

# **ROADWAY, WATER, AND WASTEWATER IMPACT FEE STUDY**

## **LAND USE ASSUMPTIONS AND CAPITAL IMPROVEMENTS PLAN**

### **REPORT**

Prepared for:

**City of DeSoto**



Prepared by:

**FREESE AND NICHOLS, INC.**  
4055 International Plaza, Suite 200  
Fort Worth, Texas 76109

# ROADWAY, WATER, AND WASTEWATER IMPACT FEE STUDY

## LAND USE ASSUMPTIONS AND CAPITAL IMPROVEMENTS PLAN

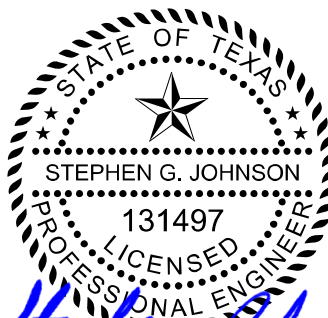
### REPORT

Prepared for:

**City of DeSoto**

  
*Mazen H. Kawasmi*  
3/1/2021

FREESE AND NICHOLS, INC.  
TEXAS REGISTERED  
ENGINEERING FIRM  
F-2144

  
*Stephen G. Johnson*  
03/01/2021

FREESE AND NICHOLS, INC.  
TEXAS REGISTERED  
ENGINEERING FIRM  
F-2144

  
*Namoo A. Han*  
3/1/2021

FREESE AND NICHOLS, INC.  
TEXAS REGISTERED  
ENGINEERING FIRM  
F-2144

Prepared by:

**FREESE AND NICHOLS, INC.**  
4055 International Plaza, Suite 200  
Fort Worth, Texas 76109

DES20539

## Table of Contents

<b>EXECUTIVE SUMMARY.....</b>	<b>ES-1</b>
<b>1.0 INTRODUCTION .....</b>	<b>1-1</b>
1.1 Report Elements .....	1-3
<b>2.0 METHODOLOGY .....</b>	<b>2-1</b>
<b>3.0 LAND USE ASSUMPTIONS.....</b>	<b>3-1</b>
3.1 Data Collection Zones .....	3-1
3.2 Service Areas .....	3-1
3.3 Data Format .....	3-4
3.4 Base Year Data .....	3-5
3.4.1 Historical Growth .....	3-5
3.4.2 2020 Population and Employment .....	3-6
3.5 Ten-Year Growth Assumptions .....	3-11
3.6 Summary .....	3-14
<b>4.0 ROADWAY CAPITAL IMPROVEMENTS PLAN .....</b>	<b>4-1</b>
4.1 Existing Conditions Analysis .....	4-1
4.1.1 Existing Volumes .....	4-1
4.1.2 Vehicle-Miles of Existing Capacity Supply .....	4-2
4.1.3 Vehicle-Miles of Existing Demand .....	4-2
4.1.4 Vehicle-Miles of Existing Excess Capacity and Deficiencies .....	4-2
4.2 Growth Projections .....	4-3
4.2.1 Projected Vehicle-Miles of New Demand .....	4-3
4.3 Roadway Capital Improvements Plan .....	4-4
4.3.1 Eligible Projects .....	4-4
4.3.2 Eligible Costs .....	4-4
4.3.3 Impact Fee CIP .....	4-7
4.3.4 Projected Vehicle-Miles Capacity Available for New Growth .....	4-10
4.3.5 Cost of Roadway Improvements .....	4-11
<b>5.0 WATER AND WASTEWATER CAPITAL IMPROVEMENTS PLAN .....</b>	<b>5-1</b>
5.1 Existing Water and Wastewater Systems .....	5-1
5.2 Water Demand and Wastewater Load Projections .....	5-1
5.3 Water and Wastewater System Analyses .....	5-2
5.4 Water and Wastewater System Improvements .....	5-2

5.5	Water and Wastewater Impact Fee Analysis.....	5-5
5.5.1	Water and Wastewater Capacity Analysis .....	5-5

### List of Tables

Table ES-1: Water Impact Fee CIP Projects.....	ES-2
Table ES-2: Wastewater Impact Fee CIP Projects.....	ES-3
Table ES-3: Roadway Impact Fee CIP Projects.....	ES-5
Table 1: Historical City Population .....	3-5
Table 2: Building Permit Population Growth.....	3-6
Table 3: 2020 Population and Employment by Service Area.....	3-7
Table 4: Summary of Base Year (2020) Population and Employment - Roadway .....	3-7
Table 5: 2030 Population and Employment by Service Area.....	3-13
Table 6: Population and Employment Projections (2030) for Roadway Service Area.....	3-13
Table 7: Land Use Assumption Summary (2020-2030) .....	3-14
Table 8: Roadway Facility Vehicle Mile Lane Capacities.....	4-1
Table 9: Peak Hour Vehicle-Miles of Existing Capacity, Demand, Excess-Capacity, and Deficiencies .....	4-3
Table 10: 10-Year Projected Service Units of Demand.....	4-4
Table 11: Roadway Impact Fee Capital Improvements Plan Projects .....	4-9
Table 12: Capacity and Net Capacity Provided by the Proposed CIP .....	4-10
Table 13: Projected Demand and Net Capacity Provided by the Proposed CIP .....	4-11
Table 14: Summary of Roadway Improvements Plan Cost Analysis.....	4-11
Table 15: Proposed Impact Fee Eligible CIP Projects.....	5-2
Table 16: Cost Allocation for Water Impact Fee Calculation.....	5-6
Table 17: Cost Allocation for Wastewater Impact Fee Calculation .....	5-7

### List of Figures

Figure 1: Water and Wastewater Service Area .....	3-2
Figure 2: Roadway Service Areas.....	3-3
Figure 3: Population by TSZ – Water/Wastewater Service Area .....	3-8
Figure 4: Employment by TSZ – Water/Wastewater Service Area .....	3-9
Figure 5: Population and Employment by TSZ – Roadway Service Area .....	3-10
Figure 6: Developable Land .....	3-12
Figure 7: Roadway Impact Fee Capital Improvements Plan .....	4-8
Figure 8: Water System Impact Fee Capital Improvements Plan .....	5-3
Figure 9: Wastewater System Impact Fee Capital Improvements Plan.....	5-4



## **List of Appendices**

Appendix A: Roadway Existing Conditions Analysis

Appendix B: Projected Roadway 10-year Growth (Vehicle-Miles of New Demand)

Appendix C: Roadway Capital Improvements Plan List

Appendix D: Roadway Capital Improvements Plan Cost Estimates

Appendix E: Garver Water Capital Improvements Plan Project Cost Estimates

Appendix F: Grantham Wastewater Capital Improvements Plan Project Cost Estimates

## **EXECUTIVE SUMMARY**

The City of DeSoto, Texas, authorized Freese and Nichols, Inc. (FNI) to perform an impact fee analysis on the City's water, wastewater, and roadway systems. The purpose of this report is to summarize the methodology used in the development of land use assumptions and impact fee capital improvements plans and costs for the City of DeSoto.

### **LAND USE ASSUMPTIONS**

Population and land use assumptions are important elements in the analysis of water, wastewater, and roadway systems. A reasonable estimation of future growth is required to assist in determining the need and timing of capital improvements to serve future development. Growth and future development projections were formulated based on assumptions pertaining to the type, location, quantity, and timing of various future land uses within the community. These land use assumptions, which include population projections, are the basis for the preparation of impact fee capital improvements plans for water, wastewater, and roadway facilities.

### **CAPITAL IMPROVEMENT PLAN**

Water, wastewater, and roadway impact fee capital improvements plans (CIP) were developed for the City of DeSoto based on the land use assumptions, input from City staff, and projects from previous studies. The recommended improvements will provide the required capacity to meet projected water demands, wastewater flows, and roadway demand through the 10-year period for this impact fee study. The projects identified are consistent with Chapter 395 of the Texas Local Government Code (TLGC) definition of impact fee eligible projects. The water, wastewater, and roadway CIP projects and their costs are summarized in **Tables ES-1, ES-2, and ES-3** respectively.

**Table ES-1: Water Impact Fee CIP Projects**

Project Number	Description of Project	Percent Utilization			Costs Based on 2020 Dollars	
		2020*	2030	10-Year 2020-2030	Capital Cost	10-Year 2020-2030
Existing Projects						
A	Water Master Plan	0%	50%	50%	\$575,000	\$287,500
B	Water Impact Fee	0%	100%	100%	\$30,000	\$30,000
Existing Total					\$605,000	\$317,500
Proposed Projects						
2	Bolton Boone Pump Station and EST	30%	75%	45%	\$9,160,000	\$4,122,000
3	20-inch Transmission Main for Bolton Boone Zone	30%	75%	45%	\$2,652,000	\$1,193,400
11	12-inch Belt Line Road Waterline Improvements	40%	70%	30%	\$1,376,000	\$412,800
12	18-inch Spinner Road Waterline Improvements	25%	45%	20%	\$4,759,000	\$951,800
13	24-inch Silver Creek Waterline Improvements	30%	35%	5%	\$121,000	\$6,050
14	12-inch Eagle Drive Waterline Improvements	30%	45%	15%	\$3,498,000	\$524,700
20	New Briarwood Pump Station and Southwest Zone Elevated Storage Tank	30%	50%	20%	\$9,324,000	\$1,864,800
21	Southwest Zone Waterline Improvements	15%	65%	50%	\$5,777,000	\$2,888,500
24	12-inch I-35 Frontage Waterline Improvements	15%	20%	5%	\$4,191,000	\$209,550
25	12-inch Parks Waterline Improvements	10%	20%	10%	\$1,676,000	\$167,600
26	Assorted 12-inch Waterline Improvements	20%	30%	10%	\$1,227,000	\$122,700
27	12-inch Hampton Road Waterline Improvements	60%	100%	40%	\$1,727,000	\$690,800
Proposed Project Sub-Total					\$45,488,000	\$13,154,700
Total Water Capital Improvements Cost					\$46,093,000	\$13,472,200

\*Utilization in 2020 on proposed projects indicates a portion of the project that will be used to address deficiencies within the existing system and therefore not eligible for impact fee cost recovery for future growth.

**Table ES-2: Wastewater Impact Fee CIP Projects**

Project Number	Description of Project	Percent Utilization			Cost Based on 2020 Dollars	
		2020 <sup>1</sup>	2030	10-Year 2020-2030	Capital Cost <sup>2</sup>	10-Year 2020-2030
Existing Projects						
A	Wastewater Impact Fee	0%	100%	100%	\$30,000	\$30,000
Existing Total					\$30,000	\$30,000
Proposed Projects						
1	Basin A 12-inch Replacement from MH 1188 to MH 1193	85%	95%	10%	\$353,827	\$35,383
2	Basin A 18-inch Replacement from MH 1198 to MH 1242	85%	95%	10%	\$271,537	\$27,154
3	Basin B 15-inch Replacement from MH 1486 to MH 2064	75%	90%	15%	\$592,328	\$88,849
4	Basin B 15-inch Replacement from MH 2064 to MH 2050	75%	90%	15%	\$816,891	\$122,534
5	Basin B 18-inch Replacement from MH 2050 to MH 2134	75%	90%	15%	\$800,731	\$120,110
6	Basin C 12-inch Replacement from MH 1157 to MH 2247	80%	100%	20%	\$269,333	\$53,867
7	Basin C 15-inch Replacement from MH 2247 to MH 2251	80%	100%	20%	\$473,090	\$94,618
8	Basin C 18-inch Replacement from MH 2251 to MH 2305	80%	100%	20%	\$1,366,508	\$273,302
9	Basin D 15-inch Replacement from MH 2441S to MH 2441Q	80%	90%	10%	\$1,111,728	\$111,173
10	Basin G 21-inch Replacement from MH 410 to MH 418A	70%	85%	15%	\$933,088	\$139,963
11	Basin G 24-inch Replacement from MH 418A to MH 868	70%	85%	15%	\$1,452,993	\$217,949
12	Basin H 12-inch Replacement from MH 980 to MH 980D	70%	85%	15%	\$288,851	\$43,328
13	Basin H 15-inch Replacement	70%	85%	15%	\$660,041	\$99,006
14	Basin H 18-inch Replacement from MH 1016 to MH 924	70%	85%	15%	\$927,529	\$139,129
15	Basin O 10-inch Replacement	75%	90%	15%	\$276,364	\$41,455
16	Basin O 12-inch Replacement	75%	90%	15%	\$234,906	\$35,236
17	Basin O 15-inch Replacement	75%	90%	15%	\$778,638	\$116,796
18	Bee Branch Basin 12-inch Replacements	70%	85%	15%	\$795,496	\$119,324
19	Bee Branch Basin 15-inch Replacement from MH 1894 to MH 1899	70%	85%	15%	\$154,491	\$23,174
20	Bee Branch Basin 18-inch Replacement from MH 1900 to MH 1916	70%	85%	15%	\$892,096	\$133,814

**Table ES-2: Wastewater Impact Fee CIP Projects - Continued**

Project Number	Description of Project	Percent Utilization			Cost Based on 2020 Dollars	
		2020 <sup>1</sup>	2030	10-Year 2020-2030	Capital Cost <sup>2</sup>	10-Year 2020-2030
21	Spring Creek Basin 15-inch Replacement from MH 257 to MH 18	80%	90%	10%	\$351,369	\$35,137
22	Spring Creek Basin 18-inch Replacement	80%	90%	10%	\$1,230,139	\$123,014
23	Heath Creek Basin 10-inch Replacement	70%	85%	15%	\$229,901	\$34,485
24	Heath Creek Basin 12-inch Replacement	75%	90%	15%	\$2,927,568	\$439,135
25	Heath Creek Basin 15-inch Replacement	75%	90%	15%	\$1,445,076	\$216,761
26	Heath Creek Basin 18-inch Replacement	75%	90%	15%	\$1,297,193	\$194,579
27	Heath Creek Basin 21-inch Replacement	75%	90%	15%	\$984,135	\$147,620
28	Heath Creek Basin 24-inch Replacement	75%	90%	15%	\$3,028,900	\$454,335
<b>Proposed Project Sub-Total</b>					<b>\$24,944,747</b>	<b>\$3,681,230</b>
<b>Total Wastewater Capital Improvements Cost</b>					<b>\$24,974,747</b>	<b>\$3,711,230</b>

1 - Utilization in 2020 on Proposed Projects indicates a portion of the project that will be used to address deficiencies within the existing system and therefore not eligible for impact fee cost recovery for future growth.

2 - ENR factor of 149.42% used to inflate projected cost from 2006 WWMP to 2020 dollars on proposed projects only (ENR Construction Cost Index).

- A 20% professional services cost was applied to the total estimated pipe cost. Professional services include survey, deed research, preliminary, and final design of all improvements.

- A 20% contingency was applied to the estimated pipe cost.

**Table ES-3: Roadway Impact Fee CIP Projects**

Project Num.	Service Area	Roadway Project	Roadway Type	Lane Capacity (veh/hr)	VTM Supply (veh/hr)	VTM Capacity (veh/hr)	Total Project Cost
1	1	Widen 0.54 miles of Daniieldale Rad from 2 to 4 lanes: west City Limit to Westmoreland Road	DA	665	723	723	\$4,631,134
2	1	Widen 0.49 miles of Daniieldale Road from 2 to 4 lanes: Westmoreland Road to Old Hickory Trail	DA	665	652	652	\$3,723,204
3	1	Widen 0.5 miles of Wintergreen Road from 2 to 4 lanes: Tenmile Creek to Westmoreland Road	DA	665	665	665	\$5,924,261
4	1	Widen 1 miles of Wintergreen Road from 2 to 4 lanes: Westmoreland Road to Hampton Road	DA	665	1,330	1,330	\$8,017,147
5	1	Widen 0.96 miles of Wintergreen Road from 4 to 6 lanes: Polk Street to IH35	DA	665	1,277	1,277	\$10,131,231
6	1/2	Widen 0.92 miles of Pleasant Run Road from 2 to 4 lanes: Duncanville Road to Cockrell Hill Road	DA	665	1,224	1,224	\$4,085,955
7	1/2	Widen 0.79 miles of Pleasant Run Road from 2 to 4 lanes: Cockrell Hill Road to Westmoreland Rd	DA	665	1,051	1,051	\$3,236,477
8	1/2	Widen 1.01 miles of Pleasant Run Road from 4 to 6 lanes: Polk Street to IH35	DA	665	1,343	1,343	\$5,044,626
9	1	Widen 0.62 miles of Polk Street from 4 to 6 lanes: Centre Park Blvd to Daniieldale Road	DA	665	825	825	\$6,394,249
10	2	Build 0.52 miles of Parkerville Road to 4 lanes: Duncanville Road to 700' west of Keswick Drive	DA	665	1,383	1,383	\$2,020,748
11	2	Widen 0.43 miles of Parkerville Road from 2 to 4 lanes: 700' west of Keswick Dr to Cockrell Hill Rd	DA	665	572	572	\$3,562,790
12	2	Widen 0.96 miles of Parkerville Road from 2 to 4 lanes: Cockrell Hill Road to Westmoreland Road	DA	665	1,277	1,277	\$7,690,192
13	2	Widen 1 miles of Parkerville Road from 2 to 4 lanes: Westmoreland Road to Hampton Road	DA	665	1,330	1,330	\$7,490,790
14	2	Widen 0.95 miles of Parkerville Road from 2 to 4 lanes: Hampton Road to Polk Street	DA	665	1,264	1,264	\$7,143,842
15	2	Recoupment of project to widen 0.98 miles of Parkerville Road from 2 to 6 lanes: Polk St to IH35	DA	665	2,607	2,607	\$10,411,418
16	2	Widen 0.46 miles of Cockrell Hill Road from 2 to 4 lanes: south City limit to Parkerville Road	DA	665	612	612	\$3,680,945
17	2	Recoupment of project to widen 1 miles of Cockrell Hill Road from 2 to 6 lanes: Parkerville Road to Belt Line Road	DA	665	2,660	2,660	\$10,638,696
18	2	Recoupment of project to widen 1 miles of Cockrell Hill Road from 2 to 6 lanes: Belt Line Road to Pleasant Run Road	DA	665	2,660	2,660	\$10,643,814
19	2	Widen 1 miles of Westmoreland Road from 2 to 4 lanes: Parkerville Road to Belt Line Road	DA	665	1,330	1,330	\$7,988,873
20	2	Widen 0.66 miles of Hampton Road from 2 to 4 lanes: south City limit to Parkerville Road	DA	665	878	878	\$5,255,269
21	2	Widen 0.66 miles of Uhl Road from 2 to 4 lanes: south City limit to Parkerville Road	DA	665	878	878	\$5,149,547

<sup>1</sup>DA=Divided Arterial

## 1.0 INTRODUCTION

Chapter 395 of the Texas Local Government Code prescribes the process by which cities in Texas must formulate impact fees. An impact fee is a one-time charge by the city on new development to address impacts of new development on the system. A fee per service unit of need is based on costs of specific capital improvements necessitated by new development and identified on the impact fee capital improvements plan described herein. This report serves as a building block to the development and *potential* imposition of an impact fee program in DeSoto.

An initial step in the impact fee development process is the establishment of land use assumptions that address growth and development for a ten-year planning period (TLGC Section 395.001(5)) for the years 2020-2030. The land use assumptions (LUA), which also include population and employment projections, will become the basis for the preparation of impact fee capital improvement plans for roadway, water, and wastewater facilities. Legislative mandate requires that a capital improvements plan (CIP) be prepared that addresses long-term growth and that such plan be approved by the governing body prior to a public hearing for the consideration of imposing an impact fee. The purpose of this report is to detail the development of the land use assumptions and the impact fee capital improvements plan.

To assist the City of DeSoto in determining the need and timing of capital improvements to serve future development, a reasonable estimation of future growth is required. One purpose of this report is to summarize the growth and development projections based upon assumptions pertaining to the type, location, quantity and timing of various future land uses within the community, and to establish and document the methodology used for preparing the growth and land use assumptions. These assumptions were initially prepared as part of the *2015 Comprehensive Plan*.

This report describes the roadway, water, and wastewater improvements where costs will be recovered by new growth in order to serve this future development. Statutory requirements mandate that impact fees be based on a specific list of improvements identified in the program and only the cost attributed (and necessitated) by new growth over a ten-year period may be considered. As projects in the program are completed, planned costs are updated with actual costs to more accurately reflect the capital expenditure of the program. New capital improvement projects may be added to the program.

Additionally, this report proposes the eligible costs as part of the proposed capital improvement projects. Chapter 395 identifies the following items as impact fee eligible costs:

- Construction contract price
- Surveying and engineering fees
- Land acquisition costs
- Fees paid to the consultant preparing or updating the capital improvements plan (CIP)
- Projected interest charges and other finance costs for projects identified in the CIP

Chapter 395 also identifies items that impact fees cannot be used to pay for, such as:

- Construction, acquisition, or expansion of public facilities or assets other than those identified on the capital improvements plan
- Repair, operation, or maintenance of existing or new capital improvements
- Upgrading, updating, expanding, or replacing existing capital improvements to serve existing development in order to meet stricter safety, efficiency, environmental, or regulatory standards
- Upgrading, updating, expanding, or replacing existing capital improvements to provide better service to existing development
- Administrative and operating costs of the political subdivision
- Principal payments and interest or other finance charges on bonds or other indebtedness, except as allowed above



## **1.1 REPORT ELEMENTS**

This report contains the following components:

- **Methodology** – Explanation of the general methodology used to prepare the land use assumptions and capital improvements plan.
- **Land Use Assumptions**
  - **Service Area** – Explanation of data collection zones (traffic survey zones), and the division of the city into impact fee service areas for roadway, water, and wastewater facilities.
  - **Base Year Data** – Information on historic population trends in DeSoto as well as population and employment demographics for 2020 in each capital service area.
  - **Ten-Year Growth Assumptions** – Population and employment growth assumptions for ten years by impact fee service area.
  - **Summary** – Brief synopsis of the land use assumptions report.
- **Capital Improvements Plan**
  - **Existing Conditions Analysis** – Analysis of the existing water, wastewater, and roadway systems; their carrying capacity, current utilization, and deficiencies.
  - **Growth Projections** – Development of growth projections to occur over the ten-year planning period by service area.
  - **Capital Improvements Plan** – Description of the capital improvements plan.

## **2.0 METHODOLOGY**

The data in this report has been formulated using reasonable and generally accepted planning principles for the preparation of impact fee systems in Texas and meets the requirements of the TLGC Chapter 395 for the establishment of impact fees.

For the formulation of the land use assumptions and capital improvements plan, a series of work tasks were undertaken and are described below.

1. A kick-off meeting was held to describe the general methodological approach in the study.
2. Roadway, water, and wastewater service areas were confirmed as to conform with legislative mandate, as well as considerations to allow for future city annexations.
3. Current and projected data of population and employment was gathered from the *2015 Comprehensive Plan*, North Central Texas Council of Governments (NCTCOG) forecasts, U.S. Census, and input from City staff on upcoming developments to serve as a basis for future growth.
4. An existing conditions inventory was conducted to document system utilization, capacity, and deficiencies based on existing users. To support the existing conditions inventory, traffic volume count data was gathered using StreetLight cell phone data to obtain traffic counts. Through Streetlight, historic traffic counts were obtained from February 2020, prior to effects of COVID-19 lockdowns.
5. A base year (2020) estimate of population and employment was defined using the *2015 Comprehensive Plan*, NCTCOG data, and residential building permit data.
6. A ten-year projection (2030) of population and employment was prepared using input from City staff on upcoming developments and NCTCOG forecasts. Distribution adjustments were then made to consider known or anticipated development activity within the 10-year planning period.
7. Base and 10-year demographics were prepared for the respective service areas for roadway, water, and wastewater.
8. A capital improvements plan to address projected growth was developed by service area based upon discussions with City Staff.

Based on the growth assumptions and the capital improvements needed to support growth, an impact fee structure can be developed. This methodology fairly allocates improvement costs to growth areas in relationship to their impact upon the entire infrastructure system.

## **3.0 LAND USE ASSUMPTIONS**

### **3.1 DATA COLLECTION ZONES**

Data collection zones used for the land use assumptions are based upon small geographic areas known as traffic survey zones (TSZs). These zones, established by NCTCOG, cover the Metropolitan Planning Organization's (MPO) planning area and serve as the basis for socio-demographic data used in the regional travel forecast model. Traffic survey zones were originally formulated on the basis of homogeneity and traffic generation potential using major arterials, creeks, railroad lines, and other physical boundaries for delineation.

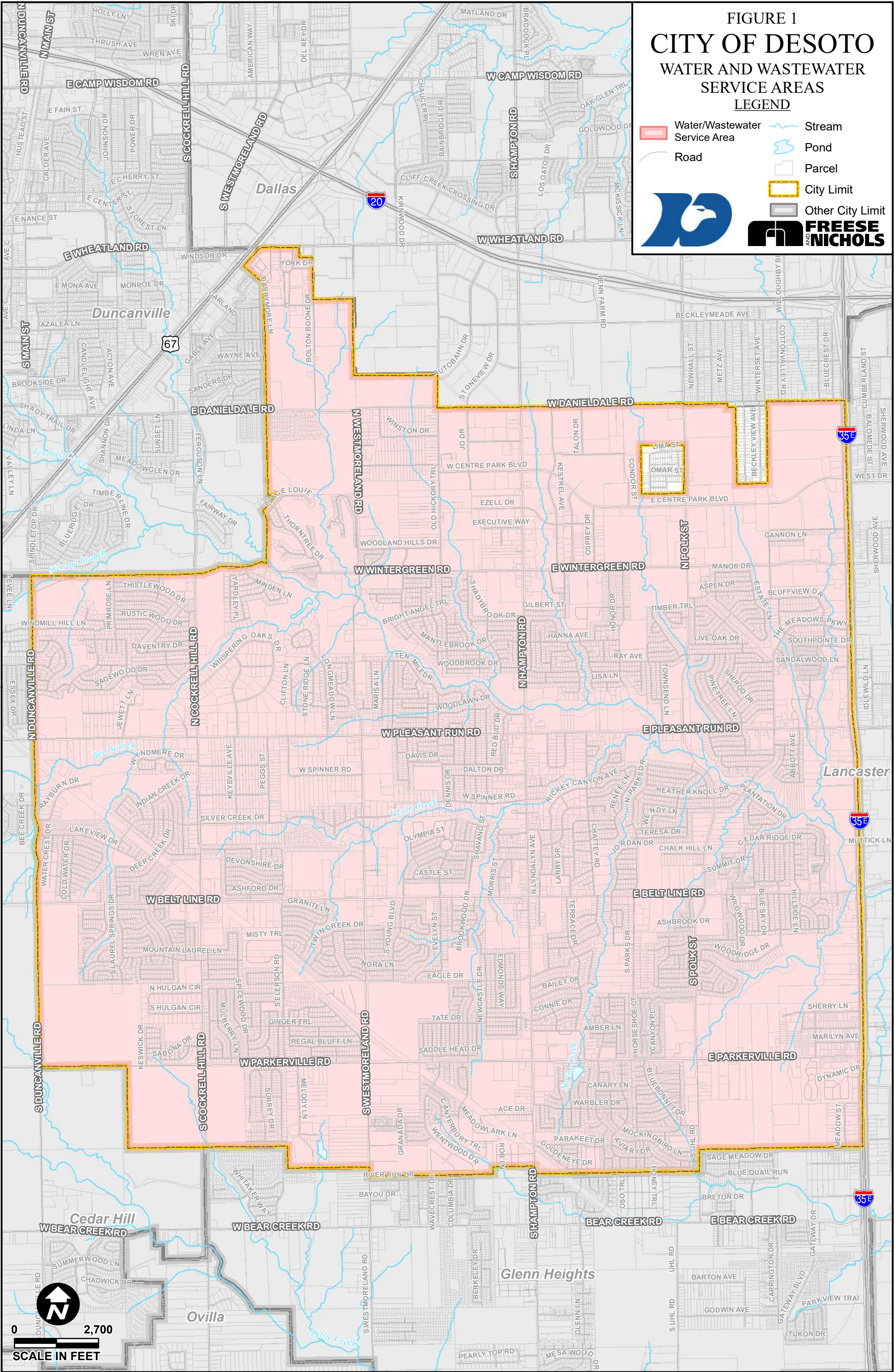
Population and employment demographics will be compiled by TSZs and then aggregated into larger areas to form the service areas for impact fees.

### **3.2 SERVICE AREAS**

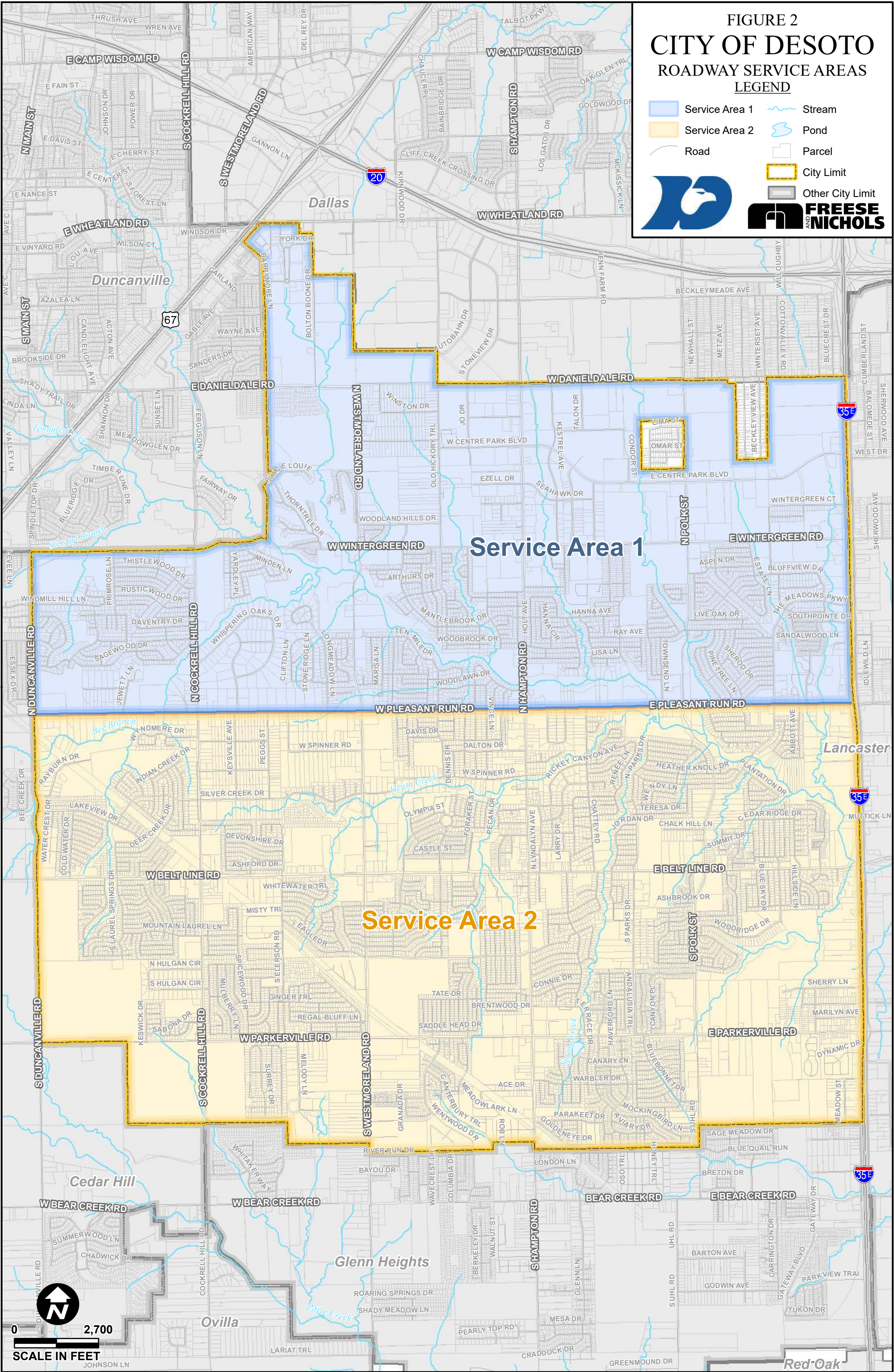
Chapter 395 requires that service areas be defined for impact fees to ensure that facility improvements are located in close proximity to areas generating needs. The water and wastewater service areas were assumed to be the city limits. **Figure 1** illustrates the water and wastewater service area.

Legislative requirements stipulate that roadway service areas be limited to a six-mile maximum and must be located within the current city limits. The result is that, for roadways, new development can only be assessed an impact fee based on the cost of necessary capital improvements within that service area and within city limits. A roadway service area structure consisting of two (2) areas has been developed for DeSoto, as depicted in **Figure 2**. The service areas were split along Pleasant Run Road which roughly splits the City in half and corresponds to the NCTCOG TSZ zones. The structure was reviewed and approved by City staff.











### 3.3 DATA FORMAT

The existing roadway database, as well as the future projections, was formulated according to the following format and categories:

**Service Area** Correlates to the roadway, water, and wastewater service areas identified on the attached maps.

**Traffic Survey Zone** Geographic areas established by the NCTCOG Traffic Model which are used for data collection purposes and termed TSZs within this report.

**Population (2020)** Existing estimated population for the base year (2020).

**Population (2030)** Projected population by service zone for the year 2030 (ten-year growth projection).

**Employment (2020-30)** Employment data provided by NCTCOG is aggregated to three employment sectors and include Basic, Retail and Service. The following details which land use falls within each of the three sectors.

Basic -- Land use activities that produce goods and services such as those that are exported outside the local economy; manufacturing, construction, transportation, wholesale trade, warehousing and other industrial uses.

Service -- Land use activities which provide personal and professional services such as financial, insurance, government, and other professional and administrative offices.

Retail -- Land use activities which provide for the retail sale of goods that primarily serve households and whose location choice is oriented toward the household sector such as grocery stores, restaurants, etc.

NCTCOG employment estimates at the TSZ level were used to determine employment growth within the City and this data was approved by City staff.

### 3.4 BASE YEAR DATA

This section documents the City's historical growth trends and data used to derive the 2020 base year population estimate for the City of DeSoto. This base data provides a starting basis of data for the 10-year growth assumptions that will be presented within the following section.

#### 3.4.1 Historical Growth

A City's past growth rates are often an indicator of future growth rates. Population projections were developed using historical data from the NCTCOG, the United States Census Bureau, the 2015 *Comprehensive Plan*, and residential building permit data. The projections were compared to the Texas Water Development Board Region C (TWDB).

The 2015 *Comprehensive Plan* assumed a 1.5% population growth rate based on NCTCOG population data available in 2015. This growth rate is being used in the ongoing Water Master Plan by Garver. NCTCOG data suggests the City has experienced a steady population growth rate of approximately 0.92% over the last 10 years. The population growth rate for the Census data indicates that the population has decreased over the previous ten years. The average annual growth for the historic period is shown in **Table 1**.

**Table 1: Historical City Population**

Year	NCTCOG Population <sup>1</sup>	NCTCOG Growth Rate	Census Population <sup>2</sup>	Census Growth Rate
2009	48,700	--	--	--
2010	49,047	0.71%	49,344	--
2011	49,210	0.33%	50,196	1.73%
2012	49,540	0.67%	51,216	2.03%
2013	49,930	0.79%	51,587	0.72%
2014	50,520	1.18%	52,046	0.89%
2015	50,970	0.89%	52,612	1.09%
2016	51,770	1.57%	53,088	0.90%
2017	52,120	0.68%	53,533	0.84%
2018	52,870	1.44%	53,254	-0.52%
2019	53,200	0.62%	52,988	-0.50%
2020	53,750	1.03%	--	--
<b>10-Year Average Growth Rate</b>		<b>0.92%</b>	--	<b>0.80%</b>
<b>5-Year Average Growth Rate</b>		<b>1.07%</b>	--	<b>0.36%</b>
<b>3-Year Average Growth Rate</b>		<b>1.03%</b>	--	<b>-0.06%</b>

<sup>1</sup>Source: North Central Texas Council of Governments

<sup>2</sup>Source: U.S Census Bureau

FNI obtained residential permit data from 2018 through November 2020 to evaluate recent residential growth trends. Approximately 510 new single-family units and one 194-unit multifamily development were added since 2018. FNI referenced the American Community Survey and assumed 2.5 persons per dwelling unit for multifamily developments and 3.0 persons per dwelling unit for single-family developments to determine population increase. **Table 2** shows that approximately 2,015 people were added to the City's population from 2018 to 2020, resulting in an average growth rate of 1.27%.

**Table 2: Building Permit Population Growth**

Year	Population	Growth Rate
2017	52,120	--
2018	52,606	0.93%
2019	53,517	1.73%
2020	54,135	1.15%
Average		1.27%

The building permit growth rate suggests that high-density growth has been occurring in recent years and is in the range of the 1.5% growth rate recommended by the 2015 *Comprehensive Plan*. Based on this review, City staff approved utilizing a 1.5% growth rate for this study.

### 3.4.2 2020 Population and Employment

For the land use assumptions process, 2020 base population and employment data was calculated using data from NCTCOG. The data set provided by NCTCOG was for the years 2018 and 2045 and it provided a breakout of population and employment by TSZ. For assumption purposes, and to be consistent with the population totals, an interpolation of the population and employment numbers was calculated to derive the 2020 population and employment estimates by TSZ. It is important to note that the TSZs do not follow city limits or water and wastewater service areas in some locations, so adjustments were made based on the locations of existing land uses and upon the percentage of each TSZ located within City limits. **Figures 3 through 5** present the population and employment by TSZ for the water, wastewater, and roadway service areas. Employment for each TSZ was broken down into basic, retail, and service uses as defined by the NCTCOG. It is assumed water and wastewater have the same service area defined by the City limits. The two roadway service areas were split at Pleasant Run Road which corresponded with TSZ boundaries and roughly divides the City in half. Using the TSZ boundaries will facilitate quick updates in the future with NCTCOG data. **Table 3** summarizes the population and employment for 2020 for each service area. **Table 4** further breaks down the population and employment for 2020 for each roadway service area.



**Table 3: 2020 Population and Employment by Service Area**

Infrastructure Component	Population	Employment
Roadway	53,750	18,159
Water	53,750	18,159
Wastewater	53,750	18,159

**Table 4: Summary of Base Year (2020) Population and Employment - Roadway**

Service Area	Population	Employment (Employees)			
		Basic	Retail	Service	Total
1	20,306	2,614	6,914	991	10,519
2	33,444	1,712	5,237	691	7,640
<b>Total</b>	<b>53,750</b>	<b>4,326</b>	<b>12,151</b>	<b>1,682</b>	<b>18,159</b>



FIGURE 3  
CITY OF DESOTO  
POPULATION GROWTH  
PROJECTIONS BY TSZ

LEGEND

- Traffic Survey Zone
- Road
- Stream
- Pond
- Parcel
- City Limit
- Other City Limit



**FREESE  
AND  
NICHOLS**

TSZ ID
2020 Population
2025 Population
2030 Population
2035 Population
2040 Population

POPULATION GROWTH

- Less than 300 Persons
- 300 - 600 Persons
- 600 - 900 Persons
- Greater than 900 Persons

POPULATION TOTALS

2020 Population: 53,750  
2025 Population: 58,412  
2030 Population: 63,079  
2035 Population: 67,736  
2040 Population: 72,393

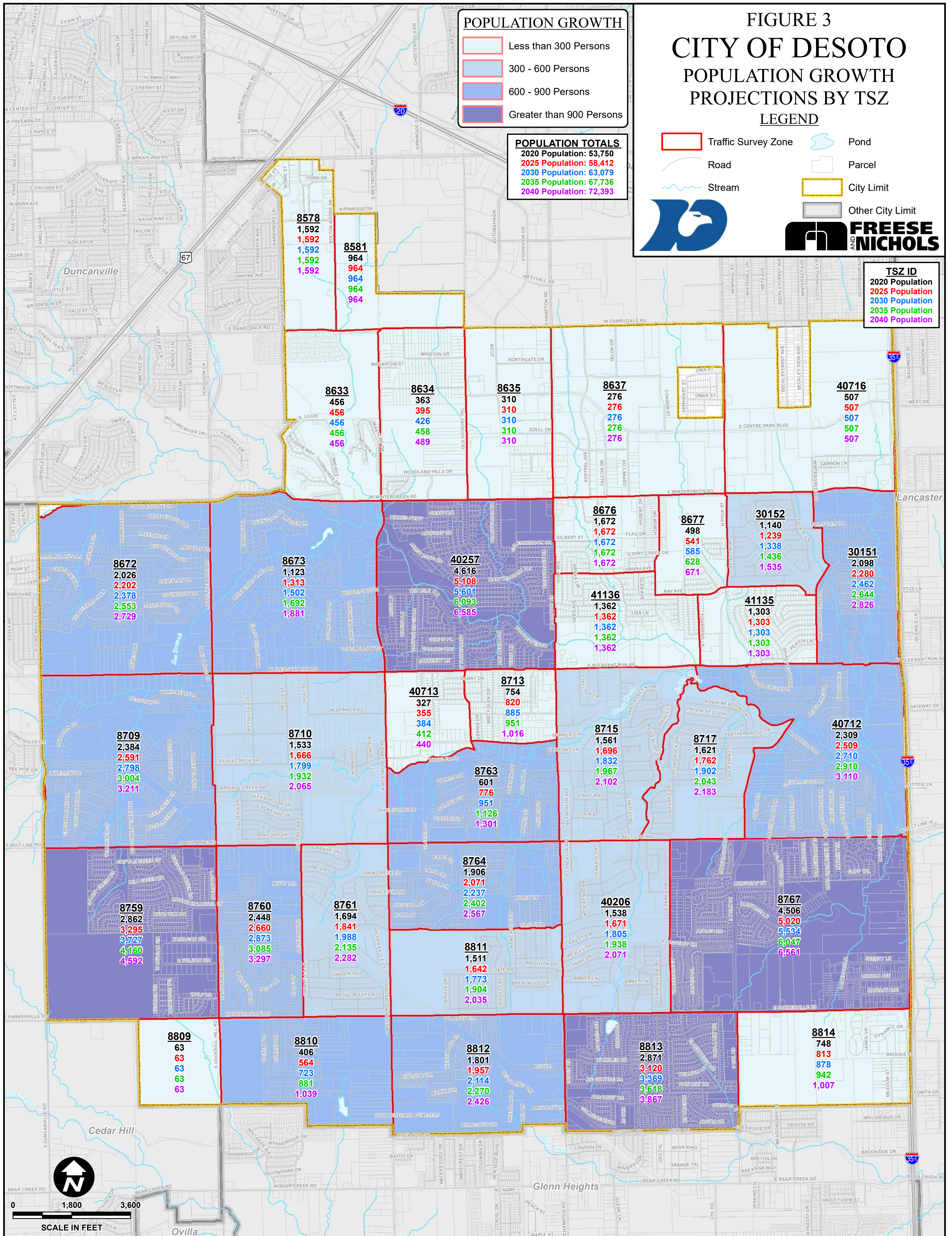




FIGURE 4  
CITY OF DESOTO  
EMPLOYMENT GROWTH  
PROJECTIONS BY TSZ

LEGEND

- Traffic Survey Zone  
Road  
Stream  
Pond  
Parcel  
City Limit  
Other City Limit



TSZ ID
2020 Total Employment
2025 Total Employment
2030 Total Employment
2035 Total Employment
2040 Total Employment

EMPLOYMENT GROWTH

- Less than 10 Employees  
10 - 50 Employees  
50 - 200 Employees  
Greater than 200 Employees

TOTAL EMPLOYMENT

2020 Total Employees: 18,159  
2025 Total Employees: 20,302  
2030 Total Employees: 22,448  
2035 Total Employees: 24,595  
2040 Total Employees: 26,745

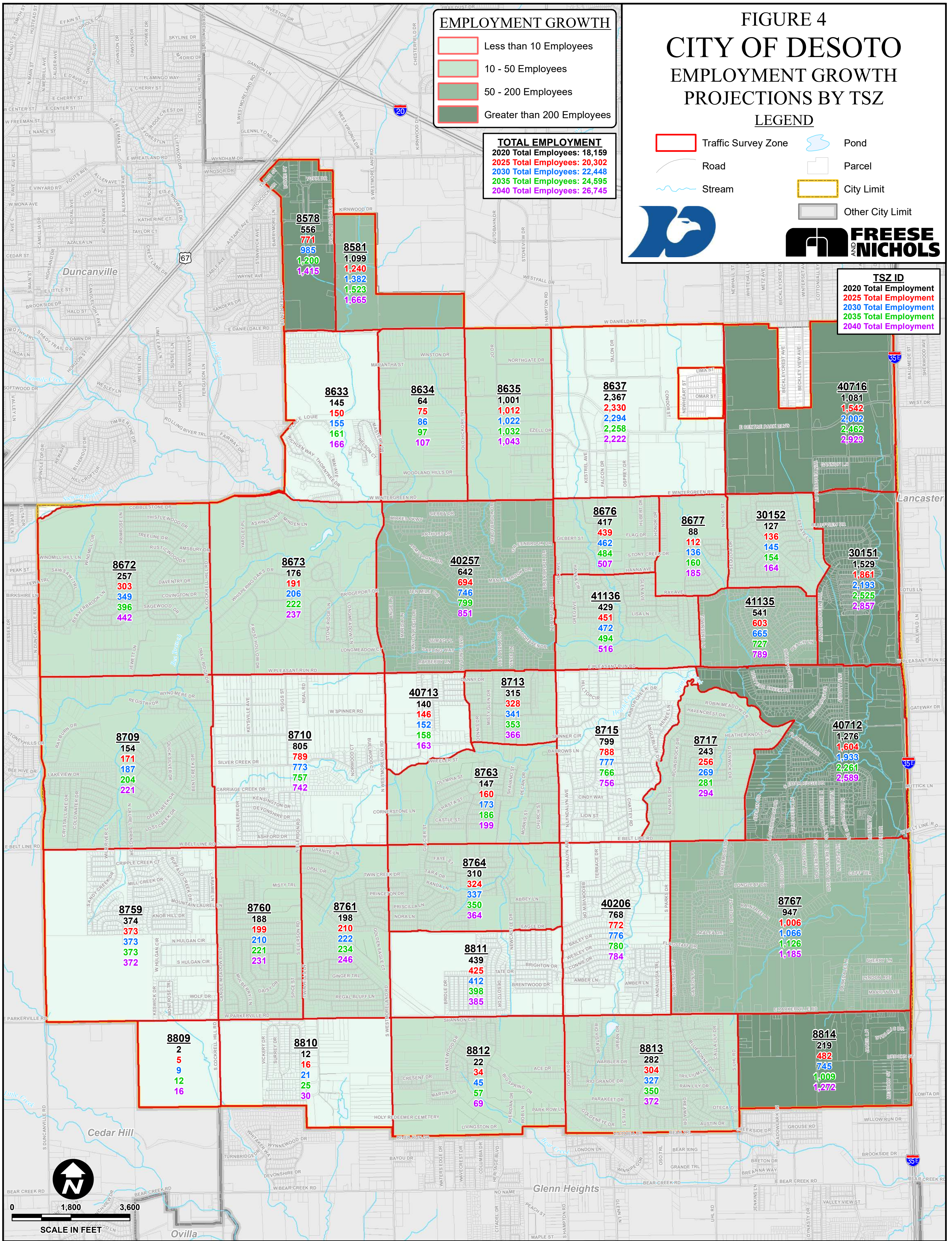











FIGURE 5  
CITY OF DESOTO  
POPULATION AND EMPLOYMENT  
PROJECTIONS BY TSZ  
ROADWAY SERVICE AREAS  
LEGEND

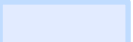
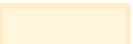
-  Traffic Survey Zone
-  Pond
-  Road
-  Parcel
-  Stream
-  City Limit
-  Other City Limit

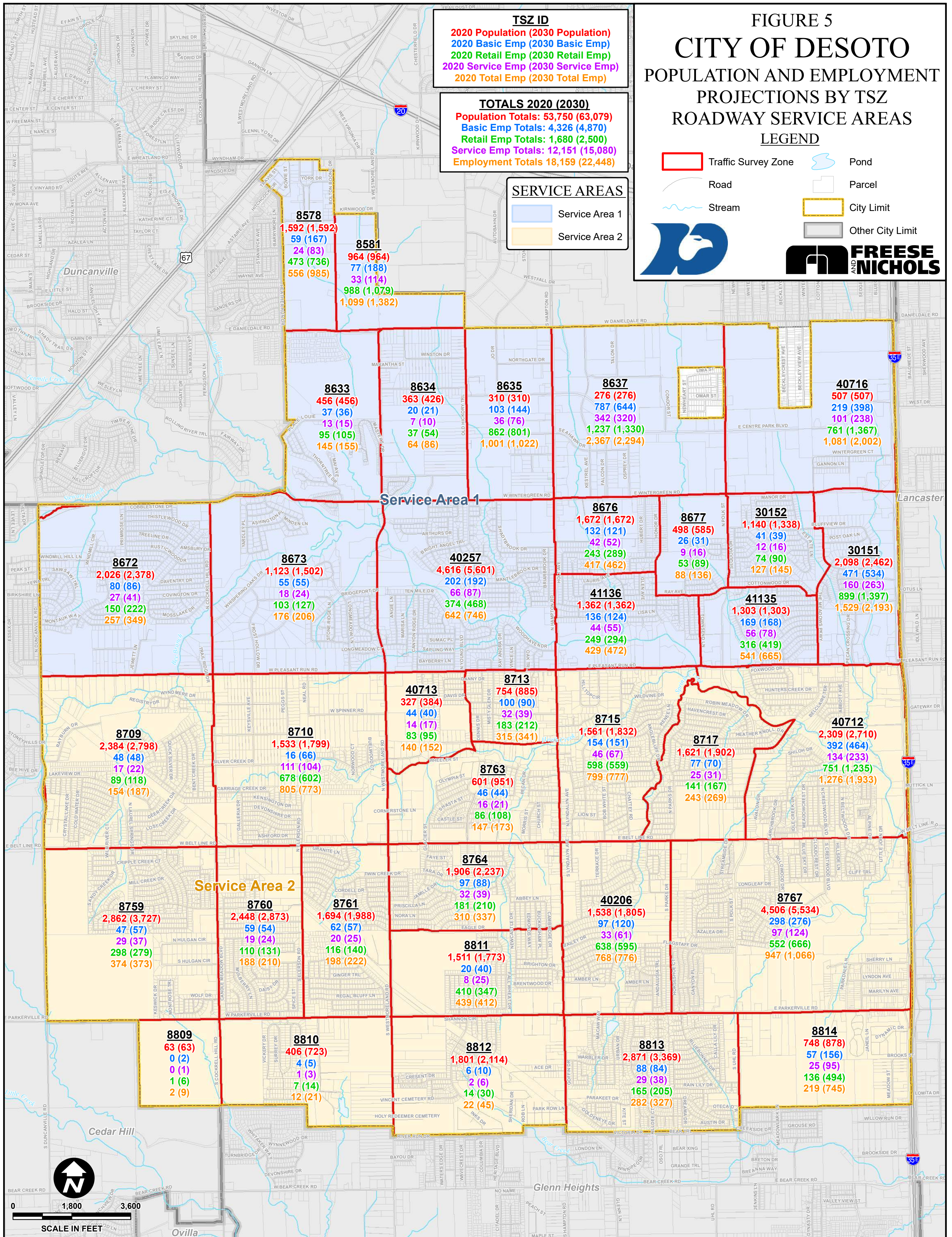


**FREESE  
AND  
NICHOLS**

**TSZ ID**  
**2020 Population (2030 Population)**  
**2020 Basic Emp (2030 Basic Emp)**  
**2020 Retail Emp (2030 Retail Emp)**  
**2020 Service Emp (2030 Service Emp)**  
**2020 Total Emp (2030 Total Emp)**

**TOTALS 2020 (2030)**  
**Population Totals: 53,750 (63,079)**  
**Basic Emp Totals: 4,326 (4,870)**  
**Retail Emp Totals: 1,680 (2,500)**  
**Service Emp Totals: 12,151 (15,080)**  
**Employment Totals 18,159 (22,448)**

**SERVICE AREAS**  
 Service Area 1  
 Service Area 2





### **3.5 TEN-YEAR GROWTH ASSUMPTIONS**

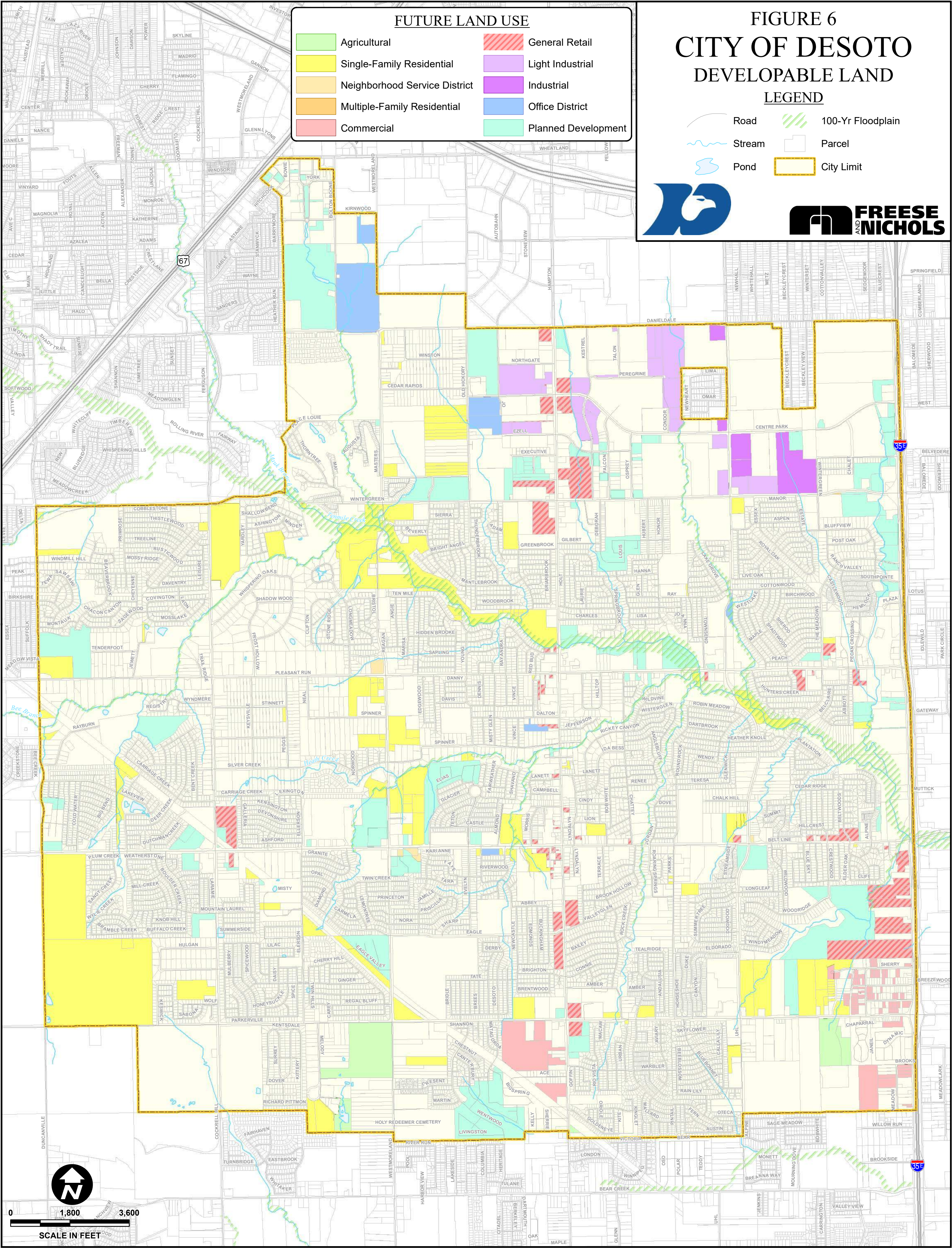
Projected growth has been characterized in two forms: population and employment. A series of assumptions were made to arrive at reasonable growth projections for population and employment. FNI assumed a population growth rate of 1.5% based on residential permit data as discussed in **Section 3.4**. This growth trend is consistent with the recommendation in the 2015 *Comprehensive Plan*. The following assumptions have been made as a basis from which 10-year projections could be initiated.

- Future land uses will occur based on similar trends of the past and consistent with the *2015 Comprehensive Plan*;
- Known planned development activities to occur; and
- The City will be able to finance the necessary improvements to accommodate continued growth.

The 10-year population projections are based upon incorporating the information on planned development densities provided by City staff. The developable land identified by City staff is shown on **Figure 6**. The 10-year employment projections are based upon the NCTCOG forecasts by TSZ. Distribution of population and employment for the future water and wastewater service area and between the two roadway service areas was based upon the allocation of future growth by TSZ.

The population and employment projections (2030) for the service areas are summarized in **Table 5**. **Table 6** further breaks down the population and employment for 2030 for each roadway service area.







**Table 5: 2030 Population and Employment by Service Area**

Infrastructure Component	Population	Employment
Roadway	63,079	22,448
Water	63,079	22,448
Wastewater	63,079	22,448

**Table 6: Population and Employment Projections (2030) for Roadway Service Area**

Service Area	Population	Employment (Employees)			
		Basic	Retail	Service	Total
1	22,734	2,948	8,867	1,487	13,302
2	40,345	1,922	6,213	1,011	9,146
Total	63,079	4,870	15,080	2,498	22,448

### 3.6 SUMMARY

- The existing 2020 population for DeSoto stands at approximately 53,750 persons, with an existing estimated employment of 18,159 jobs.
- The 10-year population projections are based upon incorporating the information on planned development densities provided by City staff. NCTCOG employment estimates were used to calculate ten-year growth projections.
- Ten-year (2030) population is forecast to be 63,079 persons, with an employment of 22,448 jobs. This is a growth of 9,329 persons and 4,289 employees, respectively.

**Table 7: Land Use Assumption Summary (2020-2030)**

	2020	2030	Total Increase	Percent Total Growth	Annual Growth Rate
<b>Population (Persons)</b>					
<b>Water Total</b>	<b>53,750</b>	<b>63,079</b>	<b>9,329</b>	<b>17.36%</b>	<b>1.61%</b>
<b>Wastewater Total</b>	<b>53,750</b>	<b>63,079</b>	<b>9,329</b>	<b>17.36%</b>	<b>1.61%</b>
<b>Roadway Total</b>	<b>53,750</b>	<b>63,079</b>	<b>9,329</b>	<b>17.36%</b>	<b>1.61%</b>
Service Area 1	20,306	22,734	2,428	11.96%	1.14%
Service Area 2	33,444	40,345	6,901	20.63%	1.89%
<b>Employment (Employees)</b>					
<b>Water Total</b>	<b>18,159</b>	<b>22,448</b>	<b>4,289</b>	<b>23.62%</b>	<b>2.14%</b>
<b>Wastewater Total</b>	<b>18,159</b>	<b>22,448</b>	<b>4,289</b>	<b>23.62%</b>	<b>2.14%</b>
<b>Roadway Total</b>	<b>18,159</b>	<b>22,448</b>	<b>4,289</b>	<b>23.62%</b>	<b>2.14%</b>
Service Area 1	10,519	13,302	2,783	26.46%	2.38%
Basic	2,614	2,948	334	12.78%	1.21%
Retail	6,914	8,867	1,953	28.25%	2.52%
Service	991	1,487	496	50.05%	4.14%
Service Area 2	7,640	9,146	1,506	19.71%	1.82%
Basic	1,712	1,922	210	12.27%	1.16%
Retail	5,237	6,213	976	18.64%	1.72%
Service	691	1,011	320	46.31%	3.88%



## 4.0 ROADWAY CAPITAL IMPROVEMENTS PLAN

### 4.1 EXISTING CONDITIONS ANALYSIS

An inventory of major roadways that are designated as arterial and/or collector facilities on the *2015 Comprehensive Plan's* Thoroughfare Plan was conducted to determine: 1) capacity provided by the existing roadway system, 2) the demand currently placed on the system, and 3) the potential existence of deficiencies in the system. Any deficiencies found to occur will be carried over in the impact fee calculations (netting out capacity made available by the CIP). Data for the inventory were obtained from the Thoroughfare Plan and historic peak hour traffic volume count data collected in from February 2020, prior to effects of the COVID-19 pandemic.

The roadways were divided into segments based on changes in lane configuration, major intersections, city limits or area development that may influence roadway characteristics. For the assessment of individual segments, lane capacities were assigned to each segment based on roadway functional class defined by the City's Thoroughfare Plan and type of existing cross-section, as listed in **Table 8**. Roadway hourly volume capacities are defined by link-level carrying capacity values based upon generally accepted capacities defined by the NCTCOG travel demand modeling description for the suburban residential context at a level-of-service (LOS) "D/E" operation.

**Table 8: Roadway Facility Vehicle Mile Lane Capacities**

Roadway Facility Functional Classification	Designation	Hourly Vehicle-mile Capacity per Lane Mile of Roadway Facility
Divided Arterial*	DA/SA*	580
Divided Collector*	DC/SC*	460
Undivided Arterial	UA	520
Undivided Collector	UC	420

\*Facilities with a two-way left turn lane (TWLTL) treated as a divided facility and marked with a Special Arterial (SA) or Special Collector (SC) designation.

#### 4.1.1 Existing Volumes

Existing directional PM peak hour volumes were obtained by utilizing StreetLight traffic data. With StreetLight, historic data could be obtained from February 2020, prior to effects of lockdown from Covid. This information was supplemented with data from Texas Department of Transportation's (TxDOT) traffic count system.

These data were compiled for roadway segments throughout the City and entered into the Roadway existing database for use in calculations. A summary of volumes by roadway segment is included in the **Appendix B** as part of the existing capital improvements database.

#### 4.1.2 Vehicle-Miles of Existing Capacity Supply

An analysis of the total capacity for each service area was performed. For each roadway segment, the existing vehicle-miles of capacity supplied were calculated using the following:

$$\text{Vehicle-Miles of Capacity} = \text{Link capacity per peak hour per lane} \times \text{No. of Lanes} \times \text{Length of segment (miles)}$$

A summary of the current capacity available on the roadway system by service area is detailed in **Table 9**.

#### 4.1.3 Vehicle-Miles of Existing Demand

The level of current usage in terms of vehicle-miles was calculated for each roadway segment. The vehicle-miles of existing demand were calculated by the following equation:

$$\text{Vehicle-Miles of Demand} = \text{PM peak hour volume} \times \text{Length of segment (miles)}$$

The total vehicle-miles of demand by service area is also listed in **Table 9**.

#### 4.1.4 Vehicle-Miles of Existing Excess Capacity and Deficiencies

For each roadway segment, the existing vehicle-miles of excess capacity and/or deficiencies were calculated and are listed in **Table 9**. Each direction was evaluated to determine if vehicle demands (volumes) exceeded the available capacity. If demand in either direction exceeded capacity, this deficiency in the roadway network was documented as the excess demand over available capacity in that segment. The total deficiencies in the network is deducted from the capacity supply associated with the impact fee capital improvement plan in order to account for excess demand in the network from existing development. A summary of peak hour excess capacity and deficiencies is also shown in **Table 9**. Any deficiencies identified under current operations will be carried over to the impact fee calculation. A detailed listing of existing excess capacity and deficiencies by roadway segment is also located in the **Appendix A**.

**Table 9: Peak Hour Vehicle-Miles of Existing Capacity, Demand, Excess-Capacity, and Deficiencies**

Service Area	Capacity (veh-mile)	Demand (veh-mile)	Existing Deficiencies (veh-mile)	Excess Capacity (veh-mile)
1	9,115	8,733	0	422
2	21,077	11,752	0	9,325
<b>Total</b>	30,192	20,485	0	9,747

## 4.2 GROWTH PROJECTIONS

The projected growth for the roadway service areas is represented by the increase in the number of new vehicle-miles of demand generated over the 10-year planning period. The basis for the calculation of new demand is the population and employment projections that were described in the previous **Section 3.0**.

Population growth in dwelling units will be used to calculate vehicle-miles of demand from this demographic type. Employment growth data presented in the LUA were converted to square feet of development using estimated employees per square foot of gross floor area based on a range of values commonly found in modeling. The conversion of population to dwelling units and employment to square feet of development aligns the growth assumptions with the service unit equivalencies for each demographic allowing for the calculation of a total projected vehicle-miles of new demand in this 10-year planning period.

### 4.2.1 Projected Vehicle-Miles of New Demand

Projected vehicle-miles of demand were calculated based on the net growth expected to occur over the 10-year planning period, and on the associated service unit generation for each of the population and employment data components (basic, service and retail). Separate calculations were performed for each data component and were then aggregated for each service area. Vehicle-miles of demand for population growth were based on dwelling units (residential). Vehicle-miles of demand for employment were based on square footage of building space.

These growth assumptions were then multiplied by the service unit equivalency for vehicle-mile generation based on trip rates in the Institute for Transportation Engineer's (ITE) *Trip Generation, 10<sup>th</sup> Edition* and trip lengths derived from StreetLight analysis and from the NCTCOG travel demand model, tailored to the City of DeSoto.

The 10-year projected vehicle-miles of demand by service area are summarized in **Table 10. Appendix B** details the derivation of the projected demand calculations.

**Table 10: 10-Year Projected Service Units of Demand**

Service Area	Projected 10-Year Growth (Vehicle-Miles)
1	8,733
2	11,752
Total	20,485

### 4.3 ROADWAY CAPITAL IMPROVEMENTS PLAN

The impact fee CIP is aimed at facilitating long-term growth in DeSoto. The City has identified the City-funded transportation projects needed to accommodate the projected growth within the City. City Staff input along with the City’s Thoroughfare Plan served as a basis for incorporating projects into this impact fee program. Other considerations for which the CIP for roadway impact fees includes:

- Recently completed projects with excess capacity available to serve new growth;
- Projects currently under construction; and
- Remaining projects needed to complete the City’s Thoroughfare Plan.

Arterial class facilities in the current adopted Thoroughfare Plan were included in the impact fee CIP to provide flexibility in the development of the community due to the anticipated rates of development.

#### 4.3.1 Eligible Projects

Legislative mandate stipulates that the impact fee CIP contain only those roadways classified as *arterial* or *collector* status facilities that are included in the City’s adopted Thoroughfare Plan. Impact fee legislation also allows for the recoupment of costs for previously constructed facilities and projects currently under construction. All these projects conform to the Thoroughfare Plan requirements and will consider only the costs incurred by the City for facility implementation. Standalone traffic signal projects were omitted from the CIP to focus on major “facility expansions” and avoid potential “modernization” projects which are not allowed per TLGC Chapter 395.

#### 4.3.2 Eligible Costs

In general, those costs associated with the design, right-of-way acquisition, and construction and financing of all items necessary to implement the roadway projects identified in the capital improvements plan are

eligible. These estimates are based on the ultimate roadway section identified by functional classification in the Transportation element of the 2015 Comprehensive Plan. It is important to note that upon completion of the capital improvements identified in the CIP, the city must recalculate the impact fee using the *actual* costs and make refunds if the actual cost is less than the impact fee paid by greater than 10 percent. To prevent this situation, conservative (low) estimates of project cost are considered.

Chapter 395.012 identifies roadway costs eligible for impact fee recovery. The law states that:

“An impact fee may be imposed only to pay the cost of constructing capital improvements for facility expansions, including and limited to the construction contract price, surveying and engineering fees, land acquisition costs, including land purchases, court awards and costs, attorney fees, and expert witness fees; and fees actually paid or contracted to be paid to an independent qualified engineer or financial consultant preparing or updating the capital improvements plan who is not an employee of the political subdivision.”

“Projected interest charges and other finance costs may be included in determining the amount of impact fees only if the impact fees are used for the payment of principal and interest on bonds, notes, or other obligations issued by or on behalf of the political subdivision to finance the capital improvements or facility expansions identified in the capital improvements plan and are not used to reimburse bond funds expended for facilities that are not identified in the capital improvements plan.”

The following details the individual cost components of the impact fee CIP.

Construction: Construction costs include those costs which are normally associated with construction, including: paving, dirt work (including sub-grade preparation, embankment fill and excavation), clearing and grubbing, retaining walls or other slope protection measures, and general drainage items which are necessary in order to build the roadway and allow the roadway to fulfill its vehicle carrying capability. Individual items may include; bridges, culverts, inlets and storm sewers, junction boxes, manholes, curbs and/or gutters, and channel linings and other erosion protection appurtenances. Other items included in cost estimates may include: sidewalks, traffic control devices at select locations (initial cost only), ancillary adjustments to existing utilities, and minimal sodding/landscaping.

Engineering: These are the costs associated with the design and surveying necessary to construct the roadway. Because the law specifically references fees, it has generally been understood that in-house City design and surveying cannot be included. Only those services that are contracted out can be included and it may be necessary to use outside design and surveying firms to perform the work. For planned projects, a percentage based on typical engineering contracts was used to estimate these fees.

Right-of-Way: Any land acquisition cost estimated to be necessary to construct a roadway can be included in the cost estimate. For planning purposes, only the additional amount of land needed to bring a roadway right-of-way to thoroughfare standard was considered. For example, if a 120' right-of-way for an arterial road was needed and 80' of right-of-way currently existed, only 40' would be considered in the acquisition cost.

The cost for right-of-way may vary based on location of project and will be based on data from the most current County Appraisal District data.

Debt Service: Predicted interest charges and finance costs may be included in determining the amount of impact fees only if the impact fees are used for the payment of principal and interest on bonds, notes, or other obligations issued by the city to finance capital improvements identified in the impact fee capital improvements plans. They cannot be used to reimburse bond funds for other facilities.

Previous Assessments: The cost for any previous assessments collected by the City on projects identified on the impact fee CIP must be removed from program consideration. As this is a new impact fee program, there are no previous assessments to consider in the initial calculation.

Study Updates: The fees paid or contracted to be paid to an independent qualified engineer or financial consultant preparing or updating the capital improvements plan who is not an employee of the political subdivision can be included in the impact fees.

Only the cost necessitated by new development is considered for impact fee calculations. For example, if only 60% of the capacity provided by the impact fee CIP is needed over the ten-year window, then only 60% of the cost associated with those facilities will be considered.

#### 4.3.3 Impact Fee CIP

The proposed CIP consists of 21 project segments over the two (2) service areas and advance the implementation of the Comprehensive Plan Transportation network, as seen in **Figure 7**.

Project costs were developed based on unit cost estimates compiled by Freese and Nichols. Individual project costs were developed for engineering, right-of-way, and construction as found in the **Appendix D**. Each roadway segment uses the Thoroughfare Plan's defined functional classification to determine the ultimate roadway standard for each link. These construction estimates included all appurtenances called for in the City construction standards. Other costs were updated for engineering, right-of-way, construction, and debt service based on the following:

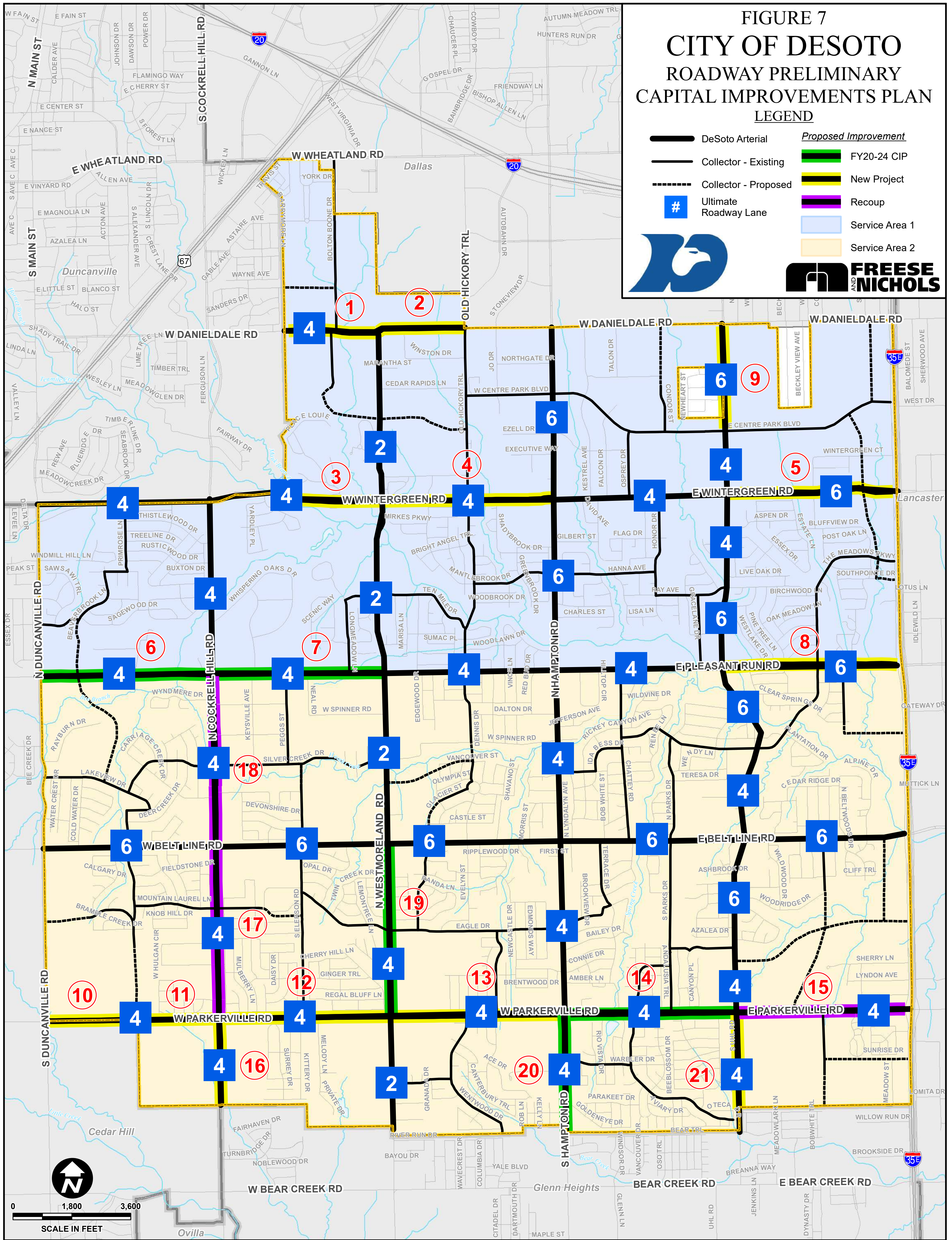
- Engineering/surveying – 10% of construction costs
- Right-of-way acquisition - \$1.00/square foot
- Debt service – 3% compounded annually over 20 years

Additionally, impact fee study update costs were attributed to the project costs. For recently completed projects, actual costs must be input to meet legislative mandates. The cost for the impact fee CIP program totals \$145.2 million. **Figure 7** and **Table 11** illustrate and list the capital improvement projects and their associated total cost for the impact fee program.



# FIGURE 7 CITY OF DESOTO ROADWAY PRELIMINARY CAPITAL IMPROVEMENTS PLAN LEGEND

- |   |                       |   |  |
|---|-----------------------|---|--|
|  | DeSoto Arterial       |  | <i>Proposed Improvement</i><br>FY20-24 CIP |
|  | Collector - Existing  |  | New Project                                |
|  | Collector - Proposed  |  | Recoup                                     |
|  | Ultimate Roadway Lane |  | Service Area 1                             |
|   |                       |  | Service Area 2                             |



0 1,800 3,600  
SCALE IN FEET



**Table 11: Roadway Impact Fee Capital Improvements Plan Projects**

Project Num.	Service Area	Roadway Project	Roadway Type	Lane Capacity (veh/hr)	VMT Supply (veh/hr)	VMT Capacity (veh/hr)	Total Project Cost
1	1	Widen 0.54 miles of Danieldale Rad from 2 to 4 lanes: west City Limit to Westmoreland Road	DA	665	723	723	\$4,631,134
2	1	Widen 0.49 miles of Danieldale Road from 2 to 4 lanes: Westmoreland Road to Old Hickory Trail	DA	665	652	652	\$3,723,204
3	1	Widen 0.5 miles of Wintergreen Road from 2 to 4 lanes: Tenmile Creek to Westmoreland Road	DA	665	665	665	\$5,924,261
4	1	Widen 1 miles of Wintergreen Road from 2 to 4 lanes: Westmoreland Road to Hampton Road	DA	665	1,330	1,330	\$8,017,147
5	1	Widen 0.96 miles of Wintergreen Road from 4 to 6 lanes: Polk Street to IH35	DA	665	1,277	1,277	\$10,131,231
6	1/2	Widen 0.92 miles of Pleasant Run Road from 2 to 4 lanes: Duncanville Road to Cockrell Hill Road	DA	665	1,224	1,224	\$4,085,955
7	1/2	Widen 0.79 miles of Pleasant Run Road from 2 to 4 lanes: Cockrell Hill Road to Westmoreland Rd	DA	665	1,051	1,051	\$3,236,477
8	1/2	Widen 1.01 miles of Pleasant Run Road from 4 to 6 lanes: Polk Street to IH35	DA	665	1,343	1,343	\$5,044,626
9	1	Widen 0.62 miles of Polk Street from 4 to 6 lanes: Centre Park Blvd to Danieldale Road	DA	665	825	825	\$6,394,249
10	2	Build 0.52 miles of Parkerville Road to 4 lanes: Duncanville Road to 700' west of Keswick Drive	DA	665	1,383	1,383	\$2,020,748
11	2	Widen 0.43 miles of Parkerville Road from 2 to 4 lanes: 700' west of Keswick Dr to Cockrell Hill Rd	DA	665	572	572	\$3,562,790
12	2	Widen 0.96 miles of Parkerville Road from 2 to 4 lanes: Cockrell Hill Road to Westmoreland Road	DA	665	1,277	1,277	\$7,690,192
13	2	Widen 1 miles of Parkerville Road from 2 to 4 lanes: Westmoreland Road to Hampton Road	DA	665	1,330	1,330	\$7,490,790
14	2	Widen 0.95 miles of Parkerville Road from 2 to 4 lanes: Hampton Road to Polk Street	DA	665	1,264	1,264	\$7,143,842
15	2	Recoupment of project to widen 0.98 miles of Parkerville Road from 2 to 6 lanes: Polk St to IH35	DA	665	2,607	2,607	\$10,411,418
16	2	Widen 0.46 miles of Cockrell Hill Road from 2 to 4 lanes: south City limit to Parkerville Road	DA	665	612	612	\$3,680,945
17	2	Recoupment of project to widen 1 miles of Cockrell Hill Road from 2 to 6 lanes: Parkerville Road to Belt Line Road	DA	665	2,660	2,660	\$10,638,696
18	2	Recoupment of project to widen 1 miles of Cockrell Hill Road from 2 to 6 lanes: Belt Line Road to Pleasant Run Road	DA	665	2,660	2,660	\$10,643,814
19	2	Widen 1 miles of Westmoreland Road from 2 to 4 lanes: Parkerville Road to Belt Line Road	DA	665	1,330	1,330	\$7,988,873
20	2	Widen 0.66 miles of Hampton Road from 2 to 4 lanes: south City limit to Parkerville Road	DA	665	878	878	\$5,255,269
21	2	Widen 0.66 miles of Uhl Road from 2 to 4 lanes: south City limit to Parkerville Road	DA	665	878	878	\$5,149,547

<sup>1</sup>DA=Divided Arterial

#### 4.3.4 Projected Vehicle-Miles Capacity Available for New Growth

The vehicle-miles of new capacity supply were calculated similar to the vehicle-miles of existing capacity supplied. The equation used was:

$$\text{Vehicle-Miles of New Capacity} = \text{Link capacity per peak hour per lane} \times \text{No. of Lanes} \times \text{Length of segment (miles)}$$

The capacity and net capacity provided by the proposed CIP is summarized in Error! Reference source not found.. Net capacity provided by the proposed CIP takes into consideration current traffic on CIP roads and any deficiencies from the existing conditions analysis described in **Section 4.1** of this report. A detailed listing by project of capacity supplied can be found in **Appendix C**.

**Table 12: Capacity and Net Capacity Provided by the Proposed CIP**

Service Area	A	B	C = A – B	D	E = C – D
	Capacity Supplied by CIP (veh-mi)	Existing Utilization (veh-mi)	Excess Capacity (veh-mi)	Existing Deficiencies (veh-mi)	Net Capacity Supplied by CIP (veh-mi)
1	9,115	0	9,115	0	9,115
2	21,077	2,998	18,079	0	18,079
Total	30,192	2,998	27,194	0	29,194

A comparison of net capacity provided by the proposed CIP relative to 10-year needs (developed in **Section 4.2**) is listed in Error! Reference source not found.. The percent attributable to new growth is a direct result of the land use assumptions described earlier in the report. Based on the defined capital improvements plan, some service areas have capacity supplied by the CIP exceeding the projected growth. The resultant cost per service unit is calculated as the CIP cost attributed to growth (full cost of net capacity in this case) divided by the projected growth. The cost attributed to growth is limited by the projected growth, so because the capacity supplied by CIP is greater than the projected growth there is the potential for more cost to be attributed to growth. The net effect is that the cost per service unit will be lower than a scenario where capacity supplied by the CIP meets or exceeds the projected growth.

**Table 13: Projected Demand and Net Capacity Provided by the Proposed CIP**

Service Area	A	B	B / A (Max 100%)
	Net Capacity Supplied by CIP (veh-mi)	Projected 10-Year Growth (Vehicle-Miles)	Pcnt. Of CIP Attributable to New Dev. (10-Yr.)
1	9,115	8,733	95.8%
2	21,077	11,752	55.7%
<b>Total</b>	30,192	20,485	67.8%

#### 4.3.5 Cost of Roadway Improvements

The total impact fee capital improvement plan (IFCIP) cost, including study update costs, credited (50%) IFCIP cost, and cost of net capacity supplied to implement the roadway improvements plan projects by service area is shown in **Table 14**. If traffic exists on proposed CIP project roadways or there are any deficiencies present in each respective service area (existing utilization), the total system cost is adjusted to reflect the net capacity being made available by the impact fee program. In other words, only the unused portion of the CIP and its associated costs are considered eligible. A detailed listing by project segment in each service area can be found in **Appendix C**.

**Table 14: Summary of Roadway Improvements Plan Cost Analysis**

Service Area	Total Cost of Proposed IFCIP Projects	Credited Cost of Proposed IFCIP Projects (with 50% CIP Credit)	Credited Cost of Net Capacity Supplied (with 50% CIP Credit)	Credited Cost to Meet Existing Utilization (with 50% CIP Credit)
1	\$51,058,964	\$25,537,030	\$25,537,030	\$0
2	\$94,072,172	\$47,053,539	\$40,360,626	\$6,692,912
<b>Total</b>	<b>\$145,131,136</b>	<b>\$72,590,568</b>	<b>\$65,897,656</b>	<b>\$6,692,912</b>

## **5.0 WATER AND WASTEWATER CAPITAL IMPROVEMENTS PLAN**

FNI received the draft *Water Capital Improvements Program* from Garver as part of their *Water Distribution System Master Plan* study. FNI received from Grantham the 2006 Opinion of Probable Construction Cost (OPCC) for each sewer basin as part of their *Wastewater Master Plan* study. The CIP's received served as the basis for determining the impact fee eligible water and wastewater CIP.

### **5.1 EXISTING WATER AND WASTEWATER SYSTEMS**

The City of DeSoto's existing water service area covers approximately 25.32 square miles. The existing water distribution system includes three ESTs and three GSTs. The system is currently operated on three pressure planes and two pump stations. There are approximately 274 miles of water lines ranging in diameter from 1.5-inch to 54-inches.

The City of DeSoto's existing wastewater service area covers approximately 25.32 square miles. Within the service area, there are approximately 180 miles of wastewater lines owned by the City ranging from 4-inch to 21-inches in diameter. The wastewater collection system is primarily a gravity flow system that follows the major drainage features of the service area. There are currently seven lift stations in the wastewater collection system which convey wastewater flow into gravity sewers. These lift stations are required because of local topographic constraints or to transfer flows across sewer basins.

### **5.2 WATER DEMAND AND WASTEWATER LOAD PROJECTIONS**

The location and magnitude of the CIP projects were developed by Garver for the water system and by Grantham for the wastewater system. Typically, land use data and historical water demands, and wastewater flow characteristics are used to develop future water demands and wastewater flows based on projected use and peaking factors. FNI assumed these projections were the basis for determining the location and magnitude of the CIP projects. FNI received the CIP project data and assumed that the location and sizing of the projects were the most recent and up to date. Only projects whose primary driver was capacity related were included in this impact fee study.

### 5.3 WATER AND WASTEWATER SYSTEM ANALYSES

The water system analysis was conducted by Garver as part of the *Water Distribution System Master Plan* study. Grantham conducted the wastewater system analysis in 2006 and made modifications to the capital improvement projects in 2020. FNI received this data from the consultants to use in the impact fee analysis.

### 5.4 WATER AND WASTEWATER SYSTEM IMPROVEMENTS

Proposed impact fee eligible water and wastewater system improvement projects were identified using the *Water Capital Improvements Plan* developed by Garver and the *Wastewater Master Plan CIP* developed by Grantham. Impact fee eligible projects were determined based on projects needed to meet growth. FNI maintained the project name, size, and location to match those from the system studies, except in cases where FNI recommended a line addition or line upsize to prevent potential bottlenecks in the wastewater system. Costs for the impact fee eligible projects are based on design and construction costs provided by Garver and Grantham. FNI utilized an Engineering News-Record (ENR) factor of approximately 150% to inflate projected cost from the 2006 wastewater study to 2020 dollars for the proposed wastewater projects. Additionally, FNI included a 20% professional services and 20% contingency cost to the wastewater project costs since the cost developed by Grantham only consisted of a conceptual pipe cost. **Table 14** summarizes the cost of the water and wastewater system impact fee eligible CIP. Detailed project cost estimates for the water and wastewater system developed by Garver and Grantham respectively are included in **Appendix E** and **F**. The proposed 10-year impact fee eligible water system projects are shown on **Figure 8**. The proposed 10-year impact fee eligible wastewater system projects are shown on **Figure 9**.

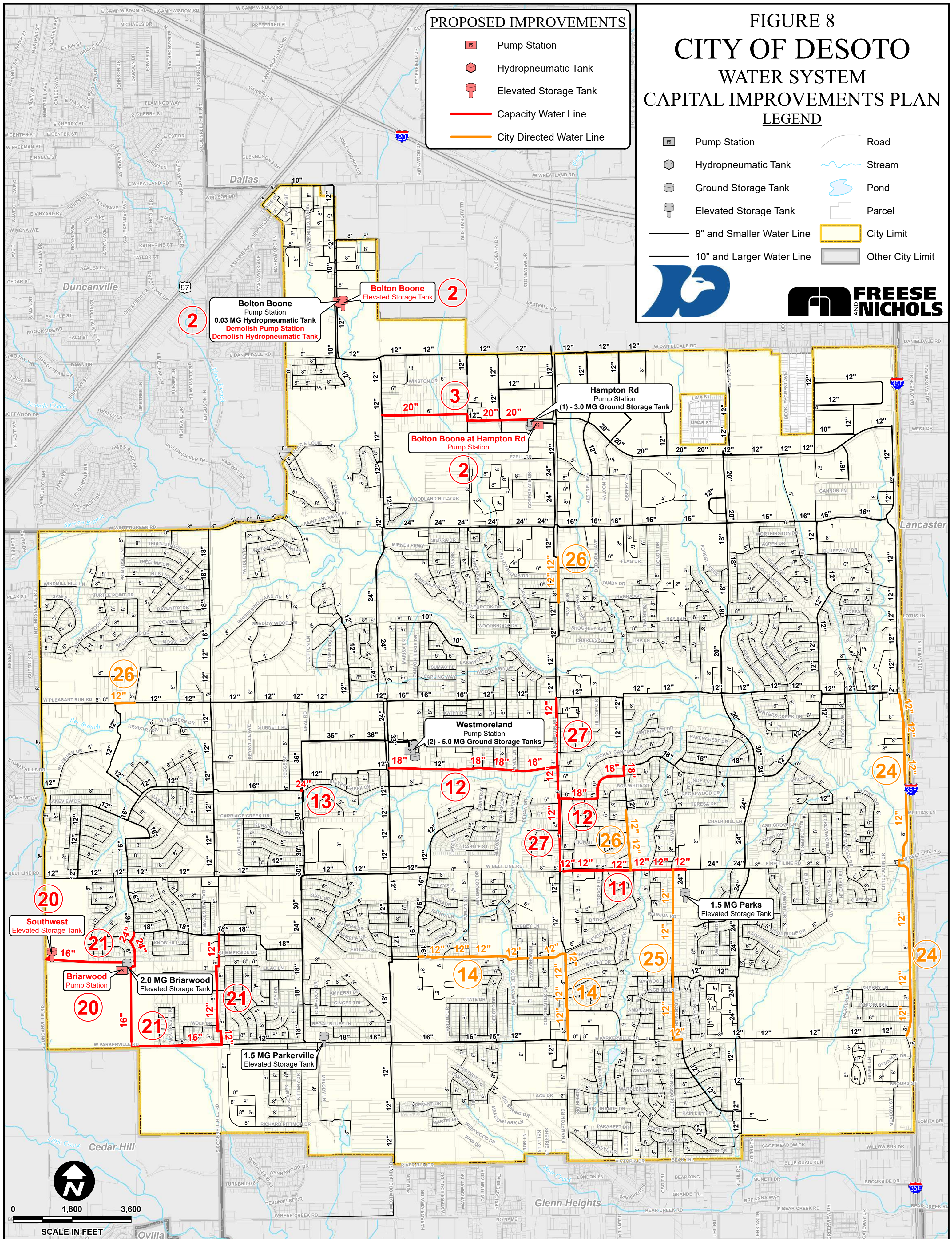
**Table 15: Proposed Impact Fee Eligible CIP Projects**

Impact Fee Eligible CIP	Total Project Cost
Existing Water Projects	\$605,000
Proposed Water Projects	\$45,488,000
<b>WATER CIP TOTAL</b>	<b>\$46,093,000</b>
Existing Wastewater Projects	\$30,000
Proposed Wastewater Projects	\$24,944,747
<b>WASTEWATER CIP TOTAL</b>	<b>\$24,974,747</b>

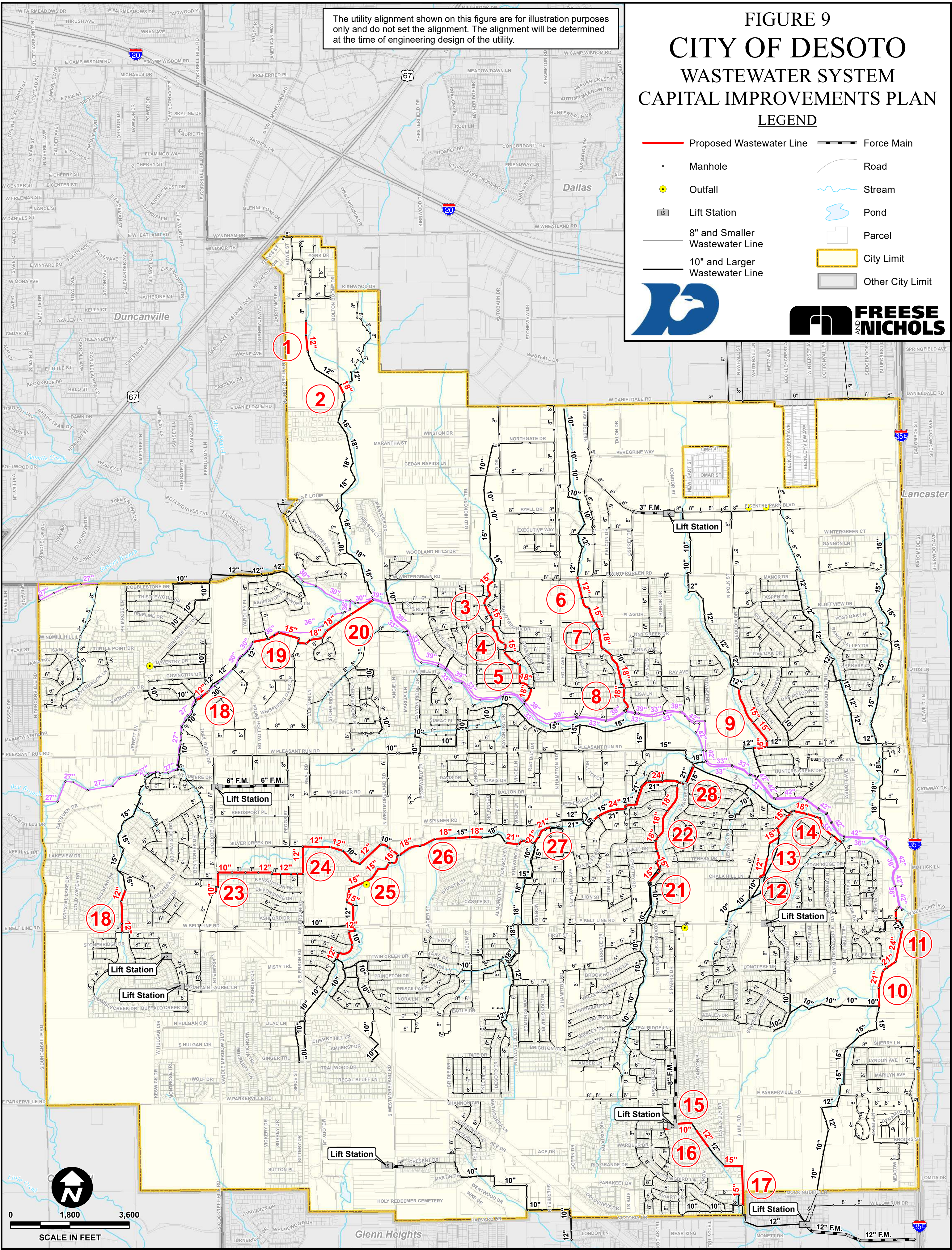


# FIGURE 8 CITY OF DESOTO WATER SYSTEM CAPITAL IMPROVEMENTS PLAN LEGEND

- Pump Station
- Hydropneumatic Tank
- Ground Storage Tank
- Elevated Storage Tank
- 8" and Smaller Water Line
- 10" and Larger Water Line
- Road
- Stream
- Pond
- Parcel
- City Limit
- Other City Limit









## **5.5 WATER AND WASTEWATER IMPACT FEE ANALYSIS**

The water and wastewater impact fee analysis involves determining the utilization of existing and proposed projects required as defined by the capital improvement plan to serve new development over the next 10-year time period. For existing or proposed projects, the impact fee is calculated as a percentage of the project cost, based upon the percentage of the project's capacity required to serve development projected to occur between 2020 and 2030. Capacity serving existing development and development projected for more than 10 years in the future cannot be charged to impact fees.

### **5.5.1 Water and Wastewater Capacity Analysis**

Eligible existing and proposed water and wastewater projects were evaluated to determine the proportion of the project that will be utilized within the next 10 years. The 10-year utilization will define the percentage of the project cost that is impact fee eligible. A summary of the proportion of the project costs required for the 10-year growth period used in the impact fee analysis for both the water and wastewater systems are shown in **Table 15** and **16**, respectively. The 2020 percent utilization is the portion of a project's capacity required to serve existing development and is therefore not included in the impact fee eligible cost. The 2030 percent utilization is the portion of the project's capacity that will be utilized by 2030. The 2020 - 2030 percent utilization is the portion of the project's capacity required to serve growth from 2020 to 2030. The portion of a project's total cost that is used to serve growth projected to occur from 2020 through 2030 is calculated as the total project cost multiplied by the 2030 - 2030 percent utilization. Only this portion of the cost is used in the water and wastewater impact fee analysis.



**Table 16: Cost Allocation for Water Impact Fee Calculation**

Project Number	Description of Project	Percent Utilization			Costs Based on 2020 Dollars	
		2020*	2030	10-Year 2020-2030	Capital Cost	10-Year 2020-2030
Existing Projects						
A	Water Master Plan	0%	50%	50%	\$575,000	\$287,500
B	Water Impact Fee	0%	100%	100%	\$30,000	\$30,000
Existing Total					\$605,000	\$317,500
Proposed Projects						
2	Bolton Boone Pump Station and EST	30%	75%	45%	\$9,160,000	\$4,122,000
3	20-inch Transmission Main for Bolton Boone Zone	30%	75%	45%	\$2,652,000	\$1,193,400
11	12-inch Belt Line Road Waterline Improvements	40%	70%	30%	\$1,376,000	\$412,800
12	18-inch Spinner Road Waterline Improvements	25%	45%	20%	\$4,759,000	\$951,800
13	24-inch Silver Creek Waterline Improvements	30%	35%	5%	\$121,000	\$6,050
14	12-inch Eagle Drive Waterline Improvements	30%	45%	15%	\$3,498,000	\$524,700
20	New Briarwood Pump Station and Southwest Zone Elevated Storage Tank	30%	50%	20%	\$9,324,000	\$1,864,800
21	Southwest Zone Waterline Improvements	15%	65%	50%	\$5,777,000	\$2,888,500
24	12-inch I-35 Frontage Waterline Improvements	15%	20%	5%	\$4,191,000	\$209,550
25	12-inch Parks Waterline Improvements	10%	20%	10%	\$1,676,000	\$167,600
26	Assorted 12-inch Waterline Improvements	20%	30%	10%	\$1,227,000	\$122,700
27	12-inch Hampton Road Waterline Improvements	60%	100%	40%	\$1,727,000	\$690,800
Proposed Project Sub-Total					\$45,488,000	\$13,154,700
Total Water Capital Improvements Cost					\$46,093,000	\$13,472,200

\*Utilization in 2020 on proposed projects indicates a portion of the project that will be used to address deficiencies within the existing system and therefore not eligible for impact fee cost recovery for future growth.

**Table 17: Cost Allocation for Wastewater Impact Fee Calculation**

Project Number	Description of Project	Percent Utilization			Cost Based on 2020 Dollars	
		2020 <sup>1</sup>	2030	10-Year 2020-2030	Capital Cost <sup>2</sup>	10-Year 2020-2030
Existing Projects						
A	Wastewater Impact Fee	0%	100%	100%	\$30,000	\$30,000
Existing Total					\$30,000	\$30,000
Proposed Projects						
1	Basin A 12-inch Replacement from MH 1188 to MH 1193	85%	95%	10%	\$353,827	\$35,383
2	Basin A 18-inch Replacement from MH 1198 to MH 1242	85%	95%	10%	\$271,537	\$27,154
3	Basin B 15-inch Replacement from MH 1486 to MH 2064	75%	90%	15%	\$592,328	\$88,849
4	Basin B 15-inch Replacement from MH 2064 to MH 2050	75%	90%	15%	\$816,891	\$122,534
5	Basin B 18-inch Replacement from MH 2050 to MH 2134	75%	90%	15%	\$800,731	\$120,110
6	Basin C 12-inch Replacement from MH 1157 to MH 2247	80%	100%	20%	\$269,333	\$53,867
7	Basin C 15-inch Replacement from MH 2247 to MH 2251	80%	100%	20%	\$473,090	\$94,618
8	Basin C 18-inch Replacement from MH 2251 to MH 2305	80%	100%	20%	\$1,366,508	\$273,302
9	Basin D 15-inch Replacement from MH 2441S to MH 2441Q	80%	90%	10%	\$1,111,728	\$111,173
10	Basin G 21-inch Replacement from MH 410 to MH 418A	70%	85%	15%	\$933,088	\$139,963
11	Basin G 24-inch Replacement from MH 418A to MH 868	70%	85%	15%	\$1,452,993	\$217,949
12	Basin H 12-inch Replacement from MH 980 to MH 980D	70%	85%	15%	\$288,851	\$43,328
13	Basin H 15-inch Replacement	70%	85%	15%	\$660,041	\$99,006
14	Basin H 18-inch Replacement from MH 1016 to MH 924	70%	85%	15%	\$927,529	\$139,129
15	Basin O 10-inch Replacement	75%	90%	15%	\$276,364	\$41,455
16	Basin O 12-inch Replacement	75%	90%	15%	\$234,906	\$35,236
17	Basin O 15-inch Replacement	75%	90%	15%	\$778,638	\$116,796
18	Bee Branch Basin 12-inch Replacements	70%	85%	15%	\$795,496	\$119,324
19	Bee Branch Basin 15-inch Replacement from MH 1894 to MH 1899	70%	85%	15%	\$154,491	\$23,174
20	Bee Branch Basin 18-inch Replacement from MH 1900 to MH 1916	70%	85%	15%	\$892,096	\$133,814

**Table 20: Cost Allocation for Wastewater Impact Fee Calculation - Continued**

Project Number	Description of Project	Percent Utilization			Cost Based on 2020 Dollars	
		2020 <sup>1</sup>	2030	10-Year 2020-2030	Capital Cost <sup>2</sup>	10-Year 2020-2030
21	Spring Creek Basin 15-inch Replacement from MH 257 to MH 18	80%	90%	10%	\$351,369	\$35,137
22	Spring Creek Basin 18-inch Replacement	80%	90%	10%	\$1,230,139	\$123,014
23	Heath Creek Basin 10-inch Replacement	70%	85%	15%	\$229,901	\$34,485
24	Heath Creek Basin 12-inch Replacement	75%	90%	15%	\$2,927,568	\$439,135
25	Heath Creek Basin 15-inch Replacement	75%	90%	15%	\$1,445,076	\$216,761
26	Heath Creek Basin 18-inch Replacement	75%	90%	15%	\$1,297,193	\$194,579
27	Heath Creek Basin 21-inch Replacement	75%	90%	15%	\$984,135	\$147,620
28	Heath Creek Basin 24-inch Replacement	75%	90%	15%	\$3,028,900	\$454,335
<b>Proposed Project Sub-Total</b>					<b>\$24,944,747</b>	<b>\$3,681,230</b>
<b>Total Wastewater Capital Improvements Cost</b>					<b>\$24,974,747</b>	<b>\$3,711,230</b>

1 - Utilization in 2020 on Proposed Projects indicates a portion of the project that will be used to address deficiencies within the existing system and therefore not eligible for impact fee cost recovery for future growth.

2 - ENR factor of 149.42% used to inflate projected cost from 2006 WWMP to 2020 dollars on proposed projects only (ENR Construction Cost Index).

- A 20% professional services cost was applied to the total estimated pipe cost. Professional services include survey, deed research, preliminary, and final design of all improvements.

- A 20% contingency was applied to the estimated pipe cost.



# **Appendix A: Roadway Existing Conditions Analysis**

## DeSoto Roadway Impact Fee Study Update

### Existing Capital Improvements Analysis

Serv Area	Shared Svc Area	Roadway	From	To	Length (mi)	No. of Lanes	Type	PM Peak Hr Capacity/Lane	Pct. in Serv. Area	Peak Hour Volume			VMT Supply Pk Hr Total	VMT Demand Pk Hr Total	Excess VMT Capacity	Exist. VMT Deficiency
										A	B	Total				
1		Danieldale Rd	W City Limit	Westmoreland Rd	0.54	2	DA	665	100%	566	535	1,101	723	599	125	0
1		Danieldale Rd	Westmoreland Rd	Old Hickory Trl	0.49	2	DA	665	100%	566	535	1,101	654	541	113	0
1		Wintergreen Rd	Tenmile Creek	Westmoreland Rd	0.50	2	DA	665	100%	273	396	669	669	337	333	0
1		Wintergreen Rd	Westmoreland Rd	Hampton Rd	1.00	2	DA	665	100%	273	396	669	1,330	669	661	0
1		Wintergreen Rd	Hampton Rd	Polk St	1.00	4	DA	665	100%	805	626	1,431	2,660	1,431	1,229	0
1		Wintergreen Rd	Polk St	IH35	0.96	4	DA	665	100%	805	626	1,431	2,565	1,380	1,185	0
1	2	Pleasant Run Rd	Duncanville Rd	Cockrell Hill Rd	0.92	2	DA	665	50%	412	436	848	1,225	781	444	0
1	2	Pleasant Run Rd	Cockrell Hill Rd	Westmoreland Rd	0.79	2	DA	665	50%	412	436	848	1,057	674	383	0
1	2	Pleasant Run Rd	Westmoreland Rd	Hampton Rd	0.97	4	DA	665	50%	412	436	848	2,585	824	1,761	0
1	2	Pleasant Run Rd	Hampton Rd	Polk St	0.96	4	DA	665	50%	789	804	1,593	2,543	1,523	1,020	0
1	2	Pleasant Run Rd	Polk St	IH35	1.01	4	DA	665	50%	789	804	1,593	2,695	1,614	1,081	0
1		Cockrell Hill Rd	Pleasant Run Rd	Wintergreen Rd	1.01	4	DA	665	100%	470	887	1,357	2,681	1,368	1,313	0
1		Westmoreland Rd	Pleasant Run Rd	Wintergreen Rd	1.00	2	DA	665	100%	223	524	747	1,329	746	582	0
1		Westmoreland Rd	Wintergreen Rd	Danieldale Rd	0.99	2	DA	665	100%	223	524	747	1,314	738	576	0
1		Hampton Rd	Pleasant Run Rd	Wintergreen Rd	0.99	6	DA	665	100%	572	1,216	1,788	3,936	1,764	2,172	0
1		Hampton Rd	Wintergreen Rd	Danieldale Rd	1.00	6	DA	665	100%	572	1,216	1,788	3,986	1,786	2,200	0
1		Polk St	Pleasant Run Rd	Cottonwood Dr	0.47	6	DA	665	100%	353	782	1,135	1,885	536	1,349	0
1		Polk St	Cottonwood Dr	Wintergreen Rd	0.54	4	DA	665	100%	353	782	1,135	1,431	611	821	0
1		Polk St	Wintergreen Rd	Centre Park Blvd	0.37	4	DA	665	100%	353	782	1,135	977	417	560	0
1		Polk St	Centre Park Blvd	Danieldale Rd	0.62	4	DA	665	100%	353	782	1,135	1,636	698	938	0
Sub-Total Service Area 1													37,882	19,036	18,845	0
2	1	Pleasant Run Rd	Duncanville Rd	Cockrell Hill Rd	0.92	2	DA	665	50%	412	436	848	1,225	781	444	0
2	1	Pleasant Run Rd	Cockrell Hill Rd	Westmoreland Rd	0.79	2	DA	665	50%	412	436	848	1,057	674	383	0
2	1	Pleasant Run Rd	Westmoreland Rd	Hampton Rd	0.97	4	DA	665	50%	412	436	848	2,585	824	1,761	0
2	1	Pleasant Run Rd	Hampton Rd	Polk St	0.96	4	DA	665	50%	789	804	1,593	2,543	1,523	1,020	0
2	1	Pleasant Run Rd	Polk St	IH35	1.01	4	DA	665	50%	789	804	1,593	2,695	1,614	1,081	0
2		Belt Line Rd	Duncanville Rd	Cockrell Hill Rd	1.00	4	DA	665	100%	1,037	792	1,829	2,660	1,829	831	0
2		Belt Line Rd	Cockrell Hill Rd	Westmoreland Rd	1.00	4	DA	665	100%	1,037	792	1,829	2,660	1,829	831	0
2		Belt Line Rd	Westmoreland Rd	Hampton Rd	1.00	4	DA	665	100%	1,037	792	1,829	2,660	1,829	831	0
2		Belt Line Rd	Hampton Rd	Polk St	1.07	4	DA	665	100%	791	871	1,662	2,846	1,778	1,068	0
2		Belt Line Rd	Polk St	IH35	0.92	4	DA	665	100%	791	871	1,662	2,451	1,531	920	0
2		Parkerville Rd	700' west of Keswick Dr	Cockrell Hill Rd	0.43	2	DA	665	100%	270	391	661	576	286	290	0
2		Parkerville Rd	Cockrell Hill Rd	Westmoreland Rd	0.96	2	DA	665	100%	270	391	661	1,275	634	641	0
2		Parkerville Rd	Westmoreland Rd	Hampton Rd	1.00	2	DA	665	100%	270	391	661	1,328	660	668	0
2		Parkerville Rd	Hampton Rd	Polk St	0.95	2	DA	665	100%	298	533	831	1,266	790	475	0
2		Parkerville Rd	Polk St	IH35	0.98	4	DA	665	100%	326	674	1,000	2,596	976	1,620	0
2		Cockrell Hill Rd	S City limit	Parkerville Rd	0.46	2	DA	665	100%	198	469	667	618	310	308	0
2		Cockrell Hill Rd	Parkerville Rd	Belt Line Rd	1.00	4	DA	665	100%	198	469	667	2,655	666	1,989	0
2		Cockrell Hill Rd	Belt Line Rd	Pleasant Run Rd	1.00	4	DA	665	100%	198	469	667	2,660	667	1,993	0
2		Westmoreland Rd	south City limit	Parkerville Rd	0.68	2	DA	665	100%	78	186	264	901	179	722	0
2		Westmoreland Rd	Parkerville Rd	Belt Line Rd	1.00	2	DA	665	100%	78	186	264	1,330	264	1,066	0
2		Westmoreland Rd	Belt Line Rd	Pleasant Run Rd	1.00	2	DA	665	100%	78	186	264	1,330	264	1,066	0
2		Hampton Rd	south City limit	Parkerville Rd	0.66	2	DA	665	100%	304	501	805	877	531	346	0

## DeSoto Roadway Impact Fee Study Update

### Existing Capital Improvements Analysis

Serv Area	Shared Svc Area	Roadway	From	To	Length (mi)	No. of Lanes	Type	PM Peak Hr Capacity/Lane	Pct. in Serv. Area	Peak Hour Volume			VMT Supply Pk Hr Total	VMT Demand Pk Hr Total	Excess VMT Capacity	Exist. VMT Deficiency
2		Hampton Rd	Parkerville Rd	Belt Line Rd	1.00	4	DA	665	100%	304	501	805	2,660	805	1,855	0
2		Hampton Rd	Belt Line Rd	Pleasant Run Rd	1.00	4	DA	665	100%	304	501	805	2,660	805	1,855	0
2		Uhl Rd	south City limit	Parkerville Rd	0.66	2	DA	665	100%	149	158	307	880	203	677	0
2		Polk Rd	Parkerville Rd	Eldorado Rd	0.38	4	DA	665	100%	149	158	307	1,018	118	901	0
2		Polk Rd	Eldorado Rd	Belt Line Rd	0.64	6	DA	665	100%	149	158	307	2,536	195	2,341	0
2		Polk Rd	Belt Line Rd	The Meadows Pkwy	0.54	4	DA	665	100%	149	158	307	1,432	165	1,267	0
2		Polk Rd	The Meadows Pkwy	Pleasant Run Rd	0.53	6	DA	665	100%	149	158	307	2,118	163	1,955	0
Sub-Total Service Area 2					24.51								54,097	22,893	31,204	0
<b>Total</b>													<b>91,979</b>	<b>41,929</b>	<b>50,049</b>	<b>0</b>

Notes:

- DA - Divided Arterial
- UA - Undivided Arterial
- SA - Special Arterial with two-way left turn lane (TWLTL)
- DC - Divided collector
- UC - Undivided Collector
- SC - Special Collector with two-way left turn lane (TWLTL)



## **Appendix B:**

# **Projected Roadway 10-Year Growth (Vehicle-Miles of New Demand)**

# Vehicle-Mile Trip Generation by Service Area, DeSoto Impact Fee

Based on 2020-2030 Land Use Assumptions dated November 2020

## Service Unit Equivalency

Residential	3.39	Service Emp	4.15
Basic Emp	1.90	Retail Emp	1.90

## Estimated Residential Growth Vehicle-Mile Trip Generation

Conversion Factor: 2.71 2010 persons/household

Service Area	Added Population	Added Dwelling Units	Vehicle-Miles per DU	Total Vehicle-Miles
1	2,428	896	3.39	3,037
2	6,901	2,546	3.39	8,631
Total	9,329	3,442		11,668

## Estimated Basic Employment Growth Vehicle-Mile Trip Generation

Conversion Factor: 1,500 square feet/employee

Service Area	Added Employees	Total Square Feet	Vehicle-Miles per 1,000 Sq Ft	Total Vehicle-Miles
1	334	501,000	1.90	952
2	210	315,000	1.90	599
Total	544	816,000		1,551

## Estimated Service Employment Growth Vehicle-Mile Trip Generation

Conversion Factor: 500 square feet/employee

Service Area	Added Employees	Total Square Feet	Vehicle-Miles per 1,000 Sq Ft	Total Vehicle-Miles
1	498	249,000	4.15	1,033
2	322	161,000	4.15	668
Total	820	410,000		1,701

## Estimated Retail Employment Growth Vehicle-Mile Trip Generation

Conversion Factor: 1,000 square feet/employee

Service Area	Added Employees	Total Square Feet	Vehicle-Miles per 1,000 Sq Ft	Total Vehicle-Miles
1	1,953	1,953,000	1.90	3,711
2	976	976,000	1.90	1,854
Total	2,929	2,929,000		5,565

## Total Vehicle-Mile Generation Summary

Service Area	Residential Growth Vehicle-Miles	Basic Emp Growth Vehicle-Miles	Service Emp Growth Vehicle-Miles	Retail Emp Growth Vehicle-Miles	Total Growth Vehicle-Miles
1	3,037	952	1,033	3,711	8,733
2	8,631	599	668	1,854	11,752
Total	11,668	1,551	1,701	5,565	20,485

## **Appendix C:**

# **Roadway Capital Improvements Plan List**



## ROADWAY IMPROVEMENTS PLAN PROJECTS

### Definitions

LANES	The total number of lanes in both directions available for travel.
TYPE	<p>The type of roadway (used in determining capacity):</p> <p>DA = divided arterial UA = undivided arterial SA = special arterial (arterial with continuous left turn) DC = divided collector UC = undivided collector SC = special collector (arterial with continuous left turn)</p>
PK-HR VOLUME	The existing volumes of cars on the roadway segment traveling during the afternoon (P.M.) peak hour of travel.
% IN SERVICE AREA	If the roadway is located on the boundary of the service area (with the city limits running along the centerline of the roadway), then half of the roadway is inventoried in the service area and the other half is not. This value is either 50% or 100%.
VEH-MI SUPPLY PK-HR TOTAL	The number of total service units (vehicle-miles) supplied within the service area, based on the length and established capacity of the roadway type.
VEH-MI TOTAL DEMAND PK-HR	The total service unit (vehicle-mile) demand created by existing traffic on the roadway segment in the afternoon peak hour.
EXCESS CAPACITY PK-HR VEH-MI	The number of service units supplied but unused by existing traffic in the afternoon peak hour.
CIP VEH-MI DEFICIENCY	The number of service units used by existing traffic in excess of the available service units supplied by the roadway in the afternoon peak hour.

## DeSoto Roadway Impact Fee Study

### 10 Year Roadway CIP

10 Year Roadway CIP													50%									
Proj No.	CIP Origin	Serv Area	Shared Svc Area	Roadway	From	To	Length (mi)	Added Lanes	Lane Type	Capacity	Pct. in Serv. Area	VMT Supply/MT Demand	Excess CIP VMT	Engineering	ROW	Construction	Finance	Total Project Cost				
												Pk Hr Total	Pk Hr Total	Deficiency								
1	New	1		Danieldale Rd	W City Limit	Westmoreland Rd	0.54	2	DA	665	100%	723	0	723	0	\$ 310,643	\$ 28,710	\$ 3,106,431	\$ 1,185,350	\$ 4,631,134		
2	New	1		Danieldale Rd	Westmoreland Rd	Old Hickory Trl	0.49	2	DA	665	100%	654	0	654	0	\$ 249,480	\$ 25,960	\$ 2,494,801	\$ 952,963	\$ 3,723,204		
3	New	1		Wintergreen Rd	Tenmile Creek	Westmoreland Rd	0.50	2	DA	665	100%	669	0	669	0	\$ 400,721	\$ -	\$ 4,007,211	\$ 1,516,329	\$ 5,924,261		
4	New	1		Wintergreen Rd	Westmoreland Rd	Hampton Rd	1.00	2	DA	665	100%	1,330	0	1,330	0	\$ 532,685	\$ 105,600	\$ 5,326,854	\$ 2,052,008	\$ 8,017,147		
5	New	1		Wintergreen Rd	Polk St	IH35	0.96	2	DA	665	100%	1,282	0	1,282	0	\$ 682,969	\$ 25,455	\$ 6,829,694	\$ 2,593,113	\$ 10,131,231		
6	FY2020	1	2	Pleasant Run Rd	Duncanville Rd	Cockrell Hill Rd	0.92	2	DA	665	50%	1,225	0	1,225	0	\$ 267,535	\$ 97,260	\$ 2,675,350	\$ 1,045,810	\$ 4,085,955		
7	FY2020	1	2	Pleasant Run Rd	Cockrell Hill Rd	Westmoreland Rd	0.79	2	DA	665	50%	1,057	0	1,057	0	\$ 218,918	\$ -	\$ 2,189,175	\$ 828,384	\$ 3,236,477		
8	New	1	2	Pleasant Run Rd	Polk St	IH35	1.01	2	DA	665	50%	1,348	0	1,348	0	\$ 341,222	\$ -	\$ 3,412,220	\$ 1,291,184	\$ 5,044,626		
9	New	1		Polk St	Centre Park Blvd	Danieldale Rd	0.62	2	DA	665	100%	827	0	827	0	\$ 432,511	\$ -	\$ 4,325,115	\$ 1,636,623	\$ 6,394,249		
Sub-Total Service Area 1							6.85					9,115	0	9,115	0	\$ 3,436,685	\$ 282,985	\$ 34,366,851	\$ 13,429,088	\$ 51,515,610		
6	FY2020	2	1	Pleasant Run Rd	Duncanville Rd	Cockrell Hill Rd	0.92	2	DA	665	50%	1,225	0	1,225	0	\$ 267,535	\$ 97,260	\$ 2,675,350	\$ 1,045,810	\$ 4,085,955		
7	(	2	1	Pleasant Run Rd	Cockrell Hill Rd	Westmoreland Rd	0.79	2	DA	665	50%	1,057	0	1,057	0	\$ 218,918	\$ 20,975	\$ 2,189,175	\$ 835,599	\$ 3,264,667		
8	New	2	1	Pleasant Run Rd	Polk St	IH35	1.01	2	DA	665	50%	1,348	0	1,348	0	\$ 341,222	\$ -	\$ 3,412,220	\$ 1,291,184	\$ 5,044,626		
10	New	2	X	Parkerville Rd	Duncanville Rd	700' west of Keswick Dr	0.52	4	DA	665	50%	1,386	0	1,386	0	\$ 127,928	\$ 96,320	\$ 1,279,284	\$ 517,215	\$ 2,020,748		
11	New	2		Parkerville Rd	700' west of Keswick Dr	Cockrell Hill Rd	0.43	2	DA	665	100%	576	0	576	0	\$ 231,642	\$ 102,825	\$ 2,316,418	\$ 911,905	\$ 3,562,790		
12	New	2		Parkerville Rd	Cockrell Hill Rd	Westmoreland Rd	0.96	2	DA	665	100%	1,275	0	1,275	0	\$ 515,569	\$ 50,610	\$ 5,155,690	\$ 1,968,323	\$ 7,690,192		
13	New	2		Parkerville Rd	Westmoreland Rd	Hampton Rd	1.00	2	DA	665	100%	1,328	0	1,328	0	\$ 506,682	\$ -	\$ 5,066,822	\$ 1,917,286	\$ 7,490,790		
14	FY2020	2		Parkerville Rd	Hampton Rd	Polk St	0.95	2	DA	665	100%	1,266	0	1,266	0	\$ 483,214	\$ -	\$ 4,832,144	\$ 1,828,483	\$ 7,143,842		
15	Recoup	2		Parkerville Rd	Polk St	IH35	0.98	4	DA	665	100%	2,596	976	1,620	0	\$ 657,399	\$ 515,200	\$ 6,573,992	\$ 2,664,827	\$ 10,411,418		
16	New	2		Cockrell Hill Rd	s City limit	Parkerville Rd	0.46	2	DA	665	100%	618	0	618	0	\$ 248,982	\$ -	\$ 2,489,817	\$ 942,147	\$ 3,680,945		
17	Recoup	2		Cockrell Hill Rd	Parkerville Rd	Belt Line Rd	1.00	4	DA	665	100%	2,655	895	1,760	0	\$ 671,700	\$ 527,000	\$ 6,716,997	\$ 2,723,000	\$ 10,638,696		
18	Recoup	2		Cockrell Hill Rd	Belt Line Rd	Pleasant Run Rd	1.00	4	DA	665	100%	2,660	1,127	1,533	0	\$ 671,955	\$ 528,000	\$ 6,719,550	\$ 2,724,310	\$ 10,643,814		
19	FY2020	2		Westmoreland Rd	Parkerville Rd	Belt Line Rd	1.00	2	DA	665	100%	1,330	0	1,330	0	\$ 535,573	\$ 52,800	\$ 5,355,729	\$ 2,044,771	\$ 7,988,873		
20	FY2020	2		Hampton Rd	south City limit	Parkerville Rd	0.66	2	DA	665	100%	877	0	877	0	\$ 345,974	\$ 104,460	\$ 3,459,737	\$ 1,345,099	\$ 5,255,269		
21	New	2		Uhl Rd	south City limit	Parkerville Rd	0.66	2	DA	665	100%	880	0	880	0	\$ 335,610	\$ 139,800	\$ 3,356,098	\$ 1,318,039	\$ 5,149,547		
Sub-Total Service Area 2							12.35					21,077	2,998	18,078	0	\$ 6,159,902	\$ 2,235,250	\$ 61,599,023	\$ 24,077,996	\$ 94,072,172		
Totals:													30,192	2,998	27,192	0	\$ 9,596,587	\$ 2,518,235	\$ 95,965,875	\$ 37,507,085	\$ 145,587,782	

Summary:	Engineering Cost	\$ 9,596,587
	Right-of-Way Cost	\$2,518,235
	Construction Cost	\$95,965,875
	Finance Cost	\$37,507,085
	TOTAL NET COST	\$145,587,782
	Future CRF Update Cost	\$50,000
	TOTAL IMPLEMENTATION COST	\$145,637,782
	50% Percent Credit	\$72,818,891

#### Notes:

DA - Divided Arterial  
 UA - Undivided Arterial  
 DC - Divided collector  
 UC - Undivided Collector

# **Appendix D: Roadway Capital Improvements Plan Cost Estimates**

## Impact Fee Engineer's Opinion of Probable Construction Cost Estimate

Danieldale Road  
west City Limit to Westmoreland Road

Roadway Information:		
Functional Classification:	Major Thoroughfare-4D Sec	No. of Lanes: 4
Length (lf):	2,871	
Right-of-Way Width (ft.):	100	
Median Type:	Raised	
Pavement Width (BOC to BOC):	46	

Roadway Construction Cost Estimate:				
I. Paving Construction Cost Estimate				
Item No.	Item Description	Quantity	Unit	Item Cost
1	Right of Way Preparation	29	STA	\$ 8,100.00 \$ 234,900
2	Remove Existing Pavement	29	STA	\$ 2,200.00 \$ 63,800
3	Unclassified Street Excavation	5,400	CY	\$ 15.00 \$ 81,000
4	6" Cement Stabilized Subgrade	14,700	SY	\$ 4.71 \$ 69,237
5	Cement for Stabilization (32 lb/SY)	240	TON	\$ 160.00 \$ 38,400
6	8" Concrete Pavement with Integral Curb	14,700	SY	\$ 70.00 \$ 1,029,000
7	4" Concrete Sidewalk and Ramps	3,200	SY	\$ 70.00 \$ 224,000
8	Landscaping	2,880	STA	\$ 0.50 \$ 1,440
9	Median Pavement	638	SY	\$ 65.00 \$ 41,470
Paving Estimate Subtotal:				\$ 1,783,247
II. Non-Paving Construction Components				
Item No.	Item Description	Pct. Of Paving	Item Cost	
10	Pavement Markings & Signage	2%	\$	35,700
11	Traffic Control	4%	\$	71,400
12	Erosion Control	3%	\$	53,500
13	Drainage Improvements (RCP, Inlets, MH, Outfalls)	20%	\$	356,700
14	Utility Adjustments	5%	\$	89,200
Other Components Estimate Subtotal:				\$ 606,500
III. Special Construction Components				
Item No.	Item Description	Notes	Allowance	Item Cost
15	Drainage Structures	1 Major	\$ 300,000	\$ 300,000
16	Bridge Structures	None	-	-
17	Traffic Signals	None	-	-
Special Components Estimate Subtotal:				\$ 300,000
I, II, & III Construction Subtotal:				\$ 2,689,747
Mobilization				5% \$ 134,500
Contingency				10% \$ 282,500
Construction Cost Estimate Total:				\$ 3,106,800

Impact Fee Cost Estimate Summary			
Item Description	Notes	Allowance	Item Cost
Construction		-	\$ 3,106,800
Engineering/Survey/Testing		10.0%	\$ 310,700
Right-of-Way Acquisition (\$/SF)	\$/SF	1.00	\$ 28,710
Impact Fee Project Cost Estimate Total:			\$ 3,446,210
Estimated Finance Cost (34.4%; i.e. 3% over 20 years)			\$ 1,185,400



## Impact Fee Engineer's Opinion of Probable Construction Cost Estimate

Danielsdale Road  
Westmoreland Road to Old Hickory Trail

Roadway Information:		
Functional Classification:	Major Thoroughfare-4D Sec	No. of Lanes: 4
Length (lf):	2,596	
Right-of-Way Width (ft.):	100	
Median Type:	Raised	
Pavement Width (BOC to BOC):	46	

Roadway Construction Cost Estimate:				
I. Paving Construction Cost Estimate				
Item No.	Item Description	Quantity	Unit	Item Cost
1	Right of Way Preparation	26	STA	\$ 8,100.00 \$ 210,600
2	Remove Existing Pavement	26	STA	\$ 2,200.00 \$ 57,200
3	Unclassified Street Excavation	4,900	CY	\$ 15.00 \$ 73,500
4	6" Cement Stabilized Subgrade	13,300	SY	\$ 4.71 \$ 62,643
5	Cement for Stabilization (32 lb/SY)	220	TON	\$ 160.00 \$ 35,200
6	8" Concrete Pavement with Integral Curb	13,300	SY	\$ 70.00 \$ 931,000
7	4" Concrete Sidewalk and Ramps	2,900	SY	\$ 70.00 \$ 203,000
8	Landscaping	2,600	STA	\$ 0.50 \$ 1,300
9	Median Pavement	577	SY	\$ 65.00 \$ 37,498
Paving Estimate Subtotal:				\$ 1,611,941
II. Non-Paving Construction Components				
Item No.	Item Description	Pct. Of Paving	Item Cost	
10	Pavement Markings & Signage	2%	\$	32,300
11	Traffic Control	4%	\$	64,500
12	Erosion Control	3%	\$	48,400
13	Drainage Improvements (RCP, Inlets, MH, Outfalls)	20%	\$	322,400
14	Utility Adjustments	5%	\$	80,600
Other Components Estimate Subtotal:				\$ 548,200
III. Special Construction Components				
Item No.	Item Description	Notes	Allowance	Item Cost
15	Drainage Structures	1 Major	\$ -	\$ -
16	Bridge Structures	None	-	-
17	Traffic Signals	None	-	-
Special Components Estimate Subtotal:				\$ -
I, II, & III Construction Subtotal:				\$ 2,160,141
Mobilization				5% \$ 108,100
Contingency				10% \$ 226,900
Construction Cost Estimate Total:				\$ 2,495,200

Impact Fee Cost Estimate Summary			
Item Description	Notes	Allowance	Item Cost
Construction		-	\$ 2,495,200
Engineering/Survey/Testing		10.0%	\$ 249,500
Right-of-Way Acquisition (\$/SF)	\$/SF	1.00	\$ 25,960
Impact Fee Project Cost Estimate Total:			\$ 2,770,660
Estimated Finance Cost (34.4%; i.e. 3% over 20 years)			\$ 953,100

## Impact Fee Engineer's Opinion of Probable Construction Cost Estimate

Wintergreen Road  
Tenmile Creek to Westmoreland Road

Roadway Information:		
Functional Classification:	Major Thoroughfare-4D Sec	No. of Lanes: 4
Length (lf):	2,657	
Right-of-Way Width (ft.):	100	
Median Type:	Raised	
Pavement Width (BOC to BOC):	46	

Roadway Construction Cost Estimate:				
I. Paving Construction Cost Estimate				
Item No.	Item Description	Quantity	Unit	Item Cost
1	Right of Way Preparation	27	STA	\$ 8,100.00 \$ 218,700
2	Remove Existing Pavement	27	STA	\$ 2,200.00 \$ 59,400
3	Unclassified Street Excavation	5,000	CY	\$ 15.00 \$ 75,000
4	6" Cement Stabilized Subgrade	13,600	SY	\$ 4.71 \$ 64,056
5	Cement for Stabilization (32 lb/SY)	220	TON	\$ 160.00 \$ 35,200
6	8" Concrete Pavement with Integral Curb	13,600	SY	\$ 70.00 \$ 952,000
7	4" Concrete Sidewalk and Ramps	3,000	SY	\$ 70.00 \$ 210,000
8	Landscaping	2,660	STA	\$ 0.50 \$ 1,330
9	Median Pavement	590	SY	\$ 65.00 \$ 38,379
Paving Estimate Subtotal:				\$ 1,654,065
II. Non-Paving Construction Components				
Item No.	Item Description	Pct. Of Paving	Item Cost	
10	Pavement Markings & Signage	2%	\$	33,100
11	Traffic Control	4%	\$	66,200
12	Erosion Control	3%	\$	49,700
13	Drainage Improvements (RCP, Inlets, MH, Outfalls)	20%	\$	330,900
14	Utility Adjustments	5%	\$	82,800
Other Components Estimate Subtotal:				\$ 562,700
III. Special Construction Components				
Item No.	Item Description	Notes	Allowance	Item Cost
15	Drainage Structures	1 Major	\$ 300,000	\$ 300,000
16	Bridge Structures	None	-	-
17	Traffic Signals	None	-	-
Special Components Estimate Subtotal:				\$ 300,000
I, II, & III Construction Subtotal:				\$ 2,516,765
Mobilization				5% \$ 125,900
Contingency				10% \$ 264,300
Construction Cost Estimate Total:				\$ 2,907,000

Impact Fee Cost Estimate Summary			
Item Description	Notes	Allowance	Item Cost
Construction		-	\$ 2,907,000
Engineering/Survey/Testing		10.0%	\$ 290,700
Right-of-Way Acquisition (\$/SF)	\$/SF	1.00	\$ -
Impact Fee Project Cost Estimate Total:			\$ 3,197,700
Estimated Finance Cost (34.4%; i.e. 3% over 20 years)			\$ 1,100,000

## Impact Fee Engineer's Opinion of Probable Construction Cost Estimate

Wintergreen Road  
Westmoreland Road to Hampton Road

Roadway Information:			
Functional Classification:	Major Thoroughfare-4D Sec	No. of Lanes:	4
Length (lf):	5,280		
Right-of-Way Width (ft.):	100		
Median Type:	Raised		
Pavement Width (BOC to BOC):	46		

Roadway Construction Cost Estimate:				
I. Paving Construction Cost Estimate				
Item No.	Item Description	Quantity	Unit	Item Cost
1	Right of Way Preparation	53	STA	\$ 429,300
2	Remove Existing Pavement	53	STA	\$ 116,600
3	Unclassified Street Excavation	9,900	CY	\$ 148,500
4	6" Cement Stabilized Subgrade	27,000	SY	\$ 127,170
5	Cement for Stabilization (32 lb/SY)	440	TON	\$ 70,400
6	8" Concrete Pavement with Integral Curb	27,000	SY	\$ 1,890,000
7	4" Concrete Sidewalk and Ramps	5,900	SY	\$ 413,000
8	Landscaping	5,280	STA	\$ 2,640
9	Median Pavement	1,173	SY	\$ 76,267
Paving Estimate Subtotal:				\$ 3,273,877
II. Non-Paving Construction Components				
Item No.	Item Description	Pct. Of Paving	Item Cost	
10	Pavement Markings & Signage	2%	\$	65,500
11	Traffic Control	4%	\$	131,000
12	Erosion Control	3%	\$	98,300
13	Drainage Improvements (RCP, Inlets, MH, Outfalls)	20%	\$	654,800
14	Utility Adjustments	5%	\$	163,700
Other Components Estimate Subtotal:				\$ 1,113,300
III. Special Construction Components				
Item No.	Item Description	Notes	Allowance	Item Cost
15	Drainage Structures	1 Major	\$ 100,000	\$ 100,000
16	Bridge Structures	None	-	-
17	Traffic Signals	None	-	-
Special Components Estimate Subtotal:				\$ 100,000
I, II, & III Construction Subtotal:				\$ 4,487,177
Mobilization		5%	\$	224,400
Contingency		10%	\$	471,200
Construction Cost Estimate Total:				\$ 5,182,800

Impact Fee Cost Estimate Summary			
Item Description	Notes	Allowance	Item Cost
Construction		-	\$ 5,182,800
Engineering/Survey/Testing		10.0%	\$ 518,300
Right-of-Way Acquisition (\$/SF)	\$/SF	1.00	\$ 105,600
Impact Fee Project Cost Estimate Total:			\$ 5,806,700
Estimated Finance Cost (34.4%; i.e. 3% over 20 years)			\$ 1,997,500

## Impact Fee Engineer's Opinion of Probable Construction Cost Estimate

Wintergreen Road  
Polk Street to IH35 E Service Rd

Roadway Information:		
Functional Classification:	Major Thoroughfare-6D Sec	No. of Lanes: 6
Length (lf):	5,091	
Right-of-Way Width (ft.):	100	
Median Type:	Raised	
Pavement Width (BOC to BOC):	68	

Roadway Construction Cost Estimate:					
I. Paving Construction Cost Estimate					
Item No.	Item Description	Quantity	Unit	Unit Cost	Item Cost
1	Right of Way Preparation	51	STA	\$ 8,100.00	\$ 413,100
2	Remove Existing Pavement	51	STA	\$ 2,200.00	\$ 112,200
3	Unclassified Street Excavation	14,200	CY	\$ 15.00	\$ 213,000
4	6" Cement Stabilized Subgrade	38,500	SY	\$ 4.71	\$ 181,335
5	Cement for Stabilization (32 lb/SY)	620	TON	\$ 160.00	\$ 99,200
6	8" Concrete Pavement with Integral Curb	38,500	SY	\$ 70.00	\$ 2,695,000
7	4" Concrete Sidewalk and Ramps	5,700	SY	\$ 70.00	\$ 399,000
8	Landscaping	5,100	STA	\$ 0.50	\$ 2,550
9	Median Pavement	1,131	SY	\$ 65.00	\$ 73,537
Paving Estimate Subtotal:				\$	4,188,922
II. Non-Paving Construction Components					
Item No.	Item Description			Pct. Of Paving	Item Cost
10	Pavement Markings & Signage			2%	\$ 83,800
11	Traffic Control			4%	\$ 167,600
12	Erosion Control			3%	\$ 125,700
13	Drainage Improvements (RCP, Inlets, MH, Outfalls)			20%	\$ 837,800
14	Utility Adjustments			5%	\$ 209,500
Other Components Estimate Subtotal:				\$	1,424,400
III. Special Construction Components					
Item No.	Item Description	Notes	Allowance		Item Cost
15	Drainage Structures	1 Major	\$	300,000	\$ 300,000
16	Bridge Structures	None	-	-	
17	Traffic Signals	None	-	-	
Special Components Estimate Subtotal:				\$	300,000
I, II, & III Construction Subtotal:				\$	5,913,322
Mobilization				5%	\$ 295,700
Contingency				10%	\$ 621,000
Construction Cost Estimate Total:				\$	6,830,100

Impact Fee Cost Estimate Summary			
Item Description	Notes	Allowance	Item Cost
Construction		-	\$ 6,830,100
Engineering/Survey/Testing		10.0%	\$ 683,000
Right-of-Way Acquisition (\$/SF)	\$/SF	1.00	\$ 25,455
Impact Fee Project Cost Estimate Total:			\$ 7,538,555
Estimated Finance Cost (34.4%; i.e. 3% over 20 years)			\$ 2,593,200



**City of DeSoto**  
**Impact Fee Engineer's Opinion of Probable Construction Cost Estimate**

**SA: 1**  
**SA: 2**

**Pleasant Run Road**  
Duncanville Road to Cockrell Hill Road

Roadway Information:		
Functional Classification:	Major Thoroughfare-4D Sec	No. of Lanes: 4
Length (lf):	4,863	
Right-of-Way Width (ft.):	100	
Median Type:	Raised	
Pavement Width (BOC to BOC):	46	

Roadway Construction Cost Estimate:				
I. Paving Construction Cost Estimate				
Item No.	Item Description	Quantity	Unit	Item Cost
1	Right of Way Preparation	49	STA	\$ 396,900
2	Remove Existing Pavement	49	STA	\$ 107,800
3	Unclassified Street Excavation	9,200	CY	\$ 138,000
4	6" Cement Stabilized Subgrade	24,900	SY	\$ 117,279
5	Cement for Stabilization (32 lb/SY)	400	TON	\$ 64,000
6	8" Concrete Pavement with Integral Curb	24,900	SY	\$ 1,743,000
7	4" Concrete Sidewalk and Ramps	5,500	SY	\$ 385,000
8	Landscaping	4,870	STA	\$ 2,435
9	Median Pavement	1,081	SY	\$ 70,243
Paving Estimate Subtotal:				\$ 3,024,657
II. Non-Paving Construction Components				
Item No.	Item Description	Pct. Of Paving	Item Cost	
10	Pavement Markings & Signage	2%	\$	60,500
11	Traffic Control	4%	\$	121,000
12	Erosion Control	3%	\$	90,800
13	Drainage Improvements (RCP, Inlets, MH, Outfalls)	20%	\$	605,000
14	Utility Adjustments	5%	\$	151,300
Other Components Estimate Subtotal:				\$ 1,028,600
III. Special Construction Components				
Item No.	Item Description	Notes	Allowance	Item Cost
15	Drainage Structures	1 Major	\$ -	\$ -
16	Bridge Structures	None	-	-
17	Traffic Signals	None	-	-
Special Components Estimate Subtotal:				\$ -
I, II, & III Construction Subtotal:				\$ 4,053,257
Mobilization		5%	\$	202,700
Contingency		10%	\$	425,600
Construction Cost Estimate Total:				\$ 4,681,600

Impact Fee Cost Estimate Summary			
Item Description	Notes	Allowance	Item Cost
Construction		-	\$ 4,681,600
Engineering/Survey/Testing		10.0%	\$ 468,200
Right-of-Way Acquisition (\$/SF)	\$/SF	1.00	\$ 194,520
Impact Fee Project Cost Estimate Total:			\$ 5,344,320
Estimated Finance Cost (34.4%; i.e. 3% over 20 years)			\$ 1,838,400

**City of DeSoto**  
**Impact Fee Engineer's Opinion of Probable Construction Cost Estimate**

**SA: 1**  
**SA: 2**

**Pleasant Run Road**  
Cockrell Hill Road to Westmoreland Road

Roadway Information:		
Functional Classification:	Major Thoroughfare-4D Sec	No. of Lanes: 4
Length (lf):	4,195	
Right-of-Way Width (ft.):	100	
Median Type:	Raised	
Pavement Width (BOC to BOC):	46	

Roadway Construction Cost Estimate:				
I. Paving Construction Cost Estimate				
Item No.	Item Description	Quantity	Unit	Item Cost
1	Right of Way Preparation	42	STA	\$ 8,100.00 \$ 340,200
2	Remove Existing Pavement	42	STA	\$ 2,200.00 \$ 92,400
3	Unclassified Street Excavation	7,900	CY	\$ 15.00 \$ 118,500
4	6" Cement Stabilized Subgrade	21,500	SY	\$ 4.71 \$ 101,265
5	Cement for Stabilization (32 lb/SY)	350	TON	\$ 160.00 \$ 56,000
6	8" Concrete Pavement with Integral Curb	21,500	SY	\$ 70.00 \$ 1,505,000
7	4" Concrete Sidewalk and Ramps	4,700	SY	\$ 70.00 \$ 329,000
8	Landscaping	4,200	STA	\$ 0.50 \$ 2,100
9	Median Pavement	932	SY	\$ 65.00 \$ 60,594
Paving Estimate Subtotal:				\$ 2,605,059
II. Non-Paving Construction Components				
Item No.	Item Description	Pct. Of Paving	Item Cost	
10	Pavement Markings & Signage	2%	\$	52,200
11	Traffic Control	4%	\$	104,300
12	Erosion Control	3%	\$	78,200
13	Drainage Improvements (RCP, Inlets, MH, Outfalls)	20%	\$	521,100
14	Utility Adjustments	5%	\$	130,300
Other Components Estimate Subtotal:				\$ 886,100
III. Special Construction Components				
Item No.	Item Description	Notes	Allowance	Item Cost
15	Drainage Structures	1 Major	\$ 300,000	\$ 300,000
16	Bridge Structures	None	-	-
17	Traffic Signals	None	-	-
Special Components Estimate Subtotal:				\$ 300,000
I, II, & III Construction Subtotal:				\$ 3,791,159
Mobilization				5% \$ 189,600
Contingency				10% \$ 398,100
Construction Cost Estimate Total:				\$ 4,378,900

Impact Fee Cost Estimate Summary			
Item Description	Notes	Allowance	Item Cost
Construction		-	\$ 4,378,900
Engineering/Survey/Testing		10.0%	\$ 437,900
Right-of-Way Acquisition (\$/SF)	\$/SF	1.00	\$ -
Impact Fee Project Cost Estimate Total:			\$ 4,816,800
Estimated Finance Cost (34.4%; i.e. 3% over 20 years)			\$ 1,656,900

**City of DeSoto**  
**Impact Fee Engineer's Opinion of Probable Construction Cost Estimate**

**SA: 1**  
**SA: 2**

**Pleasant Run Road**  
 Polk Street to IH35 E Service Rd

Roadway Information:		
Functional Classification:	Major Thoroughfare-6D Sec	No. of Lanes: 6
Length (lf):	5,350	
Right-of-Way Width (ft.):	100	
Median Type:	Raised	
Pavement Width (BOC to BOC):	68	

Roadway Construction Cost Estimate:				
I. Paving Construction Cost Estimate				
Item No.	Item Description	Quantity	Unit	Item Cost
1	Right of Way Preparation	54	STA	\$ 437,400
2	Remove Existing Pavement	54	STA	\$ 118,800
3	Unclassified Street Excavation	14,900	CY	\$ 223,500
4	6" Cement Stabilized Subgrade	40,500	SY	\$ 190,755
5	Cement for Stabilization (32 lb/SY)	650	TON	\$ 104,000
6	8" Concrete Pavement with Integral Curb	40,500	SY	\$ 2,835,000
7	4" Concrete Sidewalk and Ramps	6,000	SY	\$ 420,000
8	Landscaping	5,350	STA	\$ 2,675
9	Median Pavement	1,189	SY	\$ 77,278
Paving Estimate Subtotal:				\$ 4,409,408
II. Non-Paving Construction Components				
Item No.	Item Description	Pct. Of Paving	Item Cost	
10	Pavement Markings & Signage	2%	\$	88,200
11	Traffic Control	4%	\$	176,400
12	Erosion Control	3%	\$	132,300
13	Drainage Improvements (RCP, Inlets, MH, Outfalls)	20%	\$	881,900
14	Utility Adjustments	5%	\$	220,500
Other Components Estimate Subtotal:				\$ 1,499,300
III. Special Construction Components				
Item No.	Item Description	Notes	Allowance	Item Cost
15	Drainage Structures	1 Major	\$ -	\$ -
16	Bridge Structures	None	-	-
17	Traffic Signals	None	-	-
Special Components Estimate Subtotal:				\$ -
I, II, & III Construction Subtotal:				\$ 5,908,708
Mobilization				\$ 295,500
Contingency				\$ 620,500
Construction Cost Estimate Total:				\$ 6,824,800

Impact Fee Cost Estimate Summary			
Item Description	Notes	Allowance	Item Cost
Construction		-	\$ 6,824,800
Engineering/Survey/Testing		10.0%	\$ 682,500
Right-of-Way Acquisition (\$/SF)	\$/SF	1.00	\$ -
Impact Fee Project Cost Estimate Total:			\$ 7,507,300
Estimated Finance Cost (34.4%; i.e. 3% over 20 years)			\$ 2,582,500

## Impact Fee Engineer's Opinion of Probable Construction Cost Estimate

## Polk Street

Centre Park Blvd to Daniieldale Road

Roadway Information:		
Functional Classification:	Major Thoroughfare-6D Sec	No. of Lanes: 6
Length (lf):	3,282	
Right-of-Way Width (ft.):	100	
Median Type:	Raised	
Pavement Width (BOC to BOC):	68	

Roadway Construction Cost Estimate:				
I. Paving Construction Cost Estimate				
Item No.	Item Description	Quantity	Unit	Item Cost
1	Right of Way Preparation	33	STA	\$ 8,100.00 \$ 267,300
2	Remove Existing Pavement	33	STA	\$ 2,200.00 \$ 72,600
3	Unclassified Street Excavation	9,100	CY	\$ 15.00 \$ 136,500
4	6" Cement Stabilized Subgrade	24,800	SY	\$ 4.71 \$ 116,808
5	Cement for Stabilization (32 lb/SY)	400	TON	\$ 160.00 \$ 64,000
6	8" Concrete Pavement with Integral Curb	24,800	SY	\$ 70.00 \$ 1,736,000
7	4" Concrete Sidewalk and Ramps	3,700	SY	\$ 70.00 \$ 259,000
8	Landscaping	3,290	STA	\$ 0.50 \$ 1,645
9	Median Pavement	729	SY	\$ 65.00 \$ 47,407
Paving Estimate Subtotal:				\$ 2,701,260
II. Non-Paving Construction Components				
Item No.	Item Description	Pct. Of Paving	Item Cost	
10	Pavement Markings & Signage	2%	\$	54,100
11	Traffic Control	4%	\$	108,100
12	Erosion Control	3%	\$	81,100
13	Drainage Improvements (RCP, Inlets, MH, Outfalls)	20%	\$	540,300
14	Utility Adjustments	5%	\$	135,100
Other Components Estimate Subtotal:				\$ 918,700
III. Special Construction Components				
Item No.	Item Description	Notes	Allowance	Item Cost
15	Drainage Structures	1 Major	\$ -	\$ -
16	Bridge Structures	None	-	-
17	Traffic Signals	None	-	-
Special Components Estimate Subtotal:				\$ -
I, II, & III Construction Subtotal:				\$ 3,619,960
Mobilization				5% \$ 181,000
Contingency				10% \$ 380,100
Construction Cost Estimate Total:				\$ 4,181,100

Impact Fee Cost Estimate Summary			
Item Description	Notes	Allowance	Item Cost
Construction		-	\$ 4,181,100
Engineering/Survey/Testing		10.0%	\$ 418,100
Right-of-Way Acquisition (\$/SF)	\$/SF	1.00	\$ -
Impact Fee Project Cost Estimate Total:			\$ 4,599,200
Estimated Finance Cost (34.4%; i.e. 3% over 20 years)			\$ 1,582,100



**City of DeSoto**  
**Impact Fee Engineer's Opinion of Probable Construction Cost Estimate**

**SA: 2**  
**SA: X**

Parkerville Rd  
Duncanville Rd to 700' west of Keswick Dr

Roadway Information:			
Functional Classification:	Major Thoroughfare-4D Sec	No. of Lanes:	4
Length (lf):	2,752		
Right-of-Way Width (ft.):	100		
Median Type:	Raised		
Pavement Width (BOC to BOC):	46		

Roadway Construction Cost Estimate:					
I. Paving Construction Cost Estimate					
Item No.	Item Description	Quantity	Unit	Unit Cost	Item Cost
1	Right of Way Preparation	28	STA	\$ 8,100.00	\$ 226,800
2	Remove Existing Pavement	0	STA	\$ 2,200.00	\$ -
3	Unclassified Street Excavation	5,200	CY	\$ 15.00	\$ 78,000
4	6" Cement Stabilized Subgrade	14,100	SY	\$ 4.71	\$ 66,411
5	Cement for Stabilization (32 lb/SY)	230	TON	\$ 160.00	\$ 36,800
6	8" Concrete Pavement with Integral Curb	14,100	SY	\$ 70.00	\$ 987,000
7	4" Concrete Sidewalk and Ramps	3,100	SY	\$ 70.00	\$ 217,000
8	Landscaping	2,760	STA	\$ 0.50	\$ 1,380
9	Median Pavement	612	SY	\$ 65.00	\$ 39,751
Paving Estimate Subtotal:					\$ 1,653,142
II. Non-Paving Construction Components					
Item No.	Item Description			Pct. Of Paving	Item Cost
10	Pavement Markings & Signage			2%	\$ 33,100
11	Traffic Control			4%	\$ 66,200
12	Erosion Control			3%	\$ 49,600
13	Drainage Improvements (RCP, Inlets, MH, Outfalls)			20%	\$ 330,700
14	Utility Adjustments			5%	\$ 82,700
Other Components Estimate Subtotal:					\$ 562,300
III. Special Construction Components					
Item No.	Item Description	Notes	Allowance		Item Cost
15	Drainage Structures	1 Major	\$ -		\$ -
16	Bridge Structures	None	-		-
17	Traffic Signals	None	-		-
Special Components Estimate Subtotal:					\$ -
I, II, & III Construction Subtotal:					\$ 2,215,442
Mobilization				5%	\$ 110,800
Contingency				10%	\$ 232,700
Construction Cost Estimate Total:					\$ 2,559,000

Impact Fee Cost Estimate Summary			
Item Description	Notes	Allowance	Item Cost
Construction		-	\$ 2,559,000
Engineering/Survey/Testing		10.0%	\$ 255,900
Right-of-Way Acquisition (\$/SF)	\$/SF	1.00	\$ 192,640
<b>Impact Fee Project Cost Estimate Total:</b>			<b>\$ 3,007,540</b>
<b>Estimated Finance Cost (34.4%; i.e. 3% over 20 years)</b>			<b>\$ 1,034,500</b>

## Impact Fee Engineer's Opinion of Probable Construction Cost Estimate

## Parkerville Rd

700' west of Keswick Dr to Cockrell Hill Rd

Roadway Information:			
Functional Classification:	Major Thoroughfare-4D Sec	No. of Lanes:	4
Length (lf):	2,285		
Right-of-Way Width (ft.):	100		
Median Type:	Raised		
Pavement Width (BOC to BOC):	46		

Roadway Construction Cost Estimate:					
I. Paving Construction Cost Estimate					
Item No.	Item Description	Quantity	Unit	Unit Cost	Item Cost
1	Right of Way Preparation	23	STA	\$ 8,100.00	\$ 186,300
2	Remove Existing Pavement	23	STA	\$ 2,200.00	\$ 50,600
3	Unclassified Street Excavation	4,300	CY	\$ 15.00	\$ 64,500
4	6" Cement Stabilized Subgrade	11,700	SY	\$ 4.71	\$ 55,107
5	Cement for Stabilization (32 lb/SY)	190	TON	\$ 160.00	\$ 30,400
6	8" Concrete Pavement with Integral Curb	11,700	SY	\$ 70.00	\$ 819,000
7	4" Concrete Sidewalk and Ramps	2,600	SY	\$ 70.00	\$ 182,000
8	Landscaping	2,290	STA	\$ 0.50	\$ 1,145
9	Median Pavement	508	SY	\$ 65.00	\$ 33,006
Paving Estimate Subtotal:					\$ 1,422,058
II. Non-Paving Construction Components					
Item No.	Item Description			Pct. Of Paving	Item Cost
10	Pavement Markings & Signage			2%	\$ 28,500
11	Traffic Control			4%	\$ 56,900
12	Erosion Control			3%	\$ 42,700
13	Drainage Improvements (RCP, Inlets, MH, Outfalls)			20%	\$ 284,500
14	Utility Adjustments			5%	\$ 71,200
Other Components Estimate Subtotal:					\$ 483,800
III. Special Construction Components					
Item No.	Item Description	Notes	Allowance		Item Cost
15	Drainage Structures	1 Major	\$ 100,000		\$ 100,000
16	Bridge Structures	None	-		-
17	Traffic Signals	None	-		-
Special Components Estimate Subtotal:					\$ 100,000
I, II, & III Construction Subtotal:					\$ 2,005,858
Mobilization				5%	\$ 100,300
Contingency				10%	\$ 210,700
Construction Cost Estimate Total:					\$ 2,316,900

Impact Fee Cost Estimate Summary			
Item Description	Notes	Allowance	Item Cost
Construction		-	\$ 2,316,900
Engineering/Survey/Testing		10.0%	\$ 231,700
Right-of-Way Acquisition (\$/SF)	\$/SF	1.00	\$ 102,825
Impact Fee Project Cost Estimate Total:			\$ 2,651,425
Estimated Finance Cost (34.4%; i.e. 3% over 20 years)			\$ 912,000

## Impact Fee Engineer's Opinion of Probable Construction Cost Estimate

Parkerville Rd  
Cockrell Hill Rd to Westmoreland Rd

Roadway Information:			
Functional Classification:	Major Thoroughfare-4D Sec	No. of Lanes:	4
Length (lf):	5,061		
Right-of-Way Width (ft.):	100		
Median Type:	Raised		
Pavement Width (BOC to BOC):	46		

Roadway Construction Cost Estimate:					
I. Paving Construction Cost Estimate					
Item No.	Item Description	Quantity	Unit	Unit Cost	Item Cost
1	Right of Way Preparation	51	STA	\$ 8,100.00	\$ 413,100
2	Remove Existing Pavement	51	STA	\$ 2,200.00	\$ 112,200
3	Unclassified Street Excavation	9,500	CY	\$ 15.00	\$ 142,500
4	6" Cement Stabilized Subgrade	25,900	SY	\$ 4.71	\$ 121,989
5	Cement for Stabilization (32 lb/SY)	420	TON	\$ 160.00	\$ 67,200
6	8" Concrete Pavement with Integral Curb	25,900	SY	\$ 70.00	\$ 1,813,000
7	4" Concrete Sidewalk and Ramps	5,700	SY	\$ 70.00	\$ 399,000
8	Landscaping	5,070	STA	\$ 0.50	\$ 2,535
9	Median Pavement	1,125	SY	\$ 65.00	\$ 73,103
Paving Estimate Subtotal:					\$ 3,144,627
II. Non-Paving Construction Components					
Item No.	Item Description			Pct. Of Paving	Item Cost
10	Pavement Markings & Signage			2%	\$ 62,900
11	Traffic Control			4%	\$ 125,800
12	Erosion Control			3%	\$ 94,400
13	Drainage Improvements (RCP, Inlets, MH, Outfalls)			20%	\$ 629,000
14	Utility Adjustments			5%	\$ 157,300
Other Components Estimate Subtotal:					\$ 1,069,400
III. Special Construction Components					
Item No.	Item Description	Notes	Allowance		Item Cost
15	Drainage Structures	1 Major	\$ -		\$ -
16	Bridge Structures	None	-		-
17	Traffic Signals	None	-		-
Special Components Estimate Subtotal:					\$ -
I, II, & III Construction Subtotal:				\$	4,214,027
Mobilization				5%	\$ 210,800
Contingency				10%	\$ 442,500
Construction Cost Estimate Total:					\$ 4,867,400

Impact Fee Cost Estimate Summary			
Item Description	Notes	Allowance	Item Cost
Construction		-	\$ 4,867,400
Engineering/Survey/Testing		10.0%	\$ 486,700
Right-of-Way Acquisition (\$/SF)	\$/SF	1.00	\$ 50,610
Impact Fee Project Cost Estimate Total:			\$ 5,404,710
Estimated Finance Cost (34.4%; i.e. 3% over 20 years)			\$ 1,859,200

## Impact Fee Engineer's Opinion of Probable Construction Cost Estimate

Parkerville Rd  
Westmoreland Rd to Hampton Rd

Roadway Information:			
Functional Classification:	Major Thoroughfare-4D Sec	No. of Lanes:	4
Length (lf):	5,273		
Right-of-Way Width (ft.):	100		
Median Type:	Raised		
Pavement Width (BOC to BOC):	46		

Roadway Construction Cost Estimate:				
I. Paving Construction Cost Estimate				
Item No.	Item Description	Quantity	Unit	Item Cost
1	Right of Way Preparation	53	STA	\$ 429,300
2	Remove Existing Pavement	53	STA	\$ 116,600
3	Unclassified Street Excavation	9,900	CY	\$ 148,500
4	6" Cement Stabilized Subgrade	27,000	SY	\$ 127,170
5	Cement for Stabilization (32 lb/SY)	440	TON	\$ 70,400
6	8" Concrete Pavement with Integral Curb	27,000	SY	\$ 1,890,000
7	4" Concrete Sidewalk and Ramps	5,900	SY	\$ 413,000
8	Landscaping	5,280	STA	\$ 2,640
9	Median Pavement	1,172	SY	\$ 76,166
Paving Estimate Subtotal:				\$ 3,273,776
II. Non-Paving Construction Components				
Item No.	Item Description	Pct. Of Paving	Item Cost	
10	Pavement Markings & Signage	2%	\$	65,500
11	Traffic Control	4%	\$	131,000
12	Erosion Control	3%	\$	98,300
13	Drainage Improvements (RCP, Inlets, MH, Outfalls)	20%	\$	654,800
14	Utility Adjustments	5%	\$	163,700
Other Components Estimate Subtotal:				\$ 1,113,300
III. Special Construction Components				
Item No.	Item Description	Notes	Allowance	Item Cost
15	Drainage Structures	1 Major	\$ -	\$ -
16	Bridge Structures	None	-	-
17	Traffic Signals	None	-	-
Special Components Estimate Subtotal:				\$ -
I, II, & III Construction Subtotal:				\$ 4,387,076
Mobilization				\$ 219,400
Contingency				\$ 460,700
Construction Cost Estimate Total:				\$ 5,067,200

Impact Fee Cost Estimate Summary			
Item Description	Notes	Allowance	Item Cost
Construction		-	\$ 5,067,200
Engineering/Survey/Testing		10.0%	\$ 506,700
Right-of-Way Acquisition (\$/SF)	\$/SF	1.00	\$ -
Impact Fee Project Cost Estimate Total:			\$ 5,573,900
Estimated Finance Cost (34.4%; i.e. 3% over 20 years)			\$ 1,917,400



## Impact Fee Engineer's Opinion of Probable Construction Cost Estimate

Parkerville Rd  
Hampton Rd to Polk St

Roadway Information:			
Functional Classification:	Major Thoroughfare-4D Sec	No. of Lanes:	4
Length (lf):	5,025		
Right-of-Way Width (ft.):	100		
Median Type:	Raised		
Pavement Width (BOC to BOC):	46		

Roadway Construction Cost Estimate:					
I. Paving Construction Cost Estimate					
Item No.	Item Description	Quantity	Unit	Unit Cost	Item Cost
1	Right of Way Preparation	51	STA	\$ 8,100.00	\$ 413,100
2	Remove Existing Pavement	51	STA	\$ 2,200.00	\$ 112,200
3	Unclassified Street Excavation	9,500	CY	\$ 15.00	\$ 142,500
4	6" Cement Stabilized Subgrade	25,700	SY	\$ 4.71	\$ 121,047
5	Cement for Stabilization (32 lb/SY)	420	TON	\$ 160.00	\$ 67,200
6	8" Concrete Pavement with Integral Curb	25,700	SY	\$ 70.00	\$ 1,799,000
7	4" Concrete Sidewalk and Ramps	5,600	SY	\$ 70.00	\$ 392,000
8	Landscaping	5,030	STA	\$ 0.50	\$ 2,515
9	Median Pavement	1,117	SY	\$ 65.00	\$ 72,583
Paving Estimate Subtotal:					\$ 3,122,145
II. Non-Paving Construction Components					
Item No.	Item Description			Pct. Of Paving	Item Cost
10	Pavement Markings & Signage			2%	\$ 62,500
11	Traffic Control			4%	\$ 124,900
12	Erosion Control			3%	\$ 93,700
13	Drainage Improvements (RCP, Inlets, MH, Outfalls)			20%	\$ 624,500
14	Utility Adjustments			5%	\$ 156,200
Other Components Estimate Subtotal:					\$ 1,061,800
III. Special Construction Components					
Item No.	Item Description	Notes	Allowance		Item Cost
15	Drainage Structures	1 Major	\$ -		\$ -
16	Bridge Structures	None	-		-
17	Traffic Signals	None	-		-
Special Components Estimate Subtotal:					\$ -
I, II, & III Construction Subtotal:					\$ 4,183,945
Mobilization				5%	\$ 209,200
Contingency				10%	\$ 439,400
Construction Cost Estimate Total:					\$ 4,832,600

Impact Fee Cost Estimate Summary			
Item Description	Notes	Allowance	Item Cost
Construction		-	\$ 4,832,600
Engineering/Survey/Testing		10.0%	\$ 483,300
Right-of-Way Acquisition (\$/SF)	\$/SF	1.00	\$ -
Impact Fee Project Cost Estimate Total:			\$ 5,315,900
Estimated Finance Cost (34.4%; i.e. 3% over 20 years)			\$ 1,828,600

## Impact Fee Engineer's Opinion of Probable Construction Cost Estimate

Parkerville Rd

Polk St to IH35

Roadway Information:		
Functional Classification:	Major Thoroughfare-4D Sec	No. of Lanes: 6
Length (lf):	5,152	
Right-of-Way Width (ft.):	100	
Median Type:	Raised	
Pavement Width (BOC to BOC):	68	

Roadway Construction Cost Estimate:				
I. Paving Construction Cost Estimate				
Item No.	Item Description	Quantity	Unit	Item Cost
1	Right of Way Preparation	52	STA	\$ 421,200
2	Remove Existing Pavement	52	STA	\$ 114,400
3	Unclassified Street Excavation	14,300	CY	\$ 214,500
4	6" Cement Stabilized Subgrade	39,000	SY	\$ 183,690
5	Cement for Stabilization (32 lb/SY)	630	TON	\$ 100,800
6	8" Concrete Pavement with Integral Curb	39,000	SY	\$ 2,730,000
7	4" Concrete Sidewalk and Ramps	5,800	SY	\$ 406,000
8	Landscaping	5,160	STA	\$ 2,580
9	Median Pavement	1,145	SY	\$ 74,418
Paving Estimate Subtotal:				\$ 4,247,588
II. Non-Paving Construction Components				
Item No.	Item Description	Pct. Of Paving	Item Cost	
10	Pavement Markings & Signage	2%	\$ 85,000	
11	Traffic Control	4%	\$ 170,000	
12	Erosion Control	3%	\$ 127,500	
13	Drainage Improvements (RCP, Inlets, MH, Outfalls)	20%	\$ 849,600	
14	Utility Adjustments	5%	\$ 212,400	
Other Components Estimate Subtotal:				\$ 1,444,500
III. Special Construction Components				
Item No.	Item Description	Notes	Allowance	Item Cost
15	Drainage Structures	1 Major	\$ -	\$ -
16	Bridge Structures	None	-	-
17	Traffic Signals	None	-	-
Special Components Estimate Subtotal:				\$ -
I, II, & III Construction Subtotal:				\$ 5,692,088
Mobilization				\$ 284,700
Contingency				\$ 597,700
Construction Cost Estimate Total:				\$ 6,574,500

Impact Fee Cost Estimate Summary			
Item Description	Notes	Allowance	Item Cost
Construction		-	\$ 6,574,500
Engineering/Survey/Testing		10.0%	\$ 657,500
Right-of-Way Acquisition (\$/SF)	\$/SF	1.00	\$ 515,200
Impact Fee Project Cost Estimate Total:			\$ 7,747,200
Estimated Finance Cost (34.4%; i.e. 3% over 20 years)			\$ 2,665,000

## Impact Fee Engineer's Opinion of Probable Construction Cost Estimate

Cockrell Hill Rd  
s City limit to Parkerville Rd

Roadway Information:			
Functional Classification:	Major Thoroughfare-4D Sec	No. of Lanes:	4
Length (lf):	2,452		
Right-of-Way Width (ft.):	100		
Median Type:	Raised		
Pavement Width (BOC to BOC):	46		

Roadway Construction Cost Estimate:					
I. Paving Construction Cost Estimate					
Item No.	Item Description	Quantity	Unit	Unit Cost	Item Cost
1	Right of Way Preparation	25	STA	\$ 8,100.00	\$ 202,500
2	Remove Existing Pavement	25	STA	\$ 2,200.00	\$ 55,000
3	Unclassified Street Excavation	4,600	CY	\$ 15.00	\$ 69,000
4	6" Cement Stabilized Subgrade	12,600	SY	\$ 4.71	\$ 59,346
5	Cement for Stabilization (32 lb/SY)	210	TON	\$ 160.00	\$ 33,600
6	8" Concrete Pavement with Integral Curb	12,600	SY	\$ 70.00	\$ 882,000
7	4" Concrete Sidewalk and Ramps	2,800	SY	\$ 70.00	\$ 196,000
8	Landscaping	2,460	STA	\$ 0.50	\$ 1,230
9	Median Pavement	545	SY	\$ 65.00	\$ 35,418
Paving Estimate Subtotal:				\$	1,534,094
II. Non-Paving Construction Components					
Item No.	Item Description			Pct. Of Paving	Item Cost
10	Pavement Markings & Signage			2%	\$ 30,700
11	Traffic Control			4%	\$ 61,400
12	Erosion Control			3%	\$ 46,100
13	Drainage Improvements (RCP, Inlets, MH, Outfalls)			20%	\$ 306,900
14	Utility Adjustments			5%	\$ 76,800
Other Components Estimate Subtotal:				\$	521,900
III. Special Construction Components					
Item No.	Item Description	Notes	Allowance		Item Cost
15	Drainage Structures	1 Major	\$	100,000	\$ 100,000
16	Bridge Structures	None	-	-	
17	Traffic Signals	None	-	-	
Special Components Estimate Subtotal:				\$	100,000
I, II, & III Construction Subtotal:				\$	2,155,994
Mobilization				5%	\$ 107,800
Contingency				10%	\$ 226,400
Construction Cost Estimate Total:				\$	2,490,200

Impact Fee Cost Estimate Summary			
Item Description	Notes	Allowance	Item Cost
Construction		-	\$ 2,490,200
Engineering/Survey/Testing		10.0%	\$ 249,000
Right-of-Way Acquisition (\$/SF)	\$/SF	1.00	\$ -
Impact Fee Project Cost Estimate Total:			\$ 2,739,200
Estimated Finance Cost (34.4%; i.e. 3% over 20 years)			\$ 942,200

## Impact Fee Engineer's Opinion of Probable Construction Cost Estimate

Cockrell Hill Rd  
Parkerville Rd to Belt Line Rd

Roadway Information:		
Functional Classification:	Major Thoroughfare-4D Sec	No. of Lanes: 6
Length (lf):	5,270	
Right-of-Way Width (ft.):	100	
Median Type:	Raised	
Pavement Width (BOC to BOC):	68	

Roadway Construction Cost Estimate:				
I. Paving Construction Cost Estimate				
Item No.	Item Description	Quantity	Unit	Item Cost
1	Right of Way Preparation	53	STA	\$ 429,300
2	Remove Existing Pavement	53	STA	\$ 116,600
3	Unclassified Street Excavation	14,600	CY	\$ 219,000
4	6" Cement Stabilized Subgrade	39,900	SY	\$ 187,929
5	Cement for Stabilization (32 lb/SY)	640	TON	\$ 102,400
6	8" Concrete Pavement with Integral Curb	39,900	SY	\$ 2,793,000
7	4" Concrete Sidewalk and Ramps	5,900	SY	\$ 413,000
8	Landscaping	5,270	STA	\$ 2,635
9	Median Pavement	1,171	SY	\$ 76,122
Paving Estimate Subtotal:				\$ 4,339,986
II. Non-Paving Construction Components				
Item No.	Item Description	Pct. Of Paving	Item Cost	
10	Pavement Markings & Signage	2%	\$ 86,800	
11	Traffic Control	4%	\$ 173,600	
12	Erosion Control	3%	\$ 130,200	
13	Drainage Improvements (RCP, Inlets, MH, Outfalls)	20%	\$ 868,000	
14	Utility Adjustments	5%	\$ 217,000	
Other Components Estimate Subtotal:				\$ 1,475,600
III. Special Construction Components				
Item No.	Item Description	Notes	Allowance	Item Cost
15	Drainage Structures	1 Major	\$ -	\$ -
16	Bridge Structures	None	-	-
17	Traffic Signals	None	-	-
Special Components Estimate Subtotal:				\$ -
I, II, & III Construction Subtotal:				\$ 5,815,586
Mobilization				\$ 290,800
Contingency				\$ 610,700
Construction Cost Estimate Total:				\$ 6,717,100

Impact Fee Cost Estimate Summary			
Item Description	Notes	Allowance	Item Cost
Construction		-	\$ 6,717,100
Engineering/Survey/Testing		10.0%	\$ 671,700
Right-of-Way Acquisition (\$/SF)	\$/SF	1.00	\$ 527,000
Impact Fee Project Cost Estimate Total:			\$ 7,915,800
Estimated Finance Cost (34.4%; i.e. 3% over 20 years)			\$ 2,723,000

## Impact Fee Engineer's Opinion of Probable Construction Cost Estimate

Cockrell Hill Rd  
Belt Line Rd to Pleasant Run Rd

Roadway Information:		
Functional Classification:	Major Thoroughfare-4D Sec	No. of Lanes: 6
Length (lf):	5,280	
Right-of-Way Width (ft.):	100	
Median Type:	Raised	
Pavement Width (BOC to BOC):	68	

Roadway Construction Cost Estimate:					
I. Paving Construction Cost Estimate					
Item No.	Item Description	Quantity	Unit	Unit Cost	Item Cost
1	Right of Way Preparation	53	STA	\$ 8,100.00	\$ 429,300
2	Remove Existing Pavement	53	STA	\$ 2,200.00	\$ 116,600
3	Unclassified Street Excavation	14,700	CY	\$ 15.00	\$ 220,500
4	6" Cement Stabilized Subgrade	39,900	SY	\$ 4.71	\$ 187,929
5	Cement for Stabilization (32 lb/SY)	640	TON	\$ 160.00	\$ 102,400
6	8" Concrete Pavement with Integral Curb	39,900	SY	\$ 70.00	\$ 2,793,000
7	4" Concrete Sidewalk and Ramps	5,900	SY	\$ 70.00	\$ 413,000
8	Landscaping	5,280	STA	\$ 0.50	\$ 2,640
9	Median Pavement	1,173	SY	\$ 65.00	\$ 76,267
Paving Estimate Subtotal:				\$	4,341,636
II. Non-Paving Construction Components					
Item No.	Item Description			Pct. Of Paving	Item Cost
10	Pavement Markings & Signage			2%	\$ 86,900
11	Traffic Control			4%	\$ 173,700
12	Erosion Control			3%	\$ 130,300
13	Drainage Improvements (RCP, Inlets, MH, Outfalls)			20%	\$ 868,400
14	Utility Adjustments			5%	\$ 217,100
Other Components Estimate Subtotal:				\$	1,476,400
III. Special Construction Components					
Item No.	Item Description	Notes	Allowance		Item Cost
15	Drainage Structures	1 Major	\$ -		\$ -
16	Bridge Structures	None	-		-
17	Traffic Signals	None	-		-
Special Components Estimate Subtotal:				\$	-
I, II, & III Construction Subtotal:				\$	5,818,036
Mobilization				5%	\$ 291,000
Contingency				10%	\$ 611,000
Construction Cost Estimate Total:				\$	6,720,100

Impact Fee Cost Estimate Summary			
Item Description	Notes	Allowance	Item Cost
Construction		-	\$ 6,720,100
Engineering/Survey/Testing		10.0%	\$ 672,000
Right-of-Way Acquisition (\$/SF)	\$/SF	1.00	\$ 528,000
Impact Fee Project Cost Estimate Total:			\$ 7,920,100
Estimated Finance Cost (34.4%; i.e. 3% over 20 years)			\$ 2,724,500



## Impact Fee Engineer's Opinion of Probable Construction Cost Estimate

Westmoreland Rd  
Parkerville Rd to Belt Line Rd

Roadway Information:			
Functional Classification:	Major Thoroughfare-4D Sec	No. of Lanes:	4
Length (lf):	5,280		
Right-of-Way Width (ft.):	100		
Median Type:	Raised		
Pavement Width (BOC to BOC):	46		

Roadway Construction Cost Estimate:				
I. Paving Construction Cost Estimate				
Item No.	Item Description	Quantity	Unit	Item Cost
1	Right of Way Preparation	53	STA	\$ 429,300
2	Remove Existing Pavement	53	STA	\$ 116,600
3	Unclassified Street Excavation	9,900	CY	\$ 148,500
4	6" Cement Stabilized Subgrade	27,000	SY	\$ 127,170
5	Cement for Stabilization (32 lb/SY)	440	TON	\$ 70,400
6	8" Concrete Pavement with Integral Curb	27,000	SY	\$ 1,890,000
7	4" Concrete Sidewalk and Ramps	5,900	SY	\$ 413,000
8	Landscaping	5,280	STA	\$ 2,640
9	Median Pavement	1,173	SY	\$ 76,267
Paving Estimate Subtotal:				\$ 3,273,877
II. Non-Paving Construction Components				
Item No.	Item Description	Pct. Of Paving	Item Cost	
10	Pavement Markings & Signage	2%	\$	65,500
11	Traffic Control	4%	\$	131,000
12	Erosion Control	3%	\$	98,300
13	Drainage Improvements (RCP, Inlets, MH, Outfalls)	20%	\$	654,800
14	Utility Adjustments	5%	\$	163,700
Other Components Estimate Subtotal:				\$ 1,113,300
III. Special Construction Components				
Item No.	Item Description	Notes	Allowance	Item Cost
15	Drainage Structures	1 Major	\$ -	\$ -
16	Bridge Structures	None	-	-
17	Traffic Signals	None	-	-
Special Components Estimate Subtotal:				\$ -
I, II, & III Construction Subtotal:				\$ 4,387,177
Mobilization				\$ 219,400
Contingency				\$ 460,700
Construction Cost Estimate Total:				\$ 5,067,300

Impact Fee Cost Estimate Summary			
Item Description	Notes	Allowance	Item Cost
Construction		-	\$ 5,067,300
Engineering/Survey/Testing		10.0%	\$ 506,700
Right-of-Way Acquisition (\$/SF)	\$/SF	1.00	\$ 52,800
Impact Fee Project Cost Estimate Total:			\$ 5,626,800
Estimated Finance Cost (34.4%; i.e. 3% over 20 years)			\$ 1,935,600

## Impact Fee Engineer's Opinion of Probable Construction Cost Estimate

Hampton Rd  
south City limit to Parkerville Rd

Roadway Information:			
Functional Classification:	Major Thoroughfare-4D Sec	No. of Lanes:	4
Length (lf):	3,482		
Right-of-Way Width (ft.):	100		
Median Type:	Raised		
Pavement Width (BOC to BOC):	46		

Roadway Construction Cost Estimate:					
I. Paving Construction Cost Estimate					
Item No.	Item Description	Quantity	Unit	Unit Cost	Item Cost
1	Right of Way Preparation	35	STA	\$ 8,100.00	\$ 283,500
2	Remove Existing Pavement	35	STA	\$ 2,200.00	\$ 77,000
3	Unclassified Street Excavation	6,600	CY	\$ 15.00	\$ 99,000
4	6" Cement Stabilized Subgrade	17,800	SY	\$ 4.71	\$ 83,838
5	Cement for Stabilization (32 lb/SY)	290	TON	\$ 160.00	\$ 46,400
6	8" Concrete Pavement with Integral Curb	17,800	SY	\$ 70.00	\$ 1,246,000
7	4" Concrete Sidewalk and Ramps	3,900	SY	\$ 70.00	\$ 273,000
8	Landscaping	3,490	STA	\$ 0.50	\$ 1,745
9	Median Pavement	774	SY	\$ 65.00	\$ 50,296
Paving Estimate Subtotal:					\$ 2,160,779
II. Non-Paving Construction Components					
Item No.	Item Description			Pct. Of Paving	Item Cost
10	Pavement Markings & Signage			2%	\$ 43,300
11	Traffic Control			4%	\$ 86,500
12	Erosion Control			3%	\$ 64,900
13	Drainage Improvements (RCP, Inlets, MH, Outfalls)			20%	\$ 432,200
14	Utility Adjustments			5%	\$ 108,100
Other Components Estimate Subtotal:					\$ 735,000
III. Special Construction Components					
Item No.	Item Description	Notes	Allowance		Item Cost
15	Drainage Structures	1 Major	\$	100,000	\$ 100,000
16	Bridge Structures	None	-	-	
17	Traffic Signals	None	-	-	
Special Components Estimate Subtotal:					\$ 100,000
I, II, & III Construction Subtotal:					\$ 2,995,779
Mobilization				5%	\$ 149,800
Contingency				10%	\$ 314,600
Construction Cost Estimate Total:					\$ 3,460,200

Impact Fee Cost Estimate Summary			
Item Description	Notes	Allowance	Item Cost
Construction		-	\$ 3,460,200
Engineering/Survey/Testing		10.0%	\$ 346,000
Right-of-Way Acquisition (\$/SF)	\$/SF	1.00	\$ 104,460
Impact Fee Project Cost Estimate Total:			\$ 3,910,660
Estimated Finance Cost (34.4%; i.e. 3% over 20 years)			\$ 1,345,200

## Impact Fee Engineer's Opinion of Probable Construction Cost Estimate

## Uhl Rd

south City limit to Parkerville Rd

Roadway Information:			
Functional Classification:	Major Thoroughfare-4D Sec	No. of Lanes:	4
Length (lf):	3,495		
Right-of-Way Width (ft.):	100		
Median Type:	Raised		
Pavement Width (BOC to BOC):	46		

Roadway Construction Cost Estimate:					
I. Paving Construction Cost Estimate					
Item No.	Item Description	Quantity	Unit	Unit Cost	Item Cost
1	Right of Way Preparation	35	STA	\$ 8,100.00	\$ 283,500
2	Remove Existing Pavement	35	STA	\$ 2,200.00	\$ 77,000
3	Unclassified Street Excavation	6,600	CY	\$ 15.00	\$ 99,000
4	6" Cement Stabilized Subgrade	17,900	SY	\$ 4.71	\$ 84,309
5	Cement for Stabilization (32 lb/SY)	290	TON	\$ 160.00	\$ 46,400
6	8" Concrete Pavement with Integral Curb	17,900	SY	\$ 70.00	\$ 1,253,000
7	4" Concrete Sidewalk and Ramps	3,900	SY	\$ 70.00	\$ 273,000
8	Landscaping	3,500	STA	\$ 0.50	\$ 1,750
9	Median Pavement	777	SY	\$ 65.00	\$ 50,483
Paving Estimate Subtotal:				\$	2,168,442
II. Non-Paving Construction Components					
Item No.	Item Description			Pct. Of Paving	Item Cost
10	Pavement Markings & Signage			2%	\$ 43,400
11	Traffic Control			4%	\$ 86,800
12	Erosion Control			3%	\$ 65,100
13	Drainage Improvements (RCP, Inlets, MH, Outfalls)			20%	\$ 433,700
14	Utility Adjustments			5%	\$ 108,500
Other Components Estimate Subtotal:				\$	737,500
III. Special Construction Components					
Item No.	Item Description	Notes	Allowance		Item Cost
15	Drainage Structures	1 Major	\$ -		\$ -
16	Bridge Structures	None	-		-
17	Traffic Signals	None	-		-
Special Components Estimate Subtotal:				\$	-
I, II, & III Construction Subtotal:				\$	2,905,942
Mobilization				5%	\$ 145,300
Contingency				10%	\$ 305,200
Construction Cost Estimate Total:				\$	3,356,500

Impact Fee Cost Estimate Summary			
Item Description	Notes	Allowance	Item Cost
Construction		-	\$ 3,356,500
Engineering/Survey/Testing		10.0%	\$ 335,700
Right-of-Way Acquisition (\$/SF)	\$/SF	1.00	\$ 139,800
Impact Fee Project Cost Estimate Total:			\$ 3,832,000
Estimated Finance Cost (34.4%; i.e. 3% over 20 years)			\$ 1,318,200



# **Appendix E:**

## **Garver Water Capital Improvements**

### **Project Cost Estimates**

Project Identification				Schedule					2020 Costs (\$1,000)			Forecasted Cost (\$1,000)		
Project - Group	Description	Location	Primary Trigger	Trigger Date	Project Complete	Engineering /Design	Bid/ Construction	Total Project Duration	Construction	Professional Services	OPCC	Construction	Professional Services	OPCC
1 – B	Hampton Road Pump Station Rehabilitation	Hampton Road PS	Condition	Oct-20	Oct-23	12	24	36	\$4,861	\$729	\$5,590	\$5,157	\$751	\$5,908
2 – D	Bolton Boone Pump Station and EST	Bolton Boone PS and Hampton Road PS	Capacity	Oct-21	Oct-24	12	24	36	\$7,966	\$1,195	\$9,160	\$8,704	\$1,268	\$9,972
3 – H	20" Transmission Main for Bolton Boone Zone	New Bolton Boone Zone	Capacity	Oct-22	Jul-24	12	9	21	\$2,306	\$346	\$2,652	\$2,595	\$378	\$2,973
4 – A	Westmoreland Pump Station Rehabilitation	Westmoreland PS	Condition	Oct-22	Oct-24	12	12	24	\$8,341	\$1,251	\$9,592	\$9,388	\$1,367	\$10,755
5 – F	Parks Elevated Storage Tank Rehabilitation and Site Improvements	Parks EST	Condition	Oct-23	Jan-25	6	9	15	\$918	\$138	\$1,056	\$1,033	\$155	\$1,188
6 – G	Briarwood Elevated Storage Tank Mixing and Site Improvements	Briarwood EST	Operational	Oct-23	Jan-25	6	9	15	\$109	\$16	\$125	\$123	\$18	\$141
7 – E	Parkerville Elevated Storage Tank Rehabilitation and Site Improvements	Parkerville EST	Condition	Oct-23	Jan-25	6	9	15	\$713	\$107	\$820	\$803	\$120	\$923
8 – C	System-wide SCADA and Electrical Improvements	City-wide	City Directed	Mar-24	Jun-24	1	2	3	\$1,012	\$152	\$1,164	\$1,140	\$171	\$1,310
9 – I	12" Wintergreen Road Waterline Improvements	798 and 860 Zones	Fire Flow	Oct-24	Jan-26	9	6	15	\$2,363	\$354	\$2,717	\$2,739	\$411	\$3,150
10 – P	8" Ace Drive Waterline Improvements	860 Zone	Fire Flow	Oct-25	Oct-26	6	6	12	\$537	\$81	\$618	\$642	\$96	\$738
11 – L	12" Belt Line Road Waterline Improvements	798 Zone	Capacity	Mar-26	Sep-27	12	6	18	\$1,197	\$180	\$1,376	\$1,472	\$214	\$1,686
12 – M	18" Spinner Road Waterline Improvements	798 Zone	Capacity	Oct-26	Oct-28	12	12	24	\$4,647	\$697	\$5,344	\$5,887	\$857	\$6,745
13 – N	24" Silver Creek Waterline Improvements	860 Zone	Capacity	Mar-27	Nov-27	4	4	8	\$105	\$16	\$121	\$129	\$19	\$148
14 – O	12" Eagle Drive Waterline Improvements	860 Zone	City Directed	Oct-27	Jan-29	9	6	15	\$3,041	\$456	\$3,498	\$3,853	\$578	\$4,431
15 – Q	8" Williams Avenue Waterline Improvements	798 Zone	Fire Flow	Mar-28	Mar-29	6	6	12	\$558	\$84	\$642	\$707	\$106	\$813
16 – R	8" Thunderbrook Circle Waterline Improvements	798 Zone	Fire Flow	Mar-28	Mar-29	6	6	12	\$70	\$10	\$80	\$89	\$13	\$102
17 – S	8" Wyndmere Drive Waterline Improvements	860 Zone	Fire Flow	Oct-28	Oct-29	6	6	12	\$638	\$96	\$734	\$832	\$125	\$957
18 – T	8" Cripple Creek Waterline Improvements	860 Zone	Fire Flow	Oct-28	Oct-29	6	6	12	\$129	\$19	\$148	\$168	\$25	\$193
19 – U	8" Place Louie Waterline Improvements	798 Zone	Fire Flow	Oct-28	Oct-29	6	6	12	\$342	\$51	\$394	\$447	\$67	\$514
20 – V	New Briarwood Pump Station and Southwest Zone Elevated Storage Tank	Southwest Zone	Capacity	Oct-28	Oct-31	12	24	36	\$8,108	\$1,216	\$9,324	\$10,897	\$1,587	\$12,484
21 – K	Southwest Zone Waterline Improvements	Southwest Zone	Capacity	Oct-29	Oct-31	12	12	24	\$5,024	\$754	\$5,777	\$6,954	\$1,013	\$7,967
22 – J	8-in Mountain Laurel Waterline Improvements	Southwest Zone	Operational	Oct-30	Oct-31	6	6	12	\$238	\$36	\$273	\$329	\$49	\$378
23 – W	16" Chalet Ct. Waterline Improvements	798 Zone	Operational	Oct-30	Oct-31	6	6	12	\$408	\$61	\$469	\$564	\$85	\$649
24 – Y	12" I-35 Frontage Waterline Improvements	798 Zone	City Directed	Oct-31	Jul-33	12	9	21	\$3,644	\$547	\$4,191	\$5,352	\$779	\$6,131
25 – AA	12" Parks Waterline Improvements	798 Zone	City Directed	Oct-32	Apr-34	12	6	18	\$1,458	\$219	\$1,676	\$2,205	\$321	\$2,526
26 – X	Assorted 12" Waterline Improvements	798 Zone and 860 Zone	City Directed	Oct-33	Apr-35	12	6	18	\$1,067	\$160	\$1,227	\$1,663	\$242	\$1,905
27 – Z	Assorted 8" Waterline Improvements	City-wide	City Directed	Oct-20	Oct-45	150	150	300	\$74,110	\$7,411	\$81,521	\$129,953	\$9,115	\$139,067
											<b>Total 2020 OPCC:</b>	<b>\$150,291</b>	<b>Total Forecasted OPCC:</b>	<b>\$223,754</b>
											<b>5-YR Total 2020 OPCC:</b>	<b>\$32,877</b>	<b>Total Forecasted OPCC:</b>	<b>\$36,321</b>

Condition Driven Projects:

Project Identification				Schedule					2020 Costs (\$1,000)			Forecasted Cost (\$1,000)		
Project - Group	Description	Location	Primary Trigger	Trigger Date	Project Complete	Engineering /Design	Bid/ Construction	Total Project Duration	Construction	Professional Services	OPCC	Construction	Professional Services	OPCC
1 – B	Hampton Road Pump Station Rehabilitation	Hampton Road PS	Condition	Oct-20	Oct-23	12	24	36	\$4,861	\$729	\$5,590	\$5,157	\$751	\$5,908
4 – A	Westmoreland Pump Station Rehabilitation	Westmoreland PS	Condition	Oct-22	Oct-24	12	12	24	\$8,341	\$1,251	\$9,592	\$9,388	\$1,367	\$10,755
5 – F	Parks Elevated Storage Tank Rehabilitation and Site Improvements	Parks EST	Condition	Oct-23	Jan-25	6	9	15	\$918	\$138	\$1,056	\$1,033	\$155	\$1,188
7 – E	Parkerville Elevated Storage Tank Rehabilitation and Site Improvements	Parkerville EST	Condition	Oct-23	Jan-25	6	9	15	\$713	\$107	\$820	\$803	\$120	\$923
											Total 2020 OPCC:	\$17,058	Total Forecasted OPCC:	\$18,774
											5-YR Total 2020 OPCC:	\$17,058	Total Forecasted OPCC:	\$17,058

Capacity Driven Projects:

Project Identification				Schedule					2020 Costs (\$1,000)			Forecasted Cost (\$1,000)		
Project - Group	Description	Location	Primary Trigger	Trigger Date	Project Complete	Engineering /Design	Bid/ Construction	Total Project Duration	Construction	Professional Services	OPCC	Construction	Professional Services	OPCC
2 – D	Bolton Boone Pump Station and EST	Bolton Boone PS and Hampton Road PS	Capacity	Oct-21	Oct-24	12	24	36	\$7,966	\$1,195	\$9,160	\$8,704	\$1,268	\$9,972
3 – H	20" Transmission Main for Bolton Boone Zone	New Bolton Boone Zone	Capacity	Oct-22	Jul-24	12	9	21	\$2,306	\$346	\$2,652	\$2,595	\$378	\$2,973
11 – L	12" Belt Line Road Waterline Improvements	798 Zone	Capacity	Mar-26	Sep-27	12	6	18	\$1,197	\$180	\$1,376	\$1,472	\$214	\$1,686
12 – M	18" Spinner Road Waterline Improvements	798 Zone	Capacity	Oct-26	Oct-28	12	12	24	\$4,647	\$697	\$5,344	\$5,887	\$857	\$6,745
13 – N	24" Silver Creek Waterline Improvements	860 Zone	Capacity	Mar-27	Nov-27	4	4	8	\$105	\$16	\$121	\$129	\$19	\$148
20 – V	New Briarwood Pump Station and Southwest Zone Elevated Storage Tank	Southwest Zone	Capacity	Oct-28	Oct-31	12	24	36	\$8,108	\$1,216	\$9,324	\$10,897	\$1,587	\$12,484
21 – K	Southwest Zone Waterline Improvements	Southwest Zone	Capacity	Oct-29	Oct-31	12	12	24	\$5,024	\$754	\$5,777	\$6,954	\$1,013	\$7,967
											Total 2020 OPCC:	\$33,755	Total Forecasted OPCC:	\$41,975
											5-YR Total 2020 OPCC:	\$11,812	Total Forecasted OPCC:	\$12,945

Operational Driven Projects:

Project Identification				Schedule					2020 Costs (\$1,000)			Forecasted Cost (\$1,000)		
Project - Group	Description	Location	Primary Trigger	Trigger Date	Project Complete	Engineering /Design	Bid/ Construction	Total Project Duration	Construction	Professional Services	OPCC	Construction	Professional Services	OPCC
6 – G	Briarwood Elevated Storage Tank Mixing and Site Improvements	Briarwood EST	Operational	Oct-23	Jan-25	6	9	15	\$109	\$16	\$125	\$123	\$18	\$141
22 – J	8-in Mountain Laurel Waterline Improvements	Southwest Zone	Operational	Oct-30	Oct-31	6	6	12	\$238	\$36	\$273	\$329	\$49	\$378
23 – W	16" Chalet Ct. Waterline Improvements	798 Zone	Operational	Oct-30	Oct-31	6	6	12	\$408	\$61	\$469	\$564	\$85	\$649
											Total 2020 OPCC:	\$882	Total Forecasted OPCC:	\$1,168
											5-YR Total 2020 OPCC:	\$125	Total Forecasted OPCC:	\$141



Fire Flow Driven Projects:

Project Identification				Schedule					2020 Costs (\$1,000)			Forecasted Cost (\$1,000)		
Project - Group	Description	Location	Primary Trigger	Trigger Date	Project Complete	Engineering /Design	Bid/ Construction	Total Project Duration	Construction	Professional Services	OPCC	Construction	Professional Services	OPCC
9 – I	12" Wintergreen Road Waterline Improvements	798 and 860 Zones	Fire Flow	Oct-24	Jan-26	9	6	15	\$2,363	\$354	\$2,717	\$2,739	\$411	\$3,150
10 – P	8" Ace Drive Waterline Improvements	860 Zone	Fire Flow	Oct-25	Oct-26	6	6	12	\$537	\$81	\$618	\$642	\$96	\$738
15 – Q	8" Williams Avenue Waterline Improvements	798 Zone	Fire Flow	Mar-28	Mar-29	6	6	12	\$558	\$84	\$642	\$707	\$106	\$813
16 – R	8" Thunderbrook Circle Waterline Improvements	798 Zone	Fire Flow	Mar-28	Mar-29	6	6	12	\$70	\$10	\$80	\$89	\$13	\$102
17 – S	8" Wyndmere Drive Waterline Improvements	860 Zone	Fire Flow	Oct-28	Oct-29	6	6	12	\$638	\$96	\$734	\$832	\$125	\$957
18 – T	8" Cripple Creek Waterline Improvements	860 Zone	Fire Flow	Oct-28	Oct-29	6	6	12	\$129	\$19	\$148	\$168	\$25	\$193
19 – U	8" Place Louie Waterline Improvements	798 Zone	Fire Flow	Oct-28	Oct-29	6	6	12	\$342	\$51	\$394	\$447	\$67	\$514
											Total 2020 OPCC:	\$5,333	Total Forecasted OPCC:	\$6,467
											5-YR Total 2020 OPCC:	\$2,717	Total Forecasted OPCC:	\$3,150

City Directed Driven Projects:

Project Identification				Schedule					2020 Costs (\$1,000)			Forecasted Cost (\$1,000)		
Project - Group	Description	Location	Primary Trigger	Trigger Date	Project Complete	Engineering /Design	Bid/ Construction	Total Project Duration	Construction	Professional Services	OPCC	Construction	Professional Services	OPCC
8 – C	System-wide SCADA and Electrical Improvements	City-wide	City Directed	Mar-24	Jun-24	1	2	3	\$1,012	\$152	\$1,164	\$1,140	\$171	\$1,310
14 – O	12" Eagle Drive Waterline Improvements	860 Zone	City Directed	Oct-27	Jan-29	9	6	15	\$3,041	\$456	\$3,498	\$3,853	\$578	\$4,431
24 – Y	12" I-35 Frontage Waterline Improvements	798 Zone	City Directed	Oct-31	Jul-33	12	9	21	\$3,644	\$547	\$4,191	\$5,352	\$779	\$6,131
25 – AA	12" Parks Waterline Improvements	798 Zone	City Directed	Oct-32	Apr-34	12	6	18	\$1,458	\$219	\$1,676	\$2,205	\$321	\$2,526
26 – X	Assorted 12" Waterline Improvements	798 Zone and 860 Zone	City Directed	Oct-33	Apr-35	12	6	18	\$1,067	\$160	\$1,227	\$1,663	\$242	\$1,905
27 – Z	Assorted 8" Waterline Improvements	City-wide	City Directed	Oct-20	Oct-45	150	150	300	\$74,110	\$7,411	\$81,521	\$129,953	\$9,115	\$139,067
											Total 2020 OPCC:	\$93,278	Total Forecasted OPCC:	\$155,370
											5-YR Total 2020 OPCC:	\$1,164	Total Forecasted OPCC:	\$1,310

# **Appendix F:**

## **Grantham Wastewater Capital Improvements Project Cost Estimates**



**6.1 GENERAL**

The pipe size upgrades identified in this section are based upon the assumption that the existing sewer line will be taken out of service and replaced with a single new pipe to carry the estimated ultimate peak flow. This is the most conservative assumption that can be made.

It is possible that some of the existing trunk lines are still in good, stable condition and will not need to be replaced when the basin develops to the point where the flow exceeds the pipe capacity. In this event, rather than replace the existing pipe, a parallel pipe would be a less expensive alternative. If the trunk line does need to be replaced, and the existing line condition and trench embedment allows, pipe bursting may be less expensive than replacing the trunk line.

However, without the benefit of smoke testing or televised inspection data, it would be speculation to anticipate cost savings based upon existing line conditions at the time that a replacement pipe is necessary. As future I&I studies are performed for the basins evaluated in this report, the need to replace each trunk line can be reevaluated.

**6.2 CURRENT SYSTEM CONDITION**

In order to gauge the overall capacity condition of DeSoto's wastewater system, G&A reviewed a six month inventory of Sanitary Sewer Overflow (SSO) data sheets furnished by City staff. According to these data sheets, the only recurring overflow on a trunk line is located at the upstream manhole of Siphon S-8, near the intersection of Belt Line Road and I.H. 35, and in an adjacent gas station restroom. This siphon is discussed in more detail in Section 6.4.

The lack of recurring SSO's on the existing trunk lines throughout the City is a positive indication of the wastewater system's ability to convey existing peak flows. However, as indicated previously, many of the drainage basins included in this study contain a significant amount of undeveloped land. It is the impact of flows from this future development that results in the trunk line upgrades that are identified in the following section.

**6.3 IDENTIFIED FUTURE TRUNK LINE UPGRADES**

Tables 4 through 13 in the following sections summarize the trunk line upgrades that have been identified for each basin in this study. A conceptual Opinion of Probable Cost has been provided for each future pipe replacement; however, these represent order-of-magnitude costs only for the City's future planning purposes. Preliminary engineering would be required to prepare detailed Opinions of Probable Cost for each replacement trunk line.

## Section 6

## Identified Sewer System Improvements

### 6.3.1 Basin A

Approximately 1,420 L.F. of pipe will need to be upgraded. Approximately 42% of Basin A is currently developed.

Table 4 - Basin A Pipe Summary						
Up-Stream MH No.	Down-Stream MH No.	Length	Existing Pipe Size	Proposed Pipe Size	Proposed Manholes	Conceptual Pipe Cost
1167A	1188	1001	10	-		-
1188	1193	804	10	12	3	\$ 144,000
1193	1198	1315	12	-		-
1198	1242	616	12	15	3	\$ 127,000
1242	1243	138	15	-		-
1243	1244	486	18	-		-
1244	1916	6649	18	-		-

### 6.3.2 Basin B

Approximately 4,609 L.F. of pipe in Basin B will need to be upgraded to meet the capacity requirements of ultimate flow. Basin B is currently 49% developed.

Table 5 - Basin B Pipe Summary						
Up-Stream MH No.	Down-Stream MH No.	Length	Existing Pipe Size	Proposed Pipe Size	Proposed Manholes	Conceptual Pipe Cost
1487	1482	2108	10	-		-
1482	1486	2087	15	-		-
1486	2064	1213	10	12	5	\$ 220,000
2064	2050	1878	10	15	10	\$ 393,000
2050	2134	1519	10	18	8	\$ 360,000

### 6.3.3 Basin C

The trunk line located within Basin C will require approximately 4,756 L.F. of pipe upgrades to meet the capacity of ultimate flows. Basin C is currently 67% developed.



## Section 6

## Identified Sewer System Improvements

**Table 6 – Basin C Pipe Summary**

Up-Stream MH No.	Down-Stream MH No.	Length	Existing Pipe Size	Proposed Pipe Size	Proposed Manholes	Conceptual Pipe Cost
1571	1559	4074	10	-		-
1559	1557	1377	12	-		-
1557	2247	740	8-10	12	3	\$ 134,000
2247	2251	1058	10	15	4	\$ 209,000
2251	2305	2958	10	18	10	\$ 658,000

### 6.3.4 Basin D

Approximately 8,056 L.F. of the Basin D trunk line will need to be upgraded to meet the ultimate capacity requirements. Basin D is currently 50% developed.

**Table 7 - Basin D Pipe Summary**

Up-Stream MH No.	Down-Stream MH No.	Length	Existing Pipe Size	Proposed Pipe Size	Proposed Manholes	Conceptual Pipe Cost
1643	2441X	259	10	-		-
2441X	2441S	1848	10	12	5	\$ 315,000
2441S	2441Q	354	10	15	2	\$ 75,000
2441Q	2441H	1954	12	-		-
2441H	1072	5854	12-15	18	23	\$1,326,000

### 6.3.5 Basin G

Basin G has approximately 3,618 L.F. of trunk line that is undersized for ultimate flows. Currently, 53% of Basin G is developed.

**Table 8 - Basin G Pipe Summary**

Up-Stream MH No.	Down-Stream MH No.	Length	Existing Pipe Size	Proposed Pipe Size	Proposed Manholes	Conceptual Pipe Cost
133	131	948	10	-		-
131	128	1022	12	-		-
128	412	2945	15	-		-
412	410	608	18	-		-
410	418A	1664	18	21	7	\$ 459,000
418A	868	1954	18	24	12	\$ 714,000

## Section 6

## Identified Sewer System Improvements

### 6.3.6 Basin H

The trunk line located within Basin H will require approximately 2,912 L.F. of pipe upgrades to meet the capacity of ultimate flows from within the Basin. In addition, the downstream section of the trunk line, from manhole 1013 to manhole 927, serves as an emergency overflow for the Heath Creek Basin. The capacity of the Basin H trunk main will need to be reviewed in the future when the Heath Creek Basin is studied to determine how much flow is being diverted to that portion of the line. Basin H is currently 72% developed.

**Table 9 - Basin H Pipe Summary**

Up-Stream MH No.	Down-Stream MH No.	Length	Existing Pipe Size	Proposed Pipe Size	Proposed Manholes	Conceptual Pipe Cost
549	980	1744	10	-		-
980	980D	688	10	12	4	\$ 134,000
980D	980G	476	12	-		-
980G	1010	383	12	15	3	\$ 88,000
1010	1016	1095	15	-		-
1016	924	1841	15	18	8	\$ 423,000
924	927	262	24	-		-

### 6.3.7 Atchison Branch Basin

The Atchison Branch Basin does not have any lines that are undersized for ultimate flow. This Basin is currently 36% developed.

**Table 10 - Atchison Branch Basin Pipe Summary**

Up-Stream MH No.	Down-Stream MH No.	Length	Existing Pipe Size	Proposed Pipe Size	Proposed Manholes	Conceptual Pipe Cost
1692	2561	6970	15	-	-	-
2561	1148	3770	18	-	-	-

### 6.3.8 Bee Branch Basin

Approximately 1,552 L.F. of the Bee Branch Basin trunk line will need to be upgraded to meet the ultimate capacity requirements. Bee Branch Basin is currently 58% developed.



## Section 6

## Identified Sewer System Improvements

Table 11 - Bee Branch Basin Pipe Summary						
Up-Stream MH No.	Down-Stream MH No.	Length	Existing Pipe Size	Proposed Pipe Size	Proposed Manholes	Conceptual Pipe Cost
1345	3075B	1597	10-12	15	6	\$ 315,000
3075B	3075E	397	12	-		-
3075E	3045	3679	No plans available			

### 6.3.9 Basin I

The capacity of Basin I was analyzed as part of a previous I&I study, and found to have no lines that are undersized for ultimate flow. Table 12 summarizes the results of the capacity analysis from the previous I&I study.

Table 12 - Basin I Pipe Summary						
Up-Stream MH No.	Down-Stream MH No.	Length	Existing Pipe Size	Proposed Pipe Size	Proposed Manholes	Conceptual Pipe Cost
1204	1198	2172	6	-		
1198	1090	4001	8	-		
1090	1144	4397	10-12	-		
1144	1001	7308	15	-		

### 6.3.10 Spring Creek Basin

The previous Spring Creek Basin I&I Study included a capacity analysis of the basin's trunk line, which found that approximately 2,400 linear feet of the trunk line is marginally undersized to carry the estimated fully developed flows. The results of the previous study have been summarized in the table below and conceptual pipe costs added using the methodology in this report.

Table 13 - Spring Creek Basin Pipe Summary

Up-Stream MH No.	Down-Stream MH No.	Length	Existing Pipe Size	Proposed Pipe Size	Proposed Manholes	Conceptual Pipe Cost
161	133	2318	8	-		-
133	289	1797	10	-		-
289	259	1860	15	-		-
259	257	1263	12	-		-
257	18	916	12	15	5	\$ 193,000
18	8	1497	15	18	5	\$ 333,000
8	1	868	15	-		-

### 6.3.11 Heath Creek Basin

An analysis of the trunk line capacities in the Heath Creek Basin was not included in the scope of the WWMP. The future Heath Creek Basin I&I study will include a capacity analysis of the trunk lines located within the basin; consequently, the WWMP will need to be updated when that I&I study is completed.

## 6.4 SIPHONS

G&A calculated the siphon capacity based on survey data gathered by G&A's survey crew. In addition, the capacity of the gravity flow pipes located immediately upstream and downstream of each siphon was calculated based on data from the as-built plans. For the siphons where the estimated ultimate flow was not able to be calculated, the siphon capacity was compared to that of the gravity pipes located immediately upstream and downstream of the siphon.

Siphon S-1 is adequately sized to carry the estimated ultimate flow.

Siphon S-2 acts as an emergency overflow for a portion of Basin I, and therefore the flow reaching this siphon will vary depending on the adjacent trunk main conditions, although the maximum peak flow that could reach the siphon is 1.32 mgd as calculated in the Basin I study. This siphon has a capacity of 4.09 mgd, which is greater than the peak flow and both the upstream and downstream adjacent pipes.

The ultimate flows reaching siphons S-3, S-4, and S-5 have not yet been calculated. These calculations will be part of the future Heath Creek Basin I/I study and were not included in the scope of this report. Siphons S-3 and S-4 both have greater capacity than the adjacent gravity pipes, and siphon S-5 has essentially the same capacity as the downstream gravity pipe, while being smaller than the upstream pipe.

Siphon S-6 carries the flow from Basin H and also acts as an emergency overflow for the Heath Creek Basin. The calculated ultimate peak flow reaching the siphon from Basin H is