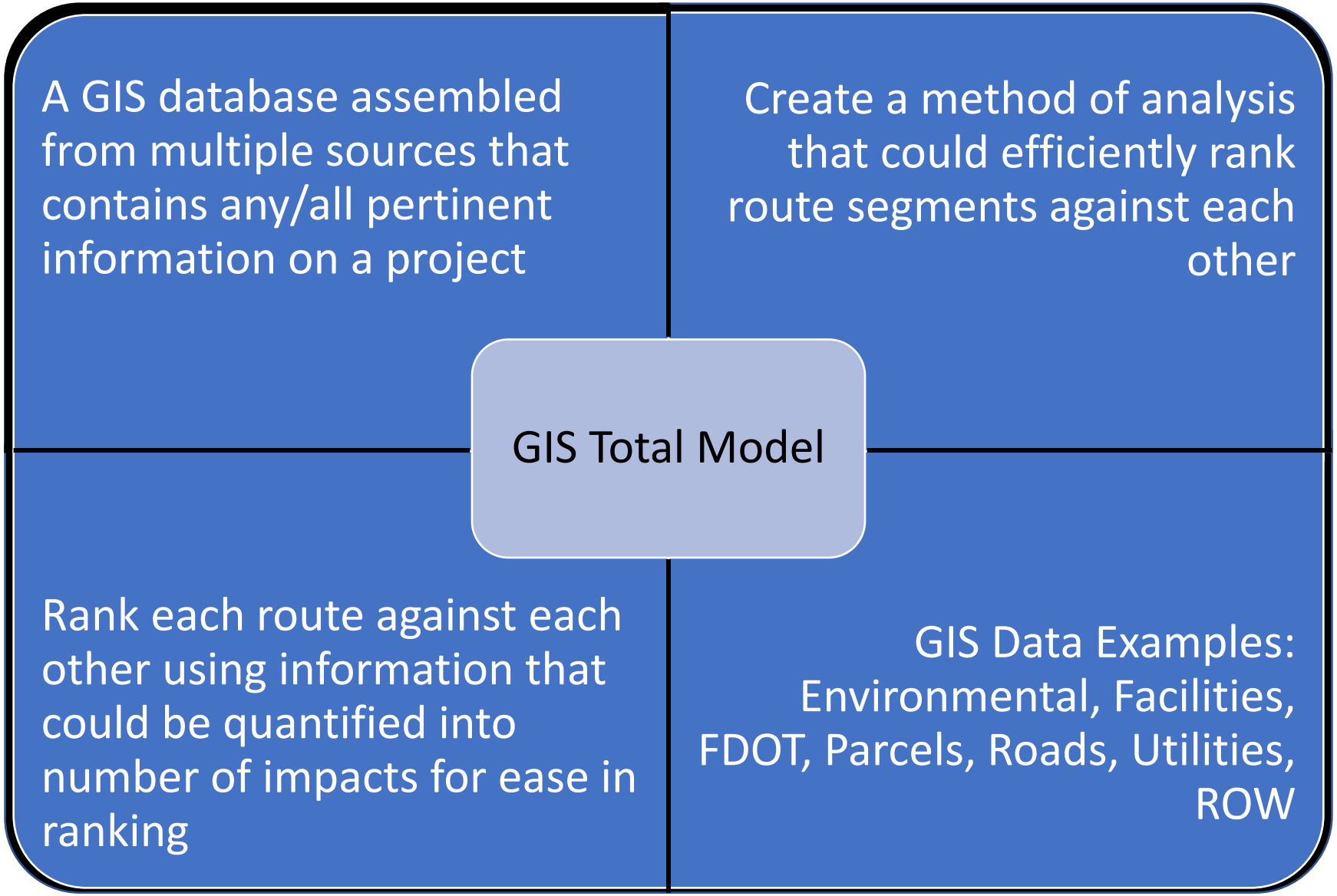
Used ArcMap since retired
Currently we would use ArcGIS Pro

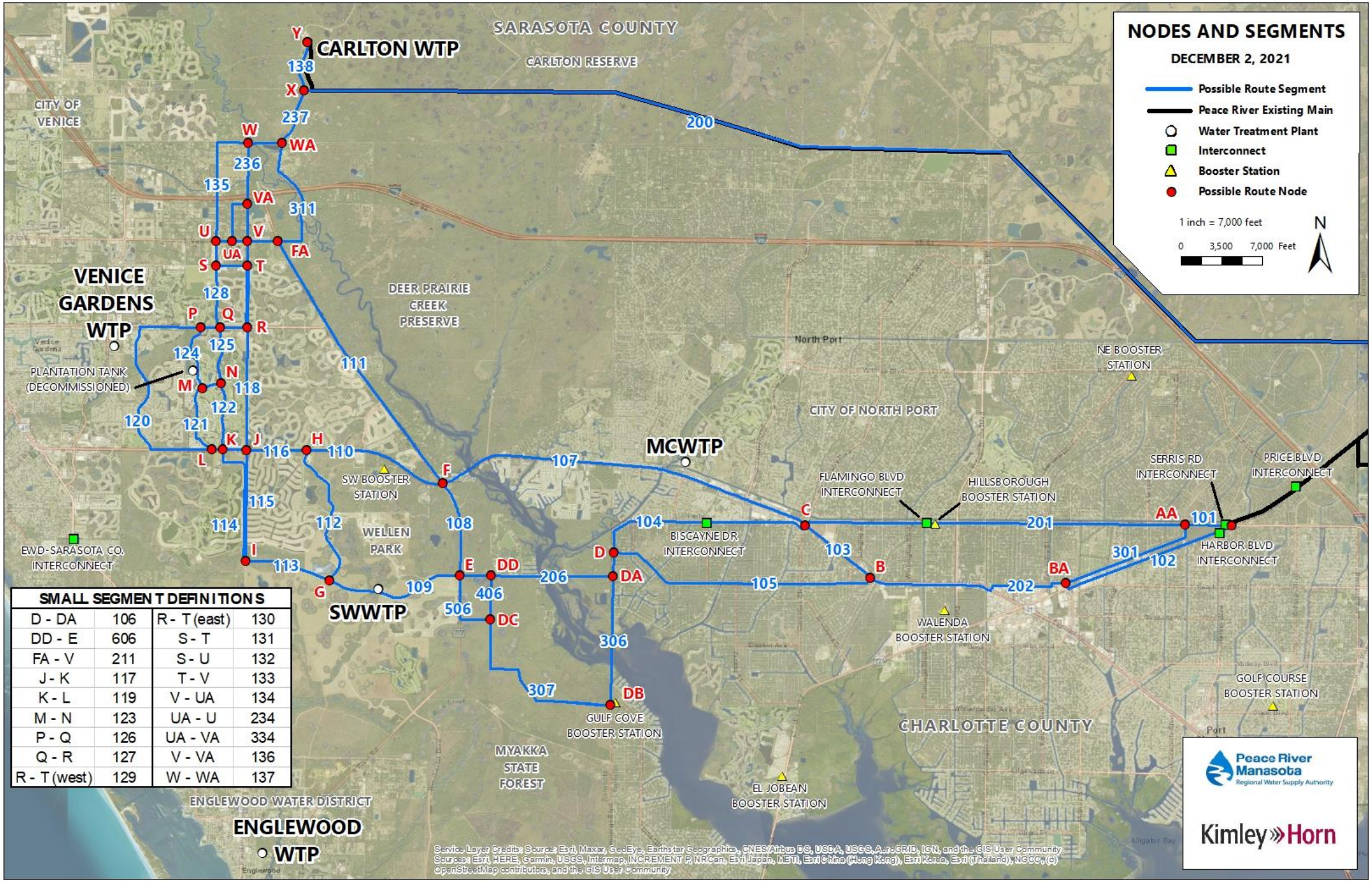
ArcGIS Pro is a full-featured professional desktop GIS application from Esri. With ArcGIS Pro, you can explore, visualize, and analyze data; create 2D maps and 3D scenes; and share your work to ArcGIS Online or your ArcGIS Enterprise portal. The sections below introduce the sign-in process, the start page, ArcGIS Pro projects, and the user interface.

Source: esri.com *Environmental Systems Research Institute, Inc.*



What is a GIS Total Model




NODES AND SEGMENTS
DECEMBER 2, 2021
Possible Route Segment
Peace River Existing Main
Water Treatment Plant
Interconnect
Booster Station
Possible Route Node
1 inch = 7,000 feet
0 3,500 7,000 Feet
N
SARASOTA COUNTY
CARLTON RESERVE
CARLTON WTP
CITY OF VENICE
VENICE GARDENS WTP
PLANTATION TANK (DECOMMISSIONED)
DEER PRAIRIE CREEK PRESERVE
North Port
CITY OF NORTH PORT
NE BOOSTER STATION
MCWTP
SW BOOSTER STATION
WELLEN PARK
SWWTP
EWD-SARASOTA CO. INTERCONNECT
BISCAYNE DR INTERCONNECT
FLAMINGO BLVD INTERCONNECT
HILLSBOROUGH BOOSTER STATION
SERRIS RD INTERCONNECT
PRICE BLVD INTERCONNECT
HARBOR BLVD INTERCONNECT
WALENDA BOOSTER STATION
GOLF COURSE BOOSTER STATION
GULF COVE BOOSTER STATION
CHARLOTTE COUNTY
MYAKKA STATE FOREST
EL JOBEAN BOOSTER STATION
ENGLEWOOD WATER DISTRICT
ENGLEWOOD WTP
Y
X
W
WA
VA
U
V
UA
S
T
P
Q
R
N
M
K
J
H
L
I
G
F
E
DD
D
C
B
AA
BA
DC
DA
DB
138
237
236
135
311
FA
128
125
124
118
122
120
121
116
110
115
114
112
113
111
107
108
109
104
103
105
206
406
506
306
307
200
201
202
101
102
301
SMALL SEGMENT DEFINITIONS
D - DA 106
DD - E 606
FA - V 211
J - K 117
K - L 119
M - N 123
P - Q 126
Q - R 127
R - T (west) 129
R - T (east) 130
S - T 131
S - U 132
T - V 133
V - UA 134
UA - U 234
UA - VA 334
V - VA 136
W - WA 137
Peace River Manasota Regional Water Supply Authority
Kimley»Horn
Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

GIS Total Model Construction

The first step in the GIS Total Model construction is to gather pertinent information in the form of shapefiles. The shapefiles that were gathered for this route study are listed below:

1. Environmental

    a. Endangered Species
    b. Soils
    c. ERIC Waste Cleanup Zones
    d. Florida State Fund Cleanup Zones
    e. Florida Department of Environmental Protection Dry-cleaning Solvent Cleanup Zones
    f. Florida Superfund Cleanup Zones
    g. Petroleum Contamination Monitoring Zones
    h. Underground Injection Control Class I Wells
    i. Underground Injection Control Class V ASR Wells
    j. Underground Injection Control Class V ASR Non-Wells
    k. Groundwater Contamination Areas
    l. National Wetlands Inventory
    m. Waterway Crossings

GIS Total Model Construction

2. Facilities

   a. County Facilities (Charlotte County)
   i. Including fire stations and law enforcement
   b. Parks (Charlotte County)
   c. County Facility (Sarasota County)
   i. Including law enforcement and fire departments
   d. School
   e. Daycare
   f. Health Medical
   i. Including hospitals, hospice, assisted living facilities, and nursing homes
   g. Church
   h. Park Boundary (Sarasota County)
   i. Trail (Sarasota County)

GIS Total Model Construction

3. Florida Department of Transportation (FDOT)

   a. Annual Average Daily Traffic
   b. Speed Limit
   c. Number of Lanes
   d. Thoroughfares
   e. FDOT 2022-2027 Work Plan

GIS Total Model Construction

4. Parcels

    a. Parcels (Sarasota County)
    b. Parcels (Charlotte County)
    c. Sarasota County Owned Parcels
    d. Future Land Use (Sarasota County)
    e. Future Land Use (Charlotte County

5. Roads

    a. Hurricane Evacuation Route
    b. Streets (Charlotte County)
    c. Streets (Sarasota County)
    d. Sidewalk (Sarasota County)
    e. Bus Route (Sarasota County)
    f. Bicycle Lane (Sarasota County)

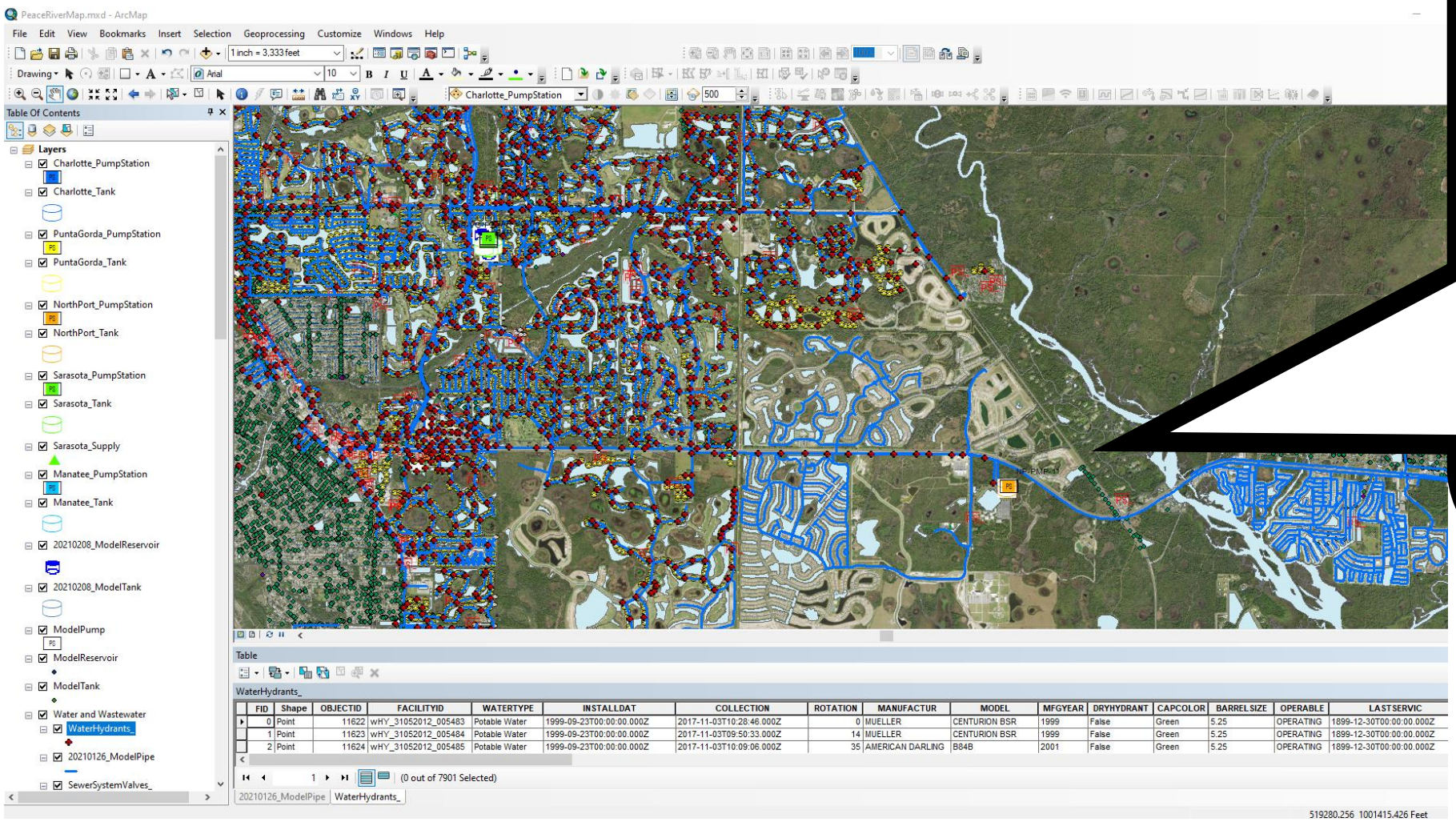
GIS Total Model Construction

6. Utilities

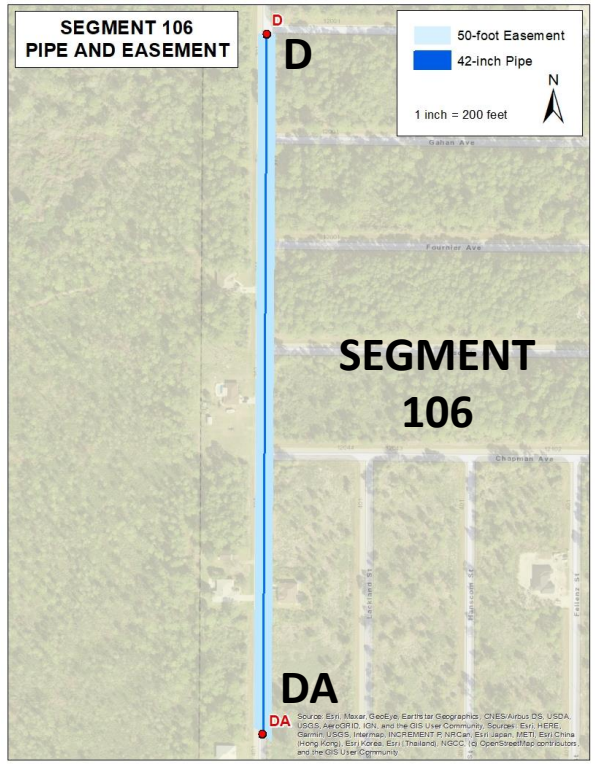
   a. Stormwater Open Channels (Sarasota County)
   b. Stormwater Pipes (Sarasota County)
   c. Reclaimed Water Mains (Sarasota County)
   d. Sanitary Sewer Gravity Mains (Sarasota County)
   e. Sanitary Sewer Pressurized Mains (Sarasota County)
   f. Water Mains (Sarasota County)
   g. Reclaimed Water Mains (Charlotte County)
   h. Sanitary Sewer Mains (Charlotte County)
   i. Sanitary Vacuum Mains (Charlotte County)
   j. Force Main (City of North Port)
   k. Sanitary Sewer Gravity Mains (City of North Port)
   l. Reuse Main (City of North Port)

There were shapefiles that had to be created from scratch, these included a right-of-way (ROW) shapefile and information collected from field reconnaissance. The ROW shapefile was created by taking the negative space from the different parcels shapefiles to create a ROW area.

GIS Total Model Construction



FID	Shape	OBJECTID	FACILITYID	WATERTYPE	INSTALLDAT	COLLECTION	ROTATION	MANUFACTUR	MODEL	MFGYEAR	DRYHYDRANT	CAPCOLOR	BARRELSIZE	OPERABLE	LASTSERVIC
0	Point	11622	wHY_31052012_005483	Potable Water	1999-09-23T00:00:00.000Z	2017-11-03T10:28:46.000Z	0	MUELLER	CENTURION BSR	1999	False	Green	5.25	OPERATING	1899-12-30T00:00:00.000Z
1	Point	11623	wHY_31052012_005484	Potable Water	1999-09-23T00:00:00.000Z	2017-11-03T09:50:33.000Z	14	MUELLER	CENTURION BSR	1999	False	Green	5.25	OPERATING	1899-12-30T00:00:00.000Z
2	Point	11624	wHY_31052012_005485	Potable Water	1999-09-23T00:00:00.000Z	2017-11-03T10:09:06.000Z	35	AMERICAN DARLING	B84B	2001	False	Green	5.25	OPERATING	1899-12-30T00:00:00.000Z



- Segment Nodes
- Pipe (42” wide)
- Easement (50’ wide)

Segment and object definition

GIS Total Model Construction

- There was a massive amount of data and information available. Therefore, focused on the potential impacts of each route or segment. To determine what impacts (intersections with GIS data) defined GIS polygons for the pipes and easements based on actual size.
- To evaluate each segment, node files were created. Between each set of nodes, a segment runs between the 2 nodes.
- The pipe shape is a 42” wide shapefile that evenly splits the centerline of each segment – shown in dark blue in the image
- The easement shape is a 50’ wide shapefile evenly splits the centerline – shown in light blue
- In total, 54 segments were created through this process
- Each of the 54 segments has a separate GIS polygon pipe and easement shape in the respective shapefiles

Field Reconnaissance

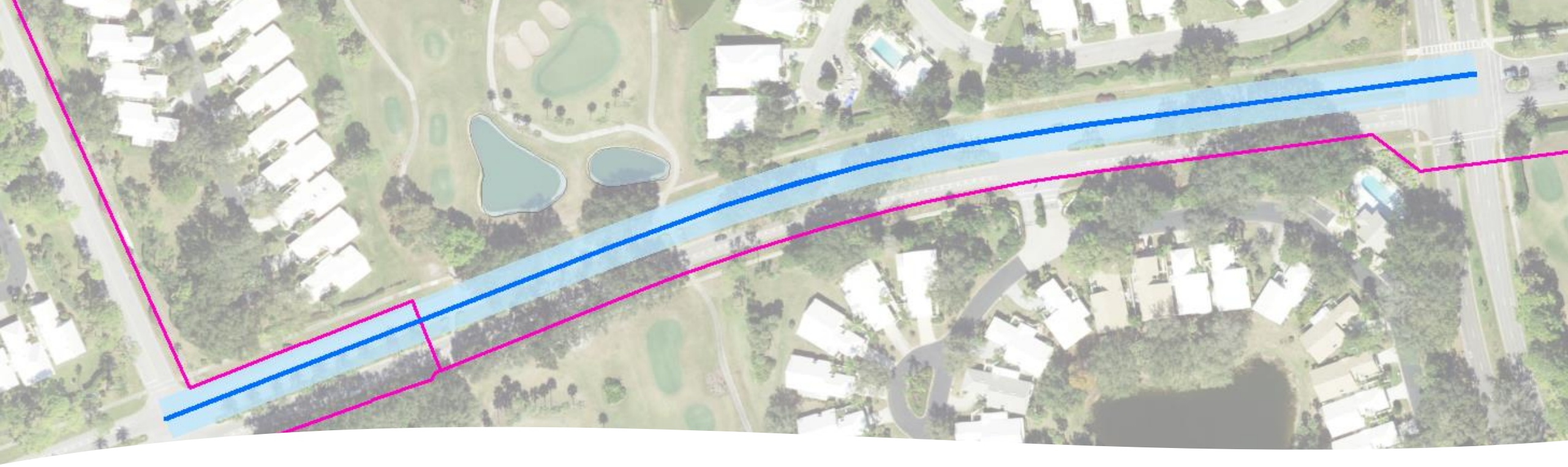
Over 60 Miles of Route Segments

- Walked & drove
- Split into 2 groups for repetitive and different perspectives
- Information missing from the database
- Verifying GIS data

Utilities	North/East	South/West	
Water			
Sewer/force main			
Reclaimed water/irrigation			
Gas/chemical			
Telecom			
Power (buried and overhead)			
Stormwater (pipes, structures, swales)			
Special/water crossings			
Structures	**North/East**	**South/West**	
Bridge abutments			
Buildings			
Equipment/machinery			
Traffic/Public Impacts	**North/East**	**South/West**	
Schools			
Transit/bus routes (public and school)			
Residential neighborhoods			
Backup-commuting delays			
Pedestrian infrastructure (crosswalks, sidewalks, trails)			
Bicycle infrastructure (bike lanes, trails)			
Evacuation routes			
Hospitals/care facilities			
Fire stations/EMS stations			
Construction	**North/East**	**South/West**	
Trenchless construction staging areas			
Construction staging areas and proximity to construction site			
Temporary construction easements			
Speed limit consideration			

Field Reconnaissance

- Walked/ drove 60 miles of segments
- These shapefiles were curated from the field reconnaissance:
  - Underground Sewer Mains in North Port
  - Underground Gas
  - Underground Telecom
  - Overhead Power
- In the data analysis, these shapefiles are given a “1” if present on the segment, and a “0” if there is not evidence of them on a segment



GIS used to determine conflicts impacting a route by the quantitative data involved with each 42-inch pipe segment and 50’ easement

Roads – everything pertaining to roads and sidewalks, such as the speed limits, road ownership for permitting, and sidewalk impacts that would complicate the project and increase costs

Wetlands – would be a conflict that would require HDD or permitting

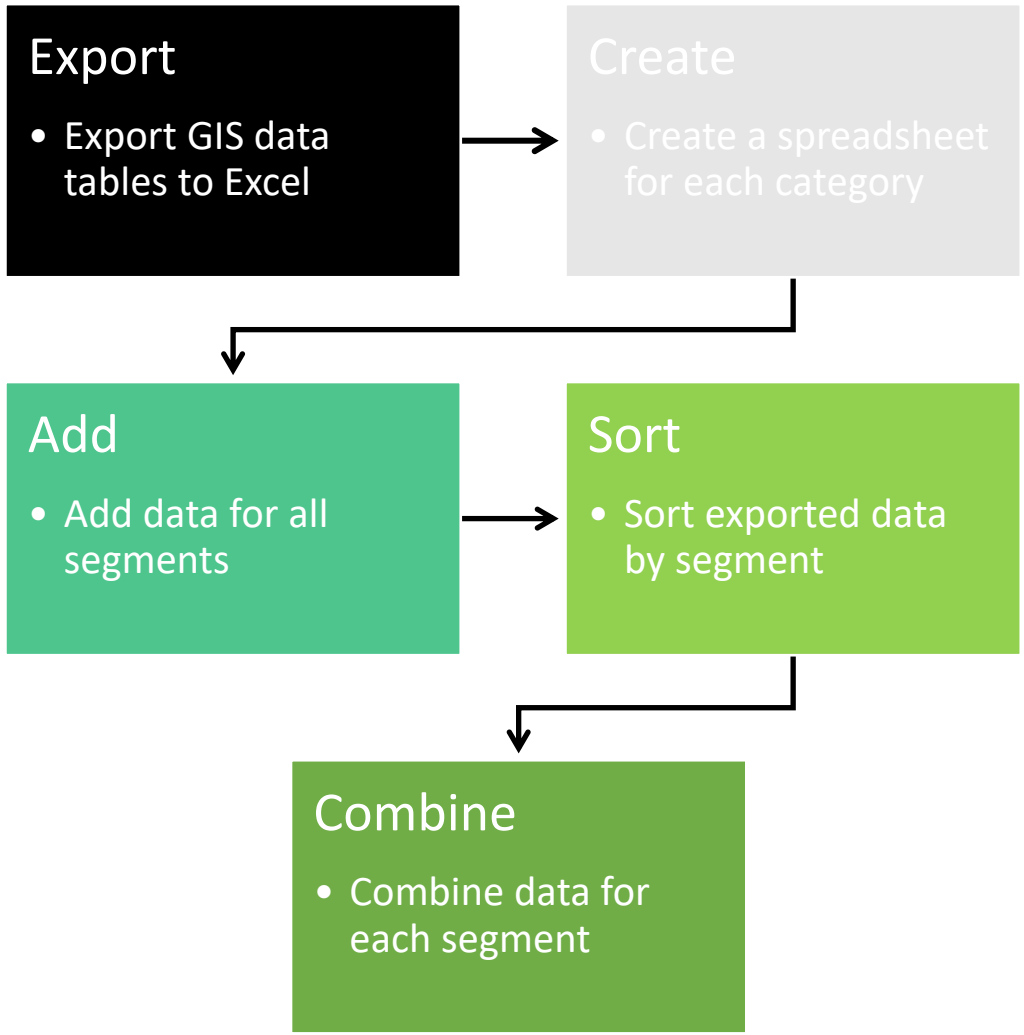
HDD - drills under water ways, intersections, and wetlands

Planning – FDOT projects including road widening and repairs

Facilities – daycares, schools, hospice, hospitals, parks, fire departments, police departments conflicts pertaining to public inconveniences and altered construction schedules

Environmental – soil contamination zones, endangered species – scrub jays, bald eagles, burrowing owls potential permitting and construction seasonal constrictions (nesting)

Segment Analysis



PEACE RIVER MANASOTA REGIONAL WATER SUPPLY AUTHORITY

PHASE 2B AND 2C PIPELINES FEASIBILITY STUDY

SEGMENT ANALYSIS - 202 (Kenilworth, Hineline, Alonzo, US 41)

Total Length of Pipe: 17,677 LF **Nodes: BA-B**

CATEGORY	DESCRIPTION	QUANTITY	UNIT
Utilities - Water	50-ft Esmt, Length Adjacent or Intersected	8,424	LF
	42" Pipeline, Length Intersected	2,329	LF
Utilities - Sewer	50-ft Esmt, Length Adjacent or Intersected	880	LF
	42" Pipeline, Length Intersected	135	LF
Utilities - Sewer (site walk)	Along Segment, 1-yes or 0-no	0	Y/N
Utilities - Reclaimed	50-ft Esmt, Length Adjacent or Intersected	300	LF
	42" Pipeline, Length Intersected	18	LF
Utilities - Overhead Power	50-ft Esmt, Length Adjacent	13,907	LF
Utilities - Gas (site walk)	Along Segment, 1-yes or 0-no	1	Y/N
Utilities - Telecom (site walk)	Along Segment, 1-yes or 0-no	1	Y/N
Stormwater - Pipes	50-ft Esmt, Length Adjacent or Intersected	0	LF
ROW	50-ft Esmt, % of Segment in ROW	92.08	%
Parcels	50-ft Esmt, No of Parcels Intersected	24	EA
Waterways	HDD Length Waterways (100'/side)	1,360	LF
	Waterway Crossing Count	5	EA
Road Intersections	Intersection Count	3	EA
Wetlands	HDD Length Wetland (100'/side)	417	LF
	50-ft Esmt, Wetland Crossing Count	2	EA
Environmental	Endangered Species Located within 100 ft	1	EA
	Contamination Sites within 100 ft	2	EA
Sidewalk	50-ft Esmt, Length Intersected	0	LF
Speed Limit	Max Speed Along Segment	45	mph
	Min Speed Along Segment	30	mph
Roads	Along Evacuation Route, 1-yes, or 0-no	1	Y/N
	Along Transit/Bus Route, 1-yes, or 0-no	0	Y/N
Facilities	Total School Count	0	EA
	Total Daycare Count	1	EA
	Total Church Count	2	EA
	Total Fire/EMS Count	0	EA
	Total Hospital/Medical Count	0	EA

Segment Analysis

- The GIS data were exported into excel
- Each category became a separate spreadsheet
- Individual segment data was combined into one spreadsheet as shown previously
- The first category for this segment is water main intersections there were 8000 LF of easement intersections found in GIS and 2000 LF of pipe intersections
- The respective data from the GIS export for each segment for each category was pulled into the spreadsheets
- Each spreadsheet contains the data for each category by segment
- A master spreadsheet for each segment was created – shown here
- This tab pulls all the data for that individual segment into one spreadsheet

Segment Analysis – for each segment, the quantity of each category such as water, sewer, environmental impacts, was totaled

Route Ranking Methodology

The methodology used to rank the routes came down to two types of analyses, the Comparative Cost analysis and the Non-direct cost impact analysis.

Comparative cost analysis: estimated construction cost comparison developed by using consistent unit pricing based on recent bid tabulations for construction of similar projects. Quantities found with the GIS Total model were used to quantify the crossings, intersections and other components consistently over all the routes for consistent applied cost projections

Non-direct cost impacts were determined from the GIS Total Model, where we could rank impacts of non-direct cost criteria applying a weighting factor scoring the routes based on the combined factor with the highest scoring having the lowest number of conflicts which would be the more favorable route having fewer impacts to the surrounding community.

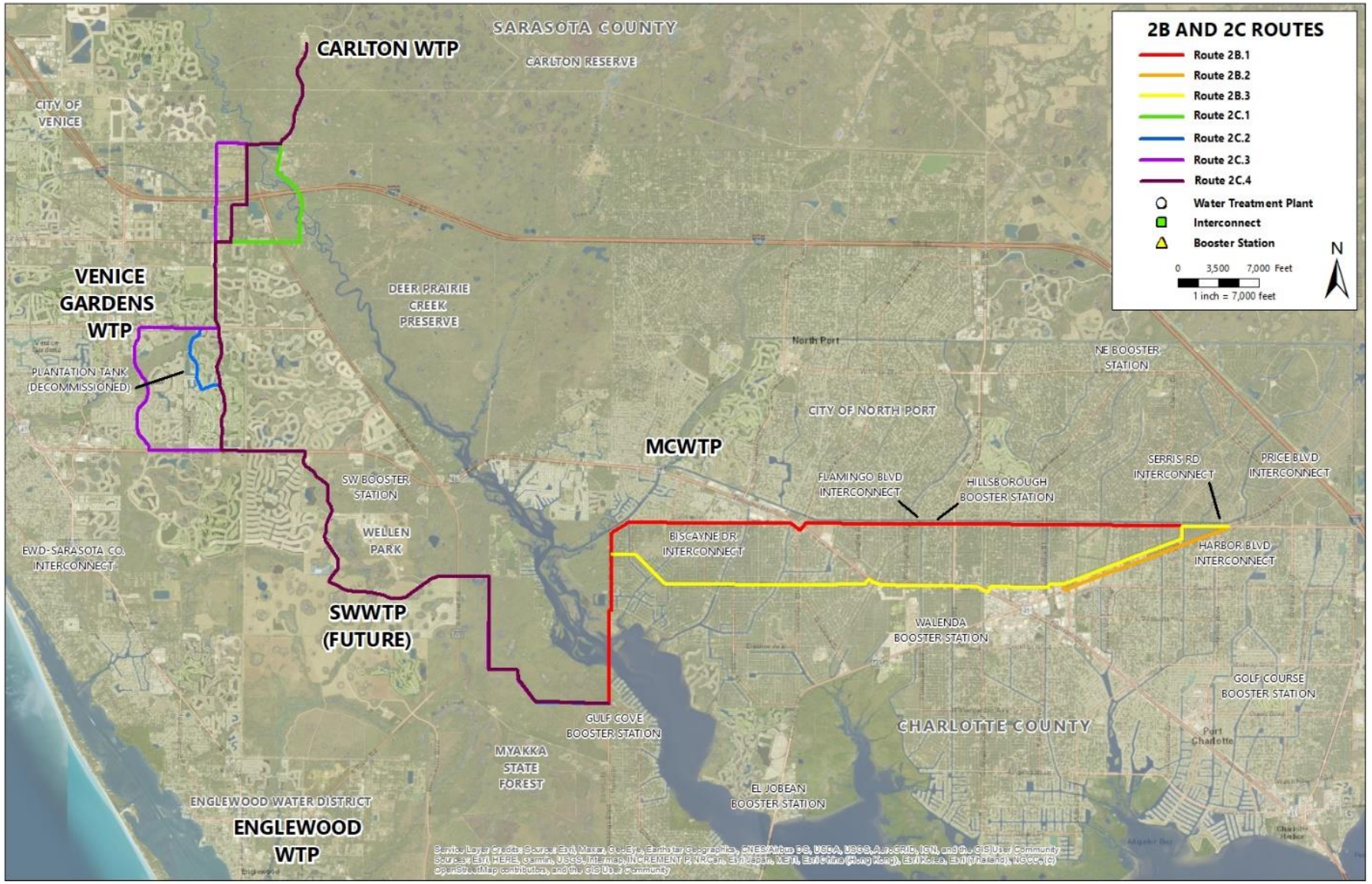
Route Development

Combine segments into routes

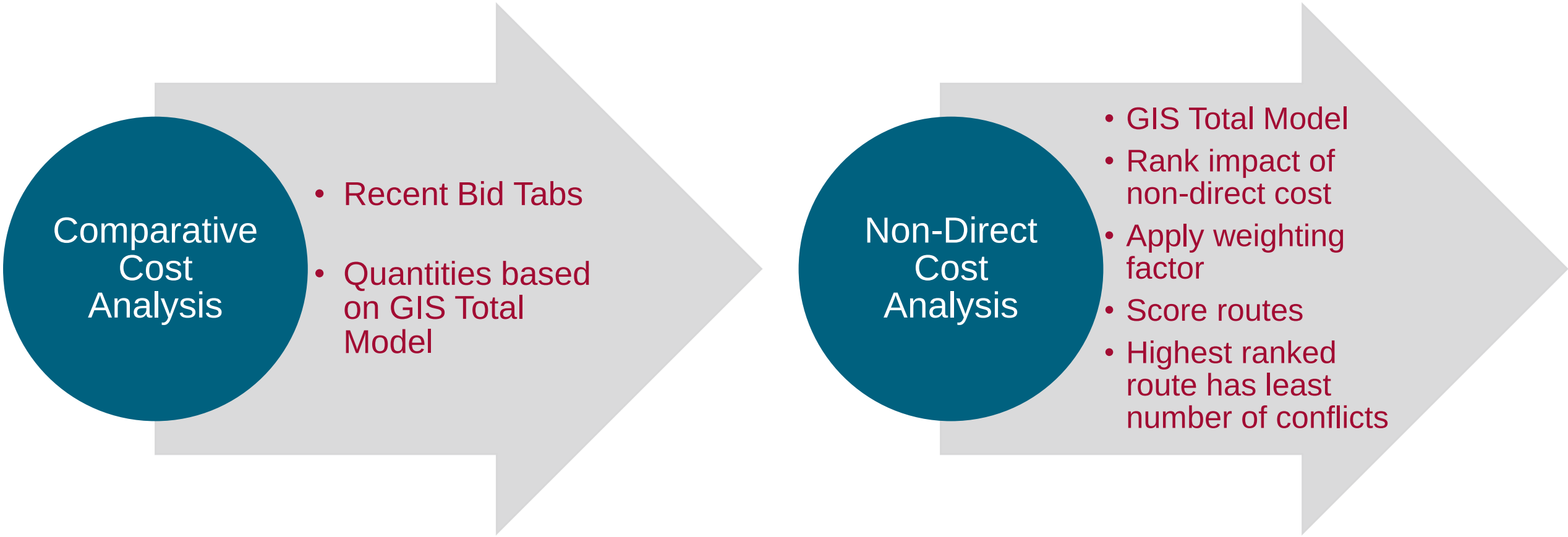
Arrange segments into logical route alternatives

- Segment-by-segment comparison
- Dependent on the least number of impacts from quantitative evaluation

- Concerns:
  - Crossing environmentally sensitive Myakka River
  - Crossing I-75
  - Crossing State Forested lands and SWFWMD property



Route Ranking Methodology



The non-direct costs were determined solely from the GIS Total Model by ranking the impacts, applying a weighting factor, scoring the routes with the highest-ranking route having the fewest number of conflicts.

Ranking Matrix

Public Impacts						
Maintenance of Traffic	4	0	0		1	1
Facilities Along Route	4	0	2	4	5	7
Bus Route Impacted	4	0	0	1	1	1
Sidewalk Impacted	4	0	2982	5964	8946	11928
Safety						
Construction Safety						
Speed Limit	4	0	14	28	41	55
Gas Mains	4	0	0		1	1
Sidewalk Proximity	4	0	2982	5964	8946	11928
Powerlines	4	0	8227	16454	24681	32908
Evacuation Route	4	0	0		1	
Medical Facility Proximity	4	0	0		1	
Future Accessibility for O&M	4	0.05	2	3	5	
Operations and Maintenance						
Future Accessibility for O&M	4	6	5	3	2	
O&M for Water Crossings	4	0	3	6	8	
Consistency with Long Range Planning						
Consistency/adaptability of route with regional planning	1	0	1	3	4	
Regional Water Supply and Resiliency	1	0	1	3	4	
Planned Regional Infrastructure Improvements	1	0	1	3	4	
Consistency with Regional Comprehensive Plans	1	0	1	3	4	
Consistency with Future Development	1	0	1	3	4	
Environmental & Permitting						
Permits Required	4	5	8	10	13	15
Proximity to Contaminated Soil	4	0	1	1	2	2

- Non-Direct Cost Criteria
- Constructability
- Public Impacts
- Safety
- O&M
- Long Range Planning
- Environmental and Permitting
- Land Needs
- Impacts to Cultural Resources

Route 2B.1 Impact Factor

		MIN	25%	AVE	75%	MAX		Unit	101		201		104		106		306	
									Value	Rank	Value	Rank	Value	Rank	Value	Rank	Value	Rank
Constructability																		
Geotechnical Considerations	4	0	0	0	0	0	1	EA	0	0	0	0	0	0	0	0	0	0
Proximity to Overhead Power	4	0	8227	16454	24681	32908	1	LF	10601	3	26234	1	16584	2	1748	4	0	4
Utility Crossings																		
Water	4	0	8644	17288	25932	34576	1	LF	7138	4	31576	1	11354	3	250	4	6638	4
Sewer	4	0	2104	4208	6312	8416	1	LF	0	4	0	4	0	4	0	4	0	4
Reclaim	4	0	3834	7669	11503	15337	1	LF	0	4	0	4	0	4	0	4	0	4
Stormwater Pipe Crossing	4	0	984	1968	2951	3935	1	LF	0	4	0	4	0	4	0	4	0	4
Intersection Crossings	4	0	2	4	6	8	1	EA	0	4	7	1	5	2	0	4	0	4
[illegible]	4	0	3	6	8	11	1	EA	1	4	11	1	4	3	0	4	1	4
Wetland Crossings	4	0	3	7	10	13	1	EA	0	4	5	3	0	4	0	4	0	4

The impacts were quantified for each category based on the percent breakdown: between 0-25% (4 points), >25-50% (3 points), >50-75% (2 points) up to a maximum of >75-100% for 1 point. A segment ranking of 1 is negatively impactful and a ranking of 4 is minimally impactful

Weighting Factor

Criteria Categories	Weighting Factor % of 100%	Comment
Constructability	20%	Increases direct cost and duration
Public Impacts	5%	Public impacts temporary
Safety	10%	Important but can be mitigated
Operations and Maintenance	20%	Long term impact so important
Consistency with Long Range Planning	20%	Long term impact so important
Environmental and Permitting	10%	May increase direct cost and duration
Land Requirements	10%	Significant permanent impact
Impacts to Cultural Resources	5%	No significant impacts discovered

Not all criteria of equal importance, weighting factor established by round table of Authority staff representing operations, management, water resources

Ranking of Route 2B.1

From Ranking Matrix

Weight x Impact Factor

		101		201		104		106		306	
	Weight	Impact Factor	Weighted Factor	Impact Factor	Weighted Factor	Impact Factor	Weighted Factor	Impact Factor	Weighted Factor	Impact Factor	Weighted Factor
Constructability	20%	31	6.2	19	3.8	26	5.2	32	6.4	32	6.4
Public Impacts	5%	13	0.65	13	0.65	13	0.65	13	0.65	16	0.8
Safety	10%	24	2.4	19	1.9	18	1.8	25	2.5	25	2.5
O&M	20%	5	1	5	1	6	1.2	5	1	5	1
Consistency w/ Planning	20%	20	4	20	4	20	4	20	4	20	4
Environment & Permits	10%	14	1.4	13	1.3	11	1.1	16	1.6	15	1.5
Land Requirements			0.9	9	0.9	9	0.9	9	0.9	12	1.2
Cultural Impacts			0.2	4	0.2	4	0.2	4	0.2	4	0.2
Ranking Factor			**16.75**		**13.75**		**15.05**		**17.25**		**17.6**
										Non-Direct Cost Criteria Score	**16.08**

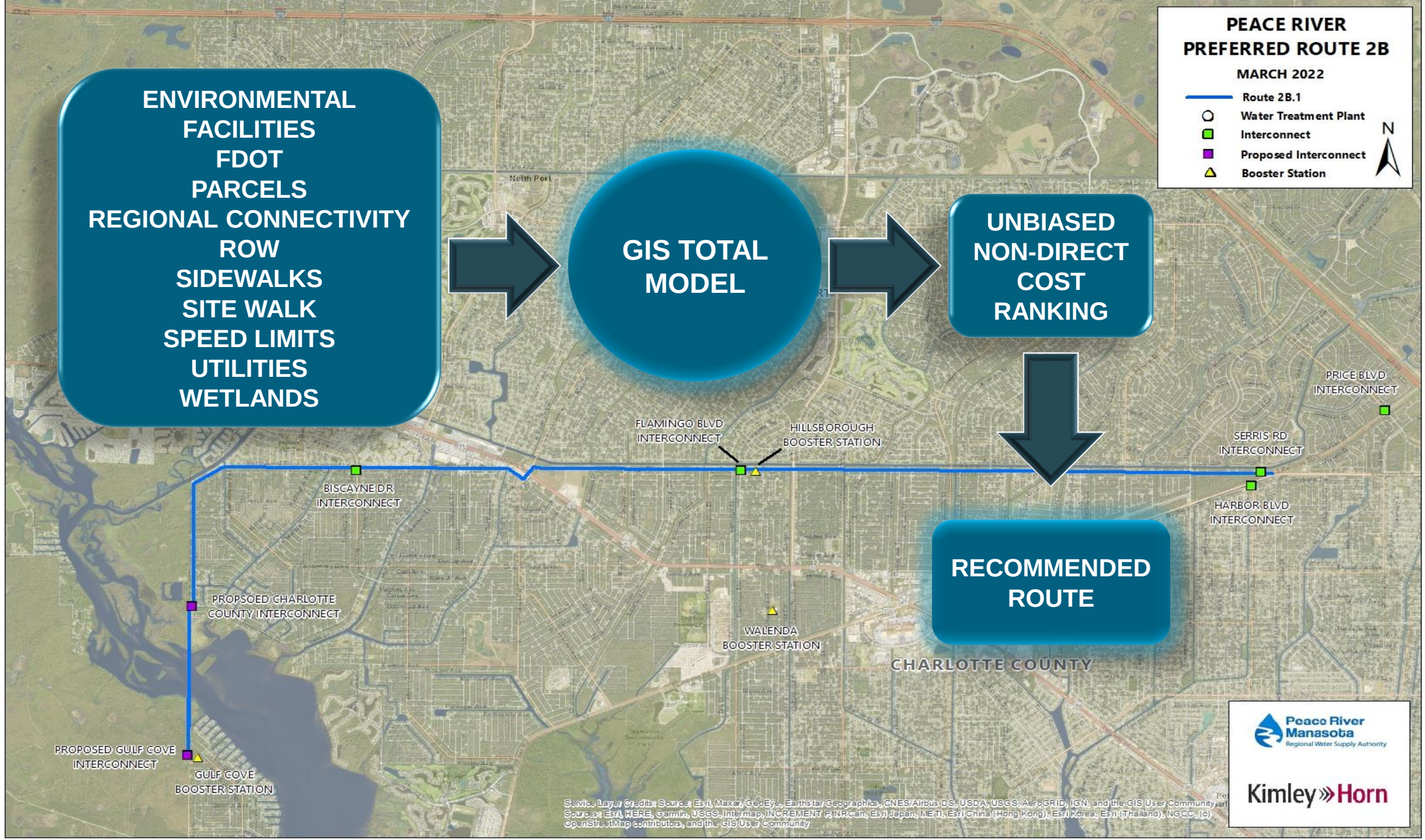
Sum of Weighted Factors

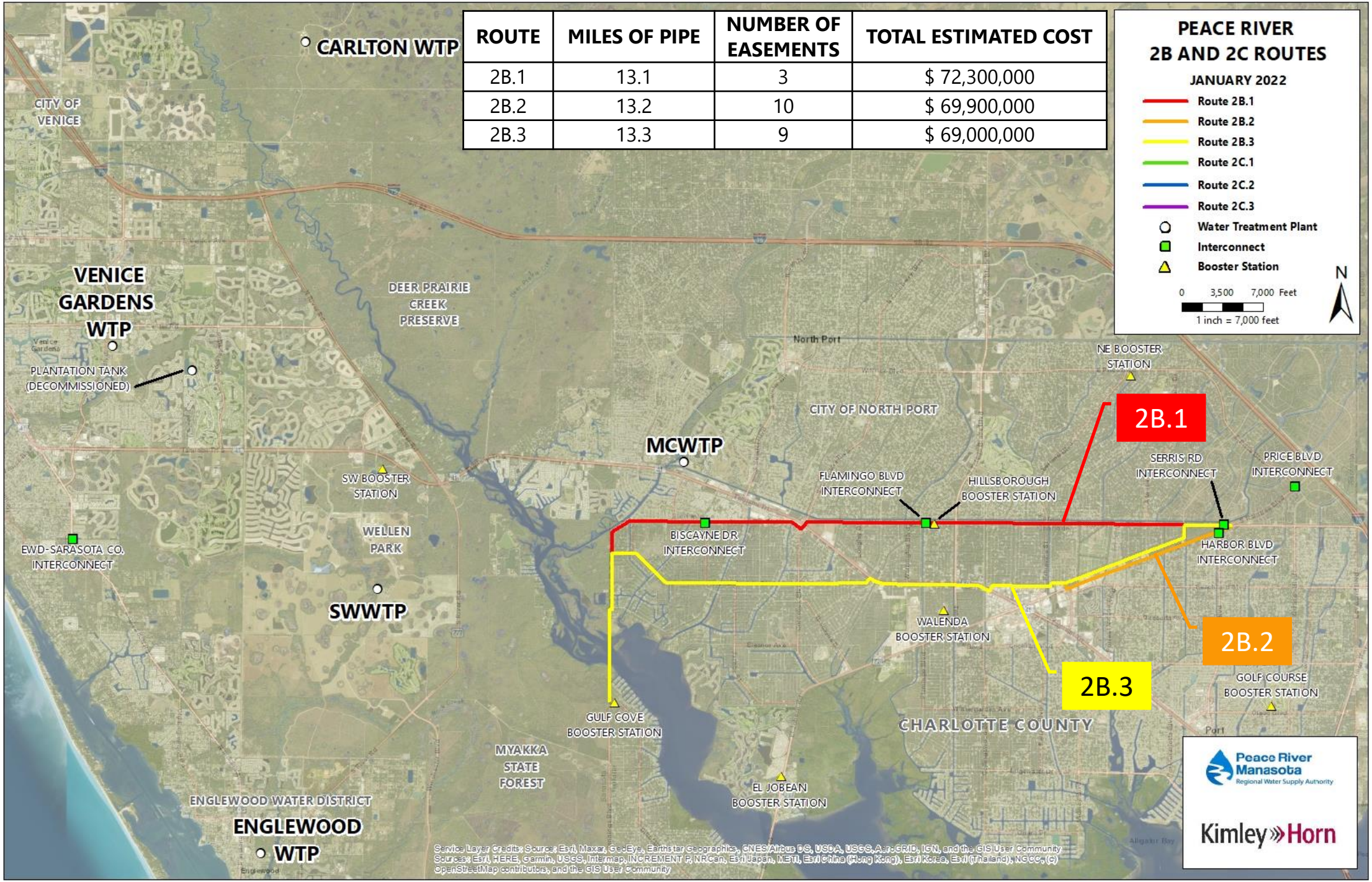
Average of Ranking Factors

The ranking criteria and weight are in the far-left columns. The sum of each impact from 0-4 is the impact factor, shown here. The weighted factor is the weight times the impact factor. The sum of all weighted factors is the ranking for that individual segment. The average of all the ranking factors for a route is the final non-direct cost criteria.

Phase 2B Route Rankings

Route	Miles	Number of Easements	Non-Cost Criteria Score	Comparative Cost
2B.1	13.1	3	16.08	$72,300,000
2B.2	13.2	10	15.18	$69,900,000
2B.3	13.3	9	15.05	$69,000,000


PEACE RIVER
PREFERRED ROUTE 2B
MARCH 2022
Route 2B.1
Water Treatment Plant
Interconnect
Proposed Interconnect
Booster Station
N
ENVIRONMENTAL
FACILITIES
FDOT
PARCELS
REGIONAL CONNECTIVITY
ROW
SIDEWALKS
SITE WALK
SPEED LIMITS
UTILITIES
WETLANDS
GIS TOTAL MODEL
UNBIASED NON-DIRECT COST RANKING
RECOMMENDED ROUTE
North Port
FLAMINGO BLVD INTERCONNECT
HILLSBOROUGH BOOSTER STATION
PRICE BLVD INTERCONNECT
SERRIS RD INTERCONNECT
HARBOR BLVD INTERCONNECT
BISCAYNE DR INTERCONNECT
PROPSOED CHARLOTTE COUNTY INTERCONNECT
WALENDA BOOSTER STATION
CHARLOTTE COUNTY
PROPOSED GULF COVE INTERCONNECT
GULF COVE BOOSTER STATION
Peace River Manasota Regional Water Supply Authority
Kimley»Horn
Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



ROUTE	MILES OF PIPE	NUMBER OF EASEMENTS	TOTAL ESTIMATED COST
2B.1	13.1	3	$ 72,300,000
2B.2	13.2	10	$ 69,900,000
2B.3	13.3	9	$ 69,000,000

PEACE RIVER 2B AND 2C ROUTES

JANUARY 2022

- Route 2B.1
- Route 2B.2
- Route 2B.3
- Route 2C.1
- Route 2C.2
- Route 2C.3
- Water Treatment Plant
- Interconnect
- Booster Station

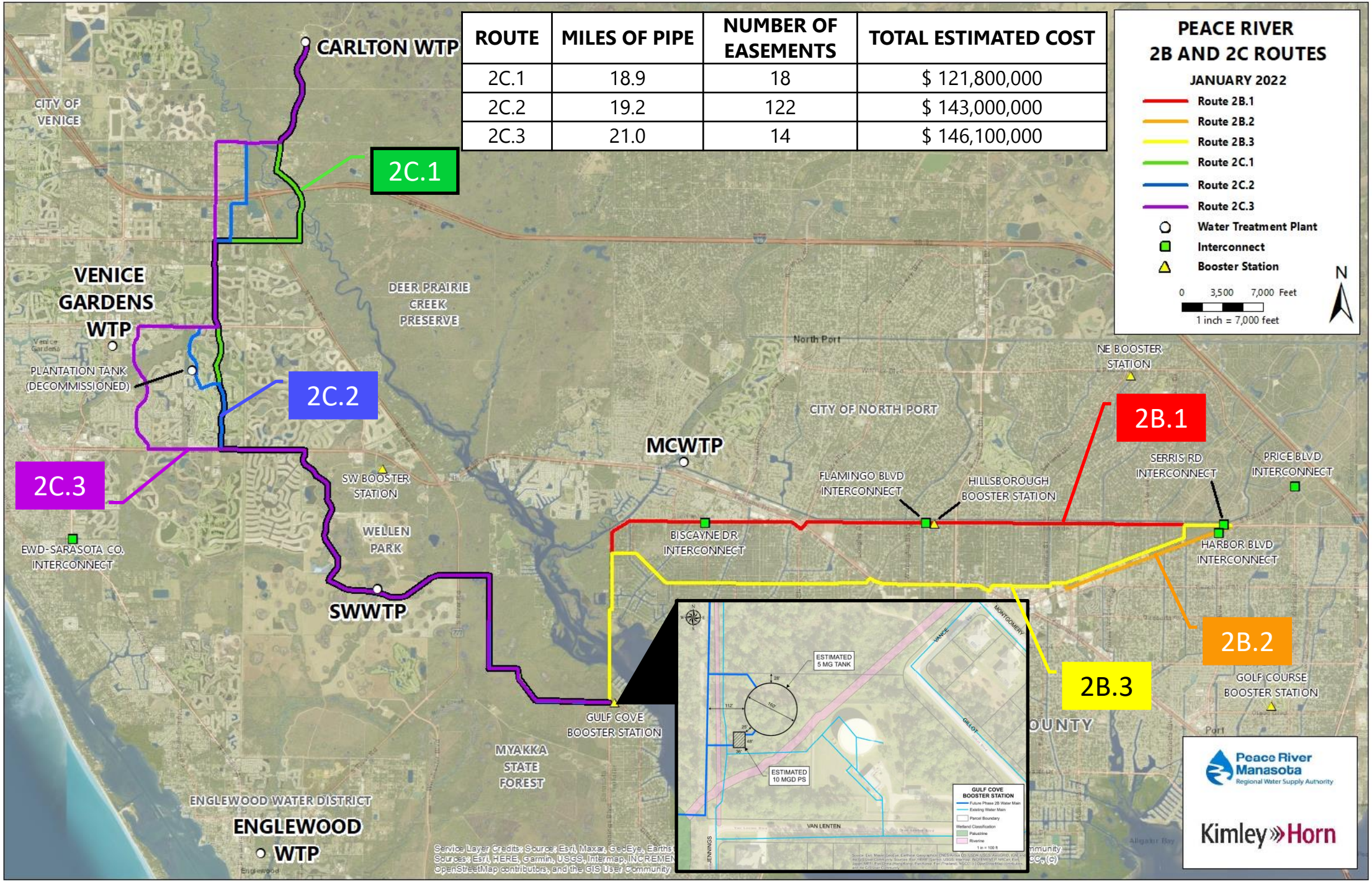
0 3,500 7,000 Feet

1 inch = 7,000 feet

N

Peace River Manasota Regional Water Supply Authority

Kimley»Horn



ROUTE	MILES OF PIPE	NUMBER OF EASEMENTS	TOTAL ESTIMATED COST
2C.1	18.9	18	$ 121,800,000
2C.2	19.2	122	$ 143,000,000
2C.3	21.0	14	$ 146,100,000

Part 3 – Results

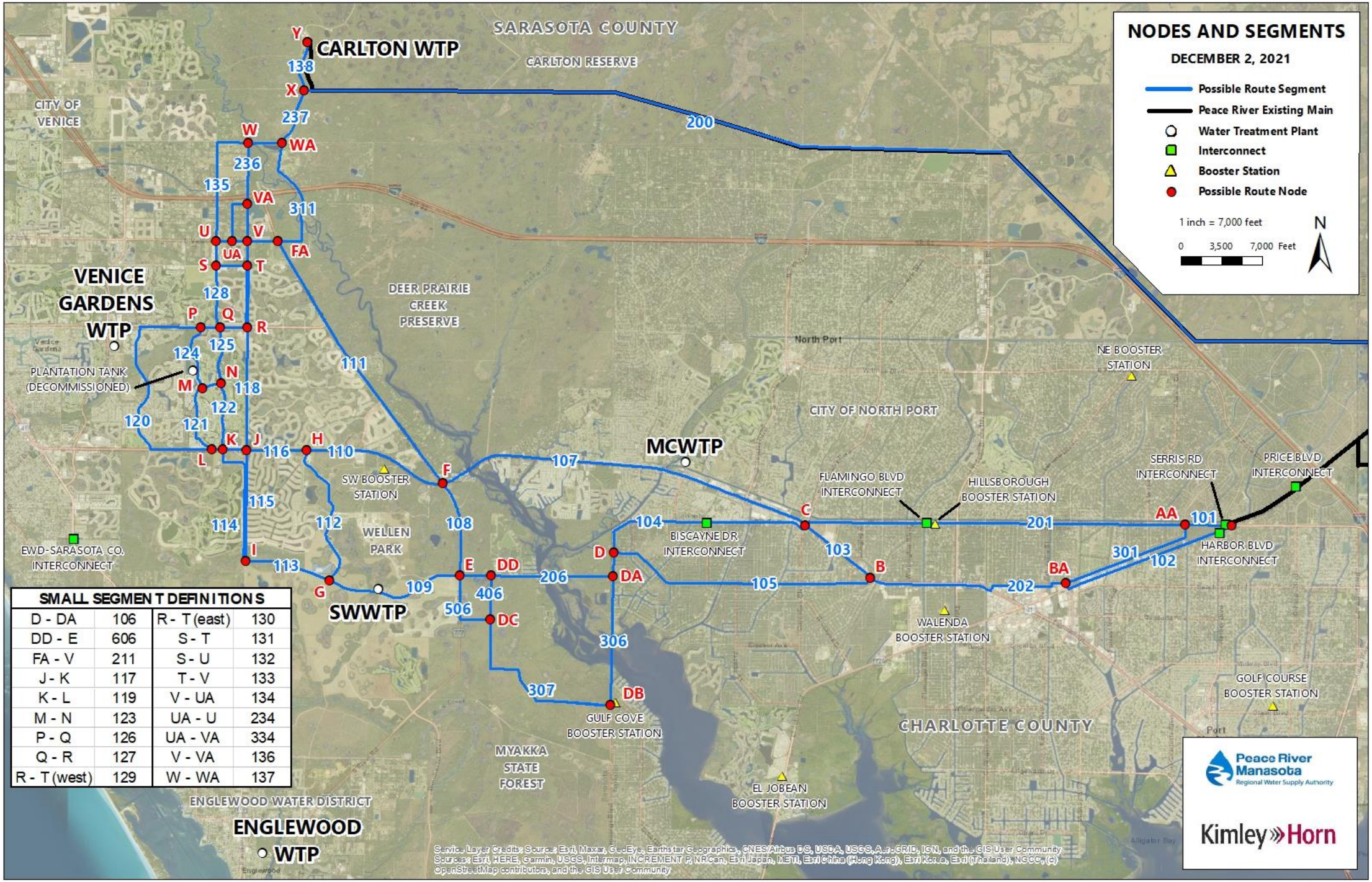
Peace River Manasota
Regional Water Supply Authority

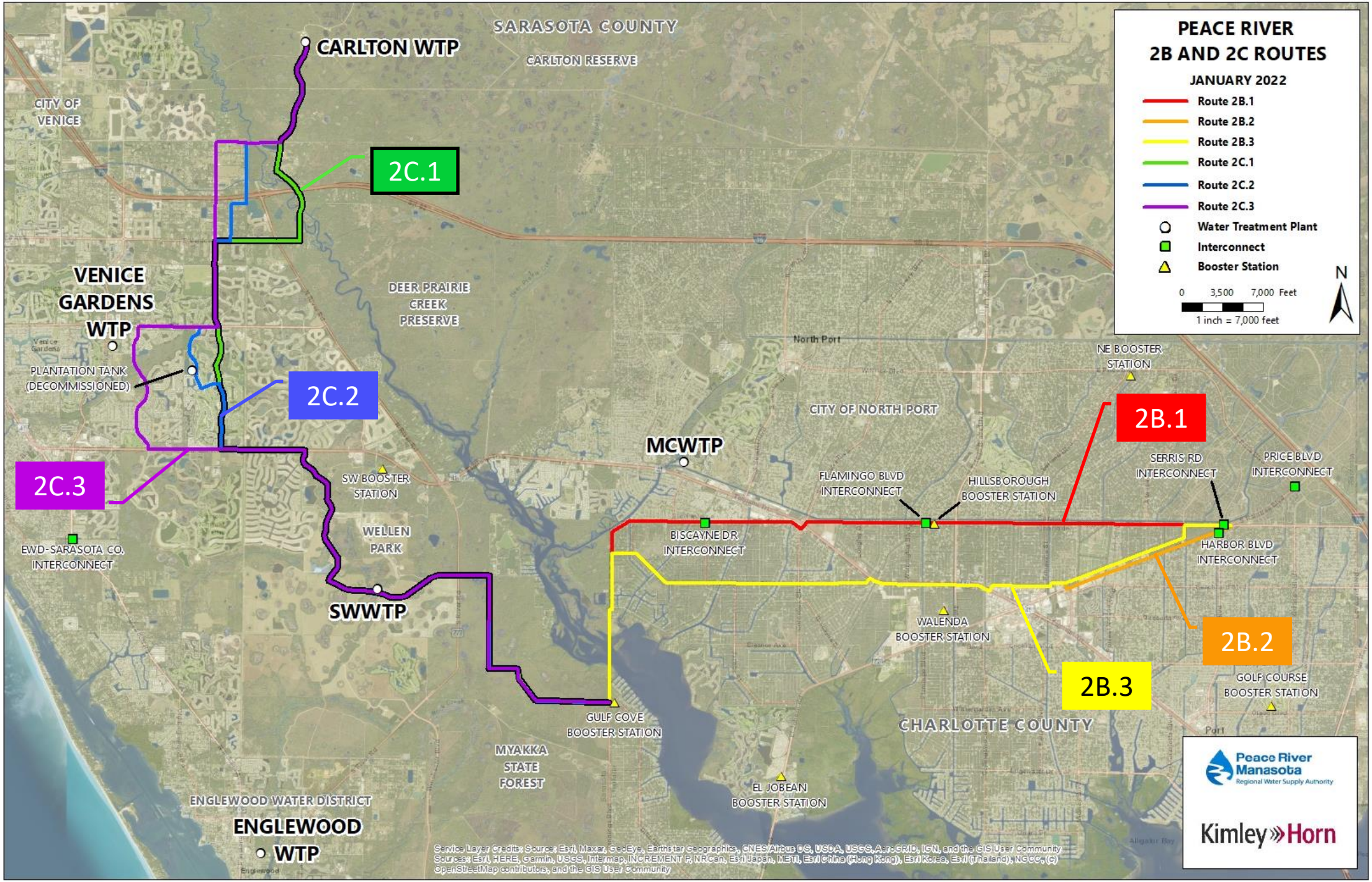
Kimley»Horn

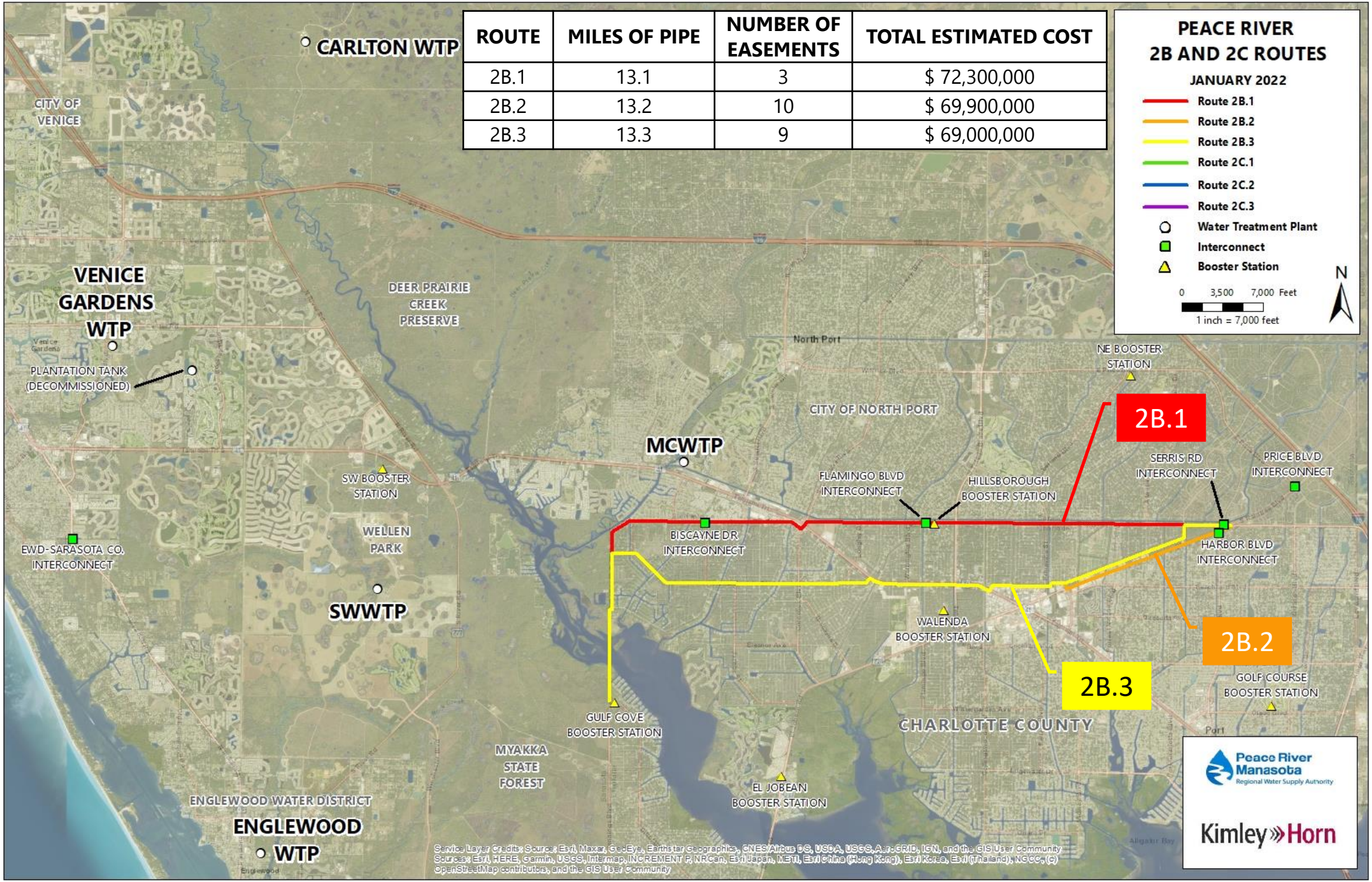
AAEES 2024 Excellence in Environmental Engineering

Summary of steps in the analysis

1. Meet with Authority Members, Customers, and Partners to identify routes from the determination of all possible routes that would be acceptable and beneficial individually.
2. From these meetings identify feasible routes.
3. Break the alignments into nodes and segments for analysis.
4. Analyze each segment, quantify direct cost and non-direct cost impacts.
5. Develop a non-direct cost impact score for each segment.
6. Combine segments into route alternatives.
7. Score the route alternatives.
8. Present findings and recommendation for Authority Board approval and approval of funding agency (SWFWMD).


NODES AND SEGMENTS
DECEMBER 2, 2021
Possible Route Segment
Peace River Existing Main
Water Treatment Plant
Interconnect
Booster Station
Possible Route Node
1 inch = 7,000 feet
0 3,500 7,000 Feet
N
SARASOTA COUNTY
CARLTON RESERVE
CARLTON WTP
CITY OF VENICE
VENICE GARDENS WTP
PLANTATION TANK (DECOMMISSIONED)
DEER PRAIRIE CREEK PRESERVE
North Port
CITY OF NORTH PORT
NE BOOSTER STATION
MCWTP
SW BOOSTER STATION
WELLEN PARK
SWWTP
EWD-SARASOTA CO. INTERCONNECT
BISCAYNE DR INTERCONNECT
FLAMINGO BLVD INTERCONNECT
HILLSBOROUGH BOOSTER STATION
SERRIS RD INTERCONNECT
PRICE BLVD INTERCONNECT
HARBOR BLVD INTERCONNECT
WALENDA BOOSTER STATION
GOLF COURSE BOOSTER STATION
GULF COVE BOOSTER STATION
CHARLOTTE COUNTY
MYAKKA STATE FOREST
EL JOBEAN BOOSTER STATION
ENGLEWOOD WATER DISTRICT
ENGLEWOOD WTP
Y
X
W
WA
VA
U
V
UA
S
T
P
Q
R
N
M
K
J
H
L
I
G
F
E
DD
D
C
B
AA
BA
DC
DA
DB
138
237
236
135
311
FA
128
125
124
118
122
120
121
116
110
115
114
112
113
111
107
108
109
104
103
105
206
406
506
306
307
200
201
202
101
102
301
SMALL SEGMENT DEFINITIONS
D - DA 106
DD - E 606
FA - V 211
J - K 117
K - L 119
M - N 123
P - Q 126
Q - R 127
R - T (west) 129
R - T (east) 130
S - T 131
S - U 132
T - V 133
V - UA 134
UA - U 234
UA - VA 334
V - VA 136
W - WA 137
Peace River Manasota Regional Water Supply Authority
Kimley»Horn
Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community


PEACE RIVER
2B AND 2C ROUTES
JANUARY 2022
Route 2B.1
Route 2B.2
Route 2B.3
Route 2C.1
Route 2C.2
Route 2C.3
Water Treatment Plant
Interconnect
Booster Station
0 3,500 7,000 Feet
1 inch = 7,000 feet
N
SARASOTA COUNTY
CARLTON RESERVE
CARLTON WTP
CITY OF VENICE
2C.1
VENICE GARDENS WTP
PLANTATION TANK (DECOMMISSIONED)
DEER PRAIRIE CREEK PRESERVE
2C.2
2C.3
SW BOOSTER STATION
WELLEN PARK
EWD-SARASOTA CO. INTERCONNECT
SWWTP
North Port
NE BOOSTER STATION
CITY OF NORTH PORT
MCWTP
2B.1
SERRIS RD INTERCONNECT
PRICE BLVD INTERCONNECT
FLAMINGO BLVD INTERCONNECT
HILLSBOROUGH BOOSTER STATION
BISCAYNE DR INTERCONNECT
HARBOR BLVD INTERCONNECT
WALENDA BOOSTER STATION
2B.2
2B.3
GOLF COURSE BOOSTER STATION
GULF COVE BOOSTER STATION
CHARLOTTE COUNTY
MYAKKA STATE FOREST
EL JOBEAN BOOSTER STATION
ENGLEWOOD WATER DISTRICT
ENGLEWOOD WTP
Peace River Manasota Regional Water Supply Authority
Kimley»Horn
Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



ROUTE	MILES OF PIPE	NUMBER OF EASEMENTS	TOTAL ESTIMATED COST
2B.1	13.1	3	$ 72,300,000
2B.2	13.2	10	$ 69,900,000
2B.3	13.3	9	$ 69,000,000

PEACE RIVER 2B AND 2C ROUTES

JANUARY 2022

- Route 2B.1
- Route 2B.2
- Route 2B.3
- Route 2C.1
- Route 2C.2
- Route 2C.3
- Water Treatment Plant
- Interconnect
- Booster Station

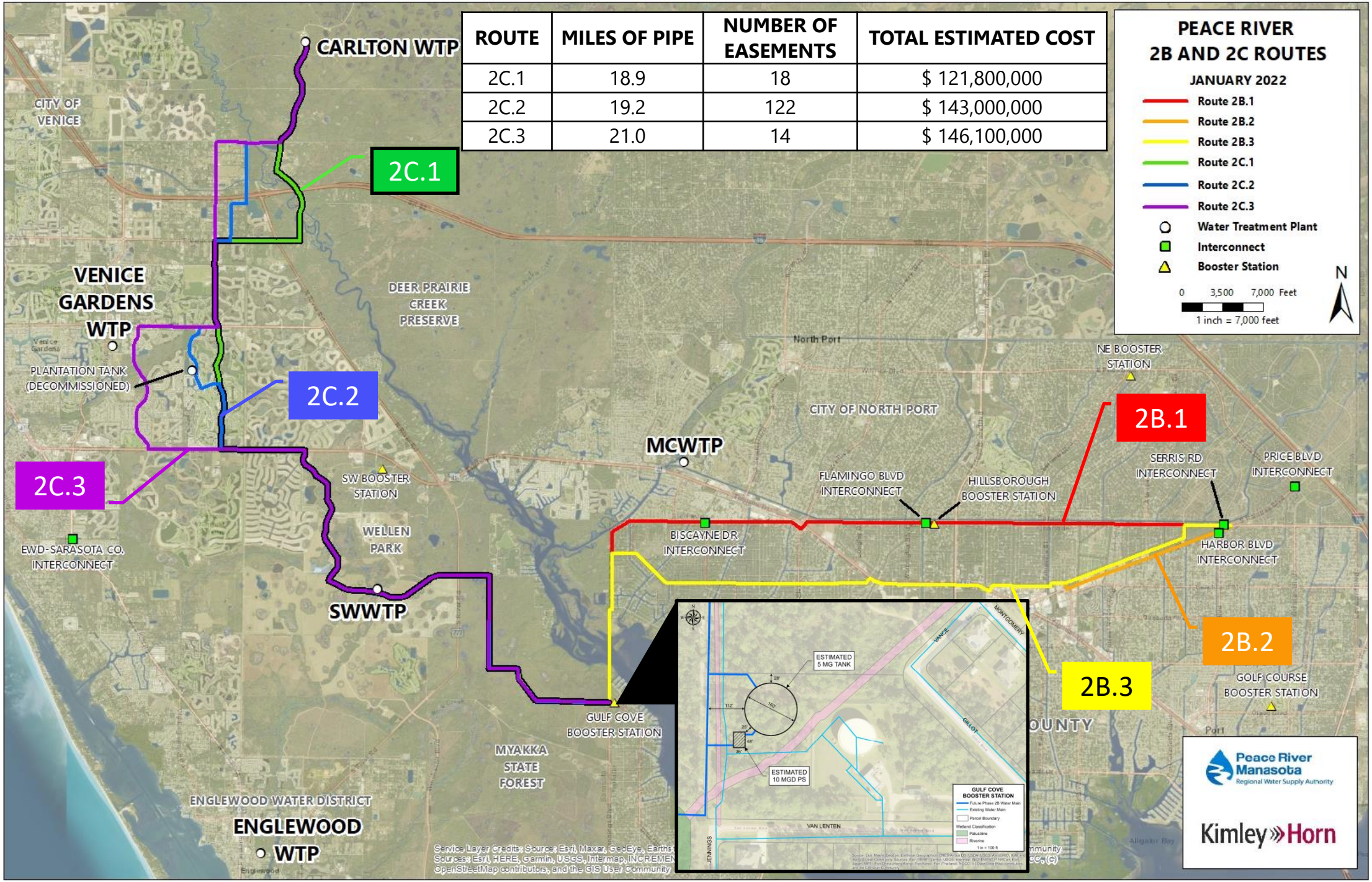
0 3,500 7,000 Feet

1 inch = 7,000 feet

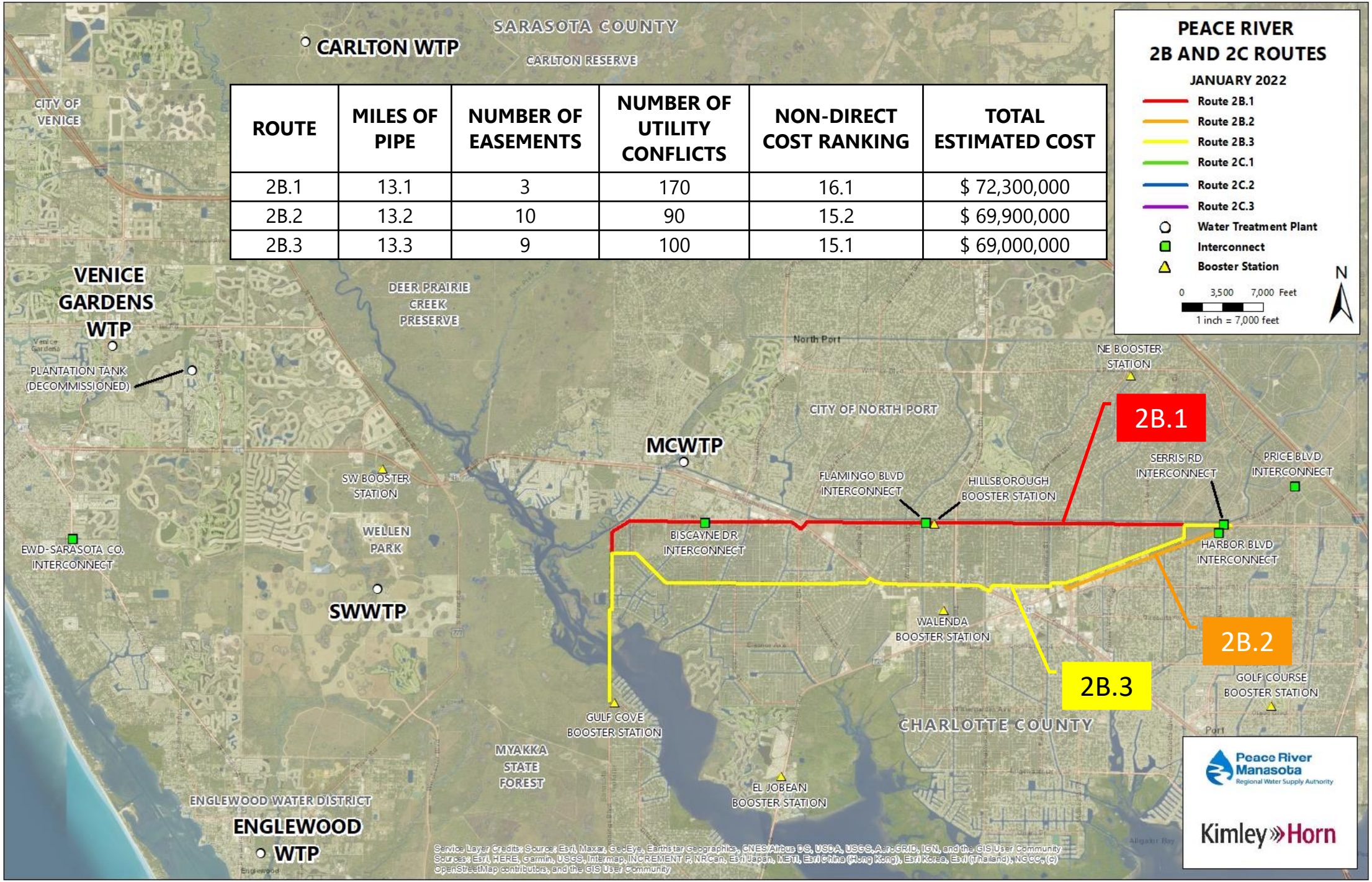
N

Peace River Manasota Regional Water Supply Authority

Kimley»Horn



ROUTE	MILES OF PIPE	NUMBER OF EASEMENTS	TOTAL ESTIMATED COST
2C.1	18.9	18	$ 121,800,000
2C.2	19.2	122	$ 143,000,000
2C.3	21.0	14	$ 146,100,000



ROUTE	MILES OF PIPE	NUMBER OF EASEMENTS	NUMBER OF UTILITY CONFLICTS	NON-DIRECT COST RANKING	TOTAL ESTIMATED COST
2B.1	13.1	3	170	16.1	$ 72,300,000
2B.2	13.2	10	90	15.2	$ 69,900,000
2B.3	13.3	9	100	15.1	$ 69,000,000

PEACE RIVER 2B AND 2C ROUTES

JANUARY 2022

- Route 2B.1
- Route 2B.2
- Route 2B.3
- Route 2C.1
- Route 2C.2
- Route 2C.3
- Water Treatment Plant
- Interconnect
- Booster Station

0 3,500 7,000 Feet

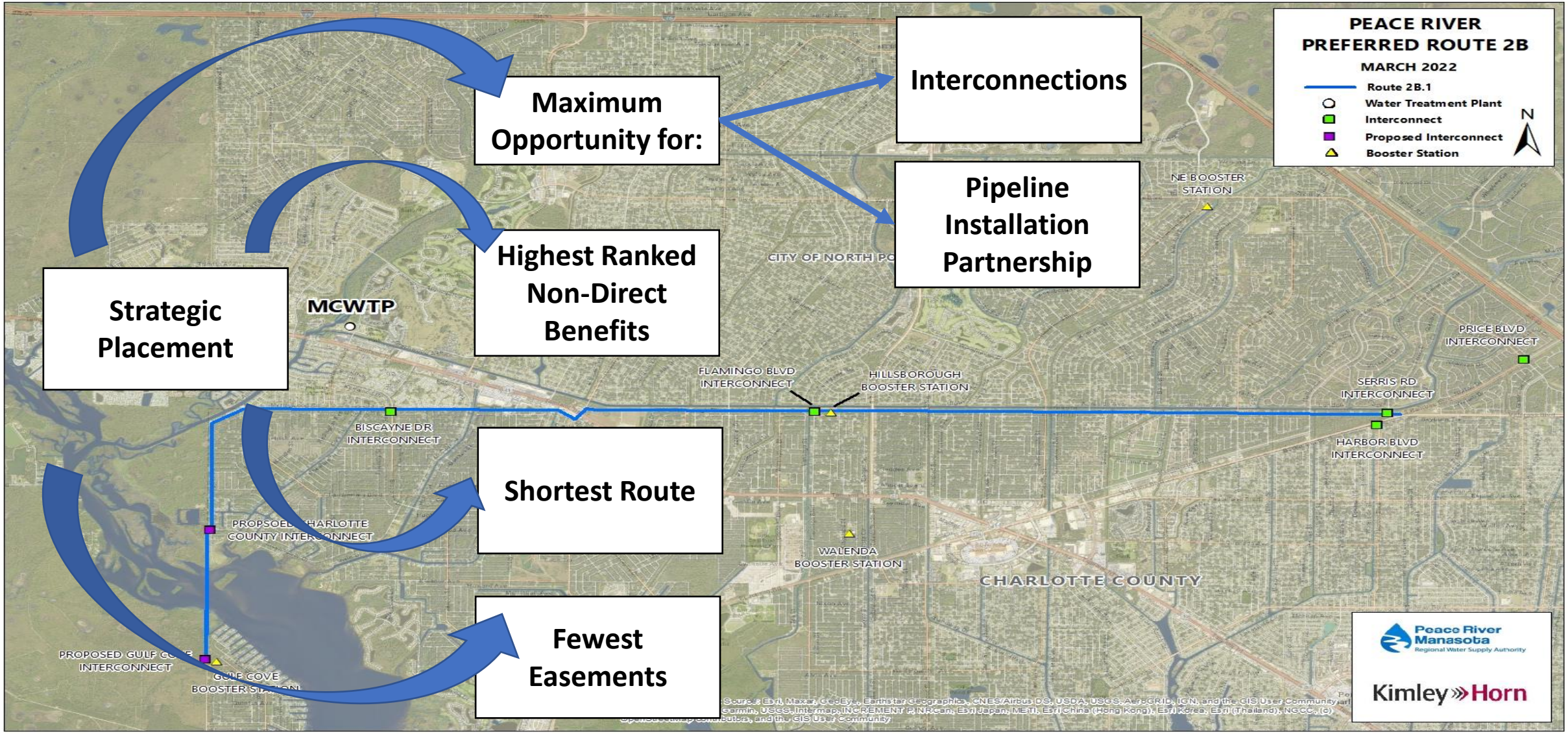
1 inch = 7,000 feet

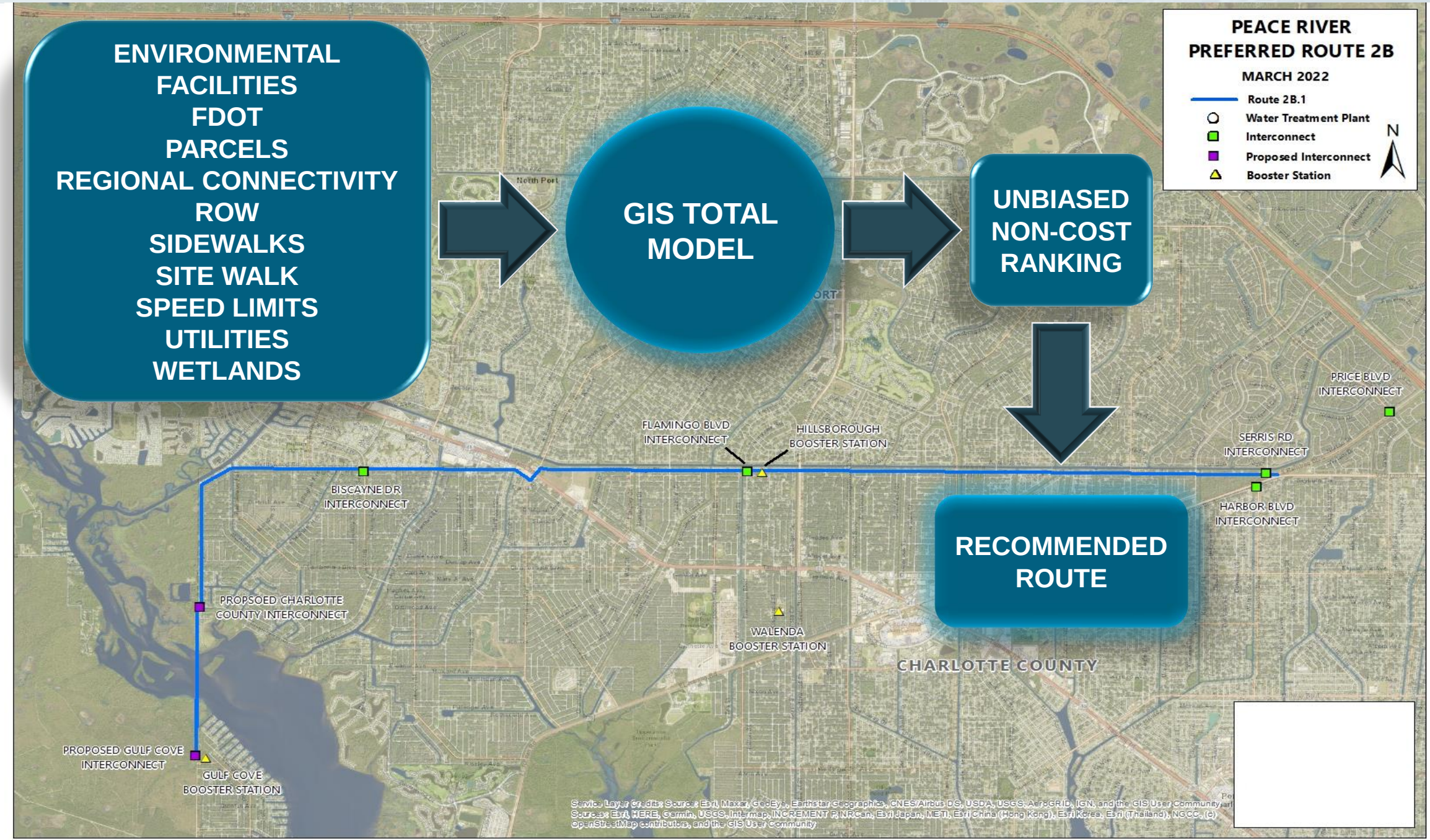
N

Peace River Manasota Regional Water Supply Authority

Kimley»Horn

Recommended Route for Phase 2B Regional Interconnect




ENVIRONMENTAL
FACILITIES
FDOT
PARCELS
REGIONAL CONNECTIVITY
ROW
SIDEWALKS
SITE WALK
SPEED LIMITS
UTILITIES
WETLANDS
GIS TOTAL MODEL
UNBIASED NON-COST RANKING
RECOMMENDED ROUTE
PEACE RIVER PREFERRED ROUTE 2B
MARCH 2022
Route 2B.1
Water Treatment Plant
Interconnect
Proposed Interconnect
Booster Station
N
North Port
FLAMINGO BLVD INTERCONNECT
HILLSBOROUGH BOOSTER STATION
BISCAYNE DR INTERCONNECT
PRICE BLVD INTERCONNECT
SERRIS RD INTERCONNECT
HARBOR BLVD INTERCONNECT
PROPSOED CHARLOTTE COUNTY INTERCONNECT
WALENDA BOOSTER STATION
CHARLOTTE COUNTY
PROPOSED GULF COVE INTERCONNECT
GULF COVE BOOSTER STATION
Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

PEACE RIVER MANASOTA REGIONAL WATER SUPPLY AUTHORITY

PHASE 2B AND 2C PIPELINES FEASIBILITY STUDY

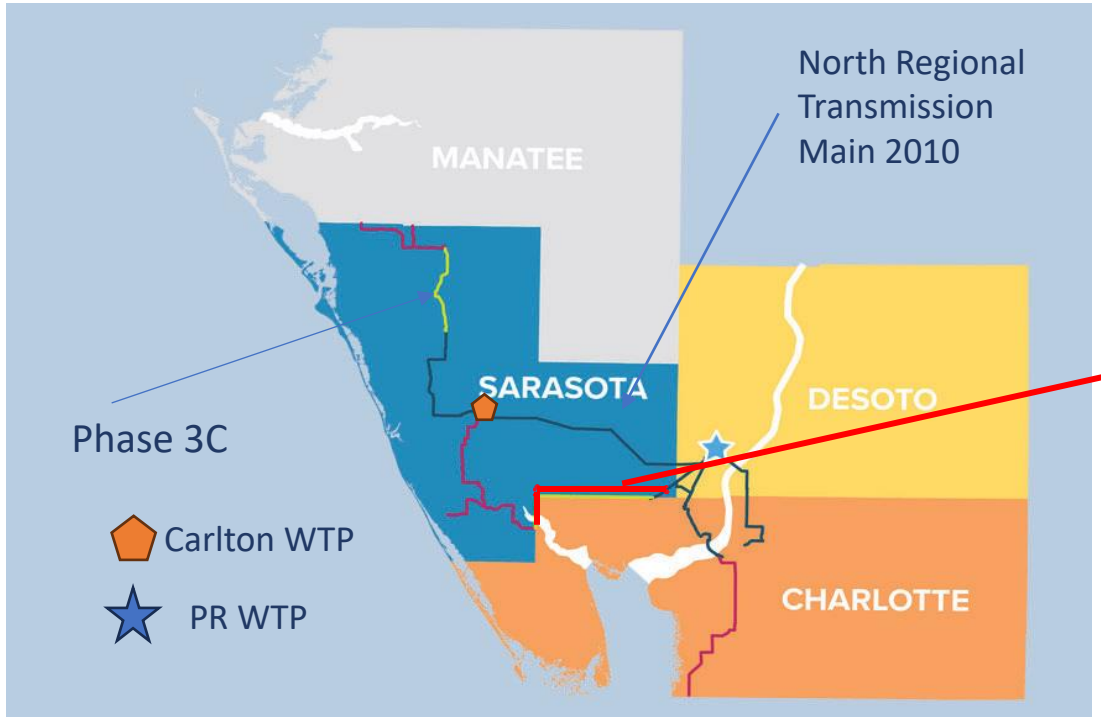
COST COMPARISON: 101-201-104-106-306

ITEM	DESCRIPTION	ESTIMATED QUANTITY						UNIT PRICE	AMOUNT
I . MISCELLANEOUS									
		101	**201**	**104**	**106**	**306**			
2.0	Maintenance of Traffic	1	1	1	1	1	LS		$ -
2.0	Erosion and Sediment Control	1	1	1	1	1	LS		$ -
2.0	Misc. Clean-up, Record drawings and Project Close-out	1	1	1	1	1	LS		$ -
2.0	Clearing and Grubbing	0	1	1	1	1	LS		$ -
2.0	Seeding/Sodding	2,503	18,864	11,953	1,181	6,359	SY	4.00	$ 163,436
								MISC . SUBTOTAL	**$ 164,000**
II. PROPOSED WATER MAIN									
		101	**201**	**104**	**106**	**306**			
2.0	Water Main - Open Cut Installation - 42" DIP	3,755	28,989	17,929	2,002	8,472	LF	450.00	$ 27,516,150
2.0	42" DI Fittings - 45-Degree	4	3	4	2	0	EA	11,773.00	$ 153,049
2.0	42" DI Fittings - 22.5-Degree	0	0	4	0	0	EA	9,717.00	$ 38,868
2.0	42" DI Fittings - 11.25-Degree	0	0	0	0	0	EA	9,276.00	$ -
10.0	Gate Valves - 42" Diameter	1	5	3	0	2	EA	65,000.00	$ 752,757
11.0	6" CAV - Air Valve Assembly	1	10	6	0	3	EA	27,000.00	$ 540,000
3.1	Water Main - Horizontal Directional Drill Installation - Parallel 30" DR-9	0	0	0	0	5,280	LF	900.00	$ 4,752,000
3.0	Water Main - Horizontal Directional Drill Installation - 42" HDPE DR-11	265	3,981	1,085	0	0	LF	800.00	$ 4,264,800
3.0	42" HDPE to DIP Transition Couplings DR-11	2	24	8	0	0	EA	6,500.00	$ 221,000
3.1	42" HDPE to DIP Transition Couplings DR-9	0	0	0	0	2	EA	6,500.00	$ 13,000
4.0	Water Main - Jack and Bore Installation - 42" Steel Casing	0	100	0	0	0	LF	820.82	$ 82,082
5.0	Inspection Vaults for Myakka Crossing	0	0	0	0	2	EA	150,000.00	$ 300,000
15.0	Connection to PRMRWSA Phase 2A	1	0	0	0	0	EA	2,500.00	$ 2,500
16.0	Holding of Florida Power and Light (FPL) Utility Poles	7	16	6	5	0	EA	23,094.46	$ 785,212
								PROPOSED WATER MAIN SUBTOTAL	$ 39,422,000
IV. ROADWAY IMPROVEMENTS									
		101	**201**	**104**	**106**	**306**			
20.0	Rural Road Full Lane Reconstruction	0	0	0	0.05	0.7	MI	596,484.29	$ 446,346
21.0	Rural Road Half Lane Reconstruction	0.7	0	3.6	0	0	MI	423,242.15	$ 1,834,370
22.0	Urban Road Full Lane Reconstruction	0	0	0	0	0	MI	729,027.64	$ -
23.0	Urban Road Half Lane Reconstruction	0	5.5	0	0	0	MI	499,513.82	$ 2,742,501
28.0	Concrete Sidewalk Restoration	0	0	0	0	0	LF	32.40	$ -
29.0	Driveway Restoration	0	462	293	22	0	SY	78.00	$ 60,632
30.0	Concrete Curb and Gutter Restoration	0	0	0	0	0	LF	23.00	$ -
								ROADWAY IMPROVEMENTS SUBTOTAL	$ 5,084,000
VI. UTILITY RELOCATIONS									
		101	**201**	**104**	**106**	**306**			
6.0	Utility Crossings	12	121	14	5	17	EA	50,000.00	$ 8,450,000
								UTILITY RELOCATIONS SUBTOTAL	**$ 8,450,000**
								TOTAL COST FOR COMPARISON	**$ 53,120,000**

Charlotte County Inspection	$ 75,000	$ 75,000
Owner's Allowance	$ 500,000	$ 500,000
Construction Contingency	0%	$ -
Permit Fee Allowance	$ 50,000	
Project Close-out	$ -	$ -
Erosion and Sediment Control	$ 50,000	$ 50,000
Contingency	15%	$ 7,968,000
Maintenance of Traffic	3%	$ 1,593,600
Mobilization	5%	$ 2,656,000
CEI	7%	$ 3,718,400
Design and Permitting	15%	$ 7,968,000
Inflation Contingency	9%	$ 4,780,800
	TOTAL	**$ 82,430,000**

Engineer's OPCC
2/15/22
$82,430,000

Woodruff and
Sons GMP 9/14/23
$81,793,063



Source:
www.regionalwater.org
(notes added)

INTERCONNECT PROJECTS UNDER CONSTRUCTION

PHASE 3C

7.3 miles of 42-inch diameter transmission main to serve Northeast Sarasota County

PHASE 2B

13 miles of 42-inch diameter transmission main to serve Western Charlotte County
Supports future interconnection of the two largest drinking water systems in the region
Interconnects alternative water supplies providing regional connectivity and reliability
Increases resiliency to drought, hurricanes, floods and climate change
Improves drinking water quality to residents.

CURRENT PROJECTS - TOTAL CAPITAL COST

Estimated at $ 157.7 Million

Interconnect Emergency Scenarios (EPS)

Hurricane Ian (Regional Interconnect System Worked)

DeSoto Co
Arcadia
Charlotte Co
North Port

Englewood

ACE23 – (WED25b)
Michael Knowles, P.E.
Heather Ripley, P.E.
June 14,2023
Ontario

Thank you for attending our event today.

AMERICAN ACADEMY OF ENVIRONMENTAL ENGINEERS & SCIENTISTS®

Would you like to attend our next event?
We have several webinars happening in the near future. Go to https://www.aaees.org/events to reserve your spot.

Would you like to watch this event again?
A recording of today's event will be available on our website in a few weeks.

Need a PDH Certificate?
You will be emailed a PDH Certificate for attending this event within the next week.

Questions?
Email Marisa Waterman at mwaterman@aaees.org with any questions you may have.