“Exhibit C”

Fort Worth Water and Wastewater

Capital Improvement Plans

Innovative approaches
Practical results
Outstanding service

Water & Wastewater Impact Fee Update

Exhibit D: Capital Improvement Plan Water Facilities 2017-2037

Prepared for:

City of Fort Worth Water Department

Prepared by:

FREESE AND NICHOLS, INC.
4055 International Plaza, Suite 200
Fort Worth, Texas 76109
817-735-7300

FTW16125

October 07, 2016

Water & Wastewater Impact Fee Update

Prepared for:

City of Fort Worth Water Department

Prepared by:

FREESE AND NICHOLS, INC.
4055 International Plaza, Suite 200
Fort Worth, Texas 76109
817-735-7300

FTW16125

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

APPENDICES

1.0 INTRODUCTION

In accordance with Texas Local Government Code (TLGC), Chapter 395, the City of Fort Worth commissioned Freese and Nichols, Inc., to conduct a Water and Wastewater Impact Fee Study. This report establishes the engineering basis for the fee schedule, updating the previous study completed in 2012.

Impact fees provide the City of Fort Worth a mechanism for recouping the cost associated with expanding the municipal water system to accommodate growth in the service area. The City of Fort Worth owns and operates a system comprised of treatment facilities, pumping stations, storage facilities, and pipelines that are continuously improved and expanded. The schedule for future investment in the water system is known as the Capital Improvements Plan (CIP). The CIP was updated as a part of this study with capital projects and costs provided by previously commissioned master planning documents and input from Fort Worth Water Department staff.

The report describes the basis for establishing which City of Fort Worth water facilities are eligible to be included in the impact fee analysis. The additional facilities required to accommodate growth during the study period are summarized.

2.0 EXISTING WATER DISTRIBUTION SYSTEM

2.1 Raw Water Sources and Transmission

The City obtains the majority of its raw water supply from the Tarrant Regional Water District (TRWD), with the balance supplied by the City's permitted capacity at Lake Worth, the Corps of Engineers (COE) permitted capacity at Lake Benbrook, and several small reuse projects. The City's supply from TRWD is per a long term contract, with no contractual limits on the water withdrawn from the Richland-Chambers and Cedar Creek Reservoirs, subject to the TRWD permit limits. The current water supplies for the City are as follows in **Table 2-1**:

Table 2-1 Water Supply Allocated to Fort Worth

Source	Water Right Holder	Permitted or Contracted Amount (MGD)
West Fork	TRWD	142.37
Lake Worth (Fort Worth Permit)	Fort Worth	11.85*
Lake Benbrook (COE Contract)	Fort Worth	0.65
Richland-Chambers Reservoir	TRWD	182.87
Cedar Creek Reservoir	TRWD	153.88

*Fort Worth has allowed this water right to be used as part of TRWD's West Fork System

Through a series of pump stations, the TRWD has implemented improvements to allow water from the Richland-Chambers and Cedar Creek Reservoirs to flow to Lake Benbrook. The blended water can then be pumped to Rolling Hills Water Treatment Plant (RHWTP), North Holly Water Treatment Plant (NHWTP)/South Holly Water Treatment Plant (SHWTP), or Westside Water Treatment Plant (WSWTP). TRWD implemented improvements to tie Lake Benbrook to Eagle Mountain Lake, where Fort Worth operates the Eagle Mountain Water Treatment Plant (EMWTP).

The existing raw water supply facilities are shown as follows in **Table 2-2**:

Table 2-2 Raw Water Supply Facilities

Unit	Capacity
Eagle Mountain Lake	66 mgd
Eagle Mountain Pump Station and Pipeline	105 mgd*
Lake Worth Intake and Pipeline	127 mgd
Clear Fork Pump Station	90 mgd*
Cedar Creek System	136 mgd*
Richland-Chambers System	118 mgd*

*Indicates firm capacity with largest pump out of service

2.2 Water Treatment Plants, Pump Stations and Storage

The City's distribution system consists of ten pressure planes. The pressure planes include the Holly, Eastside II (ES II), Northside II (NS II), Northside III (NS III), Northside IV (NS IV), Southside II (SS II), Southside III (SS III), Westside II (WS II), Westside III (WS III) and Westside IV (WS IV) Pressure Planes. Some pressure planes, such as Holly and ES II, are supplied principally by pump stations at the water treatment plants.

The City currently operates five water treatment plants, summarized in **Table 2-3** below. These plants take raw water from the TRWD reservoirs and treat it, and is then pumped into the distribution system through the high service pump stations at each treatment plant.

Table 2-3 Water Treatment Plant Facilities

Water Treatment Plant	Treatment Capacity (MGD)
North Holly Plant	80
South Holly Plant	80
Rolling Hills Plant	200
Eagle Mountain Plant	108
Westside Plant	12

In order to provide adequate pressure to each of the City's ten pressure planes, the City operates a series of twenty-one pump stations. A summary of the existing system pumping capacities of each high service pump station as well as the in-system pump stations can be found in **Appendix A**. These pump

stations are used to fill the twenty-seven ground and elevated storage tanks located throughout the City. A summary of the existing system storage capacities of the ground and elevated storage tanks can be found in **Appendix B.**

3.0 PROJECTED WATER DEMANDS

3.1 Projected Water Demands

Average day demands were developed for the City of Fort Worth for the on-going 2016 Water Master Plan Update. Based on historical usage, a residential and non-residential per capita was developed for each individual pressure plane, resulting in a city 2017 average day demand of 166 mgd, and a City 2027 average day demand of 210 mgd (City demands do not include wholesale demand). An average day to maximum day peaking factor was also developed for each pressure plane, resulting in a City 2017 maximum day demand of 313 mgd, and a City 2027 maximum day demand of 404 mgd.

The wholesale customer demand was provided by the wholesale customers as part of the wholesale customer surveys. The 2017 average day demand for wholesale customers is 68 mgd, and the 2027 average day demand for the wholesale customers is 82 mgd. The 2017 maximum day demand for wholesale customers is 158 mgd, and the 2027 maximum day demand for the wholesale customers is 185 mgd.

The total 2017 average day demand for Fort Worth and its wholesale customers is 234 mgd. The total 2027 average day demand for Fort Worth and its wholesale customers is 292 mgd. The total 2017 maximum day demand for Fort Worth and its wholesale customers is 471 mgd. The total 2027 maximum day demand for Fort Worth and its wholesale customers is 589 mgd.

The 2016 Water Master Plan Update recommended a maximum day to peak hour peaking factor of 1.5, resulting in a total 2017 peak hour demand for Fort Worth and its wholesale customers of 707 mgd, and a total 2027 peak hour demand for Fort Worth and its wholesale customers of 884 mgd.

Table 3-1 summarizes the projected water demands for Fort Worth.

Table 3-1 Projected Water Demands

Entity	Planning Year	Average Day Demand (MGD)	Maximum Day Demand (MGD)	Peak Hour Demand (MGD)
City of Fort Worth	2017	166	313	470
	2027	210	404	606
Wholesale Customers (Portion Served by Fort Worth)	2017	68	158	237
	2027	82	185	278
Total Demand	2017	234	471	707
	2027	292	589	884

4.0 WATER CAPITAL IMPROVEMENTS

This section establishes the City of Fort Worth water facilities and engineering studies that are eligible for inclusion in the calculation of the impact fee. The City's existing water model was updated by FNI staff to reflect the updated demands for the impact fee period, as well as include the recommended CIP projects for the impact fee period. Projects included in the CIP increase system capacity as a result of projected growth. Only those projects warranted by capacity needs derived from growth occurring during the study period (2017 to 2027) can be included in the impact fee calculation. Additionally, projects are excluded from the impact fee calculation if alternate mechanisms for cost recovery are in place.

Projects included in the impact fee study are TRWD supply projects, raw water supply and transmission, water treatment facilities, regional transmission lines, pump stations, storage facilities, and engineering studies.

Table 4-1 provides a summary of each water CIP project cost and allocation for the 2017-2027 study period. The 2017 percent utilization is the portion of a project's capacity required to serve existing development. It is not included in the impact fee analysis. The 2017-2027 percent utilization is the portion of the project's capacity that will be required to serve development projected to occur from 2017 to 2027. The portion of a project's total cost that is used to serve development projected to occur from 2017 through 2027 is calculated as the total cost multiplied by the 2017-2027 percent utilization. Only this portion of the cost is used in the impact fee analysis.

Figures D-1 and **D-2** show existing and proposed facilities, respectively, for the impact fee study period. **Appendix C** describes each water CIP project for the 2017-2027 planning period. The purpose of each project, the portion that is allocated to growth and the current status is also included.

Table 4-1
Water Capital Improvement Projects 2017 - 2027

Project ID	Project Title	Project Phase	Initial Project Cost	Project Cost in 2017 Dollars*	Start Date	Completion Date	Added Capacity	% Allocated to Existing 2017 Capacity	Cost Allocated to Existing 2017 Capacity	% Allocated to 2017-2027 Impact Fees	Cost Allocated to 2017-2027 Impact Fees	% Allocated to Impact Fees after 2027	Cost Allocated to Impact Fees after 2027
TARRANT REGIONAL WATER DISTRICT (TRWD) PROJECTS													
-	Eagle Mountain Connection Raw Water Line & Pump Station	Const	$138,867,058	$138,867,058	2006	2008	47 MGD	39.0%	$54,158,153	13.0%	$18,052,718	48.0%	$66,656,188
-	Integrated Pipeline & Pump Stations	Const	$1,076,947,000	$1,076,947,000	2009	2020	167.5 MGD	0.0%	$0	24.2%	$261,117,039	75.8%	$815,829,961
-	Richland-Chambers Wetlands	Const	$61,000,000	$61,000,000	1999	2013	89.6 MGD	35.1%	$21,393,267	64.9%	$39,606,733	0.0%	$0
TOTAL TRWD PROJECTS				**$1,276,814,058**					**TRWD PROJECTS ELIGIBLE COST**		**$318,776,489**		
RAW WATER SUPPLY AND TREATMENT PLANTS													
W3-15A	Westside WTP - Phase I (0-12 MGD)	Eng	$4,972,125	$4,972,125	2009	2009	-	80.0%	$3,977,700	20.0%	$994,425	0.0%	$0
W3-15A	Westside WTP - Phase I (0-12 MGD)	Const	$46,847,759	$46,847,759	2009	2012	12 MGD	80.0%	$37,478,207	20.0%	$9,369,552	0.0%	$0
N2-6A	Eagle Mountain Clearwell #3	Eng & Const	$2,968,644	$2,968,644	2011	2014	2.5 MG	20.0%	$593,729	60.0%	$1,781,186	20.0%	$593,729
W3-15B	Westside WTP Expansion 12 MGD to 15 MGD - Membrane Rack	Const	$1,000,000	$1,055,500	2016	2017	3 MGD	0.0%	$0	100.0%	$1,055,500	0.0%	$0
W3-15C	Westside WTP Expansion 15 MGD to 18 MGD - Membrane Rack	Const	$1,000,000	$1,055,500	2020	2020	3 MGD	0.0%	$0	81.0%	$854,955	19.0%	$200,545
-	Clearfork Raw Water Pump Station Parallel Pipeline to Holly WTP	Eng	$639,000	$674,465	2020	2020	-	0.0%	$0	32.0%	$215,829	68.0%	$458,636
-	Clearfork Raw Water Pump Station Parallel Pipeline to Holly WTP	Const	$6,386,000	$6,740,423	2021	2022	50 MGD	0.0%	$0	32.0%	$2,156,935	68.0%	$4,583,488
N2-18B	Expand Second Eagle Mountain Raw Water PS from 35 MGD to 70 MGD	Eng	$206,000	$217,433	2020	2021	-	0.0%	$0	40.0%	$86,973	60.0%	$130,460
N2-18B	Expand Second Eagle Mountain Raw Water PS from 35 MGD to 70 MGD	Const	$2,060,000	$2,174,330	2021	2023	35 MGD	0.0%	$0	40.0%	$869,732	60.0%	$1,304,598
N2-18A	Eagle Mountain WTP Expansion from 105 MGD to 140 MGD	Eng	$5,000,000	$5,277,500	2020	2021	-	0.0%	$0	40.0%	$2,111,000	60.0%	$3,166,500
N2-18A	Eagle Mountain WTP Expansion from 105 MGD to 140 MGD	CM	$2,778,000	$2,932,179	2021	2023	-	0.0%	$0	40.0%	$1,172,872	60.0%	$1,759,307
N2-18A	Eagle Mountain WTP Expansion from 105 MGD to 140 MGD	Const	$48,690,000	$51,392,295	2021	2023	35 MGD	0.0%	$0	40.0%	$20,556,918	60.0%	$30,835,377
TOTAL RAW WATER SUPPLY AND WATER TREATMENT PLANTS				**$126,308,153**					**RAW WATER SUPPLY AND WATER TREATMENT PLANT ELIGIBLE COST**		**$41,225,877**		
REGIONAL TRANSMISSION LINES AND PUMP STATIONS													
S3-51	McCart Pump Station Expansion to 35 MGD	Eng & Const	$563,375	$563,375	2013	2013	10 MGD	0.0%	$0	86.0%	$484,503	14.0%	$78,873
W5-1	3 MGD Westside V Pump Station at Walsh Ranch Tank	Eng	$173,000	$182,602	2015	2016	-	0.0%	$0	68.0%	$124,169	32.0%	$58,432
W5-1	3 MGD Westside V Pump Station at Walsh Ranch Tank	Const	$1,729,685	$1,825,683	2016	2017	3 MGD	0.0%	$0	68.0%	$1,241,464	32.0%	$584,218
N2-8	Expansion of the Northside Pump Station to 70 MGD	Eng & Const	$1,294,391	$1,366,230	2018	2019	12 MGD	0.0%	$0	33.0%	$450,856	67.0%	$915,374
S4-5	3 MGD Southside IV Pump Station at Sun Country Tank	Eng	$124,000	$130,882	2019	2020	-	0.0%	$0	5.0%	$6,544	95.0%	$124,338
S4-5	3 MGD Southside IV Pump Station at Sun Country Tank	Const	$1,236,000	$1,304,598	2020	2021	3 MGD	0.0%	$0	5.0%	$65,230	95.0%	$1,239,368
W4-3	4 MGD Westside IV Pump Station	Eng	$166,000	$175,213	2020	2021	-	0.0%	$0	78.0%	$136,666	22.0%	$38,547
W4-3	4 MGD Westside IV Pump Station	Const	$1,648,000	$1,739,464	2021	2022	4 MGD	0.0%	$0	78.0%	$1,356,782	22.0%	$382,682
-	NS2 48-Inch Transmission Line Phase II	Eng & Const	$38,334,816	$40,462,398	2015	2017	-	0.0%	$0	35.0%	$14,161,839	65.0%	$26,300,559
TOTAL REGIONAL TRANSMISSION LINES AND PUMP STATIONS				**$47,750,444**					**REGIONAL TRANSMISSION LINES AND PUMP STATIONS ELIGIBLE COST**		**$18,028,053**		
STORAGE TANKS													
N3-11	Sendera Ranch Ground Storage Tank & Pump Station**	Eng & Const	$4,284,791	$4,284,791	2006	2008	5 MG	63.0%	$2,699,418	29.0%	$1,242,589	8.0%	$342,783
N4-2B	1.0 MG Northside IV Elevated Storage Tank on Hwy. 287	Eng	$672,115	$672,115	2014	2015	-	17.0%	$114,260	55.0%	$369,663	28.0%	$188,192
N4-2B	1.0 MG Northside IV Elevated Storage Tank on Hwy. 287 & Land Purchase	Const & Land	$4,068,060	$4,068,060	2014	2015	1 MG	17.0%	$691,570	55.0%	$2,237,433	28.0%	$1,139,057
N2-10	5.0 MG Northside II Ground Storage Tank at the Caylor Tank Site	Eng	$601,729	$601,729	2014	2015	-	5.0%	$30,086	40.0%	$240,692	55.0%	$330,951
N2-10	5.0 MG Northside II Ground Storage Tank at the Caylor Tank Site	Const	$4,879,440	$4,879,440	2015	2016	5 MG	5.0%	$243,972	40.0%	$1,951,776	55.0%	$2,683,692
W5-3	1.0 MG Westside V Elevated Storage Tank North of Aledo Road	Eng	$575,000	$606,913	2016	2017	-	0.0%	$0	31.0%	$188,143	69.0%	$418,770
W5-3	1.0 MG Westside V Elevated Storage Tank North of Aledo Road	Const	$2,575,000	$2,717,913	2018	2019	1 MG	0.0%	$0	31.0%	$842,553	69.0%	$1,875,360
W4-10	1.0 MG Westside IV Elevated Storage Tank	Eng & Land	$575,000	$606,913	2020	2021	-	0.0%	$0	47.0%	$285,249	53.0%	$321,664
W4-10	1.0 MG Westside IV Elevated Storage Tank	Const	$2,575,000	$2,717,913	2021	2022	1 MG	0.0%	$0	47.0%	$1,277,419	53.0%	$1,440,494
W3-4	2.5 MG Westside III Ground Storage Tank South of IH-20	Eng	$1,000,000	$1,055,500	2020	2021	-	0.0%	$0	36.0%	$379,980	64.0%	$675,520
W3-4	2.5 MG Westside III Ground Storage Tank South of IH-20	Const	$2,100,000	$2,216,550	2021	2022	2.5 MG	0.0%	$0	36.0%	$797,958	64.0%	$1,418,592
S2-73	5.0 MG Southside II Ground Storage Tank at the McCart Pump Station	Eng	$330,000	$348,315	2023	2024	-	0.0%	$0	25.0%	$87,079	75.0%	$261,236
S2-73	5.0 MG Southside II Ground Storage Tank at the McCart Pump Station	Const	$3,300,000	$3,483,150	2024	2025	5 MG	0.0%	$0	25.0%	$870,788	75.0%	$2,612,363
N3-13	2.0 MG Northside III Elevated Storage Tank	Eng	$330,000	$348,315	2022	2022	-	0.0%	$0	46.0%	$160,225	54.0%	$188,090
N3-13	2.0 MG Northside III Elevated Storage Tank	Const	$3,300,000	$3,483,150	2022	2023	2 MG	0.0%	$0	46.0%	$1,602,249	54.0%	$1,880,901
TOTAL STORAGE TANKS				**$32,090,765**					**STORAGE TANKS ELIGIBLE COST**		**$12,533,795**		
ENGINEERING STUDIES													
-	2004 Water Master Plan 2005-2025	Study	$1,360,386	$1,360,386	2003	2005	-	60.0%	$816,232	40.0%	$544,154	0.0%	$0
-	2014 Water Master Plan 2013-2033	Study	$768,168	$768,168	2013	2016	-	20.0%	$153,634	50.0%	$384,084	30.0%	$230,450
-	Impact Fee Study - 2017-2027	Study	$117,987	$117,987	2015	2016	-	0.0%	$0	100.0%	$117,987	0.0%	$0
TOTAL ENGINEERING STUDIES				**$2,246,541**					**ENGINEERING STUDIES ELIGIBLE COST**		**$1,046,225**		
TOTAL WATER CIP				**$1,485,209,961**					**WATER CIP ELIGIBLE COST**		**$391,610,439**		

Information Sources:

2004 Water System Master Plan, Freese & Nichols
2014 Water System Master Plan, Freese & Nichols
10-year CIP Bonds 2016-2026, Tarrant Regional Water District
Fort Worth Water Department Capital Improvement Program 2015-2019
*ENR factor of 5.55% used to inflate costs from 2016 dollars to 2017 dollars on proposed projects only.
**City of Fort Worth cost participation

5.0 IMPACT FEE ANALYSIS

Table 5-1 summarizes the impact fee eligible costs for projects. **Table 4-1** shows the detail development of the costs and capacities of the eligible facilities.

Table 5-1 2017-2027 Impact Fee Eligible Costs

CIP Category	Total Growth Related Cost	% Allocated to 2017-2027 Impact Fees	2017-2027 Growth Related Cost
TRWD Projects	$1,276,814,058	25.0%	$318,776,489
Raw Water/ Treatment Plants	$126,308,153	32.6%	$41,225,877
Transmission Lines/ Pump Stations	$47,750,444	37.8%	$18,028,053
Storage Tanks	$32,090,765	39.1%	$12,533,795
Engineering Studies	$2,246,541	46.6%	$1,046,225
IMPACT FEE CIP SUBTOTAL			**$391,610,439**
FINANCING COSTS			**$233,431,318**
TOTAL IMPACT FEE ELIGIBLE COST			**$625,041,757**

5.1 Service Units

The different costs between customer types are allocated through the application of the equivalent meter concept. Since the 5/8" x 3/4" water meter is the most frequently used meter by the residential customer, a factor has been calculated to relate the capacities of other meter sizes to the 5/8" x 3/4" meter capacity. **Table 5-2** presents the factors developed using capacity information from the American Water Works Association (AWWA) Standard C700-02, Cold-Water Meters – Displacement Type, Bronze Main Case and AWWA Standard C701-07, Cold-Water Meters – Turbine Type for Customer Service.

Table 5-2 AWWA Meter Equivalency Factors

Meter Size	5/8" x 3/4" Equivalency Factor
5/8" x 3/4"	1.00
3/4"	1.50
1"	2.50
1-1/2"	5.00
2"	8.00
3"	21.75
4"	37.50
6"	80.00
8"	140.00
10"	210.00

Appendix D contains the number of water meters for residential and non-residential customers by meter size for the City of Fort Worth, as well as for the wholesale customers who provided this information to FNI. The number of equivalent meters was also calculated for the City and wholesale customers.

The next calculation step determines factors for population per residential meter and employment per non-residential meter. **Table 5-3** summarizes this calculation for the City of Fort Worth and wholesale customers using 2017 information.

Table 5-3 Development of Factors of 2017 Population and Employment by Equivalent Meter

Description	Residential	Non-Residential
City of Fort Worth		
Number of Equivalent Meters	299,889	117,005
Population / Employment	825,967	550,117
Population per Equivalent Meter	2.75	--
Employment per Equivalent Meter	--	4.70
Wholesale Customers		
Number of Equivalent Meters	157,108	62,912
Population / Employment	392,163	201,803
Population per Equivalent Meter	2.50	--
Employment per Equivalent Meter	--	3.21

FNI did not receive meter count information from five of Fort Worth's wholesale water customers; however, their meter counts were estimated based on growth since the previous impact fee study. The number of equivalent meters used to calculate the wholesale customers' population/employment per equivalent meter in **Table 5-3** is the total number of equivalent meters served by Fort Worth for all

wholesale customers. In order to more accurately estimate the population/employment per equivalent meter, FNI divided the number of equivalent meters by the sum of population or employment served by Fort Worth.

The projected increase in equivalent meters between 2017 and 2027 uses the ratios in **Table 5-3** and the population and employment projections for 2017 and 2027 in *Exhibit A- Water Land Use Assumptions report*. The calculation is shown below.

City of Fort Worth

Residential = Population Change / Population per Equivalent Meter
= (1,026,780 – 825,967) / 2.75
= 73,023

Non- Residential = Employment Change / Employment per Equivalent Meter
= (679,901 – 550,117) / 4.70
= 27,614

Fort Worth Total = Residential + Non-Residential
= 73,023 + 27,614
= 100,637

Wholesale Customers

Residential = Population Change / Population per Equivalent Meter
= (462,435 – 392,163) / 2.50
= 28,109

Non- Residential = Employment Change / Employment per Equivalent Meter
= (245,018 – 201,803) / 3.21
= 13,463

Wholesale Total = Residential + Non-Residential
= 28,109 + 13,463
= 41,572

Grand Total = Fort Worth Total + Wholesale Total
= 100,637 + 41,572
= 142,209

5.2 Maximum Allowable Impact Fee Calculation

This report is based on a credit equal to 50% of the total projected cost of implementing the capital improvements plan, as specified in Chapter 395 of the Texas Local Government Code. Should the City choose to adopt an impact fee of greater than 50% of the total projected cost, a detailed credit calculation analysis is included in **Appendix E**.

Impact fees are the quotient of the total cost of expansion for the study period from **Table 5-1** divided by the increase in equivalent meters from **Section 5.1**. This fee equals the maximum water impact fee for a 5/8" x 3/4" water meter size.

Maximum Water Impact Fee = Cost of Expansion / Increase in Equivalent Meters
= $625,041,757 / 142,209
= $4,395 per 5/8" x 3/4" equivalent meter

The water impact fees for meters other than 5/8" x 3/4" are the product of the fee per 5/8" x 3/4" equivalent meter multiplied by the respective equivalent meter factor from **Table 5-2**. The maximum allowable water impact fees are provided in **Table 5-4**, as well as the resulting impact fee at a 50% collection rate.

Table 5-4 Water Impact Fees by Meter Size

Meter Size	5/8" x 3/4" Equivalency Factor	Maximum Allowable Impact Fee	Impact Fee (Collected at 50%)
5/8" x 3/4"	1.00	$4,395	$2,197
3/4"	1.50	$6,593	$3,296
1"	2.50	$10,988	$5,493
1-1/2"	5.00	$21,975	$10,985
2"	8.00	$35,160	$17,576
3"	21.75	$95,591	$47,785
4"	37.50	$164,813	$82,388
6"	80.00	$351,600	$175,760
8"	140.00	$615,300	$307,580
10"	210.00	$922,950	$461,370

FIGURE D-1

CITY OF FORT WORTH

2017 WATER IMPACT FEE STUDY
EXISTING FACILITIES

LEGEND

- Existing Pump Station
- Existing Ground Storage Tank
- Existing Elevated Storage Tank
- Existing Water Treatment Plant
- Road
- Lake
- Fort Worth City Limit
- Fort Worth ETJ Boundary
- Water Wholesale Customer
- Non-Wholesale Customer
- County Boundary

FORT WORTH®

FREESE AND NICHOLS

Sendera Ranch GST and PS
Willow Springs EST
Crumb EST
Caylor Road GST
North Beach GST and PS
Bradley EST
Lago Vista PS
Lake Country EST
Eagle Mountain WTP
Cantrell-Sansom PS
Jenkins Heights PS
Northside GST and PS
Old Northside PS
Fleetwood GST and PS
Randol Mill GST and PS
Meadowbrook EST
North Holly WTP
South Holly WTP
Westside PS
Westside WTP
Stagecoach GST and PS
Meadowbrook EST
Eastside PS
Como GSTs and PS
Edwards Ranch PS
Eastwood EST
Walsh Ranch GST and Standpipe
Westland GST and PS & Chapel Creek PS
Southside GST and PS
Seminary Hill EST
Timberline EST
Russom Ranch PS
Rolling Hills WTP
Alta Mesa GST and PS
Armstrong Ranch EST
Sun Country EST
McCart GST and PS

Justin
NORTHLAKE
Rhome
WISE
DENTON
ROANOKE
Newark
WISE
PARKER
HASLET
Grapevine
SOUTHLAKE
KELLER
Eagle Mountain Lake
Azle
Colleyville
DFW AIRPORT
SAGINAW
Blue Mound
WATAUGA
NORTH RICHLAND HILLS
Bedford
Euless
HURST
LAKE WORTH
Lakeside
Lake Worth
SANSOM PARK
HALTOM CITY
RICHLAND HILLS
RIVER OAKS
WESTWORTH VILLAGE
WHITE SETTLEMENT
WESTOVER HILLS
Lake Arlington
Pantego
Arlington
DALWORTHINGTON GARDENS
ALEDO
BENBROOK
Benbrook Lake
EDGECLIFF VILLAGE
FOREST HILL
KENNEDALE
EVERMAN
GRAND PRAIRIE
Joe Pool Lake
CROWLEY
Mansfield
BURLESON
BETHESDA WSC
PARKER
JOHNSON
DALLAS
ELLIS
JOHNSON
ELLIS

0 18,000
SCALE IN FEET

Created By Freese and Nichols, Inc.
Job No.: FTW16125
Location: H:\W_WW_PLANNING\Final_Report\(Figure_D1)-Existing_Water_Facilities(11x17).mxd
Updated: Friday, October 07, 2016
User: 02499

FIGURE D-2

CITY OF FORT WORTH

2017 WATER IMPACT FEE STUDY

PROPOSED FACILITY IMPROVEMENTS

Additional TRWD Projects

- Integrated Pipeline & Pump Station
- Richland-Chambers Wetlands

LEGEND

- Proposed Pump Station
- Proposed Ground Storage Tank
- Proposed Elevated Storage Tank
- Under Design/Construction Pump Station
- Existing Pump Station
- Existing Ground Storage Tank
- Existing Elevated Storage Tank
- Existing Water Treatment Plant
- Road
- Lake
- Fort Worth City Limit
- Fort Worth ETJ Boundary
- Non-Wholesale Customer
- County Boundary

FORT WORTH®

FREESE AND NICHOLS

Proposed NS-III - 2.0 MG EST

Sendera Ranch GST & PS N3-11

Caylor GST NS-II - 5.0 MG GST N2-10

NS-IV - 1.0 MG EST N4-2B

NS2 48-Inch Transmission Line Phase II

Eagle Mountain WTP Proposed Improvements N2-18 A,B

Proposed WS-V - 1.0 MG EST W5-3

Proposed WS-IV - 1.0 MG EST W4-10

Westside WTP Proposed Improvements W3 - 15A, B, C

Under Construction WS-V PS W5-1

Proposed WS-III - 2.5 MG GST W3-4

Proposed WS-IV PS W4-3

Eagle Mountain Connection Raw Water Line & Pump Station

Proposed SS-IV PS S4-5

McCart GST and PS Proposed Improvements S3-51, S2-73

0 18,000

SCALE IN FEET

Created By Freese and Nichols, Inc.
Job No.: FTW16125
Location: H:\W_WW_PLANNING\Final_Report\(Figure_D2)-Water_Proposed_Facilities_CIP(11x17).mxd
Updated: Friday, October 07, 2016
User: 02499

APPENDIX A
EXISTING WATER PUMPING CAPACITIES

APPENDIX A
Existing Water Pumping Capacities

North Holly Plant:

Four 27 MGD and two 15 MGD electrically driven centrifugal units. Total pumping capacity 138 MGD. The total measured capacity of the pump station is 90 MGD due to piping restrictions.

South Holly Plant:

Four 30 MGD and one 15 MGD electrically driven centrifugal units. Total pumping capacity 135 MGD.

Rolling Hills Plant:

HSPS #1:

Seven 30 MGD, one 22 MGD, one 17 MGD, and one 10 MGD electrically driven centrifugal units.
Total pumping capacity of 259 MGD.

HSPS #2:

Two vertical turbines 30 MGD and two 20 MGD vertical turbines.
Total pumping capacity of 100 MGD.

Eagle Mountain Plant:

HSPS #1:

Four 21.7 MGD, two 15 MGD, three 3.6 MGD, and two 8.6 MGD. Total pumping capacity of 144.8

HSPS #2:

Three 22 MGD and two 3 MGD. Total pumping capacity of 72 MGD.

Westside Plant:

Two 9.8 MGD and two 6.3 MGD vertical turbines. Total Pumping Capacity 32.2 MGD.

Southside II Pressure Plane:

Edwards Ranch Station:

Two 16 MGD and one 10 MGD electrically driven centrifugal units, as well as one 5 MGD emergency generator pump. Total pumping capacity 47 MGD.

South Side Reservoir Station:

Two 5.7 MGD electrically driven centrifugal units. Total pumping capacity 11.4 MGD.

Southside III Pressure Plane:

Russom Ranch Station:

One 6 MGD and one 5 MGD electrically driven centrifugal units, as well as one 10 MGD electric and gas unit. Total pumping capacity 21 MGD.

Alta Mesa Station:

Two 10 MGD, one 9.4 MGD, and one 5 MGD electrically driven centrifugal units, as well as one 5 MGD emergency generator pump. Total pumping capacity 39.4 MGD.

McCart Station:

Two 10.5 MGD, one 10 MGD, and one 4.6 MGD electrically driven centrifugal units. Total pumping capacity 35.6 MGD.

Northside II Pressure Plane:

North Side Station:

Two 5.7 MGD and one 3.4 MGD electrically driven centrifugal units, and one 4.5 MGD gas driven unit. Total pumping capacity 19.3 MGD.

Cantrell-Sansom Station:

One 5 MGD, one 3 MGD, and one 2 MGD electrically driven centrifugal units.
Total pumping capacity 10 MGD.

North Beach Station:

One 2 MGD electrically driven centrifugal unit. Total pumping capacity 2 MGD.

North Side Station (NEW):

Two 18.3 MGD, two 12.9 MGD, and one 11.9 MGD electrically driven centrifugal units. Total pumping capacity 74.3 MGD.

Northside III Pressure Plane:

Jenkins Heights Station:

One 2 MGD, one 3.9 MGD and one 3.4 MGD electrically driven centrifugal units.
Total pumping capacity 9.3 MGD.

North Beach Station:

Two 4 MGD electrically driven centrifugal units. Total pumping capacity 8 MGD.

Sendera Ranch Station:

One 5.8 MGD and three 10.1 MGD electrically driven centrifugal units. Total pumping capacity 36.1 MGD.

Northside IV Pressure Plane:

Lago Vista Station:

Two .25 MGD and two .5 MGD electrically driven centrifugal units. Total pumping capacity 1.5 MGD.

Sendera Ranch Station:

Three 10.1 MGD and one 5.8 MGD electrically driven centrifugal units.
Totally pumping capacity 36.1 MGD.

Westside II Pressure Plane:

West Side Station:

One 12 MGD, one 6.3 MGD and two 5 MGD electrically driven centrifugal units, and one 7 MGD gas driven standby unit. Total pumping capacity 35.3 MGD.

Como Station:

Three 15 MGD, one 10 MGD electrically driven centrifugal units, and one 5.8 MGD emergency generator. Total pumping capacity 60.8 MGD.

Westside III Pressure Plane:

Stagecoach Road Station:

Two 8 MGD and two 5 MGD electrically driven centrifugal units, as well as one 5 MGD emergency generator. Total pumping capacity 31 MGD.

Westside IV Pressure Plane:

Westland Pump Station:

Two 3 MGD and two 5 MGD electrically driven centrifugal units. Total pumping capacity 16 MGD.

Eastside II Pressure Plane:

East Side Station:

One 22 MGD, one 17 MGD and three 10 MGD electrically driven centrifugal units and one 7 MGD gas driven standby unit. Total pumping capacity 76 MGD.

Randol Mill Station:

One 10 MGD and two 5 MGD electrically driven centrifugal units. Total pumping capacity 20 MGD.

Fleetwood Station:

One 3 MGD and three 2 MGD electrically driven centrifugal units. Total pumping capacity 9 MGD.

APPENDIX B
EXISTING DISTRIBUTION SYSTEM STORAGE

APPENDIX B
Existing Distribution System Storage

Eastside Pressure Plane II (805'):	**CAPACITY (MG)**
Eastwood Elevated Tank	1.5
Timberline Elevated Tank	2.0
Meadowbrook Elevated Tank	2.0
Randol Mill Ground Reservoir	6.0
Beach Street Ground Reservoir	5.5
Fleetwood Ground Reservoir	5.5
Holly Pressure Plane (706'):	
Northside Ground Reservoir	4.0
Como Ground Storage Reservoir	6.0
Como Ground Storage Reservoir	2.0
Southside Ground Storage Reservoir	5.0
Northside Pressure Planes:	
Elevation 853' Plane II	
Northwest Elevated Tank	1.0
Caylor Ground Storage Reservoir	5.0
Sendera Ranch Ground Storage Reservoir	5.0
Elevation 936' Plane III	
Lake Country Elevated Tank	0.5
Elevation 950' Plane III	
Bradley Elevated Tank	2.0
Willow Springs Elevated Tank	2.0
Elevation 1040' Plane IV	
Crumb Elevated Tank	1.0
Southside Pressure Planes:	
Elevation 850' Plane II	
Seminary Hill Elevated Tank	2.0
Alta Mesa Ground Storage Reservoir	9.2
McCart Ground Storage Reservoir	5.0
Elevation 990' Plane III	
Armstrong Ranch Elevated Tank	2.0
Sun Country Elevated Tank	2.0

Westside Pressure Planes:	**CAPACITY (MG)**
Elevation 857' Plane II	
Calmont Elevated Tank	1.0
Stagecoach Ground Storage Reservoir	5.5
Elevation 974' Plane III	
Westland Ground Storage Reservoir	5.0
Elevation 1055' Plane IV	
Walsh Ranch Ground Storage Reservoir	2.5
Walsh Ranch Standpipe (used for pressure)	0.06
TOTAL DISTRIBUTION SYSTEM STORAGE CAPACITY:	**90.26 MG**

Water Treatment Plants:	**CAPACITY (MG)**
Eagle Mountain WTP	10.5
Holly WTP	20.0
Rolling Hills WTP	17.2
Westside WTP	2.5
TOTAL CLEARWELL CAPACITY:	**50.2 MG**

APPENDIX C
WATER CIP PROJECTS

Appendix C
Water CIP Projects

TARRANT REGIONAL WATER DISTRICT PROJECTS

Project Title: **Eagle Mountain Connection Raw Water Line and Pump Station**

Description: Construction of raw water line and pump station from Benbrook Lake to Eagle Mountain Lake.

Purpose: Provide additional raw water supplies to the Eagle Mountain Water Treatment Plant.

Allocation: This project is allocated 13% to growth in the study period, as it is required to provide capacity to meet projected water demands.

Project Title: **Integrated Pipeline and Pump Stations**

Description: Construction of raw water line and pump stations from Richland-Chambers Reservoir to Benbrook Lake.

Purpose: Provide an additional raw water line to provide additional raw water supplies.

Allocation: This project is allocated 24.2% to growth in the study period, as it is required to Provide capacity to meet projected water demands.

Project Title: **Richland-Chambers Wetlands**

Description: Construction of wetlands near Richland-Chambers Reservoir.

Purpose: Provide an additional raw water supply to the Integrated Pipeline Project.

Allocation: This project is allocated 64.9% to growth in the study period, as it is required to Provide capacity to meet projected water demands.

Appendix C
Water CIP Projects

RAW WATER SUPPLY

Project Title: **Expand Second Eagle Mountain Raw Water PS from 35 MGD to 70 MGD (N2-18B)**

Description: Design and construction of additional pumping capacity in the Second Eagle Mountain Raw Water Pump Station.

Purpose: Provide additional raw water supplies to the Eagle Mountain Water Treatment Plant to a capacity of 140 mgd.

Allocation: This project is allocated 40% to growth in the study period as it is required to treat a portion the projected maximum day demand of 589 mgd in 2027.

Project Title: **Clear Fork Raw Water Pump Station Parallel Pipeline to Holly WTP**

Description: Design and construction of an additional raw water pipeline from the Clear Fork Trinity River Pump Station to the Holly WTP.

Purpose: Provide an additional raw water line to provide additional raw water supplies.

Allocation: This project is allocated 32% to growth in the study period, as it is required to bring an additional 50 mgd of raw water to the Holly WTP.

Appendix C
Water CIP Projects

WATER TREATMENT PLANTS

Project Title: **Westside Water Treatment Plant (W3-15A)**

Description: Design and construction of new 12 MGD Water Treatment Plant.

Purpose: A new water treatment plant is recommended to meet the demands in the northwest part of the City. This project was recommended by the on-going Water Master Plan Update.

Allocation: This project is allocated 20% to growth in the study period, as it is required to provide capacity to meet projected water demands.

Project Title: **Eagle Mountain Clearwell #3 Expansion (N2-6A)**

Description: Design and construction of the third clearwell at the Eagle Mountain WTP.

Purpose: The completion of the third clearwell adds 2.5 MG of capacity as well as allows for the full 105 MGD capacity to be utilized at the water treatment plant.

Allocation: This project is allocated 60% to growth in the study period, as it is required to provide capacity to meet projected water demands.

Project Title: **Westside Water Treatment Plant Expansion (W3-15B)**

Description: Design and construction of a 3 MGD expansion of the Westside WTP.

Purpose: An expansion of the water treatment plant capacity from 12 mgd to 15 mgd is recommended to meet the demands in the northwest part of the City. This project was recommended by the on-going Water Master Plan Update.

Allocation: This project is allocated 100% to growth in the study period, as it is required to provide capacity to meet projected water demands.

Project Title: **Westside Water Treatment Plant Expansion (W3-15C)**

Description: Design and construction of a 3 MGD expansion of the Westside WTP.

Purpose: An expansion of the water treatment plant capacity from 15 mgd to 18 mgd is recommended to meet the demands in the northwest part of the City. This project was recommended by the on-going Water Master Plan Update.

Allocation: This project is allocated 81% to growth in the study period, as it is required to provide capacity to meet projected water demands.

Appendix C
Water CIP Projects

Project Title: **Eagle Mountain WTP Expansion from 105 MGD to 140 MGD; Expand High Service Pump Station (N2-18A)**

Description:	Design and construction of Eagle Mountain Water Treatment Plant expansion to treat 140 mgd.
Purpose:	An expansion of Eagle Mountain WTP to be increased further to 140 mgd because of the growth of the City's north side and Alliance Airport area, and because of the projected water demand increase.
Allocation:	This project is allocated 40% to growth in the study period, as it is required to provide capacity to meet projected water demands.

Appendix C
Water CIP Projects

PUMP STATIONS AND REGIONAL TRANSMISSION LINES

Project Title: **McCart Pump Station Improvements (S3-51)**

Description: Design and construction of an expansion to the McCart Pump Station with an expanded capacity from 25 to 35 mgd.

Purpose: A larger pump station is necessary to provide additional pumping capacity to this pressure plane and redeveloping areas.

Allocation: The additional 10 mgd pump station capacity increases the total pump station capacity by 40% to meet future water system demands. This project is allocated 86% to growth in the study period.

Project Title: **Westside V Pump Station with 3 mgd Capacity (W5-1)**

Description: Design and construction of a new Westside V Pump Station with a capacity of 3 mgd.

Purpose: A new pump station is necessary to address the projected new population growth in this pressure plane. This project was recommended in the on-going Water Master Plan Update.

Allocation: This project was allocated 68% to growth in the study period.

Project Title: **Northside Pump Station Improvements (N2-8)**

Description: Design and construction of an expansion to the Northside Pump Station with an expanded capacity from 58 to 70 mgd.

Purpose: A larger pump station is necessary to provide additional pumping capacity to this pressure plane and redeveloping areas. This project was recommended in the on-going Water Master Plan Update.

Allocation: This project was allocated 33% to growth in the study period.

Project Title: **SSIV Pump Station at Sun County Tank (S4-5)**

Description: Design and construction of a new Southside IV Pump Station with a capacity of 3 mgd.

Purpose: A new pump station is necessary to address the projected new population growth in this pressure plane. This project was recommended in the on-going Water Master Plan Update.

Allocation: This project was allocated 5% to growth in the study period.

Appendix C
Water CIP Projects

Project Title: **Westside IV Pump Station on Interstate 20 (W4-3)**

Description: Design and construction of a new Westside IV Pump Station with a capacity of 4 mgd.

Purpose: A new pump station is necessary to address the projected new population growth in this pressure plane. This project was recommended in the on-going Water Master Plan Update.

Allocation: This project is allocated 78% to growth in the study period.

Project Title: **Northside II 48-inch Transmission Line Phase II**

Description: Design and construction of a 48-inch transmission line in the Northside II Pressure Plane. This project runs from Cromwell Marine Creek Road to Texas Sage Trail.

Purpose: A large transmission line is necessary to address the projected new population growth in the area.

Allocation: This project is allocated 35% to growth in the study period.

Appendix C
Water CIP Projects

STORAGE TANKS

Project Title: **Sendera Ranch Ground Storage Tank and Pump Station (N3-11)**

Description: Design and construction of a 5 MG ground storage tank.

Purpose: In order to meet operational storage requirements and higher water demand due to the projected population, additional storage facilities are needed. This improvement was recommended by the on-going Water Master Plan Update.

Allocation: This project is allocated 29% to growth.

Project Title: **1.0 MG Elevated Storage Tank on Highway 287 (N4-2B)**

Description: Design and construction of a 1.0 MG elevated storage tank for the Northside IV Pressure Plane.

Purpose: In order to meet operational storage requirements and higher water demand due to the projected population, additional storage facilities are needed in the Northside IV Pressure Plane. This improvement was recommended by the on-going Water Master Plan Update.

Allocation: This project is allocated 55% to growth.

Project Title: **5.0 MG Ground Storage Tank at the Caylor Tank Site (N2-10)**

Description: Design and construction of a 5.0 MG ground storage tank for the Northside II Pressure Plane.

Purpose: This improvement is to provide additional storage facilities that are needed in the Northside II Pressure Plane. This improvement was recommended by the on-going Water Master Plan Update.

Allocation: This project is allocated 40% to growth.

Project Title: **1.0 MG Westside V Elevated Storage Tank North of Aledo Road (W5-3)**

Description: Design and construction of a 1.0 MG elevated storage tank for the Westside V Pressure Plane.

Purpose: In order to meet operational storage requirements and higher water demand due to the projected population, additional storage facilities are needed in the Westside V Pressure Plane. This improvement was recommended by the on-going Water Master Plan Update.

Allocation: This project is allocated 31% to growth.

Appendix C
Water CIP Projects

Project Title: **1.0 MG Westside IV Elevated Storage Tank (W4-10)**

Description: Design and construction of a 1.0 MG elevated storage tank for the Westside IV Pressure Plane.

Purpose: In order to meet operational storage requirements and higher water demand due to the projected population, additional storage facilities are needed in the Westside IV Pressure Plane. This improvement was recommended by the on-going Water Master Plan Update.

Allocation: This project is allocated 47% to growth.

Project Title: **2.5 MG Westside III Ground Storage Tank South of IH-20 (W3-4)**

Description: Design and construction of a 2.5 MG ground storage tank for the Westside III Pressure Plane.

Purpose: In order to meet operational storage requirements and higher water demand due to the projected population, additional storage facilities are needed in the Westside II Pressure Plane. This improvement was recommended by the on-going Water Master Plan Update.

Allocation: This project is allocated 36% to growth.

Project Title: **5.0 MG Ground Storage Tank at the McCart Pump Station (S2-73)**

Description: Design and construction of a 5.0 MG ground storage tank at the McCart Pump Station.

Purpose: This improvement is to provide additional storage facilities that are needed in the surrounding areas.

Allocation: This project is allocated 25% to growth.

Project Title: **2.0 MG Northside III Elevated Storage Tank (N3-13)**

Description: Design and construction of a 2.0MG elevated storage tank for the Northside III Pressure Plane.

Purpose: In order to meet operational storage requirements and higher water demand due to the projected population, additional storage facilities are needed in the Northside III Pressure Plane. This improvement was recommended by the on-going Water Master Plan Update.

Allocation: This project is allocated 46% to growth.

Appendix C
Water CIP Projects

ENGINEERING STUDIES

Project Title: **2004 Water Master Plan**

Description: An engineering study to update the 1994 Water Master Plan.

Purpose: The water master plan projects system flows and requirements for the 20 year period from 2005 to 2025. This plan was updated again in 2014. The water master plan guides the capital improvements program to ensure cost effective expansion of the system.

Allocation: 40% of the cost for the 2004 Water Master Plan is allocated to the study period because eight of the twenty years of the plan's useful life are within the study period.

Project Title: **2014 Water Master Plan**

Description: An engineering study to update the 2004 Water Master Plan.

Purpose: The water master plan projects system flows and requirements for the 20 year period from 2013 to 2033. The water master plan guides the capital improvements program to ensure cost effective expansion of the system.

Allocation: 50% of the cost for the 2014 Water Master Plan is allocated to the study period because ten of the twenty years of the plan's useful life are within the study period.

Project Title: **2016 Impact Fee Study (2017-2027)**

Description: An engineering study to revise the impact fee ordinance and recalculate the maximum allowable fee which can be assessed.

Purpose: By statute the impact fee report and ordinance must be updated every five years.

Allocation: 100% of the cost for the 2016 impact fee study can be allocated to the study period because seven of the ten years are within the study period. The impact fee covers water and wastewater, with 50% allocated to each.

APPENDIX D
WATER METER SUMMARY

Table D-1
Water Meter Summary

City of Fort Worth

Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	199,200	199,200
3/4"	1.50	663	995
1"	2.50	21,870	54,675
1-1/2"	5.00	2,046	10,230
2"	8.00	2,058	16,464
3"	21.75	20	435
4"	37.50	56	2,100
6"	80.00	130	10,400
8"	140.00	34	4,760
10"	210.00	3	630
	TOTAL	**226,080**	**299,889**
Non-Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	7,265	7,265
3/4"	1.50	12	18
1"	2.50	3,571	8,928
1-1/2"	5.00	2,103	10,515
2"	8.00	5,202	41,616
3"	21.75	366	7,961
4"	37.50	331	12,413
6"	80.00	169	13,520
8"	140.00	68	9,520
10"	210.00	25	5,250
	TOTAL	**19,112**	**117,005**

Wholesale Customer: **City of Aledo**

Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0
3/4"	1.50	910	1,365
1"	2.50	9	23
1-1/2"	5.00	0	0
2"	8.00	1	8
3"	21.75	0	0
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**920**	**1,396**
Non-Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0
3/4"	1.50	89	134
1"	2.50	12	30
1-1/2"	5.00	5	25
2"	8.00	20	160
3"	21.75	2	44
4"	37.50	2	75
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**130**	**467**

Table D-1
Water Meter Summary

Wholesale Customer: **Bethesda Water Supply Corportation**

Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	6,875	6,875
3/4"	1.50	37	56
1"	2.50	34	85
1-1/2"	5.00	4	20
2"	8.00	0	0
3"	21.75	0	0
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**6,950**	**7,036**
Non-Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	92	92
3/4"	1.50	4	6
1"	2.50	13	33
1-1/2"	5.00	7	35
2"	8.00	24	192
3"	21.75	1	22
4"	37.50	1	38
6"	80.00	1	80
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**143**	**497**

Wholesale Customer: **City of Burleson**

Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	12,998	12,998
3/4"	1.50	3	5
1"	2.50	43	108
1-1/2"	5.00	7	35
2"	8.00	3	24
3"	21.75	0	0
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**13,054**	**13,169**
Non-Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	476	476
3/4"	1.50	5	8
1"	2.50	226	565
1-1/2"	5.00	130	650
2"	8.00	261	2,088
3"	21.75	22	479
4"	37.50	6	225
6"	80.00	1	80
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**1,127**	**4,570**

Table D-1
Water Meter Summary

Wholesale Customer: **City of Crowley**

Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	4,910	4,910
3/4"	1.50	0	0
1"	2.50	27	68
1-1/2"	5.00	3	15
2"	8.00	7	56
3"	21.75	2	44
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**4,949**	**5,092**
Non-Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	162	162
3/4"	1.50	0	0
1"	2.50	60	150
1-1/2"	5.00	21	105
2"	8.00	55	440
3"	21.75	9	196
4"	37.50	1	38
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**308**	**1,090**

Wholesale Customer: **Dallas Fort Worth International Airport Board**

Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0
3/4"	1.50	0	0
1"	2.50	0	0
1-1/2"	5.00	0	0
2"	8.00	0	0
3"	21.75	0	0
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**0**	**0**
Non-Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	1	1
3/4"	1.50	1	2
1"	2.50	3	8
1-1/2"	5.00	12	60
2"	8.00	86	688
3"	21.75	13	283
4"	37.50	22	825
6"	80.00	7	560
8"	140.00	1	140
10"	210.00	0	0
	TOTAL	**146**	**2,566**

Table D-1
Water Meter Summary

Wholesale Customer: **City of Dalworthington Gardens**

Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	303	303
3/4"	1.50	36	54
1"	2.50	205	513
1-1/2"	5.00	4	20
2"	8.00	7	56
3"	21.75	0	0
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**555**	**946**
Non-Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	39	39
3/4"	1.50	8	12
1"	2.50	24	60
1-1/2"	5.00	0	0
2"	8.00	10	80
3"	21.75	0	0
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**81**	**191**

Wholesale Customer: **City of Edgecliff Village**

Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	1,146	1,146
3/4"	1.50	0	0
1"	2.50	0	0
1-1/2"	5.00	0	0
2"	8.00	0	0
3"	21.75	0	0
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**1,146**	**1,146**
Non-Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	1	1
3/4"	1.50	3	5
1"	2.50	0	0
1-1/2"	5.00	3	15
2"	8.00	0	0
3"	21.75	0	0
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	1	140
10"	210.00	0	0
	TOTAL	**8**	**161**

Table D-1
Water Meter Summary

Wholesale Customer: **City of Everman (Stand by Customer)**

Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0
3/4"	1.50	0	0
1"	2.50	0	0
1-1/2"	5.00	0	0
2"	8.00	0	0
3"	21.75	0	0
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**0**	**0**

Non-Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0
3/4"	1.50	0	0
1"	2.50	0	0
1-1/2"	5.00	0	0
2"	8.00	0	0
3"	21.75	0	0
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**0**	**0**

Wholesale Customer: **City of Forest Hill**

Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0
3/4"	1.50	4,774	7,161
1"	2.50	0	0
1-1/2"	5.00	0	0
2"	8.00	0	0
3"	21.75	0	0
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**4,774**	**7,161**

Non-Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0
3/4"	1.50	0	0
1"	2.50	67	168
1-1/2"	5.00	37	185
2"	8.00	72	576
3"	21.75	2	44
4"	37.50	2	75
6"	80.00	1	80
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**181**	**1,127**

Table D-1
Water Meter Summary

Wholesale Customer: **City of Grand Prairie**

Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	4,033	4,033
3/4"	1.50	0	0
1"	2.50	41	103
1-1/2"	5.00	14	71
2"	8.00	56	452
3"	21.75	1	26
4"	37.50	0	0
6"	80.00	4	282
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**4,150**	**4,966**
Non-Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	129	129
3/4"	1.50	0	0
1"	2.50	76	189
1-1/2"	5.00	50	248
2"	8.00	116	927
3"	21.75	7	154
4"	37.50	6	222
6"	80.00	1	95
8"	140.00	1	166
10"	210.00	0	0
	TOTAL	**385**	**2,129**

Wholesale Customer: **City of Haltom City**

Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0
3/4"	1.50	11,985	17,978
1"	2.50	39	99
1-1/2"	5.00	0	0
2"	8.00	1	8
3"	21.75	0	0
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**12,026**	**18,084**
Non-Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0
3/4"	1.50	2,033	3,049
1"	2.50	542	1,355
1-1/2"	5.00	0	0
2"	8.00	504	4,034
3"	21.75	122	2,652
4"	37.50	22	843
6"	80.00	5	379
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**3,228**	**12,313**

Table D-1
Water Meter Summary

Wholesale Customer: **City of Haslet**

Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	615	615
3/4"	1.50	5	8
1"	2.50	12	30
1-1/2"	5.00	0	0
2"	8.00	0	0
3"	21.75	0	0
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**632**	**653**
Non-Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	32	32
3/4"	1.50	0	0
1"	2.50	16	40
1-1/2"	5.00	3	15
2"	8.00	53	424
3"	21.75	4	87
4"	37.50	1	38
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**109**	**636**

Wholesale Customer: **City of Hurst**

Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	9,139	9,139
3/4"	1.50	1	2
1"	2.50	1,329	3,323
1-1/2"	5.00	42	210
2"	8.00	9	72
3"	21.75	0	0
4"	37.50	8	300
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**10,528**	**13,045**
Non-Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	422	422
3/4"	1.50	1	2
1"	2.50	343	858
1-1/2"	5.00	210	1,050
2"	8.00	182	1,456
3"	21.75	30	653
4"	37.50	15	563
6"	80.00	1	80
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**1,204**	**5,082**

Table D-1
Water Meter Summary

Wholesale Customer: **City of Keller**

Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	14,452	14,452
3/4"	1.50	74	111
1"	2.50	161	403
1-1/2"	5.00	7	35
2"	8.00	5	40
3"	21.75	0	0
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**14,699**	**15,041**
Non-Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	440	440
3/4"	1.50	42	63
1"	2.50	315	788
1-1/2"	5.00	64	320
2"	8.00	203	1,624
3"	21.75	24	522
4"	37.50	5	188
6"	80.00	0	0
8"	140.00	3	420
10"	210.00	0	0
	TOTAL	**1,096**	**4,364**

Wholesale Customer: **City of Kennedale**

Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	888	888
3/4"	1.50	0	0
1"	2.50	77	193
1-1/2"	5.00	3	15
2"	8.00	2	16
3"	21.75	0	9
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**970**	**1,120**
Non-Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	91	91
3/4"	1.50	0	0
1"	2.50	17	43
1-1/2"	5.00	6	30
2"	8.00	14	112
3"	21.75	3	65
4"	37.50	1	38
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**132**	**378**

Table D-1
Water Meter Summary

Wholesale Customer: **Lake Worth**

Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	1	1
3/4"	1.50	1,360	2,040
1"	2.50	117	293
1-1/2"	5.00	0	0
2"	8.00	1	8
3"	21.75	0	0
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**1,479**	**2,342**
Non-Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0
3/4"	1.50	108	162
1"	2.50	99	248
1-1/2"	5.00	35	175
2"	8.00	86	688
3"	21.75	20	435
4"	37.50	4	150
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**352**	**1,858**

Wholesale Customer: **City of North Richland Hills**

Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	12,727	12,727
3/4"	1.50	0	0
1"	2.50	650	1,625
1-1/2"	5.00	3	16
2"	8.00	11	85
3"	21.75	0	0
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**13,391**	**14,453**
Non-Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	450	450
3/4"	1.50	0	0
1"	2.50	230	575
1-1/2"	5.00	54	268
2"	8.00	491	3,924
3"	21.75	20	434
4"	37.50	13	473
6"	80.00	3	252
8"	140.00	1	147
10"	210.00	0	0
	TOTAL	**1,260**	**6,523**

Table D-1
Water Meter Summary

Wholesale Customer: **Town of Northlake**

Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0
3/4"	1.50	342	513
1"	2.50	0	0
1-1/2"	5.00	0	0
2"	8.00	0	0
3"	21.75	0	0
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**342**	**513**

Non-Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0
3/4"	1.50	4	6
1"	2.50	7	18
1-1/2"	5.00	3	15
2"	8.00	44	352
3"	21.75	23	500
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**81**	**891**

Wholesale Customer: **City of Richland Hills**

Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0
3/4"	1.50	2,783	4,175
1"	2.50	79	198
1-1/2"	5.00	8	40
2"	8.00	12	96
3"	21.75	0	0
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**2,882**	**4,508**

Non-Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0
3/4"	1.50	173	260
1"	2.50	83	208
1-1/2"	5.00	29	145
2"	8.00	38	304
3"	21.75	4	87
4"	37.50	2	75
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**329**	**1,078**

Table D-1
Water Meter Summary

Wholesale Customer: **City of River Oaks (Stand By Customer)**

Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0
3/4"	1.50	0	0
1"	2.50	0	0
1-1/2"	5.00	0	0
2"	8.00	0	0
3"	21.75	0	0
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**0**	**0**

Non-Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0
3/4"	1.50	0	0
1"	2.50	0	0
1-1/2"	5.00	0	0
2"	8.00	0	0
3"	21.75	0	0
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**0**	**0**

Wholesale Customer: **City of Roanoke**

Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0
3/4"	1.50	1,837	2,756
1"	2.50	47	119
1-1/2"	5.00	0	0
2"	8.00	0	0
3"	21.75	0	0
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**1,885**	**2,875**

Non-Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0
3/4"	1.50	271	406
1"	2.50	114	284
1-1/2"	5.00	33	164
2"	8.00	169	1,349
3"	21.75	5	102
4"	37.50	11	395
6"	80.00	2	187
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**603**	**2,888**

Table D-1
Water Meter Summary

Wholesale Customer: **City of Saginaw**

Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0
3/4"	1.50	6,964	10,446
1"	2.50	9	23
1-1/2"	5.00	0	0
2"	8.00	0	0
3"	21.75	0	0
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**6,973**	**10,469**
Non-Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0
3/4"	1.50	167	251
1"	2.50	116	290
1-1/2"	5.00	12	60
2"	8.00	137	1,096
3"	21.75	16	348
4"	37.50	7	263
6"	80.00	1	80
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**456**	**2,387**

Wholesale Customer: **Sansom Park (Stand By Customer)**

Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0
3/4"	1.50	0	0
1"	2.50	0	0
1-1/2"	5.00	0	0
2"	8.00	0	0
3"	21.75	0	0
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**0**	**0**
Non-Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0
3/4"	1.50	0	0
1"	2.50	0	0
1-1/2"	5.00	0	0
2"	8.00	0	0
3"	21.75	0	0
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**0**	**0**

Table D-1
Water Meter Summary

Wholesale Customer: **City of Southlake**

Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0
3/4"	1.50	842	1,263
1"	2.50	7,787	19,468
1-1/2"	5.00	0	0
2"	8.00	21	168
3"	21.75	1	22
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**8,651**	**20,920**

Non-Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0
3/4"	1.50	95	143
1"	2.50	834	2,085
1-1/2"	5.00	0	0
2"	8.00	441	3,528
3"	21.75	5	109
4"	37.50	37	1,388
6"	80.00	9	720
8"	140.00	1	140
10"	210.00	0	0
	TOTAL	**1,422**	**8,112**

Wholesale Customer: **Trinity River Authority (Stand By Customer)**

Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0
3/4"	1.50	0	0
1"	2.50	0	0
1-1/2"	5.00	0	0
2"	8.00	0	0
3"	21.75	0	0
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**0**	**0**

Non-Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0
3/4"	1.50	0	0
1"	2.50	0	0
1-1/2"	5.00	0	0
2"	8.00	0	0
3"	21.75	0	0
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**0**	**0**

Table D-1
Water Meter Summary

Wholesale Customer: **Trophy Club Municipal Utility District No. 1**

Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	2,116	2,116
3/4"	1.50	0	0
1"	2.50	1,582	3,955
1-1/2"	5.00	2	10
2"	8.00	9	72
3"	21.75	0	0
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**3,709**	**6,153**
Non-Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	31	31
3/4"	1.50	0	0
1"	2.50	23	58
1-1/2"	5.00	15	75
2"	8.00	65	520
3"	21.75	14	305
4"	37.50	10	375
6"	80.00	2	160
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**160**	**1,523**

Wholesale Customer: **Westlake**

Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	124	124
3/4"	1.50	0	0
1"	2.50	240	601
1-1/2"	5.00	29	147
2"	8.00	20	157
3"	21.75	0	0
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**413**	**1,028**
Non-Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	3	3
3/4"	1.50	0	0
1"	2.50	6	16
1-1/2"	5.00	7	36
2"	8.00	40	317
3"	21.75	3	68
4"	37.50	1	39
6"	80.00	2	167
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**63**	**646**

Table D-1
Water Meter Summary

Wholesale Customer: **Town of Westover Hills**

Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0
3/4"	1.50	12	18
1"	2.50	93	233
1-1/2"	5.00	159	795
2"	8.00	46	368
3"	21.75	2	44
4"	37.50	1	38
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**313**	**1,495**
Non-Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0
3/4"	1.50	0	0
1"	2.50	0	0
1-1/2"	5.00	0	0
2"	8.00	0	0
3"	21.75	0	0
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**0**	**0**

Wholesale Customer: **City of Westworth Village**

Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0
3/4"	1.50	479	719
1"	2.50	5	13
1-1/2"	5.00	0	0
2"	8.00	3	24
3"	21.75	0	0
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**487**	**755**
Non-Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0
3/4"	1.50	2	3
1"	2.50	3	8
1-1/2"	5.00	5	25
2"	8.00	11	88
3"	21.75	0	0
4"	37.50	2	75
6"	80.00	1	80
8"	140.00	1	140
10"	210.00	0	0
	TOTAL	**25**	**419**

Table D-1
Water Meter Summary

Wholesale Customer: **City of White Settlement**

Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	2,745	2,745
3/4"	1.50	0	0
1"	2.50	0	0
1-1/2"	5.00	0	0
2"	8.00	0	0
3"	21.75	0	0
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**2,745**	**2,745**

Non-Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	123	123
3/4"	1.50	0	0
1"	2.50	5	14
1-1/2"	5.00	24	121
2"	8.00	56	448
3"	21.75	7	143
4"	37.50	2	82
6"	80.00	1	88
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**218**	**1,018**

APPENDIX E
CREDIT CALCULATION ANALYSIS

CREDIT CALCULATION

CODE GOVERNING IMPACT FEE DEVELOPMENT

Local Government Code Title 12, Subtitle C, Chapter 395 contains the rules governing Impact Fee development. As defined in those rules, the maximum impact fee per service unit shall be calculated by dividing the costs of the portion of capital improvements attributed to new growth by the number of new growth units over the time period covered in the impact fee analysis (Section 395.015 MAXIMUM FEE PER SERVICE UNIT, (b)). In addition, the capital improvements plan must contain a plan for awarding either:

- A credit for the portion of utility service revenues (rates) generated by new service units during the program period that is used for the payment of improvements, including the payment of debt, that are included in the capital improvements plan; or
- In the alternative, a credit equal to 50 percent of the total projected cost of implementing the capital improvements plan (Section 395.014 CAPITAL IMPROVEMENTS PLAN, (A)(7)).

The code further states that the impact fee is not allowed to exceed the amount determined by subtracting the credit from the costs of the impact fee eligible capital improvements (maximum impact fee). (Section 395.015 MAXIMUM FEE PER SERVICE UNIT, (a)).

As described by the definitions in the code, the following formulas result:

Maximum Impact Fee = (Total Costs attributed to new growth over 10 years including Interest – Credit) / Number of New Service Units over next 10 years

The purpose of this credit is to ensure that new growth is not charged twice for the portion of capital improvements attributed to them, once through the impact fee and then again through rates.

The code does not specifically address the way in which this credit is to be calculated. Each utility should calculate the credit in a way that is consistent with the operation of their fund, the way they finance their capital improvements, and the way these capital improvements costs are represented in their utility rates. The next section describes how Fort Worth's credit was calculated.

FORT WORTH FINANCING OF CAPITAL IMPROVEMENTS AND CREDIT ANALYSIS

The City of Fort Worth finances all (100%) of its capital improvements through the issuance of bonds. As such, debt service payments include a portion of impact fee eligible costs. Fort Worth then uses impact fee funds collected to pay the portion of their debt service that is attributed to impact fee eligible costs.

This would result in none of their impact fee eligible costs being included in the calculation of their rates (no credit) unless the city chose to transfer impact fees in an amount less than the eligible costs.

As part of its decision making process, the City of Fort Worth considered several options of impact fee and credit analysis. The three scenarios considered are below.

- Scenario 1 – The city would choose the option laid out in Chapter 395 guidelines of collecting only 50% of the maximum impact fee (a 50% credit, no credit analysis needed).
- Scenario 2 – The city would choose to collect an impact fee higher than 50% of the maximum (75%), thereby needing a credit analysis; in years 2017-2018 it is assumed impact fees would cover only a portion of the impact fee eligible debt service; in years 2019-2026 it is assumed impact fees would cover all of the impact fee eligible debt service.
- Scenario 3 – The city would choose to collect an impact fee higher than 50% of the maximum (100%), thereby needing a credit analysis; in years 2017-2018 it is assumed impact fees would cover only a portion of the impact fee eligible debt service; in years 2019-2026 it is assumed impact fees would cover all of the impact fee eligible debt service.

As mentioned above, for Scenarios 2 and 3 the city is choosing not to cover all impact fee eligible debt with money from the Impact Fee Fund for the first two years. The reason for this is that those transfers have already been determined (the 2017 budget was already approved prior to this impact fee study, and the 2018 budget is nearing final approval). In both of those years, the budgeted transfer had been determined based on the anticipated Impact Fee Funds available using the prior Impact Fee collection rate of $921 per service unit. These budgeted transfers are not sufficient to cover all of the impact fee eligible debt service as calculated in this Impact Fee Study. This results in a credit for those years.

In remaining years (2019-2026), it is Fort Worth's intent to transfer sufficient funds from the Impact Fees Fund to cover all impact fee eligible debt service. Fort Worth has a very detailed method of calculating the portion of each year's debt service payments for each bond series that is impact fee eligible, based on the projects that were funded in each bond series and what portion of those projects is impact fee eligible. Further, if there should be a year in which less impact fee funds have been collected than was projected and sufficient impact fee funds are not available to cover the portion of debt service that is impact fee eligible, then the city has committed to use other funds as necessary to pay that portion of the debt service. When additional impact fees have been collected, the city will reimburse those other funds.

A summary of the impact fee credit analysis for all three scenarios are shown in **Tables E-1** through **E-3**. Graphs of these results and their proposed phasing over the next three years are shown in **Figures E-1** through **E-3**.

Table E-1 Scenario 1 - Impact Fee and Credit Analysis (50%)

	Water	Wastewater
Preliminary Maximum Calculated Infrastructure Cost	$625,041,757	$332,339,827
Minus the CREDIT	$0	$0
Max Allowable Calculated Infrastructure Cost	$625,041,757	$332,339,827
Service Units	142,209	127,381
Max Allowable Impact Fee per Service Unit	$4,395	$2,609
Collect 50% of Max Allowable Impact Fee per Service Unit	**$2,197**	**$1,304**

Table E-2 Scenario 2 - Impact Fee and Credit Analysis (75%)

Credit Calculation	Water	
	2017	2018
Portion of debt service attributed to impact fee eligible costs	$14,236,513	$18,970,578
Budgeted Transfer from Impact Fee Fund to Cover Debt Service	$6,206,967	$6,206,967
Yearly Credit	$8,029,546	$12,763,611
TOTAL Credit	**$20,793,157**	
	Wastewater	
	2017	**2018**
Portion of debt service attributed to impact fee eligible costs	$3,303,775	$4,377,409
Budgeted Transfer from Impact Fee Fund to Cover Debt Service	$2,838,453	$2,838,453
Yearly Credit	$465,322	$1,538,956
TOTAL Credit	**$2,004,278**	

	Water	Wastewater
Preliminary Maximum Calculated Infrastructure Cost	$625,041,757	$332,339,827
Minus the CREDIT	($20,793,157)	($2,004,278)
Max Allowable Calculated Infrastructure Cost	$604,248,600	$330,335,549
Service Units	142,209	127,381
Max Allowable Impact Fee per Service Unit	$4,249	$2,593
Collect 75% of Max Allowable Impact Fee per Service Unit	**$3,187**	**$1,945**

Table E-3 Scenario 3 - Impact Fee and Credit Analysis (100%)

Credit Calculation	Water	
	2017	2018
Portion of debt service attributed to impact fee eligible costs	$14,236,513	$18,970,578
Budgeted Transfer from Impact Fee Fund to Cover Debt Service	$6,206,967	$6,206,967
Yearly Credit	$8,029,546	$12,763,611
TOTAL Credit	**$20,793,157**	
	Wastewater	
	2017	**2018**
Portion of debt service attributed to impact fee eligible costs	$3,303,775	$4,377,409
Budgeted Transfer from Impact Fee Fund to Cover Debt Service	$2,838,453	$2,838,453
Yearly Credit	$465,322	$1,538,956
TOTAL Credit	**$2,004,278**	

	Water	Wastewater
Preliminary Maximum Calculated Infrastructure Cost	$625,041,757	$332,339,827
Minus the CREDIT	($20,793,157)	($2,004,278)
Max Allowable Calculated Infrastructure Cost	$604,248,600	$330,335,549
Service Units	142,209	127,381
Max Allowable Impact Fee per Service Unit	$4,249	$2,593
Collect 100% of Max Allowable Impact Fee per Service Unit	**$4,249**	**$2,593**

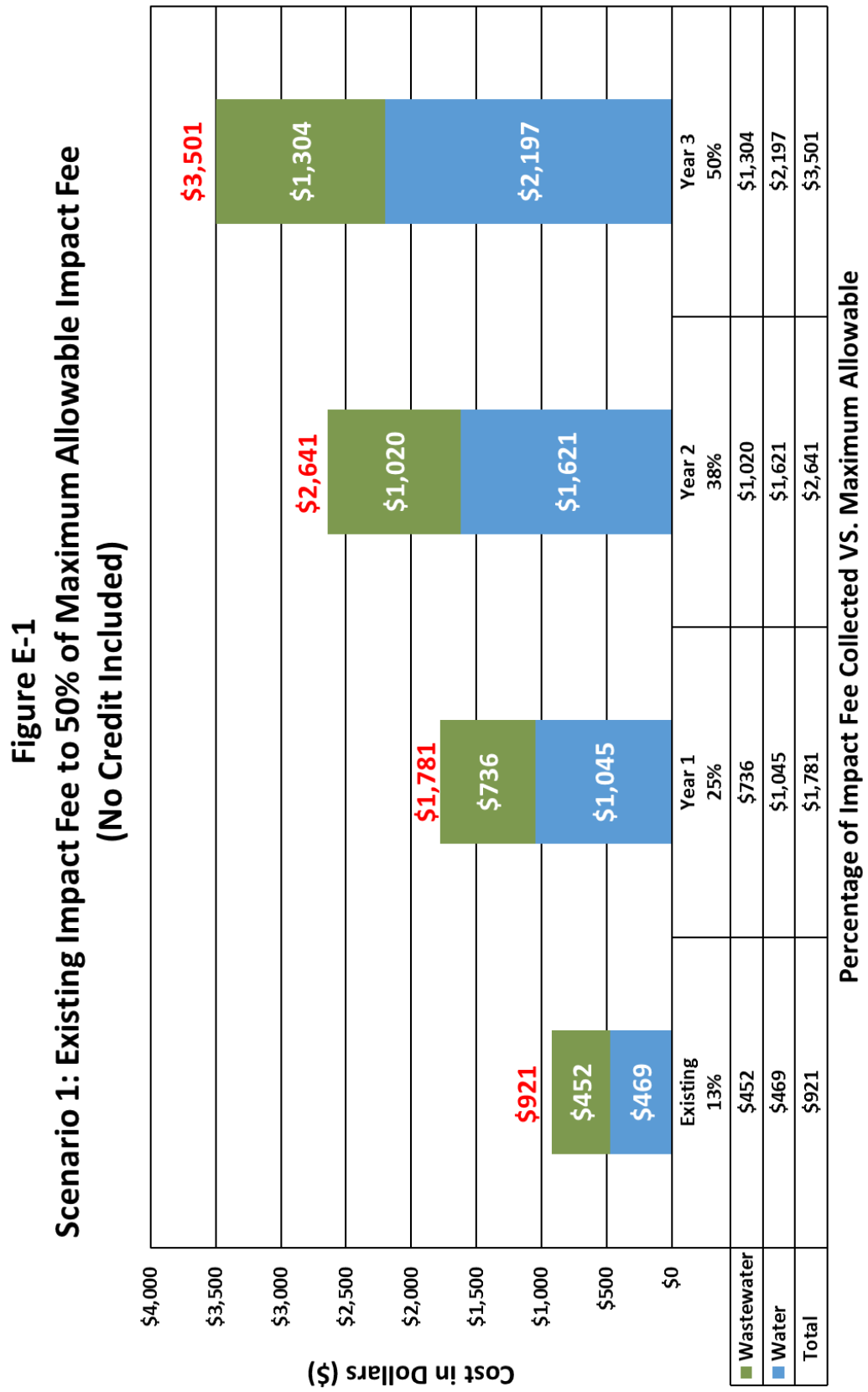


Figure E-1
Scenario 1: Existing Impact Fee to 50% of Maximum Allowable Impact Fee
(No Credit Included)
Cost in Dollars ($)
$4,000
$3,500
$3,000
$2,500
$2,000
$1,500
$1,000
$500
$0
$921
$1,781
$2,641
$3,501
$452
$469
$736
$1,045
$1,020
$1,621
$1,304
$2,197
Existing 13%
Year 1 25%
Year 2 38%
Year 3 50%
Wastewater $452 $736 $1,020 $1,304
Water $469 $1,045 $1,621 $2,197
Total $921 $1,781 $2,641 $3,501
Percentage of Impact Fee Collected VS. Maximum Allowable
Water
Wastewater

Figure E-2
Scenario 2: Existing Impact Fee to 75% of Maximum Allowable Impact Fee
(Including Credit Calculation)

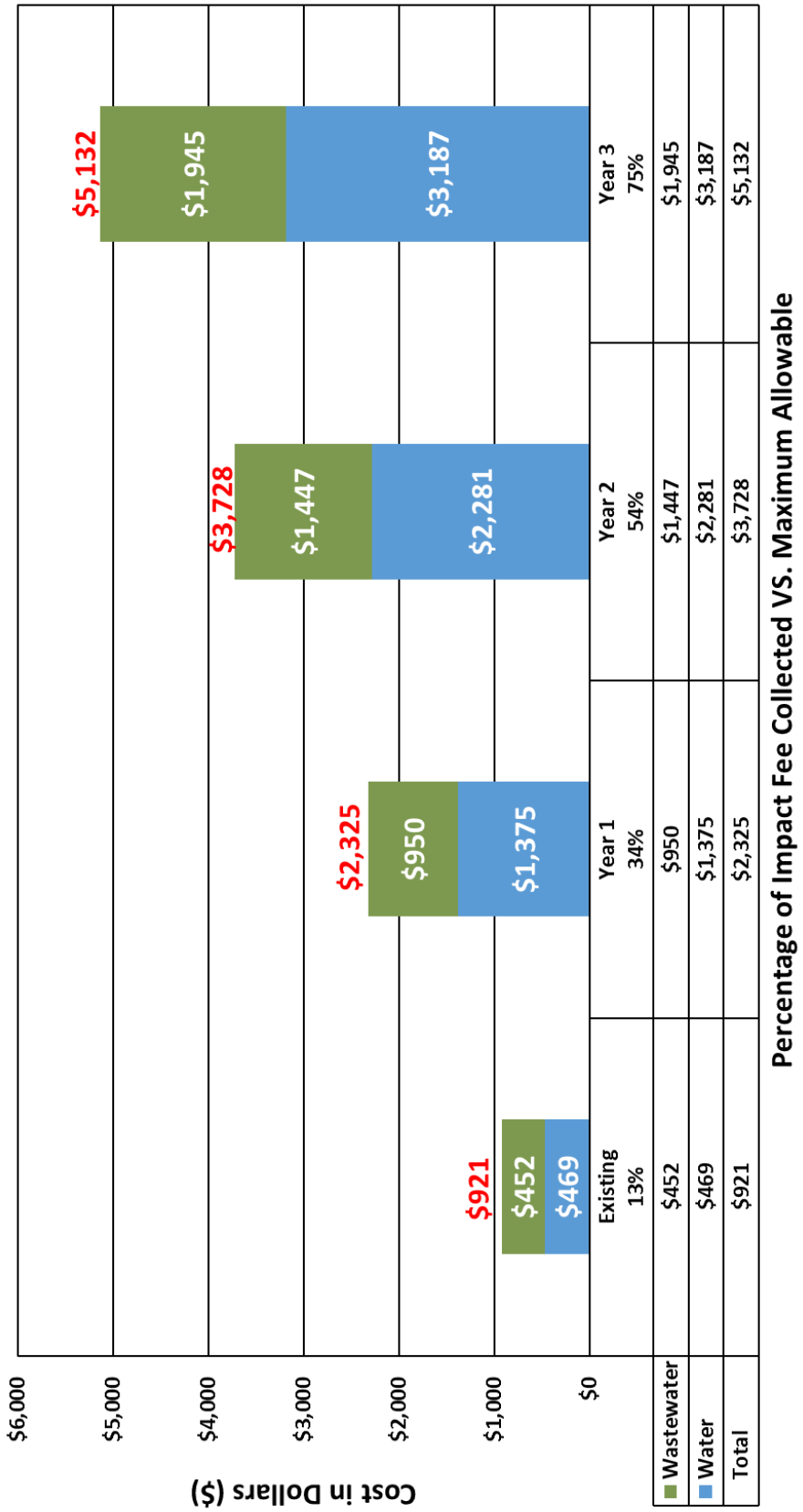
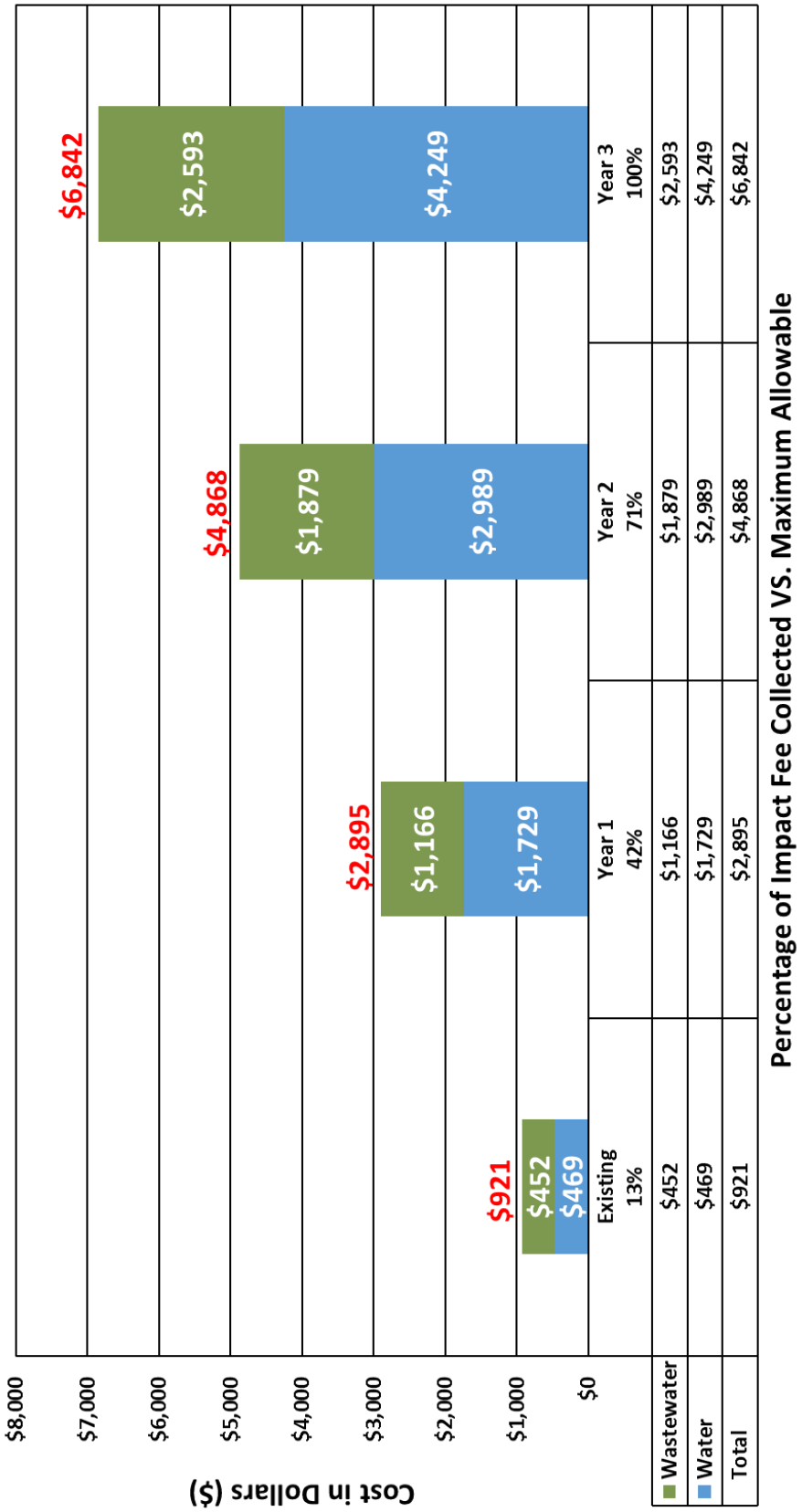


Figure E-3
Scenario 3: Existing Impact Fee to 100% of Maximum Allowable Impact Fee (Including Credit Calculation)



FREESE AND NICHOLS, INC.
4055 INTERNATIONAL PLAZA, SUITE 200
FORT WORTH, TEXAS 76109
817-735-7300

www.freese.com

Innovative approaches
Practical results
Outstanding service

Water & Wastewater Impact Fee Update

Exhibit F: Capital Improvements Plan Wastewater Facilities 2017-2037

Prepared for:

City of Fort Worth Water Department

FORT WORTH®

Prepared by:

FREESE AND NICHOLS, INC.
4055 International Plaza, Suite 200
Fort Worth, Texas 76109
817-735-7300

FTW16125

October 07, 2016

Water & Wastewater Impact Fee Update

Prepared for:

City of Fort Worth Water Department

Prepared by:

FREESE AND NICHOLS, INC.
4055 International Plaza, Suite 200
Fort Worth, Texas 76109
817-735-7300

FTW16125

TABLE OF CONTENTS

TABLE OF TABLES

TABLE OF FIGURES

APPENDICES

1.0 INTRODUCTION

In accordance with Texas Local Government Code (TLGC), Chapter 395, the City of Fort Worth commissioned Freese and Nichols, Inc. (FNI), to conduct a Water and Wastewater Impact Fee Study. This report establishes the engineering basis for the fee schedule, updating the previous study completed in 2012.

Impact fees provide the City of Fort Worth a mechanism for recouping the cost associated with expanding the municipal wastewater system to accommodate growth in the service area. The City of Fort Worth owns and operates a system comprised of treatment facilities, lift stations, and pipelines that are continuously improved and expanded. The schedule for future investment in the wastewater system is known as the Capital Improvements Plan (CIP). The CIP was updated as a part of this study with capital project scope and cost provided by previously commissioned master planning documents and input from Fort Worth Water Department staff.

The report describes the basis for establishing which City of Fort Worth wastewater facilities are eligible to be included in the impact fee analysis. The additional facilities required to accommodate growth during the study period are summarized.

2.0 EXISTING WASTEWATER COLLECTION SYSTEM

2.1 Wastewater Treatment Plants

The City of Fort Worth provides wastewater service to retail customers within the city and to 23 wholesale customers in the surrounding counties. The Fort Worth wastewater collection system is primarily a gravity flow system that follows the major drainage features of the service area. The City's collection system consists of 12 sewer basins. There are currently three major wastewater treatment facilities serving the study area: the Village Creek Water Reclamation Facility (WRF), which is owned and operated by the City of Fort Worth, and the Denton Creek Wastewater Treatment Plant (WWTP) and the Central Regional WWTP, which are both owned and operated by the Trinity River Authority (TRA). The Village Creek WRF serves the majority of the population within the study area. The TRA Basin is served by the TRA Central WWTP, and the Denton Creek Basin is served by the TRA Denton Creek WWTP.

2.2 Lift Stations and Force Mains

The City of Fort Worth currently operates 30 lift stations, which pump wastewater into gravity sewers. The City has made a conscious effort to limit the number of lift stations in the collection system. These lift stations are required because of local topographical constraints or to pump flows across sewer basins. **Appendix A** summarizes the existing lift station capacities.

3.0 PROJECTED WASTEWATER FLOWS AND MODEL UPDATE

3.1 Projected Wastewater Flows

The Texas Commission on Environmental Quality (TCEQ) recommends a minimum of 100 gallons per capita per day (gpcd) for municipal base flow. The 2012 master plan determined that the existing loading for the City of Fort Worth and its wholesale customers is 91 gpcd based on flow monitoring data. The 2012 master plan recommends using 110 gpcd and an additional 10 gpcd to account for groundwater infiltration (GWI), resulting in a total per capita for future growth of 120 gpcd. The 2012 master plan determined that the current usage per employee per day for the City of Fort Worth is 37 gallons per employee per day. Additionally, the master plan recommends using 40 gped for future commercial growth.

In order to calculate the annual average day wastewater flows, the population and employment growth projections were taken from *Exhibit B: Land Use Assumptions- Wastewater Facilities*.

The 2012 *Wastewater System Master Plan* did not use a straight average flow to peak flow peaking factor because the City utilized an extended period simulation model to determine the projected peak flows. The model used the RTK method, which calculates a different peaking factor for each scenario dependent on amount of rainfall, peaking time, and recession time. From the 2012 *Wastewater System Master Plan*, the historical annual average flow to peak hour flow ratio is 3.03 and was used to calculate the peak flows. **Table 3-1** summarizes the projected wastewater flows for the City of Fort Worth and its wholesale customers.

Table 3-1 Projected Wastewater Flows

Planning Year	Residential Average Day Flow (MGD)	Non-Residential Average Day Flow (MGD)	Total Average Day Flow (MGD)	Peak Wet Weather Flow (MGD)
2017	121	26	147	445
2027	150	32	182	552

4.0 WASTEWATER CAPITAL IMPROVEMENTS

This section establishes the City of Fort Worth wastewater facilities and engineering studies that are eligible for inclusion in the calculation of the impact fee. The City's existing wastewater model was updated by FNI staff to reflect the updated flows for the impact fee period, as well as include the recommended CIP projects for the impact fee period. Projects included in the CIP increase system capacity as a result of projected growth. Only those projects warranted by capacity needs derived from growth occurring during the study period (2017 to 2027) can be included in the impact fee calculation. Additionally, projects are excluded from the impact fee calculation if alternate mechanisms for cost recovery are in place. Facilities included in the impact fee study are TRA projects, wastewater treatment facilities, lift stations, interceptors and engineering studies.

Table 4-1 provides a summary of each wastewater CIP project cost and allocation for the 2017-2027 study period. The 2017 percent utilization is the portion of a project's capacity required to serve existing development. It is not included in the impact fee analysis. The 2017-2027 percent utilization is the portion of the project's capacity that will be required to serve development projected to occur from 2017 to 2027. The portion of a project's total cost that is used to serve development projected to occur from 2017 through 2027 is calculated as the total cost multiplied by the 2017-2027 percent utilization. Only this portion of the cost is used in the impact fee analysis.

Figures F-1 and **F-2**, show existing and proposed facilities, respectively, for the impact fee study period. **Appendix B** describes each wastewater CIP project for the 2017-2027 planning period. The purpose of each project, the portion that are allocated to growth and the current status is also included.

Table 4-1
Wastewater Capital Improvement Projects 2017 - 2027

Project ID	Project Title	Project Phase	TRA Project Cost	Fort Worth Participation Cost	Initial Project Cost	Project Cost in 2017 Dollars*	Start Date	Completion Date	Added Capacity (MGD)	% Allocated to Existing 2017 Capacity	Cost Allocated to Existing 2017 Capacity	% Allocated to 2017-2027 Impact Fees	Cost Allocated to 2017-2027 Impact Fees	% Allocated to Impact Fees after 2027	Cost Allocated to Impact Fees after 2027
TRINITY RIVER AUTHORITY PROJECTS															
-	Denton Creek WWTP Expansion	Const	$47,595,000	$26,177,250	-	$26,177,250	2008	2010	6.5 MGD	55.0%	$14,397,488	30.0%	$7,853,175	15.0%	$3,926,588
2013 Ph. 2	CB-1 30-inch Parallel Relief Interceptor	Const	$5,317,548	$2,924,651	-	$3,086,970	2013	2016	-	0.0%	$0	12.0%	$370,436	88.0%	$2,716,533
3828.642	25HC-1 Relief Int. (740H - 460H) 12,500 LF	Land	$1,241,000	$682,550	-	$720,432	2016	2017	-	0.0%	$0	50.0%	$360,216	50.0%	$360,216
3828.642	25HC-1 Relief Int. (740H - 460H) 12,500 LF	Const	$14,363,000	$7,899,650	-	$8,338,081	2016	2017	-	0.0%	$0	50.0%	$4,169,040	50.0%	$4,169,040
6828.644	25HC-3 Relief Int. (1320H to 740H) 13,100 LF	Land	$1,795,000	$987,250	-	$1,042,042	2016	2017	-	0.0%	$0	100.0%	$1,042,042	0.0%	$0
6828.644	25HC-3 Relief Int. (1320H to 740H) 13,100 LF	Const	$15,904,000	$8,747,200	-	$9,232,670	2016	2017	-	0.0%	$0	100.0%	$9,232,670	0.0%	$0
6828.202	25HC-5 Relief & MS 12.0HC (1780H-2995H)	Land	$765,000	$420,750	-	$444,102	2016	2018	-	0.0%	$0	100.0%	$444,102	0.0%	$0
6828.202	25HC-5 Relief & MS 12.0HC (1780H-2995H)	Const	$5,819,000	$3,200,450	-	$3,378,075	2016	2018	-	0.0%	$0	100.0%	$3,378,075	0.0%	$0
3828.2004	Two Alternate Discharge 14 MGD Pumps	Eng	$967,000	$531,850	-	$561,368	2016	2018	-	0.0%	$0	50.0%	$280,684	50.0%	$280,684
3828.2004	Two Alternate Discharge 14 MGD Pumps	Const	$6,741,000	$3,707,550	-	$3,913,319	2019	2021	-	0.0%	$0	50.0%	$1,956,660	50.0%	$1,956,660
3828.2012	Peak Flow Storage	Eng	$4,858,000	$2,671,900	-	$2,820,190	2018	2019	-	0.0%	$0	50.0%	$1,410,095	50.0%	$1,410,095
3828.2012	Peak Flow Storage	Const	$30,560,000	$16,808,000	-	$17,740,844	2018	2021	-	0.0%	$0	50.0%	$8,870,422	50.0%	$8,870,422
6828.643	25HC-2 Relief Int. (2060H to 740H) 4,400 LF	Eng	$1,007,000	$553,850	-	$584,589	2020	2021	-	0.0%	$0	19.0%	$111,072	81.0%	$473,517
TOTAL TRINITY RIVER AUTHORITY PROJECTS			**$136,932,548**	**$75,312,901**	**-**	**$78,039,930**					**TRINITY RIVER AUTHORITY PROJECTS ELIGIBLE COST**		**$39,478,688**		
TREATMENT FACILITIES															
WWTP-001	Mary's Creek WRF Site Selection and Land Purchase	Land	-	-	$4,950,000	$4,950,000	2011	2011	-	0.0%	$0	40.0%	$1,980,000	60.0%	$2,970,000
-	Deep Bed Media Filters 1-20 Modifications	Design	-	-	$1,032,750	$1,032,750	2011	2016	-	60.0%	$619,650	40.0%	$413,100	0.0%	$0
-	Deep Bed Media Filters 1-20 Modifications	CM\Insp	-	-	$995,000	$995,000	2011	2016	-	60.0%	$597,000	40.0%	$398,000	0.0%	$0
-	Deep Bed Media Filters 1-20 Modifications	Const	-	-	$16,889,298	$16,889,298	2011	2016	80 MGD	60.0%	$10,133,579	40.0%	$6,755,719	0.0%	$0
WWTP-009	VCWRF Peak Flow Diversion Structure (Equalization Basin for Peak Flows)	CM\Const	-	-	$30,921,046	$30,921,046	2012	2016	100 MG	15.0%	$4,638,157	85.0%	$26,282,889	0.0%	$0
WWTP-012-1	VCWRF Replace Primary Clarifiers 1-12 & Grit System (Phase 2B of 191 MGD expansion)	Study\Eng	-	-	$3,785,000	$4,194,916	2016	2019	-	0.0%	$0	88.0%	$3,691,526	12.0%	$503,390
WWTP-001-1	Mary's Creek Satellite Plant (MP-053)	Permitting\Eng	-	-	$4,850,000	$5,375,255	2017	2021	-	0.0%	$0	40.0%	$2,150,102	60.0%	$3,225,153
WWTP-012-2	VCWRF Replace Primary Clarifiers 1-12 & Grit System (Phase 2B of 191 MGD expansion)	CM\Const	-	-	$10,574,070	$11,719,242	2019	2020	25 MGD	0.0%	$0	88.0%	$10,312,933	12.0%	$1,406,309
WWTP-012-3	VCWRF Replace Primary Clarifiers 1-12 & Grit System (Phase 2B of 191 MGD expansion)	CM\Const	-	-	$10,574,070	$11,719,242	2021	2021	-	0.0%	$0	88.0%	$10,312,933	12.0%	$1,406,309
WWTP-001-2	Mary's Creek Satellite Plant (MP-053)	Const	-	-	$56,150,000	$62,231,045	2023	2025	5 MGD	0.0%	$0	40.0%	$24,892,418	60.0%	$37,338,627
WWTP-013	VCWRF South Influent Lift Station (V-3)	Eng	-	-	$1,000,000	$1,108,300	2023	2024	-	0.0%	$0	88.0%	$975,304	12.0%	$132,996
WWTP-013	VCWRF South Influent Lift Station (V-3)	Const	-	-	$5,000,000	$5,541,500	2023	2024	-	0.0%	$0	88.0%	$4,876,520	12.0%	$664,980
TOTAL WASTEWATER TREATMENT PLANTS			**-**	**-**	**$146,721,234**	**$156,677,593**					**WASTEWATER TREATMENT PLANTS ELIGIBLE COST**		**$93,041,443**		
REGIONAL LIFT STATIONS & INTERCEPTORS															
WWMP-9	Casino Beach Lift Station and Force Main	Eng	-	-	$430,850	$430,850	2013	2017	-	0.0%	$0	85.0%	$366,223	15.0%	$64,628
WWMP-9	Casino Beach Lift Station and Force Main	Const	-	-	$2,872,320	$2,872,320	2013	2017	0.3 MGD	0.0%	$0	85.0%	$2,441,472	15.0%	$430,848
WWMP-28	Dosier Creek 20-inch Force Main	Eng	-	-	$288,290	$319,512	2015	2016	-	0.0%	$0	50.0%	$159,756	50.0%	$159,756
WWMP-28	Dosier Creek 20-inch Force Main	Const	-	-	$2,402,400	$2,662,580	2015	2018	-	0.0%	$0	50.0%	$1,331,290	50.0%	$1,331,290
LS-5	Tarleton Regional Lift Station LS-5 (Upsize)	Eng	-	-	$250,000	$277,075	2017	2018	-	0.0%	$0	45.0%	$124,684	55.0%	$152,391
LS-5	Tarleton Regional Lift Station LS-5 (Upsize)	Const	-	-	$2,500,000	$2,770,750	2017	2018	12 MGD	0.0%	$0	45.0%	$1,246,838	55.0%	$1,523,913
LS-6	Walsh Ranch LS & Force Main IVB	Eng	-	-	$200,000	$221,660	2020	2021	-	0.0%	$0	80.0%	$177,328	20.0%	$44,332
LS-6	Walsh Ranch LS & Force Main IVB	Const	-	-	$1,288,000	$1,427,490	2020	2021	1 MGD	0.0%	$0	80.0%	$1,141,992	20.0%	$285,498
LS-1A	Bonds Ranch Lift Station "A" & Force Main	Eng	-	-	$200,000	$221,660	2020	2023	-	0.0%	$0	72.0%	$159,595	28.0%	$62,065
LS-1A	Bonds Ranch Lift Station "A" & Force Main	Const	-	-	$1,400,000	$1,551,620	2020	2023	2 MGD	0.0%	$0	72.0%	$1,117,166	28.0%	$434,454
LS-1B	Bonds Ranch Lift Station "B" & Force Main	Eng	-	-	$200,000	$221,660	2020	2023	-	0.0%	$0	72.0%	$159,595	28.0%	$62,065
LS-1B	Bonds Ranch Lift Station "B" & Force Main	Const	-	-	$1,400,000	$1,551,620	2020	2023	2 MGD	0.0%	$0	72.0%	$1,117,166	28.0%	$434,454
WWC-080	108-inch Third Barrel Interceptor Parallel to M-280 and M-338 MP-018	Eng	-	-	$5,175,080	$5,735,541	2021	2025	-	0.0%	$0	64.0%	$3,670,746	36.0%	$2,064,795
WWC-080	108-inch Third Barrel Interceptor Parallel to M-280 and M-338 MP-018	Const	-	-	$43,125,600	$47,796,102	2021	2025	-	0.0%	$0	64.0%	$30,589,506	36.0%	$17,206,597
LS-4	Live Oak Creek Regional Lift Station & Force Main LS-4	Eng	-	-	$400,000	$443,320	2022	2023	-	0.0%	$0	100.0%	$443,320	0.0%	$0
LS-4	Live Oak Creek Regional Lift Station & Force Main LS-4	Const	-	-	$2,000,000	$2,216,600	2022	2023	1.12 MGD	0.0%	$0	100.0%	$2,216,600	0.0%	$0
LS-9	Lake Arlington - VC Drainage Basin Lift Station & Force Main MP-013	Eng	-	-	$3,034,440	$3,363,070	2022	2023	-	0.0%	$0	60.0%	$2,017,842	40.0%	$1,345,228
LS-9	Lake Arlington - VC Drainage Basin Lift Station & Force Main MP-013	Const	-	-	$20,229,600	$22,420,466	2022	2023	25 MGD	0.0%	$0	60.0%	$13,452,279	40.0%	$8,968,186
LS-1C	Bonds Ranch Lift Station "C" & Force Main	Eng	-	-	$200,000	$221,660	2023	2025	-	0.0%	$0	24.0%	$53,198	76.0%	$168,462
LS-1C	Bonds Ranch Lift Station "C" & Force Main	Const	-	-	$1,750,000	$1,939,525	2023	2025	3 MGD	0.0%	$0	24.0%	$465,486	76.0%	$1,474,039
LS-12	5.5 MGD Richardson Slough Lift Station Expansion and 20-inch Force Main in the Clear Fork Basin	Eng	-	-	$207,160	$229,595	2024	2025	-	0.0%	$0	10.0%	$22,960	90.0%	$206,636
LS-12	5.5 MGD Richardson Slough Lift Station Expansion and 20-inch Force Main in the Clear Fork Basin	Const	-	-	$1,680,000	$1,861,944	2025	2025	5.5 MGD	0.0%	$0	10.0%	$186,194	90.0%	$1,675,750
LS-13	1.1 MGD Lake Country #4 Lift Station Expansion in the Marine Creek Basin	Eng	-	-	$93,600	$103,737	2024	2025	-	0.0%	$0	6.0%	$6,224	94.0%	$97,513
LS-13	1.1 MGD Lake Country #4 Lift Station Expansion in the Marine Creek Basin	Const	-	-	$780,000	$864,474	2025	2025	1.1 MGD	0.0%	$0	6.0%	$51,868	94.0%	$812,606
TOTAL LIFT STATIONS			**-**	**-**	**$92,107,340**	**$101,724,832**					**LIFT STATIONS ELIGIBLE COST**		**$62,719,329**		
ENGINEERING STUDIES															
-	2009 Wastewater Master Plan 2010-2020	Study	-	-	$4,156,850	$4,156,850	2008	2012	-	70.0%	$2,909,795	30.0%	$1,247,055	0.0%	$0
-	Impact Fee Study - 2017-2027	Study	-	-	$117,987	$117,987	2015	2016	-	0.0%	$0	100.0%	$117,987	0.0%	$0
TOTAL ENGINEERING STUDIES			**-**	**-**	**$4,274,837**	**$4,274,837**					**ENGINEERING STUDIES ELIGIBLE COST**		**$1,365,042**		
TOTAL WASTEWATER CIP			**$136,932,548**	**$75,312,901**	**$243,103,411**	**$340,717,192**							**$196,604,503**		

Information Sources:
2012 Wastewater System Master Plan, Freese & Nichols
2013 Phase II Interceptor Flow Assessment, Black and Veatch
5-year CIP Budget 2016-2021, Trinity River Authority of Texas
2014 Denton Creek Regional Wastewater System Master Plan Update, Alan Plummer Associates
Fort Worth Water Department Capital Improvement Program 2015-2019
*ENR factor of 10.83% used to inflate projected costs from 2012 WWMP to 2017 dollars on proposed projects only. ENR factor of 5.55% used to inflate costs from 2016 dollars to 2017 dollars on proposed projects only.

5.0 IMPACT FEE ANALYSIS

Table 5-1 summarizes impact fee eligible costs for projects. **Table 4-1** shows the detailed development of the costs and capacities of the eligible facilities.

Table 5-1 2017-2027 Impact Fee Eligible Costs

CIP Category	Total Growth Related Cost	% Allocated to 2017-2027 Impact Fees	2017-2027 Growth Related Cost
TRA Projects	$78,039,930	50.6%	$39,478,688
Treatment Plants	$156,677,593	59.4%	$93,041,443
Lift Stations/ Interceptors	$101,724,832	61.7%	$62,719,329
Engineering Studies	$4,274,837	31.9%	$1,365,042
IMPACT FEE SUBTOTAL			**$196,604,503**
FINANCING COSTS			**$135,735,324**
TOTAL IMPACT FEE ELIGIBLE COST			**$332,339,827**

5.1 Service Units

The different costs between customer types are allocated through the application of the equivalent meter concept. Since the 5/8" x 3/4" water meter is the most frequently used meter by the residential customer, a factor has been calculated to relate the capacities of other meter sizes to the 5/8" x 3/4" meter capacity. **Table 5-2** presents the factors developed using capacity information from the American Water Works Association (AWWA) Standard C700-02, Cold-Water Meters – Displacement Type, Bronze Main Case and AWWA Standard C701-07, Cold-Water Meters – Turbine Type, for Customer Service.

Table 5-2 AWWA Meter Equivalency Factors

Meter Size	5/8" x 3/4" Equivalency Factor
5/8" x 3/4"	1.00
3/4"	1.50
1"	2.50
1-1/2"	5.00
2"	8.00
3"	21.75
4"	37.50
6"	80.00
8"	140.00
10"	210.00

Appendix C contains the number of water meters for residential and non-residential customers by meter size for the City of Fort Worth, as well as for the wholesale customers who provided this information to FNI. The number of equivalent meters was also calculated for the City and wholesale customers.

The next calculation step determines factors for population per residential meter and employment per non-residential meter. **Table 5-3** summarizes this calculation for the City of Fort Worth and wholesale customers using 2017 information.

Table 5-3 Development of Factors of 2017 Population and Employment by Equivalent Meter

Description	Residential	Non-Residential
City of Fort Worth		
Number of Equivalent Meters	299,889	117,005
Population / Employment	825,967	550,117
Population per Equivalent Meter	2.75	--
Employment per Equivalent Meter	--	4.70
Wholesale Customers		
Number of Equivalent Meters	137,139	46,818
Population / Employment	339,103	142,309
Population per Equivalent Meter	2.47	--
Employment per Equivalent Meter	--	3.04

FNI did not receive meter count information from four of Fort Worth's wholesale wastewater customers; however, their meter counts were estimated based on growth since the previous impact fee

study. The number of equivalent meters used to calculate the wholesale customers' population/employment per equivalent meter in **Table 5-3** is the total number of equivalent meters served by Fort Worth for all wholesale customers. In order to more accurately estimate the population/employment per equivalent meter, FNI. divided the number of equivalent meters by the sum of population or employment served by Fort Worth.

The projected increase in equivalent meters between 2017 and 2027 uses the ratios in **Table 5-3** and the population and employment projections for 2017 and 2027 from *Exhibit B: Land Use Assumptions-Wastewater Facilities* report. The calculation is shown below:

City of Fort Worth

Residential	= Population Change / Population per Equivalent Meter = (1,026,780 – 825,967) / 2.75 = 73,023
Non- Residential	= Employment Change / Employment per Equivalent Meter = (679,901 – 550,117) / 4.70 = 27,614
Fort Worth Total	= Residential + Non-Residential = 73,023 + 27,614 = 100,637

Wholesale Customers

Residential	= Population Change / Population per Equivalent Meter = (379,802 – 339,103) / 2.47 = 16,477
Non- Residential	= Employment Change / Employment per Equivalent Meter = (173,522 – 142,309) / 3.04 = 10,267
Wholesale Total	= Residential + Non-Residential = 16,477 + 10,267 = 26,744
Grand Total	**= Fort Worth Total + Wholesale Total** **= 100,637 + 26,744** **= 127,381**

5.2 Maximum Allowable Impact Fee Calculation

This report is based on a credit equal to 50% of the total projected cost of implementing the capital improvements plan, as specified in Chapter 395 of the Texas Local Government Code. Should the City

choose to adopt an impact fee of greater than 50% of the total projected cost, a detailed credit calculation analysis is included in **Appendix D.**

Impact fees are the quotient of the total cost of expansion for the study period from **Table 5-1** divided by the increase in equivalent meters. This fee equals the maximum wastewater impact fee for a 5/8" x 3/4" water meter size.

Maximum Wastewater Impact Fee = Cost of Expansion / Increase in Equivalent Meters
= $332,339,827/ 127,381
= $2,609 per 5/8" x 3/4" equivalent meter

The wastewater impact fees for meters other than 5/8" x 3/4" are the product of the fee per 5/8" x 3/4" equivalent meter multiplied by the respective equivalent meter factor from **Table 5-2.** The maximum allowable wastewater impact fees are provided in **Table 5-4**, as well as the resulting impact fee at a 50% collection rate.

Table 5-4 Wastewater Impact Fees by Meter Size

Meter Size	5/8" x 3/4" Equivalency Factor	Maximum Allowable Impact Fee	Impact Fee (Collected at 50%)
5/8" x 3/4"	1.00	$2,609	$1,304
3/4"	1.50	$3,914	$1,956
1"	2.50	$6,523	$3,260
1-1/2"	5.00	$13,045	$6,520
2"	8.00	$20,872	$10,432
3"	21.75	$56,746	$28,362
4"	37.50	$97,838	$48,900
6"	80.00	$208,720	$104,320
8"	140.00	$365,260	$182,560
10"	210.00	$547,890	$273,840

Created By Freese and Nichols, Inc.
Job No.: FTW16125
Location: H:\W_WW_PLANNING\Final_Report\(Figure_F1)-Existing_Watewater_Facilities(11x17).mxd
Updated: Friday, October 07, 2016

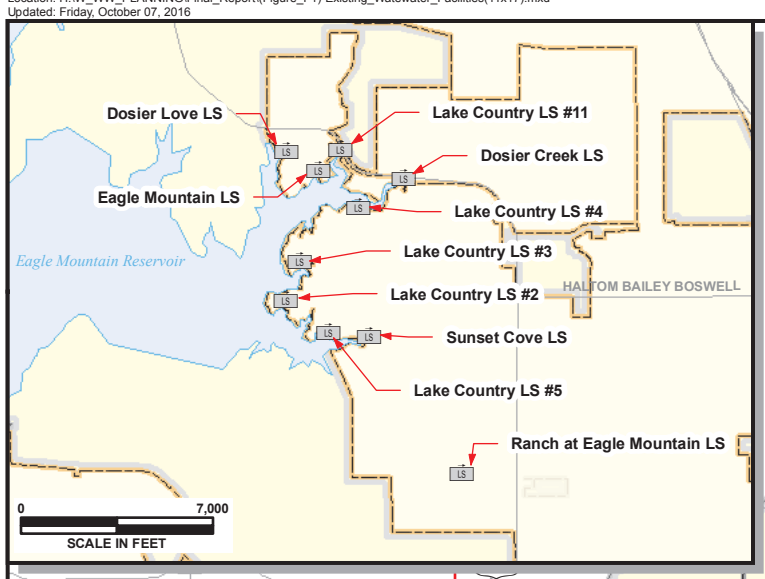
FIGURE F-1
CITY OF FORT WORTH
2017 WASTEWATER IMPACT FEE STUDY
EXISTING FACILITIES

LEGEND

- Existing Lift Station
- Existing Water Reclamation Center
- Road
- Lake
- City Limit
- Wastewater Wholesale Customer
- Non-Wholesale Customer
- ETJ Boundary
- County Boundary

FREESE AND NICHOLS

FORT WORTH®



Denton County

Justin

Rhome

Newark

Intel LS #1

Shield LS

Intel LS #2

Grapevine Lake

Grapevine

Sendera Ranch LS

Spring Ranch LS

Parker County

Azle

Eagle Mountain Reservoir

Glen Mills LS

Colleyville

SAGINAW

BLUE MOUND

WATAUGA

NORTH RICHLAND HILLS

Bedford

Euless

HURST

Jenkins Heights LS

Meadow Lakes LS

Centreport LS

Lakeside

LAKE WORTH

Lake Worth

Lake Worth LS

HALTOM CITY

RICHLAND HILLS

Spring Addition LS

Mosier Valley LS

SANSOM PARK

Castle Circle LS

RIVER OAKS

Live Oak Creek LS

Greenway LS

WRC

Village Creek WRC

WHITE SETTLEMENT

WESTWORTH VILLAGE

Museum Way LS

Western Hills LS

WESTOVER HILLS

Calmont LS

PANTEGO

Lake Arlington

Arlington

Enchanted Bay LS

Winn Dixie LS

BENBROOK

Hulen Bend LS

EDGECLIFF VILLAGE

FOREST HILL

Richardson Slough LS

KENNEDALE

EVERMAN

Joe Pool Lake

Benbrook Lake

Summercreek Ranch LS

Rosemary Ridge LS

CROWLEY

Mansfield

BURLESON

BETHESDA WSC

Johnson County

Ellis County

0
18,000
SCALE IN FEET

Created By Freese and Nichols, Inc.
Job No.: FTW16125
Location: H:\WW_WW_PLANNING\Final_Report\(Figure_F2)-Wastewater_Proposed_Facilities_CIP(11x17).mxd
Updated: Friday, October 07, 2016

FIGURE F-2
CITY OF FORT WORTH
2017 WASTEWATER IMPACT FEE STUDY
PROPOSED FACILITY IMPROVEMENTS

LEGEND

- Proposed Lift Station
- Lift Station Expansion
- Existing Water Reclamation Facility
- Mary's Creek WRF Site 10
- TRA Sewer Line Parallel Improvement
- Road
- Lake
- Fort Worth City Limit
- Fort Worth ETJ Boundary
- Water Wholesale Customer
- Non-Wholesale Customer
- County Boundary

FREESE AND NICHOLS

FORT WORTH®

HC-1
10-25HC-1S
10-25HC-2
15-25HC-3
15-25HC-5
10-25HC-1
CB-1
Denton Creek WWTP
11.5 MGD
Proposed LS
Bonds Ranch C
3.0 MGD
LS-1C
Proposed LS
Bonds Ranch B
2.0 MGD
LS-1B
Proposed LS
Bonds Ranch A
2.0 MGD
LS-1A
Dosier Creek LS
Dosier Creek 20"FM
WWMP-28
Lake Country LS #4
2.0 MGD
LS-13/WWMP-66
Casino Beach LS
0.3 MGD
WWMP-9
Live Oak Creek LS
4.0 MGD
LS-4
Proposed
Mary's Creek WRF
WWMP-53
Walsh Ranch
Phase IVB LS
1.0 MGD
LS-6
Richardson Slough LS
10.0 MGD
LS-12/WWMP-61
Tarleton Regional LS
12.0 MGD
LS-5
108-inch Third Barrel
Interceptor
Village Creek WRF
Proposed Improvements
Proposed LS
25.0 MGD
LS-9

Denton County
Wise County
Parker County
Johnson County
Ellis County

0 18,000
SCALE IN FEET

APPENDIX A
EXISTING WASTEWATER LIFT STATION CAPACITIES

APPENDIX A
Existing Fort Worth Wastewater Lift Stations

No.	Name	Address	Firm Capacity	Total # of Pumps
1	Castle Circle	9101 Heron Dr	1.0 mgd	2 pumps
2	Dosier Creek	9241 Boat Club Rd	10.0 mgd	3 pumps
3	Enchanted Bay	5788 Vesta Farley Rd	0.7 mgd	2 pumps
4	Glen Mills	9091 Saginaw Blvd	0.5 mgd	2 pumps
5	Greenway	1000 Nixon Rd	2 mgd	2 pumps
6	Hulen Bend	6401 Oakmont Blvd	0.8 mgd	2 pumps
7	Intel # 1	3001 Eagle Pkwy	3.9 mgd	2 pumps
8	Intel # 2	3200 Keller-Haslet Rd	8 mgd	3 pumps
9	Jenkins Heights	4525 Norris Valley Dr	1.8 mgd	2 pumps
10	Lake Worth	6201 Cahoba Dr	2.2 mgd	2 pumps
11	Lake Country # 11	9401 Boat Club Rd	0.9 mgd	2 pumps
12	Lake Country # 12	9341 Mountain Lake	0.9 mgd	2 pumps
13	Lake Country # 13	9331 Dosier Cove W	0.5 mgd	2 pumps
14	Lake Country # 2	7903 Skylake Dr	0.1 mgd	2 pumps
15	Lake Country # 3	8831 Random Rd	0.8 mgd	2 pumps
16	Lake Country # 4	9033 Crosswind Dr	0.9 mgd	2 pumps
17	Lake Country # 5	8420 Crosswind Dr	0.2 mgd	2 pumps
18	Live Oak	731 Verna Trail N	2.9 mgd	2 pumps
19	Meadow Lakes	4691 St. Thomas Place	0.5 mgd	2 pumps
20	Mosier Valley	3120 House Anderson Rd	0.14 mgd	2 pumps

21	Ranch at Eagle Mtn	6692 Robertson Rd	0.5 mgd	2 pumps
22	Richardson Slough	7990 Old Granbury Rd	4.6 mgd	3 pumps
23	Rosemary Ridge	10499 Old Crowley Cleburne Rd	1.0 mgd	2 pumps
24	Sendera Ranch	1092 Avondale Haslet Rd	1.5 mgd	2 pumps
25	Shield	14050 Park Vista Blvd	0.7 mgd	2 pumps
26	Spring Ranch	1100 Travis Court	0.4 mgd	2 pumps
27	Summer Creek	9898 W Cleburne Rd	1.5 mgd	2 pumps
28	Sunset Cove	8505 Lake Country Dr	4.0 mgd	3 pumps
29	Western Hills	2717 Glenrock	0.3 mgd	2 pumps
30	Winn Dixie	200 SW Loop 820	0.5 mgd	2 pumps

APPENDIX B
WASTEWATER CIP PROJECTS

Appendix B
WASTEWATER CIP PROJECTS

TRINITY RIVER AUTHORITY PROJECTS

Project Title: **Denton Creek Wastewater Treatment Plant Expansion**

Description: Construction of a 6.5 mgd expansion of TRAs Denton Creek Wastewater Treatment Plant.

Purpose: Provide treatment capacity to address potential growth needs by expanding the existing treatment plant.

Allocation: This project is allocated 30% in the study period.

Project Title: **CB-1 30-Inch Parallel Relief Interceptor**

Description: Land purchase and construction of a 30-inch relief interceptor conveying water to the Denton Creek WWTP.

Purpose: Provide flow capacity to address potential growth needs by paralleling the existing interceptor.

Allocation: This project is allocated 12% in the study period.

Project Title: **25 HC-1 Relief Interceptor**

Description: Land purchase and construction of 12,500 feet of a relief interceptor conveying water to the Denton Creek WWTP.

Purpose: Provide flow capacity to address potential growth needs.

Allocation: This project is allocated 50% in the study period.

Project Title: **25 HC-3 Relief Interceptor**

Description: Land purchase and construction of 13,100 feet of a relief interceptor conveying water to the Denton Creek WWTP.

Purpose: Provide flow capacity to address potential growth needs.

Allocation: This project is allocated 100% in the study period.

Project Title: **25 HC-5 Relief Interceptor and MS 12.0 HC**

Description: Land purchase and construction of a relief interceptor conveying water to the Denton Creek WWTP.

Purpose: Provide flow capacity to address potential growth needs.

Allocation: This project is allocated 100% in the study period.

Appendix B
WASTEWATER CIP PROJECTS

Project Title: **Two Alternate Discharge 14 MGD Pumps**

Description	Design and construction of two alternate discharge pumps at the Denton Creek WWTP.
Purpose:	Provide additional discharge capacity at the Denton Creek WWTP to address potential growth needs.
Allocation:	This project is allocated 50% in the study period.

Project Title: **Peak Flow Storage**

Description	Design and construction of a peak flow storage structure at the Denton Creek WWTP.
Purpose:	Provide additional peak flow storage capacity at the Denton Creek WWTP to address potential growth needs.
Allocation:	This project is allocated 50% in the study period.

Project Title: **25 HC-2 Relief Interceptor**

Description	Land purchase and construction of 4,400 feet of a relief interceptor conveying water to the Denton Creek WWTP.
Purpose:	Provide flow capacity to address potential growth needs.
Allocation:	This project is allocated 19% in the study period.

Appendix B
WASTEWATER CIP PROJECTS

WASTEWATER TREATMENT

Project Title: **Mary's Creek WRF Site Selection and Land Purchase**

Description: Land purchase for Mary's Creek WRF to address growth related needs in the Clear Fork sewer basin.

Purpose: Provide treatment needs to address growth needs by constructing a new treatment facility to serve portions of the Clear Fork Basin.

Allocation: This project is allocated 40% in the study period.

Project Title: **Deep Bed Media Filters 1-20 Modifications**

Description: Modification of the deep bed media filters 1-20.

Purpose: Provides added treatment capacity at the Village Creek Reclamation Facility.

Allocation: This project is allocated 40% in the study period.

Project Title: **VCWRF Peak Flow Diversion Structure**

Description: Design and construction of a wastewater diversion and peak flow storage basin adjacent to the Village Creek Reclamation Facility (VCWRF).

Purpose: Detention facility will equalize the peak influent flows to the VCWWTP. This project will divert and store the peak flows for later treatment under normal conditions.

Allocation: This project is allocated 85% in the study period.

Project Title: **VCWRF Replace Primary Clarifiers 1 - 12 & Grit System (Phase 2B of 191 mgd expansion)**

Description: Design and construction for the replacement of primary clarifiers 1 – 12 and addition of a new grit removal system sized to meet the 191 MGD expansion requirements.

Purpose: The addition of new primary clarifiers to replace the existing primary clarifiers 1-12 would greatly increase the functional capacity of the primary clarifiers and increase hydraulic capacity of the internal 96 inch pipeline. Primary clarifiers 1 - 12 at VCWRF are a hydraulic bottleneck which needs to be addressed to realize the planned expansion to 191 MGD. In addition to being a hydraulic bottleneck, the reliability of the clarifiers are impacted by large amounts of grit (particularly at higher flows). These clarifiers need to be replaced before the 191 MGD capacity can be realized and a new grit removal system needs to be added to increase reliability in capacity and treatment.

Allocation: This project is allocated 88% in the study period.

Project Title: **Mary's Creek WRF Phase 1**

Description: Permitting, design and construction of Mary's Creek WRF to address growth related needs in the Clear Fork Basin.

Purpose: Provide treatment needs to address growth needs by constructing a new treatment plant to serve portions of the Clear Fork Basin.

Allocation: This project is allocated 40% in the study period.

Project Title: **VCWRF South Influent Lift Station**

Description: Design and construction of an influent lift station at the VCWRF.

Purpose: The influent lift station is needed to address growth by providing added influent capacity at the VCWRF.

Allocation: This project is allocated 88% in the study period.

Appendix B
WASTEWATER CIP PROJECTS

REGIONAL LIFT STATIONS AND INTERCEPTORS

Project Title: **Casino Beach Lift Station and Lake Worth Gravity Sewer Extension**

Description: Design and construction of a 0.3 mgd firm capacity lift station to serve future growth.

Purpose: This project is the extension of new sewer service to the west side of Lake Worth. The new service extension is a proposed 8-inch sewer line to serve customers on the west side of Lake Worth along Watercress Dr. The gravity line will convey flow to the Casino Beach Lift Station along Jacksboro Highway on the west side of the lake. The lift station will pump the flow across the lake to the existing Meadow Lakes Lift Station. The new gravity line, along with the proposed lift station and 3-inch force main will provide service to customers currently using an OSSF.

Allocation: This project is allocated 85% in the study period.

Project Title: **Dosier Creek 20-inch Force Main**

Description: Design and construction of 20-inch force main in the Marine Creek and Big Fossil Basins.

Purpose: The purpose of this force main is to provide future wastewater service to the Marine Creek Basin. Due to tight corridors and easements in the downtown area the future flow will be pumped from the Marine Creek Basin to the Big Fossil Basin through the Dosier Creek Lift Station. The transfer of flow will reduce the amount of flow through the downtown corridor and delay the need for paralleling larger interceptors in that area.

Allocation: This project is allocated 50% in the study period.

Project Title: **Tarleton Regional Lift Station LS-5 (Upsize)**

Description: Design and construction of a 12 mgd lift station in the Sycamore Creek Basin.

Purpose: The purpose of this lift station is to provide future wastewater service to the Sycamore Creek Basin. The lift station will serve potential growth in the southwestern corner of the Sycamore Creek Basin and convey it into the existing collection system.

Allocation: This project is allocated 45% in the study period.

Appendix B
WASTEWATER CIP PROJECTS

Project Title: **Walsh Ranch Lift Station and Force Main IVB**

Description: Design and construction of a 1 mgd lift station in the Clear Fork Basin.

Purpose: The purpose of this lift station is to provide future wastewater service to the Clear Fork Basin. The lift station will serve potential growth in the western corner of the Clear Fork Basin and convey it into the existing collection system.

Allocation: This project is allocated 80% in the study period.

Project Title: **Bonds Ranch Lift Station "A" and Force Main**

Description: Design and construction of 2 mgd firm capacity lift station to serve future growth.

Purpose: The purpose of this lift station is to provide future wastewater service to the northwest portions of the City.

Allocation: This project is allocated 72% in the study period.

Project Title: **Bonds Ranch Lift Station "B" and Force Main**

Description: Design and construction of 2 mgd firm capacity lift station to serve future growth.

Purpose: The purpose of this lift station is to provide future wastewater service to the northwest portions of the City.

Allocation: This project is allocated 72% in the study period.

Project Title: **108-Inch Third Barrel Interceptor Parallel to M-280 and M-338**

Description: Design and construction of a 108-inch wastewater interceptor west of the VCWRF.

Purpose: The purpose of this interceptor is to provide capacity to accommodate projected growth.

Allocation: This project is allocated 64% in the study period.

Project Title: **Live Oak Creek Regional Lift Station and Force Main Expansion**

Description: Design and construction of a 1.12 mgd firm capacity expansion lift station of the Live Oak Creek Lift Station to serve future growth.

Purpose: The purpose of this lift station expansion is to provide future wastewater service to the western portion of the West Fork Basin.

Allocation: This project is allocated 100% in the study period.

Appendix B
WASTEWATER CIP PROJECTS

Project Title: **Lake Arlington- VC Drainage Basin Lift Station and Force Main**

Description: Design and construction of a 25 mgd firm capacity lift station to serve future growth.

Purpose: The proposed 25 MGD Village Creek Lift Station and 30-inch force main will discharge into a proposed 54-inch gravity interceptor. The force main will follow the proposed alignment of the new Lakeshore Drive along the west side of Lake Arlington. The purpose of this lift station is to provide growth future wastewater service to the Village Creek Basin.

Allocation: This project is allocated 60% in the study period.

Project Title: **Bonds Ranch Lift Station "C" and Force Main**

Description: Design and construction of 3 mgd firm capacity lift station to serve future growth.

Purpose: The purpose of this lift station is to provide future wastewater service to the northwest portions of the City.

Allocation: This project is allocated 24% in the study period.

Project Title: **5.5 MGD Richardson Slough Lift Station Expansion and 20-inch Force Main in the Clear Fork Basin**

Description: This project is a 5.5 MGD expansion of the Richardson Slough Lift Station just east of Benbrook Lake in the Clear Fork Basin.

Purpose: The purpose of this expansion is to provide future wastewater service to growth related service areas.

Allocation: This project is allocated 10% in the study period.

Project Title: **1.1 MGD Lake Country #4 Lift Station Expansion in the Marine Creek Basin**

Description: This project is the expansion of the existing Lake Country #4 Lift Station, which will be upgraded from a firm capacity of 0.95 MGD to 2.0 MGD.

Purpose: The purpose of this expansion/ rehabilitation is to provide future wastewater service to growth related service areas.

Allocation: This project is allocated 6% in the study period.

Appendix B
WASTEWATER CIP PROJECTS

WASTEWATER ENGINEERING STUDIES

Project Title: **2009 Wastewater System Master Plan**

Description: Engineering Study

Purpose: The 2009 master plan was an update of the 1999 study and includes the planning period 2010 through 2020.

Allocation: This project is allocated 30% to the study period.

Project Title: **2012 Wastewater Impact Fee Study**

Description: Impact Fee Study

Purpose: The 2016 Impact Fee Study provides impact fees for the study period 2017 through 2027.

Allocation: This project is allocated 100% to the study period.

APPENDIX C
WATER METER SUMMARY

Table C-1
Water Meter Summary

City of Fort Worth

Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	199,200	199,200
3/4"	1.50	663	995
1"	2.50	21,870	54,675
1-1/2"	5.00	2,046	10,230
2"	8.00	2,058	16,464
3"	21.75	20	435
4"	37.50	56	2,100
6"	80.00	130	10,400
8"	140.00	34	4,760
10"	210.00	3	630
	TOTAL	**226,080**	**299,889**

Non-Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	7,265	7,265
3/4"	1.50	12	18
1"	2.50	3,571	8,928
1-1/2"	5.00	2,103	10,515
2"	8.00	5,202	41,616
3"	21.75	366	7,961
4"	37.50	331	12,413
6"	80.00	169	13,520
8"	140.00	68	9,520
10"	210.00	25	5,250
	TOTAL	**19,112**	**117,005**

Wholesale Customer: **Benbrook Water Authority**

Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	6,238	6,238
3/4"	1.50	58	88
1"	2.50	3,101	7,752
1-1/2"	5.00	10	49
2"	8.00	13	107
3"	21.75	0	0
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**9,420**	**14,233**

Non-Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	176	176
3/4"	1.50	8	11
1"	2.50	237	593
1-1/2"	5.00	52	258
2"	8.00	183	1,460
3"	21.75	40	864
4"	37.50	1	40
6"	80.00	1	86
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**697**	**3,489**

Table C-1
Water Meter Summary

Wholesale Customer: **Bethesda Water Supply Corportation**

Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	14	14
3/4"	1.50	0	0
1"	2.50	0	0
1-1/2"	5.00	0	0
2"	8.00	0	0
3"	21.75	0	0
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**14**	**14**
Non-Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0
3/4"	1.50	0	0
1"	2.50	0	0
1-1/2"	5.00	0	0
2"	8.00	0	0
3"	21.75	0	0
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**0**	**0**

Wholesale Customer: **City of Blue Mound**

Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	777	777
3/4"	1.50	0	0
1"	2.50	0	0
1-1/2"	5.00	0	0
2"	8.00	0	0
3"	21.75	0	0
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**777**	**777**
Non-Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	2	2
3/4"	1.50	10	15
1"	2.50	1	3
1-1/2"	5.00	1	5
2"	8.00	1	8
3"	21.75	0	0
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**15**	**33**

Table C-1
Water Meter Summary

Wholesale Customer: **City of Burleson**

Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	12,978	12,978
3/4"	1.50	2	3
1"	2.50	27	68
1-1/2"	5.00	3	15
2"	8.00	3	24
3"	21.75	0	0
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**13,013**	**13,088**
Non-Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	391	391
3/4"	1.50	0	0
1"	2.50	129	323
1-1/2"	5.00	94	470
2"	8.00	191	1,528
3"	21.75	20	435
4"	37.50	3	113
6"	80.00	1	80
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**829**	**3,339**

Wholesale Customer: **City of Crowley**

Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	5,168	5,168
3/4"	1.50	0	0
1"	2.50	28	70
1-1/2"	5.00	3	15
2"	8.00	7	56
3"	21.75	2	44
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**5,208**	**5,353**
Non-Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	171	171
3/4"	1.50	0	0
1"	2.50	63	158
1-1/2"	5.00	22	110
2"	8.00	58	464
3"	21.75	9	196
4"	37.50	1	38
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**324**	**1,136**

Table C-1
Water Meter Summary

Wholesale Customer: **City of Edgecliff Village**

Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	1,257	1,257
3/4"	1.50	0	0
1"	2.50	0	0
1-1/2"	5.00	0	0
2"	8.00	0	0
3"	21.75	0	0
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**1,257**	**1,257**

Non-Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	1	1
3/4"	1.50	3	5
1"	2.50	0	0
1-1/2"	5.00	3	16
2"	8.00	0	0
3"	21.75	0	0
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	1	152
10"	210.00	0	0
	TOTAL	**9**	**174**

Wholesale Customer: **City of Everman**

Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0
3/4"	1.50	1,676	2,514
1"	2.50	0	0
1-1/2"	5.00	0	0
2"	8.00	0	0
3"	21.75	0	0
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**1,676**	**2,514**

Non-Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0
3/4"	1.50	125	188
1"	2.50	8	20
1-1/2"	5.00	0	0
2"	8.00	11	88
3"	21.75	1	22
4"	37.50	1	38
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**146**	**355**

Table C-1
Water Meter Summary

Wholesale Customer: **City of Forest Hill**

Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0
3/4"	1.50	4,774	7,161
1"	2.50	0	0
1-1/2"	5.00	0	0
2"	8.00	0	0
3"	21.75	0	0
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**4,774**	**7,161**
Non-Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0
3/4"	1.50	0	0
1"	2.50	64	160
1-1/2"	5.00	30	150
2"	8.00	50	400
3"	21.75	0	0
4"	37.50	2	75
6"	80.00	1	80
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**147**	**865**

Wholesale Customer: **Haltom City**

Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0
3/4"	1.50	11,985	17,978
1"	2.50	39	99
1-1/2"	5.00	0	0
2"	8.00	1	8
3"	21.75	0	0
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**12,026**	**18,084**
Non-Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0
3/4"	1.50	2,033	3,049
1"	2.50	542	1,355
1-1/2"	5.00	0	0
2"	8.00	504	4,034
3"	21.75	122	2,652
4"	37.50	22	843
6"	80.00	5	379
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**3,228**	**12,313**

Table C-1
Water Meter Summary

Wholesale Customer: **City of Hurst**

Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	8,850	8,850
3/4"	1.50	1	2
1"	2.50	1,241	3,103
1-1/2"	5.00	40	200
2"	8.00	8	64
3"	21.75	0	0
4"	37.50	7	263
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**10,147**	**12,481**
Non-Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	408	408
3/4"	1.50	1	2
1"	2.50	332	830
1-1/2"	5.00	203	1,015
2"	8.00	177	1,416
3"	21.75	29	631
4"	37.50	15	563
6"	80.00	1	80
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**1,166**	**4,944**

Wholesale Customer: **City of Kennedale**

Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	67	67
3/4"	1.50	0	0
1"	2.50	6	15
1-1/2"	5.00	0	0
2"	8.00	0	0
3"	21.75	0	9
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**73**	**91**
Non-Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	7	7
3/4"	1.50	0	0
1"	2.50	1	3
1-1/2"	5.00	0	0
2"	8.00	1	8
3"	21.75	0	0
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**9**	**18**

Table C-1
Water Meter Summary

Wholesale Customer: **Lake Worth**

Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	1	1
3/4"	1.50	1,679	2,519
1"	2.50	144	360
1-1/2"	5.00	0	0
2"	8.00	1	8
3"	21.75	0	0
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**1,825**	**2,888**
Non-Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0
3/4"	1.50	133	200
1"	2.50	122	305
1-1/2"	5.00	43	215
2"	8.00	106	848
3"	21.75	25	544
4"	37.50	5	188
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**434**	**2,299**

Wholesale Customer: **City of North Richland Hills**

Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	16,704	16,704
3/4"	1.50	0	0
1"	2.50	853	2,133
1-1/2"	5.00	4	21
2"	8.00	14	110
3"	21.75	0	0
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**17,575**	**18,968**
Non-Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	590	590
3/4"	1.50	0	0
1"	2.50	301	754
1-1/2"	5.00	69	347
2"	8.00	643	5,143
3"	21.75	26	571
4"	37.50	17	630
6"	80.00	3	252
8"	140.00	2	294
10"	210.00	0	0
	TOTAL	**1,652**	**8,581**

Table C-1
Water Meter Summary

Wholesale Customer: **City of Pantego**

Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0
3/4"	1.50	488	732
1"	2.50	43	108
1-1/2"	5.00	4	20
2"	8.00	0	0
3"	21.75	0	0
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**535**	**860**

Non-Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0
3/4"	1.50	316	474
1"	2.50	11	28
1-1/2"	5.00	9	45
2"	8.00	14	112
3"	21.75	2	44
4"	37.50	2	75
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**354**	**777**

Wholesale Customer: **City of Richland Hills**

Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0
3/4"	1.50	2,783	4,175
1"	2.50	79	198
1-1/2"	5.00	8	40
2"	8.00	12	96
3"	21.75	0	0
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**2,882**	**4,508**

Non-Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0
3/4"	1.50	173	260
1"	2.50	83	208
1-1/2"	5.00	29	145
2"	8.00	38	304
3"	21.75	4	87
4"	37.50	2	75
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**329**	**1,078**

Table C-1
Water Meter Summary

Wholesale Customer: **City of River Oaks**

Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	2,562	2,562
3/4"	1.50	15	23
1"	2.50	50	125
1-1/2"	5.00	9	45
2"	8.00	2	16
3"	21.75	0	0
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**2,638**	**2,771**

Non-Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	121	121
3/4"	1.50	0	0
1"	2.50	29	73
1-1/2"	5.00	18	90
2"	8.00	16	128
3"	21.75	1	22
4"	37.50	1	38
6"	80.00	2	160
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**188**	**631**

Wholesale Customer: **City of Saginaw**

Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0
3/4"	1.50	6,964	10,446
1"	2.50	9	23
1-1/2"	5.00	0	0
2"	8.00	0	0
3"	21.75	0	0
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**6,973**	**10,469**

Non-Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0
3/4"	1.50	167	251
1"	2.50	116	290
1-1/2"	5.00	12	60
2"	8.00	137	1,096
3"	21.75	16	348
4"	37.50	7	263
6"	80.00	1	80
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**456**	**2,387**

Table C-1
Water Meter Summary

Wholesale Customer: **Sansom Park**

Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0
3/4"	1.50	1,481	2,222
1"	2.50	0	0
1-1/2"	5.00	0	0
2"	8.00	0	0
3"	21.75	0	0
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**1,481**	**2,222**

Non-Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0
3/4"	1.50	115	173
1"	2.50	2	5
1-1/2"	5.00	0	0
2"	8.00	4	32
3"	21.75	0	0
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**121**	**210**

Wholesale Customer: **Trinity River Authority**

Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0
3/4"	1.50	0	0
1"	2.50	0	0
1-1/2"	5.00	0	0
2"	8.00	0	0
3"	21.75	0	0
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**0**	**0**

Non-Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0
3/4"	1.50	0	0
1"	2.50	0	0
1-1/2"	5.00	0	0
2"	8.00	0	0
3"	21.75	0	0
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**0**	**0**

Table C-1
Water Meter Summary

Wholesale Customer: **City of Watauga**

Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0
3/4"	1.50	7,949	11,924
1"	2.50	1	3
1-1/2"	5.00	0	0
2"	8.00	0	0
3"	21.75	0	0
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**7,950**	**11,926**
Non-Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0
3/4"	1.50	109	163
1"	2.50	107	269
1-1/2"	5.00	6	28
2"	8.00	122	978
3"	21.75	2	49
4"	37.50	1	42
6"	80.00	0	0
8"	140.00	1	158
10"	210.00	0	0
	TOTAL	**349**	**1,688**

Wholesale Customer: **Westover Hills**

Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0
3/4"	1.50	12	18
1"	2.50	93	233
1-1/2"	5.00	159	795
2"	8.00	46	368
3"	21.75	2	44
4"	37.50	1	38
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**313**	**1,495**
Non-Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0
3/4"	1.50	0	0
1"	2.50	0	0
1-1/2"	5.00	0	0
2"	8.00	0	0
3"	21.75	0	0
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**0**	**0**
	TOTAL	**0**	**0**

Table C-1
Water Meter Summary

Wholesale Customer: **City of Westworth Village**

Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0
3/4"	1.50	540	810
1"	2.50	6	15
1-1/2"	5.00	0	0
2"	8.00	3	24
3"	21.75	0	0
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**549**	**849**

Non-Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0
3/4"	1.50	3	5
1"	2.50	15	38
1-1/2"	5.00	6	30
2"	8.00	18	144
3"	21.75	0	0
4"	37.50	2	75
6"	80.00	1	80
8"	140.00	1	140
10"	210.00	0	0
	TOTAL	**46**	**511**

Wholesale Customer: **White Settlement**

Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	5,088	5,088
3/4"	1.50	0	0
1"	2.50	5	13
1-1/2"	5.00	0	0
2"	8.00	4	33
3"	21.75	0	0
4"	37.50	0	0
6"	80.00	0	0
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**5,098**	**5,134**

Non-Residential Meters			
Meter Size	**Equivalency Factor**	**Quantity Meters Served by Ft. Worth**	**Equivalent Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	224	224
3/4"	1.50	0	0
1"	2.50	70	175
1-1/2"	5.00	44	219
2"	8.00	107	860
3"	21.75	12	262
4"	37.50	4	165
6"	80.00	1	88
8"	140.00	0	0
10"	210.00	0	0
	TOTAL	**463**	**1,993**

APPENDIX D
CREDIT CALCULATION ANALYSIS

CREDIT CALCULATION

CODE GOVERNING IMPACT FEE DEVELOPMENT

Local Government Code Title 12, Subtitle C, Chapter 395 contains the rules governing Impact Fee development. As defined in those rules, the maximum impact fee per service unit shall be calculated by dividing the costs of the portion of capital improvements attributed to new growth by the number of new growth units over the time period covered in the impact fee analysis (Section 395.015 MAXIMUM FEE PER SERVICE UNIT, (b)). In addition, the capital improvements plan must contain a plan for awarding either:

- A credit for the portion of utility service revenues (rates) generated by new service units during the program period that is used for the payment of improvements, including the payment of debt, that are included in the capital improvements plan; or
- In the alternative, a credit equal to 50 percent of the total projected cost of implementing the capital improvements plan (Section 395.014 CAPITAL IMPROVEMENTS PLAN, (A)(7)).

The code further states that the impact fee is not allowed to exceed the amount determined by subtracting the credit from the costs of the impact fee eligible capital improvements (maximum impact fee). (Section 395.015 MAXIMUM FEE PER SERVICE UNIT, (a)).

As described by the definitions in the code, the following formulas result:

Maximum Impact Fee = (Total Costs attributed to new growth over 10 years including Interest – Credit) / Number of New Service Units over next 10 years

The purpose of this credit is to ensure that new growth is not charged twice for the portion of capital improvements attributed to them, once through the impact fee and then again through rates.

The code does not specifically address the way in which this credit is to be calculated. Each utility should calculate the credit in a way that is consistent with the operation of their fund, the way they finance their capital improvements, and the way these capital improvements costs are represented in their utility rates. The next section describes how Fort Worth's credit was calculated.

FORT WORTH FINANCING OF CAPITAL IMPROVEMENTS AND CREDIT ANALYSIS

The City of Fort Worth finances all (100%) of its capital improvements through the issuance of bonds. As such, debt service payments include a portion of impact fee eligible costs. Fort Worth then uses impact

fee funds collected to pay the portion of their debt service that is attributed to impact fee eligible costs. This would result in none of their impact fee eligible costs being included in the calculation of their rates (no credit) unless the city chose to transfer impact fees in an amount less than the eligible costs.

As part of its decision making process, the City of Fort Worth considered several options of impact fee and credit analysis. The three scenarios considered are below.

- Scenario 1 – The city would choose the option laid out in Chapter 395 guidelines of collecting only 50% of the maximum impact fee (a 50% credit, no credit analysis needed).
- Scenario 2 – The city would choose to collect an impact fee higher than 50% of the maximum (75%), thereby needing a credit analysis; in years 2017-2018 it is assumed impact fees would cover only a portion of the impact fee eligible debt service; in years 2019-2026 it is assumed impact fees would cover all of the impact fee eligible debt service.
- Scenario 3 – The city would choose to collect an impact fee higher than 50% of the maximum (100%), thereby needing a credit analysis; in years 2017-2018 it is assumed impact fees would cover only a portion of the impact fee eligible debt service; in years 2019-2026 it is assumed impact fees would cover all of the impact fee eligible debt service.

As mentioned above, for Scenarios 2 and 3 the city is choosing not to cover all impact fee eligible debt with money from the Impact Fee Fund for the first two years. The reason for this is that those transfers have already been determined (the 2017 budget was already approved prior to this impact fee study, and the 2018 budget is nearing final approval). In both of those years, the budgeted transfer had been determined based on the anticipated Impact Fee Funds available using the prior Impact Fee collection rate of $921 per service unit. These budgeted transfers are not sufficient to cover all of the impact fee eligible debt service as calculated in this Impact Fee Study. This results in a credit for those years.

In remaining years (2019-2026), it is Fort Worth's intent to transfer sufficient funds from the Impact Fees Fund to cover all impact fee eligible debt service. Fort Worth has a very detailed method of calculating the portion of each year's debt service payments for each bond series that is impact fee eligible, based on the projects that were funded in each bond series and what portion of those projects is impact fee eligible. Further, if there should be a year in which less impact fee funds have been collected than was projected and sufficient impact fee funds are not available to cover the portion of debt service that is impact fee eligible, then the city has committed to use other funds as necessary to

pay that portion of the debt service. When additional impact fees have been collected, the city will reimburse those other funds.

A summary of the impact fee credit analysis for all three scenarios are shown in **Tables D-1** through **D-3**. Graphs of these results and their proposed phasing over the next three years are shown in **Figures D-1** through **D-3**.

Table D-1 Scenario 1 - Impact Fee and Credit Analysis (50%)

	Water	Wastewater
Preliminary Maximum Calculated Infrastructure Cost	$625,041,757	$332,339,827
Minus the CREDIT	$0	$0
Max Allowable Calculated Infrastructure Cost	$625,041,757	$332,339,827
Service Units	142,209	127,381
Max Allowable Impact Fee per Service Unit	$4,395	$2,609
Collect 50% of Max Allowable Impact Fee per Service Unit	**$2,197**	**$1,304**

Table D-1 Scenario 2 - Impact Fee and Credit Analysis (75%)

Credit Calculation	Water	
	2017	2018
Portion of debt service attributed to impact fee eligible costs	$14,236,513	$18,970,578
Budgeted Transfer from Impact Fee Fund to Cover Debt Service	$6,206,967	$6,206,967
Yearly Credit	$8,029,546	$12,763,611
TOTAL Credit	**$20,793,157**	
	Wastewater	
	2017	**2018**
Portion of debt service attributed to impact fee eligible costs	$3,303,775	$4,377,409
Budgeted Transfer from Impact Fee Fund to Cover Debt Service	$2,838,453	$2,838,453
Yearly Credit	$465,322	$1,538,956
TOTAL Credit	**$2,004,278**	

	Water	Wastewater
Preliminary Maximum Calculated Infrastructure Cost	$625,041,757	$332,339,827
Minus the CREDIT	($20,793,157)	($2,004,278)
Max Allowable Calculated Infrastructure Cost	$604,248,600	$330,335,549
Service Units	142,209	127,381
Max Allowable Impact Fee per Service Unit	$4,249	$2,593
Collect 75% of Max Allowable Impact Fee per Service Unit	**$3,187**	**$1,945**

Table D-3 Scenario 3 - Impact Fee and Credit Analysis (100%)

Credit Calculation	Water	
	2017	2018
Portion of debt service attributed to impact fee eligible costs	$14,236,513	$18,970,578
Budgeted Transfer from Impact Fee Fund to Cover Debt Service	$6,206,967	$6,206,967
Yearly Credit	$8,029,546	$12,763,611
TOTAL Credit	**$20,793,157**	
	Wastewater	
	2017	**2018**
Portion of debt service attributed to impact fee eligible costs	$3,303,775	$4,377,409
Budgeted Transfer from Impact Fee Fund to Cover Debt Service	$2,838,453	$2,838,453
Yearly Credit	$465,322	$1,538,956
TOTAL Credit	**$2,004,278**	

	Water	Wastewater
Preliminary Maximum Calculated Infrastructure Cost	$625,041,757	$332,339,827
Minus the CREDIT	($20,793,157)	($2,004,278)
Max Allowable Calculated Infrastructure Cost	$604,248,600	$330,335,549
Service Units	142,209	127,381
Max Allowable Impact Fee per Service Unit	$4,249	$2,593
Collect 100% of Max Allowable Impact Fee per Service Unit	**$4,249**	**$2,593**

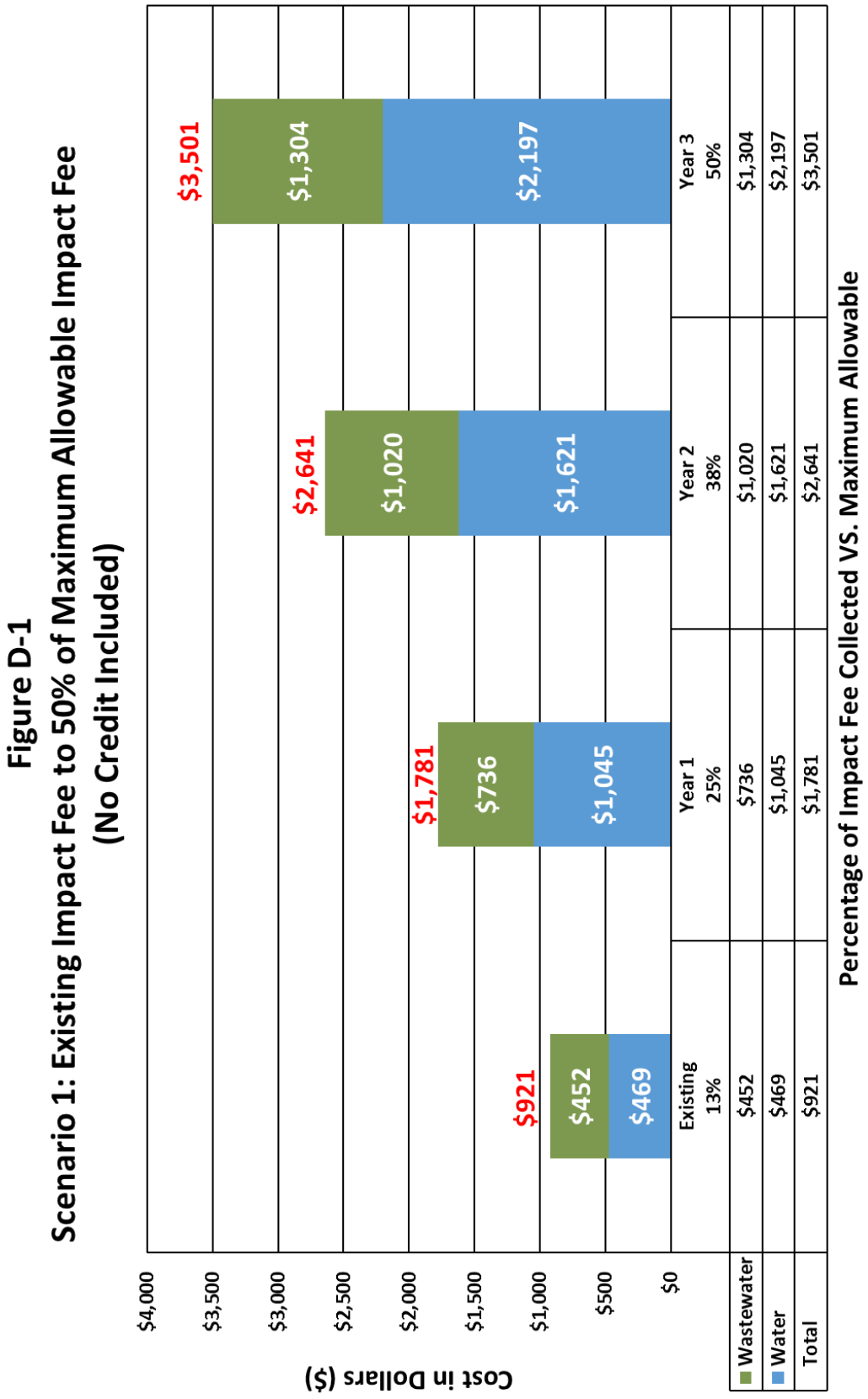


Figure D-1
Scenario 1: Existing Impact Fee to 50% of Maximum Allowable Impact Fee
(No Credit Included)
Cost in Dollars ($)
$4,000
$3,500
$3,000
$2,500
$2,000
$1,500
$1,000
$500
$0
$921
$1,781
$2,641
$3,501
$452
$469
$736
$1,045
$1,020
$1,621
$1,304
$2,197
Existing 13%
Year 1 25%
Year 2 38%
Year 3 50%
Wastewater $452 $736 $1,020 $1,304
Water $469 $1,045 $1,621 $2,197
Total $921 $1,781 $2,641 $3,501
Percentage of Impact Fee Collected VS. Maximum Allowable
Water
Wastewater

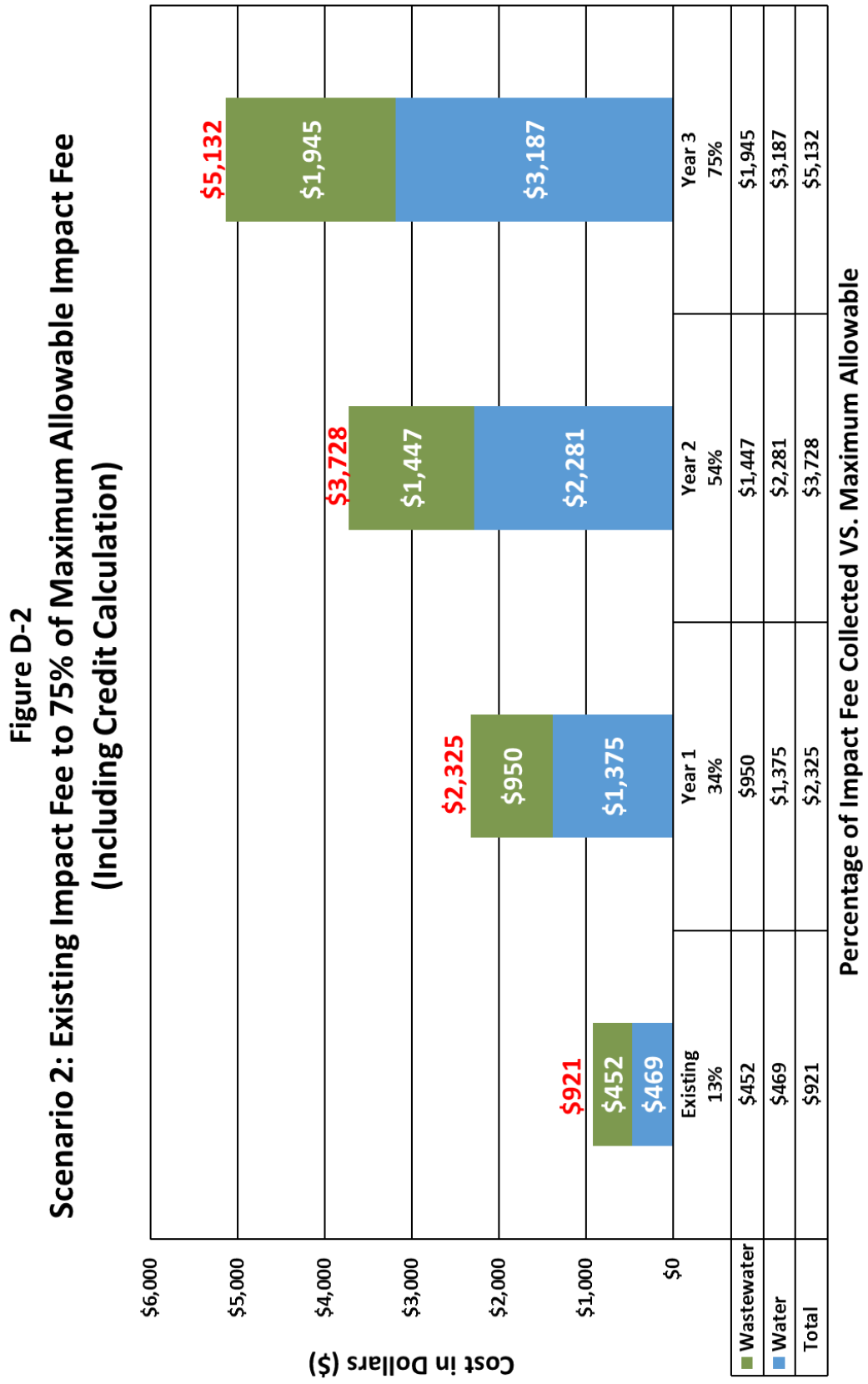


Figure D-2
Scenario 2: Existing Impact Fee to 75% of Maximum Allowable Impact Fee
(Including Credit Calculation)
Cost in Dollars ($)
$6,000
$5,000
$4,000
$3,000
$2,000
$1,000
$0
$921
$2,325
$3,728
$5,132
$452
$469
$950
$1,375
$1,447
$2,281
$1,945
$3,187
Existing 13%
Year 1 34%
Year 2 54%
Year 3 75%
Wastewater
Water
Total
$452
$469
$921
$950
$1,375
$2,325
$1,447
$2,281
$3,728
$1,945
$3,187
$5,132
Percentage of Impact Fee Collected VS. Maximum Allowable
Water
Wastewater


Figure D-3
Scenario 3: Existing Impact Fee to 100% of Maximum Allowable Impact Fee
(Including Credit Calculation)
Cost in Dollars ($)
$8,000
$7,000
$6,000
$5,000
$4,000
$3,000
$2,000
$1,000
$0
$921
$4,868
$2,895
$6,842
$452
$469
$1,166
$1,729
$1,879
$2,989
$2,593
$4,249
Existing 13%
Year 1 42%
Year 2 71%
Year 3 100%
Wastewater $452 $1,166 $1,879 $2,593
Water $469 $1,729 $2,989 $4,249
Total $921 $2,895 $4,868 $6,842
Percentage of Impact Fee Collected VS. Maximum Allowable
Water
Wastewater

FREESE AND NICHOLS, INC.
4055 INTERNATIONAL PLAZA, SUITE 200
FORT WORTH, TEXAS 76109
817-735-7300

www.freese.com