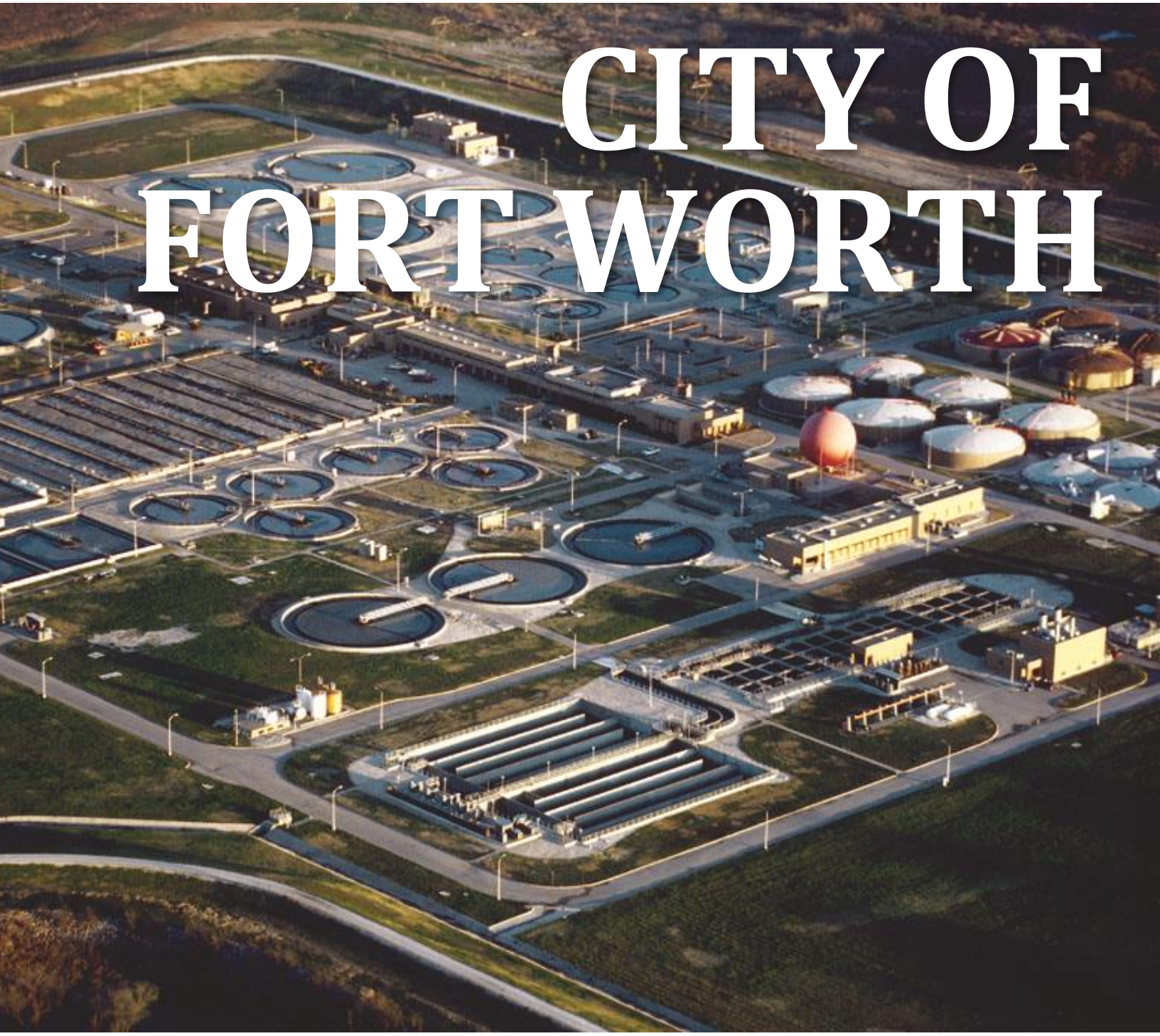

CITY OF FORT WORTH

WATER/WASTEWATER IMPACT FEE UPDATE

EXHIBIT F: CAPITAL IMPROVEMENT PLAN - WASTEWATER (2022–2041)

PREPARED BY:
FREESE AND NICHOLS, INC.
801 CHERRY STREET, SUITE 2800
FORT WORTH, TEXAS 76102
817-735-7300

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WATER & WASTEWATER IMPACT FEE UPDATE

EXHIBIT F: CAPITAL IMPROVEMENT PLAN - WASTEWATER (2022 – 2041)

Prepared for:

Fort Worth Water

July 22, 2021

Prepared by:

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Fort Worth, Texas 76102
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WATER & WASTEWATER IMPACT FEE UPDATE

Prepared for:

Fort Worth Water

7/22/2021

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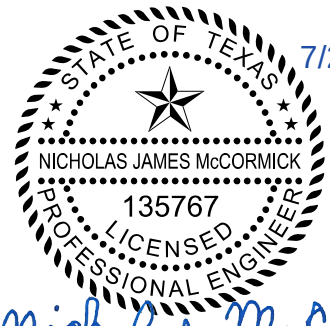

7/22/2021

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ENGINEERING FIRM
F-2144

Prepared by:

FREESE AND NICHOLS, INC.
801 Cherry Street, Suite 2800
Fort Worth, Texas 76102
817-735-7300

FTW20118

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 2017.

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 Improvement 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 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 35 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

The Texas Commission on Environmental Quality (TCEQ) recommends a minimum of 100 gallons per capita per day (gpcd) for municipal base flow. The *2012 Wastewater System 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. Additionally, the *2012 Wastewater System 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.

The wholesale customer flow was provided by the wholesale customers as part of the wholesale customer surveys. **Table 3-1** summarizes the projected wastewater flows for the City of Fort Worth and its wholesale customers.

Table 3-1 Projected Wastewater Flows

Entity	Planning Year	Average Day Flow (MGD)	Peak Hour Demand (MGD)
City of Fort Worth	2022	134.04	406.14
	2031	164.20	497.53
Wholesale Customers (Portion Served by Fort Worth)	2022	38.79	117.18
	2031	51.33	144.54
Total Flow	**2022**	**172.83**	**523.32**
	2031	**215.53**	**642.07**

4.0 WASTEWATER CAPITAL IMPROVEMENTS

This section establishes the wastewater facilities and engineering studies that are eligible for inclusion in the calculation of the impact fee. Projects included in the CIP are designated to increase system capacity as a result of projected growth. Only those projects warranted by capacity needs derived from growth occurring during the study period (2022-2031) 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, City of Fort Worth 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 2022-2031 study period. Project costs do not include costs associated with purchasing land, unless specified in the "Project Phase" field. The 2022 percent utilization is the portion of a project's capacity required to serve existing development. It is not included in the impact fee cost calculations. The 2022-2031 percent utilization is the portion of the project's capacity that will be required to serve development projected to occur from 2022 to 2031. The portion of a project's total cost that is used to serve development projected to occur from 2022 through 2031 is calculated as the total cost multiplied by the 2022-2031 percent utilization. Only this portion of the cost is used in the impact fee analysis. The percent utilization beyond 2031 is the portion of a project's capacity allocated to development projected to occur after 2031.

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 2022-2031 planning period. A project description, the purpose of each project, and the portion of each project that is allocated to associated growth are included.

Table 4-1 Wastewater Capital Improvement Projects 2022 - 2031

Project ID	Project Title	Project Phase	TRA Project Cost	Fort Worth Participation Cost	Initial Project Cost	Project Cost in 2020 Dollars[1]	Start Date	Completion Date	Added Capacity (MGD)	% Allocated to Existing 2022 Capacity	Cost Allocated to Existing 2022 Capacity	% Allocated to 2022-2031 Impact Fees	2022-2031 Impact Fees (2020 Dollars)	Inflation Adjusted Impact Fee Costs[1] ('Start Date' Dollars)	% Allocated to Impact Fees after 2031	Cost Allocated to Impact Fees after 2031
TRINITY RIVER AUTHORITY PROJECTS																
3828.211	Denton Creek WRF Expansion to 11.5 MGD	Const	$47,595,000	$26,177,250	-	$26,177,250	2008	2010	6.5 MGD	54%	$14,135,715	24%	$6,282,540	$6,282,540	22.0%	$5,758,995
3828.651	CB-1 36-inch Parallel Relief Interceptor	Const	$5,317,548	$2,924,651	-	$2,924,651	2013	2015	-	12%	$350,958	30%	$877,395	$877,395	58.0%	$1,696,298
3828.641	HC-1 Relief Int. (460H-DCRWS)	Eng	$2,407,149	$1,323,932	-	$1,323,932	2015	2020	-	0%	$0	20%	$264,786	$264,786	80.0%	$1,059,146
3828.641	HC-1 Relief Int. (460H-DCRWS)	Const	$17,650,502	$9,707,776	-	$9,707,776	2015	2020	-	0%	$0	20%	$1,941,555	$1,941,555	80.0%	$7,766,221
3828.2017[2]	One Alternate Discharge Pump	Eng	$161,330	$88,732	-	$88,732	2016	2018	-	54%	$47,915	24%	$21,296	$21,296	22.0%	$19,521
3828.2017[2]	One Alternate Discharge Pump	Const	$449,555	$247,255	-	$247,255	2019	2021	-	54%	$133,518	24%	$59,341	$59,341	22.0%	$54,396
3828.642	10-25HC-1 Relief Int. (740H - 460H) 12,500 LF	Land	$1,241,000	$682,550	-	$682,550	2015	2019	-	0%	$0	46%	$313,973	$313,973	54.0%	$368,577
3828.642	10-25HC-1 Relief Int. (740H - 460H) 12,500 LF	Const	$12,970,707	$7,133,889	-	$7,133,889	2019	2021	-	0%	$0	46%	$3,281,589	$3,281,589	54.0%	$3,852,300
3828.644	15-25HC-3 Relief Int. (1320H to 740H) 13,100 LF (Relieving 24-inch Interceptor)	Land	$800,000	$440,000	-	$440,000	2019	2021	-	0%	$0	49%	$215,600	$215,600	51.0%	$224,400
3828.644	15-25HC-3 Relief Int. (1320H to 740H) 13,100 LF (Relieving 24-inch Interceptor)	Const	$15,015,891	$8,258,740	-	$8,258,740	2021	2022	44.12 MGD	0%	$0	49%	$4,046,783	$4,168,186	51.0%	$4,211,957
3828.645	15-25HC-4/15-25HC-5 Relief Interceptor & MS 10_0HC (1320H-1780H)	Land	$894,000	$491,700	-	$491,700	2020	2021	-	0%	$0	52%	$255,684	$255,684	48.0%	$518,989
3828.645	15-25HC-4/15-25HC-5 Relief Interceptor & MS 10_0HC (1320H-1780H)	Const	$15,829,000	$8,705,950	-	$8,705,950	2021	2023	16.1 MGD	0%	$0	52%	$4,527,094	$4,662,907	48.0%	$4,178,856
3828.2012	Peak Flow Storage	Eng	$5,213,000	$2,867,150	-	$2,867,150	2021	2022	30.6 MG	0%	$0	50%	$1,433,575	$1,476,582	50.0%	$1,433,575
3828.2012	Peak Flow Storage	Const	$32,640,000	$17,952,000	-	$17,952,000	2023	2023	-	0%	$0	50%	$8,976,000	$9,808,318	50.0%	$8,976,000
			$158,184,682	**$87,001,575**	**-**	**$87,001,575**				**TRINITY RIVER AUTHORITY PROJECTS ELIGIBLE COST**			**$32,497,211**	**$33,629,752**		
TREATMENT FACILITIES																
WWTP-003	Deep Bed Media Filters 1-20 Modifications	Design	-	-	$1,032,750	$1,032,750	2011	2016	-	75%	$774,563	25%	$258,188	$258,188	0.0%	$0
WWTP-003	Deep Bed Media Filters 1-20 Modifications	CM\Insp	-	-	$995,000	$995,000	2011	2016	-	75%	$746,250	25%	$248,750	$248,750	0.0%	$0
WWTP-003	Deep Bed Media Filters 1-20 Modifications	Const	-	-	$16,889,298	$16,889,298	2011	2016	80 MGD	75%	$12,666,974	25%	$4,222,325	$4,222,325	0.0%	$0
WWTP-009	VCWRF Peak Flow Diversion Structure (Equalization Basin for Peak Flows)	CM\Const	-	-	$30,921,046	$30,921,046	2012	2018	100 MG	25%	$7,730,262	75%	$23,190,785	$23,190,785	0.0%	$0
WWTP-013[3]	VCWRF South Influent Lift Station (V-3)	Eng	-	-	$452,147	$452,147	2017	2021	-	0%	$0	93%	$420,497	$420,497	7.0%	$31,650
WWTP-013[3]	VCWRF South Influent Lift Station (V-3)	Const	-	-	$21,081,975	$21,081,975	2021	2022	-	0%	$0	93%	$19,606,237	$20,194,424	7.0%	$1,475,738
WWMP #53	Mary's Creek WRF Site Selection and Land Purchase	Land	-	-	$4,950,000	$4,950,000	2011	2011	-	0%	$0	52%	$2,574,000	$2,574,000	48.0%	$2,376,000
WWMP #53	Mary's Creek Satellite Plant (MP-053)	Permitting\Eng	-	-	$13,500,000	$13,500,000	2017	2023	-	0%	$0	52%	$7,020,000	$7,020,000	48.0%	$6,480,000
WWMP #53[3]	Mary's Creek Satellite Plant (MP-053)	Const	-	-	$135,000,000	$135,000,000	2024	2026	10 MGD	0%	$0	52%	$70,200,000	$79,010,718	48.0%	$64,800,000
WWTP-012-1	VCWRF Replace Primary Clarifiers 1-12 (Phase 2B of 191 MGD expansion)	Study\Eng	-	-	$3,785,000	$3,785,000	2017	2020	-	0%	$0	93%	$3,520,050	$3,520,050	7.0%	$264,950
WWTP-012-2	VCWRF Replace Primary Clarifiers 1-12 (Phase 2B of 191 MGD expansion)	CM\Const	-	-	$10,574,070	$10,574,070	2024	2025	25 MGD	0%	$0	93%	$9,833,885	$11,068,124	7.0%	$740,185
WWTP-012-3	VCWRF Replace Primary Clarifiers 1-12 (Phase 2B of 191 MGD expansion)	CM\Const	-	-	$10,574,070	$10,574,070	2024	2025	-	0%	$0	93%	$9,833,885	$11,068,124	7.0%	$740,185
			-	**-**	**$249,755,356**	**$249,755,356**				**WASTEWATER TREATMENT PLANTS ELIGIBLE COST**			**$150,928,602**	**$162,795,985**		
REGIONAL LIFT STATIONS & INTERCEPTORS																
WWMP #107[4]	4.4 MGD Rock Creek Lift Station Expansion (outside of PID boundary) to 6.0 MGD (Including 16-inch Parallel Force Main)	Eng	-	-	$1,096,000	$1,096,000	2017	2023	-	0%	$0	99%	$1,085,040	$1,085,040	1.0%	$10,960
WWMP #107[4]	4.4 MGD Rock Creek Lift Station Expansion (outside of PID boundary) to 6.0 MGD (Including 16-inch Parallel Force Main)	Const	-	-	$7,306,600	$7,306,600	2017	2024	4.4 MGD	0%	$0	99%	$7,233,534	$7,233,534	1.0%	$73,066
WWMP #28[3]	Dosier Creek 24-inch Force Main (Marine Creek to Big Fossil Basin WW Diversion)	Eng	-	-	$400,000	$400,000	2015	2019	-	31%	$124,000	69%	$276,000	$276,000	0.0%	$0
WWMP #28[3]	Dosier Creek 24-inch Force Main (Marine Creek to Big Fossil Basin WW Diversion)	Const	-	-	$3,877,861	$3,877,861	2019	2020	14 MGD	31%	$1,202,137	69%	$2,675,724	$2,675,724	0.0%	$0
WWMP #13[4]	Proposed 44.0 MGD Lake Arlington - VC Basin Lift Station & 42-inch Force Main	Eng	-	-	$4,299,132	$4,299,132	2018	2020	-	0%	$0	100%	$4,299,132	$4,299,132	0.0%	$0
WWMP #13[4]	Proposed 44.0 MGD Lake Arlington - VC Basin Lift Station & 42-inch Force Main	Const	-	-	$49,018,693	$49,018,693	2020	2023	44 MGD	0%	$0	100%	$49,018,693	$49,018,693	0.0%	$0
2022 IF #1[4]	Proposed 5.25 MGD Bonds Ranch Lift Station "A" & Force Main	Eng	-	-	$800,900	$800,900	2020	2023	-	0%	$0	55%	$440,495	$440,495	45.0%	$360,405
2022 IF #1[4]	Proposed 5.25 MGD Bonds Ranch Lift Station "A" & Force Main	Const	-	-	$5,338,800	$5,338,800	2020	2023	5.25 MGD	0%	$0	55%	$2,936,340	$2,936,340	45.0%	$2,402,460
2022 IF #2[3]	Proposed 22.0 MGD Clear Fork Lift Station & 30-inch Force Main	Eng	-	-	$3,720,000	$3,720,000	2020	2021	-	0%	$0	59%	$2,194,800	$2,194,800	41.0%	$1,525,200
2022 IF #2[3]	Proposed 22.0 MGD Clear Fork Lift Station & 30-inch Force Main	Const	-	-	$24,800,000	$24,800,000	2021	2025	22 MGD	0%	$0	59%	$14,632,000	$15,070,960	41.0%	$10,168,000
2022 IF #3[4]	Proposed 4.5 MGD Bonds Ranch Lift Station "B" & Force Main	Eng	-	-	$806,000	$806,000	2022	2023	-	0%	$0	55%	$443,300	$470,297	45.0%	$362,700
2022 IF #3[4]	Proposed 4.5 MGD Bonds Ranch Lift Station "B" & Force Main	Const	-	-	$5,372,700	$5,372,700	2023	2024	4.5 MGD	0%	$0	55%	$2,954,985	$3,228,992	45.0%	$2,417,715
WWMP #61[4]	5.5 MGD Richardson Slough Lift Station Expansion to 10.0 MGD & 20-inch Force Main in the Clear Fork Basin	Eng	-	-	$607,200	$607,200	2024	2025	-	0%	$0	100%	$607,200	$683,409	0.0%	$0
WWMP #61[4]	5.5 MGD Richardson Slough Lift Station Expansion to 10.0 MGD & 20-inch Force Main in the Clear Fork Basin	Const	-	-	$4,047,600	$4,047,600	2025	2025	5.5 MGD	0%	$0	100%	$4,047,600	$4,692,278	0.0%	$0
WWMP #54[4]	Proposed 10.0 MGD Walnut Creek Lift Station & 24-inch Force Main	Eng	-	-	$2,924,700	$2,924,700	2026	2028	-	0%	$0	48%	$1,403,856	$1,676,277	52.0%	$1,520,844
WWMP #54[4]	Proposed 10.0 MGD Walnut Creek Lift Station & 24-inch Force Main	Const	-	-	$19,497,600	$19,497,600	2026	2028	10 MGD	0%	$0	48%	$9,358,848	$11,174,954	52.0%	$10,138,752
WWMP #64[4]	14.0 MGD Dosier Creek Lift Station Expansion to 24.0 MGD & 24-inch Force Main	Eng	-	-	$1,953,100	$1,953,100	2026	2028	-	0%	$0	50%	$976,550	$1,166,052	50.0%	$976,550
WWMP #64[4]	14.0 MGD Dosier Creek Lift Station Expansion to 24.0 MGD & 24-inch Force Main	Const	-	-	$13,020,500	$13,020,500	2026	2028	14 MGD	0%	$0	50%	$6,510,250	$7,773,579	50.0%	$6,510,250
2022 IF #4[3]	Proposed 13.0 MGD La Frontera Lift Station	Eng	-	-	$540,000	$540,000	2026	2028	-	0%	$0	40%	$216,000	$257,915	60.0%	$324,000
2022 IF #4[4]	Proposed 13.0 MGD La Frontera Lift Station	Const	-	-	$8,594,900	$8,594,900	2026	2028	13 MGD	0%	$0	40%	$3,437,960	$4,105,104	60.0%	$5,156,940
WWMP #96[4]	Proposed 10.0 MGD Regional Lift Station & 24-inch Force Main	Eng	-	-	$2,251,100	$2,251,100	2026	2028	-	0%	$0	30%	$675,330	$806,379	70.0%	$1,575,770
WWMP #96[4]	Proposed 10.0 MGD Regional Lift Station & 24-inch Force Main	Const	-	-	$15,006,800	$15,006,800	2026	2028	10 MGD	0%	$0	30%	$4,502,040	$5,375,671	70.0%	$10,504,760
WWMP #18[4]	108-inch Third Barrel Interceptor Parallel to M-280 & M-338 MP-018	Eng	-	-	$14,467,800	$14,467,800	2025	2032	-	0%	$0	51%	$7,378,578	$8,553,794	49.0%	$7,089,222
WWMP #18[4]	108-inch Third Barrel Interceptor Parallel to M-280 & M-338 MP-018	Const	-	-	$96,432,000	$96,432,000	2026	2032	173 MGD	0%	$0	51%	$49,180,320	$58,723,874	49.0%	$47,251,680
			-	**-**	**$286,179,986**	**$286,179,986**					**LIFT STATIONS ELIGIBLE COST**		**$176,484,575**	**$193,919,293**		
ENGINEERING STUDIES																
-	2012 Wastewater Master Plan 2010-2030	Study	-	-	$4,156,850	$4,156,850	2008	2012	-	60%	$2,494,110	40%	$1,662,740	$1,662,740	0.0%	$0
-	Impact Fee Study 2022-2031	Study	-	-	$450,000	$450,000	2019	2021	-	0%	$0	100%	$450,000	$450,000	0.0%	$0
WWTP-043[3]	Village Creek Facilities Plan	Study			$1,000,000	$1,000,000	2023	2023	-	0%	$0	100%	$1,000,000	$1,092,727	0.0%	$0
			-	**-**	**$5,606,850**	**$5,606,850**					**ENGINEERING STUDIES ELIGIBLE COST**		**$3,112,740**	**$3,205,467**		
						$628,543,767					**WASTEWATER CIP ELIGIBLE COST**		**$363,023,128**	**$393,550,497**		

[1]ENR factor of 7.9% used to inflate projected cost from 2017 WMP to 2020 dollars and an inflation rate of 3%/year was assumed on proposed projects only.

[2]One alternate discharge pump was included in Plant Rehab Phase 1 Project.

[3]Revised project costs for 2020 provided by City Staff/Consultant.

[4]Revised project costs due to deviations from 2012 WWMP CIP.

*New lift station unit pricing was provided by Fort Worth Water staff based on recent bid tabs (Ventana Lift Station).

**Expansion lift station unit pricing was provided by Fort Worth Water staff.

Information Sources:

- 2012 Wastewater System Master Plan, Freese & Nichols
- 5-year CIP Budget 2021 - 2025, City of Fort Worth
- Semiannual CIP Progress Report, City of Fort Worth
- City of Fort Worth staff
- Trinity River Authority staff

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FIGURE F-1
CITY OF FORT WORTH
EXISTING WASTEWATER SYSTEM FACILITIES

LEGEND

- Water Reclamation Facility
- Lift Station
- Road
- Lake
- Impact Fee Wastewater Service Area
- Fort Worth City Limit
- Fort Worth ETJ Boundary
- Sewer Wholesale Customer
- Non-Wholesale Customer
- County Boundary

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Lake Country LS #13
Lake Country LS #12
Lake Country LS #11
Dosier Creek LS
Lake Country LS #4
Lake Country LS #3
Lake Country LS #2
Sunset Cove LS
Lake Country LS #5
Eagle Ranch LS

0 7,000
SCALE IN FEET

Denton Creek WRC
Intel LS #1
Haslet Heights LS
Sendera Ranch LS
Spring Ranch LS
Hunter Crossroads LS
Shield LS
Intel LS #2
Glen Mills LS
Meadow Lakes LS
Jenkins Heights LS
Casino Beach LS
Lake Worth LS
Castle Circle LS
Live Oak LS
Western Hills LS
Greenway LS
Village Creek WRC
Mosier Valley LS
Waterside LS
Winn Dixie LS
Enchanted Bay LS
Hulen Bend LS
Richardson Slough LS
Summer Creek Ranch LS
Rosemary Ridge LS
Rock Creek Ranch LS

0 18,000
SCALE IN FEET

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ENGINEERING STUDIES

2012 Wastewater Master Plan
Impact Fee Study 2022-2031
Village Creek Facilities Plan

FIGURE F-2
CITY OF FORT WORTH
2022 WASTEWATER IMPACT FEE STUDY
PROPOSED IMPROVEMENTS

LEGEND

- Proposed Lift Station
- Proposed Wastewater Line Improvement
- Proposed Force Main Improvement
- Mary's Creek WRF
- TRA Sewer Line Improvement
- Impact Fee Wastewater Service Area
- Existing Water Reclamation Facility
- Existing Force Main
- Road
- Lake
- Fort Worth City Limit
- Fort Worth ETJ Boundary
- Sewer Wholesale Customer
- Non-Wholesale Customer
- County Boundary

FORT WORTH®

FREESE AND NICHOLS

Denton Creek WRF
11.5 MGD (3828.211)
One Alternate Discharge Pump (3828.2017*)
Peak Flow Storage (3828.2012)

HC-1 (3828.641)

CB-1 (3828.651)

10-25HC-1 (3828.642)

15-25HC-3 (3828.644)

15-25HC-5 (3828.645)

15-25HC-4 (3828.645)

Bonds Ranch LS B
4.5 MGD
2022 IF #3

Bonds Ranch LS A
5.25 MGD
2022 IF #1

Proposed LS La Frontera
13.0 MGD
2022 IF #4

Dosier Creek 24" FM
WWMP #28

Dosier Creek LS
24.0 MGD (14 MGD Expansion)
and 24" FM (Parallel)
WWMP #64

Proposed Regional LS & 24" FM
10.0 MGD
WWMP #96

Proposed Mary's Creek 10.0 MGD WRF
WWMP #53

Proposed Clearfork LS & 30" FM
22.0 MGD
2022 IF #2

Proposed Walnut Creek LS & 24" FM
10.0 MGD
WWMP #54

Richardson Slough LS
10.0 MGD (5.5 MGD Expansion)
& 20" FM (Parallel)
WWMP #61

Rock Creek Ranch LS
6.0 MGD (4.4 MGD Expansion)
& 16" FM (Parallel)
WWMP #107

Proposed Lake Arlington LS & 42" FM
44.0 MGD
WWMP #13

108-inch Third Barrel Interceptor
WWMP #18

Village Creek WRF
Proposed Improvements
WWTP-003, 009, 012, 013

Wise County
Denton County
Parker County
Tarrant County
Johnson County
Ellis County

Decatur, Ponder, Dish, New Fairview, Boyd, Rhome, Aurora, Justin, Northlake, Roanoke, Trophy Club, Lewisville, Grapevine Lake, Lakeside, Newark, Briar, Reno, Pecan Acres, Pelican Bay, Sanctuary, Azle, Eagle Mountain Lake, Lake Worth, Westlake, Keller, Southlake, Grapevine, Colleyville, DFW Airport, Bedford, Euless, Hurst, Haltom City, Richland Hills, North Richland Hills, Watauga, Saginaw, Blue Mound, Lake Worth, Sansom Park, Westworth Village, River Oaks, White Settlement, Westover Hills, Benbrook, Edgecliff Village, Forest Hill, Everman, Kennedale, Arlington, Pantego, Dalworthington Gardens, Benbrook Lake, Crowley, Burleson, Bethesda WSC, Briaroaks, Cross Timber, Joshua, Godley, Cleburne, Keene, Alvarado, Venus, Midlothian, Mansfield, Rendon, Joe Pool Lake, Grand Prairie, Cresson, Willow Park, Annetta North, Annetta South, Aledo, Annetta

0 18,000
SCALE IN FEET

5.0 IMPACT FEE ANALYSIS

Table 5-1 summarizes the impact fee eligible costs for projects from **Table 4-1**. The calculated cumulative interest includes the following assumptions:

- Existing impact fee eligible CIP
  - Based on the actual interest for the already outstanding debt for the full term of the bond issuance.
- Future impact fee eligible CIP
  - Based on the projects start date.
  - Utilizing a bond issuance cost of 2.0%.
  - Utilizing an interest rate of 4.0%.
  - Utilizing a Fort Worth bond term of 30 years.
  - Utilizing a TRA bond term of 20 years.

A more detailed explanation of the cumulative interest is included in the impact fee credit analysis, which can be found in **Appendix C**.

Table 5-1 2022-2031 Impact Fee Eligible Costs

CIP Category	Total Growth Related Cost	% Allocated to 2022-2031 Impact Fees	2022-2031 Growth Related Cost
TRA Projects	$87,001,575	39%	$33,629,752
Treatment Facilities	$249,755,356	65%	$162,795,985
Lift Stations/Interceptors	$286,179,986	68%	$193,919,293
Engineering Studies	$5,606,850	57%	$3,205,467
ELIGIBLE IMPACT FEE CIP SUBTOTAL (2020 DOLLARS)			**$393,550,497**
Cumulative Interest - Fort Worth			$159,736,337
Cumulative Interest - TRA			$16,155,341
TOTAL IMPACT FEE ELIGIBLE COST			**$569,442,175**

5.1 SERVICE UNITS

Costs between various customer types and sizes are allocated through the application of equivalent meters. 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 current 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 its wholesale customers using 2020 information.

Table 5-3 Development of Factors of 2020 Population and Employment by Equivalent Meter

Description	Residential	Non-Residential
City of Fort Worth		
Number of Equivalent Meters	327,199	97,081
Population / Employment	873,130	589,052
Population per Equivalent Meter	2.67	--
Employment per Equivalent Meter	--	6.07
Wholesale Customers		
Number of Equivalent Meters	134,510	32,729
Population / Employment	351,673	160,231
Population per Equivalent Meter	2.61	--
Employment per Equivalent Meter	--	4.90

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 its 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 2022 and 2031 uses the ratios in **Table 5-3** and the population and employment projections for 2022 and 2031 in *Exhibit B- Wastewater Land Use Assumptions Report*. The calculation is shown below:

City of Fort Worth Increase in Equivalent Meters

Residential = Population Change / Population per Equivalent Meter
= (1,133,678 – 911,970) / 2.67
= 83,037 Service Units

Non- Residential = Employment Change / Employment per Equivalent Meter
= (704,041 – 615,009) / 6.07
= 14,668 Service Units

Fort Worth Total = Residential + Non-Residential
= 83,037 + 14,668
= 97,705 Service Units

Wholesale Customers Increase in Equivalent Meters

Residential = Population Change / Population per Equivalent Meter
= (429,667 – 364,844) / 2.61
= 24,836 Service Units

Non- Residential = Employment Change / Employment per Equivalent Meter
= (185,300 – 164,635) / 4.90
= 4,217 Service Units

Wholesale Total = Residential + Non-Residential
= 24,836 + 4,217
= 29,053 Service Units

Grand Total **= Fort Worth Total + Wholesale Total**
= 97,705 + 29,053
= 126,758 Service Units

5.2 MAXIMUM ALLOWABLE IMPACT FEE CALCULATION

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

Wastewater Impact Fee per Service Unit = Max Infrastructure Cost / Increase in Equivalent Meters
= $569,442,175 / 126,758
= $4,492 per 5/8" x 3/4" equivalent meter

The maximum allowable impact fee that can be collected is calculated by subtracting a credit from the impact fee eligible cost. A detailed impact fee credit analysis is included in **Appendix C**. A summary of the maximum allowable water impact fee including the credit analysis is shown in **Table 5-4**.

Table 5-4 Wastewater Impact Fee with Credit Analysis

Credit Analysis Methodology	
Preliminary Maximum Calculated Infrastructure Cost	$569,442,175
Minus the CREDIT	**($5,443,068)**
Max Allowable Calculated Infrastructure Cost	$563,999,107
Service Units	126,758
Max Allowable Impact Fee per Service Unit	**$4,449**

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 5-5**.

Table 5-5 Wastewater Impact Fees by Meter Size

Meter Size	5/8" x 3/4" Equivalency Factor	Calculated Impact Fee per Service Unit (Before Subtracting Credit)	Maximum Allowable Impact Fee (After Subtracting Credit)
5/8" x 3/4"	1.00	$4,492	$4,449
3/4"	1.50	$6,738	$6,674
1"	2.50	$11,230	$11,123
1-1/2"	5.00	$22,460	$22,245
2"	8.00	$35,936	$35,592
3"	21.75	$97,701	$96,766
4"	37.50	$168,450	$166,838
6"	80.00	$359,360	$355,920
8"	140.00	$628,880	$622,860
10"	210.00	$943,320	$934,290

Appendix A
Existing Wastewater Lift Station Capacities

APPENDIX A
Existing Fort Worth Wastewater Lift Stations

No.	Name	Address	Firm Capacity	Total # of Pumps
1	Casino Beach	7551 Surfside Dr.	0.6 mgd	2 pumps
2	Castle Circle	9101 Heron Drive	1.0 mgd	2 pumps
3	Dosier Creek	9241 Boat Club Rd.	10.1 mgd	3 pumps
4	Eagle Ranch	6692 Robertson Rd.	0.5 mgd	2 pumps
5	Enchanted Bay	5788 Vesta Farley Rd.	0.7 mgd	2 pumps
6	Glen Mills	9091 Saginaw Blvd.	0.5 mgd	2 pumps
7	Greenway	1000 Nixon Rd.	2.0 mgd	2 pumps
8	Haslet Heights	2484 Avondale Haslet Rd	0.7 mgd	2 pumps
9	Hulen Bend	6401 Oakmont Blvd.	0.8 mgd	2 pumps
10	Hunter Crossroads	13050 Avondale Farms Dr.	0.3 mgd	2 pumps
11	Intel # 1	3001 Eagle Pkwy	3.9 mgd	2 pumps
12	Intel # 2	3200 Keller-Haslet Rd.	8.0 mgd	3 pumps
13	Jenkins Heights	4525 Norris Valley Dr	1.8 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	Lake Country # 11	9401 Boat Club Rd	0.9 mgd	2 pumps
19	Lake Country # 12	9341 Mountain Lake	0.9 mgd	2 pumps
20	Lake Country # 13	9331 Dosier Cove W	0.5 mgd	2 pumps
21	Lake Worth	6201 Cahoba Dr	2.2 mgd	2 pumps
22	Live Oak	731 Verna Trail N	2.9 mgd	2 pumps

23	Meadow Lakes	4691 St. Thomas Place	0.5 mgd	2 pumps
24	Mosier Valley	3120 House Anderson Rd.	0.14 mgd	2 pumps
25	Richardson Slough	7990 Old Granbury Rd.	4.6 mgd	3 pumps
26	Rock Creek Ranch	10716 Tarleton Way Rd.	1.6 mgd	2 pumps
27	Rosemary Ridge	10499 Old Crowley Cleburne	1.6 mgd	2 pumps
28	Sendera Ranch	1092 Avondale Haslet Rd.	1.5 mgd	2 pumps
29	Shield	14050 Park Vista Boulevard	1.1 mgd	2 pumps
30	Spring Ranch	1100 Travis Court	0.4 mgd	2 pumps
31	Summer Creek Ranch	9898 West Cleburne Road	1.5 mgd	2 pumps
32	Sunset Cove	8505 Lake Country Drive	4.0 mgd	3 pumps
33	Waterside	3912 Watercourse Drive	0.7 mgd	2 pumps
34	Western Hills	2717 Glenrock	0.6 mgd	2 pumps
35	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 WRF Expansion to 11.5 MGD (3828.211)**

Description: Construction of a 6.5 MGD expansion of TRAs Denton Creek Water Reclamation Facility (WRF).

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

Allocation: This project is allocated 24% in the study period. Allocation was determined using the projected growth in peak wet weather flow (2022—2031) for Fort Worth and its wholesale customers, divided by the added capacity due to the expansion (11.5 MGD).

Project Title: **CB-1 36-Inch Parallel Relief Interceptor (3828.651)**

Description: Land purchase and construction of a 36-inch relief interceptor conveying water to the Denton Creek WRF.

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

Allocation: This project is allocated 30% in the study period. Allocation was determined using the projected growth in peak wet weather flow (2022—2023) to the Interceptor, divided by the capacity shown in the Denton Creek wastewater model's interceptors which was provided by TRA.

Project Title: **HC-1 Relief Int. (460H-DCRWS) (3828.641)**

Description: Design and construction of approximately 15,000 ft of 72- to 84-inch diameter relief pipeline conveying water to the Denton Creek WRF.

Purpose: Provide conveyance capacity to address potential growth needs.

Allocation: This project is allocated 20% during the study period. Allocation was determined using the projected peak wet weather flow in 2031 to the Relief Interceptor, divided by the percentage of capacity of the interceptors that belong to Fort Worth in the Denton Creek wastewater model provided by TRA.

Project Title: **One Alternate Discharge Pump (3828.2017)**

Description: Design and construction of one alternate discharge pump at the Denton Creek WRF.

Purpose: Provide additional discharge capacity at the Denton Creek WRF to address potential growth needs.

Allocation: This project is allocated 24% in the study period. Allocation was determined using the projected growth in peak wet weather flow (2022—2031) to the discharge pump, divided by the capacity added from the discharge pump (6.5MGD).

Appendix B
Wastewater CIP Projects

Project Title: **10-25HC-1 Relief Int. (740H - 460H) 12,500 LF (3828.642)**

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

Purpose: Provide conveyance capacity to address potential growth needs.

Allocation: This project is allocated 46% in the study period. Allocation was determined using the projected peak wet weather flow in 2031 to the relief interceptor, divided by the percentage of capacity of the interceptors that belong to Fort Worth in the Denton Creek wastewater model provided by TRA.

Project Title: **15-25HC-3 Relief Int. (1320H to 740H) 13,100 LF (Relieving 24-inch Interceptor) (3828.644)**

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

Purpose: Provide conveyance capacity to address potential growth needs.

Allocation: This project is allocated 49% in the study period. Allocation was determined using the projected peak wet weather flow in 2031 to the relief interceptor, divided by the added capacity from the relief interceptor (44.12 MGD).

Project Title: **15-25HC-4/15-25HC-5 Relief Interceptor & MS 10_0HC (1320H-1780H) (3828.645)**

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

Purpose: Provide conveyance capacity to address potential growth needs.

Allocation: This project is allocated 52% in the study period. Allocation was determined using the projected peak wet weather flow in 2031 to the relief interceptor, divided by the added capacity from the relief interceptor (16.1 MGD).

Project Title: **Peak Flow Storage (3828.2012)**

Description: Design and construction of a peak flow storage structure at the Denton Creek WRF.

Purpose: Provide additional peak flow storage capacity at the Denton Creek WRF to address potential growth needs.

Allocation: This project is allocated 50% in the study period. Allocation was determined using the projected growth in peak wet weather flow (2022—2031). A peak flow storage basin with a capacity of 30.6 MG is needed for the plant buildout flow. The initial peak flow stage capacity would be 27.4 MG with an additional 3.2 MG of storage capacity constructed at a later date.

Appendix B
Wastewater CIP Projects

WASTEWATER TREATMENT

Project Title: **Deep Bed Media Filters 1-20 Modifications (WWTP-003)**

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

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

Allocation: This project is allocated 25% in the study period. Allocation was determined using the projected growth in peak wet weather flow (2022—2031) to the VCWRF, which shows that the remaining capacity will be fully utilized during the planning period. 75% of the capacity will be utilized by 2022, based on the existing flow to the VCWRF, divided by the existing capacity.

Project Title: **VCWRF Peak Flow Diversion Structure (Equalization Basin for Peak Flows) (WWTP-009)**

Description: Design and construction of a wastewater diversion and peak flow storage basin adjacent to the VCWRF.

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

Allocation: This project is allocated 75% in the study period. Allocation was determined using the projected growth in peak wet weather flow (2022—2023) to the VCWRF, which shows that the remaining capacity will be fully utilized during the planning period. 25% of the capacity will be utilized by 2022, based on the existing flow to VCWRF, divided by the existing capacity.

Project Title: **VCWRF South Influent Lift Station (V-3) (WWTP-013)**

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 93% in the study period. Allocation was determined using the projected VCWRF average day flow in 2031, divided by the total capacity of the VCWRF (191 MGD).

Project Title: **Mary's Creek WRF Site Selection and Land Purchase (WWMP #53)**

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

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

Allocation: This project is allocated 52% in the study period. Allocation was determined using the existing flow to Mary's Creek plus the flow from the Walnut Creek LS, all divided by the additional capacity the Mary's Creek satellite plant (10 MGD).

Appendix B
Wastewater CIP Projects

Project Title: **Mary's Creek Satellite Plant (MP-053) (WWMP #53)**

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

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

Allocation: This project is allocated 52% in the study period. Allocation was determined using the projected average day flow to Mary's Creek plus the flow from the Walnut Creek LS, all divided by the additional capacity the Mary's Creek satellite plant (10 MGD).

Project Title: **VCWRF Replace Primary Clarifiers 1 - 12 & Grit System (Phase 2B of 191 MGD expansion) (WWTP-012)**

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 is 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 93% in the study period. Allocation was determined using the projected VCWRF average day flow for 2031, divided by the proposed total capacity of the VCWRF (191 MGD).

Appendix B
Wastewater CIP Projects

REGIONAL LIFT STATIONS AND INTERCEPTORS

Project Title: **4.4 MGD Rock Creek Lift Station Expansion (outside of PID boundary) to 6.0 MGD (Including 16-inch Parallel Force Main) (WWMP #107)**

Description: 4.4 MGD expansion of the Rock Creek Lift Station to the Southeast of Benbrook Lake.

Purpose: Provide future wastewater service to growth-related service areas.

Allocation: This project is allocated 99% in the study period. Allocation was determined using the projected 2031 peak wet weather flow to the Rock Creek Lift Station less the existing lift station capacity, divided by the added capacity from the expansion (4.4 MGD).

Project Title: **Dosier Creek 24-inch Force Main (Marine Creek to Big Fossil Basin WW Diversion) (WWMP #28)**

Description: Design and construction of 24-inch force main in the Marine Creek and Big Fossil Basins.

Purpose: Provide expanded wastewater capacity 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 69% in the study period. Allocation was determined assuming the projected increase in peak wet weather flow (2022—2031), including the additional flow from the La Frontera Lift Station to the Dosier Creek Force Main is greater than the remaining capacity of the force main. The existing utilization of 31% was determined using the projected 2022 peak wet weather flow, divided by the added capacity of the 24-inch force main (14 MGD).

Project Title: **Proposed 44.0 MGD Lake Arlington - VC Basin Lift Station & 42-inch Force Main (WWMP #13)**

Description: Design and construction of a 44.0 MGD firm capacity lift station and 42-inch force main in the Village Creek Basin.

Purpose: Provide expanded wastewater capacity to the Village Creek Basin west of Lake Arlington.

Allocation: This project is allocated 100% in the study period. Allocation was determined based on the projected peak wet weather flow of 44 MGD to the VC Basin Lift Station, divided by the added capacity from the lift station and force main (44 MGD).

Appendix B
Wastewater CIP Projects

Project Title: **Proposed 5.25 MGD Bonds Ranch Lift Station "A" & Force Main (2022 IF #1)**

Description: Design and construction of a 5.25 MGD firm capacity lift station to serve future growth.

Purpose: Provide future wastewater service to the northwest portions of the City.

Allocation: This project is allocated 55% in the study period. Allocation was determined using the projected growth in peak wet weather flow to the Bonds Ranch Lift Station “A”, divided by the added capacity from the lift station and force main (5.25 MGD).

Project Title: **Proposed 22.0 MGD Clear Fork Lift Station & 30-inch Force Main (2022 IF #2)**

Description: Design and construction of a 22.0 MGD lift station and 30-inch force main in the Clear Fork Basin.

Purpose: The purpose of this lift station is to provide expanded wastewater capacity to growth-related service areas.

Allocation: This project is allocated 59% in the study period. Allocation was determined using the projected growth in peak wet weather flow (2022—2031) to the Clear Fork Lift Station, divided by the added capacity from the lift station and force main (22 MGD).

Project Title: **Proposed 4.5 MGD Bonds Ranch Lift Station "B" & Force Main (2022 IF #1)**

Description: Design and construction of a 4.5 MGD firm capacity lift station to serve future growth.

Purpose: Provide future wastewater service to the northwest portions of the City.

Allocation: This project is allocated 55% in the study period. Allocation was determined using the projected growth in peak wet weather flow to the Bonds Ranch Lift Station “B”, divided by the added capacity from the lift station and force main (4.5 MGD).

Project Title: **5.5 MGD Richardson Slough Lift Station Expansion and 20-inch Force Main in the Clear Fork Basin (WWMP #61)**

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

Purpose: Provide expanded wastewater capacity to growth-related service areas.

Allocation: This project is allocated 100% in the study period. Allocation was determined using the projected growth in peak wet weather flow (2022—2031) to the Richardson Slough Lift Station, which will fully utilize the added capacity due to the expansion (5.5 MGD).

Appendix B
Wastewater CIP Projects

Project Title: **Proposed 10.0 MGD Walnut Creek Lift Station & 24-inch Force Main (WWMP #54)**

Description: Design and construction of a 10.0 MGD lift station and 24-inch force main in the Clear Fork Basin.

Purpose: Provide expanded wastewater capacity to growth-related service areas.

Allocation: This project is allocated 48% in the study period. Allocation was determined using the projected growth in flow (2022—2031) to the Walnut Creek Lift Station, divided by the added capacity due to the lift station and force main (10 MGD).

Project Title: **14.0 MGD Dosier Creek Lift Station Expansion to 24.0 MGD & 24-inch Force Main (WWMP #64)**

Description: 14 MGD expansion of the Dosier Creek Lift Station and 24-inch force main in the Marine Creek Basin.

Purpose: Provide expanded wastewater capacity to growth-related service areas.

Allocation: This project is allocated 50% in the study period. Allocation was determined using the projected growth in peak wet weather flow (2022—2031), including the additional flow from the La Frontera Lift Station, to the Dosier Creek Lift Station less the capacity of WWMP #28, divided by the added capacity from the expansion and force main (14 MGD).

Project Title: **Proposed 13.0 MGD La Frontera Lift Station (2022 IF #4)**

Description: Design and construction of a 13.0 MGD lift station in the Marine Creek Basin.

Purpose: Provide future wastewater service to growth-related service areas.

Allocation: This project is allocated 40% in the study period. Allocation was determined using the projected growth in peak wet weather flow (2022—2031) in the Marine Creek Basin that is not expected to be captured by other projects, divided by the added capacity due to the lift station (13 MGD).

Project Title: **Proposed 10.0 MGD Regional Lift Station & 24-inch Force Main (WWMP #96)**

Description: Design and construction of a 10.0 MGD lift station and 24-inch force main in the West Fork Basin.

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

Allocation: This project is allocated 30% in the study period. Allocation was determined using projected growth in peak wet weather flow (2022—2031) to the Regional Lift Station less the capacity of the existing Live Oak Lift Station capacity, divided by the added capacity from the Regional Lift Station and force main (10 MGD).

Appendix B
Wastewater CIP Projects

Project Title: **108-inch Third Barrel Interceptor Parallel to M-280 & M-338 MP-018 (WWMP #18)**

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

Purpose: Provide conveyance capacity to accommodate projected growth.

Allocation: This project is allocated 51% in the study period. Allocation was determined using the projected growth in peak wet weather flow (2022—2031) to the interceptor less the capacity of the existing "Twins" interceptors, divided by the added capacity from the 108-inch third barrel interceptor (173 MGD).

Appendix B
Wastewater CIP Projects

WASTEWATER ENGINEERING STUDIES

Project Title: **2012 Wastewater Master Plan (2010 – 2030)**

Description: Engineering Study.

Purpose: The 2012 master plan was an update of the 1999 study and includes the planning period 2010 through 2030.

Allocation: This project is allocated 40% to the study period. Allocation was determined using the percentage of the planning period within the master plan that falls within the 10-year impact fee study period.

Project Title: **2022 Wastewater Impact Fee Study**

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 2022 impact fee study can be allocated to the study period as all ten years are within the study period. The impact fee covers water and wastewater, with 50% of costs allocated to each. This study replaces the 2017 Impact Fee study, therefore the costs associated with the 2017 Impact fee study are not eligible for the 2022 impact fee update.

Project Title: **Village Creek Facilities Plan (WWTP-043)**

Description: Engineering Study.

Purpose: The engineering study provides a facilities plan for the Village Creek Water Reclamation Facility.

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

Appendix C
Impact Fee Credit Analysis

TECHNICAL MEMORANDUM

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TO: Wendy Chi-Babulal, P.E., Fort Worth Water
Matt Kusnir, P.E., Fort Worth Water

FROM: Jessica Brown, P.E, Freese and Nichols, Inc.
Mazen Kawasmi, P.E., CFM, GISP, Freese and Nichols, Inc.
Richard Campbell, Freese and Nichols, Inc.
Angie Flores, Senior Manager, Raftelis, Inc.

SUBJECT: 2022 Fort Worth Water/Wastewater Impact Fee Update:
Credit Methodology Memorandum

DATE: July 22, 2021

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. FNI contracted with Raftelis Financial Consultants, Inc. to perform a rate credit analysis in compliance with Chapter 395. For this study, Raftelis completed the maximum allowable impact fee calculation, including the rate credit analysis. The calculated impact fee includes the outstanding debt service (principal and interest) of existing facilities with excess capacity and the projected debt service (principal and interest) of the future facilities identified in the 10-year Capital Improvement Plan (CIP). This memorandum establishes the methodology utilized for the rate credit analysis and summarizes the results.

2.0 DEBT SERVICE INTEREST CALCULATION

The impact fee eligible interest is based on existing and future debt service. The existing debt service is debt service associated with existing facilities with excess capacity, while the future debt service is based on future facilities.

For the existing impact fee eligible facilities, the interest considered in the impact fee is based on the actual interest for the already outstanding debt. Specifically, the existing debt service is based upon impact fee eligible outstanding debt for Fort Worth, Trinity River Authority (TRA), and Tarrant Regional Water District (TRWD). The interest included in the impact fee is the total impact fee eligible interest for the term of the existing debt, per discussions with City staff.

The interest for the future facilities is calculated using the assumptions in **Table 1**. The proposed debt is based upon the 10-year water and wastewater impact fee eligible CIP. In the CIP, if a project's start date is in 2022 or later and is greater than $5 million, it is assumed that it will be debt-funded. Any amounts under $5 million are assumed to be cash-funded. The interest included in the impact fee is the total impact fee eligible interest for the term of the future debt, per discussions with City staff.

Table 1 Future Debt Service Assumptions

Debt Service Details	Assumption
Bond Issuance Cost	2.0%
Interest Rate	4.0%
Fort Worth Term	30 years
TRA Term	20 years

3.0 RATE CREDIT CALCULATION

The rate credit methodology was developed by FNI and was applied to the impact fee calculation. Chapter 395 prescribes that a utility must provide a credit to account for any portion of ad valorem tax and utility service revenues that would also be reflected in the developed impact fees and paid by new service units in the program period. The utility may choose to do a detailed rate credit analysis, or automatically cap the maximum allowable impact fee at 50% of the impact fee eligible infrastructure costs. In this case, a rate credit analysis was performed to determine the applicable credit for the program period.

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.

FNI utilized the projected Service Unit Equivalents (SUE), developed as part of the Land Use Assumptions, to determine the pro rata share of the existing debt (interest and principal) attributable to each SUE on the system for each year of the impact fee period (2022 – 2031). The resulting cost per SUE was multiplied by the cumulative growth in SUE's for each year of the impact fee period, resulting in the portion of the existing debt (interest and principal) that future customers will pay for in water/wastewater rates. This represents the credit to the impact fees required to avoid "double counting" and this credit was subtracted from the total impact fee eligible

infrastructure costs. **Table 2** summarizes the results of the water credit calculation. **Table 3** summarizes the results of the wastewater credit calculation.

Table 2 Water Credit Analysis Summary

Year	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Water Impact Fee Eligible Interest + Principle for 10-Year Period	$13,736,786	$14,218,851	$14,133,513	$13,415,020	$13,309,466	$13,310,499	$12,355,111	$12,360,423	$10,980,941	$17,212,541
Total Service Unit Equivalents (SUE) Each Year	718,816	732,543	746,271	759,998	773,726	787,453	801,180	814,908	828,635	842,363
Cost per SUE	$19.04	$19.34	$18.87	$17.59	$17.14	$16.85	$15.37	$15.12	$13.21	$20.38
Cumulative SUE's in 10-Year Period	13,673	27,347	41,020	54,693	68,367	82,040	95,714	109,387	123,060	136,734
Portion Paid by Growth in 10-Year Period	**$260,293**	**$528,834**	**$774,096**	**$962,093**	**$1,172,138**	**$1,382,327**	**$1,471,490**	**$1,654,279**	**$1,626,156**	**$2,786,360**
Total Credit	**$12,618,067**									

Table 3 Wastewater Credit Analysis Summary

Year	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Wastewater Impact Fee Eligible Interest + Principle for 10-Year Period	$5,735,203	$5,742,152	$5,749,275	$5,748,254	$5,755,437	$5,908,684	$5,137,534	$5,130,701	$5,132,433	$5,110,891
Total Service Unit Equivalents (SUE) Each Year	611,999	624,605	637,211	649,817	662,423	675,029	687,634	700,240	712,846	725,452
Cost per SUE	$9.31	$9.13	$8.96	$8.79	$8.63	$8.69	$7.42	$7.28	$7.15	$7.00
Cumulative SUE's in 10-Year Period	12,676	25,352	38,027	50,703	63,379	76,055	88,731	101,406	114,082	126,758
Portion Paid by Growth in 10-Year Period	**$117,966**	**$231,456**	**$340,747**	**$445,449**	**$546,912**	**$661,203**	**$658,446**	**$737,996**	**$815,857**	**$887,036**
Total Credit	**$5,443,068**									

4.0 MAXIMUM ALLOWABLE IMPACT FEE CALCULATION

The maximum allowable impact fees are the result of taking the total cost of expansion for the study period, minus the calculated credit, and dividing by the increase in SUE's. This fee equals the maximum allowable impact fee per service unit for a 5/8" x 3/4" water meter size. A summary of the maximum allowable impact fee calculation for both water and wastewater is shown in **Table 4**.

Table 4 Credit Analysis Summary

	Water	Wastewater
Preliminary Maximum Calculated Infrastructure Cost	$677,264,404	$569,442,175
Minus the CREDIT	**($12,618,067)**	**($5,443,068)**
Max Allowable Calculated Infrastructure Cost	$664,646,337	$563,999,107
Service Units	136,734	126,758
Max Allowable Impact Fee per Service Unit	**$4,860**	**$4,449**

Appendix D
Water Meter Summary

Appendix D
Water Meter Summary

City of Fort Worth **% of Wastewater Demands Served by FTW (2020):** **100%**

Residential Meters				
Meter Size	**Service Unit Equivalency Factor**	**Number of Meters**	**Number of Meters Served by Ft. Worth**	**SUE Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	220,645	220,645	220,645
3/4"	1.50	2,689	2,689	4,034
1"	2.50	21,698	21,698	54,245
1-1/2"	5.00	1,903	1,903	9,515
2"	8.00	1,755	1,755	14,040
3"	21.75	43	43	935
4"	37.50	98	98	3,675
6"	80.00	163	163	13,040
8"	140.00	46	46	6,440
10"	210.00	3	3	630
	TOTAL	**249,043**	**249,043**	**327,199**
Non-Residential Meters				
Meter Size	**Service Unit Equivalency Factor**	**Number of Meters**	**Number of Meters Served by Ft. Worth**	**SUE Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	6,841	6,841	6,841
3/4"	1.50	18	18	27
1"	2.50	2,459	2,459	6,148
1-1/2"	5.00	1,560	1,560	7,800
2"	8.00	3,642	3,642	29,136
3"	21.75	392	392	8,526
4"	37.50	327	327	12,263
6"	80.00	156	156	12,480
8"	140.00	63	63	8,820
10"	210.00	24	24	5,040
	TOTAL	**15,482**	**15,482**	**97,081**

Wholesale Customer: **Benbrook Water Authority** **% of Wastewater Demands Served by FTW (2020):** **100%**

Residential Meters				
Meter Size	**Service Unit Equivalency Factor**	**Number of Meters**	**Number of Meters Served by Ft. Worth**	**SUE Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	5,145	5,145	5,145
3/4"	1.50	43	43	65
1"	2.50	3,075	3,075	7,688
1-1/2"	5.00	17	17	85
2"	8.00	87	87	696
3"	21.75	25	25	544
4"	37.50	0	0	0
6"	80.00	0	0	0
8"	140.00	0	0	0
10"	210.00	0	0	0
	TOTAL	**8,392**	**8,392**	**14,223**
Non-Residential Meters				
Meter Size	**Service Unit Equivalency Factor**	**Number of Meters**	**Number of Meters Served by Ft. Worth**	**SUE Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	138	138	138
3/4"	1.50	4	4	6
1"	2.50	221	221	553
1-1/2"	5.00	54	54	270
2"	8.00	107	107	856
3"	21.75	11	11	239
4"	37.50	3	3	113
6"	80.00	2	2	160
8"	140.00	0	0	0
10"	210.00	0	0	0
	TOTAL	**540**	**540**	**2,335**

Appendix D
Water Meter Summary

Wholesale Customer: **Bethesda Water Supply Corportation** **% of Wastewater Demands Served by FTW (2020):** **4%**

Residential Meters				
Meter Size	**Service Unit Equivalency Factor**	**Number of Meters**	**Number of Meters Served by Ft. Worth**	**SUE Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	10,239	410	410
3/4"	1.50	8	0	0
1"	2.50	42	2	5
1-1/2"	5.00	4	0	0
2"	8.00	2	0	0
3"	21.75	1	0	0
4"	37.50	0	0	0
6"	80.00	0	0	0
8"	140.00	0	0	0
10"	210.00	0	0	0
	TOTAL	**10,296**	**412**	**415**
Non-Residential Meters				
Meter Size	**Service Unit Equivalency Factor**	**Number of Meters**	**Number of Meters Served by Ft. Worth**	**SUE Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	142	6	6
3/4"	1.50	8	0	0
1"	2.50	44	2	5
1-1/2"	5.00	13	1	5
2"	8.00	55	2	16
3"	21.75	1	0	0
4"	37.50	8	0	0
6"	80.00	1	0	0
8"	140.00	0	0	0
10"	210.00	0	0	0
	TOTAL	**272**	**11**	**32**

Wholesale Customer: **City of Blue Mound** **% of Wastewater Demands Served by FTW (2020):** **100%**

Residential Meters				
Meter Size	**Service Unit Equivalency Factor**	**Number of Meters**	**Number of Meters Served by Ft. Worth**	**SUE Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	807	807	807
3/4"	1.50	0	0	0
1"	2.50	0	0	0
1-1/2"	5.00	0	0	0
2"	8.00	0	0	0
3"	21.75	0	0	0
4"	37.50	0	0	0
6"	80.00	0	0	0
8"	140.00	0	0	0
10"	210.00	0	0	0
	TOTAL	**807**	**807**	**807**
Non-Residential Meters				
Meter Size	**Service Unit Equivalency Factor**	**Number of Meters**	**Number of Meters Served by Ft. Worth**	**SUE Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	24	24	24
3/4"	1.50	0	0	0
1"	2.50	1	1	3
1-1/2"	5.00	0	0	0
2"	8.00	1	1	8
3"	21.75	0	0	0
4"	37.50	0	0	0
6"	80.00	0	0	0
8"	140.00	0	0	0
10"	210.00	0	0	0
	TOTAL	**26**	**26**	**35**

Appendix D
Water Meter Summary

Wholesale Customer: **City of Burleson** **% of Wastewater Demands Served by FTW (2020):** **100%**

Residential Meters				
Meter Size	**Service Unit Equivalency Factor**	**Number of Meters**	**Number of Meters Served by Ft. Worth**	**SUE Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	13,746	13,746	13,746
3/4"	1.50	2	2	3
1"	2.50	3	3	8
1-1/2"	5.00	3	3	15
2"	8.00	0	0	0
3"	21.75	0	0	0
4"	37.50	0	0	0
6"	80.00	0	0	0
8"	140.00	0	0	0
10"	210.00	0	0	0
	TOTAL	**13,754**	**13,754**	**13,772**
Non-Residential Meters				
Meter Size	**Service Unit Equivalency Factor**	**Number of Meters**	**Number of Meters Served by Ft. Worth**	**SUE Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	385	385	385
3/4"	1.50	0	0	0
1"	2.50	139	139	348
1-1/2"	5.00	101	101	505
2"	8.00	210	210	1,680
3"	21.75	20	20	435
4"	37.50	3	3	113
6"	80.00	1	1	80
8"	140.00	0	0	0
10"	210.00	0	0	0
	TOTAL	**859**	**859**	**3,546**

Wholesale Customer: **City of Crowley** **% of Wastewater Demands Served by FTW (2020):** **100%**

Residential Meters				
Meter Size	**Service Unit Equivalency Factor**	**Number of Meters**	**Number of Meters Served by Ft. Worth**	**SUE Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	6,467	6,467	6,467
3/4"	1.50	0	0	0
1"	2.50	35	35	88
1-1/2"	5.00	16	16	80
2"	8.00	30	30	240
3"	21.75	2	2	44
4"	37.50	0	0	0
6"	80.00	0	0	0
8"	140.00	0	0	0
10"	210.00	0	0	0
	TOTAL	**6,550**	**6,550**	**6,919**
Non-Residential Meters				
Meter Size	**Service Unit Equivalency Factor**	**Number of Meters**	**Number of Meters Served by Ft. Worth**	**SUE Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0	0
3/4"	1.50	0	0	0
1"	2.50	59	59	148
1-1/2"	5.00	14	14	70
2"	8.00	48	48	384
3"	21.75	15	15	326
4"	37.50	0	0	0
6"	80.00	0	0	0
8"	140.00	0	0	0
10"	210.00	0	0	0
	TOTAL	**136**	**136**	**928**

Appendix D
Water Meter Summary

Wholesale Customer: **City of Edgecliff Village** **% of Wastewater Demands Served by FTW (2020):** **100%**

Residential Meters				
Meter Size	**Service Unit Equivalency Factor**	**Number of Meters**	**Number of Meters Served by Ft. Worth**	**SUE Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	78	78	78
3/4"	1.50	1,257	1,257	1,886
1"	2.50	33	33	83
1-1/2"	5.00	5	5	25
2"	8.00	0	0	0
3"	21.75	0	0	0
4"	37.50	0	0	0
6"	80.00	0	0	0
8"	140.00	0	0	0
10"	210.00	0	0	0
	TOTAL	**1,373**	**1,373**	**2,072**
Non-Residential Meters				
Meter Size	**Service Unit Equivalency Factor**	**Number of Meters**	**Number of Meters Served by Ft. Worth**	**SUE Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0	0
3/4"	1.50	3	3	5
1"	2.50	4	4	10
1-1/2"	5.00	0	0	0
2"	8.00	7	7	56
3"	21.75	0	0	0
4"	37.50	0	0	0
6"	80.00	1	1	80
8"	140.00	0	0	0
10"	210.00	0	0	0
	TOTAL	**15**	**15**	**151**

Wholesale Customer: **City of Everman** **% of Wastewater Demands Served by FTW (2020):** **100%**

Residential Meters				
Meter Size	**Service Unit Equivalency Factor**	**Number of Meters**	**Number of Meters Served by Ft. Worth**	**SUE Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0	0
3/4"	1.50	1,817	1,817	2,726
1"	2.50	0	0	0
1-1/2"	5.00	0	0	0
2"	8.00	0	0	0
3"	21.75	0	0	0
4"	37.50	0	0	0
6"	80.00	0	0	0
8"	140.00	0	0	0
10"	210.00	0	0	0
	TOTAL	**1,817**	**1,817**	**2,726**
Non-Residential Meters				
Meter Size	**Service Unit Equivalency Factor**	**Number of Meters**	**Number of Meters Served by Ft. Worth**	**SUE Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0	0
3/4"	1.50	156	156	234
1"	2.50	14	14	35
1-1/2"	5.00	5	5	25
2"	8.00	11	11	88
3"	21.75	3	3	65
4"	37.50	1	1	38
6"	80.00	0	0	0
8"	140.00	0	0	0
10"	210.00	0	0	0
	TOTAL	**190**	**190**	**485**

Appendix D
Water Meter Summary

Wholesale Customer: **City of Forest Hill** **% of Wastewater Demands Served by FTW (2020):** **4%**

Residential Meters				
Meter Size	**Service Unit Equivalency Factor**	**Number of Meters**	**Number of Meters Served by Ft. Worth**	**SUE Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0	0
3/4"	1.50	4,559	182	273
1"	2.50	10	0	0
1-1/2"	5.00	38	2	10
2"	8.00	55	2	16
3"	21.75	1	0	0
4"	37.50	1	0	0
6"	80.00	0	0	0
8"	140.00	0	0	0
10"	210.00	0	0	0
	TOTAL	**4,664**	**186**	**299**
Non-Residential Meters				
Meter Size	**Service Unit Equivalency Factor**	**Number of Meters**	**Number of Meters Served by Ft. Worth**	**SUE Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0	0
3/4"	1.50	10	0	0
1"	2.50	7	0	0
1-1/2"	5.00	2	0	0
2"	8.00	6	0	0
3"	21.75	1	0	0
4"	37.50	1	0	0
6"	80.00	1	0	0
8"	140.00	0	0	0
10"	210.00	0	0	0
	TOTAL	**28**	**0**	**0**

Wholesale Customer: **Haltom City** **% of Wastewater Demands Served by FTW (2020):** **100%**

Residential Meters				
Meter Size	**Service Unit Equivalency Factor**	**Number of Meters**	**Number of Meters Served by Ft. Worth**	**SUE Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	11,369	11,369	11,369
3/4"	1.50	0	0	0
1"	2.50	4	4	10
1-1/2"	5.00	0	0	0
2"	8.00	37	37	296
3"	21.75	1	1	22
4"	37.50	0	0	0
6"	80.00	0	0	0
8"	140.00	0	0	0
10"	210.00	0	0	0
	TOTAL	**11,411**	**11,411**	**11,697**
Non-Residential Meters				
Meter Size	**Service Unit Equivalency Factor**	**Number of Meters**	**Number of Meters Served by Ft. Worth**	**SUE Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	1584	1,584	1,584
3/4"	1.50	0	0	0
1"	2.50	5	5	13
1-1/2"	5.00	0	0	0
2"	8.00	18	18	144
3"	21.75	1	1	22
4"	37.50	1	1	38
6"	80.00	2	2	160
8"	140.00	0	0	0
10"	210.00	0	0	0
	TOTAL	**1,611**	**1,611**	**1,961**

Appendix D
Water Meter Summary

Wholesale Customer: **City of Hurst** **% of Wastewater Demands Served by FTW (2020):** **92%**

Residential Meters				
Meter Size	**Service Unit Equivalency Factor**	**Number of Meters**	**Number of Meters Served by Ft. Worth**	**SUE Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	9,454	8,698	8,698
3/4"	1.50	1	1	2
1"	2.50	1,517	1,396	3,490
1-1/2"	5.00	33	30	150
2"	8.00	4	4	32
3"	21.75	0	0	0
4"	37.50	1	1	38
6"	80.00	0	0	0
8"	140.00	0	0	0
10"	210.00	0	0	0
	TOTAL	**11,010**	**10,130**	**12,410**
Non-Residential Meters				
Meter Size	**Service Unit Equivalency Factor**	**Number of Meters**	**Number of Meters Served by Ft. Worth**	**SUE Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	465	428	428
3/4"	1.50	0	0	0
1"	2.50	367	338	845
1-1/2"	5.00	251	231	1,155
2"	8.00	239	220	1,760
3"	21.75	32	29	631
4"	37.50	18	17	638
6"	80.00	4	4	320
8"	140.00	1	1	140
10"	210.00	0	0	0
	TOTAL	**1,377**	**1,268**	**5,917**

Wholesale Customer: **City of Kennedale** **% of Wastewater Demands Served by FTW (2020):** **4%**

Residential Meters				
Meter Size	**Service Unit Equivalency Factor**	**Number of Meters**	**Number of Meters Served by Ft. Worth**	**SUE Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0	0
3/4"	1.50	2,543	102	153
1"	2.50	313	13	33
1-1/2"	5.00	5	0	0
2"	8.00	4	0	0
3"	21.75	0	0	0
4"	37.50	0	0	0
6"	80.00	0	0	0
8"	140.00	0	0	0
10"	210.00	0	0	0
	TOTAL	**2,865**	**115**	**186**
Non-Residential Meters				
Meter Size	**Service Unit Equivalency Factor**	**Number of Meters**	**Number of Meters Served by Ft. Worth**	**SUE Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0	0
3/4"	1.50	229	9	14
1"	2.50	57	2	5
1-1/2"	5.00	13	1	5
2"	8.00	38	2	16
3"	21.75	44	2	44
4"	37.50	3	0	0
6"	80.00	0	0	0
8"	140.00	0	0	0
10"	210.00	0	0	0
	TOTAL	**384**	**16**	**84**

Appendix D
Water Meter Summary

Wholesale Customer: **Lake Worth** **% of Wastewater Demands Served by FTW (2020):** **100%**

Residential Meters				
Meter Size	**Service Unit Equivalency Factor**	**Number of Meters**	**Number of Meters Served by Ft. Worth**	**SUE Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0	0
3/4"	1.50	1,663	1,663	2,495
1"	2.50	171	171	428
1-1/2"	5.00	0	0	0
2"	8.00	1	1	8
3"	21.75	0	0	0
4"	37.50	0	0	0
6"	80.00	0	0	0
8"	140.00	0	0	0
10"	210.00	0	0	0
	TOTAL	**1,835**	**1,835**	**2,931**
Non-Residential Meters				
Meter Size	**Service Unit Equivalency Factor**	**Number of Meters**	**Number of Meters Served by Ft. Worth**	**SUE Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0	0
3/4"	1.50	123	123	185
1"	2.50	129	129	323
1-1/2"	5.00	46	46	230
2"	8.00	108	108	864
3"	21.75	15	15	326
4"	37.50	7	7	263
6"	80.00	0	0	0
8"	140.00	0	0	0
10"	210.00	0	0	0
	TOTAL	**428**	**428**	**2,191**

Wholesale Customer: **City of North Richland Hills** **% of Wastewater Demands Served by FTW (2020):** **80%**

Residential Meters				
Meter Size	**Service Unit Equivalency Factor**	**Number of Meters**	**Number of Meters Served by Ft. Worth**	**SUE Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0	0
3/4"	1.50	19,429	15,543	23,315
1"	2.50	960	768	1,920
1-1/2"	5.00	8	6	30
2"	8.00	17	14	112
3"	21.75	0	0	0
4"	37.50	0	0	0
6"	80.00	0	0	0
8"	140.00	0	0	0
10"	210.00	0	0	0
	TOTAL	**20,414**	**16,331**	**25,377**
Non-Residential Meters				
Meter Size	**Service Unit Equivalency Factor**	**Number of Meters**	**Number of Meters Served by Ft. Worth**	**SUE Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0	0
3/4"	1.50	683	546	819
1"	2.50	404	323	808
1-1/2"	5.00	64	51	255
2"	8.00	827	662	5,296
3"	21.75	29	23	500
4"	37.50	18	14	525
6"	80.00	4	3	240
8"	140.00	2	2	280
10"	210.00	0	0	0
	TOTAL	**2,031**	**1,624**	**8,723**

Appendix D
Water Meter Summary

Wholesale Customer: **City of Pantego** **% of Wastewater Demands Served by FTW (2020):** **75%**

*Meter count information not received. Meter counts estimated based on previous IF study.

Residential Meters				
Meter Size	**Service Unit Equivalency Factor**	**Number of Meters**	**Number of Meters Served by Ft. Worth**	**SUE Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0	0
3/4"	1.50	655	491	737
1"	2.50	58	44	110
1-1/2"	5.00	5	4	20
2"	8.00	0	0	0
3"	21.75	0	0	0
4"	37.50	0	0	0
6"	80.00	0	0	0
8"	140.00	0	0	0
10"	210.00	0	0	0
	TOTAL	**718**	**539**	**867**
Non-Residential Meters				
Meter Size	**Service Unit Equivalency Factor**	**Number of Meters**	**Number of Meters Served by Ft. Worth**	**SUE Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0	0
3/4"	1.50	439	329	494
1"	2.50	15	11	28
1-1/2"	5.00	13	10	50
2"	8.00	19	14	112
3"	21.75	3	2	44
4"	37.50	3	2	75
6"	80.00	0	0	0
8"	140.00	0	0	0
10"	210.00	0	0	0
	TOTAL	**492**	**368**	**803**

Wholesale Customer: **City of Richland Hills** **% of Wastewater Demands Served by FTW (2020):** **100%**

Residential Meters				
Meter Size	**Service Unit Equivalency Factor**	**Number of Meters**	**Number of Meters Served by Ft. Worth**	**SUE Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	2	2	2
3/4"	1.50	2,778	2,778	4,167
1"	2.50	79	79	198
1-1/2"	5.00	17	17	85
2"	8.00	11	11	88
3"	21.75	0	0	0
4"	37.50	0	0	0
6"	80.00	0	0	0
8"	140.00	0	0	0
10"	210.00	0	0	0
	TOTAL	**2,887**	**2,887**	**4,540**
Non-Residential Meters				
Meter Size	**Service Unit Equivalency Factor**	**Number of Meters**	**Number of Meters Served by Ft. Worth**	**SUE Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0	0
3/4"	1.50	165	165	248
1"	2.50	85	85	213
1-1/2"	5.00	31	31	155
2"	8.00	42	42	336
3"	21.75	3	3	65
4"	37.50	2	2	75
6"	80.00	0	0	0
8"	140.00	0	0	0
10"	210.00	0	0	0
	TOTAL	**328**	**328**	**1,092**

Appendix D
Water Meter Summary

Wholesale Customer: **City of River Oaks** **% of Wastewater Demands Served by FTW (2020):** **100%**

*Meter count information not received. Meter counts estimated based on previous IF study.

Residential Meters				
Meter Size	**Service Unit Equivalency Factor**	**Number of Meters**	**Number of Meters Served by Ft. Worth**	**SUE Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	2,529	2,529	2,529
3/4"	1.50	15	15	23
1"	2.50	49	49	123
1-1/2"	5.00	9	9	45
2"	8.00	2	2	16
3"	21.75	0	0	0
4"	37.50	0	0	0
6"	80.00	0	0	0
8"	140.00	0	0	0
10"	210.00	0	0	0
	TOTAL	**2,604**	**2,604**	**2,736**
Non-Residential Meters				
Meter Size	**Service Unit Equivalency Factor**	**Number of Meters**	**Number of Meters Served by Ft. Worth**	**SUE Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	274	274	274
3/4"	1.50	0	0	0
1"	2.50	66	66	165
1-1/2"	5.00	41	41	205
2"	8.00	36	36	288
3"	21.75	2	2	44
4"	37.50	2	2	75
6"	80.00	5	5	400
8"	140.00	0	0	0
10"	210.00	0	0	0
	TOTAL	**426**	**426**	**1,451**

Wholesale Customer: **City of Saginaw** **% of Wastewater Demands Served by FTW (2020):** **100%**

Residential Meters				
Meter Size	**Service Unit Equivalency Factor**	**Number of Meters**	**Number of Meters Served by Ft. Worth**	**SUE Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	7,950	7,950	7,950
3/4"	1.50	0	0	0
1"	2.50	0	0	0
1-1/2"	5.00	0	0	0
2"	8.00	0	0	0
3"	21.75	0	0	0
4"	37.50	0	0	0
6"	80.00	0	0	0
8"	140.00	0	0	0
10"	210.00	0	0	0
	TOTAL	**7,950**	**7,950**	**7,950**
Non-Residential Meters				
Meter Size	**Service Unit Equivalency Factor**	**Number of Meters**	**Number of Meters Served by Ft. Worth**	**SUE Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	333	333	333
3/4"	1.50	0	0	0
1"	2.50	0	0	0
1-1/2"	5.00	0	0	0
2"	8.00	0	0	0
3"	21.75	0	0	0
4"	37.50	0	0	0
6"	80.00	0	0	0
8"	140.00	0	0	0
10"	210.00	0	0	0
	TOTAL	**333**	**333**	**333**

Appendix D
Water Meter Summary

Wholesale Customer: **Sansom Park** **% of Wastewater Demands Served by FTW (2020):** **100%**

Residential Meters				
Meter Size	**Service Unit Equivalency Factor**	**Number of Meters**	**Number of Meters Served by Ft. Worth**	**SUE Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	1,413	1,413	1,413
3/4"	1.50	0	0	0
1"	2.50	0	0	0
1-1/2"	5.00	0	0	0
2"	8.00	0	0	0
3"	21.75	0	0	0
4"	37.50	0	0	0
6"	80.00	0	0	0
8"	140.00	0	0	0
10"	210.00	0	0	0
	TOTAL	**1,413**	**1,413**	**1,413**
Non-Residential Meters				
Meter Size	**Service Unit Equivalency Factor**	**Number of Meters**	**Number of Meters Served by Ft. Worth**	**SUE Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	110	110	110
3/4"	1.50	0	0	0
1"	2.50	1	1	3
1-1/2"	5.00	0	0	0
2"	8.00	1	1	8
3"	21.75	4	4	87
4"	37.50	0	0	0
6"	80.00	0	0	0
8"	140.00	0	0	0
10"	210.00	0	0	0
	TOTAL	**116**	**116**	**208**

Wholesale Customer: **Trinity River Authority** **% of Wastewater Demands Served by FTW (2020):** **0%**

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

Appendix D
Water Meter Summary

Wholesale Customer: **City of Watauga** **% of Wastewater Demands Served by FTW (2020):** **100%**

Residential Meters				
Meter Size	**Service Unit Equivalency Factor**	**Number of Meters**	**Number of Meters Served by Ft. Worth**	**SUE Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0	0
3/4"	1.50	6,377	6,377	9,566
1"	2.50	1,925	1,925	4,813
1-1/2"	5.00	5	5	25
2"	8.00	120	120	960
3"	21.75	3	3	65
4"	37.50	4	4	150
6"	80.00	0	0	0
8"	140.00	1	1	140
10"	210.00	0	0	0
	TOTAL	**8,435**	**8,435**	**15,719**
Non-Residential Meters				
Meter Size	**Service Unit Equivalency Factor**	**Number of Meters**	**Number of Meters Served by Ft. Worth**	**SUE Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0	0
3/4"	1.50	0	0	0
1"	2.50	0	0	0
1-1/2"	5.00	0	0	0
2"	8.00	0	0	0
3"	21.75	0	0	0
4"	37.50	0	0	0
6"	80.00	0	0	0
8"	140.00	0	0	0
10"	210.00	0	0	0
	TOTAL	**0**	**0**	**0**

Wholesale Customer: **Westover Hills** **% of Wastewater Demands Served by FTW (2020):** **100%**

Residential Meters				
Meter Size	**Service Unit Equivalency Factor**	**Number of Meters**	**Number of Meters Served by Ft. Worth**	**SUE Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0	0
3/4"	1.50	7	7	11
1"	2.50	110	110	275
1-1/2"	5.00	149	149	745
2"	8.00	41	41	328
3"	21.75	2	2	44
4"	37.50	1	1	38
6"	80.00	0	0	0
8"	140.00	0	0	0
10"	210.00	0	0	0
	TOTAL	**310**	**310**	**1,441**
Non-Residential Meters				
Meter Size	**Service Unit Equivalency Factor**	**Number of Meters**	**Number of Meters Served by Ft. Worth**	**SUE Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	2	2	2
3/4"	1.50	0	0	0
1"	2.50	0	0	0
1-1/2"	5.00	1	1	5
2"	8.00	0	0	0
3"	21.75	0	0	0
4"	37.50	0	0	0
6"	80.00	0	0	0
8"	140.00	0	0	0
10"	210.00	0	0	0
	TOTAL	**3**	**3**	**7**

Appendix D
Water Meter Summary

Wholesale Customer: **City of Westworth Village** **% of Wastewater Demands Served by FTW (2020):** **100%**

*Meter count information not received. Meter counts estimated based on previous IF study.

Residential Meters				
Meter Size	**Service Unit Equivalency Factor**	**Number of Meters**	**Number of Meters Served by Ft. Worth**	**SUE Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0	0
3/4"	1.50	543	543	815
1"	2.50	6	6	15
1-1/2"	5.00	0	0	0
2"	8.00	3	3	24
3"	21.75	0	0	0
4"	37.50	0	0	0
6"	80.00	0	0	0
8"	140.00	0	0	0
10"	210.00	0	0	0
	TOTAL	**552**	**552**	**854**
Non-Residential Meters				
Meter Size	**Service Unit Equivalency Factor**	**Number of Meters**	**Number of Meters Served by Ft. Worth**	**SUE Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	0	0	0
3/4"	1.50	3	3	5
1"	2.50	15	15	38
1-1/2"	5.00	6	6	30
2"	8.00	18	18	144
3"	21.75	2	2	44
4"	37.50	1	1	38
6"	80.00	1	1	80
8"	140.00	0	0	0
10"	210.00	0	0	0
	TOTAL	**46**	**46**	**379**

Wholesale Customer: **City of White Settlement** **% of Wastewater Demands Served by FTW (2020):** **100%**

*Meter count information not received. Meter counts estimated based on previous IF study.

Residential Meters				
Meter Size	**Service Unit Equivalency Factor**	**Number of Meters**	**Number of Meters Served by Ft. Worth**	**SUE Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	5,156	5,156	5,156
3/4"	1.50	0	0	0
1"	2.50	0	0	0
1-1/2"	5.00	0	0	0
2"	8.00	0	0	0
3"	21.75	0	0	0
4"	37.50	0	0	0
6"	80.00	0	0	0
8"	140.00	0	0	0
10"	210.00	0	0	0
	TOTAL	**5,156**	**5,156**	**5,156**
Non-Residential Meters				
Meter Size	**Service Unit Equivalency Factor**	**Number of Meters**	**Number of Meters Served by Ft. Worth**	**SUE Meters Served by Ft. Worth**
5/8" x 3-4"	1.00	236	236	236
3/4"	1.50	0	0	0
1"	2.50	74	74	185
1-1/2"	5.00	46	46	230
2"	8.00	113	113	904
3"	21.75	13	13	283
4"	37.50	4	4	150
6"	80.00	1	1	80
8"	140.00	0	0	0
10"	210.00	0	0	0
	TOTAL	**487**	**487**	**2,068**

FREESE AND NICHOLS, INC.
801 CHERRY STREET, SUITE 2800
FORT WORTH, TEXAS 76102
817-735-7300

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