

WASTEWATER FACILITIES PLAN
for
Martin County Utilities
Golden Gate Estates
In support of the
State Revolving Loan Funding Request

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GWE Project 6291

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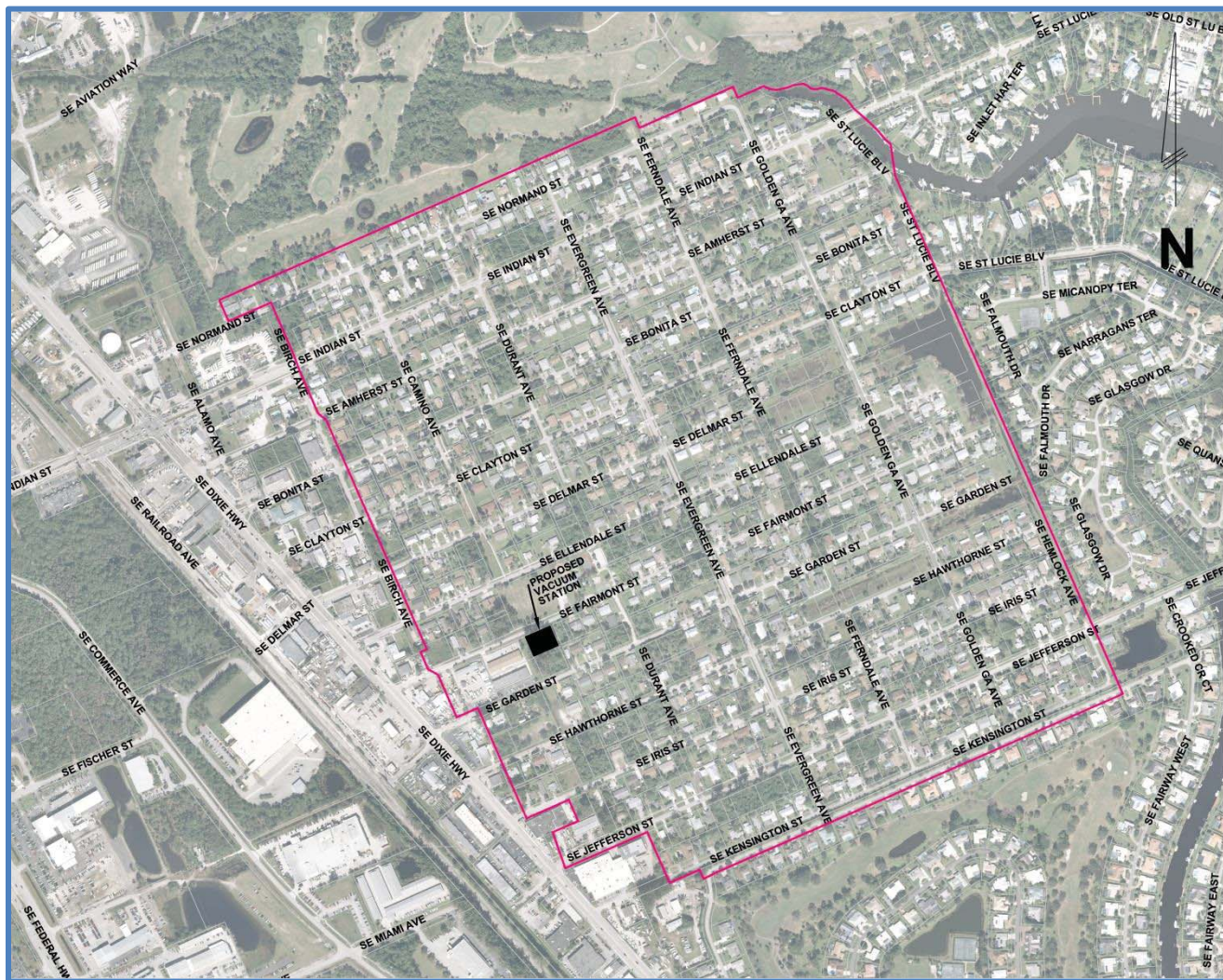
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1.0 SUMMARY OF FINDINGS AND RECOMMENDATIONS

Giffels-Webster Engineers, Inc., (GWE), prepared this facilities plan for Martin County, Florida. The goal is to meet the requirements of the State Revolving Fund (SRF) Clean Water requirements pursuant to section 62-503.700(2) FAC.

This Facilities Planning Document focuses on one area within Martin County, specifically the Golden Gate area that lies within the Martin County Primary Urban Service District. The Golden Gate area is highly developed with existing homes that use on-site septic systems for wastewater disposal.



The Golden Gate Project Area

The need for this project is to eliminate on-site septic systems thus eliminating groundwater pollution.

This Plan consists of evaluating options for the installation of a centralized sewer system that collects sewage from individual homes and transmitting it to an existing County treatment facility. The installation of a central sewer collection system will allow the elimination of on-site septic systems failures in order to protect surface and ground waters, a priority of the Clean Water Act.

After analyzing costs and benefits for three types of collection systems, a Vacuum type collection system, consisting of various sized PVC collection pipes, valve pits and central vacuum collection station, was found to be the best, most cost effective system.

2.0 INTRODUCTION

2.1 Background

Martin County, located on the eastern coast of Florida, provides a comprehensive range of municipal services including central water and sewer utility services for both residential and commercial properties throughout many parts of the county. However, several specific areas do not have a central sewer collection system, and still rely on on-site septic systems for wastewater disposal. Martin County has embarked on an expansion program installing central sewer to many areas formerly served by septic. Golden Gate is one of a larger group of 24 communities that have been identified as part of a septic tank elimination program.

2.2 Need

A re-development plan, adopted in 2002 and revised in 2009, called for a strong need for central sewers in the Golden Gate area. In addition, a countywide Septic Elimination Study by CAPTEC in February of 2015 listed Golden Gate as a high priority for central sewer installation. Moreover, elevated bacteria levels from the St. Lucie River and Estuary prompted the Martin County Health Department to post health advisories. The combination of consistently elevated counts of fecal coliform bacteria, the presence of the human marker, suggests inadequately treated human waste water sources may be present.

Although on-site septic systems can partially treat wastewater, if installed properly using current codes, they can be problematic if they are older, installed too close to the groundwater table or concentrated on relatively small lots. Accordingly, the goals and needs for this community are to eliminate older on-site septic systems where feasible in order to minimize environmental concerns.

2.3 Scope of Study

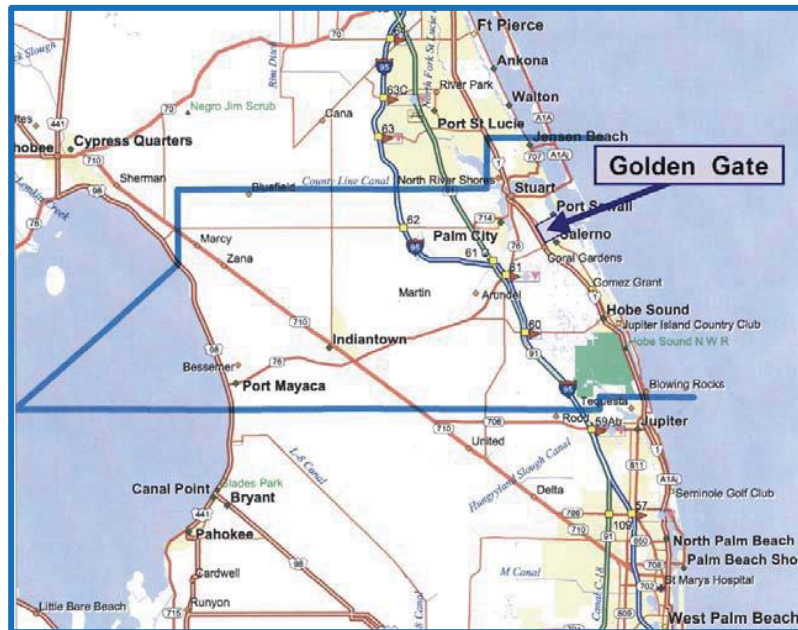
The scope of the Wastewater Facilities Plan is described below:

- Identify the boundaries of the service area
- Define alternate methods of wastewater collection systems
- Develop cost estimates for the alternate systems
- Recommend the most cost effective system that meets the needs
- Describe the recommended infrastructure

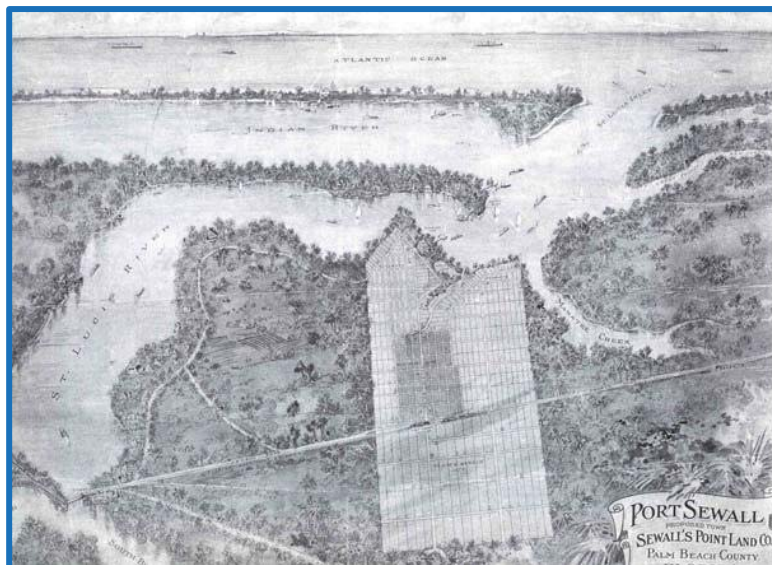
3.0 EXISTING CONDITIONS/ENVIRONMENTAL REVIEW

3.1 Description of Planning Area

The Golden Gate area was initially platted in 1911 as part of the Port Sewall subdivision. It was platted again in 1925 to create a subdivision for residential and business use. There was little development until the 1950's through the 1970's, with the dominant building type being residential, consisting of a mix of single family, duplex, triplex and quadraplex. In 1996, a municipal central water system was installed; however, the properties still utilize on-site septic systems for wastewater disposal.



Location of Golden Gate in Martin County



Original Golden Gate Development as part of the Port Sewall development

3.1.1 Planning Area

The planning and service area of Golden Gate Estates of Martin County is bordered by S.W. Dixie Highway to the west, Normand Street to the north, S.E. Kensington Street to the south and St. Lucie Boulevard to the east.

There are a total of 775 parcels within the planning area.



3.1.2 Climate

The Martin County area is humid with mild winters and long summers. The average temperature is 75 degrees F. with an average annual high and low of 82.5 and 66.8 degrees, respectively.

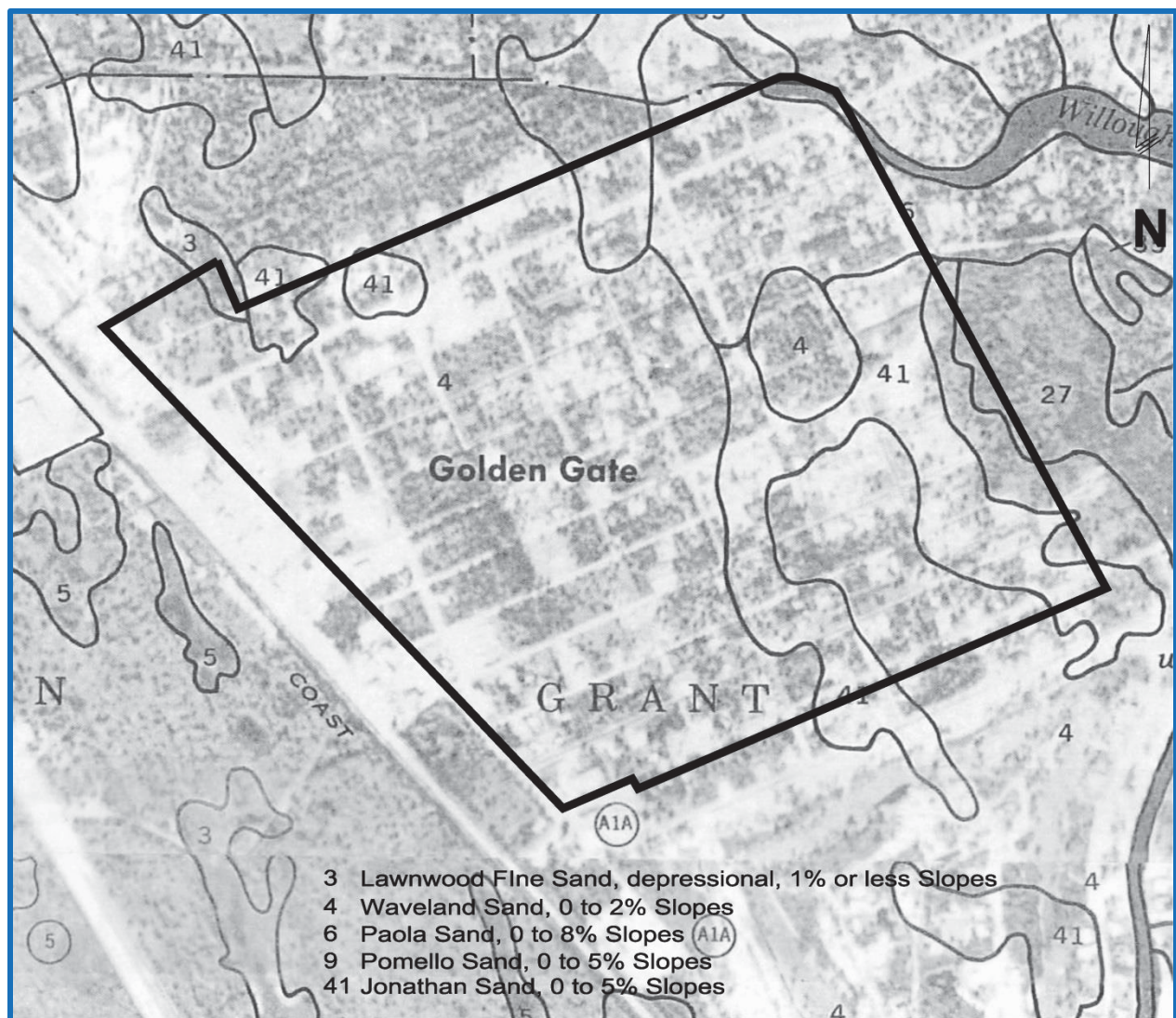
The average annual rainfall is approximately 64 inches. Rainfall is seasonally distributed. Nearly half of the average annual precipitation falls during the months of June through September. Most rainfall in summer comes as thunderstorms of short duration during the afternoon and early evening hours.

3.1.3 Topography and Drainage

The geography of the service areas can be described as having a mild topographic change generally sloping and draining from the west to the east. Elevations range from elevation 5 feet NGVD in the eastern portion to elevation 20 NGVD along the S.W. Dixie Highway. Change in elevation is consistent with most regions in the southerly regions of Florida.

3.1.4 Geology, Soils and Physiography

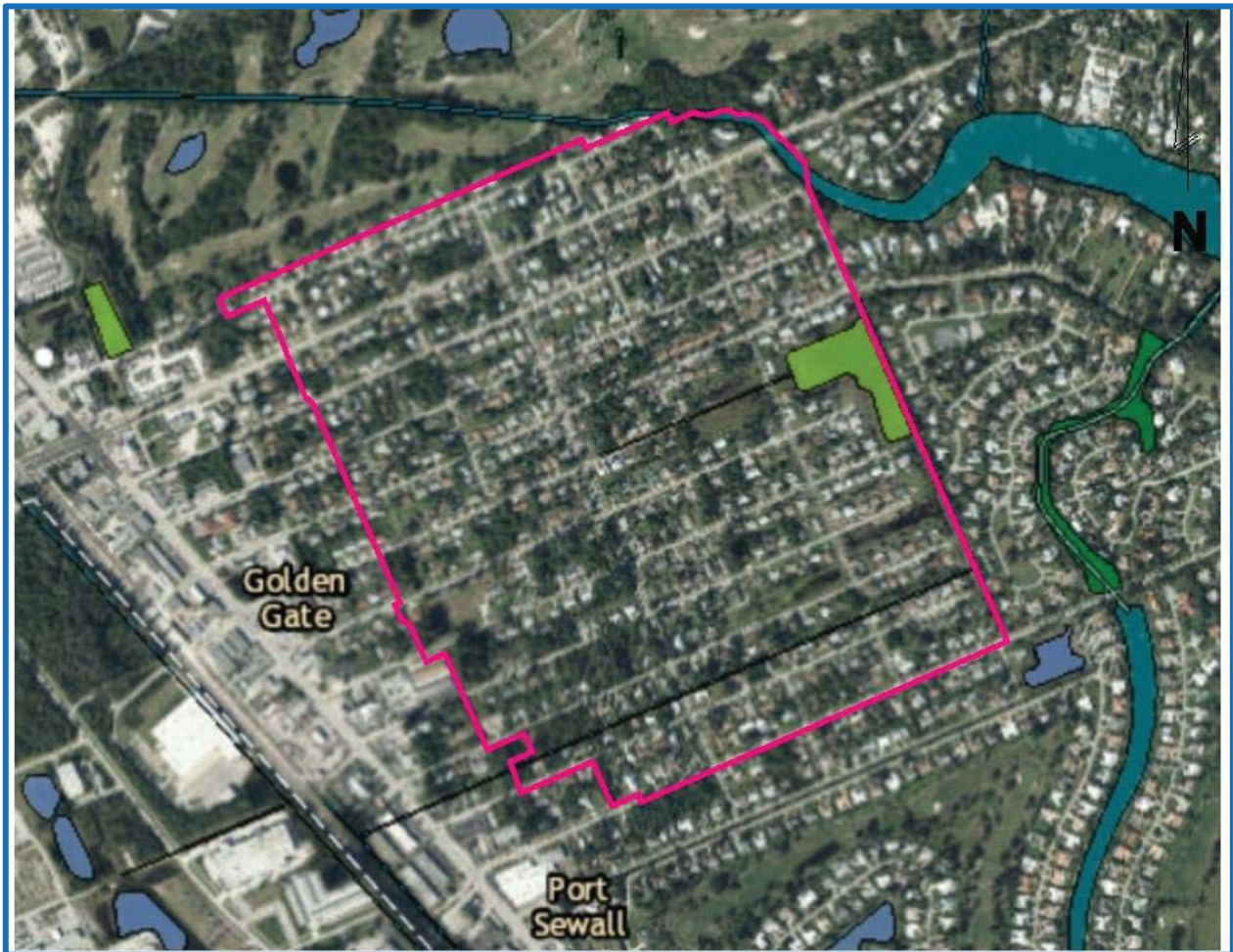
The predominant soils within the Golden Gate consist of Waveland Sands, Lawnwood Fine Sands (Type B/D), Jonathan Sand and Paola (Type A) Sand. Paola sand is a well-drained soil with fast permeability and Jonathan is a moderately well drained soil. Waveland is a poorly drained soil with a seasonal high water table of less than one foot below the surface.



3.1.5 Environmentally Sensitive Areas and Features

3.1.5.1 Wetlands

Based on the National Wetlands Inventory for the project area, there is a potential of one wetland area within or adjacent to the project. Specifically, it is identified as PEM 1 FD, a 4-acre site. Both areas are indicated on the below mapping.



However, the areas that are proposed to be serviced with sewer collection systems are located in previously disturbed road systems and developed areas of single and multifamily properties. All pipe networks will be installed in County Right-of-Way or within easements. No pipeline or improvements will be affecting the known wetlands identified.

3.1.5.2 Plant and Animal Communities (Endangered Species)

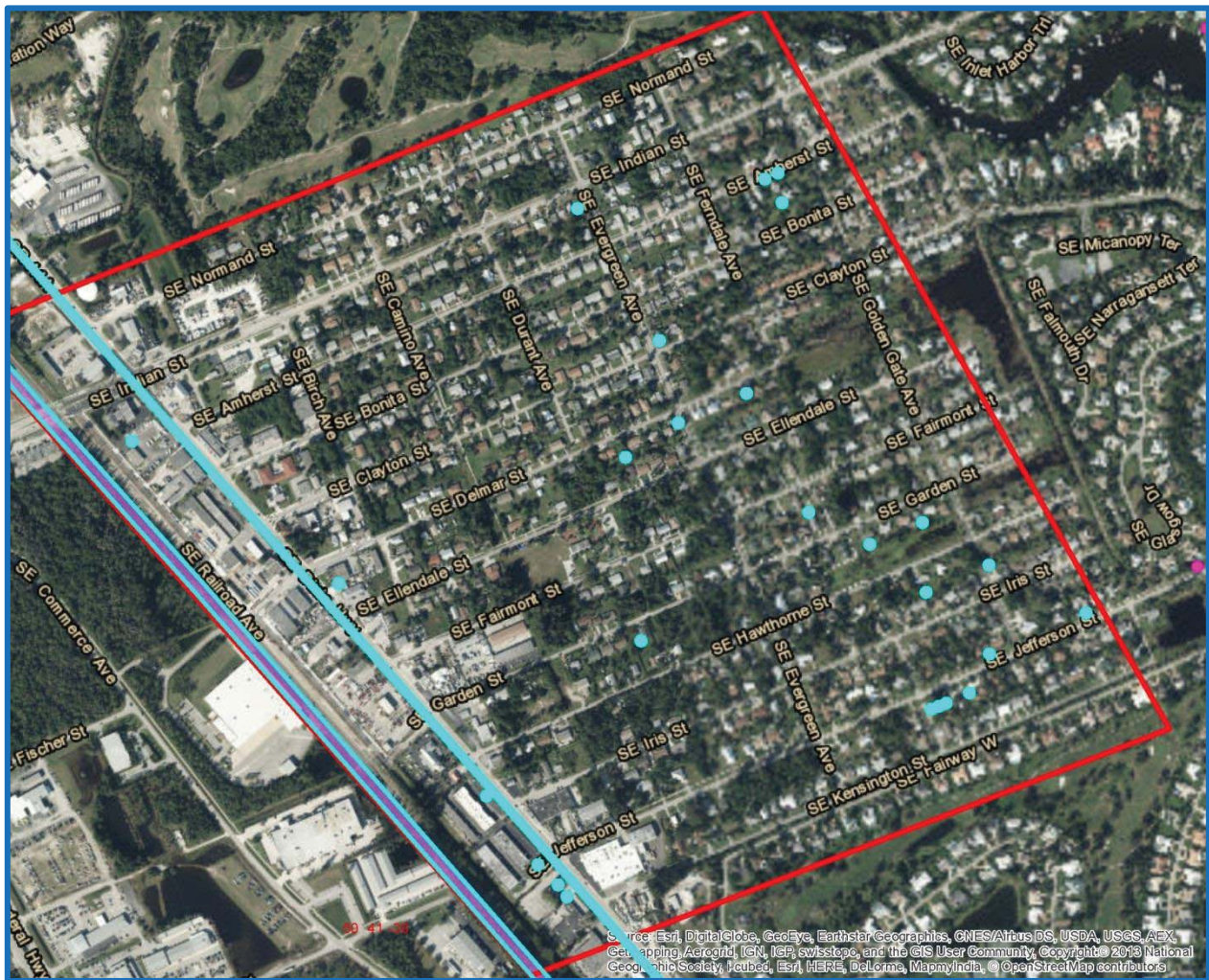
Contact was made using the website of the U.S. Fish & Wildlife Service to determine the listing of endangered or threatened plant and animal communities in the vicinity of Martin County. Based upon the query targeting the specific Golden Gate boundary according to the website *“there are no critical habitats at this location”*.

3.1.5.3 Archeological and Historic Sites

There are several older structures that have been identified within the project boundary. Contact was made with Florida Master Site file and the following cultural roster developed.

		AR=0 SS=26 CM=0 RG=2 BR=0 Total=28	Created: 12/16/2016 Cultural Resource Roster			
SiteID	Type	Site Name	Address	Additional Info	SHPO Eval	NR Status
MT00401	SS	3109 AMHERST STREET	3109 AMHERST ST, STUART	c1930 Frame Vernacular		
MT00402	SS	3089 SE AMHERST STREET	3089 SE AMHERST ST, GOLDEN GATE/PORT SEWALL	c1926 Mediterranean Revival		
MT00403	SS	3100 SE AMHERST STREET	3100 SE AMHERST ST, GOLDEN GATE/PORT SEWALL	c1926 Mediterranean Revival		
MT00404	SS	EVERGREEN & CLAYTON	EVERGREEN & CLAYTON, STUART	c1920 Mixed, none dominant		
MT00405	SS	3231 SE DIXIE HIGHWAY	3231 SE DIXIE HWY, GOLDEN GATE/PORT SEWALL	1925 Mission		
MT00406	SS	3022 DELMAR STREET	3022 DELMAR ST, STUART	c1918 Frame Vernacular		
MT00407	SS	303 ELLENDALE STREET	303 ELLENDALE ST, STUART	c1920 Mission		
MT00408	SS	3036 FAIRMONT STREET	3036 FAIRMONT ST, STUART	c1918 Frame Vernacular		
MT00409	SS	3126 SE GARDEN STREET	3126 SE GARDEN ST, GOLDEN GATE/PORT SEWALL	c1926 Mediterranean Revival		
MT00410	SS	3256 SE GARDEN STREET	3256 SE GARDEN ST, GOLDEN GATE/PORT SEWALL	c1926 Mediterranean Revival		
MT00411	SS	2796 SE GARDEN STREET	2796 SE GARDEN ST, GOLDEN GATE/PORT SEWALL	c1935 Colonial Revival		
MT00412	SS	3172 SE HAWTHORNE STREET	3172 SE HAWTHORNE ST, GOLDEN GATE/PORT SEWALL	c1926 Mediterranean Revival		
MT00413	SS	3302 SE HAWTHORNE STREET	3302 SE HAWTHORNE ST, GOLDEN GATE/PORT SEWALL	c1926 Frame Vernacular		
MT00414	SS	2984 SE JEFFERSON STREET	2984 SE JEFFERSON ST, GOLDEN GATE/PORT SEWALL	c1925 Mediterranean Revival		
MT00415	SS	2994 JEFFERSON STREET	2994 JEFFERSON ST, STUART	c1940 Mediterranean Revival		
MT00416	SS	3034 SE JEFFERSON STREET	3034 SE JEFFERSON ST, GOLDEN GATE/PORT SEWALL	c1926 Mediterranean Revival		
MT00417	SS	3073 JEFFERSON STREET	3073 JEFFERSON ST, STUART	c1925 No style		
MT00421	SS	3590 DIXIE HIGHWAY	3590 DIXIE HWY, STUART	-RESOURCE DESTROYED- c1940 Frame Vernacular		
MT00422	SS	3574 OLD DIXIE HIGHWAY	3574 OLD DIXIE HWY, STUART	c1925 Frame Vernacular		
MT01068	SS	3141 SE RAILROAD AVENUE	3141 SE RAILROAD AVE, GOLDEN GATE/ PORT SEWALL	c1930 Frame Vernacular		
MT01069	SS	3576 SE DIXIE HIGHWAY	3576 SE DIXIE HWY, GOLDEN GATE/PORT SEWALL	c1926 Frame Vernacular		
MT01070	SS	3590 SE DIXIE HIGHWAY	3590 SE DIXIE HWY, GOLDEN GATE/PORT SEWALL	c1926 Frame Vernacular		
MT01071	SS	3004 SE JEFFERSON STREET	3004 SE JEFFERSON ST, GOLDEN GATE/PORT SEWALL	c1926 Mediterranean Revival		
MT01072	SS	3193 SE JEFFERSON STREET	3193 SE JEFFERSON ST, GOLDEN GATE/PORT SEWALL	c1926 Mediterranean Revival		
MT01073	SS	2844 SE INDIAN STREET	2844 SE INDIAN ST, GOLDEN GATE/PORT SEWALL	c1940 Frame Vernacular		
MT01074	SS	2965 SE EVERGREEN AVENUE	2965 SE EVERGREEN AVE, GOLDEN GATE/PORT SEWALL	c1926 Mediterranean Revival		
MT01450	RG	FEC Railroad	Stuart	Linear Resource	Eligible	
MT01621	RG	Dixie Highway	Stuart, Salerno, Hobe Sound	Linear Resource - 1 Contrib Resources	Eligible	

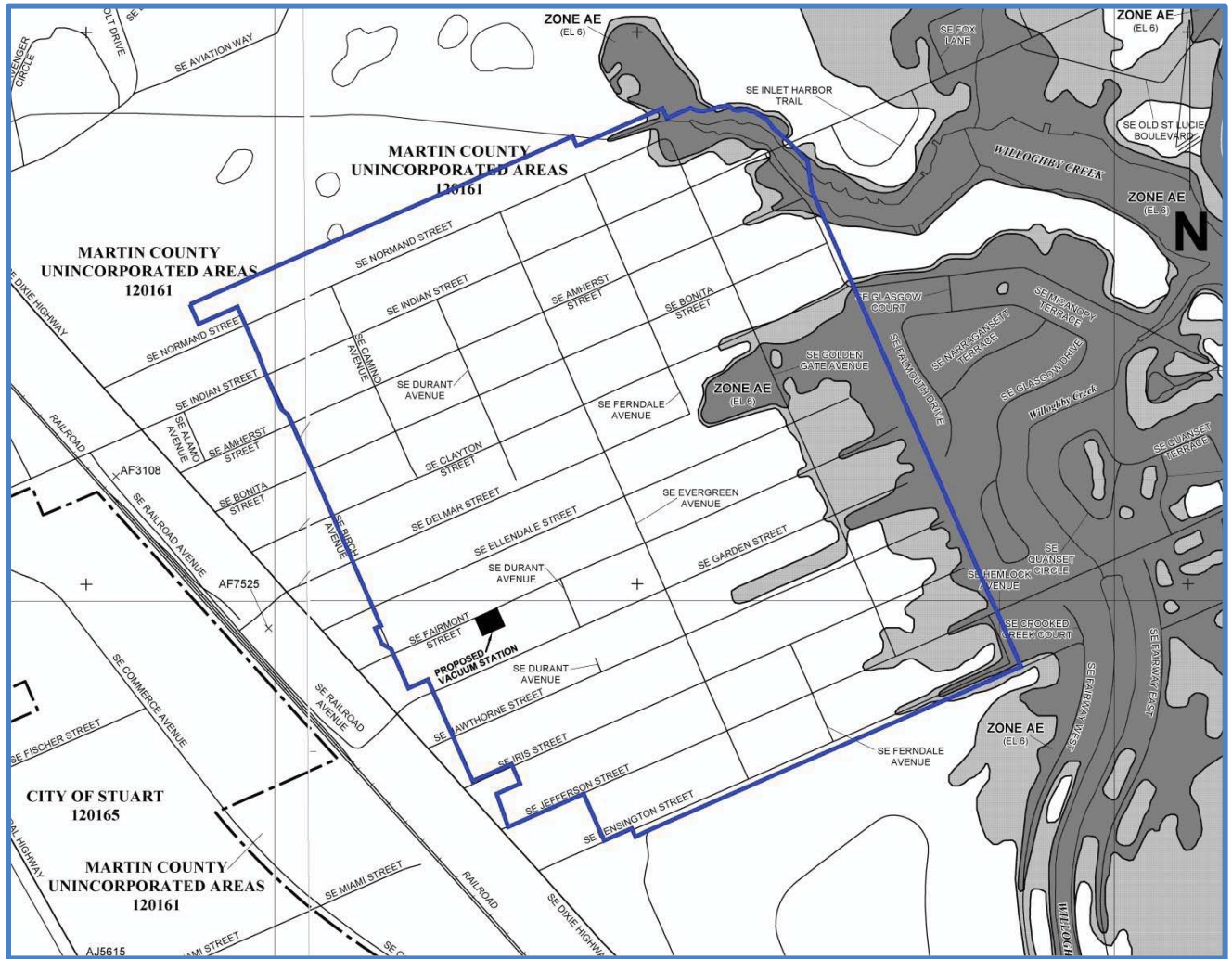
The location of the sites for the Culture Resource Roster are indicated in blue on the map below.



However, this is a public sewer infrastructure that will be installed within disturbed county owned right-of-ways and will not affect individual private property nor on-site structures. Accordingly, no known archeological and/or historical sites will be disturbed as part of this sewer installation.

3.1.6 Flood Plain

The vast majority of the project area lies well outside of any special 100 year flood prone areas. A portion of the southeast area lies in FEMA Zone X, or Zone AE where the 100-year flood are anticipated to have water depths of less than one foot. This project, being a pipeline project, is not anticipated to have any net filling or any significant impact on the flood Plain. The vacuum station will be located well above the FEMA 100-year flood elevation.



Excerpt from FEMA Flood Mapping

3.1.7 Air Quality

There are no known major sources of air pollution within the project boundary. The air quality in Martin County is generally good and according to FAC Chapter 62-204.340 is classified as an area of attainment with respect to the National Ambient Air Quality Standards. The proposed projects will have no significant impact on the existing ambient air quality.

3.2 Socio-Economic Conditions

3.2.1 Population

The estimated population that will be served with the Golden Gate project is 1705 total capita. The area is near full build out.

3.2.2 Land Use and Development

Land use in the proposed service areas includes residential housing (single and multifamily) and public use land. There are currently no commercial users or other high demand sources. Significant future growth in residences is not anticipated.



Typical Duplex home



Golden Gate Avenue – Typical residential street in the area

4.0 DEVELOPMENT OF ALTERNATIVES

4.1 General

A comprehensive Septic Elimination Report was prepared by CAPTEC in Feb 2015 for the primary un-sewered areas within Martin County, including this Golden Gate Area. Three types of collection systems were analyzed for each area to determine the most cost effective option for Martin County, namely a conventional gravity system, a low pressure system or a vacuum type collection system.

4.2 Cost-Effectiveness

Preliminary Cost estimates for all three types of collection systems were developed by CAPTEC and contained in the appendix to this report. The cost estimated has been updated to account for cost impacts that have taken place since the development of that report in 2015

4.3 Wastewater Collection System Options

4.3.1 Vacuum Collection System

Vacuum collection systems rely on a central station providing energy (vacuum) to the collection network pulling all flow to a central station and conveying the sewage once collected to a treatment plant.

4.3.2 Advantages and Disadvantages

Advantages: Vacuum collection systems are advantageous in highly developed areas with high groundwater or rock. Collection lines can be installed within the grass R-O-W eliminating the need for a total road reconstruction. Additionally, they can be installed at minimal depths, generally from 3 to 6 feet in depth, minimizing dewatering during construction. Since velocities within the pipes will be much higher than a gravity system, the collection pipe size can be reduced. A vacuum station can serve up to 2,000 homes, replacing multiple gravity lift stations. With one central station, there is no need for electrical connections or individual pumps at each home. Moreover, only one large generator is needed to run the entire station during a storm event rather than multiple generators. The operation and maintenance is relatively clean because it's a sealed airtight system and the operators do not need to enter manholes or wet wells to maintain the system operation. In the event of a leak, sewage is pulled into the system rather than pushed out, making spills virtually nonexistent on the collection side of the system.

Disadvantages: Vacuum systems are not cost competitive for small areas (less than 250 connections) primarily because of the cost of the central station. Operation and maintenance is higher than gravity systems because energy is needed to pull the sewage to the central station rather than relying on gravity. Pipe grades and tolerances are critical during the installation process.

4.3.3 Low Pressure Collection System

Low pressure systems consist of relatively small diameter pipes within the road network, and individual pumping units at each home or parcel to convey the sewage to a central station. Generally, the low pressure units cannot overcome the higher pressures in a transmission network and therefore an intermediate pump station is necessary.

4.3.4 Advantages and Disadvantages

Advantages: Low pressure systems are the least expensive to install in the right-of-way because pipes can be smaller in diameter than gravity and grades are not as critical as vacuum or gravity.

Disadvantages: Low pressure sewer systems require the installation of a pump at each parcel of property. Each pump should have a backup generator. Moreover, the operation and maintenance of each individual pump is considerably more than one central pump station with only a few larger pumps.

4.3.5 Gravity Collection System

Gravity collection systems generally consist of larger diameter pipes installed at a specific minimum slope between manholes spaced a maximum of about 400 feet. Depths range from about 3 feet to 12 feet of cover. Sewage flows through the pipe network eventually to a pump station with submersible duplex pumps installed to collect and convey the sewage to a treatment plant.

4.3.6 Advantages and Disadvantages

Advantages: Gravity sewers do not require individual pumps at each parcel nor do they require vacuum assistance to convey flow. Since gravity drives the flow, they are the most efficient with regard to electrical costs for sewage transport. They are most advantageous in new subdivisions or where the roads are scheduled to be reconstructed after installation of the pipe system.

Disadvantages: Due to the depths of installation, generally the entire road network is excavated requiring the entire reconstruction of the existing roads. Dewatering is needed in areas with high ground water tables and accordingly construction is more disruptive. In addition, because gravity flows are of lesser velocity than vacuum or LPS, pipe sizes are larger to convey equivalent flows. Due to the need for road reconstruction in developed neighborhoods, the larger diameter pipes, and the need to dewater more, the cost to install a gravity sewer system is considerably more expensive than LPS or vacuum.

4.4 Summary of Costs and Present Worth (collection system only)

CAPTEC prepared a cost estimate using 2015 prices for each of the three types of systems, to determine which system would be the most cost effective. A summary of the cost to construct each type system and its present worth, based on a 4.6% discount rate, and a 40-year time frame was prepared. However, since those estimates were prepared, the requirements for road restoration has significantly increased as well as costs for other restoration items. Moreover those initial estimates didn't include account for cost increases for permits, PVC pipe costs, record drawing GIS requirements, and maintenance of traffic among other general construction cost increase. Since all these items generally apply to all three systems, an adjustment factor to account for the 2019 pricing has been applied across the board, summarized in the following table. Note that the hierarchy of system type has not changed. Vacuum Sewer is the most cost effective for the Golden Gate area.

System Type	Construction cost (CAPTEC)	Escalation factor	2019 Construction Cost	legal, engr., survey	const services/ contingency (20%)	total initial cost "C"	Annual O&M	O&M Uniform series Present worth factor	USPW (O+M)	Salvage Value	SPPW(S)	Salvage value	NET PRESENT VALUE
Gravity	\$ 12,043,517.00	1.65	\$ 19,871,803.05	\$ 1,204,352.00	\$ 3,974,360.61	\$ 25,050,515.66	\$ 55,025.00	18.0778	\$ 994,732.04	\$ 695,980.40	0.1639	\$ 114,071.77	\$ 25,931,175.93
Vacuum	\$ 7,376,279.00	1.65	\$ 12,170,860.35	\$ 737,628.00	\$ 2,434,172.07	\$ 15,342,660.42	\$ 60,450.00	18.0778	\$ 1,092,804.21	\$ 297,190.00	0.1639	\$ 48,709.69	\$ 16,386,754.94
Low Pressure	\$ 9,712,049.00	1.65	\$ 16,024,880.85	\$ 917,205.00	\$ 3,204,976.17	\$ 20,147,062.02	\$ 172,050.00	18.0778	\$ 3,110,288.90	\$ 221,099.60	0.1639	\$ 36,238.41	\$ 23,221,112.51

Additional financial information is contained in Appendix A and B of this report.

5.0 OFFSITE FORCE MAIN

The existing force main network within the area does not have the capacity to convey the additional flows, regardless of which type of collection system is selected. To make the project feasible, upgrades to the existing force main network consisting of 12" and 16" mains will be necessary.

12" Mains

Two 12" mains will be required from the proposed vacuum station to the existing Dixie Park Booster station.

- Approximately 2400 L.F. of 12" force main from the proposed collection station to and existing Lift Station 160.
- Approximately 18,000 of 12" force main from L.S. 121 to the Dixie Park inline booster station
- Misc. adjustments and connections will be necessary.

An alternate route analysis for the proposed 12" offsite force main was considered using the following routing options:

Option 1

- Installation of a 12-inch force main beginning at the Golden Gate lift station located near SE Garden St flowing south and then west across the FEC railroad, then travelling south along SE Commerce Ave, west along SE Salerno rd., south along SE Ebttide Ave, east along SE Murray St., and then finally south along SE Inez ave before finally connecting to the upstream section of the Dixie Park inline booster pump station. This alternative was not selected due to the cost and installation difficulties associated with crossing the FEC railroad. In addition, this alternative is a less direct route along SE Commerce Ave than other alternatives considered increasing the cost of construction.

Option 2

- Installation of a 12-inch force main beginning at the Golden Gate lift station located near SE Garden St flowing south and then west across the FEC railroad, then travelling south along SE Commerce Ave, south along SE Railway Ave, south along SE Inez Ave before finally connecting to the upstream section of the Dixie Park inline booster pump station. This alternative was not selected due to the cost and installation difficulties associated with crossing the FEC railroad.

Option 3

- Installation of a 12-inch force main beginning at the Golden Gate lift station located near SE Garden St flowing south and connecting downstream of LS-160. Installation of another 12-inch force main that begins downstream of LS-121 and runs west along SE Pomeroy St., south along SE Willoughby Blvd. to connect to the existing 12-inch force main along SE Cove rd. downstream of the Dixie Park inline booster pump station. This alternative was not selected due to the high pressures seen on the existing 12-inch force main downstream of the Dixie Park inline booster pump station which would require upgrades of several lift stations upstream of the Dixie Park inline booster pump station if the connection was made.

Option 4

- Installation of a 12-inch force main beginning at the Golden Gate lift station located near SE Garden St. flowing south and connecting downstream of LS-160. Installation of another 12-inch force main that begins downstream of LS-121 south along SE Commerce Ave, through a network of local streets avoiding major conflicts (see exhibit) before finally connecting to the upstream section of the Dixie Park inline booster pump station.

This option 4 route *was selected* because it hand the least conflicts and therefore deemed the most efficient route to connect Golden Gate upstream of the Dixie Park inline booster pump station while also avoiding the costs, permitting, and installation difficulties associated with crossing the FEC railroad.

16" Force Mains

Two segments of 16" main are also needed downstream from the Dixie Park Booster station in order to convey the additional flows anticipated from the Golden Gate collection area.

The downstream 16" routes are:

- From Dixie Park Booster station through a network of residential streets to the intersection of to the intersection of S.E. Federal Highway for a total length of approximately 3600 l.f.
- A parallel 16" main along S.E. Cove Road from Kanner to SE Atlantic Ridge Drive for an approximate distance of 6000 feet.

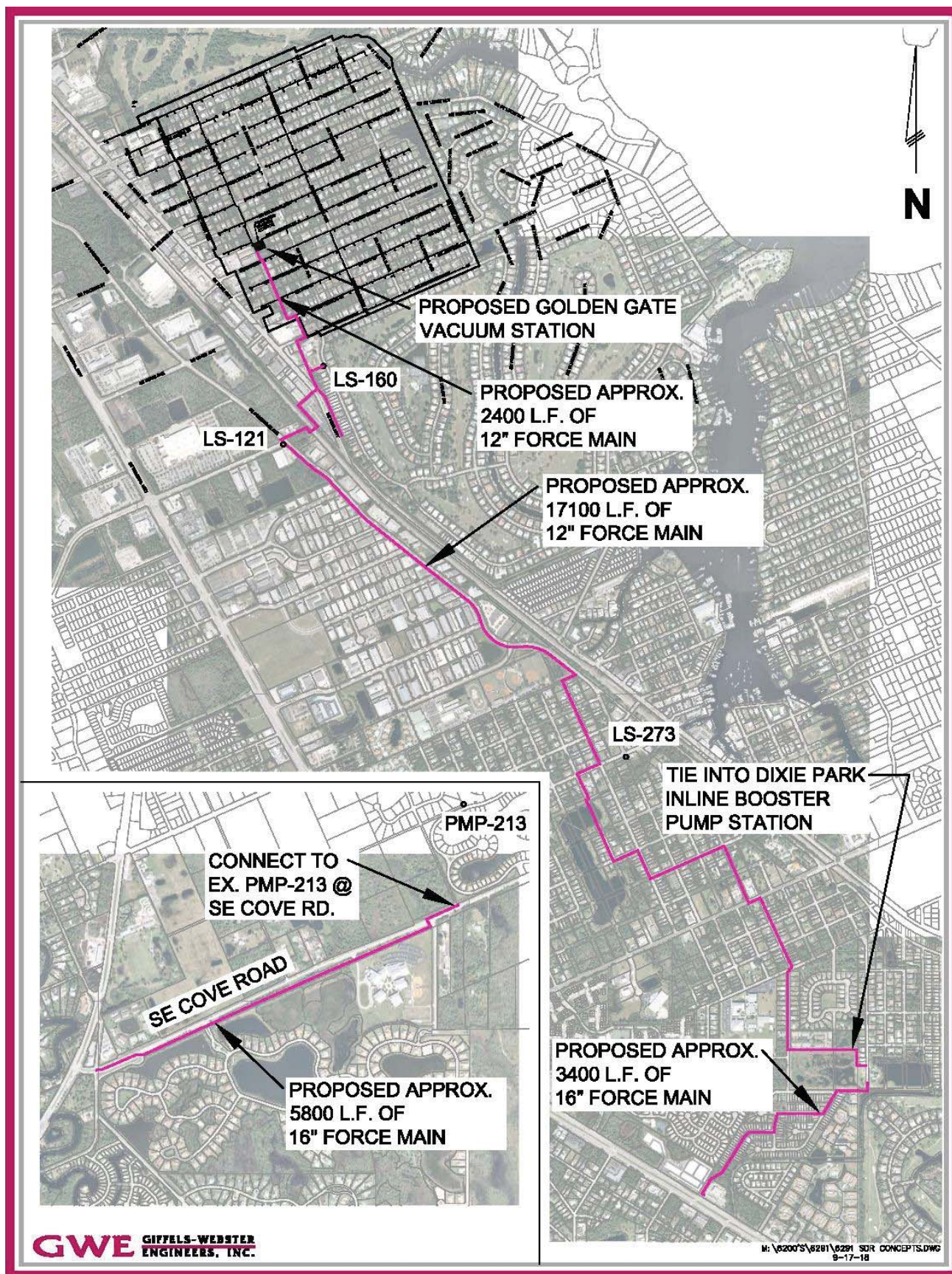
There are no viable alternates for either of these proposed 16" routes.

A hydraulic analysis was conducted to size and locate the necessary mains and is included in appendix F.

5.1 The selected force main route

The force main route for 12" segments (option 4) is proposed along existing developed streets as indicated on the following exhibit and there are no anticipated environmental or historic issues.

Similarly, the routing for the 16" mains are along existing highly developed streets and no environmental issues are anticipated.



5.2 Force main estimated cost

Cost estimates have been prepared for each for each primary segment of the offsite force main summarized as follows.

Offsite Force Main Segment	Engineer's Estimate of Probable Cost
12-Inch Force Main Golden Gate to Dixie Park	\$3,186,000
16-Inch Parallel Force Main Downstream of Dixie Park	\$868,000
16-Inch Parallel Force Main along Cove Rd – Kanner to SE Atlantic Dr	\$1,196,000
Total Cost	\$5,250,000

Additional backup regarding the force main are included in **Appendix F**.

6.0 THE SELECTED PLAN

Based on overall long-term cost to implement the selected plan, is a vacuum type collection system that has been deemed the most efficient type of collection system for the Golden Gate area. The selected route for the 12" force main is option four.

6.1 Description of Proposed Facilities

The vacuum system consists of 4, 6 and 8-inch diameter PVC pipe network with vacuum valve pits and one central pump station to collect all sewage from properties within the Golden Gate area. An offsite force main consisting of primarily 12" and 16" PVC / HDPE force main along local streets is necessary.

6.2 Environmental Impacts of Proposed Facilities

There are no known negative environmental impacts for the collection facility or the selected force main route.

6.3 Cost to Construct Facilities

The estimated construction cost to construct the vacuum collection system is \$12,171,000.00 and the cost for the force main is approximately \$5,250,000 million for a total estimated construction cost of \$17,421,000

7.0 IMPLEMENTATION AND COMPLIANCE

7.1 Public Hearing/Dedicated Revenue Hearing

The 2015 Captec report prioritizing the Golden Gate Septic to Sewer project was presented and approved by the Martin County Board of County Commissioner in 2015. An additional public meeting will be held in October of 2019 to present the Facilities Plan to the residents. This meeting will be advertised in accordance with Martin County Public Meeting requirements.

7.2 Regulatory Agency Review

To qualify for a grant and/or subsidized loan from the SRF, various governmental agencies must be satisfied with the way that Martin County's septic system problems are to be solved. Copies of the Plan adopted by Martin County are to be sent to the following government agencies for review and comments.

1. Florida Department of Environmental Protection
2. Florida State Clearing House

7.3 Financial Planning

The Florida Department of Environmental Protection, State Revolving Fund is expecting to be a financing source for the project. A Business Plan has been prepared to explain to the public what the financial impact on the users of the sewer system will be. The Business Plan is shown in **Appendix D**. It indicates that the utility will serve 775 connections/parcels consisting of a mix of single and multifamily residences who pay the annual cost. A user rate ordinance showing the charges to be paid by each user is shown in **Appendix E**.

7.4 Implementation

Martin County will have the responsibility and authority to implement the recommended facilities.

7.5 Implementation Schedule Items

1. Hold public hearings on Facilities Plan and Business Plan.
2. Submit Facilities Plan to FDEP and other governmental agencies.
3. Publication of the Department's environmental information document in the Florida Administrative Weekly.
4. At the end of 30-day comment period for the environmental information document and approval of planning documents, submit plans and specifications to the FDEP and submit construction permit application to the FDEP.
5. Notice of Intent to Permit Construction of Project issued and project added to the priority list.
6. Submit request for addition of the project to the FDEP's project priority list.
7. Hearing to add the project to the fundable portion of the priority list.
8. Sign SRF loan agreement.

9. Advertise for bids.
10. Open construction bids.
11. Award contracts
12. Start project construction.
13. Complete construction of project and certify completion.
14. Begin SRF loan repayments to the FDEP.
15. Certify operational performance of the project and close out project.

7.6 Compliance

- The collection system will be designed in compliance with regulatory requirements set forth in Chapter 62-604 F.A.C.
- The environmental aspects of the proposed facilities are satisfactory.
- The recommended facilities are consistent with the County's Comprehensive Plan.

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- A. Cost Information of the Selected Alternative
- B. Operation and Maintenance of Alternative System & Present worth Analysis
- C. Summary of Public/Dedicated Revenue Hearing & Affidavit of Publication
- D. Capital Financing Plan
- E. Draft Rate Ordinance
- F. MCU Wastewater System Hydraulic Modeling and Analysis

APPENDIX A

Cost Information of Alternative Systems

GRINDER PUMP COST ESTIMATE

Developments	Grinder Pump Sewer System										Roadway Restoration					Subtotals					Engineering Services (10%)	Total Cost w/ Contingency (20%)	Estimated Cost Per Parcel
	No. Grinder Pump Packages	FM Road ROW Line (LF)	FM from L. Station to Exst. FM (LF)	Master L. Station Package (EA)	Demolition (SY)	Asphalt (SY)	Base (SY)	Subgrade (SY)	Final Surface Restoration/So d (SY)	Grinder Pump Package	Sanitary Service Connections	Total FM Road ROW and L. S. FM	Master L. Station Package	Roadway Restoration	Final Surface Restoration/Sod	Mobilization							
3 Golden Gate Subdivision	775	59,318	200	2	19,773	19,773	20,762	21,750	98,864	5,812,500	561,875	654,698	300,000	1,027,211	296,592	519,173	9,172,049	917,205	11,923,663	15,385			

GRAVITY SEWER COST ESTIMATE

	Gravity Sewer System										Subtotals					Engineering Services (10%)	Total Cost w/ Contingency (20%)	Estimated Cost Per Parcel		
	Roadway Restoration										Final Surface Restoration/So d (SY)	Subtotals								
	No. of Parcels	Service (LF)	Manholes GS Mains	Force Main (LF)	L. Stations & Generators (EA)	Demolition (SY)	Asphalt (SY)	Base (SY)	Subgrade (SY)	Gravty Sewer System		Roadway Restoration	Final Surface Restoration/Sod	Mobilization						
3	Golden Gate Subdivision	775	15,500	59,318	149	200	4	131,818	131,818	138,409	145,000	39,546	4,395,224	6,847,947	118,638	681,709	12,043,517	1,204,352	15,656,572	20,202

VACUUM SEWER COST ESTIMATE

		Vacuum Sewer System										Roadway Restoration											
		No. of Parcels	From VM Road ROW Line (LF)	FM from L. Station to Package Exist. FM (LF)	Vacuum Station Package (EA)	Demolition (SY)	Asphalt (SY)	Base (SY)	Subgrade (SY)	Final Surface Restoration/So d (SY)				Valve Pit Package	Total VM Road ROW and L. S. FM	Master L. Station Package	Roadway Restoration	Final Surface Restoration/Sod	Mobilization	Total Cost Estimate	Engineering Services (10%)	Total Cost w/ Contingency (20%)	Estimated Cost Per Parcel
3	Golden Gate Subdivision	775	59,318	200	1	52,728	52,728	55,364	58,000	98,864	1,612,000	1,485,950	825,000	2,739,212	296,592	417,525	7,376,279	737,628	9,589,163	12,373			



APPENDIX C
MARTIN COUNTY
Septic Elimination Study
Gravily Sewer Cost Estimate
Job No. 1392.6
February 13, 2015



No. of Parcels	Service (LF)	Gravily Sewer System				Roadway Restoration				Subtotals			Mobilization	Total Cost	Engineering Services (LDN)	Total Cost w/ Contingency (20%)	Estimated Cost Per Parcel		
		GS Mains (LF)	Manholes (EA)	Force Main (LF)	L. Stations & Generator (EA)	Demolition (SY)	Asphalt (SY)	Base (SY)	Subgrade (SY)	Final Surface Restoration/ Sod (SY)	Roadway Restoration	Gravily Sewer System							
1,078	21,560	77,759	195	300	6	172,798	172,798	181,438	190,078	51,840	\$ 5,999,900	\$ 8,976,858	\$ 155,520	\$ 907,937	\$ 16,040,215	\$ 1,604,021	\$ 20,852,779	\$ 19,343	
478	9,560	27,864	70	150	3	61,920	65,016	65,016	68,112	18,576	\$ 2,436,068	\$ 3,216,744	\$ 55,728	\$ 324,185	\$ 6,042,265	\$ 604,526	\$ 7,858,844	\$ 16,441	
775	15,500	59,318	149	200	4	131,818	138,409	145,000	145,000	39,546	\$ 4,395,224	\$ 6,847,947	\$ 118,638	\$ 813,709	\$ 12,034,517	\$ 1,204,352	\$ 15,656,572	\$ 20,202	
1,349	26,980	65,552	164	350	7	145,672	152,955	160,239	160,239	47,302	\$ 5,811,539	\$ 7,567,652	\$ 131,106	\$ 810,617	\$ 14,320,893	\$ 1,432,089	\$ 18,617,161	\$ 13,801	
25	500	3,197	8	500	2	7,105	7,460	7,815	7,815	2,132	\$ 476,452	\$ 369,102	\$ 6,396	\$ 51,117	\$ 903,065	\$ 90,307	\$ 466,959	\$ 46,959	
234	4,680	15,179	38	150	3	33,732	35,418	35,418	37,105	10,120	\$ 1,686,993	\$ 1,752,369	\$ 30,340	\$ 208,183	\$ 3,677,906	\$ 367,791	\$ 4,791,277	\$ 20,433	
885	17,700	69,220	174	3,500	5	133,823	133,823	161,514	169,205	46,147	\$ 5,260,141	\$ 7,091,102	\$ 138,441	\$ 803,381	\$ 14,193,066	\$ 1,413,207	\$ 18,450,985	\$ 20,849	
652	13,040	54,289	136	250	5	120,613	126,675	132,707	132,707	36,137	\$ 4,361,819	\$ 6,267,402	\$ 108,579	\$ 644,268	\$ 11,382,067	\$ 1,138,207	\$ 14,796,687	\$ 22,694	
292	5,840	21,048	53	150	3	46,774	46,774	49,112	51,451	14,032	\$ 2,004,438	\$ 2,429,898	\$ 42,696	\$ 268,586	\$ 4,745,019	\$ 474,502	\$ 6,168,524	\$ 21,125	
326	6,520	51,150	128	11,000	10	113,667	113,667	119,350	125,034	34,100	\$ 6,081,453	\$ 5,904,997	\$ 102,300	\$ 725,325	\$ 12,814,075	\$ 1,281,408	\$ 16,568,298	\$ 17,893	
256	5,120	20,010	51	150	3	44,467	44,467	46,660	48,914	13,400	\$ 1,938,050	\$ 2,310,657	\$ 40,020	\$ 257,288	\$ 4,545,415	\$ 454,541	\$ 5,909,939	\$ 23,082	
97	1,940	9,979	15	100	2	13,287	13,287	13,951	14,616	3,986	\$ 892,687	\$ 690,256	\$ 11,908	\$ 95,694	\$ 1,260,595	\$ 109,059	\$ 2,197,773	\$ 22,657	
321	6,620	20,325	51	200	4	45,167	47,425	49,684	49,684	13,550	\$ 2,263,493	\$ 2,246,422	\$ 40,600	\$ 279,044	\$ 4,838,598	\$ 492,960	\$ 6,408,478	\$ 19,361	
113	2,260	11,248	29	500	1	24,996	24,996	26,246	27,496	7,489	\$ 892,888	\$ 1,298,546	\$ 22,497	\$ 132,831	\$ 2,346,683	\$ 244,688	\$ 3,050,687	\$ 26,997	
381	7,620	40,030	101	1,500	4	86,956	86,956	91,404	97,852	26,887	\$ 3,275,176	\$ 4,621,268	\$ 80,041	\$ 478,590	\$ 8,555,086	\$ 845,510	\$ 10,397,624	\$ 28,849	
164	3,280	14,995	38	100	2	33,423	34,323	34,989	36,655	9,997	\$ 1,893,153	\$ 1,731,127	\$ 29,981	\$ 187,816	\$ 3,318,088	\$ 331,809	\$ 4,313,114	\$ 26,302	
504	10,080	31,684	80	1,050	6	70,409	70,409	73,930	77,450	21,123	\$ 3,470,806	\$ 3,657,755	\$ 63,369	\$ 431,516	\$ 7,623,446	\$ 762,345	\$ 9,910,480	\$ 19,664	
878	17,560	56,677	137	200	4	121,449	127,627	133,704	133,704	36,465	\$ 4,218,678	\$ 6,314,478	\$ 109,395	\$ 638,553	\$ 11,281,104	\$ 1,128,110	\$ 14,655,435	\$ 16,703	
76	1,520	6,899	18	750	1	15,283	15,283	16,047	16,811	4,585	\$ 663,910	\$ 793,949	\$ 13,745	\$ 88,297	\$ 1,559,910	\$ 155,991	\$ 2,027,983	\$ 26,683	
306	2,120	11,824	30	300	1	26,276	26,276	27,590	28,804	7,883	\$ 912,766	\$ 1,305,042	\$ 23,649	\$ 138,087	\$ 2,439,513	\$ 243,953	\$ 3,171,993	\$ 29,919	
167	3,340	14,539	37	150	3	32,309	32,309	33,925	35,540	9,693	\$ 1,624,641	\$ 1,678,460	\$ 29,079	\$ 199,931	\$ 3,332,110	\$ 333,211	\$ 4,591,743	\$ 27,495	
37	740	4,811	13	700	2	10,692	10,692	11,226	11,761	3,208	\$ 818,258	\$ 555,441	\$ 9,624	\$ 82,999	\$ 1,466,323	\$ 146,632	\$ 1,906,220	\$ 51,519	
277	5,540	23,928	60	150	3	53,174	53,174	55,832	58,491	15,952	\$ 2,137,101	\$ 2,762,379	\$ 47,856	\$ 296,840	\$ 5,344,176	\$ 524,418	\$ 6,877,429	\$ 24,612	
49	15,268	19,526	49	150		43,392	43,392	45,561	47,731	13,018	\$ 1,919,304	\$ 2,254,206	\$ 39,054	\$ 252,748	\$ 4,485,212	\$ 446,521	\$ 5,901,736	\$ 21,341	
Total																		\$ 206,781,086	\$ 24,372

* Renewals / Gallon Bay (Type B Lift Stations)			
Lift Station (Type B) Package Costs			
for communities with less than 25 Parcels			
Quantity (EA)	Unit Costs	Subtotals	
No of Parcels	25		
Lift Station (Type B)	2	\$	100,000.00
Emergency Pump / Backup Generator	2	\$	50,000.00
			\$ 300,000.00

* Town of Sewalls (Gravily Sewer Rehabilitation)						
Accounted for in Gravily Sewer System Subtotal						
				No. of Parcels	GP User (UP)	Reinstate Laterals (EA)
Dry Gravity Sewer Lines (VCP)				194	13,806	97
Dry Gravity Sewer Lines (PVC)				411	10,876	206
Subtotals				605	\$ 331,344	\$ 123,410
						\$ 45,450

Calculations				Unit Costs			
Service Lines: 30 LF per connection (ROW only)				\$ 17.00 LF			
Service/Generator				\$ 317.34 EA			
GS Mains: Equivalent to L of Roadway				\$ 39.00 LF			
Manholes: For every 400' of Gravily Sewer Mains				\$ 3,975.00 EA			
Force Main: (4" PVC and Fittings/Restrains)				\$ 15.00 LF			
Gravily Sewer Rehabilitation							
— CIP liner (8") Gravily Mains (LF of Dry Lines)				\$ 24.00 LF			
— Including Cleaning & TV Inspection				\$ 2.00 LF			
— Mechanical Rod or Grout Removal				\$ 3.00 LF			
— Reinstale Lateral (Serves Every 2 Parcels)				\$ 150.00 EA			
Gravily Sewer Rehabilitation							
— Lift Station (EA) Depth of 16'-22' Depth				\$ 225,000.00 EA			
— Emergency Pump Backup Generator (Per Lift Station)				\$ 50,000.00 EA			
Acronyms				FM - Force Main			
GS - Gravily Sewer				VCP - Vitrified Clay Pipe			

Notes
1) Type B Lift Station were used for communities with less than 25 parcels due to low flow volumes. Rosewalk and Gallison Bay are two separate communities with less than 20 parcels.
2) Town of Sewalls Point Gravily Sewer System parcels represent residents without gravily sewer service. Parcels with existing dry lines proposed for rehabilitation were estimated separately and included in the Gravily Sewer Subtotal as column.
3) Estimate does not include cost associated with sanitary service connection from house to right-of-way or abandonment of existing on site sewer disposal system



APPENDIX D
MARTIN COUNTY
Septic Elimination Study
Vacuum Sewer Cost Estimate
Job No: 1352.6
February 13, 2015



Developments	Vacuum Sewer System				Roadway Restoration				Final Surface Restoration / Sod (SY)	Subtotals			Mobilization	Total Cost Estimate	Engineering Services (10%)	Total Cost w/ Contingency (20%)	Estimated Cost Per Parcel		
	No. of Parcels	From VM Road ROW Line (LF)	RM from L Station to Exst. RM (LF)	Vacuum Station Package (EA)	Demolition (SY)	Asphalt (SY)	Base (SY)	Subgrade (SY)		Valve Pit Package	Total VM Road ROW and L.S. RM	Master L. Station Package						Roadway Restoration	Final Surface Restoration / Sod
1. Martin Downs/ Sunset Gardens (Old Palm City) Area	1078	77,759	300	2	69,120	69,120	72,576	76,032	129,599	\$ 2,242,240	\$ 1,948,875	\$ 1,650,000	\$ 3,590,784	\$ 386,797	\$ 589,218	\$ 10,409,514	\$ 1,040,951	\$ 13,532,368	12,553
2. Salerno /Manatee Pocket Area	478	27,864	150	1	24,768	24,768	26,007	27,245	46,410	\$ 994,240	\$ 698,850	\$ 825,000	\$ 1,286,706	\$ 139,320	\$ 236,497	\$ 4,180,743	\$ 418,076	\$ 5,434,892	11,370
3. Golden Gate Subdivision	775	59,318	200	1	52,728	52,728	55,864	58,000	98,864	\$ 1,612,000	\$ 1,485,050	\$ 825,000	\$ 2,739,512	\$ 296,592	\$ 417,525	\$ 7,776,279	\$ 737,628	\$ 9,580,163	12,373
4. Hibiscus Park Area	1,349	65,552	350	3	58,269	58,269	61,182	64,096	109,254	\$ 2,805,920	\$ 1,644,050	\$ 2,475,000	\$ 3,027,069	\$ 327,762	\$ 616,788	\$ 10,896,589	\$ 1,089,659	\$ 14,165,566	10,501
5. Rosewalk / Gilson Bay Subdivisions	25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6. Vista Salerno / US 1 Area	234	15,179	150	1	13,493	13,493	14,168	14,842	25,299	\$ 486,720	\$ 381,725	\$ 825,000	\$ 700,865	\$ 75,897	\$ 148,218	\$ 2,618,525	\$ 261,853	\$ 3,404,083	14,547
7. Evergreen G&CC (Hidaway Isles / Mid Rivers)	885	69,220	3,500	2	61,530	61,530	64,606	67,882	115,367	\$ 1,840,800	\$ 1,783,000	\$ 1,650,000	\$ 3,196,474	\$ 346,101	\$ 528,883	\$ 9,345,338	\$ 934,536	\$ 12,148,965	13,728
8. Tropical Farms Area	652	54,289	250	2	48,258	48,258	50,070	53,083	90,482	\$ 1,356,160	\$ 1,360,925	\$ 825,000	\$ 2,506,893	\$ 271,446	\$ 428,734	\$ 7,574,304	\$ 757,430	\$ 9,846,995	15,102
9. North Rivers Shore - Phase 2	292	20,881	150	1	18,710	18,710	19,645	20,881	35,080	\$ 607,360	\$ 538,450	\$ 825,000	\$ 971,978	\$ 105,240	\$ 182,382	\$ 3,220,310	\$ 322,031	\$ 4,186,403	14,337
10. Town of Seawall's Point	931	75,832	11,000	2	45,467	45,467	47,440	50,014	126,387	\$ 1,936,480	\$ 2,060,000	\$ 1,650,000	\$ 2,362,007	\$ 378,161	\$ 503,307	\$ 8,891,755	\$ 889,175	\$ 11,559,281	12,416
11. Bear Ridge Subdivision	256	20,010	150	1	17,787	17,787	18,676	19,566	33,350	\$ 532,480	\$ 502,500	\$ 825,000	\$ 924,031	\$ 100,050	\$ 173,044	\$ 3,057,105	\$ 305,710	\$ 3,974,236	15,524
12. Rio / St. Lucie (West)	97	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
13. Rio / St. Lucie (East)	331	20,325	200	1	18,067	18,067	18,970	19,874	33,875	\$ 688,480	\$ 511,125	\$ 825,000	\$ 938,577	\$ 101,625	\$ 183,888	\$ 3,248,695	\$ 324,870	\$ 4,223,304	12,759
14. River's End Subdivision	113	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
15. Crane Creek Country Club	381	40,000	1,500	1	35,583	35,583	37,362	39,141	66,717	\$ 792,480	\$ 1,073,250	\$ 825,000	\$ 1,848,534	\$ 200,151	\$ 281,865	\$ 4,970,780	\$ 497,078	\$ 6,462,014	16,961
16. North Maple Road Area	164	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
17. Stuart Yacht & Country Club	504	31,684	1,050	2	28,164	28,164	29,572	30,980	52,807	\$ 1,048,320	\$ 807,850	\$ 1,650,000	\$ 1,463,116	\$ 158,421	\$ 307,662	\$ 5,453,469	\$ 543,537	\$ 7,065,980	14,020
18. Port Salerno / New Moravia Area	878	54,697	200	2	48,620	48,620	51,051	53,882	91,162	\$ 1,836,240	\$ 1,370,425	\$ 1,650,000	\$ 2,525,809	\$ 273,486	\$ 458,758	\$ 8,104,718	\$ 810,472	\$ 10,536,131	12,000
19. Lake Grove Subdivision	76	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
20. Four Rivers Subdivision	106	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
21. Capgans Creek Subdivision	167	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
22. South Maple Road	37	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
23. Gaines Ave Area	277	23,928	150	1	21,270	21,270	22,333	23,897	39,880	\$ 576,160	\$ 600,450	\$ 825,000	\$ 1,104,970	\$ 119,640	\$ 193,573	\$ 3,415,793	\$ 341,579	\$ 4,445,791	16,950
24. South Fork Area	272	19,526	150	1	17,857	17,857	18,225	19,693	32,544	\$ 565,760	\$ 490,400	\$ 825,000	\$ 901,699	\$ 97,632	\$ 172,829	\$ 3,053,320	\$ 305,332	\$ 3,969,317	14,593
Total	10,358									\$ 19,911,840	\$ 17,198,275	\$ 19,800,000	\$ 30,088,920	\$ 3,381,321	\$ 5,422,821	\$ 95,803,177	\$ 9,580,318	\$ 124,544,131	12,024

Notes
1) Estimate does not include cost associated with sanitary service connection from house to right-of-way or abandonment of existing on-site sewer disposal system
2) The existing gravity sewer dry lines within the Town of Seawall Point (TDS), referenced in Section 5.2.1, were not considered in this analysis.



Job No: 1352.6

Notes

1) The proposed Grinder Pump System for Rosewalk (10 parcels) and Gulliver Bay (15 Parcels) will tie into existing lift stations due to their low population densities and sanitary sewer flow rates. Rosewalk will tie into the lift station to the east currently serving the Rosewood 72 Condominiums (L. Station No. 417). Likewise, Gulliver Bay will tie into the lift station to the north serving the Alabaster 72 Condominium (L. Station No. 421). Existing Lift Station 10 are from MOUGS Database.

2) Estimate does not include cost associated with residential electrical modifications

3) No major dewatering has been anticipated in this estimate

4) The existing gravity sewer dry lines within the Town of Sewalls Point (TOPSI, referenced in Section 5.2.1, were not considered in this analysis.

APPENDIX B

- Operation and Maintenance of Alternative System
- Present Worth Analysis

Martin County

connections 775
EDU's 775

ANNUAL O&M ESTIMATE

Golden Gate Area
GRAVITY SEWER

LABOR				
Item	Labor effort		Quantity	Annual Labor
Lift Station - (if req'd)	180 hrs/yr/station	x	4 station	= 720 hrs/yr
Piping	20 hrs/yr/system	x	4 system	= 80 hrs/yr
				= 0 hrs/yr
				800 hrs/yr
				x \$20 /hr
				x 1.25 Overhead
				\$20,000 /yr
ROUND TO:				\$20,000 /yr

POWER				
Item	Unit cost		EDU	Duration
Lift Station - (if req'd)				
Flat rate	\$25.00 /mo	x	4 station	12 mo
Consumption	\$0.50 /mo/EDU	x	775 EDU	x 12 mo
				= \$1,200 /yr
				\$4,650 /yr
				\$5,850
ROUND TO:				\$5,850 /yr

EQUIPMENT REPLACEMENT				
Item	Replacement cost		Useful life	Quantity
LIFT STATION (if req'd)				
Sewage Pumps	\$14,000 /ea	/	15 years	x 8 pumps
Wetwell	\$25,000 /ea	/	20 years	x 4 ea
Control Panel	\$10,000 /ea	/	20 years	x 4 ea
Misc. Equip	\$1,000 /ea	/	15 years	x 4 ea
				= \$7,467 /yr
				= \$5,000 /yr
				= \$2,000 /yr
				= \$267 /yr
				\$14,733 /yr
ROUND TO:				\$14,700 /yr

SUMMARY	
LABOR	\$20,000 /yr
POWER	\$5,850 /yr
EQUIPMENT REPLACEMENT (LIFT STATION)	\$14,700 /yr
	\$40,550 /yr
ANNUAL O&M	\$52 /yr/EDU

Martin County

connections 775
EDU's 775

ANNUAL O&M ESTIMATE Golden Gate Area LOW PRESSURE SYSTEM

LABOR					
Item	Labor effort	Quantity	Annual Labor		
Lift Station - (if req'd)	180 hrs/yr/station	x 1 station	=	180 hrs/yr	
Piping	20 hrs/yr/system	x 1 system	=	20 hrs/yr	
Grinder pumps	2.00 hrs/yr/GP	x 775 GP's	=	1550 hrs/yr	
				1750 hrs/yr	
			x	\$20 /hr	
			x	1.25 Overhead	
				\$43,750 /yr	
ROUND TO:				\$43,800 /yr	

POWER					
Item	Unit cost	EDU	Duration	Annual Power	
Lift Station - (if req'd)					
Flat rate	\$25.00 /mo	x	12 mo	=	\$300 /yr
Consumption	\$0.50 /mo/EDU	x 775 EDU	x 12 mo	=	\$4,650 /yr
					\$4,950
Grinder Pumps	\$0.75 /mo/EDU	x 775 EDU	x 12 mo	=	\$6,975 /yr
					\$11,925
ROUND TO:				\$7,000 /yr	

EQUIPMENT REPLACEMENT					
Item	Replacement cost	Useful life	Quantity	Annual R&R	
LIFT STATION (if req'd)					
Sewage Pumps	\$14,000 /ea	/ 15 years	x 2 pumps	=	\$1,867 /yr
Wetwell	\$25,000 /ea	/ 20 years	x 1 ea	=	\$1,250 /yr
Control Panel	\$10,000 /ea	/ 20 years	x 1 ea	=	\$500 /yr
Misc. Equip	\$1,000 /ea	/ 15 years	x 1 ea	=	\$67 /yr
					\$3,683 /yr
ROUND TO:				\$3,700 /yr	
GRINDER PUMPS					
Rebuild pump core	\$750 /ea	/ 7 years	x 775 GP's	=	\$83,036 /yr
Replace controls	\$300 /ea	/ 7 years	x 775 GP's	=	\$33,214 /yr
Misc. Parts	\$15 /yr	/ 10 years	x 775 GP's	=	\$1,163 /yr
					\$117,413 /yr
ROUND TO:				\$117,400 /yr	

SUMMARY	
LABOR	\$43,800 /yr
POWER	\$7,000 /yr
EQUIPMENT REPLACEMENT (LIFT STATION)	\$3,700 /yr
EQUIPMENT REPLACEMENT (GP'S)	\$117,400 /yr
	\$171,900 /yr
ANNUAL O&M	\$222 /yr/EDU

Martin County

connections 775
EDU's 775

ANNUAL O&M ESTIMATE

Golden Gate Area
VACUUM SYSTEM

LABOR					
Item	Labor effort		Quantity		Annual Labor
Vacuum Station	450 hrs/yr/station	x	1 station	=	450 hrs/yr
Piping	60 hrs/yr/system	x	1 system	=	60 hrs/yr
Valves	1.75 hrs/yr/valve	x	310 valves	=	543 hrs/yr
					1053 hrs/yr
				x	\$20 /hr
				x	1.25 Overhead
					\$26,325 /yr
ROUND TO:					\$26,300 /yr

POWER					
Item	Unit cost		EDU	Duration	Annual Power
Vacuum Station					
Flat rate	\$125.00 /mo	x		12 mo	\$1,500 /yr
Consumption	\$2.70 /mo/EDU	x	775 EDU	x 12 mo	= \$25,110 /yr
					\$26,610
ROUND TO:					\$26,600 /yr

EQUIPMENT REPLACEMENT					
Item	Replacement cost		Useful life	Quantity	Annual R&R
VACUUM STATION					
Vacuum Pumps	\$12,400 /ea	/	15 years	x 2 pumps	= \$1,653 /yr
Sewage Pumps	\$13,500 /ea	/	15 years	x 2 pumps	= \$1,800 /yr
Collection Tank	\$23,400 /ea	/	30 years	x 1 ea	= \$780 /yr
Control Panel	\$15,000 /ea	/	20 years	x 1 ea	= \$750 /yr
Misc. Equip	\$3,000 /ea	/	15 years	x 1 ea	= \$200 /yr
					\$5,183 /yr
ROUND TO:					\$5,200 /yr
VACUUM VALVES					
Vacuum Valves	\$35 /ea	/	15 years	x 310 valves	= \$723 /yr
Controller	\$40 /ea	/	10 years	x 310 valves	= \$1,240 /yr
Misc. Parts	\$20 /ea	/	10 years	x 310 valves	= \$620 /yr
					\$2,583 /yr
ROUND TO:					\$2,600 /yr

SUMMARY	
LABOR	\$26,300 /yr
POWER	\$26,600 /yr
EQUIPMENT REPLACEMENT (STATION)	\$5,200 /yr
EQUIPMENT REPLACEMENT (VALVES)	\$2,600 /yr
	\$60,700 /yr
ANNUAL O&M	\$78 /yr/EDU

ANNUAL O&M COMPARISON			
	VACUUM	GRAVITY SEWER	LOW PRESSURE
# CONNECTIONS	775 ea	775 ea	775 ea
# OF EDU'S	775 ea	775 ea	775 ea
# UNITS	310 valves	N/A	775 GP's
# VACUUM OR LIFT STATIONS	1 ea	4 ea	1 ea
LABOR	\$26,300 /yr	\$20,000 /yr	\$43,800 /yr
POWER	\$26,600 /yr	\$5,850 /yr	\$7,000 /yr
EQUIPMENT REPLACEMENT (Vac Sta/Lift Sta)	\$5,200 /yr	\$14,700 /yr	\$3,700 /yr
REBUILD/REPAIR FREQUENCY			
Rebuild/repair frequency (vacuum valve/wetwell pumps/GP core)	15 yrs	15	7 yrs
Rebuild/repair frequency (controllers/pump controls)	10 yrs	20	7 yrs
Rebuild/repair frequency (gravity wetwell)	n/a	20	
Misc Spare parts frequency	10 yrs	15	10 yrs
EQUIPMENT REPLACEMENT (Valves/Grinder Pumps)	<u>\$2,600 /yr</u>	<u>\$14,700 /yr</u>	<u>\$117,400 /yr</u>
ANNUAL O&M	\$60,735 /yr	\$55,320 /yr	\$171,924 /yr
ANNUAL O&M per EDU	\$78 /yr/EDU	\$71 /yr/EDU	\$222 /yr/EDU

Present Worth Analysis

[illegible]

APPENDIX C

Summary of Public/Dedicated Revenue Hearing & Affidavit of
Publication

(Provided by Martin County)

APPENDIX D

Capital Financing Plan

APPENDIX E

Rate Ordinance

APPENDIX F

MCU Wastewater System Hydraulic Modeling and Analysis
(Prepared by Holtz Consulting Engineers, Inc.)

Draft Technical Memorandum

To: Jeremy Covey, PE
Martin County Utilities

From: Curtis Robinson, PE
Matthew Paymer, EI
Holtz Consulting Engineers, Inc.

Subject: MCU Wastewater System Hydraulic Modeling and Analysis

Date: July 18, 2018

1.0 INTRODUCTION

Martin County is taking a proactive approach of connecting neighborhoods currently being served by individual septic tanks to their wastewater collection and central treatment system. In 2014 Martin County Utilities (MCU) commissioned an update to their wastewater master plan. The update included an evaluation of various neighborhoods converting from utilizing individual septic tanks to a centralized collection and treatment system, infill of existing neighborhoods, and development of vacant parcels.

Currently, there are several existing neighborhoods in the MCU service area that are beginning the process of the septic to sewer conversion. Preliminary planning and design of some of these neighborhoods has begun. These neighborhoods include Golden Gate, Salerno, Hibiscus Park, Stuart Yacht and Country Club, Old Palm City, and North Mapp Road. The planning and design includes selecting vacant parcels to locate the proposed pump stations, optimizing the number and size of the stations, and finalizing the wastewater flow from each neighborhood. The optimization of the pump stations has increased the expected flows from some of the neighborhoods. A phasing plan was also developed.

MCU requested that Holtz Consulting Engineers (HCE) revisit the existing wastewater hydraulic model, revise the expected new contributing inflows, use the updated flows to determine what infrastructure improvements will be required for the system to handle buildout conditions, and then determine a phasing plan for which buildout improvements to the existing wastewater transmission system will need to be constructed as these new developments and septic to sewer conversions come on-line.

2.0 REVISED WASTEWATER FLOW RATES

MCU is expecting that the anticipated peak hour wastewater inflow for several new developments and septic to sewer conversions identified in the 2014 Master Plan Update will be either larger than was originally anticipated or will connect with fewer lift stations which would also increase total contributing flow during peak hours. The expected wastewater flow rates from the developments and septic to sewer conversions that were updated from the 2014 Master Plan are shown in **Table 1**.

Table 1: Updated Development and Septic to Sewer Peak-Hour Flows

Development/Septic-to-Sewer Conversion	2014 Master Plan Total Design Flow (GPM) [Number of Lift Stations]	2014 Master Plan Modeled Flow (GPM) [Number of Lift Stations Operational]	Updated Total Design Flow (GPM) [Number of Lift Stations]	Updated Modeled Flow (GPM) [Number of Lift Stations Operational]	Total Additional Modeled Flow (GPM)
Golden Gate ¹	648 [2]	324 [1]	800 [1]	800 [1]	152
Port Salerno ²	423 [4]	423 [1]	423 [1]	423 [1]	0
Hibiscus Park ³	622 [3]	414 [2]	622 [2]	622 [2]	0
Stuart Yacht and Country Club	255 [2]	255 [2]	255 [2]	255 [2]	0
Pineland Prairie (LS BO34) ⁴	649 [1]	649 [1]	1,080 [2]	1,080 [2]	431
Old Palm City ²	512 [4]	256 [2]	1,000 [1]	1,000 [1]	488
Western Utility Extension ³	0 [0]	0 [0]	408 [3]	408 [3]	408
North Mapp Rd ³	89 [2]	0 [0]	89 [1]	89 [1]	0
Total					1,479

¹Updated Flow Rate and Number of Stations Provided by Giffels-Webster

²Updated Number of Lift Stations Provided by MCU Septic to Sewer Schedule (11-21-17)

³Updated Number of Lift Stations Provided by MCU

⁴Updated Flow Provided by MacKenzie Engineering and Planning

3.0 REVISED “BUILDOUT” SCENARIO

The existing buildout model was updated to reflect the new peak-hour flows and number of lift stations for the developments and septic to sewer conversions identified in Section 2 of this report with baseline buildout peak hour flow rates developed at the Martin Downs Inline Booster Pump Station, the Dixie Park Inline Booster Pump Station, and the Tropical Farms Wastewater Treatment Plant (WWTP) taken from the 2014 Master Plan Update. Revised estimated peak-hour buildout flow rates for these three major facilities are included in **Table 2**.

Table 2: Revised Peak-Hour Influent Flows

Facility	2014 Master Plan Modeled Flows (GPM)	2018 Estimated Flows (GPM)	Increased Flows (GPM)
Dixie Park Inline Booster Pump Station	2,925	3,401	476
Martin Downs Inline Booster Pump Station	2,562	3,737	1,175
Tropical Farms WWTP	8,868	10,347	1,479

Peak hour flow was simulated through a combination of existing and proposed stations being operational. **Table 3** provides the operational lift stations within the hydraulic model under a simulated peak hour flow condition. The flows into the Tropical Farms WWTP, Martin Downs Inline Booster Pump Station, and Dixie Park Inline Booster Pump Stations are 10,283 gpm, 3,772 gpm, and 3,481 gpm respectively, which are close to the expected build-out flows for each facility as depicted in Table 2.

Table 3: Operational Lift Stations to Simulate Estimated Buildout Conditions

Lift Station	Design Flow (GPM)	Modeled Flow (GPM)	Head (feet)
River's End (Repumped by Martin Downs)	63	63	51
Evergreene LS 2 (Repumped by Martin Downs)	142	142	64
Evergreene LS 3 (Repumped by Martin Downs)	142	142	195
Crane Creek LS 2 (Repumped by Martin Downs)	99	99	63
Lake Grove (Repumped by Martin Downs)	43	43	39
Four Rivers (Repumped by Martin Downs)	59	59	39
Captain's Creek (Repumped by Martin Downs)	97	97	39
Salerno/Manatee Pocket LS 1 (Repumped by Dixie Park)	200	200	82
Salerno / US-1 LS 1 (Repumped by Dixie Park)	63	63	104
Salerno / US-1 LS 2 (Repumped by Dixie Park)	62	62	48
Tropical Farms LS 1	168	168	77
Tropical Farms LS 2	162	162	87
Stuart Yacht and Country Club LS 1 (Repumped by Dixie Park)	128	128	155
Stuart Yacht and Country Club LS 2 (Repumped by Dixie Park)	127	127	89
South Mapp Rd	21	21	128
Gaines Avenue	146	146	81
LS-NPS26 (Repumped by Martin Downs)	31	31	36
LS-NPS27 (Repumped by Martin Downs)	38	38	42
LS-NPS28 (Repumped by Martin Downs)	20	20	30

LS-NPS29 (Repumped by Martin Downs)	20	20	21
LS-NPS30 (Repumped by Martin Downs)	20	20	22
LS-NPS31	45	45	91
LS-NPS32	20	20	81
LS-NPS35	27	27	64
LS-NPS34	37	37	79
LS-NPS36	64	64	94
LS-NPS37	59	59	96
LS-NPS38	22	22	104
LS-NPS39	50	50	110
LS-NPS40	95	95	130
LS-NPS41 (Repumped by Dixie Park)	46	46	27
LS-NPS42 (Repumped by Dixie Park)	29	29	78
LS-NPS43 (Repumped by Dixie Park)	70	70	173
LS-NPS44 (Repumped by Dixie Park)	50	50	72
LS-NPS46 (Repumped by Dixie Park)	72	72	44
LS-BO36 (Repumped by Martin Downs)	36	36	20
LS-BO37 (Repumped by Martin Downs)	79	79	23
LS-BO38 (Repumped by Martin Downs)	72	72	24
LS-BO39 (Repumped by Martin Downs)	20	20	24
LS-BO40 (Repumped by Martin Downs)	33	33	39
LS-BO41 (Repumped by Martin Downs)	39	39	47
LS-BO42	20	20	92
LS-BO43	138	138	95
LS-BO44	20	20	94
LS-BO45	20	20	67
LS-BO46	20	20	52
LS-BO47	89	89	49
LS-BO48	90	90	66
LS-BO51	63	63	127
LS-BO52	85	85	110
LS-BO53	69	69	114
LS-BO55	24	24	113

LS-BO56	73	73	129
LS-BO57 (Repumped by Dixie Park)	52	52	125
LS-BO58 (Repumped by Dixie Park)	88	88	121
LS-BO59 (Repumped by Dixie Park)	64	64	37
LS-BO60 (Repumped by Dixie Park)	83	83	27
LS-BO61 (Repumped by Dixie Park)	85	85	32
LS-BO62 (Repumped by Dixie Park)	20	20	173
LS-BO63 (Repumped by Dixie Park)	20	20	73
LS-BO64 (Repumped by Dixie Park)	46	46	18
LS-BO65 (Repumped by Dixie Park)	28	28	72
LS-BO35 (Repumped by Martin Downs)	122	122	29
Pineland Prairie (Repumped by Martin Downs)	1080	1080	49
Golden Gate (Repumped by Dixie Park)	800	800	159
Port Salerno (Repumped by Dixie Park)	423	423	66
Old Palm City (Repumped by Martin Downs)	1000	1000	56
N Mapp Rd (Repumped by Martin Downs)	89	89	81
Hibiscus Park LS 1	311	311	116
Hibiscus Park LS 2	311	311	155
LS-120 (Repumped by Dixie Park)	--	257	99.33
LS-151 (Repumped by Dixie Park)	--	159	140.91
LS-163 (Repumped by Dixie Park)	--	106	152.46
LS-181 (Repumped by Dixie Park)	--	100	138.6
LS-189	--	137	129.36
LS-213	--	320	138.6
LS-509 (Repumped by Martin Downs)	--	112	50.82
LS-704	--	126	110.88
LS-707	--	86	97.02

LS-708	--	91	113.19
LS-713	--	24	78.54
LS-232 (Repumped by Dixie Park)	--	136	122.43
LS-234 (Repumped by Dixie Park)	--	167	122.43
LS-Canopy Creek (Repumped by Martin Downs)	--	59	113.19
LS-567 (Repumped by Martin Downs)	--	257	131.67

MCU's existing "backbone" wastewater collection and transmission system are not capable of accommodating the estimated buildout flows. As neighborhoods are converted from septic to sewer, new developments are constructed, and infill occurs in existing neighborhoods, both pumping and piping improvements will be required. When various improvements were evaluated, two factors that were evaluated were velocities and pressures. Pipelines were selected to maintain velocities between 2 and 10 feet per second, and the maximum pressure in the system was set at 100 psi.

With the addition of these revised peak hour flows the following improvements to the existing wastewater transmission system are required and are depicted in **Figure 1 and Figure 2**:

1. Construct approximately 2,263 LF of new 12-inch PVC force main that extends from the empty lot on SE Garden St south winding along existing utility easements and right-of-way to connect the Golden Gate vacuum pump station to the existing force main system downstream of LS-160 on SE Dixie Hwy.
2. Construct approximately 12,736 LF of new 12-inch PVC force main along SE Commerce Ave and SE Railway Ave from LS-121 to the Dixie Park Inline Booster Pump Station common suction header.
3. Disconnect the 8"x8" cross on SE Dixie Hwy east of SE Market Place and the F.E.C. Railroad to divert all the Golden Gate flow to the new Commerce Ave 12-inch force main.
4. Construct approximately 788 LF of new 8-inch PVC force main to connect the Port Salerno vacuum pump station to the new 12-inch Commerce Ave force main.
5. Construct an interconnect at the Port Salerno inflow to connect the new Commerce Ave force main to the existing 8-inch force main downstream of LS-237.
6. Replace the existing Dixie Park Inline Booster Pump Station with a larger pump station complete with Vaughan chopper-style pumps.
7. Construct approximately 3,516 LF of new parallel 16-inch PVC force main downstream of the Dixie Park inline booster pump station along SE Salvatori Rd and SE Village Rd that connects to the existing 12-inch force main on US-1.

8. Construct approximately 5,495 LF of new parallel 12-inch PVC force main along US-1 that extends from the intersection of Rosemont Ave and SE Cypress St to just downstream of LS-167.
9. Construct approximately 15,084 LF of new parallel 16-inch PVC force main along SE Cove Rd from the intersection of SE Cove Rd and S Kanner Hwy to the intersection of Rosemont Ave and SE Cypress St.
10. Construct approximately 5,504 LF of new parallel PVC force main along SW Gaines Ave/SW Lost River Rd to just before the I-95 crossing.
11. Construct approximately 2,600 LF of new 6-inch PVC force main along SE Holly St. and SE Celestial Cir. to connect Hibiscus Park LS 2 to the existing 8-inch force main.
12. Construct approximately 200 LF of new 6-inch PVC force main to connect Hibiscus Park LS 1 located near SE Harrison St. to the existing 12-inch force main along SE Willoughby Blvd.
13. Construct approximately 4,272 LF of new 12-inch PVC force main along SW Mapp Rd and SW Martin Downs Blvd to connect the Old Palm City vacuum pump station located at the intersection of SW Sunset Trail and SW Mapp Rd to the existing 16-inch force main.
14. Construct approximately 5,013 LF of new 4-inch PVC force main along SW Mapp Rd to connect the North Mapp Rd lift station to the new 12-inch force main at the intersection of SW Mapp Rd and SW Martin Downs Blvd.
15. Replace existing 6-inch carrier pipe in jack and bored steel casing that runs under the Florida Turnpike just upstream of the Martin Downs inline booster pump station with a new 12-inch PVC carrier pipe.
16. Construct approximately 1,525 LF of new parallel 8-inch force main from the Pineland Prairie connection near the Citrus Grove Elementary School to the existing force main Turnpike crossing.
17. Upgrade LS-540 to repump the anticipated 408 gpm of peak hour flow from the Western Utility Extension. Wet well sizing calculations and a proposed Flygt pump are provided in the appendix of this report. The existing wet well appears to be appropriately sized to accommodate the additional flows from the Western Extension.
18. Construct approximately 8,783 LF of new parallel 16-inch force main from the discharge of the Martin Downs inline booster pump station along the Turnpike to SW Martin Hwy.
19. Construct approximately 13,100 LF of new parallel 16-inch force main from SW Martin Hwy south along the Turnpike
20. Install a new Vaughan chopper-style pump and VFD at the Martin Downs Inline Booster Pump Station.



Figure 1:
MCU Force Main Model -
Proposed Buildout and
Improvements Dixie Park
to Tropical Farms WWTP

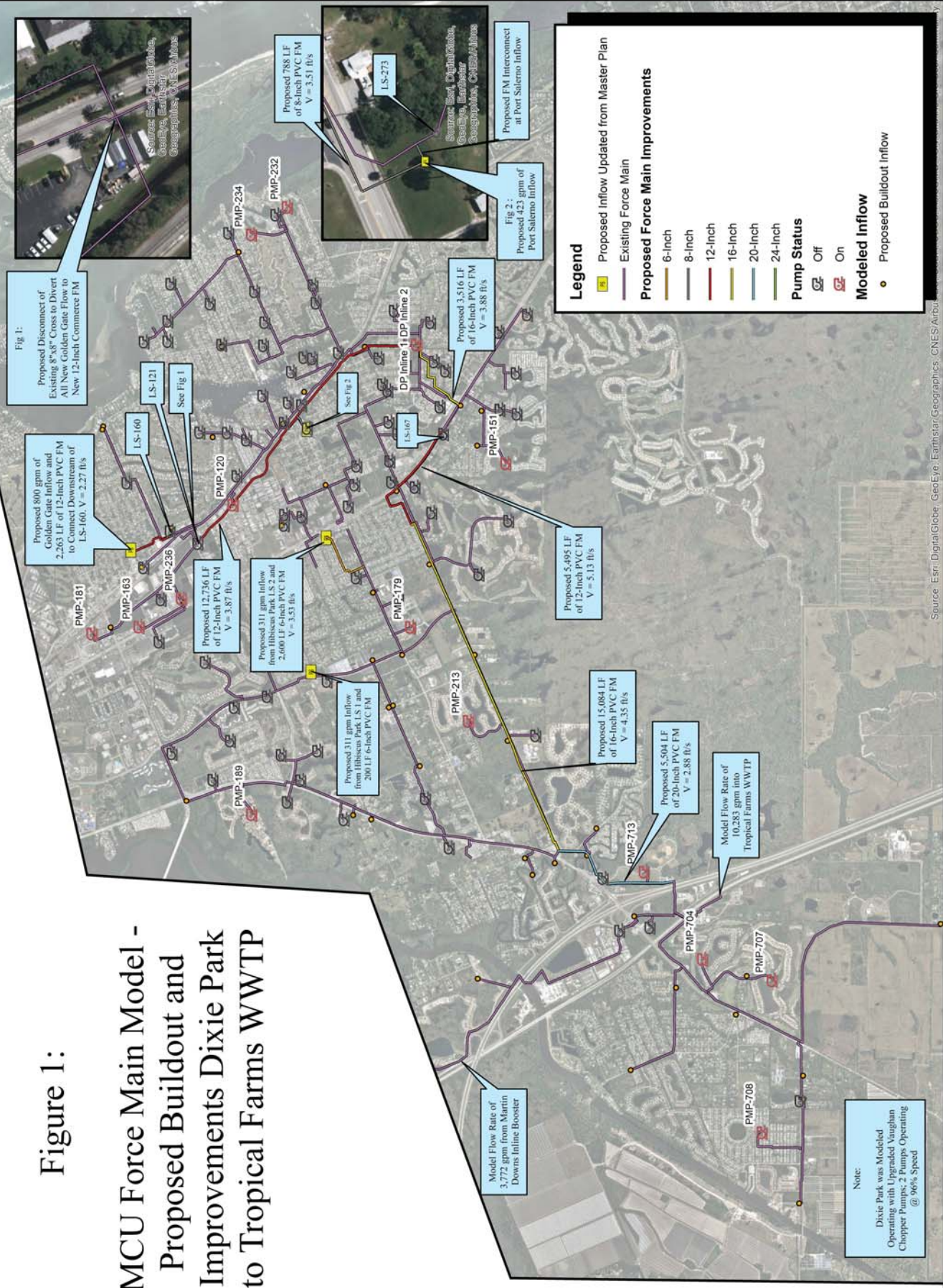
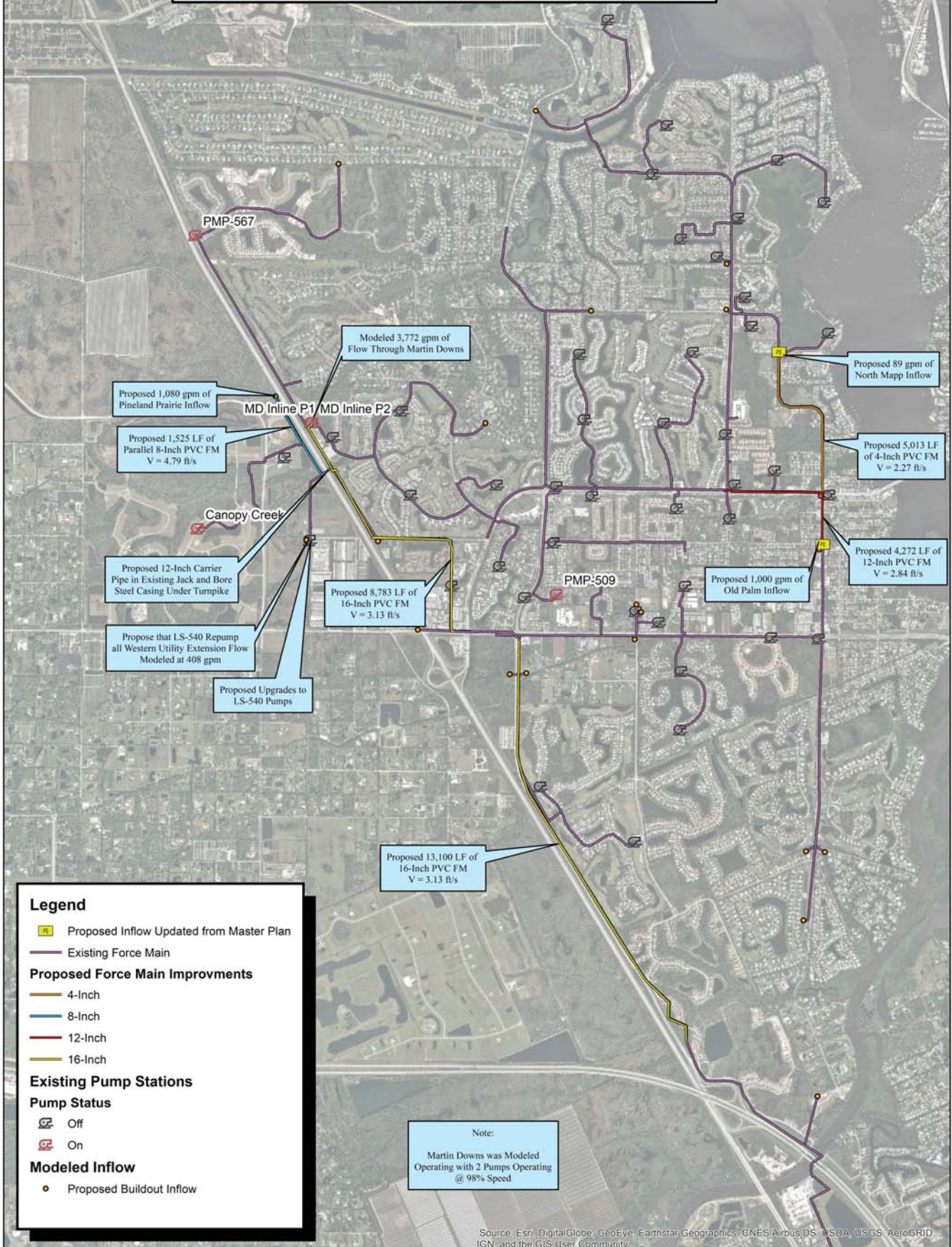


Figure 2:

MCU Force Main Model -
Proposed Buildout and Improvements
Martin Downs Inline Booster



4.0 Dixie Park Improvements – Phase I

The current MCU Septic to Sewer Conversion project schedule and developer agreements expect that Phase I of new wastewater inflow to the existing wastewater transmission system from the following developments and septic to sewer conversions:

- Golden Gate – 800 GPM
- Pineland Prairie Phase I – 330 GPM
- Old Palm City – 1,000 GPM
- North Mapp Rd – 89 GPM

Baseline existing peak hour flow rates through the Dixie Park Inline Booster Pump Station and the Martin Downs Inline Booster Pump Station were derived from SCADA data at the inline boosters from May and June of 2018. Baseline existing peak hour flow rate to the Tropical Farms WWTP were derived from Tropical Farms WWTP influent flow data from 2017-2018. Anticipated model flow rates to Dixie Park, Martin Downs, and Tropical Farms were the summation of the existing baseline flows and the expected inflow from the new developments and septic to sewer conversions and are as follows:

- Dixie Park – 2,056 GPM
- Martin Downs – 2,807 GPM
- Tropical Farms – 6,221 GPM

Peak hour flow was simulated through a combination of existing and proposed stations being operational. **Table 4** provides the operational lift stations within the hydraulic model under a simulated peak hour flow condition. The flows into Tropical Farms, Martin Downs Inline Booster Pump Station, and Dixie Park Inline Booster Pump Station are 6,204 gpm, 2,807 gpm, and 2,037 gpm respectively, which are close to the expected flows for each facility.

Table 4: Operational Lift Stations to Simulate Estimated Phase I Conditions

Lift Station	Design Flow (GPM)	Modeled Flow (GPM)	Head (feet)
Golden Gate (Repumped by Dixie Park)	800	800	92
LS-114 (Repumped by Dixie Park)	--	242	83.16
LS-115 (Repumped by Dixie Park)	--	226	71.61
LS-128 (Repumped by Dixie Park)	--	197	71.61
LS-131 (Repumped by Dixie Park)	--	25	85.47
LS-132 (Repumped by Dixie Park)	--	25	83.16
LS-160 (Repumped by Dixie Park)	--	10	97.02

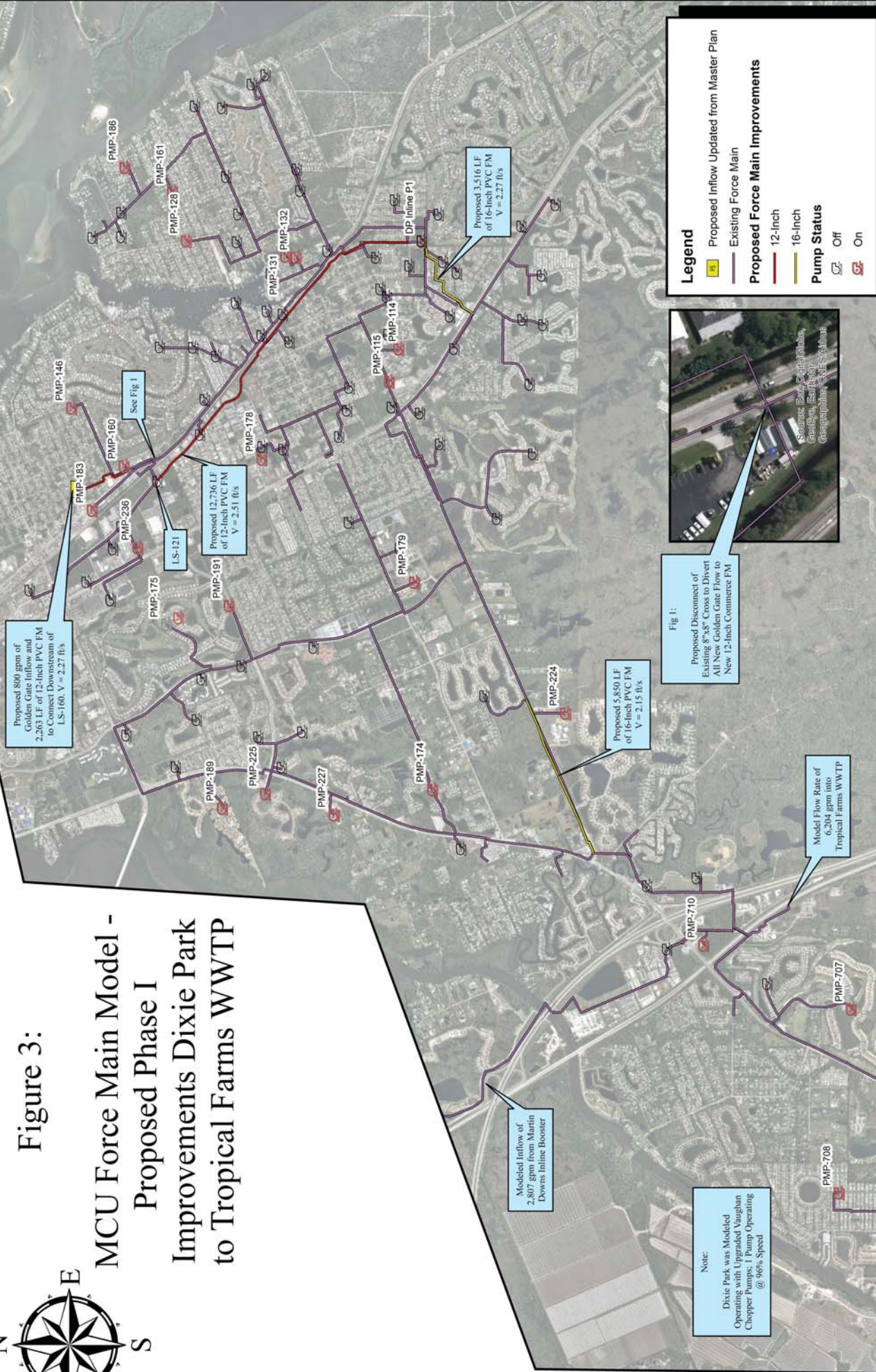
LS-161 (Repumed by Dixie Park)	--	32	110.88
LS-175	--	40	90.09
LS-178 (Repumed by Dixie Park)	--	108	97.02
LS-179	--	75	99.33
LS-183 (Repumed by Dixie Park)	--	228	87.78
LS-186 (Repumed by Dixie Park)	--	68	69.3
LS-189	--	107	97.02
LS-191	--	76	127.05
LS-707	--	235	85.47
LS-708	--	248	99.33
LS-710	--	32	50.82
LS-174	--	251	87.78
LS-224	--	188	108.57
LS-225	--	41	101.64
LS-227	--	68	90.09
LS-236 (Repumed by Dixie Park)	--	75	78.54

With the addition of these developments and septic to sewer conversions the following improvements to the existing wastewater transmission system in the Dixie Park to Tropical Farms service area are required and can be seen in **Figure 3** (Improvements to the Martin Downs service area are part of a separate report and are not discussed here):

1. Construct approximately 2,263 LF of new 12-inch PVC force main that extends from the empty lot on SE Garden St south winding along existing utility easements and right-of-way to connect the Golden Gate vacuum pump station to the existing force main system downstream of LS-160 on SE Dixie Hwy.
2. Construct approximately 12,736 LF of new 12-inch PVC force main along SE Commerce Ave and SE Railway Ave from LS-121 to the Dixie Park Inline Booster Pump Station common suction header.
3. Disconnect the 8"x8" cross on SE Dixie Hwy east of SE Market Place and the F.E.C. Railroad to divert all the Golden Gate flow to the new Commerce Ave 12-inch force main.
4. Replace the existing Dixie Park inline booster pumps with upgraded Vaughan chopper-style pumps to handle peak hour flows (one in service and one on standby with room for a third) and smaller jockey pumps to handle off-peak average flows (one in service and one on standby).
5. Construct approximately 3,516 LF of new parallel 16-inch PVC force main downstream of the Dixie Park inline booster pump station along SE Salvatori Rd and SE Village Rd that connects to the existing 12-inch force main on US-1.

6. Construct approximately 5,850 LF of new parallel 16-inch PVC FM on SE Cove Rd from S Kanner Hwy to just east of SE Atlantic Ridge Dr.
7. Install a new Vaughan chopper-style pump and VFD at the Martin Downs Inline Booster Pump Station.

Figure 3:



Note:
Dixie Park was Modeled
Operating with Upgraded Vaughan
Chopper Pumps; 1 Pump Operating
@ 96% Speed

Modeled Inflow of
2,807 gpm from Martin
Downs Inline Booster

Proposed 5,850 LF
of 16-Inch PVC FM
V = 2.15 ft/s

Fig 1:
Proposed Disconnect of
Existing 8"x8" Cross to Divert
All New Golden Gate Flow to
New 12-Inch Commerce FM

Model Flow Rate of
6,204 gpm into
Tropical Farms WWTP

[illegible]

Legend

 Proposed Inflow Updated from Master Plan
 Existing Force Main
Proposed Force Main Improvements

Proposed Force Main Improvements

— 12-Inch

— 16-Inch

Pump Status

Off

50

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus

5.0 Dixie Park Improvements – Phase II

The current MCU Septic to Sewer Conversion project schedule and developer agreements expect that Phase II of new wastewater inflow to the existing wastewater transmission system from the following developments and septic to sewer conversions:

- Golden Gate – 800 GPM
- Port Salerno – 423 GPM
- Pineland Prairie Phase I – 330 GPM
- Old Palm City – 1,000 GPM
- North Mapp Rd – 89 GPM

Baseline existing peak hour flow rates through the Dixie Park Inline Booster Pump Station and the Martin Downs Inline Booster Pump Station were derived from SCADA data at the inline boosters from May and June of 2018. Baseline existing peak hour flow rate to Tropical farms were derived from Tropical Farms influent flow data from 2017-2018. Anticipated model flow rates to Dixie Park, Martin Downs, and Tropical Farms were the summation of the existing baseline flows and the expected inflow from the new developments and septic to sewer conversions and are as follows:

- Dixie Park – 2,479 GPM
- Martin Downs – 2,807 GPM
- Tropical Farms – 6,645 GPM

Peak hour flow was simulated through a combination of existing and proposed stations being operational. **Table 5** provides the operational lift stations within the hydraulic model under a simulated peak hour flow condition. The flows into Tropical Farms, Martin Downs Inline Booster Pump Station, and Dixie Park Inline Booster Pump Station are 6,580 gpm, 2,807 gpm, and 2,460 gpm respectively, which are close to the expected flows for each facility.

Table 5: Operational Lift Stations to Simulate Estimated Phase II Conditions

Lift Station	Design Flow (GPM)	Modeled Flow (GPM)	Head (feet)
Golden Gate (Repumped by Dixie Park)	800	800	103
Port Salerno (Repumped by Dixie Park)	423	423	47
LS-114 (Repumped by Dixie Park)	--	245	83.16
LS-115 (Repumped by Dixie Park)	--	229	71.61
LS-128 (Repumped by Dixie Park)	--	201	71.61
LS-131 (Repumped by Dixie Park)	--	25	83.16
LS-132 (Repumped by Dixie Park)	--	25	83.16

LS-161 (Repumed by Dixie Park)	--	32	110.88
LS-175	--	95	85.47
LS-178 (Repumed by Dixie Park)	--	109	97.02
LS-179	--	137	94.71
LS-183 (Repumed by Dixie Park)	--	234	85.47
LS-186 (Repumed by Dixie Park)	--	69	69.3
LS-189	--	159	92.4
LS-191	--	79	120.12
LS-707	--	265	83.16
LS-710	--	21	50.82
LS-174	--	267	87.78
LS-224	--	155	110.88
LS-225	--	59	97.02
LS-227	--	76	87.78
LS-236 (Repumed by Dixie Park)	--	68	85.47

With the addition of these developments and septic to sewer conversions the following additional improvements from Phase I to the existing wastewater transmission system in the Dixie Park to Tropical Farms service area are required and can be seen in **Figure 4** (Improvements to the Martin Downs service area are part of a separate report and are not discussed here):

1. Construct 7,420 LF of additional parallel 16-inch PVC force main on SE Cove Road extending east past SE Willoughby Blvd. near SE Northgate Dr.
2. Construct approximately 788 LF of new 8-inch PVC force main to connect the Port Salerno vacuum pump station to the new 12-inch Commerce Ave force main.
3. Construct an interconnect at the Port Salerno inflow to connect the new Commerce Ave force main to the existing 8-inch force main downstream of LS-237.



6.0 Dixie Park Improvements – Phase III

The current MCU Septic to Sewer Conversion project schedule and developer agreements expect that Phase III of new wastewater inflow to the existing wastewater transmission system from the following developments and septic to sewer conversions:

- Golden Gate – 800 GPM
- Port Salerno – 423 GPM
- Stuart Yacht and Country Club LS 1 – 128 GPM
- Stuart Yacht and Country Club LS 2 – 127 GPM
- Pineland Prairie Phase I – 330 GPM
- Old Palm City – 1,000 GPM
- North Mapp Rd – 89 GPM

Baseline existing peak hour flow rates through the Dixie Park Inline Booster Pump Station and the Martin Downs Inline Booster Pump Station were derived from SCADA data at the inline boosters from May and June of 2018. Baseline existing peak hour flow rate to Tropical farms were derived from Tropical Farms influent flow data from 2017-2018. Anticipated model flow rates to Dixie Park, Martin Downs, and Tropical Farms were the summation of the existing baseline flows and the expected inflow from the new developments and septic to sewer conversions and are as follows:

- Dixie Park – 2,734 GPM
- Martin Downs – 2,807 GPM
- Tropical Farms – 6,900 GPM

Peak hour flow was simulated through a combination of existing and proposed stations being operational. **Table 6** provides the operational lift stations within the hydraulic model under a simulated peak hour flow condition. The flows into Tropical Farms, Martin Downs inline booster, and Dixie Park inline booster are 6,830 gpm, 2,807 gpm, and 2,788 gpm respectively, which are close to the expected flows for each facility.

Table 6: Operational Lift Stations to Simulate Estimated Phase III Conditions

Lift Station	Design Flow (GPM)	Modeled Flow (GPM)	Head (feet)
Golden Gate (Repumped by Dixie Park)	800	800	117
Port Salerno (Repumped by Dixie Park)	423	423	45
Stuart Yacht and Country Club LS 1 (Repumped by Dixie Park)	128	128	111
Stuart Yacht and Country Club LS 2 (Repumped by Dixie Park)	127	127	63
LS-114 (Repumped by Dixie Park)	--	266	83.16
LS-115 (Repumped by Dixie Park)	--	251	69.3

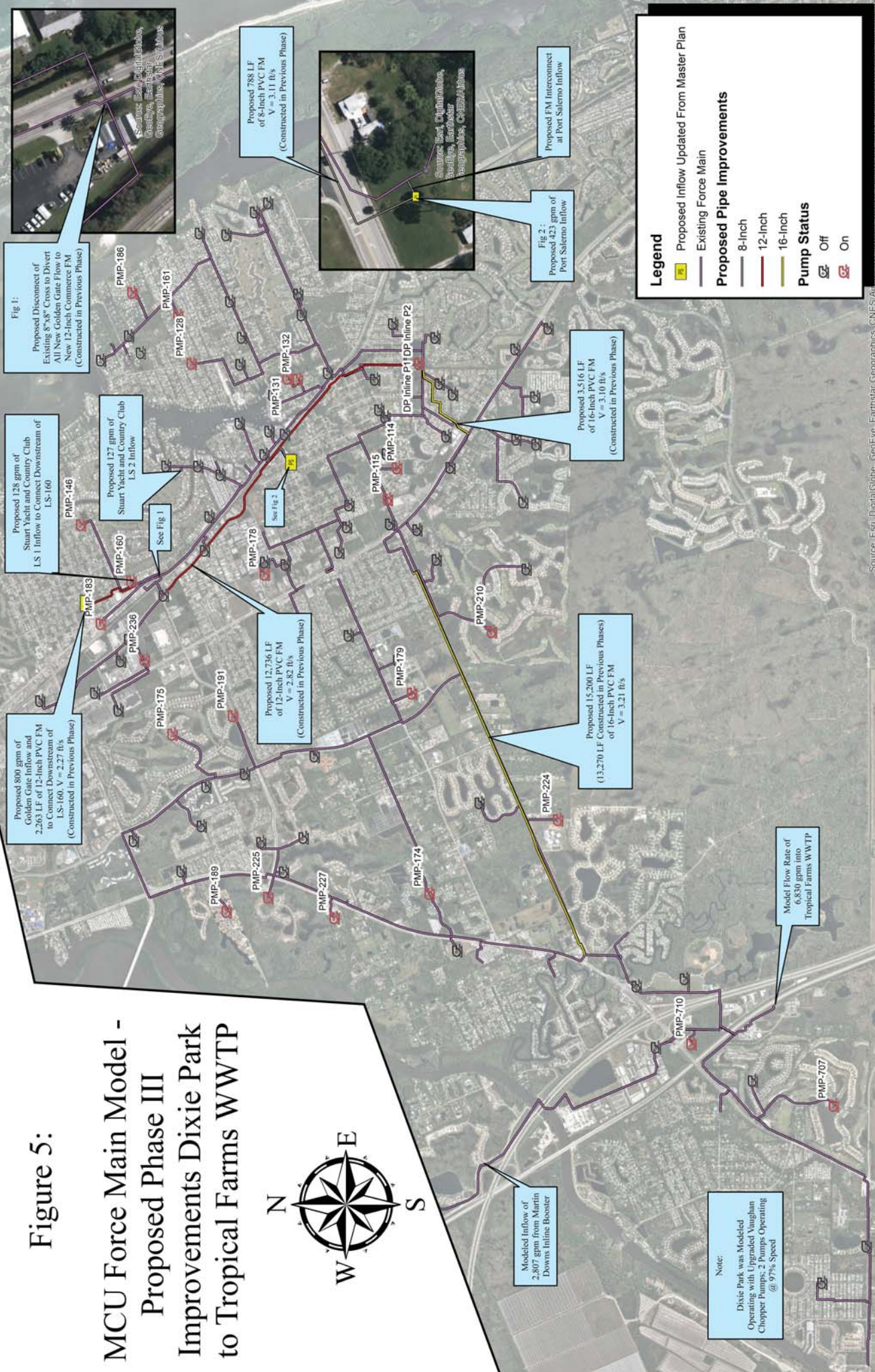
LS-128 (Repumed by Dixie Park)	--	218	69.3
LS-131 (Repumed by Dixie Park)	--	26	80.85
LS-132 (Repumed by Dixie Park)	--	26	80.85
LS-161 (Repumed by Dixie Park)	--	33	110.88
LS-175	--	70	87.78
LS-178 (Repumed by Dixie Park)	--	117	94.71
LS-179	--	114	97.02
LS-183 (Repumed by Dixie Park)	--	231	85.47
LS-186 (Repumed by Dixie Park)	--	76	66.99
LS-189	--	133	94.71
LS-191	--	78	122.43
LS-210	--	66	101.64
LS-707	--	264	83.16
LS-710	--	13	50.82
LS-174	--	240	90.09
LS-224	--	141	110.88
LS-225	--	48	99.33
LS-227	--	67	90.09
LS-236 (Repumed by Dixie Park)	--	67	85.47

With the addition of these developments and septic to sewer conversions the following additional improvements from Phase II to the existing wastewater transmission system in the Dixie Park to Tropical Farms service area are required and can be seen in **Figure 5** (Improvements to the Martin Downs service area are part of a separate report and are not discussed here):

1. Construct an additional 1,930 LF of parallel 16-inch PVC force main on SE Cove Rd east to the intersection of Rosemont Ave and SE Cypress St.
2. Install an additional Vaughan chopper-style pump and VFD at the Dixie Park Inline Booster Pump Station.

Figure 5:

MCU Force Main Model - Proposed Phase III Improvements Dixie Park to Tropical Farms WWTP



7.0 Dixie Park Improvements – Phase IV

The current MCU Septic to Sewer Conversion project schedule and developer agreements expect that Phase IV of new wastewater inflow to the existing wastewater transmission system from the following developments and septic to sewer conversions:

- Golden Gate – 800 GPM
- Port Salerno – 423 GPM
- Stuart Yacht and Country Club LS 1 – 128 GPM
- Stuart Yacht and Country Club LS 2 – 127 GPM
- Hibiscus Park LS 1 – 311 GPM
- Hibiscus Park LS 2 – 311 GPM
- Pineland Prairie Phase I – 330 GPM
- Old Palm City – 1,000 GPM
- North Mapp Rd – 89 GPM

Baseline existing peak hour flow rates through the Dixie Park inline booster pump station and the Martin Downs inline booster pump station were derived from SCADA data at the inline boosters from May and June of 2018. Baseline existing peak hour flow rate to Tropical farms were derived from Tropical Farms influent flow data from 2017-2018. Anticipated model flow rates to Dixie Park, Martin Downs, and Tropical Farms were the summation of the existing baseline flows and the expected inflow from the new developments and septic to sewer conversions and are as follows:

- Dixie Park – 2,734 GPM
- Martin Downs – 2,807 GPM
- Tropical Farms – 7,522 GPM

Peak hour flow was simulated through a combination of existing and proposed stations being operational. **Table 7** provides the operational lift stations within the hydraulic model under a simulated peak hour-flow condition. The flows into Tropical Farms, Martin Downs inline booster, and Dixie Park Inline Booster Pump Station are 7,424 gpm, 2,807 gpm, and 2,766 gpm respectively, which are close to the expected flows for each facility.

Table 7: Operational Lift Stations to Simulate Estimated Phase IV Conditions

Lift Station	Design Flow (GPM)	Modeled Flow (GPM)	Head (feet)
Golden Gate (Repumped by Dixie Park)	800	800	118
Port Salerno (Repumped by Dixie Park)	423	423	46
Stuart Yacht and Country Club LS 1 (Repumped by Dixie Park)	128	128	113
Stuart Yacht and Country Club LS 2 (Repumped by Dixie Park)	127	127	64
Hibiscus Park LS 1	311	311	89
Hibiscus Park LS 2	311	311	122

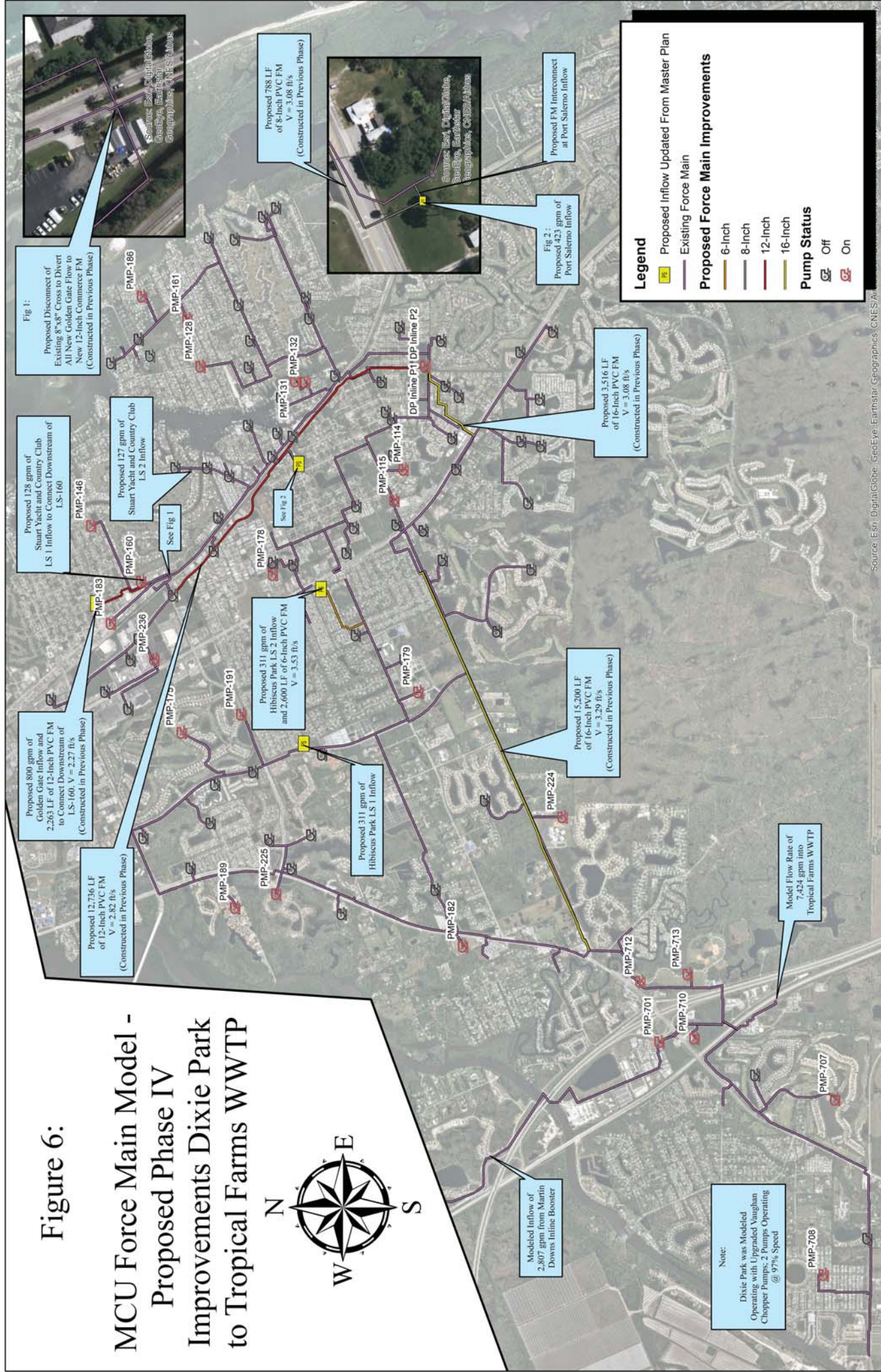
LS-114 (Repumed by Dixie Park)	--	262	83.16
LS-115 (Repumed by Dixie Park)	--	247	69.3
LS-128 (Repumed by Dixie Park)	--	213	71.61
LS-131 (Repumed by Dixie Park)	--	26	83.16
LS-132 (Repumed by Dixie Park)	--	26	83.16
LS-161 (Repumed by Dixie Park)	--	33	110.88
LS-175	--	3	94.71
LS-178 (Repumed by Dixie Park)	--	115	94.71
LS-179	--	59	101.64
LS-182	--	99	78.54
LS-183 (Repumed by Dixie Park)	--	227	87.78
LS-186 (Repumed by Dixie Park)	--	74	66.99
LS-189	--	70	99.33
LS-191	--	74	129.36
LS-701	--	243	66.99
LS-707	--	230	85.47
LS-708	--	244	99.33
LS-712	--	8	73.92
LS-713	--	44	73.92
LS-224	--	129	110.88
LS-225	--	25	103.95
LS-236 (Repumed by Dixie Park)	--	66	85.47

With the addition of these developments and septic to sewer conversions the following additional improvements from Phase III to the existing wastewater transmission system in the Dixie Park to Tropical Farms service area are required and can be seen in **Figure 6** (Improvements to the Martin Downs service area are part of a separate report and are not discussed here):

1. Construct approximately 2,600 LF of new 6-inch PVC force main along SE Holly St. and SE Celestial Cir. to connect Hibiscus Park LS 2 to the existing 8-inch force main.
2. Construct approximately 200 LF of new 6-inch PVC force main to connect Hibiscus Park LS 1 located near SE Harrison St. to the existing 12-inch force main along SE Willoughby Blvd.

Figure 6:

MCU Force Main Model - Proposed Phase IV Improvements Dixie Park to Tropical Farms WWTP



8.0 Summary

There are several existing neighborhoods in the MCU service area that are going to transition from utilizing individual septic tanks to a centralized collection and treatment system. These neighborhoods include Golden Gate, Salerno, Hibiscus Park, Stuart Yacht and Country Club, Old Palm City, and North Mapp Road. MCU and HCE prepared an updated wastewater master plan in 2014 that included these neighborhoods as well as several other developments. Now that the planning and design of the conversion of these neighborhoods are beginning or have been further refined, the existing hydraulic wastewater model of the MCU wastewater transmission system developed during the 2014 Wastewater Master Plan Update was updated to reflect these revised wastewater flows.

A construction/implementation plan was developed and these individual phases as well as the buildout scenario were evaluated. “Backbone” collection improvements will be required to accommodate the additional wastewater flows created by the neighborhoods. An analysis was performed, and force main and inline booster pump stations improvements were developed along with a phasing plan. The improvements were sized to accommodate the increased flows for each phase as well as the buildout flow.