

TECHNICAL MEMORANDUM



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12770 Merit Drive, Suite 900 ■ Dallas, Texas 75251 ■ 214-217-2200 ■ FAX 817-735-7491

www.freese.com

TO: Rifat Alam, PE, PMP, CFM, City of Lancaster
FROM: Melissa Brunger, PE, Freese and Nichols, Inc.
SUBJECT: City of Lancaster Water and Wastewater CIP Update
DATE: May 24, 2024
CC: Amy Byland, PE, Freese and Nichols, Inc.
Ben Miller, EIT, Freese and Nichols, Inc.



1.0 INTRODUCTION AND STUDY PURPOSE

The City of Lancaster (City) engaged Freese and Nichols, Inc. (FNI) to develop short-term and long-term capital improvement program (CIP) recommendations to meet projected water demands and wastewater flows. The City is experiencing significant industrial growth and development interest in the southeastern portion of the City associated with the Southern Dallas County Inland Port. The proposed developments in the area are projecting significant water demands and wastewater flows that were not considered in the *2021 Water and Wastewater Master Plan (2021 W/WWMP)* and *2021 Roadway, Water, and Wastewater Impact Fee System Update* studies.

The developments are proposed to be located at three different locations, and the developers are proposing to tie into the City's existing water distribution and wastewater collection systems. The anticipated development locations are shown on **Figure 1-1** and in **Table 1-1**. The City provided FNI the projected water demands and wastewater flow rates for the developments, which were incorporated into the hydraulic models to conduct the analyses.

Table 1-1: Anticipated Developments

Development	Location	Phasing Information	Assumed Development Year
1	1201 E. Beltline Rd	Short-Term	2023
2	1401 Green Road	Long-Term	2028
3	1401 and 1607 Green Road		

The purpose of the water and wastewater CIP updates are to evaluate available capacity in the City of Lancaster’s water distribution and wastewater collection systems to serve the water demands and wastewater flows anticipated at multiple known developments and to develop CIP recommendations for additional infrastructure to serve the new connections. This study does not include a comprehensive evaluation of growth and potential development in the eastern portion of the City. The 2021 W/WWMP contains the most recent comprehensive evaluation of population and employment growth and systemwide water and wastewater CIPs. Since the estimated water needs and wastewater generated for recent known developments is higher than projections in the 2021 W/WWMP, a more comprehensive evaluation of potential development and associated water demands and wastewater flows is recommended.

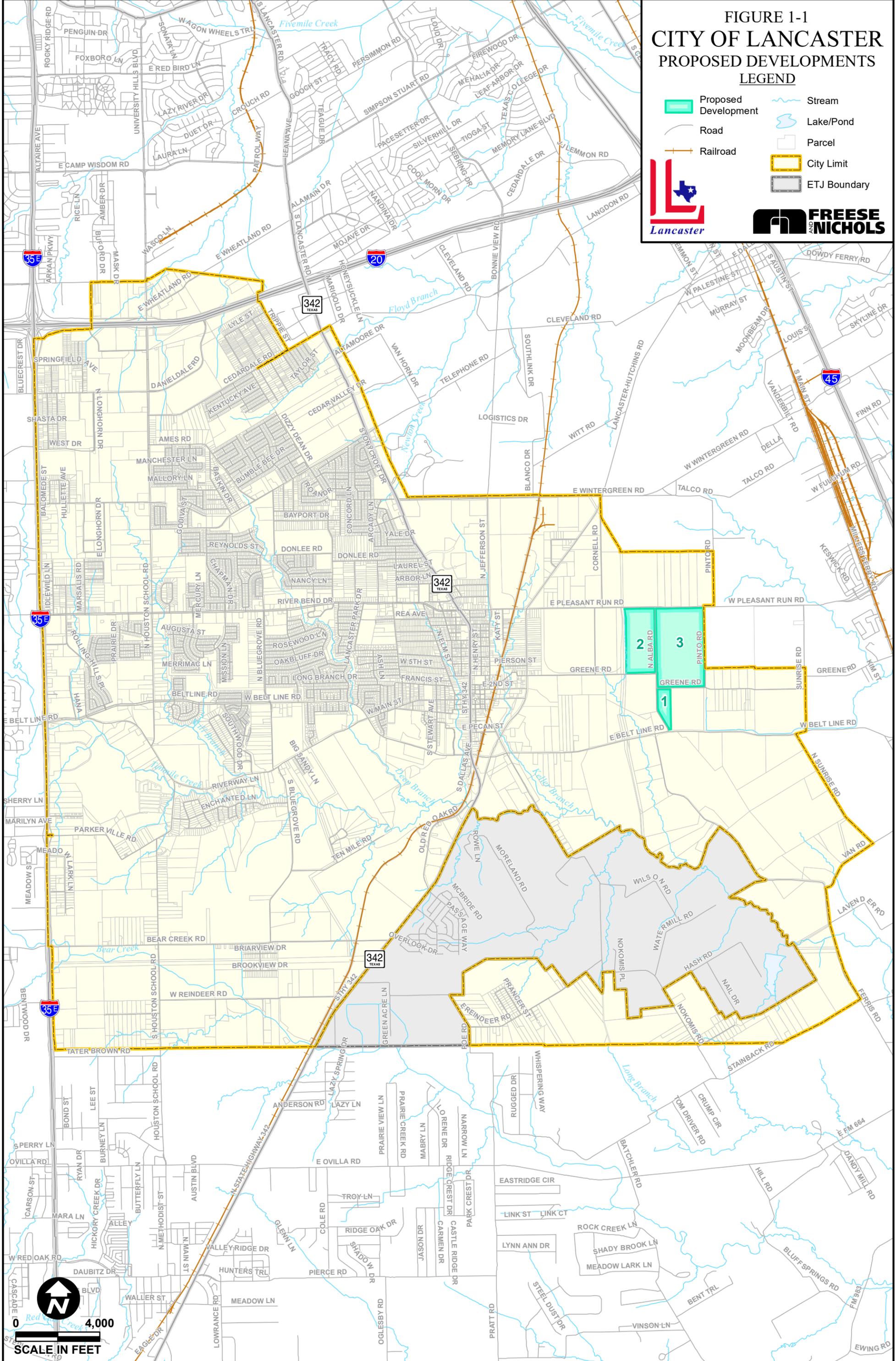
Developments have been classified as either short-term or long-term as exact dates each development will be in service are not known. Short-term development is assumed to occur in 2023 and long-term development is assumed to occur in 2028 for this update, however each phase of CIP projects should be planned to be in service before the corresponding developments connect to the City’s water and wastewater system.

This analysis utilized the City’s water and wastewater hydraulic models developed as part of the City’s 2021 W/WWMP. The City’s hydraulic models are in the Autodesk Innovyze InfoWater and InfoSewer software platforms. Private water and wastewater lines internal to the proposed commercial/industrial development were not included in the hydraulic models.

FIGURE 1-1 CITY OF LANCASTER PROPOSED DEVELOPMENTS LEGEND

-  Proposed Development
-  Stream
-  Road
-  Lake/Pond
-  Railroad
-  Parcel
-  City Limit
-  ETJ Boundary




0 4,000
 SCALE IN FEET

2.0 WATER SYSTEM CAPACITY ASSESSMENT AND RECOMMENDATIONS

2.1 EXISTING WATER INFRASTRUCTURE

City Staff provided feedback on improvements made since the 2021 W/WWMP. System infrastructure as of December 2022 is shown on **Figure 2-1** and was used for hydraulic model analyses. Existing system pumping capacity is shown in **Table 2-1**.

Table 2-1: Existing Pumping Capacity

Location	Pump Number	Rated Capacity		Rated Head (ft)
		(gpm)	(MGD)	
Ames Road Pump Station (UPP)	1	1,250	1.8	168
	2	1,250	1.8	168
	3	2,300	3.3	168
	4	2,600	3.7	168
	5	5,500	7.9	185
	6	5,500	7.9	185
James R. Williams Pump Station (LPP)	1	500	0.7	125
	2	700	1.0	125
	3	1,250	1.8	125
	5	1,250	1.8	125
	11 (pumps to UPP)	700	1.0	175
System Total Capacity	UPP	18,400	26.4	-
	LPP	33,700	5.3	-
System Firm Capacity ¹	UPP	12,900	18.5	-
	LPP	22,450	33.5	-

¹Pumping capacity with the largest pump out of service.

2.2 PROJECTED WATER DEMANDS

Recent water production data from April through August 2022 was assessed to update the existing system water Maximum Day (MD) demands identified in the 2021 W/WWMP and then combined with the demands associated with Developments 1, 2, and 3, as shown in **Table 2-2**, to identify a total system demand. Modeled total system demands for each planning period are shown in **Table 2-3**.

Table 2-2: Proposed Water System Demands

Development	Location	Phasing Information	Water Demand (MGD) ¹
1	1301 E. Beltline Rd	Short-Term	1.0
			2.7
Short-Term Total			3.7
2	1401 Green Road	Long-Term	5.5
3	1401 and 1607 Green Road		0.7
Long-Term Total			6.2
Grand Total			9.9

¹Usage for proposed developments has a fixed diurnal and seasonal pattern per City Staff, so this water demand was modeled as a steady flow rate in the maximum day model runs.

Table 2-3: Proposed Water System Demands

Planning Phase	Assumed In-Service Year	Maximum Day Demand (MGD)	Additional Development Demand (MGD)	Total Maximum Day Demand (MGD)
Short-Term	2023	14.8	3.7	18.5
Long-Term	2028	16.0	9.9	25.9

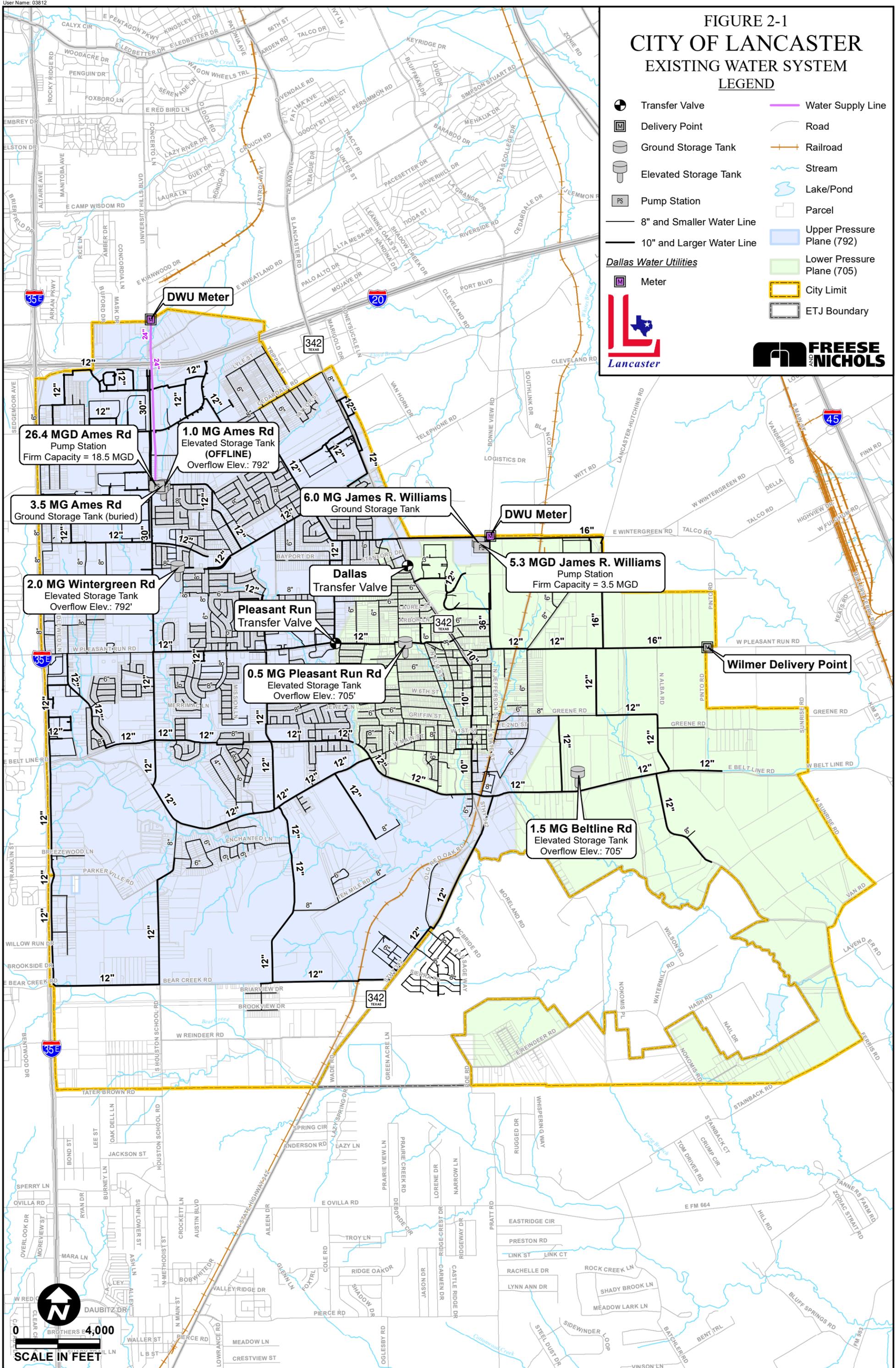
The location of the proposed developments in the southeastern portion of the Lower Pressure Plane (LPP), poses a challenge as the 2.0 MGD of contracted DWU supply to the James R. Williams Pump Station in the Lower Pressure Plane is offset by the City of Wilmer’s 2.0 MGD contracted demand. The existing system demand and any proposed developments will need to be supplied either from the Ames Pump Station in the Upper Pressure Plane (UPP) through transfer valves, additional contracted supply to the James R. Williams Pump Station, or a combination of these options.

FIGURE 2-1
CITY OF LANCASTER
 EXISTING WATER SYSTEM
 LEGEND

-  Transfer Valve
-  Delivery Point
-  Ground Storage Tank
-  Elevated Storage Tank
-  Pump Station
-  8" and Smaller Water Line
-  10" and Larger Water Line
-  Water Supply Line
-  Road
-  Railroad
-  Stream
-  Lake/Pond
-  Parcel
-  Upper Pressure Plane (792)
-  Lower Pressure Plane (705)
-  City Limit
-  ETJ Boundary

Dallas Water Utilities

-  Meter



2.3 SHORT-TERM WATER MODEL HYDRAULIC CAPACITY ANALYSES

Short-term hydraulic modeling analyses were performed for a total system demand of 18.5 MGD, 3.7 MGD of which was allocated to Development 1. Two scenarios were evaluated to assess the distribution system's ability to serve short-term water demands associated with Development 1.

1. Expanded DWU supply at the James R. Williams Pump Station
2. Existing contracted supply from DWU (2.0 MGD at James R. Williams Pump Station)

2.3.1 Short-Term Analysis with Existing Supply

The City is currently negotiating with Dallas Water Utilities (DWU) to obtain the required additional water supply at the James R. Williams Pump Station. Currently, the timeline and quantity of this additional supply is unknown. Hydraulic modeling was performed to identify the maximum flow that can be delivered to Development 1 at a minimum of 50 psi with the existing water supply and what operational changes are required to deliver this flow.

Hydraulic modeling analysis indicates a maximum of 2.0 MGD can be supplied to Development 1 with no additional supply from DWU at the James R. Williams Pump Station. Additional flow from the UPP is required to supply demands from the City of Wilmer, Development 1, and retail customers within the LPP. Valves along the pressure plane boundary were opened to provide the needed flow, as shown in **Figure 2-2**. A 12-inch transfer valve at the pressure plane boundary line along Beltline Rd is recommended to better control water transfer from the UPP to the LPP.

To summarize, the following changes are required to supply 2.0 MGD to Development 1 with no additional supply from DWU at the James R. Williams Pump Station:

- Valve status changes to facilitate increased transfer from UPP to LPP
- 12-inch Transfer Valve along Beltline Rd at Pressure Plane Boundary

2.3.2 Short-Term Analysis with Additional Supply

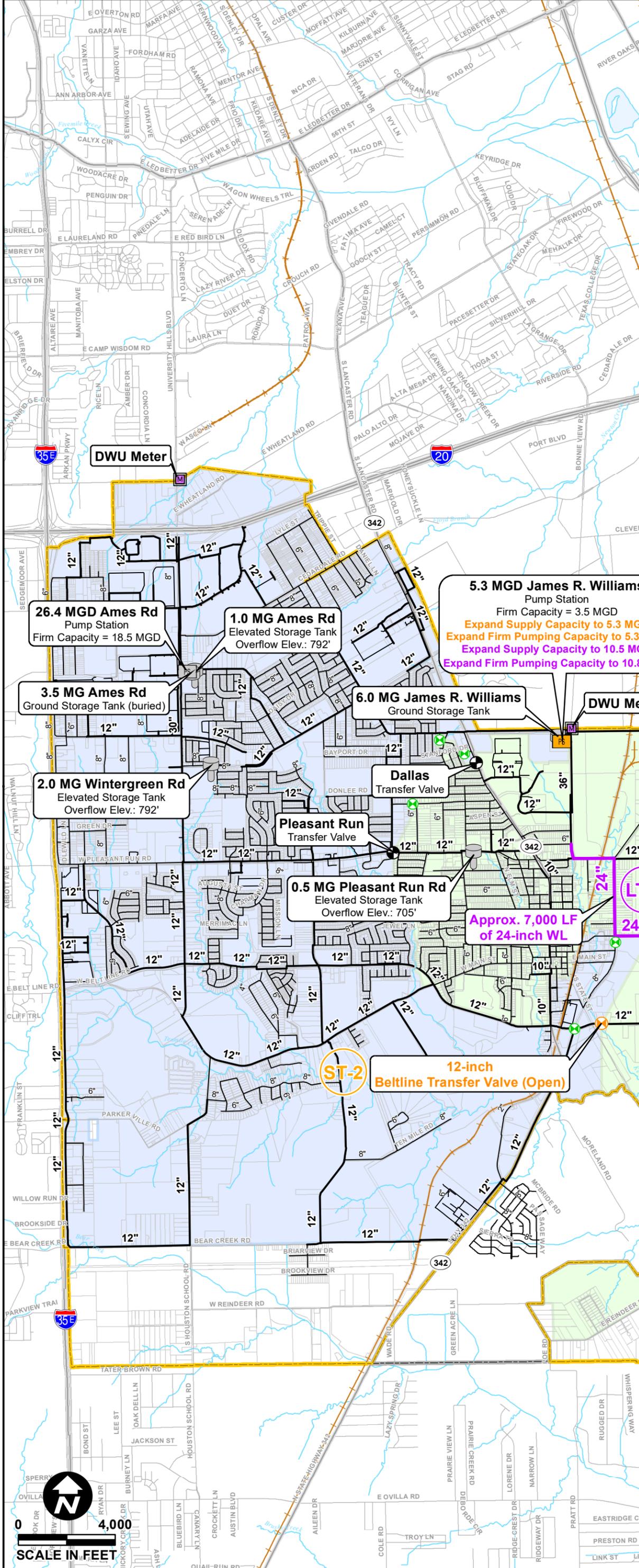
An additional scenario was analyzed assuming the City is able to obtain additional water supply from DWU at the James R. Williams Pump Station to supply the full 3.7 MGD required by Development 1. Additional water supply required from DWU was minimized by transferring flow from the UPP to the LPP through a combination of open pressure plane valves and transfer valves.

Both waterline and pump station improvements are required to supply the full 3.7 MGD requested to the Development 1 at a minimum of 50 psi under modeled demand conditions, as shown on **Figure 2-2** and described below. City Staff confirmed in November 2023 that there is an existing 12-inch water line along Cornell Rd from E Pleasant Run Rd to Greene Rd/E 3rd St that was not represented in the City's water system GIS. The short-term water line improvements have been revised to take into account this existing water line.

- Valve status changes to facilitate transfer from UPP to LPP
- James R. Williams Pump Station Improvements
 - New pump with capacity of 2,500 gpm (3.6 MGD) to be installed in existing pump 4 slot
 - Additional 3.3 MGD of supply from existing DWU supply line
- 12-inch Transfer Valve along Beltline Rd at pressure plane boundary
- Approximately 3,800 LF of 12-inch waterline along Pinto Rd from E Pleasant Run Rd to Greene Rd

FIGURE 2-2 CITY OF LANCASTER WATER SYSTEM PROPOSED WATER IMPROVEMENTS LEGEND

- | | | |
|--|------------------------------|----------------------------|
| Short-Term Proposed Improvements | | Ground Storage Tank |
| Valve | Elevated Storage Tank | Pump Station |
| Pump Station | 8" and Smaller Water Line | 10" and Larger Water Line |
| Water Line | Road | Railroad |
| Long-Term Development Proposed Improvements | | Stream |
| Pump Station | Proposed Development | Lake/Pond |
| Water Line | Parcel | Upper Pressure Plane (792) |
| Delivery Point | Dallas Water Utilities Meter | Lower Pressure Plane (705) |
| Pressure Plane Boundary Valve - To Be Opened | City Limit | ETJ Boundary |
| Valve | | |



5.3 MGD James R. Williams Pump Station
 Firm Capacity = 3.5 MGD
 Expand Supply Capacity to 5.3 MGD
 Expand Firm Pumping Capacity to 5.3 MGD
 Expand Supply Capacity to 10.5 MGD
 Expand Firm Pumping Capacity to 10.8 MGD

26.4 MGD Ames Rd Pump Station
 Firm Capacity = 18.5 MGD

1.0 MG Ames Rd Elevated Storage Tank
 Overflow Elev.: 792'

3.5 MG Ames Rd Ground Storage Tank (buried)

2.0 MG Wintergreen Rd Elevated Storage Tank
 Overflow Elev.: 792'

0.5 MG Pleasant Run Rd Elevated Storage Tank
 Overflow Elev.: 705'

1.5 MG Beltline Rd Elevated Storage Tank
 Overflow Elev.: 705'

12-inch Beltline Transfer Valve (Open)

Approx. 7,000 LF of 24-inch WL

Approx. 3,800 LF of 12-inch WL

Approx. 9,200 LF of 16-inch WL



2.4 LONG-TERM WATER MODEL ANALYSES

Long-term hydraulic modeling analyses were performed for a total system maximum day demand of 25.9 MGD, 9.9 MGD of which was allocated to Developments 1, 2, and 3, as shown in **Table 2-2**.

Valves along the pressure plane boundary were opened to provide the needed flow, as shown in **Figure 2-2**, to minimize additional supply required at the James R. Williams Pump Station. The 6.2 MGD of additional demands from long-term developments necessitates additional pump station and waterline improvements in the Lower Pressure Plane shown on **Figure 2-2** and described below.

- James R. Williams Pump Station Improvements
 - Expand firm capacity of pump station to 10.8 MGD. This is proposed by adding two new pumps, each with a capacity of 2,500 gpm (3.6 MGD). It is assumed that these two new pumps will replace the two existing pumps in slots 1 and 2.
 - Expand DWU supply to 10.5 MGD
- Approximately 7,000 LF of 24-inch waterline along N Jefferson St, E Pleasant Run Rd, N Lancaster Hutchins Rd, and E 3rd St
- Approximately 9,200 LF of 16-inch waterline along E 3rd St, Greene Rd, Belt Line Rd, and through existing waterline easements

2.5 WATER CIP RECOMMENDATIONS

The water system capital improvements plan (CIP) from the 2021 W/WWMP was updated specifically to serve short-term and long-term growth associated with Developments 1, 2, and 3. **Table 2-4** presents the CIP summary for both the short-term and long-term proposed improvements. A planning-level, conceptual estimate of costs that includes both engineering and construction was developed for each project. Costs are presented in 2023 dollars. Details for the cost estimates are included in **Appendix A** for reference. Estimated costs do not include survey, easements, or land acquisition.

Projects are grouped by time horizon: Short-Term (dependent on Development 1) and Long-Term (dependent on Developments 2 & 3). Timing for each phase of CIP recommendations is tied to the timing of the developments, such that the CIP projects will be in service before the corresponding developments require water. The recommended projects are presented on **Figure 2-2**. Locations shown for new piping and other improvements are generalized for hydraulic analysis; specific alignments and facility sites will be identified as part of the design process.

Table 2-4: Summary of Water System CIP Updates

Phase	Project Number	Project Name	Cost (In 2023 Dollars)
Short-Term	ST-1	12-inch Waterline along Pinto Rd	\$2,386,100
	ST-2	Beltline Transfer Valve	\$134,600
	ST-3	Pump Improvements at James R. Williams Pump Station	\$1,043,000
	Total Short-Term		\$3,563,700
Long-Term	LT-1	24-inch waterline along N Jefferson St, E Pleasant Run Rd, N Lancaster Hutchins Rd, and E 3rd St	\$6,368,700
	LT-2	16-inch waterline along E 3rd St, Greene Rd, Belt Line Rd, and through existing waterline easements	\$7,152,100
	LT-3	Pump Improvements and Electrical Improvements at James R. Williams Pump Station	\$11,204,000
	Total Long-Term		\$24,724,800
CIP Total			\$28,288,500

3.0 WASTEWATER CAPACITY ASSESSMENT AND RECOMMENDATIONS

3.1 EXISTING WASTEWATER INFRASTRUCTURE

The proposed developments are expected to occur in Lancaster’s Ten Mile 3 and Ten Mile 7 sewer basin. The City’s existing wastewater infrastructure, as well as the downstream TRA parallel interceptors are shown on **Figure 3-1**. FNI received email confirmation of Lancaster’s gravity main diameters and alignments in the Ten Mile 3 basin via email on July 26, 2023. This hydraulic analysis assumed adequate hydraulic capacity of the downstream TRA wastewater interceptor where the Ten Mile 3 sewer basin discharges.

3.2 PROJECTED WASTEWATER FLOWS

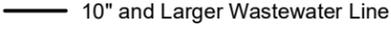
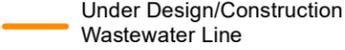
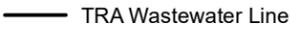
Based on previous modeling analyses conducted during the 2021 W/WWMP there is approximately 0.5 MGD of existing peak wastewater flow in the Ten Mile 3 basin, mostly coming from the Lancaster Airport. The proposed wastewater flows for the developments are shown in **Table 3-1**. The grand total represents the projected wastewater flow resulting from all commercial and industrial units considered in this analysis but does not include the existing and projected flow that is already in the hydraulic model from the 2021 W/WWMP. Since these developments are industrial sites, the wastewater pattern generated by the facilities is expected to be a steady pattern throughout the day and not fluctuate like a typical residential diurnal pattern. The existing flows in Ten Mile 3 are projected to increase over the Short-Term and buildout planning term and were included in the modeling assessments. It is understood that the short-term development (Development 1) is currently under construction and expected to come online imminently. Developments 2 and 3 are not currently confirmed to be occurring in Lancaster, and the adoption of the CIP Updates for the long-term planning period are recommended to be contingent on the confirmation of these developments.

Table 3-1: Summary of Wastewater Flows for Proposed Developments

Development	Location	Phasing Information	Peak Wastewater Flow (MGD)
1	1201 E. Beltline Rd	Short-Term	1.00
Short-Term Total			1.00
2	1401 Green Road	Long-Term	5.50
3	1401 and 1607 Green Road		0.06
Long-Term Total			5.56
Grand Total			6.56

FIGURE 3-1 CITY OF LANCASTER TEN MILE 3 BASIN EXISTING WASTEWATER SYSTEM

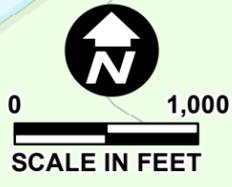
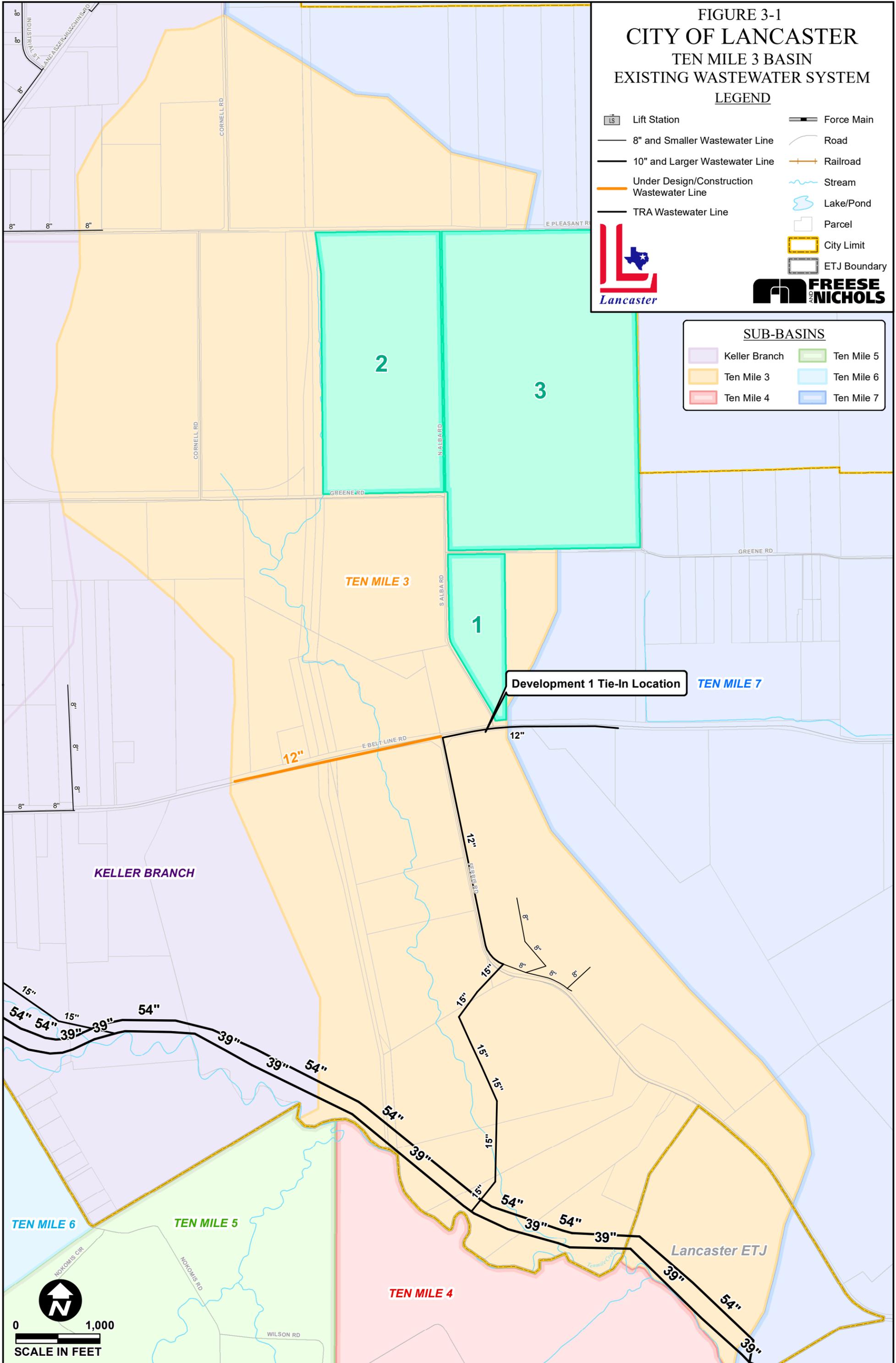
LEGEND

-  Lift Station
-  Force Main
-  8" and Smaller Wastewater Line
-  Road
-  10" and Larger Wastewater Line
-  Railroad
-  Under Design/Construction Wastewater Line
-  Stream
-  TRA Wastewater Line
-  Lake/Pond
-  Parcel
-  City Limit
-  ETJ Boundary



SUB-BASINS

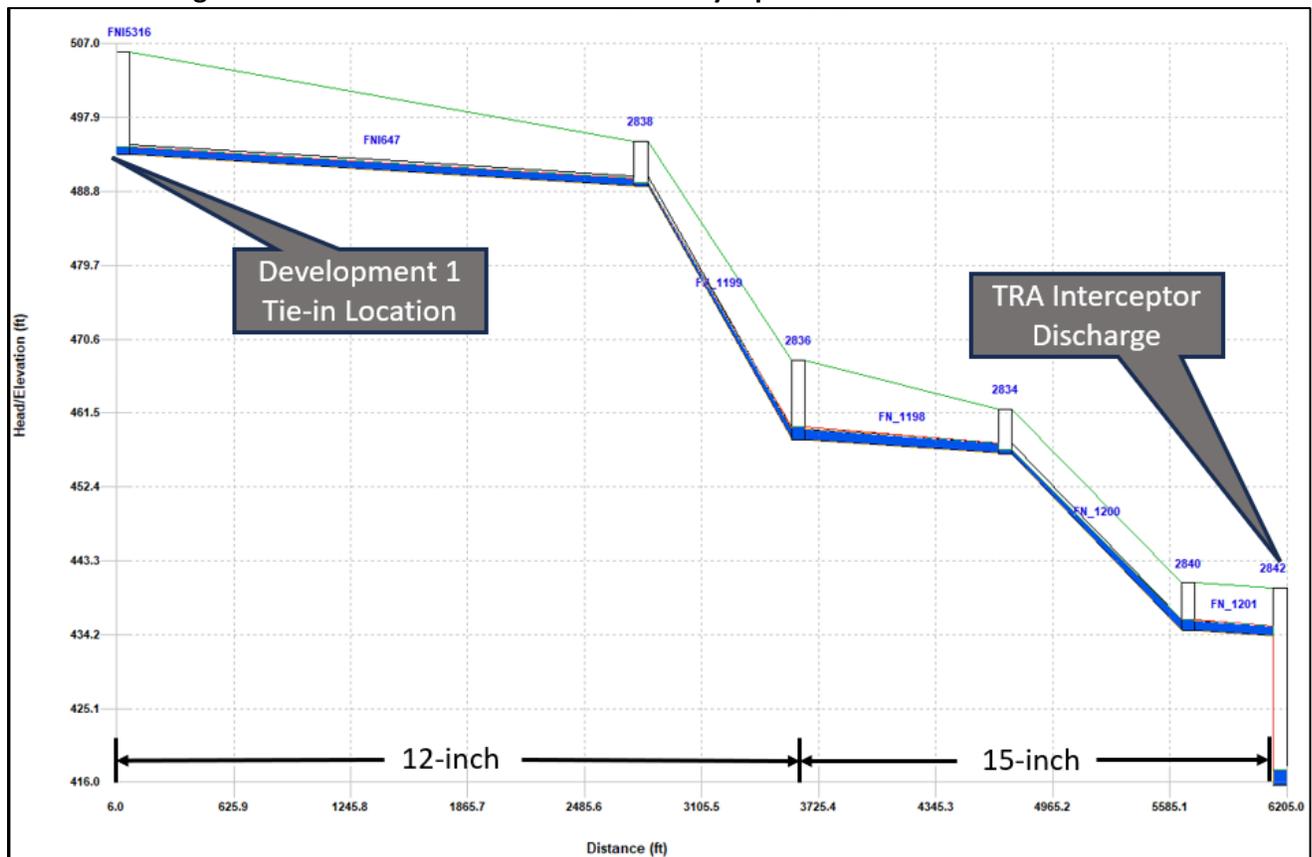
-  Keller Branch
-  Ten Mile 3
-  Ten Mile 4
-  Ten Mile 5
-  Ten Mile 6
-  Ten Mile 7



3.3 SHORT-TERM WASTEWATER MODEL HYDRAULIC CAPACITY ANALYSIS

The short-term model analysis included the existing wastewater flow in Ten Mile 3, anticipated flow from Development 1, with the existing gravity infrastructure in place as shown on **Figure 3-1**. The total peak flow from Development 1 (1.0 MGD), as well as existing customers is approximately 1.5 MGD. The existing customer flows were included in the hydraulic model from the previous modeling analyses conducted during the 2021 W/WWMP. The model predicted surcharging of the existing 15-inch pipeline but did not exceed the crown elevation of the pipe. **The model analysis shows that the existing gravity infrastructure has capacity to convey the anticipated wastewater flow from Development 1.** The hydraulic profile of the 12 and 15-inch gravity mains conveying existing flow and flow from proposed Development 1 under peak wastewater flow conditions is shown on **Figure 3-2**.

Figure 3-2: Short-Term 12 and 15-inch Gravity Pipeline Profile in Ten Mile 3



3.4 LONG-TERM WASTEWATER MODEL HYDRAULIC CAPACITY ANALYSES

The hydraulic model was utilized to evaluate the sizing of the City’s gravity infrastructure necessary to serve the developments. The long-term model analysis included the existing flow in Ten Mile 3, flow from Short-term and long-term developments (Developments 1, 2, and 3), and the recommended wastewater infrastructure that would be necessary to serve the additional peak flow from the Short-Term and Long-Term developments. The total peak flow from Developments 1, 2, and 3 (6.56 MGD), as well as existing customers is expected to be 7.06 MGD. Currently, there are no wastewater gravity lines north of E Belt Line Rd. The recommended infrastructure includes:

- 2,900 LF of 30-inch gravity main (new construction along N Alba Road)
- 6,900 LF of 30-inch gravity main (replacing 12 and 15-inch along E Belt Line Road and Ferris Road)
- 13 60-inch Diameter Wastewater Manholes

The profile of the recommended 30-inch gravity main conveying flow from all developments under peak conditions in the Long-Term scenario is shown on **Figure 3-3**.

Figure 3-3: Long-Term 30-inch Gravity Pipeline Profile

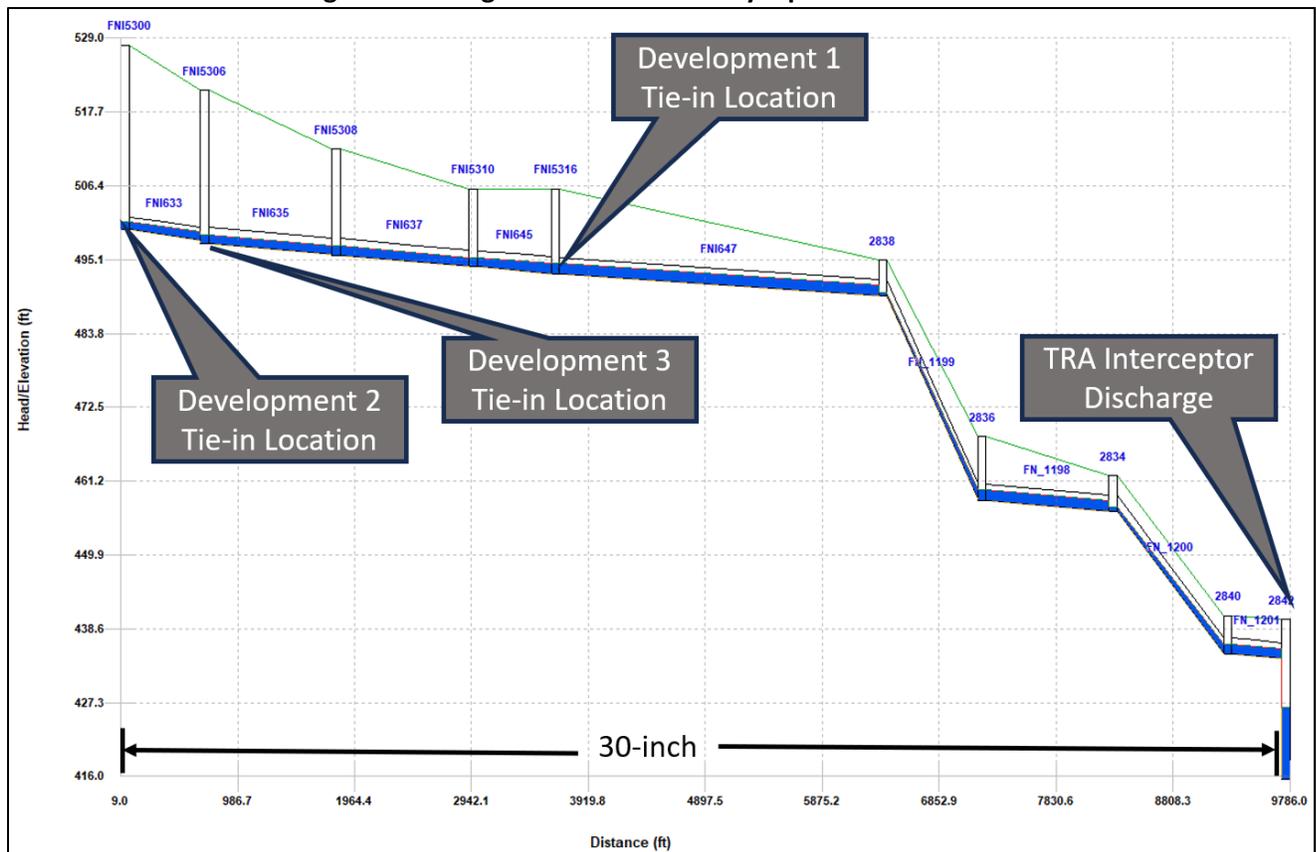
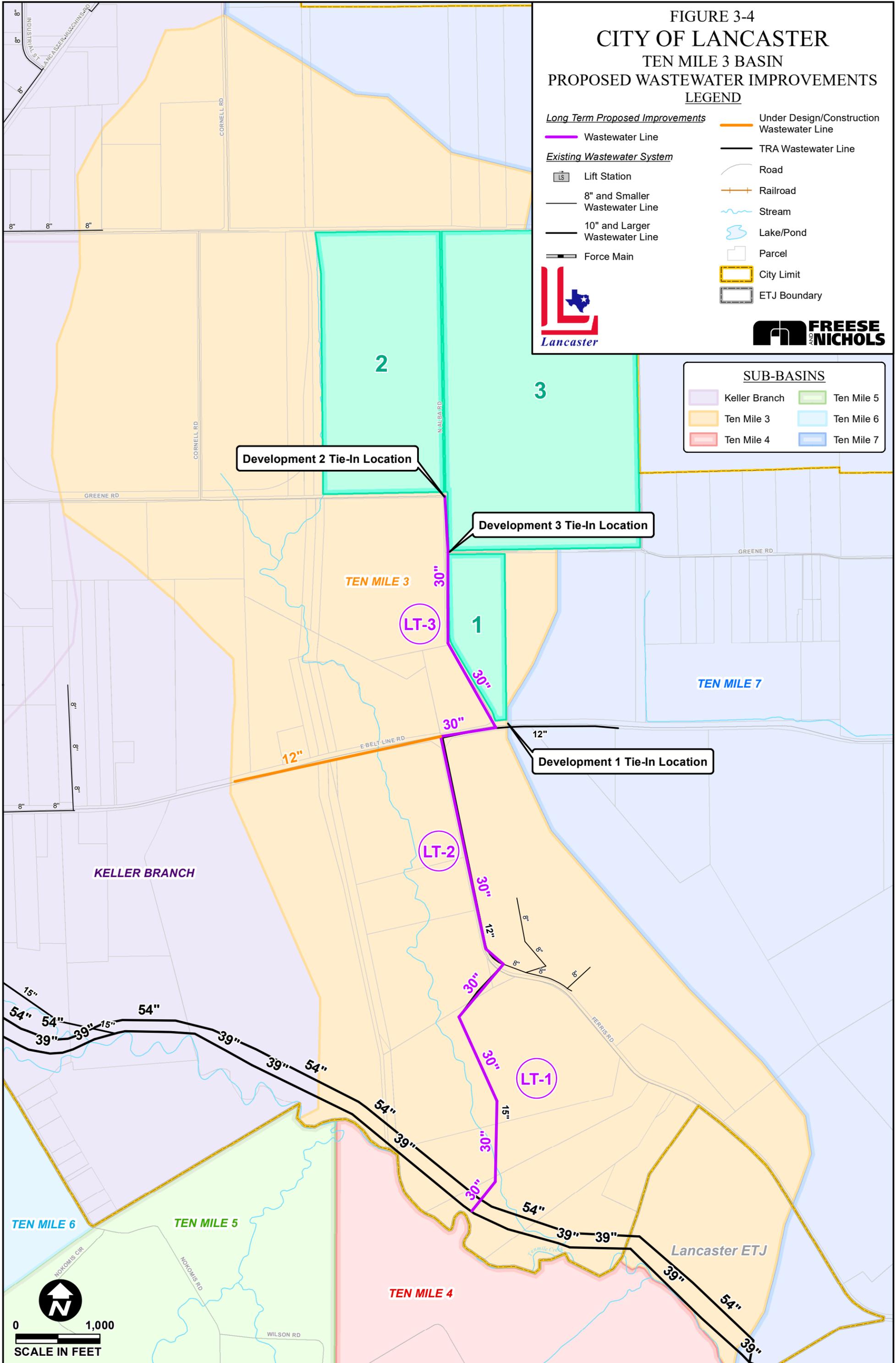


FIGURE 3-4
CITY OF LANCASTER
TEN MILE 3 BASIN
PROPOSED WASTEWATER IMPROVEMENTS
LEGEND

- | | |
|--|---|
| Long Term Proposed Improvements | Under Design/Construction Wastewater Line |
| Wastewater Line | TRA Wastewater Line |
| Existing Wastewater System | Road |
| Lift Station | Railroad |
| 8" and Smaller Wastewater Line | Stream |
| 10" and Larger Wastewater Line | Lake/Pond |
| Force Main | Parcel |
| Lancaster | City Limit |
| FREESE AND NICHOLS | ETJ Boundary |

- SUB-BASINS**
- | | |
|---------------|------------|
| Keller Branch | Ten Mile 5 |
| Ten Mile 3 | Ten Mile 6 |
| Ten Mile 4 | Ten Mile 7 |



3.5 WASTEWATER CIP RECOMMENDATIONS

A wastewater system capital improvements plan (CIP) was developed for the City of Lancaster specifically to serve the proposed short-term and long-term developments. Below is a summary of the projects for each planning period. Each proposed CIP project is shown in **Figure 3-4**.

Short-Term Wastewater System Improvements

- Hydraulic modeling analyses show that the existing 12-inch and 15-inch gravity mains in Ten Mile 3 sewer basin have capacity to convey flow from Development 1. No updated CIP projects need to be incorporated in the City’s CIP.

Long-Term Wastewater System Improvements

- LT-1: Replacement of 15-inch with 30-inch gravity main from Ferris Rd and Ten Mile Creek.
- LT-2: Replacement of 12-inch with 30-inch gravity main along Ferris Rd and E Belt Line Rd.
- LT-3: Construction of new 30-inch gravity main along N Alba Rd from E Belt Line Rd to Greene Rd.

Table 3-2 presents the CIP summary for both the short-term and long-term development proposed improvements. A planning-level, conceptual estimate of costs that includes both engineering and construction was developed for each project. Costs are presented in 2023 dollars. Details for the cost estimates are included in **Appendix A** for reference. Estimated costs do not include survey, easements, or land acquisition. Locations shown for new piping and other improvements are generalized for hydraulic analysis; specific alignments and facility sites will be identified as part of the design process.

Table 3-2: Summary of Wastewater System CIP Updates

Phase	Project Number	Project Name	Cost (In 2023 Dollars)
Long-Term	LT-1	Gravity System Improvements from Tenmile Creek to Ferris Road	\$4,724,200
	LT-2	Gravity System Improvements along Ferris Road and E Belt Line Road	\$4,799,000
	LT-3	Gravity System Improvements along N Alba Road from E Beltline Road to Greene Road	\$4,186,000
	Total Long-Term		\$13,709,200
CIP Total			\$13,709,200

APPENDIX A: CIP COST ESTIMATES

City of Lancaster



Water CIP - Opinion of Probable Construction Cost*

September 28, 2023

*Planning Level Cost in 2023 Dollars

CIP Project Number:

ST-1

Phase: Short-Term

Project Name:

12-inch Waterline along Pinto Rd

Project Description:

Approximately 3,800 LF of 12-inch Waterline along Pinto Rd

Project Drivers:

Provide Flow to Short-Term Development

Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	12" WL & Appurtenances	3,800	LF	\$ 300	\$ 1,140,000
2	Pavement Repair	3,800	LF	\$ 120	\$ 456,000
SUBTOTAL:					\$ 1,596,000
CONTINGENCY				30%	\$ 478,800
SUBTOTAL:					\$ 2,074,800
ENG/SURVEY				15%	\$ 311,300
SUBTOTAL:					\$ 2,386,100
Estimated Project Total:					\$ 2,386,100

City of Lancaster



Water CIP - Opinion of Probable Construction Cost*

September 28, 2023

*Planning Level Cost in 2023 Dollars

CIP Project Number:

ST-2

Phase: Short-Term

Project Name: Beltline Transfer Valve

Project Description:

12-inch PRV along Beltline Rd

Project Drivers:

Additional Transfer Valve to supply Short-Term Development

Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	12" Pressure Reducing Valve	1	EA	\$ 40,000	\$ 40,000
2	Precast Manhole	1	EA	\$ 50,000	\$ 50,000
SUBTOTAL:					\$ 90,000
				CONTINGENCY	30%
SUBTOTAL:					\$ 117,000
				ENG/SURVEY	15%
SUBTOTAL:					\$ 134,600
Estimated Project Total:					\$ 134,600



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PROJECT NAME	James R. Williams Pump Station Improvements (Project ST-3)	DATE	3/24/2024
CLIENT	City of Lancaster	GROUP	1153
% SUBMITTAL	Conceptual	PM	Jimmy Sibert

ESTIMATED BY	QC CHECKED BY	FNI PROJECT NUMBER
Jimmy Sibert / Wade Zemlock	Clayton Barnard	LCS22865

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
Phase 1 Improvements					
Pump Station Piping, Valves, and Equipment					
1	2,500 gpm Vertical Turbine Pump and 250 HP Motor	1	EA	\$ 104,500.00	\$ 104,500
2	Can Prep and Pump Installation	1	EA	\$ 49,500.00	\$ 49,500
3	14-inch Discharge Piping and Fittings	16	LF	\$ 308.00	\$ 4,928
4	14-inch Gate Valve	1	EA	\$ 7,000.00	\$ 7,000
5	14-inch Motor Operated Butterfly Valve	1	EA	\$ 13,000.00	\$ 13,000
6	14-inch Check Valve	2	EA	\$ 27,250.00	\$ 54,500
7	14-inch by 16-inch Reducer	1	EA	\$ 12,000.00	\$ 12,000
8	Start-Up and Testing	1	LS	\$ 11,000.00	\$ 11,000
Electrical & Instrumentation					
12	250 HP VFD	1	EA	\$ 65,000.00	\$ 65,000
13	Misc. Electrical	1	LS	\$ 15,000.00	\$ 15,000
14	Cable and Conduit	1	LS	\$ 39,260.00	\$ 39,260
15	Pullboxes	1	EA	\$ 5,500.00	\$ 5,500
16	Instrumentation	1	LS	\$ 7,500.00	\$ 7,500
17	SCADA Modifications	1	LS	\$ 150,000.00	\$ 150,000
18	Power System Studies	1	LS	\$ 10,000.00	\$ 10,000
19	Start-up and Testing	1	LS	\$ 5,000.00	\$ 5,000
SUBTOTAL					\$ 553,700
CONTINGENCY 30%					\$ 166,100
SUBTOTAL					\$ 719,800
MOBILIZATION 5%					\$ 36,000
SUBTOTAL					\$ 755,800
OH&P 15%					\$ 113,400
Construction Total					\$ 869,200
ENG/SURVEY 20%					\$ 173,800
Project Total					\$ 1,043,000

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

- 1 FNI OPCC classified as an AACE Class 5 Estimate with accuracy range of -30 to +50%.
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Estimate Class	Level of Project	End Use	Expected Accuracy Range (RP 56R-08)
Class 5	0% to 2%	Screening of feasibility	L: -20% to -30%
			H: +30% to +50%
Class 4	1% to 15%	Concept study or feasibility, Schematic Design	L: -10% to -20%
			H: +20% to +30%
Class 3	10% to 40%	Budget authorization or control; Design Development	L: -5% to -15%
			H: +10% to +20%
Class 2	30% to 75%	Control or bid/tender	L: -5% to -10%
			H: +5% to +15%
Class 1	65% to 100%	Check estimate or bid/tender	L: -3% to -5%
			H: +3% to +10%

City of Lancaster



Water CIP - Opinion of Probable Construction Cost*

September 28, 2023

*Planning Level Cost in 2023 Dollars

CIP Project Number:

LT-1

Phase: Long-Term

Project Name:

24-inch waterline along N Jefferson St, E Pleasant Run Rd, N Lancaster Hutchins Rd, and E 3rd St

Project Description:

Approx. 7,000 LF of 24-inch Waterline along 24-inch waterline along N Jefferson St, E Pleasant Run Rd, N Lancaster Hutchins Rd, and E 3rd St

Project Drivers:

Provide Flow to Long-Term development from James R. Williams Pump Station

Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	24" WL & Appurtenances	7,000	LF	\$ 600	\$ 4,200,000
2	Pavement Repair	500	LF	\$ 120	\$ 60,000
				SUBTOTAL:	\$ 4,260,000
				CONTINGENCY	30%
				SUBTOTAL:	\$ 5,538,000
				ENG/SURVEY	15%
				SUBTOTAL:	\$ 830,700
				SUBTOTAL:	\$ 6,368,700
Estimated Project Total:					\$ 6,368,700

City of Lancaster



Water CIP - Opinion of Probable Construction Cost*

September 28, 2023

*Planning Level Cost in 2023 Dollars

CIP Project Number:

LT-2

Phase: Long-Term

Project Name:

16-inch waterline along E 3rd St, Greene Rd, Belt Line Rd, and through existing waterline easements

Project Description:

Approx. 9,200 LF of 16-inch Waterline

Project Drivers:

Provide Flow to Long-Term development from James R. Williams Pump Station

Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	16" WL & Appurtenances	9,200	LF	\$ 400	\$ 3,680,000
2	Pavement Repair	9,200	LF	\$ 120	\$ 1,104,000
SUBTOTAL:					\$ 4,784,000
CONTINGENCY				30%	\$ 1,435,200
SUBTOTAL:					\$ 6,219,200
ENG/SURVEY				15%	\$ 932,900
SUBTOTAL:					\$ 7,152,100
Estimated Project Total:					\$ 7,152,100



Innovative approaches
Practical results
Outstanding service

PROJECT NAME	James R. Williams Pump Station Improvements (Project LT-3)	DATE	3/24/2024
CLIENT	City of Lancaster	GROUP	1153
% SUBMITTAL	Conceptual	PM	Jimmy Sibert

ESTIMATED BY	QC CHECKED BY	FNI PROJECT NUMBER
Jimmy Sibert / Wade Zemlock	Clayton Barnard	LCS22865

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
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Phase 2 Improvements

Pump Station Piping, Valves, and Equipment					
1	Remove Existing Pump, Motor and Piping	1	EA	\$ 55,000.00	\$ 55,000
2	2,500 gpm Vertical Turbine Pump and 250 HP Motor	2	EA	\$ 104,500.00	\$ 209,000
3	Can Prep and Pump Installation	2	EA	\$ 49,500.00	\$ 99,000
4	14-inch Discharge Piping and Fittings	32	LF	\$ 308.00	\$ 9,856
5	14-inch Gate Valve	2	EA	\$ 7,000.00	\$ 14,000
6	14-inch Motor Operated Butterfly Valve	2	EA	\$ 13,000.00	\$ 26,000
7	14-inch Check Valve	2	EA	\$ 27,250.00	\$ 54,500
8	14-inch by 16-inch Reducer	2	EA	\$ 12,000.00	\$ 24,000
9	Start-Up and Testing	1	LS	\$ 22,000.00	\$ 22,000
Electrical & Instrumentation					
8	Electrical Gear Upgrades	1	LS	\$ 2,000,000.00	\$ 2,000,000
9	Generator Upgrade	1	LS	\$ 3,000,000.00	\$ 3,000,000
10	250 HP VFD	2	EA	\$ 65,000.00	\$ 130,000
11	Misc. Electrical	1	LS	\$ 30,000.00	\$ 30,000
12	Cable and Conduit	1	LS	\$ 78,520.00	\$ 78,520
13	Pullboxes	1	EA	\$ 11,000.00	\$ 11,000
14	Instrumentation	1	LS	\$ 15,000.00	\$ 15,000
15	SCADA Modifications	1	LS	\$ 150,000.00	\$ 150,000
16	Power System Studies	1	LS	\$ 10,000.00	\$ 10,000
17	Start-up and Testing	1	LS	\$ 10,000.00	\$ 10,000

SUBTOTAL		\$ 5,947,900
CONTINGENCY	30%	\$ 1,784,400
SUBTOTAL		\$ 7,732,300
MOBILIZATION	5%	\$ 386,600
SUBTOTAL		\$ 8,118,900
OH&P	15%	\$ 1,217,800

Construction Total		\$ 9,336,700
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Project Total	ENG/SURVEY 20%	\$ 1,867,300
		\$ 11,204,000

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			H: +20% to +30%
Class 3	10% to 40%	Budget authorization or control; Design Development	L: -5% to -15%
			H: +10% to +20%
Class 2	30% to 75%	Control or bid/tender	L: -5% to -10%
			H: +5% to +15%
Class 1	65% to 100%	Check estimate or bid/tender	L: -3% to -5%
			H: +3% to +10%

City of Lancaster



Wastewater CIP - Opinion of Probable Construction Cost*

September 15, 2023

*Planning Level Cost in 2023 Dollars

CIP Project Number:

LT-1

Phase: Long Term

Project Name: Gravity System Improvements

Project Description:

Replacement of 3,400 LF of 15-inch gravity main with a new 30-inch gravity main from Tenmile Creek to Ferris Road.

Project Drivers:

Increased wastewater capacity to serve anticipated upstream development in Ten Mile 3 and Ten Mile 7 sewer basin.

Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	30" Pipe 8- 16 feet deep	3,400	LF	\$ 900	\$ 3,060,000
2	60" Diameter Manhole (8 - 16 feet deep)	5	EA	\$ 20,000	\$ 100,000
SUBTOTAL:					\$ 3,160,000
CONTINGENCY				30%	\$ 948,000
SUBTOTAL:					\$ 4,108,000
ENG/SURVEY				15%	\$ 616,200
SUBTOTAL:					\$ 4,724,200
Estimated Project Total:					\$ 4,724,200

City of Lancaster



Wastewater CIP - Opinion of Probable Construction Cost*

September 15, 2023

*Planning Level Cost in 2023 Dollars

CIP Project Number:

LT-2

Phase: Long Term

Project Name: Gravity System Improvements

Project Description:

Replacement of 3,500 LF of 12-inch gravity main with a new 30-inch gravity main along Ferris Road and E Belt Line Road .

Project Drivers:

Increased wastewater capacity to serve anticipated upstream development in Ten Mile 3 and Ten Mile 7 sewer basin.

Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	30" Pipe 8- 16 feet deep	3,500	LF	\$ 900	\$ 3,150,000
2	60" Diameter Manhole (8 - 16 feet deep)	3	EA	\$ 20,000	\$ 60,000
SUBTOTAL:					\$ 3,210,000
CONTINGENCY				30%	\$ 963,000
SUBTOTAL:					\$ 4,173,000
ENG/SURVEY				15%	\$ 626,000
SUBTOTAL:					\$ 4,799,000
Estimated Project Total:					\$ 4,799,000

City of Lancaster



Wastewater CIP - Opinion of Probable Construction Cost*

September 15, 2023

*Planning Level Cost in 2023 Dollars

CIP Project Number:

LT-3

Phase: Long Term

Project Name: Gravity System Improvements

Project Description:

Construction of 3,000 LF of 30-inch gravity main along N Alba Road from E Beltline Road to Greene Road.

Project Drivers:

Increased wastewater capacity to serve anticipated upstream development in Ten Mile 3 and Ten Mile 7 sewer basin.

Opinion of Probable Construction Cost

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	30" Pipe 8- 16 feet deep	3,000	LF	\$ 900	\$ 2,700,000
2	60" Diameter Manhole (8 - 16 feet deep)	5	EA	\$ 20,000	\$ 100,000
SUBTOTAL:					\$ 2,800,000
CONTINGENCY				30%	\$ 840,000
SUBTOTAL:					\$ 3,640,000
ENG/SURVEY				15%	\$ 546,000
SUBTOTAL:					\$ 4,186,000
Estimated Project Total:					\$ 4,186,000