

Date: 2/14/2023

Project No.: 20842 (Wright-Pierce)

To: Terry Bovaird, City Manager

From: Chris Baggett, PE; Roberto Rosario, PE; Lawrence Neal, EI;

Subject: Extending Wastewater Services to Proposed Developments – Technical Memorandum

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## 1 Introduction

Wright-Pierce (WP) is developing an Infrastructure Revitalization Plan (Plan) for the City of Williston (City). The plan has identified 20 proposed developments that are expected to connect to City services. The City wishes to evaluate connecting five of the proposed developments to City sewer service. To assist the City in this effort, WP was tasked with performing the following wastewater system-related services:

- Develop up to four options to provide the Proposed Development 15 - Morales recreational vehicle (RV) Park, and Developments 9, 10, 11, and 12 with sewer service
- Preliminarily size the wastewater collection and transmission system (WWCTS) components needed to serve these future developments
- Assess whether the existing wastewater treatment facility (WWTF) has the capacity for the proposed wastewater flows.

Additionally, the City is currently in discussions with the Morales RV Park representatives. The Morales RV Park representatives have indicated the Morales RV Park may quickly reach build out conditions shortly after initial construction. The City has requested planning-level opinions of probable project costs (OPPCs) for each option as well as OPPCs for each option modified to serve only the Morales RV Park alone.

This technical memorandum (TM) summarizes aspects of the work as well as the resultant planning-level OPPCs.

## 2 Wastewater System Overview

The City owns and operates a public wastewater system, which consists of the following:

- One 0.45 million gallon per day (MGD) WWTF
- A WWCTS consisting of approximately 20 miles of gravity mains, 19 lift stations, and 11 miles of force main

### 3 Applicable Resources

The City provided the following resources to WP for development of this TM:

- The City's wastewater infrastructure (e.g., wastewater gravity and force mains, lift stations, etc.) (in AutoCAD and PDF formats), which are partially complete
- Proposed Development Summary, developed with the assistance of WP in Task 2 of this project
- LS-6 Boundary and Topographic Survey, dated 07/01/2022, by Echo Utility Engineering & Survey
- WWTF Daily Monitoring Reports (DMRs)

WP also obtained the following additional resources for development of this TM:

- Williston WWTF Hydraulic Profile
- USGS Topographic Survey Data

### 4 Proposed Developments Descriptions and Flows

Four of the five proposed developments are located near the southeast portion of the wastewater service area, with the fifth proposed development, the Morales RV Park, located further southeast of the existing service area, along US 27. Table 4-1 provides descriptions and location details for each of the five developments being considered for connecting to the City's WWCTS.

**Table 4-1 Proposed Developments Summary**

Development ID	Development Name	Description	Location
9	Hanson	20 Single Family Residences (SFRs)	Adjacent parcels 0505901000, 0505900000, 0510000200, and 0510000000 bounded to the west by SE 4 <sup>th</sup> St, to the north by existing homes along SE 6 <sup>th</sup> Ave, to the east by the railroad, and to the south by Robert Philpot Way
10	Langston	Apartment complex with anticipated 145 units	
11	Orlando	25-acre parcel, undefined	
12	Townes of Williston	55 SFRs	
15	Morales RV Park	213 RV Cottages and 470 RV Sites	Parcel 0515200300 along the southwest side of US 27 just south of NE 25 <sup>th</sup> St.

Wastewater flows were developed for each of the five developments. The wastewater flows for Developments 9 through 12 were based on the water demand projections previously developed and presented to the City, while the wastewater flows for the Morales RV Park were developed from standard sewage generation rates for RV sites.

For Developments 9 through 12, a water-to-wastewater generation ratio (generation ratio) was used to convert water demands to wastewater flows. The generation ratio was calculated as the 12-month average daily flow (ADF) to the WWTF divided by the average metered customer demand during the same 12-month period. The 12-month period was selected to be the same period used to establish existing water customer demands, August 2020 to July 2021. The generation ratio is calculated below, and was applied to the water demands for Developments 9 through 12:

- 12-month ADF to WWTF (based on WWTF DMR for July 2021): 0.242 MGD (168 GPM)
- Average metered customer demand: 0.454 MGD
- Generation Ratio = 0.242 MGD / 0.454 MGD = 0.53

For the Morales RV Park, wastewater flow was estimated by assuming an average of 2 persons per RV site and a sewage generation rate of 40 gallons per day per person.

Table 4-2 presents the calculated future annual average daily flows (AADFs) and peak hourly flows (PHFs), population estimates, and peaking factors for the five developments.

**Table 4-2 Calculated Wastewater Flows Summary**

Development Group <sup>1</sup>	Population Estimate	Future Water Average Daily Demand (GPD/GPM) <sup>2</sup>	Per Capita Wastewater Flow (GPD/GPM)	Future Wastewater AADF (GPD/GPM)	Peak Factor <sup>3</sup>	Future Wastewater PHF (GPD/GPM)
Developments 9, 10, 11, & 12	662 <sup>4</sup>	77,948 / 54	62.9 / 0.044	41,640 / 29	3.91	162,812 / 113
Morales RV Park	1,366	185,806 / 129	40 / 0.028	54,640 / 38	3.71	202,714 / 141

Notes: (1) The Developments with common flow calculations were grouped together. (2) The future water demands were previously developed during Task 2 of this project which involved developing proposed improvements for the future water system. (3) The peaking factor is calculated using a formula referenced in the *Recommended Standards for Wastewater Facilities* for calculating the ratio of peak hourly flow to design average flow, such that the PHF / Design ADF =  $(18 + \sqrt{\text{population in thousands}}) / (4 + \sqrt{\text{population in thousands}})$ . (4) The population estimate for Developments 9 through 12 was calculated based on the previously developed Task 2 water demand estimate of 117.8 gpd / person and the previously calculated development future water demands.

## 5 Preliminary Hydraulic Analysis

A preliminary hydraulic analysis was performed considering the below four options, to determine how to optimally provide the five developments with sewer service:

- **Option 1:** Connect all five developments to the WWTF with new force mains via a primary route
- **Option 2:** Connect all five developments to the WWTF with new force mains via alternate route
- **Option 3:** Connect all five developments to LS-1 with new force mains and upgrade LS-1
- **Option 4:** Connect Morales RV Park to LS-6 with new force main; upgrade LS-6 and downstream gravity sewer to LS-7; connect Developments 9 through 12 to LS-7 with new force main; upgrade LS-7 and downstream gravity sewer to LS-1; and upgrade LS-1

For all options, the five developments are assumed to be served by two future City-maintained lift stations, one future lift station collecting wastewater from Morales RV Park (identified herein as LS-A, herein), and the other collecting wastewater from Developments 9 through 12 (identified herein as LS-B, herein).

The preliminary hydraulic analysis was performed using hydraulic modeling software, with each option represented as an individual scenario. Note: The connectivity, diameters, slopes, and current flows through the existing gravity sewers associated with Option 4 are questionable. Also, there is no hydraulic model of the existing gravity sewer associated with Option 4. Therefore, the gravity sewer improvements proposed for Option 4 are based primarily on engineering judgment. If Option 4, which is the highest cost option, were selected for implementation, a hydraulic model of the existing gravity sewer system would need to be developed and the proposed improvements discussed herein would need to be further evaluated.

The analysis consisted of the following steps (Note: all elevations based on USGS topographic survey data unless otherwise indicated):

- **Establishing boundary conditions** – Representations of wastewater infrastructure which were considered critical for conveying flow from the five developments, summarized in Table 5-1:

**Table 5-1 Boundary Conditions Summary**

Boundary Condition	Elevation (FT)	Comment
WWTF headworks influent water surface elevation (WSEL)	87.5	From recent hydraulic profile for the City's WWTF upgrade design
Discharge elevation to LS-1	67.00	From USGS topographic survey data
Discharge elevation to LS-7	65.00	From USGS topographic survey data
High point elevation along flow path to LS-6	79.00	From USGS topographic survey data
Ground elevation of LS-A	80.00	From USGS topographic survey data
WSEL of LS-A	65.00	Assumed 15 feet below ground elevation
Ground elevation of LS-B	66.00	From USGS topographic survey data
WSEL of LS-B	51.00	Assumed 15 feet below ground elevation

- **Assignment of pipe inside-diameters and Hazen-Williams C-Factors** – Pipe inside diameters were assigned based on the pipe nominal diameter and material for all new gravity and force mains. Hazen-William C-Factors were set to 120 for all new force mains.
- **Distribution of Flows** – Wastewater flows for Developments 9 through 12, and for the Morales RV Park, were assigned as point flows to each respective lift station.

The remainder of this section covers the design criteria for the sizing of needed improvements for each of the options and summarizes the needed improvements for implementing each option based on the results of this analysis.

## 5.1 Design Criteria

Details criteria for preliminary sizing of lift stations, force mains, and gravity mains included the following:

- **Lift Station Design Criteria:**
  - Proposed pumping rate for LS-A: 250 GPM per pump, to convey the future PHF from Morales RV Park
  - Proposed pumping rate for LS-B: 300 GPM per pump, to convey the total future PHF from Developments 9 through 12
- **Force Main Design Criteria:**
  - For all open cut and direct-bury installations of force main with a minimum of 36 inches of cover, PVC pipe meeting the requirements of AWWA C-900, Dimension Ratio (DR) 18 is assumed. The following average inner diameters were used:
    - 6-inch, ID = 6.09 inches
    - 8-inch, ID = 7.98 inches
    - 10-inch, ID = 9.79 inches
  - Force main sizes selected based on maintaining velocities in the force main segments above 2.5 feet per second (FPS). Table 5-2 presents the flow velocities associated with selected force main inside diameter sizes for each pumping rate scenario, as well as the corresponding options the scenario is relevant to.

**Table 5-2 Force Main Sizes and Calculated Velocities**

Development Groups Sharing Force Main Segment	Proposed Lift Station	Option(s)	Proposed Pumping Rate through Force Main Segment (GPM)	Selected Force Main Inside Diameter (in)	Velocity through Force Main (FPS)
Morales RV Park	LS-A	1,2,3,4	250	6.09	2.75
Developments 9 through 12	LS-B	4	300	6.09	3.30
Developments 9 through 12, and Morales RV Park	LS-A and LS-B	1,2,3	550	7.98	3.53

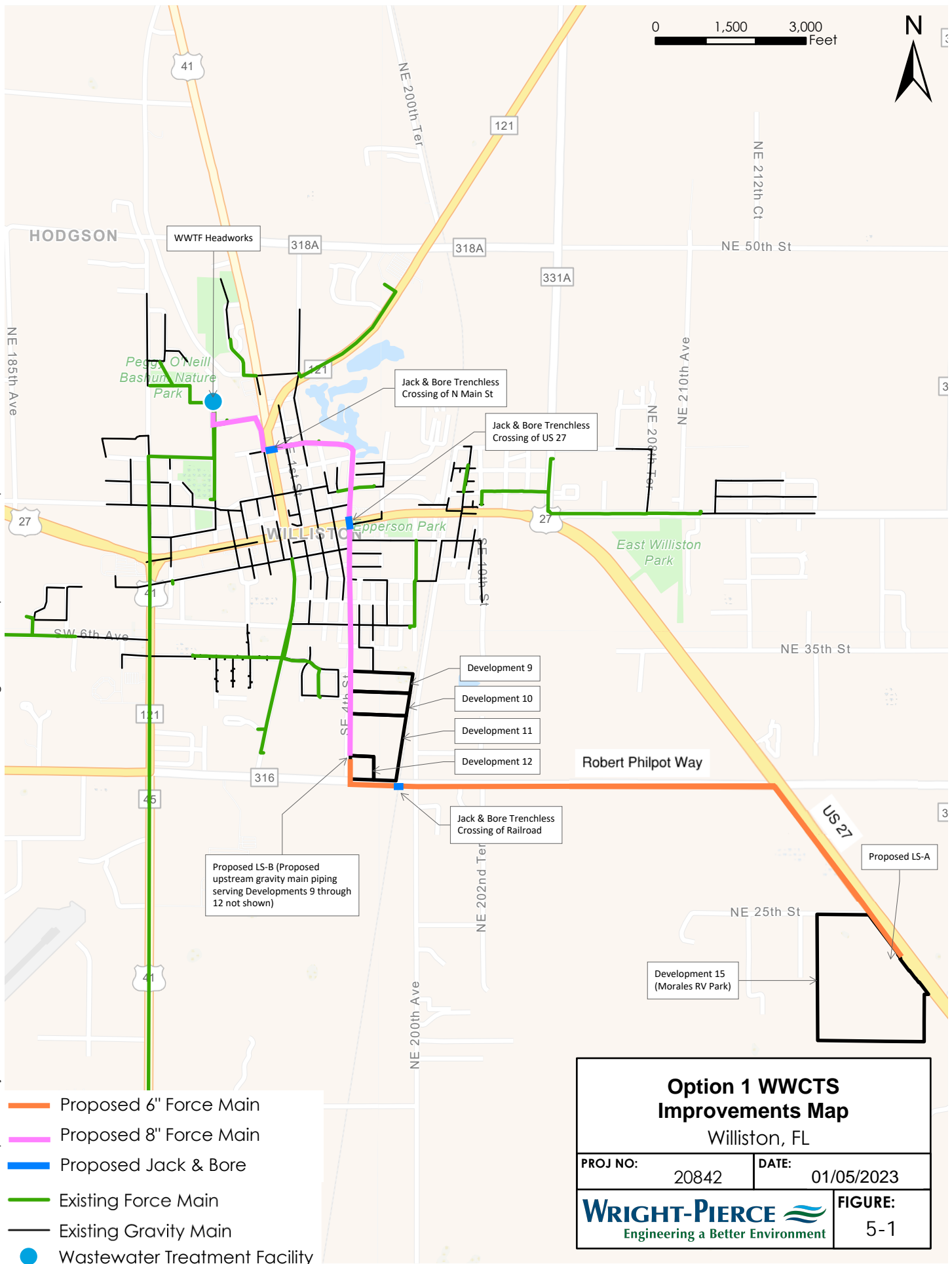
## 5.2 Analysis Results – Needed Improvements

The results of the analysis include the needed improvements for each of the four options to adequately convey wastewater flows from the five developments. Needed improvements for each of the four options are presented in the following subsections.

### 5.2.1 Option 1 – All Five Developments Routed to WWTF

Figure 5-1 presents an overview of Option 1. Option 1 consists of two sections. For the first section, a new 6-inch diameter force main will convey flows from the proposed lift station located at the Morales RV Park (LS-A), northwestward along US 27, Robert Philpot Way, and SE 4<sup>th</sup> St, manifolded to the force main from the proposed lift station associated with Developments 9 through 12 (LS-B). For the second section, a new 8-inch diameter force main will convey the combined flows from the Morales RV Park and Developments 9 through 12, northwestward along SE 4<sup>th</sup> St, NE 4<sup>th</sup> St, NE 4<sup>th</sup> Ave, and NW 5<sup>th</sup> Pl, to the WWTF. Details related to this option are summarized below:

- **Section 1:** Morales RV Park to Developments 9 through 12
  - Construct duplex lift station at Morales RV Park (LS-A)
    - Preliminary pump condition: 250 GPM at 181 FT of total dynamic head (TDH) (per pump)
    - 6-foot diameter wet well
    - 25 LF of 10-inch diameter influent gravity main and receiving manhole
  - Construct 13,170 LF of 6-inch diameter force main via open-cut along US 27, Robert Philpot Way, and SE 4<sup>th</sup> St
  - Trenchless jack & bore construction:
    - Construct 110 LF of 6-inch diameter force main inside steel casing under railroad
- **Section 2:** Developments 9 through 12 to WWTF
  - Construct 1,500 LF of local 8-inch gravity trunk main and four manholes
  - Construct duplex Lift Station near Development 12 (LS-B)
    - Preliminary pump condition: 300 GPM at 115 FT of TDH (per pump)
    - 6-foot diameter wet well
    - 25 LF of 10-inch diameter influent gravity main and receiving manhole
  - Construct 10,080 LF of 8-inch diameter force main via open-cut along SE 4<sup>th</sup> St, NE 4<sup>th</sup> St, NE 4<sup>th</sup> Ave, and NW 5<sup>th</sup> Pl
  - Trenchless jack & bore construction:
    - Construct 190 LF of 8-inch diameter force main inside steel casing under US 27
    - Construct 460 LF of 8-inch diameter force main inside steel casing under N Main St



### 5.2.2 Option 2 – All Five Developments Routed to WWTF

Figure 5-2 presents an overview of Option 2. Option 2 consists of two sections. For the first section, a new 6-inch diameter force main will convey flows from the proposed lift station located at the Morales RV Park, northwestward along US 27, Robert Philpot Way, and SE 4<sup>th</sup> St, manifolded to the force main from the proposed lift station associated with Developments 9 through 12. For the second section, a new 8-inch diameter force main will convey the combined flows from the Morales RV Park and Developments 9 through 12, northwestward along SE 4<sup>th</sup> St, SE 5<sup>th</sup> Ave, SW 5<sup>th</sup> Ave, SW 5<sup>th</sup> Terrace, SW 6<sup>th</sup> St, NW 6<sup>th</sup> St, NW 4<sup>th</sup> Ave, and NW 4<sup>th</sup> St, to the WWTF. Details related to this option are summarized below:

- **Section 1:** Morales RV Park to Developments 9 through 12
  - Construct duplex lift station at Morales RV Park (LS-A)
    - Preliminary pump condition: 250 GPM at 193 FT of TDH (per pump)
    - 6-foot diameter wet well
    - 25 LF of 10-inch diameter influent gravity main and receiving manhole
  - Construct 13,170 LF of 6-inch diameter force main via open-cut along US 27, Robert Philpot Way, and SE 4<sup>th</sup> St
  - Trenchless jack & bore construction:
    - Construct 110 LF of 6-inch diameter force main inside steel casing under railroad
- **Section 2:** Developments 9 through 12 to WWTF
  - Construct 1,500 LF of local 8-inch gravity trunk main and four manholes
  - Construct duplex Lift Station near Development 12 (LS-B)
    - Preliminary pump condition: 300 GPM at 126 FT TDH (per pump)
    - 8-foot diameter wet well
    - 25 LF of 10-inch diameter influent gravity main and receiving manhole
  - Construct 12,030 LF of 8-inch diameter force main via open-cut along SE 4<sup>th</sup> St, SE 5<sup>th</sup> Ave, SW 5<sup>th</sup> Ave, SW 5<sup>th</sup> Terrace, SW 6<sup>th</sup> St, NW 6<sup>th</sup> St, NW 4<sup>th</sup> Ave, and NW 4<sup>th</sup> St
  - Trenchless jack & bore construction:
    - Construct 370 LF of 8-inch diameter force main inside steel casing under W Noble Ave

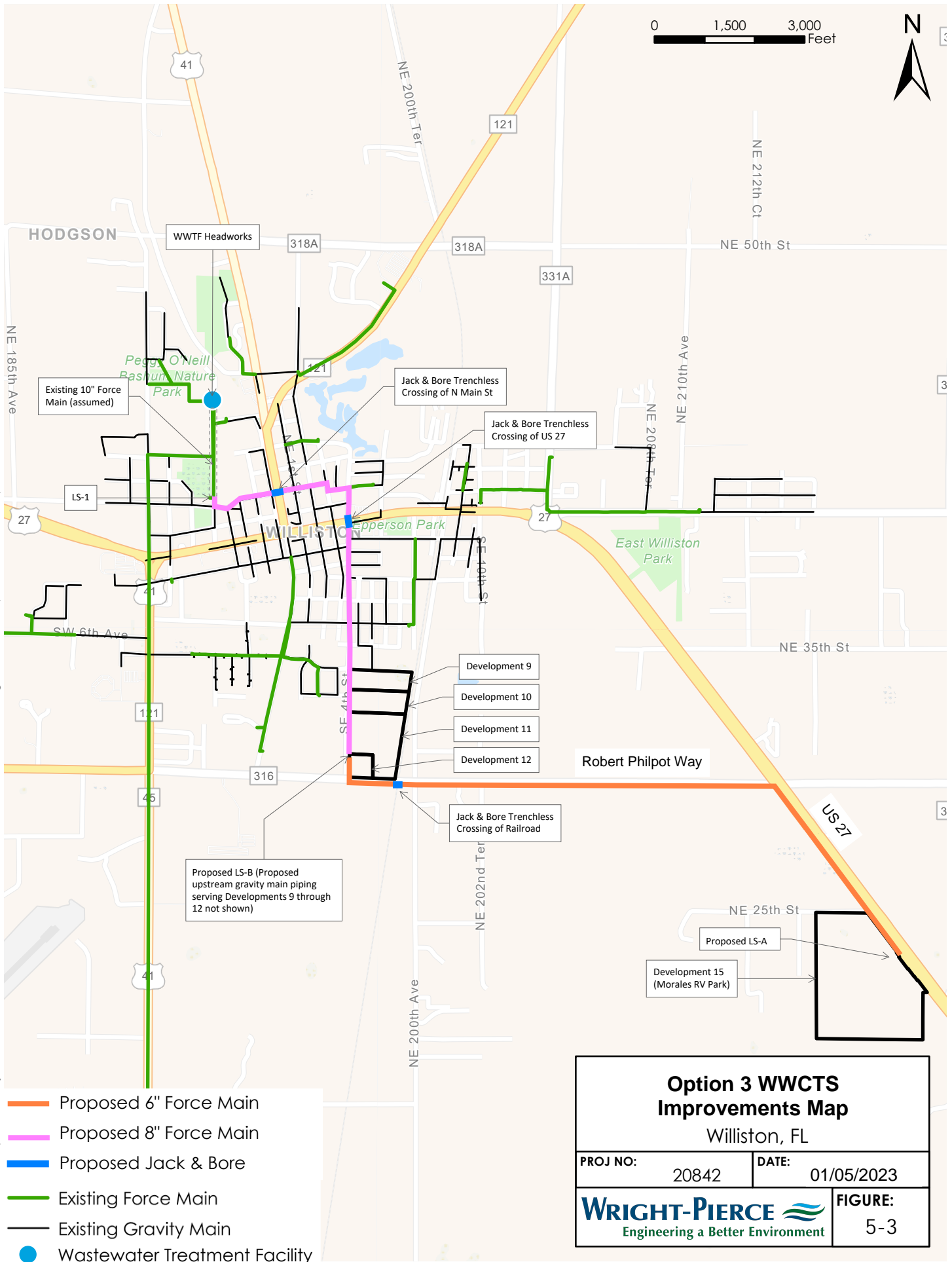




### 5.2.3 Option 3 – All Five Developments Routed to LS-1

Figure 5-3 presents an overview of Option 3. Option 3 consists of three sections. For the first section, a new 6-inch diameter force main will convey flows from the proposed lift station located at the Morales RV Park (LS-A), northwestward along US 27, Robert Philpot Way, and SE 4<sup>th</sup> St, manifolded to the force main from the proposed lift station associated with Developments 9 through 12 (LS-B). For the second section, a new 8-inch diameter force main will convey the combined flows from the Morales RV Park and Developments 9 through 12, northwestward along SE 4<sup>th</sup> St, NE 4<sup>th</sup> St, NE 1<sup>st</sup> Ave, NE 1<sup>st</sup> St, NE 2<sup>nd</sup> Ave, and NW 2<sup>nd</sup> Ave, to the receiving manhole of LS-1. For the third section, the combined flows from the Morales RV Park and Developments 9 through 12 are pumped by LS-1 through an existing 10-inch diameter force main to the WWTF. Details related to this option are summarized below:

- **Section 1:** Morales RV Park to Developments 9 through 12
  - Construct duplex lift station at Morales RV Park (LS-A)
    - Preliminary pump condition: 250 GPM at 146 FT of TDH (per pump)
    - 6-foot diameter wet well
    - 25 LF of 10-inch diameter influent gravity main and receiving manhole
  - Construct 13,170 LF of 6-inch diameter force main via open-cut along US 27, Robert Philpot Way, and SE 4<sup>th</sup> St
  - Trenchless jack & bore construction:
    - Construct 110 LF of 6-inch diameter force main inside steel casing under railroad
- **Section 2:** Developments 9 through 12 to LS-1
  - Construct 1,500 LF of local 8-inch gravity trunk main and four manholes
  - Construct duplex Lift Station near Development 12 (LS-B)
    - Preliminary pump condition: 300 GPM at 80 FT TDH (per pump)
    - 6-foot diameter wet well
    - 25 LF of 10-inch diameter influent gravity main and receiving manhole
  - Construct 7,650 LF of 8-inch diameter force main via open-cut along SE 4<sup>th</sup> St, NE 4<sup>th</sup> St, NE 1<sup>st</sup> Ave, NE 1<sup>st</sup> St, NE 2<sup>nd</sup> Ave, and NW 2<sup>nd</sup> Ave
  - Trenchless jack & bore construction:
    - Construct 460 LF of 8-inch diameter force main inside steel casing under E Noble Ave
    - Construct 260 LF of 8-inch diameter force main inside steel casing under N Main St
- **Section 3:** LS-1 to WWTF
  - Upgrade LS-1 to increase pumping capacity by 550 GPM, to convey combined flows from all five developments
  - Note: The existing 10-inch diameter discharge force main is assumed to be adequately sized



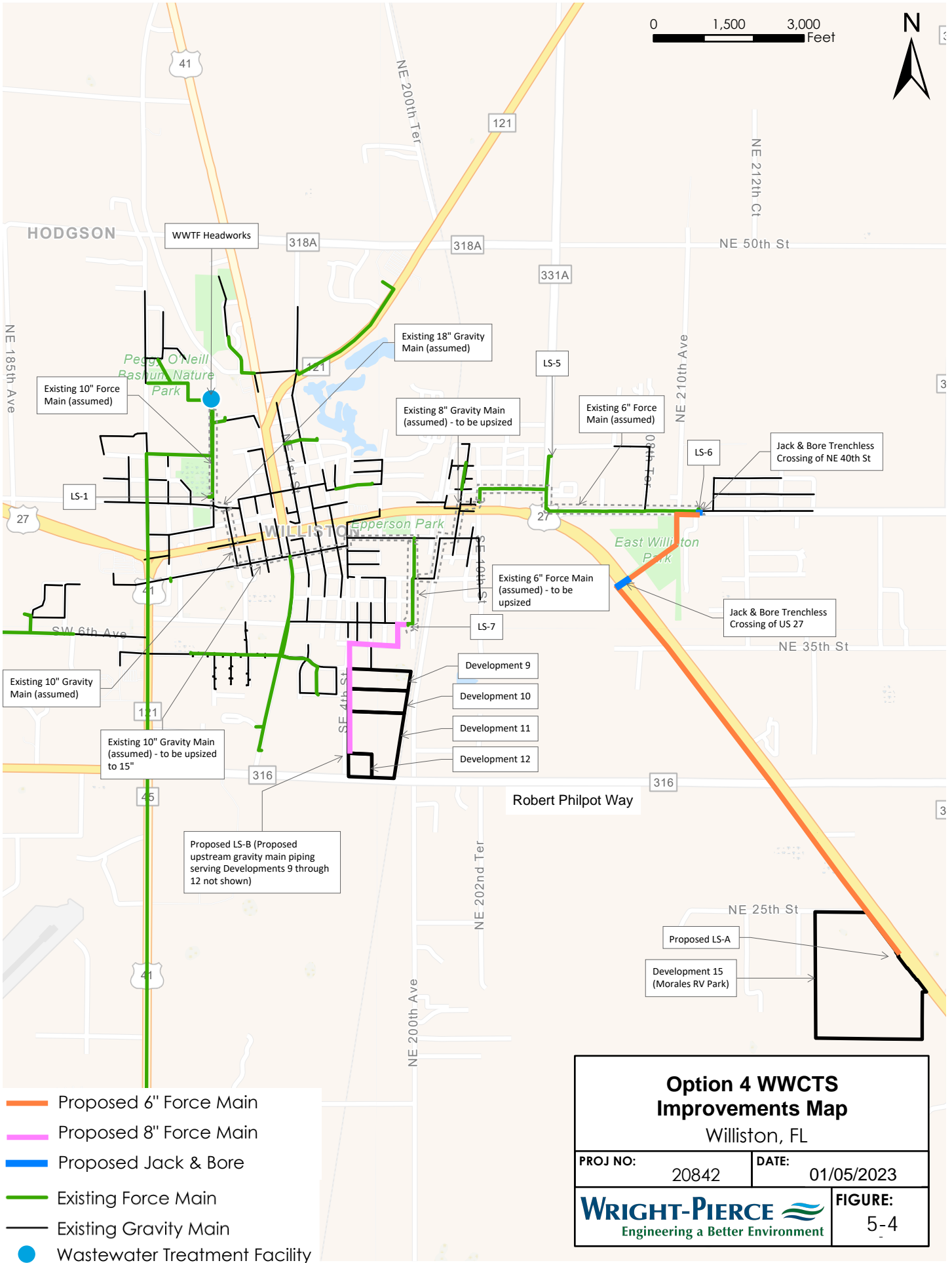
<b>Option 3 WWCTS Improvements Map</b> Williston, FL	
<b>PROJ NO:</b> 20842	<b>DATE:</b> 01/05/2023
<b>WRIGHT-PIERCE</b> Engineering a Better Environment	<b>FIGURE:</b> 5-3

#### 5.2.4 Option 4 – Developments 9 through 12 Routed to LS-7, and Morales RV Park Routed to LS-6

Figure 5-4 presents an overview of Option 4. Option 4 consists of five sections. For the first section, a new 6-inch diameter force main will convey flows from the proposed lift station located at the Morales RV Park (LS-A), northeastward along US 27, across East Williston Park, and along NE 40<sup>th</sup> St, to the receiving manhole of LS-6. For the second section, the flows from the Morales RV Park are pumped by LS-6 into an existing 6-inch diameter force main which discharges into the upstream gravity sewer of LS-7. For the third section, a new 8-inch diameter force main will convey flows from the proposed lift station located at Developments 9-12 (LS-B), northeastward along SE 4<sup>th</sup> St, SE 6<sup>th</sup> Ave, and SE 5<sup>th</sup> Terrace, to the receiving manhole of LS-7. For the fourth section, combined flows from the Morales RV Park and Developments 9 through 12 are pumped by LS-7 into an existing 6-inch diameter flows main which discharges into the upstream gravity sewer of LS-1. For the fifth section, the combined flows from the Morales RV Park and Developments 9 through 12 are pumped by LS-1 through an existing 10-inch diameter force main to the WWTF. Details related to this option are summarized below:

- **Section 1: Morales RV Park to LS-6**
  - Construct duplex lift station at Morales RV Park (LS-A)
    - Preliminary pump condition: 250 GPM at 84 FT of TDH (per pump)
    - 6-foot diameter wet well
    - 25 LF of 10-inch diameter influent gravity main and receiving manhole
  - Construct 11,380 LF of 6-inch diameter force main via open-cut along US 27, across East Williston Park, and along NE 40<sup>th</sup> St
  - Trenchless jack & bore construction:
    - Construct 290 LF of 6-inch diameter force main inside steel casing under US 27
    - Construct 120 LF of 6-inch diameter force main inside steel casing under NE 40<sup>th</sup> St
- **Section 2: LS-6 to LS-7**
  - Upgrade LS-6 to increase pumping capacity by 250 GPM, to convey the PHF from the Morales RV Park
  - Note the following assumptions:
    - LS-5 does not require upgrades (Note: LS-5 previously served an elementary school which may no longer be operational)
    - The 6-inch diameter force mains from LS-5 and LS-6 are assumed to be adequately sized
    - Upsize approximately 560 LF of gravity sewer from 8-inch to 10-inch diameter and 3,140 LF of gravity sewer from 10-inch to 12-inch diameter. Note: This gravity sewer upsizing is based on engineering judgement. If Option 4, which is the highest cost option, were selected a hydraulic model of the existing gravity sewer system would need to be developed and the proposed improvements discussed herein would need to be further evaluated.
- **Section 3: Developments 9 through 12 to LS-7**
  - Construct 1,500 LF of local 8-inch gravity trunk main and four manholes
  - Construct duplex Lift Station near Development 12 (LS-B)
    - Preliminary pump condition: 300 GPM at 46 FT TDH (per pump)
    - 6-foot diameter wet well
    - 25 LF of 10-inch diameter influent gravity main and receiving manhole
  - Construct 3,840 LF of 6-inch diameter force main via open-cut along SE 4<sup>th</sup> St, SE 6<sup>th</sup> Ave, and SE 5<sup>th</sup> Terrace

- **Section 4: LS-7 to LS-1**
  - Upgrade LS-7 to increase pumping capacity by 550 GPM, to convey combined flows from five developments
  - Upsize approximately 1,850 LF of force main from 6-inch diameter to 8-inch diameter
  - Upsize approximately 4,860 LF of gravity main from 10-inch diameter to 12-inch diameter
  - Confirm that the 18-inch diameter gravity main does not need to be upsized
- **Section 5: LS-1 to WWTF**
  - Upgrade LS-1 to increase pumping capacity by 550 GPM, to convey combined flows from the Morales RV Park and Developments 9 through 12
  - Note: The existing 10-inch diameter discharge force main from LS-1 is assumed to be adequately sized



## 6 Planning Level Opinion of Probable Project Costs

Table 6-1 presents the planning-level opinions of probable project costs (OPPCs) for each respective scenario, based on the following assumptions:

- Costs are represented in January 2023 dollars.
- Unit costs are based on engineering experience and conceptual budget estimates for various vendors
- A 30% factor is included to account for contingency
- A 10% factor is included to account for study, engineering design, survey, and geotechnical services

**Table 6-1 Options 1 through 4 – OPPCs Summary**

Item No.	Item Description	Cost
<b>Option 1</b>		
1	Proposed Collection and Transmission System	\$ 7,288,000
Option 1 OPPC		\$ 7,288,000
<b>Option 2</b>		
1	Proposed Collection and Transmission System	\$ 7,126,000
Option 2 OPPC		\$ 7,126,000
<b>Option 3</b>		
1	Proposed Collection and Transmission System	\$ 6,975,000
2	Upgrade Existing Collection and Transmission System	\$ 630,000
Option 3 OPPC		\$ 7,605,000
<b>Option 4</b>		
1	Proposed Collection and Transmission System	\$ 4,728,000
2	Upgrade Existing Collection and Transmission System	\$ 13,170,000
Option 4 OPPC		\$ 17,898,000

## 7 OPPCs for Improvements to Only Service the Morales RV Park

The City has requested OPPCs for the feasible options, with each option modified to provide sewer service to the Morales RV Park only (e.g., not including sewer services to Developments 9 through 12). For Options 1 through 3, this would entail construction of a duplex lift station at the Morales RV Park (LS-A) and construction of a 6-inch diameter force main extending from LS-A along the prescribed route to the outfall of each option, as detailed below:

- **For Options 1 and 2:**
  - **Section 2:** The 6-inch diameter force main would extend along a prescribed route to the WWTF
- **For Option 3:**
  - **Section 2:** The 6-inch diameter force main would extend along the prescribed route to the receiving manhole of LS-1
  - **Section 3:** LS-1 will be upgraded to increase pumping capacity by 250 GPM (e.g., increase station capacity for pumping flows from the Morales RV Park)

Note: The OPPC for Option 4 was significantly higher than OPPCs of the other options and for this reason, Option 4 was excluded from consideration because it does not appear feasible.

The OPPCs associated with each modified option for connecting the Morales RV Park to the City sewer service are presented in Table 7-1. The OPPC for each modified Option include the following, like the OPPCs developed for each original option:

- Costs are represented in January 2023 dollars.
- Unit costs are based on engineering experience and conceptual budget estimates for various vendors
- A 30% factor is included to account for contingency
- A 10% factor is included to account for study, engineering design, survey, and geotechnical services

**Table 7-1 OPPCs for Modified Options 1 through 3**

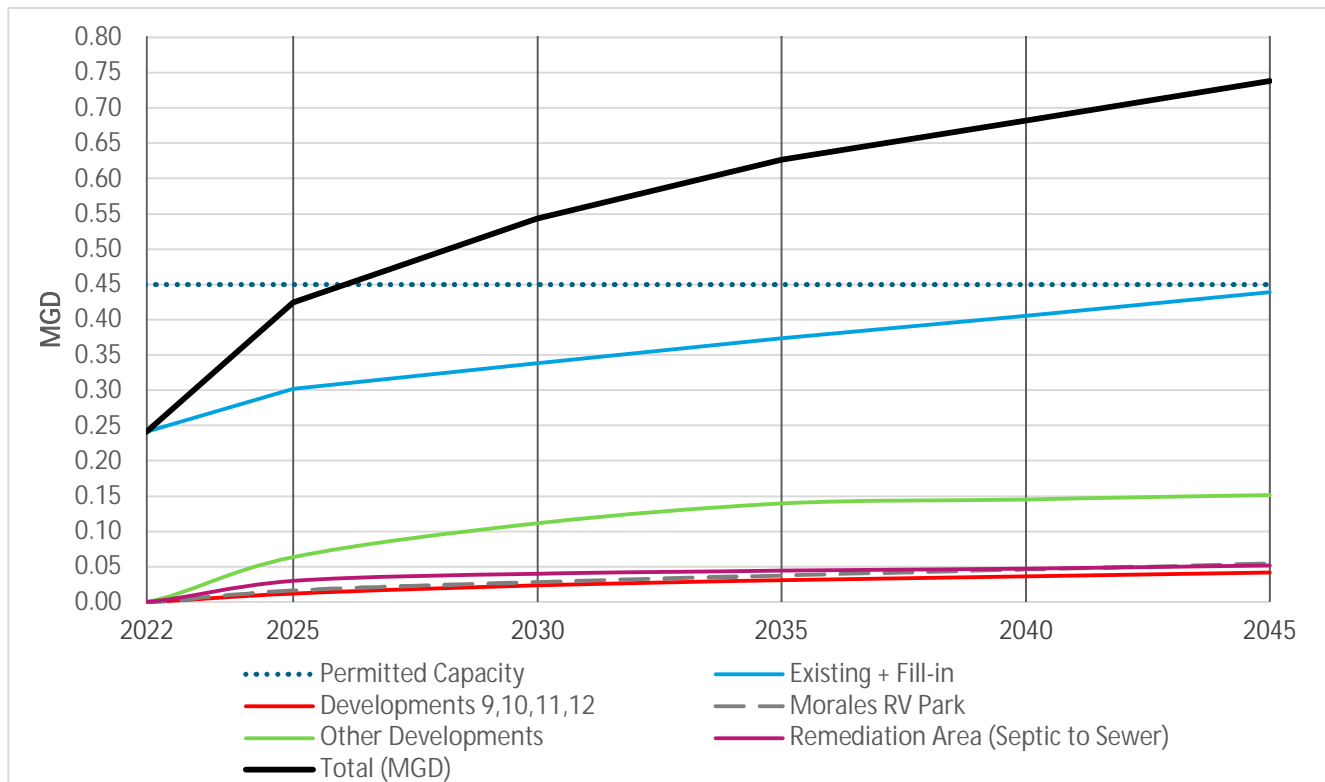
Modified Option	Item Description	OPPC
1	<ul style="list-style-type: none"> <li>• Proposed Collection and Transmission System, including LS-A and 6-inch diameter force main</li> </ul>	\$ 5,502,000
2	<ul style="list-style-type: none"> <li>• Proposed Collection and Transmission System, including LS-A and 6-inch diameter force main</li> </ul>	\$ 5,275,000
3	<ul style="list-style-type: none"> <li>• Proposed Collection and Transmission System, including LS-A and 6-inch diameter force main</li> <li>• Upgrade Existing Collection and Transmission System, including upgrades to LS-1</li> </ul>	\$ 5,903,000



## 8 Wastewater Treatment Plant Capacity

The future flows associated with the five developments being reviewed in this effort were projected over time. The relative increase in flow was assumed to be consistent with the rate of increasing water demands developed in Task 2 of this project. In addition, the water demands also included existing fill-in growth, 15 other proposed development projections, and septic to sewer conversions. Figure 6-1 shows the total wastewater flow projection with all these potential contributions through 2045. As shown, the wastewater treatment capacity may be exceeded in the next 5 to 10 years depending on the pace of fill-in growth and development.

**Figure 8-1 Projected Wastewater Flows Compared with WWTF Capacity**



Considering only the five developments reviewed in this Task A2 effort – Morales RV Park and Developments 9 through 12 – the total AADF to the WWTF is projected to increase by 0.096 MGD.

## 9 Recommendations

The following are recommended to be pursued in subsequent efforts:

- Develop a hydraulic wastewater model of the existing WWCTS for master planning purposes. Hydraulic modeling efforts would include the following:
  - Field-verification of manhole invert elevations, and gravity and force mains' sizes, materials, and connectivity
  - Lift station drawdown testing to determine actual pumping capacities of the City's primary lift stations
  - Model calibration, to incorporate the above items into the model to the extent that the model could be used for master planning purposes with a reasonable level of accuracy
- Perform an evaluation of the City's existing WWTF to more accurately determine whether the WWTF could be expanded to provide additional treatment capacity