San Antonio Water System

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Water and Wastewater Facilities Capital Improvements Plan and Maximum Impact Fee per Service Unit

DRAFT

November 2010

Report Prepared By:

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Acronyms Used in the Report

AACOG	Alamo Area Council of Governments
ADD	Average Day Demand
ADF	Average Daily Flow
AWWA	American Water Works Association
BCAD	Bexar County Appraisal District
BMWD	Bexar Metropolitan Water District
CCMA	Cibolo Creek Municipal Authority
CCN	Certificate of Convenience and Necessity
CIAC	Capital Improvements Advisory Committee
CIP	Capital Improvements Plan
EDU	Equivalent Dwelling Unit
EST	Elevated Storage Tank
ETJ	Extra-territorial Jurisdiction
gpcd	Gallons per Capita per Day
gpd	Gallons per Day
GST	Ground Storage Tank
LUAP	Land Use Assumptions Plan
MDD	Maximum Day Demand
MDPF	Maximum Day Peaking Factor
MG	Million Gallons
mgd	Millions of Gallons per Day
MHD	Maximum Hour Demand
MHPF	Maximum Hour Peaking Factor
MPO	San Antonio / Bexar County Metropolitan Planning Organization
MRSO	Medina River Sewer Outfall
PWWF	Peak Wet Weather Flow
SARA	San Antonio River Authority
SAWS	San Antonio Water System
SDC	State Data Center (Office of State Demographer)
TAZ	Transportation Analysis Zone
TCEQ	Texas Commission on Environmental Quality
TLGC	Texas Local Government Code
TWDB	Texas Water Development Board
TxDOT	Texas Department of Transportation
WRC	Water Recycling Center

1. Executive Summary

1.1. Introduction

The Texas Local Government Code (TLGC), Chapter 395 authorizes a political subdivision, such as the San Antonio Water System (SAWS), to impose impact fees on new development within its corporate boundaries and extraterritorial jurisdiction (ETJ). Impact fees provide utilities with a mechanism for funding or recouping the cost associated with capital improvements or facility expansions of the water and/or wastewater systems necessitated and attributable to new development.

Chapter 395 requires the political subdivision imposing an impact fee to update its Land Use Assumptions Plan (LUAP) and Capital Improvements Plan (CIP) every five years. SAWS commissioned Red Oak Consulting (Red Oak), to conduct a Capital Improvements Plan and Maximum Impact Fees Study. This report updates the previous LUAP and CIP for SAWS, which were completed in 2006.

Red Oak calculated the following impact fees by service area:

- Water Supply
- Water Delivery – Flow
- Water Delivery – System Development
- Wastewater Treatment
- Wastewater Collection

1.2. Land Use Assumptions Plan

Future land use assumptions are based on current land use data. For SAWS, these assumptions are primarily based on Bexar County Appraisal District (BCAD) databases and supplemented with SAWS customer data, Alamo Area Council of Governments (AACOG) land use studies as well as aerial photo documentation. Table 1-1 presents the land use distribution.

Table 1-1: Area Land Use Distribution

Land Use	Water	Wastewater
Commercial	12%	10%
Industrial	1%	1%
Residential	34%	29%
Undevelopable	10%	13%
Vacant	42%	47%
Total Acres	**379,177**	**544,332**

Population data is collected and converted into Equivalent Dwelling Units (EDU), the standard measure of demand expressed as water usage and wastewater discharge for an average household unit. One water EDU is equivalent to 313 gallons per day; a wastewater EDU is equivalent to 240 gallons per day.

In an effort to improve the equity of the impact fees, some changes to the current service areas are proposed:

- Water Flow is separated into two service areas – Inside Loop 410 and Outside Loop 410. There is currently one systemwide service area.
- For Wastewater Treatment, the current Far West and Upper / Lower service areas are combined into one service area, the Leon Creek / Dos Rios service area.
- Wastewater Collection will be separated into six service areas – Medio Creek, Upper Medina, Lower Medina, Upper Collection, Middle Collection and Lower Collection. There are currently four Wastewater Collection service areas.

Table 1-2 presents population and EDU projections for water and wastewater by service areas.

Table 1-2: Water and Wastewater Service Area Population and EDU Projections

		Population		EDUs		
	Service Area	**2011**	**2020**	**2010**	**2020**	**Change**
Flow & Supply	Inside 410	562,911	577,647	245,344	251,767	6,423
	Outside 410	784,056	953,655	341,729	415,649	73,920
	Total Flow & Supply	**1,346,967**	**1,531,302**	**587,073**	**667,416**	**80,343**
System Development	High Elevation	41,004	84,181	17,872	36,690	18,818
	Middle Elevation	500,181	595,400	218,003	259,504	41,501
	Low Elevation	805,780	851,721	351,198	371,222	20,024
	Total System Development	**1,346,965**	**1,531,302**	**587,073**	**667,416**	**80,343**
Treatment	Medio Creek(1)	78,393	118,720	33,501	50,735	17,234
	Leon Creek / Dos Rios	1,567,369	1,777,596	669,816	759,656	89,840
	Total Treatment	**1,645,762**	**1,896,316**	**703,317**	**810,391**	**107,074**
Collection	Medio Creek(1)	78,393	118,720	33,501	50,735	17,234
	Upper Medina(2)	29,100	62,384	12,436	26,660	14,224
	Lower Medina	6,074	10,102	2,596	4,317	1,721
	Upper Collection	349,313	468,013	149,279	200,006	50,727
	Middle Collection	613,865	630,734	262,335	269,544	7,209
	Lower Collection	569,017	606,372	243,170	259,133	15,963
	Total Collection	**1,645,762**	**1,896,325**	**703,317**	**810,395**	**107,078**

Boundaries are for population served in 2020

(1) Medio Creek sewershed of current Far West

(2) Includes lower 3 sewersheds of current Far West

1.3. Capital Improvement Plan

SAWS owns and operates an infrastructure-intensive 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 and wastewater system is known as the CIP. SAWS staff, with assistance from Red Oak and other consultants, updated the CIP as part of this study.

Projects included in the CIP can serve to rehabilitate and renew the system, enhance the system to improve efficiency and meet regulatory requirements, increase the system capacity, or achieve a combination of these objectives. However, only those projects required to provide capacity to serve new development during the 2011-2020 study period can be included in the maximum impact fee calculation.

Tables 1-3 through 1-9 provide the value of water facilities that are eligible to be included in the calculation of the maximum water impact fee.

Table 1-3: 2011 - 2020 Eligible Water Supply CIP Cost

Service Area	Value of Existing Capacity	Value of New CIP Capacity	Total Value of Existing and New CIP Capacity	Total Value of Eligible Study Period Capacity
All	**$575,247,480**	**$326,573,211**	**$901,820,691**	**$147,719,764**

Table 1-4: 2011 - 2020 Eligible Water Flow CIP Cost

Service Area	Value of Existing Capacity	Value of New CIP Capacity	Total Value of Existing and New CIP Capacity	Total Value of Eligible Study Period Capacity
Inside 410	$223,006,792	$11,648,000	$234,654,792	$7,658,952
Outside 410	380,230,849	139,307,749	519,538,597	116,401,358
Total	**$603,237,641**	**$150,955,749**	**$754,193,390**	**$124,060,310**

Table 1-5: 2011 - 2020 Eligible Well Pumps CIP Cost

Service Area	Value of Existing Capacity	Value of New CIP Capacity	Total Value of Existing and New CIP Capacity	Total Value of Eligible Study Period Capacity
All	**$69,308,164**	**$43,031,000**	**$112,339,164**	**$17,489,285**

Table 1-6: 2011 - 2020 Eligible High Service and Booster Pump Stations CIP Cost

Service Area	Value of Existing Capacity	Value of New CIP Capacity	Total Value of Existing and New CIP Capacity	Total Value of Eligible Study Period Capacity
High Elevation	$4,450,456	$7,079,157	$11,529,613	$3,219,077
Middle Elevation	37,190,339	11,652,911	48,843,250	7,023,917
Low Elevation	51,914,948	4,637,932	56,552,880	2,953,982
Total	**$93,555,743**	**$23,370,000**	**$116,925,743**	**$13,196,976**

Table 1-7: 2011 - 2020 Eligible Elevated Storage CIP Cost

Service Area	Value of Existing Capacity	Value of New CIP Capacity	Total Value of Existing and New CIP Capacity	Total Value of Eligible Study Period Capacity
High Elevation	$3,975,584	$10,676,000	$14,651,584	$4,489,028
Middle Elevation	18,222,082	32,990,000	51,212,082	6,116,707
Low Elevation	24,383,896	14,139,000	38,522,896	1,910,654
Total	**$46,581,563**	**$57,805,000**	**$104,386,563**	**$12,516,389**

Table 1-8: 2011 - 2020 Eligible Ground Storage CIP Cost

Service Area	Value of Existing Capacity	Value of New CIP Capacity	Total Value of Existing and New CIP Capacity	Total Value of Eligible Study Period Capacity
High Elevation	$221,526	$0	$221,526	$4,214
Middle Elevation	8,928,955	4,225,000	13,153,955	261,518
Low Elevation	18,358,970	0	18,358,970	480,539
Total	**$27,509,451**	**$4,225,000**	**$31,734,451**	**$746,270**

Table 1-9: 2011 - 2020 Eligible Water Transmission Mains CIP Cost

Service Area	Value of Existing Capacity	Value of New CIP Capacity	Total Value of Existing and New CIP Capacity	Total Value of Eligible Study Period Capacity
High Elevation	$11,384,862	$21,941,531	$33,326,394	$9,263,276
Middle Elevation	40,049,226	44,437,236	84,486,462	14,026,090
Low Elevation	49,083,076	2,578,051	51,661,126	2,618,984
Total	**$100,517,164**	**$68,956,818**	**$169,473,982**	**$25,908,350**

Tables 1-10 and 1-11 provide the value of wastewater facilities that are eligible to be included in the calculation of the maximum wastewater impact fee.

Table 1-10: 2011 - 2020 Eligible Wastewater Treatment CIP Costs

Service Area	Value of Existing Capacity	Value of New CIP Capacity	Total Value of Existing and New CIP Capacity	Total Value of Eligible Study Period Capacity
Medio Creek	$62,770,361	$0	$62,770,361	$23,653,796
Leon Creek / Dos Rios	367,856,341	59,665,710	427,522,051	91,789,543
Total	**$430,626,702**	**$59,665,710**	**$490,292,412**	**$115,443,339**

Table 1-11: 2011 - 2020 Eligible Wastewater Collection CIP Costs

Service Area	Value of Existing Capacity	Value of New CIP Capacity	Total Value of Existing and New CIP Capacity	Total Value of Eligible Study Period Capacity
Medio Creek	$21,217,243	$38,662,980	$59,880,223	$10,285,377
Upper Medina	7,876,112	53,545,401	61,421,513	8,877,790
Lower Medina	1,644,129	76,622,918	78,267,046	12,097,872
Upper Collection	94,543,113	99,975,884	194,518,997	34,328,678
Middle Collection	166,145,055	205,625,520	371,770,575	36,098,134
Lower Collection	154,007,254	268,217,925	422,225,179	42,757,964
Total	**$445,432,906**	**$742,650,628**	**$1,188,083,534**	**$144,445,814**

1.4. Impact Fees Calculation

Eligible capital costs for growth-related CIP by service area are divided by the projected number of total service units for that service area to determine the calculated impact fee per service unit. Table 1-12 presents the calculated impact fees for water and wastewater service.

Table 1-12: Water and Wastewater Calculated Impact Fees

Impact Fee	Service Area	Eligible CIP Value	Service Units	Calculated Impact Fee per Service Unit
Water Supply	All	$147,719,764	80,343	$1,839
Flow	Inside Loop 410	7,658,952	6,423	1,192
	Outside Loop 410	116,401,358	73,920	1,575
System Development	High Elevation	21,071,949	18,818	1,120
	Middle Elevation	36,462,283	41,501	879
	Low Elevation	12,323,038	20,024	615
Treatment	Medio Creek	23,653,796	17,234	1,373
	Leon Creek / Dos Rios	91,789,543	89,840	1,022
Collection	Medio Creek	10,285,377	17,234	597
	Upper Medina(1)	8,877,790	14,224	1,383
	Lower Medina	12,097,872	15,945	759
	Upper Collection(2)	34,328,678	50,727	1,878
	Middle Collection(3)	36,098,134	57,936	1,202
	Lower Collection	42,757,964	73,899	579

(1) Maximum Impact Fee per Service Unit includes Lower Medina fee
(2) Maximum Impact Fee per Service Unit includes Middle Collection fee
(3) Maximum Impact Fee per Service Unit includes Lower Collection fee

1.4.1. Credit Calculation

Chapter 395 of the Local Government Code requires utilities to calculate a credit for growth-related CIP, to be subtracted from the calculated impact fee. The credit is based on the amount of projected future rate revenues or taxes expected to be generated by the new development and used to pay for capital improvements identified in the CIP.[1] This credit provides an adjustment to benefit fee payers who will pay for CIP in both the impact fee and their future rates or taxes. Utilities can calculate this credit and apply it to the calculated impact fee or, alternatively, can forgo the credit calculation by opting to use the statutory credit equal to 50% of the calculated impact fee. SAWS opted to calculate the credit.

Credits for the value of existing and future debt are allocated among the impact fees and service areas based on the proportion of eligible existing and future capacity value. SAWS plans to fund most of its growth-related CIP with cash from impact fee revenues. However, it plans to fully fund the Water Supply CIP and the Medina River Sewer Outfall, as well as approximately 20% of all other future CIP, with debt.

1.4.2. Maximum Impact Fees per Service Unit

The maximum impact fees per service unit include both the existing value of infrastructure with capacity available to serve new development projected for the study period, 2011 through 2020, as well as the value of new water supply, water delivery, and wastewater capacity available to serve new development during the study period. Calculated impact fees, rate credits, and maximum impact fees by service area are presented in Table 1-13.

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[1] For SAWS, the credit is based on the cost of growth-related CIP projected to be in future rates of the projected new development as they do not receive tax revenue from the City of San Antonio.

Table 1-13: Maximum Water and Wastewater Impact Fees per Service Unit

Impact Fee	Service Area	Calculated Impact Fee per EDU	Rate Credit per EDU	Maximum Impact Fee per EDU
Water Supply	All	$1,839	$183	$1,656
Flow	Inside 410	1,192	82	1,110
	Outside 410	1,575	74	1,501
System Development	High Elevation	1,120	56	1,064
	Middle Elevation	879	38	841
	Low Elevation	615	32	583
Treatment	Medio Creek	1,373	103	1,270
	Dos Rios/Leon Creek	1,022	29	993
Collection	Medio Creek	597	30	567
	Upper Medina	1,383	252	1,131
	Lower Medina	759	128	631
	Upper Collection	1,878	92	1,786
	Middle Collection	1,202	58	1,144
	Lower Collection	579	26	553

Table 1-14 compares the maximum impact fee per service unit to the current impact fee per service unit.

Table 1-14: Maximum Impact Fees per EDU versus Current Fees per EDU

Impact Fee	Service Area	Maximum Impact Fee per EDU	Current Fee per EDU	Change
Water Supply	All	$1,656	$1,242	$414
Flow	Inside 410	1,110	1,098	12
	Outside 410	1,501	1,098	403
System Development	High Elevation	1,064	1,356	(292)
	Middle Elevation	841	591	250
	Low Elevation	583	668	(85)
Treatment	Medio Creek	1,270	901	369
	Dos Rios/Leon Creek	993	453	540
Collection	Medio Creek	567	394	173
	Upper Medina	1,131	772	359
	Lower Medina	631	413	218
	Upper Collection	1,786	691	1,095
	Middle Collection	1,144	413	731
	Lower Collection	553	413	140

2. Land Use Assumptions Plan

2.1. Introduction

Chapter 395 of the Texas Local Government Code (TLGC) empowers cities to calculate, impose and collect impact fees to fund capital improvements required to serve new development. This legislation requires a utility to adopt a Land Use Assumptions Plan (LUAP) and a Capital Improvements Plan (CIP) before assessing or collecting impact fees. The CIP and the maximum allowable impact fees established therein must be based upon the adopted LUAP.

The LUAP incorporates the best information available to project future land use and demand for service areas in which a municipality intends to supply utility services. The areas are for Water Supply, System Development and Flow; as well as for Wastewater Treatment and Collection. Land use assumptions are based on a ten-year period. These assumptions may be general and do not require detailed projections for specific tracts of land.

The San Antonio Water System (SAWS) provides water and wastewater service to large portions of Bexar County and has authority to provide service to parts of two adjacent counties. State authority is provided by Certificate of Convenience & Necessity (CCN) and some service is provided by contract outside of the CCN. The following two maps, Figure 2-1 and Figure 2-2, show the general areas of service. The water system map shows areas of the Bexar County served by other purveyors. The wastewater system map shows the watersheds that flow into the water recycling centers (WRC) operated by SAWS.

Figure 2-1: SAWS Water Service Areas

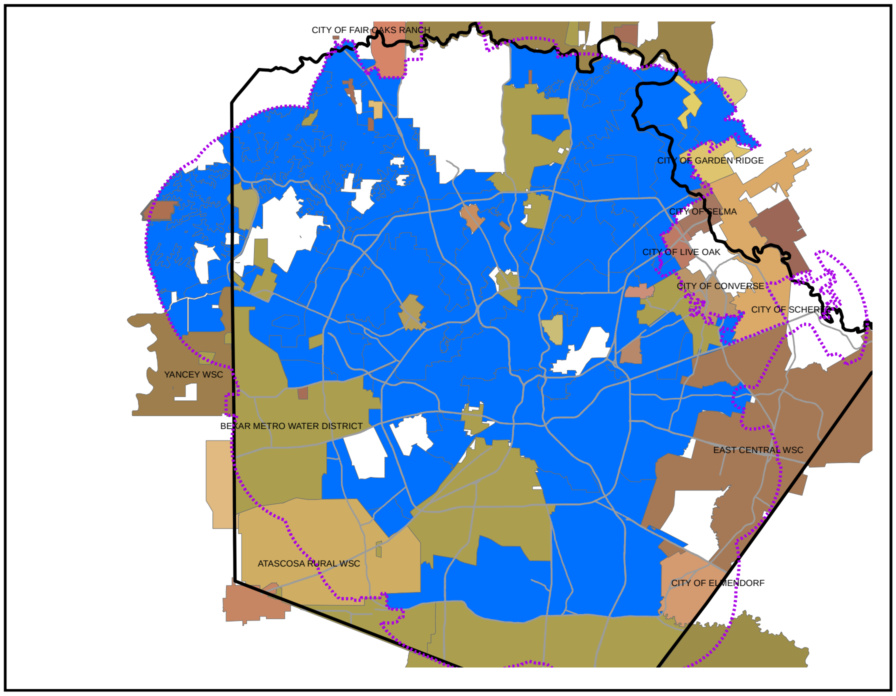
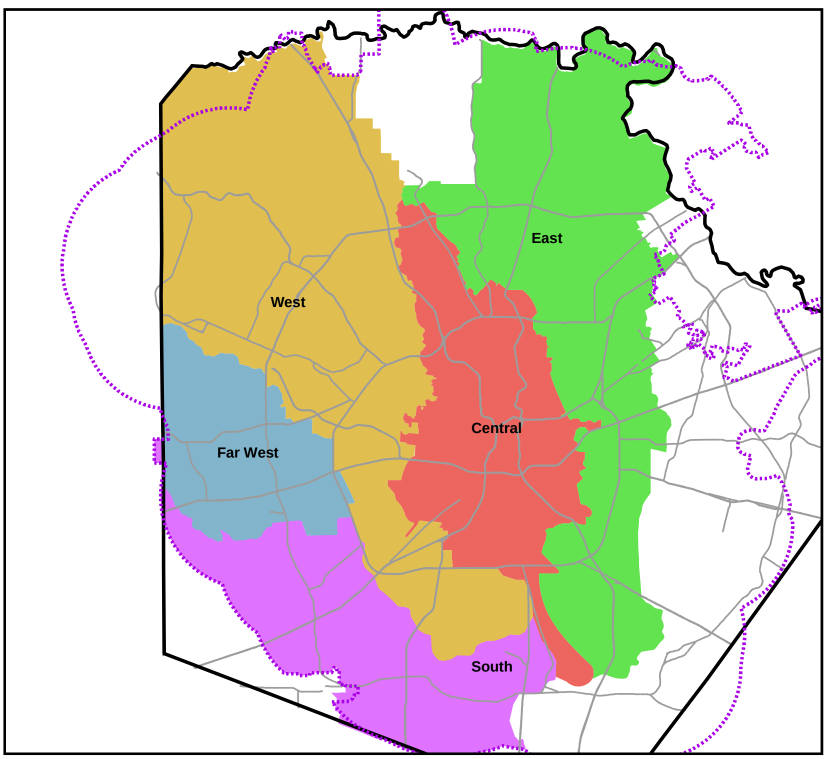


Figure 2-2: SAWS Wastewater Service Areas



2.2. Methodology

2.2.1. Current Land Use

Land use assumptions for the future are based on current land use. Current land use is primarily based on Bexar County Appraisal District (BCAD) databases but is supplanted with SAWS customer data, Alamo Area Council of Governments (AACOG) land use studies and some aerial photo documentation. The area land use distribution is provided in Table 2-1.

Table 2-1: Area Land Use Distribution

Land Use	Water	Wastewater
Commercial	12%	10%
Industrial	1%	1%
Residential	34%	29%
Undevelopable	10%	13%
Vacant	42%	47%
Total Acres	**379,177**	**544,332**

Specifically, undevelopable land includes parks, lakes, cemeteries, roads, landfills, easements and floodplains. Vacant land does not fall into other categories and could develop into any of the other categories.

2.2.2. Population and Projections

The San Antonio area has an adopted methodology for projecting population for use by many area agencies. This process coordinates information by state and local agencies as well as incorporates data from private sector master plans.

The population projections in this LUAP are based upon an area wide model, for assessing future transportation improvements. The San Antonio-Bexar County Metropolitan Planning Organization (MPO) is the coordinating body for this information and the model is run by AACOG. The particular model is called Dram/Empal and is the most widely used tool for regional projections in the United States. A committee composed of representatives from such agencies as SAWS, City of San Antonio and neighboring cities, Texas Department of Transportation (TxDOT), Texas Workforce Commission, City Public Service, and Bexar County serve as technical reviewers. Elected officials and Chambers of Commerce members also provide review

The model projects allocated population within the MPO study area (Bexar County and parts of Comal and Guadalupe Counties). The population for the total area is consistent with projections provided by the Texas State Data Center (SDC) and the Texas Water Development Board (TWDB). The SDC projects county population using Census data, migration and birth rates within the state. The local modeling data inputs include existing land uses, household sizes and birthrates, employment numbers and types, future roads and developable land. The model projects future households, population and employment based on common transportation and land use relationships as well as local demographic relationships based on the inputs.

The review team tests for quality control of the data and provides guidance to account for local expected projects or trends that may affect specific areas. The projections are reviewed by five-year increments to ensure that the modeled growth rates look within reason. Growth rates may be slightly re-allocated to reflect programs that the model does not seem to project well. These are areas where the City Council is formulating growth or economic development policies.

The model outputs are population, households and employment by 278 census tracts, as well as further allocations to 917 smaller Transportation Analysis Zones (TAZ). SAWS projections are based on the best fit of the TAZ boundaries to the LUAP boundaries.

2.3. EDU Calculations and Factors

For the LUAP, the common measure used is an Equivalent Dwelling Unit (EDU). This is the standardized measure of demand expressed as water flow for an average household unit. One water EDU equals 313 gallons per day. A single family residence using a 5/8" or ¾" meter has one EDU demand on the water system. Commercial and industrial uses have larger meters, more demand and larger numbers of EDUs. A wastewater EDU is equivalent to 240 gallons.

The Population to EDU factor is useful to represent population as demand, currently and in the future. Since the Water Infrastructure Plan is based on 2008 data, the EDUs were calculated from that year also. The EDU calculation is shown in Table 2-2.

Table 2-2: Calculation of Water EDUs

1	2	3	4	5	6	7	8
	Active Meter	Apartment	(2 - 3)	Non-apartments	(4 * 5)	Apartment Units	(6 + 7)
Meter Size	Count	Master Meters	Meters	EDU/Meter Size	EDU	149,692	
5/8	305,229	1,430	303,799	1	303,799		
3/4	21,918	161	21,757	1.5	32,636		
1	10,052	512	9,540	2	19,080	90% occupancy	
1 1/2	5,775	368	5,407	5	27,035	134,723	
2	3,938	518	3,420	14	47,880		
3	834	195	639	30	19,170		
4	635	178	457	50	22,850		
6	346	162	184	105	19,320		
8	108	40	68	135	9,180		
10	25	7	18	190	3,420	1/2 units	
					504,370	**67,361**	**571,731**
2008 population 1,311,764				**Population/ EDU = 2.29**			

Column 2 shows the distribution of meter sizes within the System. Since apartment master meter sizes are not clearly correlated to apartment use, they are removed until the end of the calculation. Column 5 shows the EDU to meter size ratio provided by the American Water Works Association (AWWA). This shows that a 1" meter can have a flow twice as much as a 5/8" meter. The total for column 5 is water system EDUs, without considering apartments. Apartment units represent at least 25% of housing units in San Antonio so their count is important to the EDU calculation. The total number of units is estimated from data provided by SAWS, CPS-Energy, the San Antonio Apartment Association, BCAD and private data sources. The private sources and the Census show a 90% occupancy rate for all apartments. Occupancy represents active apartment units. Past SAWS studies have shown the apartment water use represent 50% of residential water use. Each of these considerations yields the apartment EDU total.

The population for 2008 is estimated from residential and apartment connection data, also. Quality control is also conducted to compare TAZ estimates to connections and persons per household estimates.

Table 2-3 shows the calculation of wastewater EDUs.

Table 2-3: Calculation of Wastewater EDUs

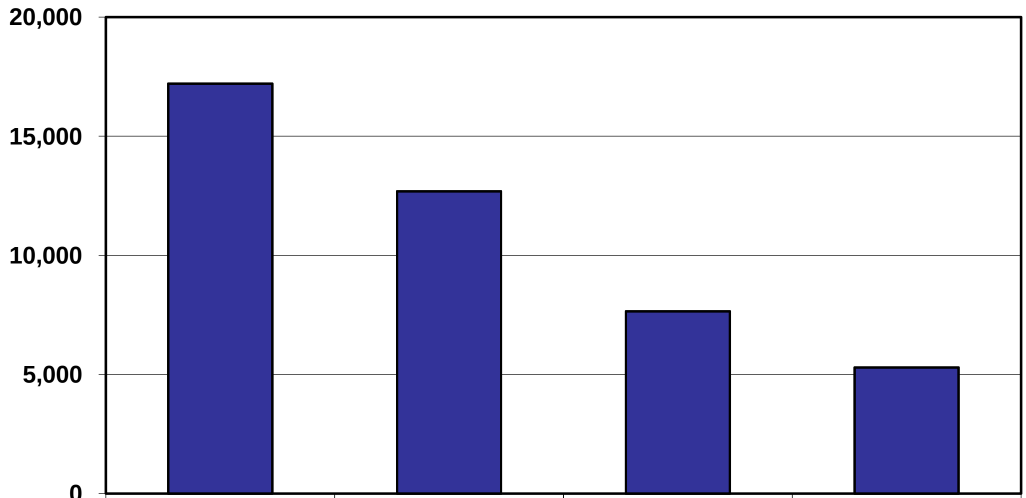
1	2	3	4	5	6	7	8	9
				(2 (total) - 3(total))* 4 percentages		(5 * 6)		(7 + 8)
	Active Meter	**Apartment**		**Non-apartments**			**Apartment Units**	
Meter Size	Count	Master Meters	Percent by Size*	Meters	EDU/Meter Size	EDUs	149,692	
5/8			87.98%	344,395	1	344,395	BxMet apt estimate	
3/4			6.30%	24,664	1.5	36,996	11,760	
1			2.76%	10,815	2	21,630		
1 1/2			1.57%	6,130	5	30,648	Sum	
2			0.99%	3,877	14	54,278	161,452	
3			0.19%	724	30	21,732		
4			0.13%	518	50	25,903	90% occupancy	
6			0.05%	209	105	21,902	145,307	
8			0.02%	77	135	10,407		
10			0.01%	20	190	3,877	1/2 units	
Total	395,227	3,798		391,429		571,767	72,653	**644,420**
			Percent sizes of sewer services assumed to equal percent for water services					
2008 population 1,505,859					**Population/ EDU = 2.34**			

The wastewater EDU calculation is similar to the water calculation, however the meter size distribution for the Bexar Metropolitan Water District (BMWD) water customers/SAWS sewer customers is assumed to be the same as the SAWS water system. The percentages in column 4 above correspond to column 2 in the water EDU calculation. Estimated apartment units in the BMWD are included in column 8.

The following sections show the 2011 – 2020 service areas, and associated land use, population and EDU change. The future EDU projection is the future population projection multiplied by the EDU population factor.

As a comparison, Figure 2-3 shows the variability of EDU growth per year for the water system. For all four years, the average yearly growth was 10,500 EDUs per year. The 2006 LUAP had projected 10,000 EDUs per year.

Figure 2-3: Historical EDU Change



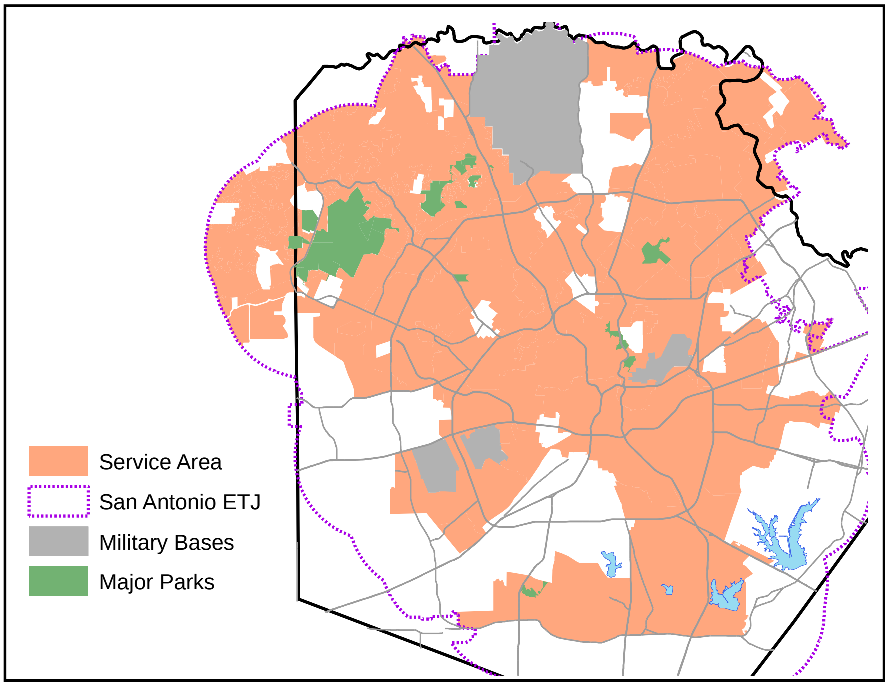
	2006	2007	2008	2009
Annual Change	17,204	12,684	7,652	5,289

2.4. Service Areas

2.4.1. Water Supply

Water Supply is the infrastructure associated with providing new water sources to the system. The proposed Water Supply service area, shown in Figure 2-4, does not change from the existing service area. The current area includes recent changes to CCN boundaries as well as pending application areas.

Figure 2-4: Proposed Water Supply Service Areas



2.4.2. Water Delivery – Flow

Flow is the distribution system. Currently, there is one service area for Flow, shown in

Figure 2-5. The proposed Water Flow Service Area has 2 areas, shown in

Figure 2-6. The Inner Area reflects policies to encourage infill development.

Figure 2-5: Existing Water Delivery - Flow Service Area

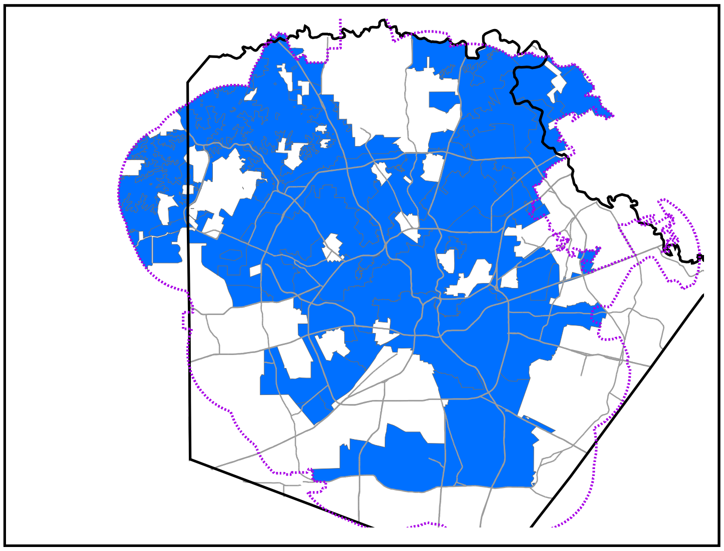
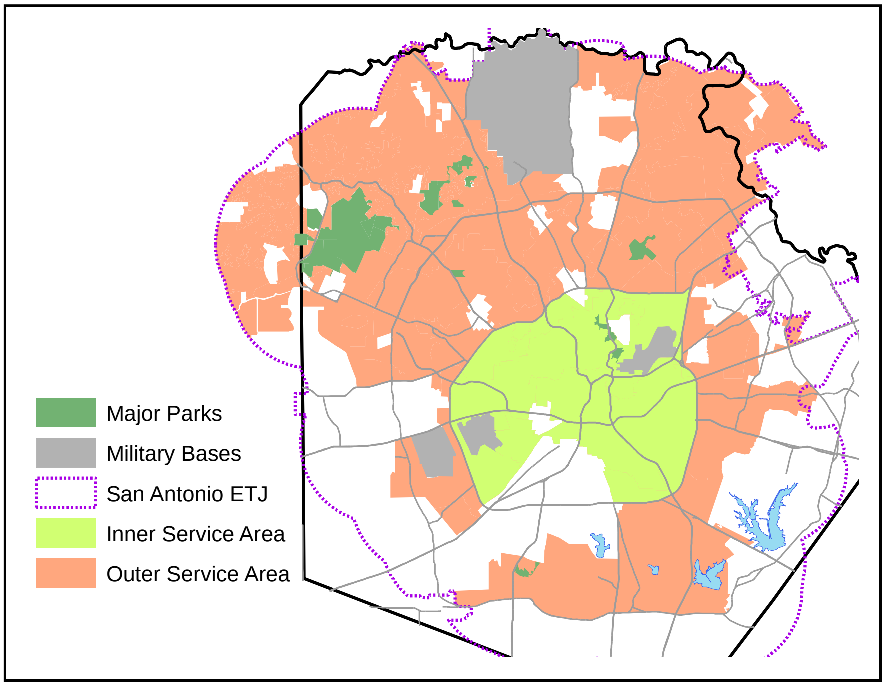


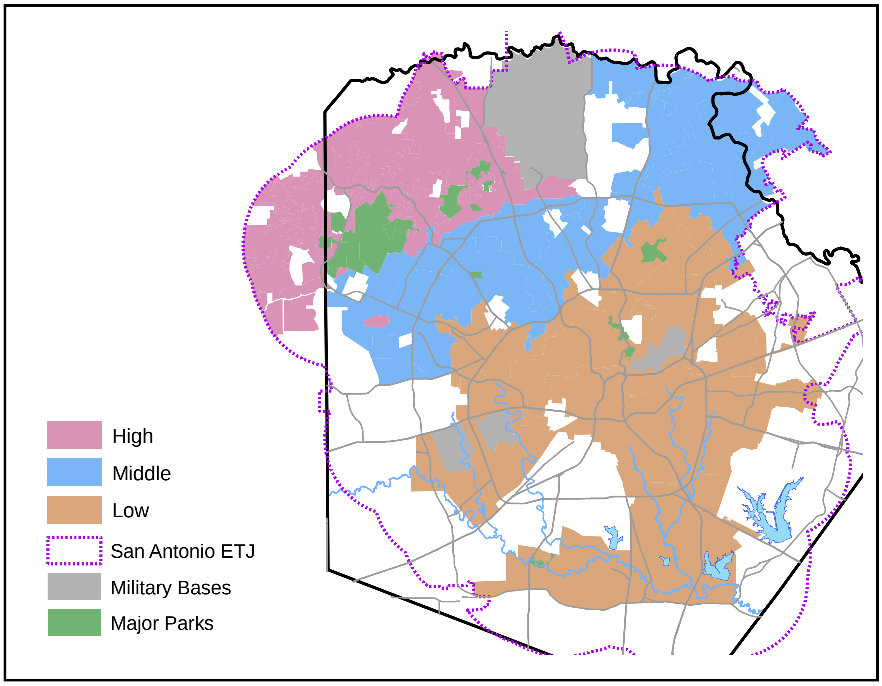
Figure 2-6: Proposed Water Delivery - Flow Service Areas



2.4.3. Water Delivery – System Development

System Development is the infrastructure associated with pumping and transmitting water to the distribution system. No change is proposed to the existing service areas, shown in Figure 2-7.

Figure 2-7: Existing and Proposed Water Delivery - System Development Service Areas



2.4.4. Wastewater Treatment

Currently there are three treatment service areas, shown in Figure 2-8. Medio Creek WRC has two, and Dos Rios and Leon Creek WRCs serve the largest area. With the Medina River Sewer Outfall (MRSO), the lower portion of the existing Medio Creek Service Area is proposed to be added to the Dos Rios/Leon Creek Service Area, as shown in Figure 2-9.

Figure 2-8: Existing Wastewater Treatment Service Areas

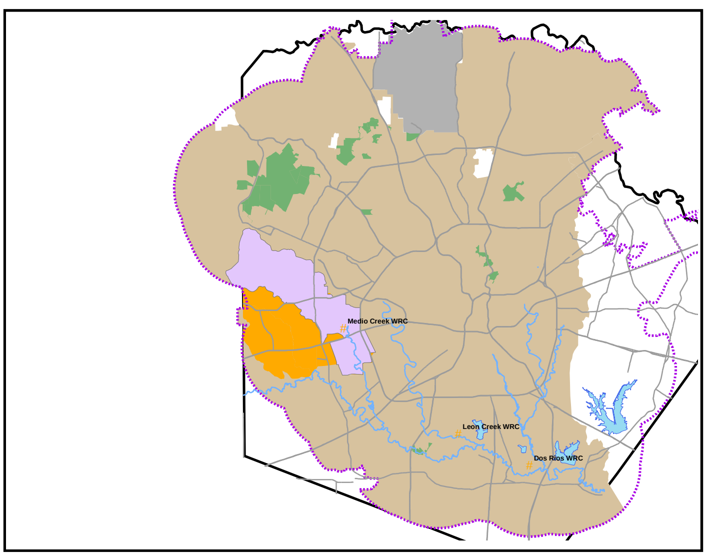
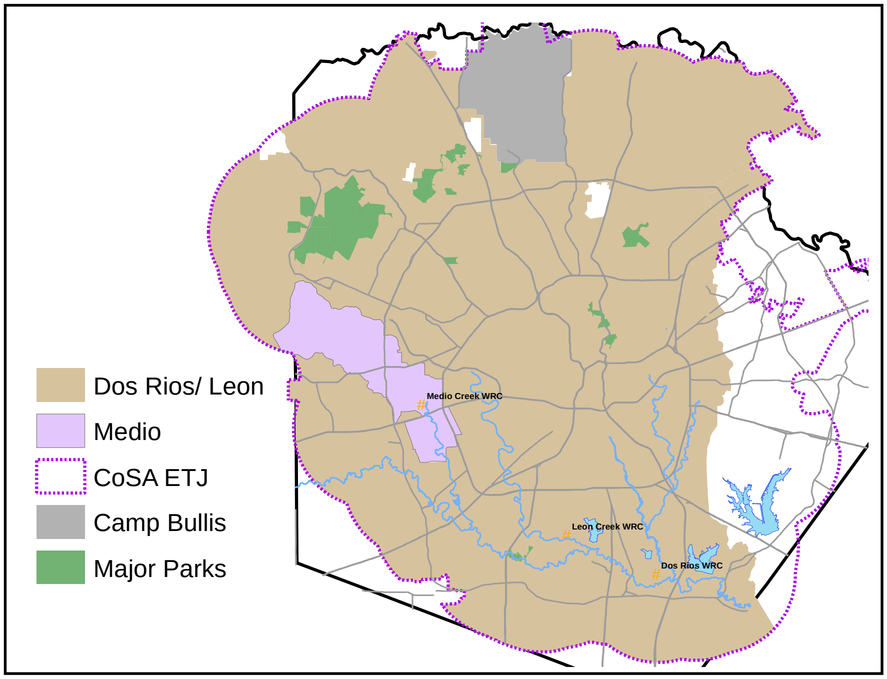


Figure 2-9: Proposed Wastewater Treatment Service Areas



2.4.5. Wastewater Collection

The Collection service areas reflect the boundaries of the sewersheds served by the WRCs but also designate high areas that have higher costs mainly due to distance to the WRC. The existing service areas are shown in Figure 2-10. The proposed Collection service areas, shown in Figure 2-11, include the proposed Upper and Lower Medina service areas, which are related to the MRSO. The Upper Medina includes land currently served by Medio WRC.

Figure 2-10: Existing Wastewater Collection Service Areas

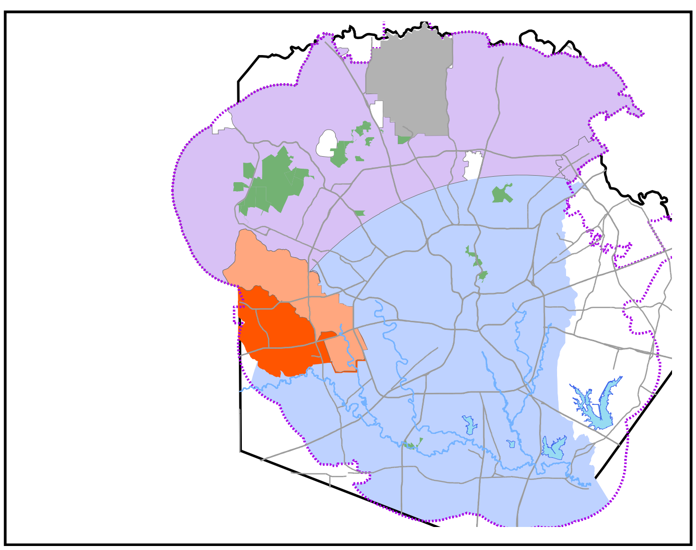
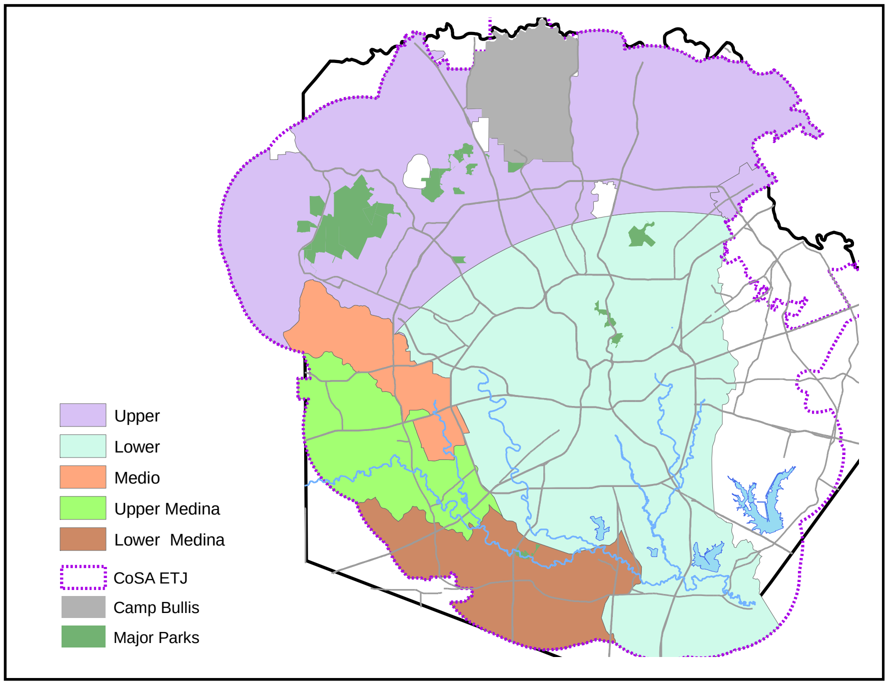


Figure 2-11: Proposed Wastewater Collection Service Areas



The population and EDU projections for the water and wastewater service areas are summarized in Table 2-4.

Table 2-4: Wastewater Service Areas Population and EDU Projections

		Population		EDUs		
	Service Area	**2011**	**2020**	**2010**	**2020**	**Change**
Flow & Supply	Inside 410	562,911	577,647	245,344	251,767	6,423
	Outside 410	784,056	953,655	341,729	415,649	73,920
	Total Flow & Supply	**1,346,967**	**1,531,302**	**587,073**	**667,416**	**80,343**
System Development	High Elevation	41,004	84,181	17,872	36,690	18,818
	Middle Elevation	500,181	595,400	218,003	259,504	41,501
	Low Elevation	805,780	851,721	351,198	371,222	20,024
	Total System Development	**1,346,965**	**1,531,302**	**587,073**	**667,416**	**80,343**
Treatment	Medio Creek(1)	78,393	118,720	33,501	50,735	17,234
	Leon Creek / Dos Rios	1,567,369	1,777,596	669,816	759,656	89,840
	Total Treatment	**1,645,762**	**1,896,316**	**703,317**	**810,391**	**107,074**
Collection	Medio Creek(1)	78,393	118,720	33,501	50,735	17,234
	Upper Medina(2)	29,100	62,384	12,436	26,660	14,224
	Lower Medina	6,074	10,102	2,596	4,317	1,721
	Upper Collection	349,313	468,013	149,279	200,006	50,727
	Middle Collection	613,865	630,734	262,335	269,544	7,209
	Lower Collection	569,017	606,372	243,170	259,133	15,963
	Total Collection	**1,645,762**	**1,896,325**	**703,317**	**810,395**	**107,078**

Boundaries are for population served in 2020

(1) Medio Creek sewershed of current Far West

(2) Includes lower 3 sewersheds of current Far West

Capital Improvements Plan

3.1. Introduction

In accordance with Chapter 395 of the TLGC, SAWS has commissioned Red Oak Consulting (Red Oak), to conduct a Capital Improvement Plan and Maximum Impact Fees Study. This section establishes the engineering basis for the capital projects included in the water and wastewater impact fee calculations, updating the previous study completed in 2006.

Impact fees provide SAWS with a mechanism for funding or recouping the cost associated with capital improvements or facility expansions of the municipal water and wastewater systems necessitated by and attributable to the new development, as necessary to accommodate growth in the identified service areas from 2011 through 2020 (the study period). SAWS owns and operates an infrastructure-intensive system comprised of water production facilities, pumping stations, storage facilities, water transmission and distribution pipelines, wastewater treatment facilities, lift stations and wastewater collection mains that are continuously improved and expanded. The schedule for future investment in the water and wastewater systems is known as the CIP. The CIP was updated by SAWS staff as part of this study. The eligible CIP includes capital project descriptions and cost estimates as developed by combined efforts of SAWS staff, other consultants, and Red Oak.

This report includes a description of the basis for establishing which SAWS water and wastewater facilities are eligible to be included in the impact fee analysis. First, the criteria for measuring infrastructure capacity are explained for each infrastructure type. Then, the facilities required to accommodate growth during the 10-year study period are identified. Finally, the impact fee per service unit is calculated using the value of the eligible capital facilities and the projected increase in service units from the LUAP, as prepared by SAWS and reviewed by the Capital Improvements Advisory Committee (CIAC). The final maximum impact fee per service unit is then calculated by subtracting statutory credits for the estimated capital costs to be included in future rates that will be charged to the new service units.

3.2. Capacity Criteria

3.2.1. General

This section of the report discusses the capacity of those facilities that are eligible for inclusion in the calculation of the impact fees. The only capacities that are considered for inclusion are existing available capacities and the increases in capacities to serve growth projected to occur during the study period.

Sections 3.2.2 through 3.2.4 describe those growth-related capacities for the water supply facilities, well pumps, high service and booster pump stations, elevated and ground storage tanks, and transmission and distribution mains that were considered for inclusion in the calculation of the water impact fees; these facilities are collectively referred to as the “water system” throughout this report. Sections 3.2.5 through 3.2.6 describe those growth-related capacities for the wastewater treatment and collection facilities (collectively referred to as the “wastewater system” in this report) that were considered for inclusion in the calculation of the wastewater impact fees.

The water system design average day demand (ADD) is 127 gallons per capita per day (gpcd), which is based on actual water production data for the 12 months ending June 2008. This period included both wet and dry weather conditions and, as such, represents a typical year. The water system maximum day peaking factor (MDPF) is 2.03. This is calculated by dividing the maximum day pumpage value by the design average day demand value. The water system maximum hour peaking factor (MHPF) is 2.81 and is calculated by dividing the maximum hour pumpage value by the design average day demand value.

The wastewater system design average daily flow (ADF) is 240 gallons per EDU. The design peak wet weather flow (PWWF) is 1,220 gallons per day (gpd) per EDU. However, this number includes inflow and infiltration. The design peak customer demand is 675 gpd per EDU. These design requirements are used to determine the requirements for wastewater treatment and collection capacities.

3.2.2. Water Supply

The water supply impact fee service area includes all the area currently receiving water service from SAWS as well as all the areas that could potentially receive water service from SAWS within the next 10 years. The water supply impact fee includes capital costs for water supply projects anticipated to be constructed within the study period.

SAWS currently receives its water supply from the Edwards Aquifer, Trinity Aquifer, Carrizo Aquifer and Canyon Lake. Other major projects that affect the availability of those water supplies include the Aquifer Storage and Recovery Project, the recycle program and the water conservation program.

Water supply projects are typically measured in acre feet per year. To convert acre feet per year to EDUs, the following calculation was performed.

$$1 \text{ acre foot} = 325{,}851 \text{ gallons}$$

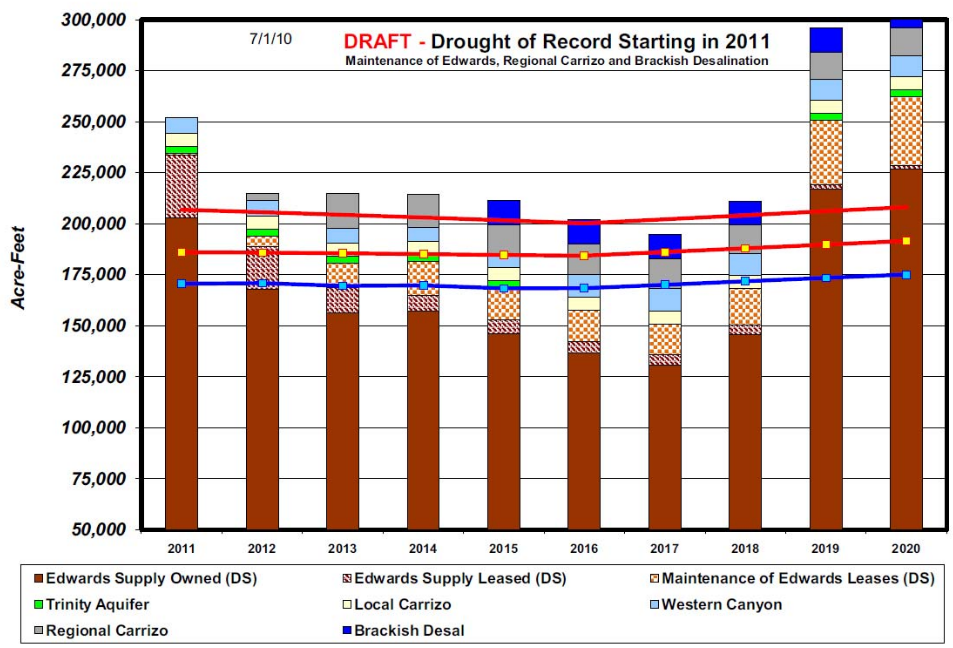
$$(313 \text{ gallons / EDU}) * 365 \text{ days} = 2.85 \text{ EDUs per acre foot}$$

The majority of the SAWS water supply comes from the Edwards Aquifer. SAWS has been granted a groundwater withdrawal permit from the Edwards Aquifer Authority

(EAA) that specifies the amount of groundwater that can be pumped from the aquifer. The permitted amount that is available each year can vary depending on the level of the aquifer and upon criteria established by the EAA. The EAA aquifer management criteria require the amount of groundwater pumping to be reduced as the level of the aquifer drops.

To manage the use of the various water supplies, SAWS has developed a water supply availability scenario based on the drought of record from the 1950s. For impact fee calculation purposes, the scenario assumes that a drought equal to the drought of record begins in 2011 and continues through 2020. The scenario assumes the projected Edwards Aquifer levels are the same as those that actually occurred during the drought of record period. The scenario reduces the amount of SAWS permitted Edwards Aquifer water available using the actual drought of record aquifer levels and also using the current EAA critical period reductions. Figure 3-1 shows the amount of Edwards Aquifer water that is available during the different years of the drought of record scenario. It also shows the amount of water available from other proposed and existing water supply projects during the study period.

Figure 3-1: Drought of Record Starting 2011



The worst year of the drought of record scenario occurs in year seven of the 10 year plan and the amount of Edwards water available under the EAA restrictions is 130,587 acre feet. For this impact fee calculation, it is assumed that the 130,587 acre feet are committed to existing customers. The Edwards supply available for new customers will be the average of the amount of Edwards that exceeds 130,587 acre feet for each of the other nine years. The amount of Edwards available for new customers will be 32,073 acre feet.

The total amount of water supply available for existing and new customers during the study period that exceeds the Edwards amount in the worst year of the drought of record will include the 32,073 acre feet of Edwards water, plus the other sources shown on the graph. This total amount of water supply will be the source to fulfill the Land Use Assumption projection of 80,343 new EDUs.

3.2.3. Water Delivery – Flow

The cost of Water Delivery is separated into two impact fees, Flow and System Development. The Flow impact fee includes growth-related costs for the water distribution mains (12-inch and larger) ; mains smaller than 12 inches are typically constructed by developers and “dedicated” or contributed to SAWS and, as such, are not included in the costs used to calculate the impact fee.

To determine the eligible capacities to include in costs used to calculate the Flow impact fee, the maximum hour demands (MHD) of the customers who will come online during the study period must be projected using the average day demand and the maximum hour peaking factor. The maximum hour demand for the system is projected to increase from 496 million gallons per day (mgd) in 2011 to 569 mgd in 2020, an increase of 73 mgd over the study period.

Two service areas are proposed for the water system (currently there is only a single water system service area), Inside Loop 410 and Outside Loop 410, to improve the equity among the fee payers. Most of the expected growth is projected to occur outside Loop 410. Because there is little growth projected inside Loop 410, the existing infrastructure is expected to be sufficient to serve this development. However, there are several CIP projects planned to serve growth outside Loop 410. In addition, the design average day demand and peaking factors (maximum day and hour) are higher outside Loop 410. As a result the costs to serve new growth outside Loop 410 are higher than inside Loop 410.

3.2.3.1. Inside Loop 410 Service Area

The customers inside Loop 410 have historically used less water than customers outside Loop 410. Therefore, design average day demands and peaking factors specific to each service area are used to determine the maximum hour demands.

The design average day demand for the Inside Loop 410 service area is 123 gpcd, and the maximum hour peaking factor is 2.65. Using these values and the population values from the LUAP, the estimated 2011 maximum hour demand for the Inside Loop 410 service area is 183 mgd:

$$\text{MHD} = \text{ADD} * \text{MHPF} * \text{Population}$$

$$2011\ \text{MHD} = 123\ \text{gpcd} * 2.65 * 562{,}911 / 1{,}000{,}000$$

$$2011\ \text{MHD} = 183\ \text{mgd}$$

Similarly, the estimated 2020 maximum hour demand for the Inside Loop 410 service areas is 188 mgd:

2020 MHD = 123 gpcd * 2.65 * 577,647 / 1,000,000
2020 MHD = 188 mgd

The expected increase in maximum hour demand due to growth during the study period in the Inside Loop 410 service areas is 5 mgd:

MHD Increase = 2020 MHD – 2011 MHD
MHD Increase = 188 mgd – 183 mgd = 5 mgd

3.2.3.2. Outside Loop 410 Service Area

As with the Inside Loop 410 Service Area, design average day demands and peaking factors specific to the Outside Loop 410 service area are used to estimate the Outside Loop 410 service area maximum hour demands.

The design average day demand for the Outside Loop 410 service area is 133 gpcd, and the maximum hour peaking factor is 3.00. Using these values and the population values from the LUAP, the estimated 2011 maximum hour demand for the Outside Loop 410 service area is 313 mgd:

2011 MHD = 133 gpcd * 3.00 * 784,056 / 1,000,000
2011 MHD = 313 mgd

Similarly, the estimated 2020 maximum hour demand for the Outside Loop 410 service areas is 381 mgd:

2020 MHD = 133 gpcd * 3.00 * 953,655 / 1,000,000
2020 MHD = 381 mgd

The expected increase in maximum hour demand due to growth during the study period in the Outside Loop 410 service areas is 68 mgd:

MHD Increase = 381 mgd – 313 mgd = 68 mgd

The calculated maximum hour demands for the two proposed Flow impact fee service areas are summarized in Table 3-1.

Table 3-1: Distribution Mains Capacity Criteria

Infrastructure Component	Service Area	Demand (mgd) 2011	2020	Change
Distribution Mains	Inside 410	183	188	5
	Outside 410	313	381	68
	Total	**496**	**569**	**73**

3.2.4. Water Delivery – System Development

The System Development impact fee includes growth-related costs for well pumps, high service and booster pump stations, elevated and ground storage tanks, and transmission mains (12-inch and larger).

There are currently three service areas for the System Development impact fee – High Elevation, Middle Elevation, and Low Elevation. No changes are proposed for the three existing service areas.

To determine the eligible allocation of existing and future CIP to the System Development impact fee, the available capacities and growth-related demands must be determined for the five infrastructure types by service area.

3.2.4.1. Well Pumps

Because the well pumps are directly related to the water supply and provide water to the entire system, they are not separated by service area. All customers within the SAWS system are assumed to require the same well pump capacity.

The well pumps are designed to meet the maximum day demand (MDD). Using the system design average day demand and maximum day peaking factor and the populations from the LUAP, the estimated 2011 maximum day demand for the SAWS system is 347 mgd:

$$\text{MDD} = \text{ADD} * \text{MDPF} * \text{Population}$$

$$\text{2011 MDD} = 127 \text{ gpcd} * 2.03 * 1{,}346{,}965 / 1{,}000{,}000$$

$$\text{2011 MDD} = 347 \text{ mgd}$$

Similarly, the estimated 2020 maximum day demand for the system is 395 mgd:

$$\text{2020 MDD} = 127 \text{ gpcd} * 2.03 * 1{,}531{,}302 / 1{,}000{,}000$$

$$\text{2020 MDD} = 395 \text{ mgd}$$

The projected study period increase in maximum day demand for well pumps is 48 mgd for the system, as presented in Table 3-2.

Table 3-2: Well Pumps Capacity Criteria

Infrastructure Component	Service Area	Demand (mgd) 2011	2020	Change
Well Pumps	All	347	395	48

3.2.4.2. High Service and Booster Pump Stations

Pumping requirements are based on design maximum hour demands and vary by pressure zone. The weighted average ADDs and MHPFs are calculated for each service area to determine the maximum hour demands for the three service areas.

HIGH ELEVATION SERVICE AREA

The High Elevation service area has significantly higher demands than the other two service areas. Its design average day demand is 166 gpcd, and its maximum day and maximum hour peaking factors are 2.76 and 3.38, respectively. Using this data and the study period populations from the LUAP, the estimated 2011 maximum hour demand for the High Elevation service area is 23 mgd:

MHD = ADD * MHPF * Population

2011 MHD = 166 gpcd * 3.38 * 41,004 / 1,000,000

2011 MHD = 23 mgd

The estimated 2020 maximum hour demand for the High Elevation service area is 47 mgd:

2020 MHD = 166 gpcd * 3.38 * 84,181 / 1,000,000

2020 MHD = 47 mgd

The expected increase in maximum hour demand due to growth during the study period in the High Elevation service area is 24 mgd:

MHD Increase = 2020 MHD – 2011 MHD

MHD Increase = 47 mgd – 23 mgd =24 mgd

MIDDLE ELEVATION SERVICE AREA

The Middle Elevation service area’s design average day demand and peaking factors are lower than the High Elevation service area and higher than the Low Elevation service area. The design average day demand is 133 gpcd, and the maximum day and maximum hour peaking factors are 2.03 and 2.89, respectively. The estimated 2011 maximum hour demand for the Middle Elevation service area is 192 mgd:

2011 MHD = 133 gpcd * 2.89 * 500,181 / 1,000,000

2011 MHD = 192 mgd

The estimated 2020 maximum hour demand for the Middle Elevation service area is 229 mgd:

$$2020\ MHD = 133\ gpcd * 2.89 * 595{,}400 / 1{,}000{,}000$$
$$2020\ MHD = 229\ mgd$$

The expected increase in maximum hour demand due to growth during the study period in the Middle Elevation service area is 37 mgd:

$$MHD\ Increase = 229\ mgd - 192\ mgd = 37\ mgd$$

LOW ELEVATION SERVICE AREA

The Low Elevation service area has the lowest design average day demand and peaking factors. Its design average day demand is 122 gpcd, and its maximum day and maximum hour peaking factors are 1.98 and 2.73, respectively. The estimated 2011 maximum hour demand for the Low Elevation service area is 268 mgd:

$$2011\ MHD = 122\ gpcd * 2.73 * 805{,}780 / 1{,}000{,}000$$
$$2011\ MHD = 268\ mgd$$

The estimated 2020 maximum hour demand for the Low Elevation service area is 284 mgd:

$$2020\ MHD = 122\ gpcd * 2.73 * 851{,}721 / 1{,}000{,}000$$
$$2020\ MHD = 284\ mgd$$

The expected increase in maximum hour demand due to growth during the study period in the Low Elevation service area is 16 mgd:

$$MHD\ Increase = 284\ mgd - 268\ mgd = 16\ mgd$$

The projected study period increase in pumping requirements is 77 mgd for the three System Development service areas, as summarized in Table 3-3.

Table 3-3: Booster Pumps Capacity Criteria

Infrastructure Component	Service Area	Demand (mgd) 2011	2020	Change
Booster PS	High	23	47	24
	Middle	192	229	37
	Low	268	284	16
	Total	**483**	**560**	**77**

3.2.4.3. Elevated Storage Tanks

Elevated storage tank (EST) requirements are based on design criteria and Texas Commission on Environmental Quality (TCEQ) requirements. Minimum design elevated storage capacity is greater than or equal to 100 gallons per connection. Design criteria provided in the Water Master Plan[2] vary by pressure zone. The weighted average elevated storage capacity requirements are calculated for each System Development service area and used as the impact fee capacity criteria if they exceed the minimum TCEQ requirement of 100 gallons per connection; if they do not exceed the TCEQ requirement, 100 gallons per connection is used.

HIGH ELEVATION SERVICE AREA

The 2011 and 2020 elevated storage demands for the three service areas are interpolated using the 2007 and 2017 weighted average elevated storage demands. For the High Elevation service area, the interpolated 2011 and 2020 demands for elevated storage capacity are 330 gallons and 253 gallons per connection, respectively. Since these demands exceed the minimum TCEQ requirement of 100 gallons per connection, they are used to estimate the 2011 capacity requirement for the High Elevation service area at 3.6 million gallons (MG):

2011 EST Capacity Requirement = Minimum capacity per connection * connections
2011 EST Capacity Requirement = 330 gallons/connection * 10,898 connections / 1,000,000
2011 EST Capacity Requirement = 3.6 MG

The estimated 2020 capacity requirement for the High Elevation service area is 5.7 MG:

2020 EST Capacity Requirement = 253 gallons/connection * 22,372 connections / 1,000,000
2020 EST Capacity Requirement = 5.7 MG

The expected increase in the elevated storage capacity requirement due to growth during the study period in the High Elevation service area is 2.1 MG:

EST Capacity Requirement Increase = 2020 Requirement – 2011 Requirement
EST Capacity Requirement Increase = 5.7 MG – 3.6 MG = 2.1 MG

MIDDLE ELEVATION SERVICE AREA

The interpolated 2011 and 2020 demands for elevated storage capacity in the Middle Elevation service area are 124 gallons and 132 gallons per connection, respectively. Since these demands exceed the minimum TCEQ requirement of 100 gallons per connection, this data is used to estimate the 2011 capacity requirement for the Middle Elevation service area at 16.5 MG:

[2] Draft 2010 Black & Veatch Water Master Plan

2011 EST Capacity Requirement = 124 gallons/connection * 132,929 connections / 1,000,000
2011 EST Capacity Requirement = 16.5 MG

The estimated 2020 capacity requirement for the Middle Elevation service area is 20.9 MG:

2020 EST Capacity Requirement = 132 gallons/connection * 158,234 connections / 1,000,000
2020 EST Capacity Requirement = 20.9 MG

The expected increase in the elevated storage capacity requirements due to growth during the study period in the Middle Elevation service area is 4.4 MG:

EST Capacity Requirement Increase = 20.9 MG – 16.5 MG = 4.4 MG

LOW ELEVATION SERVICE AREA

The interpolated 2011 and 2020 demands for elevated storage capacity in the Low Elevation service area are 103 gallons per connection. Since these demands exceed the minimum TCEQ requirement of 100 gallons per connection, this data is used to estimate the 2011 capacity requirement for the Low Elevation service area at 22.1 MG:

2011 EST Capacity Requirement = 103 gallons/connection * 214,145 connections / 1,000,000
2011 EST Capacity Requirement = 22.1 MG

The estimated 2020 capacity requirement for the Low Elevation service area is 23.3 MG:

2020 EST Capacity Requirement = 103 gallons/connection * 226,355 connections / 1,000,000
2020 EST Capacity Requirement = 23.3 MG

The expected increase in the elevated storage capacity requirement due to growth during the study period in the Low Elevation service area is 1.2 MG:

EST Capacity Requirement Increase = 23.3 MG – 22.1 MG = 1.2 MG

Table 3-4 summarizes the changes in elevated storage demands for the three service area elevations.

Table 3-4: Elevated Storage Capacity Criteria

Infrastructure Component	Service Area	Demand (MG) 2011	2020	Change
Elevated Storage	High	3.6	5.7	2.1
	Middle	16.5	20.9	4.4
	Low	22.1	23.3	1.2
	Total	**42.2**	**49.9**	**7.7**

3.2.4.4. Ground Storage Tanks

Ground storage tank (GST) requirements are based on design criteria and TCEQ requirements. Minimum design total storage capacity (elevated and ground) is greater than or equal to 200 gallons per connection. Design criteria provided in the Water Master Plan vary by pressure zone. The weighted average ground storage capacity requirements are calculated for each System Development service area and used as the impact fee capacity criteria if they exceed the difference between the minimum TCEQ total storage requirement of 200 gallons per connection and the minimum elevated storage requirement; if they do not exceed the TCEQ minimum, the difference between the TCEQ minimum of 200 gallons per connection and the weighted average ground storage capacity requirements from the Water Master Plan is used.

HIGH ELEVATION SERVICE AREA

The 2011 and 2020 ground storage demands for the three service areas are interpolated using the 2007 and 2017 weighted average ground storage demands. For the High Elevation service area, the interpolated 2011 and 2020 demands for ground storage capacity are 23 gallons and 14 gallons per connection, respectively. In the High Elevation service area, the minimum TCEQ requirement of 200 gallons of total storage per connection is met by the elevated storage demand. Therefore, the interpolated ground storage demands are used to estimate the 2011 capacity requirement for the High Elevation service area at 0.25 MG:

2011 GST Capacity Requirement = Minimum capacity per connection * connections
2011 GST Capacity Requirement = 23 gallons/connection * 10,898 connections / 1,000,000
2011 GST Capacity Requirement = 0.25 MG

The estimated 2020 capacity requirement for the High Elevation service area is 0.31 million gallons:

2020 GST Capacity Requirement = 14 gallons/connection * 22,372 connections / 1,000,000
2020 GST Capacity Requirement = 0.31 MG

The expected increase in the ground storage capacity requirement due to growth during the study period in the High Elevation service area is 0.06 MG:

GST Capacity Requirement Increase = 2020 Requirement – 2011 Requirement
GST Capacity Requirement Increase = 0.31 MG – 0.25 MG = 0.06 MG

MIDDLE ELEVATION SERVICE AREA

The interpolated 2011 and 2020 demands for ground storage capacity in the Middle Elevation service area are 0.5 gallons and 0.9 gallons per connection, respectively. However, in the Middle Elevation service area, 76 gallons and 68 gallons of ground storage capacity per connection are needed in 2011 and 2020, respectively, to meet the minimum TCEQ requirement of 200 gallons of total storage per connection. Therefore, the TCEQ minimum storage requirement is used to estimate the 2011 capacity requirement for the Middle Elevation service area at 10.1 MG:

2011 GST Capacity Requirement = 76 gallons/connection * 132,929 connections / 1,000,000
2011 GST Capacity Requirement = 10.1 MG

The estimated 2020 capacity requirement for the Middle Elevation service area is 10.8 million gallons:

2020 GST Capacity Requirement = 68 gallons/connection * 158,234 connections / 1,000,000
2020 GST Capacity Requirement = 10.8 MG

The expected increase in the ground storage capacity requirement due to growth during the study period in the Middle Elevation service area is 0.7 MG:

GST Capacity Requirement Increase = 2020 Requirement – 2011 Requirement
GST Capacity Requirement Increase = 10.8 MG – 10.1 MG = 0.7 MG

LOW ELEVATION SERVICE AREA

The Water Master Plan shows no demand for ground storage capacity in the Low Elevation service area. However, because the elevated storage capacity demand is less than 200 gallons per connection, 97 gallons of ground storage capacity per connection is needed in the Low Elevation service area to meet the minimum TCEQ requirement of 200 gallons of total storage per connection. Therefore, the TCEQ minimum storage requirement is used to estimate the 2011 capacity requirement for the Low Elevation service area at 20.8 MG:

2011 GST Capacity Requirement = 97 gallons/connection * 214,145 connections / 1,000,000
2011 GST Capacity Requirement = 20.8 MG

The estimated 2020 capacity requirement for the Low Elevation service area is 22.0 million gallons:

2020 GST Capacity Requirement = 97 gallons/connection * 226,355 connections / 1,000,000
2020 GST Capacity Requirement = 22.0 MG

The expected increase in the ground storage capacity requirement due to growth during the study period in the Low Elevation service area is 1.2 MG:

GST Capacity Requirement Increase = 2020 Requirement – 2011 Requirement
GST Capacity Requirement Increase = 22.0 MG – 20.8 MG = 1.2 MG

Table 3-5 summarizes the changes in ground storage demand for the three service area elevations.

Table 3-5: Ground Storage Capacity Criteria

Infrastructure Component	Service Area	Demand (mgd) 2011	2020	Change
Ground Storage	High	0.25	0.31	0.06
	Middle	10.1	10.8	0.7
	Low	20.8	22.0	1.2
	Total	**31.2**	**33.1**	**2.0**

3.2.4.5. Transmission Mains

The projected maximum hour demand is used to design transmission mains. Because the service areas are the same, the capacity criteria for transmission mains are the same as for the high service and booster pump stations. Table 3-6 summarizes the change in demand for the transmission mains during the study period.

Table 3-6: Transmission Mains Capacity Criteria

Infrastructure Component	Service Area	Demand (mgd) 2011	2020	Change
Transmission Mains	High	23	47	24
	Middle	192	229	37
	Low	268	284	16
	Total	**483**	**560**	**77**

3.2.5. Wastewater Treatment

To determine the eligible capacities to include in the Wastewater Treatment impact fee calculation, the system design average daily flow was used to estimate the 2011 and 2020 demands. Two service areas are proposed for wastewater treatment – Medio Creek and Leon Creek / Dos Rios. There are currently two service areas – Far West / Medio Creek and Upper / Lower. The proposed change reflects the decommissioning of the Salado Creek Water Recycling Center and the proposed construction of the MRSO.

3.2.5.1. Medio Creek Service Area

Using the system design average daily flow, the estimated average daily wastewater flow for the Medio Creek service area is 8.1 mgd in 2011 and 12.2 mgd in 2020:

ADF = Design ADF per EDU * No. of EDUs / 1,000,000

2011 ADF = 240 gallons/EDU * 33,547 EDUs / 1,000,000 = 8.1 mgd

2020 ADF = 240 gallons/EDU * 50,805 EDUs / 1,000,000 = 12.2 mgd

The estimated change in average daily flow in the Medio Creek service area for the study period is 4.1 mgd:

ADF Increase = 2020 ADF – 2011 ADF

ADF Increase = 12.2 mgd – 8.1 mgd = 4.1 mgd

3.2.5.2. Leon Creek / Dos Rios Service Area

Using the same methodology for the Medio Creek service area, the estimated average daily wastewater flows for the Leon Creek / Dos Rios service area are 161.0 mgd in 2011 and 182.6 mgd in 2020:

2011 ADF = 240 gallons/EDU * 670,743 EDUs / 1,000,000 = 161.0 mgd

2020 ADF = 240 gallons/EDU * 760,708 EDUs / 1,000,000 = 182.6 mgd

The estimated change in average daily flow in the Leon Creek / Dos Rios service area for the study period is 21.6 mgd:

ADF Increase = 182.6 mgd – 161.0 mgd = 21.6 mgd

Table 3-7 summarizes the increase in average daily wastewater flows for the study period.

Table 3-7: Treatment Average Daily Flows

Infrastructure Component	Service Area	Flow (mgd) 2011	2020	Change
WRCs	Medio Creek	8.0	12.2	4.2
	Leon Creek / Dos	160.8	182.3	21.5
	Total	**168.8**	**194.5**	**25.7**

3.2.6. Wastewater Collection

For the wastewater collection facilities, the design wet weather peak flow of 675 gallons per day per EDU was used to estimate the 2011 and 2020 capacity criteria in each service area.

3.2.6.1. Medio Creek Service Area

The estimated capacity required in the Medio Creek service area are 22.6 mgd in 2011 and 34.3 mgd in 2020:

Capacity Requirement = Design PWWF * No. of EDUs / 1,000,000

2011 Capacity Requirement = 675 gpd/EDU * 33,547 EDUs / 1,000,000 = 22.6 mgd

2020 Capacity Requirement = 675 gpd/EDU* 50,805 EDUs / 1,000,000 = 34.3 mgd

The change in collection system capacity requirements in the Medio Creek service area for the study period is 11.7 mgd:

Increase in Capacity Requirement = 2020 Capacity Requirement – 2011 Capacity Requirement

Increase in Capacity Requirement = 34.3 mgd – 22.6 mgd = 11.7 mgd

3.2.6.2. Upper Medina Service Area

The estimated wet weather peak flows for the Upper Medina service area are 8.4 mgd in 2011 and 18.0 mgd in 2020:

2011 Capacity Requirement = 675 gpd/EDU * 12,453 EDUs / 1,000,000 = 8.4 mgd

2020 Capacity Requirement = 675 gpd/EDU * 26,697 EDUs / 1,000,000 = 18.0 mgd

The change in collection system capacity requirements in the Upper Medina service area for the study period is 9.6 mgd:

Increase in Capacity Requirement = 18.0 mgd – 8.4 mgd = 9.6 mgd

3.2.6.3. Lower Medina Service Area

The estimated peak wet weather flows for the Lower Medina service area are 1.8 mgd in 2011 and 2.9 mgd in 2020:

2011 Capacity Requirement = 675 gpd/EDU * 2,599 EDUs / 1,000,000 = 1.8 mgd

2020 Capacity Requirement = 675 gpd/EDU * 4,323 EDUs/ 1,000,000 = 2.9 mgd

The change in collection system capacity requirements to serve new development in the Lower Medina service area during the study period is 1.1 mgd:

Increase in Capacity Requirement = 2.9 mgd – 1.8 mgd = 1.1 mgd

3.2.6.4. Upper Collection Service Area

For the Upper Collection service area, the estimated peak wet weather flows are 100.9 mgd in 2011 and 135.2 mgd in 2020:

2011 Capacity Requirement = 675 gpd/EDU * 149,486 EDUs / 1,000,000 = 100.9 mgd

2020 Capacity Requirement = 675 gpd/EDU * 200,282 EDUs/ 1,000,000 = 135.2 mgd

The change in collection system capacity requirements in the Upper Collection service area for the study period is 34.3 mgd:

Increase in Capacity Requirement = 135.2 mgd – 100.9 mgd = 34.3 mgd

3.2.6.5. Middle Collection Service Area

The estimated peak wet weather flows for the Middle Collection service area are 177.3 mgd in 2011 and 182.2 mgd in 2020:

2011 Capacity Requirement = 675 gpd/EDU * 262,699 EDUs / 1,000,000 = 177.3 mgd
2020 Capacity Requirement = 675 gpd/EDU * 269,918 EDUs/ 1,000,000 = 182.2 mgd

The change in collection system capacity requirements to serve new development in the Middle Collection service area during the study period is 4.9 mgd:

Increase in Capacity Requirement = 182.2 mgd – 177.3 mgd = 4.9 mgd

3.2.6.6. Lower Collection Service Area

The estimated peak wet weather flows for the Lower Collection service area are 164.4 mgd in 2011 and 175.2 mgd in 2020:

2011 Capacity Requirement = 675 gpd/EDU * 243,506 EDUs / 1,000,000 = 164.4 mgd
2020 Capacity Requirement = 675 gpd/EDU * 259,492 EDUs/ 1,000,000 = 175.2 mgd

The change in collection system capacity requirements to serve new development in the Lower Collection service area during the study period is 10.8 mgd:

Increase in Capacity Requirement = 175.2 mgd – 164.4 mgd = 10.8 mgd

Table 3-8 summarizes the increase in estimated peak wet weather flows for the wastewater collection system.

Table 3-8 Collection System Peak Wet Weather Flows

Infrastructure Component	Service Area	Flow (mgd) 2011	2020	Change
Lift Stations and Collection Mains	Medio Creek	22.6	34.2	11.6
	Upper Medina	8.4	18.0	9.6
	Lower Medina	1.8	2.9	1.1
	Upper Collection	100.8	135.0	34.2
	Middle Collection	177.1	181.9	4.8
	Lower Collection	164.1	174.9	10.8
	Total	**474.8**	**546.9**	**72.1**

3.3. Eligible Facilities

3.3.1. General

This section establishes the SAWS water and wastewater facilities that are eligible for inclusion in the calculation of the impact fee. Projects included in the CIP can serve to rehabilitate and renew the system, enhance the system to improve efficiency and meet regulatory requirements, increase the system capacity, or achieve a combination of these objectives. Only those projects warranted by capacity issues derived from growth projected to occur during the study period (2011 to 2020) can be included in the impact fee calculation. Additionally, if the cost of a project cannot be sufficiently delineated of if alternate mechanisms for cost recovery are in place, the project is not included in the impact fee calculation.

Financing costs associated with existing infrastructure with available capacity to serve new development are included in the eligible impact fee CIP. It is assumed, based on information from SAWS staff, that 65% of the existing infrastructure was financed with debt. SAWS prefers to use cash generated from impact fee revenues to fund growth-related CIP, to the extent that impact fee collections provide that cash. Although SAWS plans to fund specific future CIP projects with debt, it reserves the option to fund all CIP with cash. Therefore, based in part on the present level of uncertainty of future funding sources, SAWS elected, for the purposes of this study, to exclude financing costs associated with the future CIP from the impact fee calculation.[3]

3.3.2. Water Supply

The water supply impact fee includes growth related costs for existing water supplies and for new projects to be constructed.

Table 3-9: Water Supply Eligible Capacity Calculation

Water Sources	Capital Cost	Acre Feet	Total EDUs	2011 - 2020 EDUs	Capital Costs
Edwards Supply Drought of Record		130,587			
Ed Acquisitions (For post 2011)		32,073	91,408	39,070	
Brackish Groundwater Desalination	$112,762,576	11,800	33,630	14,374	$48,197,049
Regional Carrizo	138,100,000	15,682	44,694	19,103	59,026,786
Local Carrizo	13,800,000	6,400	18,240	7,796	5,898,240
Subtotal	264,662,576	65,955	187,972	80,343	113,122,075
Integration pipeline	61,910,635		143,770	80,343	34,597,525
Total Water Supply	**$326,573,211**			**80,343**	**$147,719,600**

The information in Table 3-9 assumes that 130,587 acre feet of Edwards Supply from the drought of record scenario (DOR) is available only for existing customers and is not included in the amount of water supply available for future growth. 32,073 acre feet of Edwards supply are available for existing and future customers as part of the overall water supply portfolio. There are no capital costs given to the Edwards Supply. The brackish groundwater desalination project and the regional Carrizo project are anticipated to be built within the next 10 years. The integration pipeline is necessary to transport water from the desalination treatment plant to the west side of San Antonio. The size of the integration pipeline will exceed that needed for the desalination project. Only the

[3] Chapter 395 allows the inclusion of financing costs in the impact fee calculation. However, SAWS staff elected to use a more conservative approach and excluded the financing costs from the calculation.

portion of the costs associated with the capacity needed for the brackish project is included in the table.

The total capital costs for water supply projects needed to serve 80,343 EDUs is $147,719,764, which is summarized in Table 3-10.

Table 3-10: 2011 – 2020 Eligible Water Supply CIP Cost

Service Area	Value of Existing Capacity	Value of New CIP Capacity	Total Value of Existing and New CIP Capacity	Total Value of Eligible Study Period Capacity
All	$575,247,480	$326,573,211	$901,820,691	$147,719,764

3.3.3. Water Delivery – Flow

The Flow impact fee includes growth-related costs associated with the distribution mains that are 12 inches or more in diameter. Because the water distribution system is looped, it is difficult to pinpoint the existing and future capacities. Therefore, it is assumed, based on information provided by SAWS staff, that the capacity of the distribution mains is increased as needed to maintain 10% excess capacity.

3.3.3.1. Inside Loop 410 Service Area

The estimated 2011 and 2020 capacities for the Inside Loop 410 service area are 204 mgd and 209 mgd, respectively:

Capacity = MHD / 90%
2011 Capacity = 183 mgd / 90% = 204 mgd
2020 Capacity = 188 mgd / 90% = 209 mgd

It is assumed that growth will utilize available existing capacity first and future CIP capacity if the projected demand requires additional capacity beyond what is available in the existing distribution mains. Of the estimated 204 mgd capacity in 2011, 183 mgd is needed to meet the demand of existing customers. Therefore, 21 mgd is available to serve new development. From Section 3.2.3.1, only 5 mgd, or 2.4% of existing capacity, is required for growth during the 2011-2020 study period:

Study Period Growth Allocation = Study Period Demand / Total 2011 Capacity
Study Period Growth Allocation = 5 mgd / 204 mgd = 2.4%

Because the available existing capacity is sufficient to serve all of the projected growth during the study period, no future CIP capacity is included in the impact fee calculation.

3.3.3.2. Outside Loop 410 Service Area

The estimated 2011 and 2020 capacities for the Outside Loop 410 service area are 348 mgd and 423 mgd, respectively:

2011 Capacity = 313 mgd / 90% = 348 mgd
2020 Capacity = 381 mgd / 90% = 423 mgd

Of the estimated 348 mgd capacity in 2011, 313 mgd is needed to meet the demand of existing customers. Therefore, 35 mgd is available to serve new development. However, from Section 3.2.3.2, 68 mgd is required to serve growth during the study period so all of the 35 mgd of available existing capacity, or 10.0% of existing capacity, is required to serve growth during the 2011-2020 study period:

Study Period Growth Allocation = 35 mgd / 348 mgd = 10.0%

Because the available existing capacity is insufficient to serve all of the projected growth during the study period, 33 mgd, or 43.8%, of the 75 mgd of future CIP capacity is included in the impact fee calculation:

Study Period Growth Allocation = Remaining Study Period Demand / Future CIP Capacity
Study Period Growth Allocation = 33 mgd / 75 mgd = 43.8%

The costs of the eligible capacities for the two Flow service areas are summarized in Table 3-11.

Table 3-11: 2011 - 2020 Eligible Water Flow CIP Cost

Service Area	Value of Existing Capacity	Value of New CIP Capacity	Total Value of Existing and New CIP Capacity	Total Value of Eligible Study Period Capacity
Inside 410	$223,006,792	$11,648,000	$234,654,792	$7,658,952
Outside 410	380,230,849	139,307,749	519,538,597	116,401,358
Total	**$603,237,641**	**$150,955,749**	**$754,193,390**	**$124,060,310**

3.3.4. Water Delivery – System Development

As with the capacity criteria, the allocation of existing facilities and future CIP is determined for each type of infrastructure in the System Development impact fee calculation. For each of these infrastructure types, there are multiple facilities within each service area, and each facility is likely to have some available capacity for future growth. Planned expansion projects in the CIP are often construction of a new facility within a service area even though several other facilities within that service area may have available capacity.

Because new System Development facilities are constructed and put into service even when available capacity exists at older facilities, the assumption that growth will utilize all existing available capacity before utilizing future CIP capacity is not realistic. Existing available and future CIP capacity are considered together as total available capacity during the study period, and the amount of that available capacity that would be utilized by study period growth is determined using the capacity criteria from Section 2.

3.3.4.1. Well Pumps

SAWS staff provided the capacities of the existing well pumps and the future well pumps in the CIP. The 2011 and 2020 well pump capacities for the combined system are 513 mgd and 553 mgd, respectively.

Of the 513 mgd of existing capacity in 2011, 347 mgd is needed to meet the demand of existing customers. Therefore, 165 mgd is available to serve new development. The CIP includes 40 mgd of well pump capacity so the total available capacity during the study period is 205 mgd:

Total Available Capacity = Existing Available Capacity + Future CIP Capacity
Total Available Capacity = 165 mgd + 40 mgd = 205 mgd

From Section 3.2.4.1, approximately 48 mgd is required to serve growth during the study period. This represents 23.1% of the total available capacity:

Study Period Growth Allocation = Study Period Demand / Total Available Capacity
Study Period Growth Allocation = 48 mgd / 205 mgd = 23.1%

Table 3-12 shows the total value of available capacity and the value eligible to be included in the System Development impact fee calculation.

Table 3-12: 2011 - 2020 Eligible Well Pumps CIP Cost

Service Area	Value of Existing Capacity	Value of New CIP Capacity	Total Value of Existing and New CIP Capacity	Total Value of Eligible Study Period Capacity
All	$69,308,164	$43,031,000	$112,339,164	$17,489,285

3.3.4.2. High Service and Booster Pump Stations

SAWS staff provided the capacities of the existing and future high service and booster pump stations. The 2011 and 2020 pump station capacities for the combined system are 838 mgd and 914 mgd, respectively. The pump stations are separated into the three System Development service areas, but there are several pump stations that are shared among the service areas. Using data provided by SAWS staff and the Water Master Plan, the shared pump stations are allocated to the three service areas.

HIGH ELEVATION SERVICE AREA

The existing and planned 2020 capacities of the high service and booster pump stations located in the High Elevation service area are 75 mgd and 92 mgd, respectively. Based on data from the Water Master Plan, 20.4 mgd, or 7%, of the 309 mgd existing capacity of the shared pump stations serves customers in the High Elevation service area. It is assumed that the High Elevation service area will continue to require the same proportion of the shared pump stations. Therefore, the 2011 and 2020 high service and booster pump station capacities for the High Elevation service area are 95 mgd and 113 mgd, respectively:

Capacity = Service Area Capacity + (Shared Capacity * Shared Allocation)
2011 Capacity = 75 mgd + (309 mgd * 7%) = 95 mgd
2020 Capacity = 92 mgd + (327 mgd * 7%) = 113 mgd

Of the 95 mgd of existing capacity in 2011, 23 mgd is needed to meet the demand of existing customers. Therefore, 72 mgd is available to serve new development in the High Elevation service area. The CIP includes 18 mgd of pump station capacity so the total available capacity for future High Elevation service area customers during the study period is 90 mgd:

Total Available Capacity = 72 mgd + 18 mgd = 90 mgd

From Section 3.2.4.2, approximately 24 mgd is required to serve growth in the High Elevation service area during the study period. This represents 26.8% of the total available capacity:

Study Period Growth Allocation = 24 mgd / 90 mgd = 26.8%

MIDDLE ELEVATION SERVICE AREA

The existing and planned 2020 capacities of the high service and booster pump stations located in the Middle Elevation service area are 89 mgd and 114 mgd, respectively. Based on data from the Water Master Plan, 244.8 mgd, or 79%, of the 309 mgd existing capacity of the shared pump stations serves customers in the Middle Elevation service area. It is assumed that the Middle Elevation service area will continue to require the same proportion of the shared pump stations. Therefore, the 2011 and 2020 high service and booster pump station capacities for the Middle Elevation service area are 334 mgd and 373 mgd, respectively:

2011 Capacity = 89 mgd + (309 mgd * 79%) = 334 mgd
2020 Capacity = 114 mgd + (327 mgd * 79%) = 373 mgd

Of the 334 mgd of existing capacity in 2011, 192 mgd is needed to meet the demand of existing customers. Therefore, 142 mgd is available to serve new development in the Middle Elevation service area. The CIP includes 39 mgd of pump station capacity so the total available capacity for future Middle Elevation service area customers during the study period is 181 mgd:

Total Available Capacity = 142 mgd + 39 mgd = 181 mgd

From Section 3.2.4.2, approximately 37 mgd is required to serve growth in the Middle Elevation service area during the study period. This represents 20.3% of the total available capacity:

Study Period Growth Allocation = 37 mgd / 181 mgd = 20.3%

LOW ELEVATION SERVICE AREA

The existing and planned 2020 capacities of the high service and booster pump stations located in the Low Elevation service area are 366 mgd and 381 mgd, respectively. Based on data from the Water Master Plan, 43.4 mgd, or 14%, of the 309 mgd existing capacity of the shared pump stations serves customers in the Low Elevation service area. It is assumed that the Low Elevation service area will continue to require the same proportion of the shared pump stations. Therefore, the 2011 and 2020 high service and booster pump station capacities for the Low Elevation service area are 409 mgd and 427 mgd, respectively:

2011 Capacity = 366 mgd + (309 mgd * 14%) = 409 mgd
2020 Capacity = 381 mgd + (327 mgd * 14%) = 427 mgd

Of the 409 mgd of existing capacity in 2011, 268 mgd is needed to meet the demand of existing customers. Therefore, 141 mgd is available to serve new development in the Low Elevation service area. The CIP includes 18 mgd of pump station capacity so the total available capacity for future Low Elevation service area customers during the study period is 159 mgd:

Total Available Capacity = 141 mgd + 18 mgd = 159 mgd

From Section 3.2.4.2, approximately 16 mgd is required to serve growth in the Middle Elevation service area during the study period. This represents 9.6% of the total available capacity:

Study Period Growth Allocation = 16 mgd / 159 mgd = 9.6%

The costs of the total available and impact fee eligible pump station capacities for the three System Development service areas are summarized in Table 3-13.
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Table 3-13: 2011 - 2020 Eligible High Service and Booster Pump Stations CIP Cost

Service Area	Value of Existing Capacity	Value of New CIP Capacity	Total Value of Existing and New CIP Capacity	Total Value of Eligible Study Period Capacity
High Elevation	$4,450,456	$7,079,157	$11,529,613	$3,219,077
Middle Elevation	37,190,339	11,652,911	48,843,250	7,023,917
Low Elevation	51,914,948	4,637,932	56,552,880	2,953,982
Total	**$93,555,743**	**$23,370,000**	**$116,925,743**	**$13,196,976**

3.3.4.3. Elevated Storage Tanks

SAWS staff provided the capacities of the existing and future elevated storage tanks. The 2011 and 2020 elevated storage tank capacities for the combined system are 74.5 million gallons and 99.5 million gallons, respectively.

HIGH ELEVATION SERVICE AREA

For the High Elevation service area, the 2011 and 2020 elevated storage capacities are 5.4 million gallons and 9.4 million gallons, respectively. Of the 5.4 million gallons of existing capacity in 2011, 3.6 million gallons is needed to meet the demand of existing customers. Therefore, 1.8 million gallons is available to serve new development in the High Elevation service area. The CIP includes 4.0 million gallons of elevated storage capacity so the total available capacity for future High Elevation service area customers during the study period is 5.8 million gallons:

$$\text{Total Available Capacity} = 1.8\text{ MG} + 4.0\text{ MG} = 5.8\text{ MG}$$

From Section 3.2.4.3, approximately 2.1 million gallons is required to serve growth in the High Elevation service area during the study period. This represents 35.6% of the total available capacity:

$$\text{Study Period Growth Allocation} = 2.1\text{ MG} / 5.8\text{ MG} = 35.6\%$$

MIDDLE ELEVATION SERVICE AREA

For the Middle Elevation service area, the 2011 and 2020 elevated storage capacities are 34.1 million gallons and 50.1 million gallons, respectively. Of the 34.1 million gallons of existing capacity in 2011, 16.5 million gallons is needed to meet the demand of existing customers. Therefore, 17.6 million gallons is available to serve new development in the Middle Elevation service area. The CIP includes 16.0 million gallons of elevated storage capacity so the total available capacity for future Middle Elevation service area customers during the study period is 33.6 million gallons:

$$\text{Total Available Capacity} = 17.6\text{ MG} + 16.0\text{ MG} = 33.6\text{ MG}$$

From Section 3.2.4.3, approximately 4.4 million gallons is required to serve growth in the Middle Elevation service area during the study period. This represents 13.1% of the total available capacity:

Study Period Growth Allocation = 4.4 MG / 33.6 MG = 13.1%

LOW ELEVATION SERVICE AREA

For the Low Elevation service area, the 2011 and 2020 elevated storage capacities are 35.0 million gallons and 40.0 million gallons, respectively. Of the 35.0 million gallons of existing capacity in 2011, 22.1 million gallons is needed to meet the demand of existing customers. Therefore, 12.9 million gallons is available to serve new development in the Low Elevation service area. The CIP includes 5.0 million gallons of elevated storage capacity so the total available capacity for future Low Elevation service area growth during the study period is 17.9 million gallons:

Total Available Capacity = 12.9 MG + 5.0 MG = 17.9 MG

From Section 3.2.4.3, approximately 1.2 million gallons is required to serve growth in the Low Elevation service area during the study period. This represents 7.0% of the total available capacity:

Study Period Growth Allocation = 1.2 MG / 17.9 MG = 7.0%

The costs of the total available and impact fee eligible elevated storage capacities for the three System Development service areas are summarized in Table 3-14.

Table 3-14: 2011 - 2020 Eligible Elevated Storage CIP Cost

Service Area	Value of Existing Capacity	Value of New CIP Capacity	Total Value of Existing and New CIP Capacity	Total Value of Eligible Study Period Capacity
High Elevation	$3,975,584	$10,676,000	$14,651,584	$4,489,028
Middle Elevation	18,222,082	32,990,000	51,212,082	6,116,707
Low Elevation	24,383,896	14,139,000	38,522,896	1,910,654
Total	**$46,581,563**	**$57,805,000**	**$104,386,563**	**$12,516,389**

3.3.4.4. Ground Storage Tanks

SAWS staff provided the capacities of the existing and future ground storage tanks. The 2011 and 2020 ground storage tank capacities for the combined system are 111.0 million gallons and 116.0 million gallons, respectively.

HIGH ELEVATION SERVICE AREA

For the High Elevation service area, the 2011 and 2020 ground storage capacities are 4.79 million gallons. Of the 4.79 million gallons of existing capacity in 2011, 0.25 million gallons is needed to meet the demand of existing customers. Therefore, 4.54 million gallons is available to serve new development in the High Elevation service area. There are no High Elevation service area ground storage tank projects in the CIP so the total available capacity for growth during the study period is 4.54 million gallons:

Total Available Capacity = 4.54 MG + 0.00 MG = 4.54 MG

From Section 3.2.4.4, approximately 0.06 million gallons of ground storage is required to serve growth in the High Elevation service area during the study period. This represents 1.4% of the total available capacity:

Study Period Growth Allocation = 0.06 MG / 4.54 MG = 1.4%

MIDDLE ELEVATION SERVICE AREA

For the Middle Elevation service area, the 2011 and 2020 ground storage capacities are 40.2 million gallons and 45.2 million gallons, respectively. Of the 40.2 million gallons of existing capacity in 2011, 10.1 million gallons is needed to meet the demand of existing customers. Therefore, 30.1 million gallons is available to serve new development in the Middle Elevation service area. The CIP includes 5.0 million gallons of ground storage capacity so the total available capacity for future Middle Elevation service area growth during the study period is 35.1 million gallons:

Total Available Capacity = 30.1 MG + 5.0 MG = 35.1 MG

From Section 3.2.4.4, approximately 0.7 million gallons of ground storage is required to serve growth in the Middle Elevation service area during the study period. This represents 1.9% of the total available capacity:

Study Period Growth Allocation = 0.7 MG / 35.1 MG = 1.9%

LOW ELEVATION SERVICE AREA

For the Low Elevation service area, the 2011 and 2020 ground storage capacities are 66.0 million gallons. Of the 66.0 million gallons of existing capacity in 2011, 20.8 million gallons is needed to meet the demand of existing customers. Therefore, 45.2 million gallons is available to serve new development in the Low Elevation service area. There are no Low Elevation service area ground storage tank projects in the CIP so the total available capacity for growth during the study period is 45.2 million gallons:

Total Available Capacity = 45.2 MG + 0.0 MG = 45.2 MG

From Section 3.2.4.4, approximately 1.2 million gallons of ground storage is required to serve growth in the Low Elevation service area during the study period. This represents 2.6% of the total available capacity:

Study Period Growth Allocation = 1.2 MG / 45.2 MG = 2.6%

The costs of the total available and impact fee eligible ground storage capacities for the three System Development service areas are summarized in Table 3-15.

Table 3-15: 2011 - 2020 Eligible Ground Storage CIP Cost

Service Area	Value of Existing Capacity	Value of New CIP Capacity	Total Value of Existing and New CIP Capacity	Total Value of Eligible Study Period Capacity
High Elevation	$221,526	$0	$221,526	$4,214
Middle Elevation	8,928,955	4,225,000	13,153,955	261,518
Low Elevation	18,358,970	0	18,358,970	480,539
Total	**$27,509,451**	**$4,225,000**	**$31,734,451**	**$746,270**

3.3.4.5. Transmission Mains

Transmission mains typically carry treated water from a high service pump station or a booster pump station to the smaller distribution mains within a pressure zone or to another pressure zone. Because, like with the distribution mains, it is difficult to estimate the total or available capacity within the transmission mains, we used the demands and capacities of the high service and booster pump stations to estimate the demands and capacities of the transmission mains. Therefore, the study period growth allocations for transmission mains are the same as for the high service and booster pump stations.

The costs of the total available and impact fee eligible transmission main capacities for the three System Development service areas are summarized in Table 3-16.

Table 3-16: 2011 - 2020 Eligible Water Transmission Mains CIP Cost

Service Area	Value of Existing Capacity	Value of New CIP Capacity	Total Value of Existing and New CIP Capacity	Total Value of Eligible Study Period Capacity
High Elevation	$11,384,862	$21,941,531	$33,326,394	$9,263,276
Middle Elevation	40,049,226	44,437,236	84,486,462	14,026,090
Low Elevation	49,083,076	2,578,051	51,661,126	2,618,984
Total	**$100,517,164**	**$68,956,818**	**$169,473,982**	**$25,908,350**

3.3.5. Wastewater Treatment

The Wastewater Treatment impact fee includes growth-related costs associated with the three water recycling centers that treat wastewater. There are currently three Wastewater Treatment impact fee service areas. However, SAWS staff proposes to combine the Far West and Upper / Lower service areas into one service area served by the Leon Creek and Dos Rios Water Recycling Centers. The Medio Creek service area, served by the Medio Creek Water Recycling Center, would remain unchanged.

3.3.5.1. Medio Creek Service Area

The existing wastewater treatment capacity at the Medio Creek Water Recycling Center is 16 mgd. Because the projected 2020 average daily flow is 12.2 mgd (from Section 3.2.5.1), no additional capacity will be required for the Medio Creek service area during the study period. Therefore, the Wastewater Treatment impact fee calculation will only include the value of existing available capacity that will be required to serve new development during the study period:

Study period growth allocation = Study period demand / Total existing capacity
Study period growth allocation = 4.1 mgd / 16.0 mgd = 25.6%

3.3.5.2. Leon Creek / Dos Rios Service Area

The existing wastewater treatment capacity at the Leon Creek and Dos Rios Water Recycling Centers is 171 mgd. From Section 3.2.5.2, the projected 2020 average daily flow is 182.6 mgd, exceeding the existing capacity. However, there are currently no expansion projects included in the CIP. Therefore, the Wastewater Treatment impact fee calculation will include all of the existing capacity available to serve new development.

The costs of the eligible facilities for the two Wastewater Treatment service areas are summarized in Table 3-17.

Table 3-17: 2011 - 2020 Eligible Wastewater Treatment CIP Costs

Service Area	Value of Existing Capacity	Value of New CIP Capacity	Total Value of Existing and New CIP Capacity	Total Value of Eligible Study Period Capacity
Medio Creek	$62,770,361	$0	$62,770,361	$23,653,796
Leon Creek / Dos Rios	367,856,341	59,665,710	427,522,051	91,789,543
Total	**$430,626,702**	**$59,665,710**	**$490,292,412**	**$115,443,339**

3.3.6. Wastewater Collection

The Wastewater Collection impact fee includes growth-related costs associated with the interceptors and wastewater collection mains that are 10 inches or greater in diameter; mains smaller than 10 inches are typically constructed by developers and “dedicated” or contributed to SAWS and, as such, are not included in the costs used to calculate the impact fee.

Since wastewater flows through a series of wastewater mains until it reaches the treatment facility, the system’s capacity is limited by any pipes that are at full capacity. SAWS enlarges and expands its collection system when it reaches 90% of its design capacity. Because there are always “bottlenecks” within the system, it is assumed, at the direction of SAWS staff, that the collection system is currently at 90% of its design capacity.

SAWS staff used the existing wastewater collection system model to estimate the 2011 and 2020 capacity requirements, based on the design peak wet weather flow and the number of EDUs contributing flow, for each collection system project in the CIP. Using this analysis, SAWS staff determined the portion of each project that is eligible for inclusion in the Wastewater Collection impact fee calculation.

There are currently four Wastewater Collection impact fee service areas. However, SAWS staff propose to create the Upper Medina, Lower Medina, and Middle Collection service areas and eliminate the Far West service area. The proposed service areas are described in each of the following sections.

3.3.6.1. Medio Creek Service Area

The Medio Creek service area is the same for the Wastewater Collection impact fee as for the Wastewater Treatment impact fee. The proposed service area is unchanged from the current service area.

The estimated 2011 collection system capacity for the Medio Creek service area is 25.2 mgd:

Capacity = PWWF / 90%
2011 Capacity = 22.6 mgd / 90% = 25.2 mgd

Using the collection system model, SAWS staff estimated the 2020 collection system capacity in the Medio Creek service area to be 46.9 mgd.

It is assumed growth will utilize available existing capacity first and future CIP capacity if the projected demand requires additional capacity beyond what is available in the existing collection system pipes. Of the estimated 25.2 mgd capacity in 2011, 22.6 mgd is needed to meet the demand of existing customers. Therefore, 2.6 mgd is available to serve new development. However, from Section 3.2.6.1, 11.7 mgd is required to serve new development during the study period so all of the 2.6 mgd of available existing capacity, or 10.0% of existing capacity, is required for new development in the Medio Creek service area during the 2011-2020 study period:

Study Period Growth Allocation = Study Period Demand / Total 2011 Capacity
Study Period Growth Allocation = 2.6 mgd / 25.2 mgd = 10.0%

Because the available existing capacity is insufficient to serve all of the projected growth during the study period, 9.1 mgd, or 42.0%, of the 21.7 mgd of future CIP capacity is included in the impact fee calculation:

Study Period Growth Allocation = Remaining Study Period Demand / Future CIP Capacity
Study Period Growth Allocation = 9.1 mgd / 21.7 mgd = 42.0%

3.3.6.2. Upper Medina Service Area

The Upper Medina service area includes the existing Far West service area and a portion of the current Lower service area. The wastewater collected from the Upper Medina customers will flow through the planned Medina River Sewer Outfall to the Dos Rios

Water Recycling Center. The estimated 2011 collection system capacity for the Upper Medina service area is 9.3 mgd:

2011 Capacity = 8.4 mgd / 90% = 9.3 mgd

Using the collection system model, SAWS staff estimated the 2020 collection system capacity in the Upper Medina service area to be 65.6 mgd.

Of the estimated 9.3 mgd capacity in 2011, 8.4 mgd is needed to meet the demand of existing customers. Therefore, 0.9 mgd is available to serve new development. However, from Section 3.2.6.2, 9.6 mgd is required to serve new development during the study period so all of the 0.9 mgd of available existing capacity, or 10.0% of existing capacity, is required for new development in the Upper Medina service area during the 2011-2020 study period:

Study Period Growth Allocation = 0.9 mgd / 9.3 mgd = 10.0%

Because the available existing capacity is insufficient to serve all of the projected growth during the study period, 8.7 mgd, or 15.4%, of the 56.3 mgd of future CIP capacity is included in the impact fee calculation:

Study Period Growth Allocation = 8.7 mgd / 56.3 mgd = 15.4%

3.3.6.3. Lower Medina Service Area

The new Lower Medina service area includes a portion of the current Lower service area where wastewater will be collected and delivered to the Dos Rios Water Recycling Center through the downstream portion of the planned Medina River Sewer Outfall.

Wastewater flows from the Upper Medina service area through the Lower Medina service area to the wastewater treatment facilities. Therefore, collection system infrastructure in the Lower Medina service area must be sized to carry combined flow from customers in the Upper Medina and Lower Medina service areas.

The estimated 2011 collection system capacity for the Lower Medina service area is 11.3 mgd:

Capacity = (Upper Medina PWWF + Lower Medina PWWF) / 90%
2011 Capacity = (8.4 mgd + 1.8 mgd) / 90% = 11.3 mgd

Using the collection system model, SAWS staff estimated the 2020 collection system capacity in the Lower Medina service area to be 77.2 mgd.

Of the estimated 11.3 mgd capacity in 2011, 10.2 mgd is needed to meet the demand of existing customers. Therefore, 1.1 mgd is available to serve new development. However, from Sections 3.2.6.2 and 3.2.6.3, 10.7 mgd is required to serve new development in the Upper Medina and Lower Medina service areas during the study period so all of the 1.1 mgd of available existing capacity in the Lower Medina service area, or 10.0% of existing capacity, is required to serve new development in the Upper Medina and Lower Medina service areas during the 2011-2020 study period:

Study Period Growth Allocation = 1.1 mgd / 11.3 mgd = 10.0%

Because the available existing capacity is insufficient to serve all of the projected growth during the study period, 9.6 mgd, or 14.6%, of the 65.9 mgd of future CIP capacity is included in the impact fee calculation:

Study Period Growth Allocation = 9.6 mgd / 65.9 mgd = 14.6%

3.3.6.4. Upper Collection Service Area

The proposed Upper Collection service area is the same as the current Upper service area. The estimated 2011 collection system capacity for the Upper Collection service area is 112.1 mgd:

2011 Capacity = 100.9 / 90% = 112.1 mgd

Using the collection system model, SAWS staff estimated the 2020 collection system capacity in the Upper Collection service area to be 166.7 mgd.

Of the estimated 112.1 mgd of existing capacity, 100.9 mgd is needed for existing customers. Therefore, 11.2 mgd is available to serve new development. However, from Section 3.2.6.4, 34.3 mgd is required to serve new development during the study period so all of the 11.2 mgd of available existing capacity, or 10.0% of existing capacity, is required for new development in the Upper Collection service area during the 2011-2020 study period:

Study Period Growth Allocation = 11.2 mgd / 112.1 mgd = 10.0%

Because the available existing capacity is insufficient to serve all of the projected growth during the study period, 23.1 mgd, or 42.3%, of the 54.6 mgd of future CIP capacity is included in the impact fee calculation:

Study Period Growth Allocation = 23.1 mgd / 54.6 mgd = 42.3%

3.3.6.5. Middle Collection Service Area

The proposed Middle Collection service area is the northern portion of the current Lower service area. SAWS staff propose creating the Middle Collection service area to improve equity among fee payers in the current Lower service area. Wastewater flows from the Upper Collection service area through the Middle Collection service area to the Lower

Collection service area where the wastewater treatment facilities are located. Therefore, collection system infrastructure in the Middle Collection service area must be sized to carry combined flow from customers in the Upper Collection and Middle Collection service areas.

The estimated 2011 collection system capacity for the Middle Collection service area is 309.1 mgd:

Capacity = (Upper Collection PWWF + Middle Collection PWWF) / 90%
2011 Capacity = (100.9 mgd + 177.3 mgd) / 90% = 309.1 mgd

Using the collection system model, SAWS staff estimated the 2020 collection system capacity in the Middle Collection service area to be 369.7 mgd.

Of the 309.1 mgd of existing capacity, 278.2 mgd is needed for existing customers. Therefore, 30.9 mgd is available to serve new development. However, from Sections 3.2.6.4 and 3.2.6.5, 39.2 mgd is required to serve new development during the study period so all of 30.9 mgd of available existing capacity, or 10% of existing capacity, is required for new development in the Upper Collection and Middle Collection service areas during the 2011-2020 study period:

Study Period Growth Allocation = 30.9 mgd / 309.1 mgd = 10%

Because the available existing capacity is insufficient to serve all of the projected growth during the study period 8.3 mgd, or 13.6%, of the 60.6 mgd is included in the impact fee calculation:

Study Period Growth Allocation = 8.3 mgd / 60.6 mgd = 13.6%

3.3.6.6. Lower Collection Service Area

The proposed Lower Collection service area is reduced from the current Lower service area. Portions of the current Lower service area are included in the proposed Middle Collection, Upper Medina, and Lower Medina service areas. The remainder of the current Lower service area is the proposed Lower Collection service area.

Wastewater flows from the Upper Collection and Middle Collection service areas through the Lower Collection service area to the wastewater treatment facilities. Therefore, collection system infrastructure in the Lower Collection service area must be sized to carry combined flow from customers in the Upper Collection and Middle Collection service areas.

The estimated 2011 collection system capacity for the Lower Collection service area is 491.8 mgd:

$$Capacity = (Upper\ Collection\ PWWF + Middle\ Collection\ PWWF + Lower\ Collection\ PWWF) / 90\%$$

$$2011\ Capacity = (100.9\ mgd + 177.3\ mgd + 164.4\ mgd) / 90\% = 491.8\ mgd$$

Using the collection system model, SAWS staff estimated the 2020 collection system capacity in the Lower Collection service area to be 570.1 mgd.

Of the 491.8 mgd of existing capacity, 442.6 mgd is needed for existing customers. Therefore, 49.2 mgd is available to serve new development. However, from Sections 3.2.6.4, 3.2.6.5 and 3.2.6.6, 50.0 mgd is required to serve new development during the study period so all of the 49.2 mgd of available existing capacity, or 10% of existing capacity, is required for new development in the Upper Collection, Middle Collection, and Lower Collection service areas during the 2011-2020 study period:

$$Study\ Period\ Growth\ Allocation = 49.2\ mgd / 491.8\ mgd = 10\%$$

Because the available existing capacity is insufficient to serve all of the projected growth during the study period, 0.8 mgd or 1.0%, of the 78.3 mgd of future CIP capacity is included in the impact fee calculation:

$$Study\ Period\ Growth\ Allocation = 0.8\ mgd / 78.3\ mgd = 1.0\%$$

The costs of the eligible facilities for the six Wastewater Collection service areas are summarized in Table 3-18.

Table 3-18: 2011 - 2020 Eligible Wastewater Collection CIP Costs

Service Area	Value of Existing Capacity	Value of New CIP Capacity	Total Value of Existing and New CIP Capacity	Total Value of Eligible Study Period Capacity
Medio Creek	$21,217,243	$38,662,980	$59,880,223	$10,285,377
Upper Medina	7,876,112	53,545,401	61,421,513	8,877,790
Lower Medina	1,644,129	76,622,918	78,267,046	12,097,872
Upper Collection	94,543,113	99,975,884	194,518,997	34,328,678
Middle Collection	166,145,055	205,625,520	371,770,575	36,098,134
Lower Collection	154,007,254	268,217,925	422,225,179	42,757,964
Total	**$445,432,906**	**$742,650,628**	**$1,188,083,534**	**$144,445,814**

4. Impact Fee Calculations

4.1. Calculated Impact Fee per Service Unit

The calculated impact fee per service unit by service area is calculated by first determining the eligible capital costs for growth-related CIP, as presented in Section 3. Those eligible capital costs per service area are then divided by the projected number of total service units for that service area, which are presented in Section 1, to determine the calculated impact fee per service unit.

Error! Reference source not found. presents the calculated impact fees per service unit.

Table 4-1: Water and Wastewater Calculated Impact Fees per Service Unit

Impact Fee	Service Area	Eligible CIP Value	Service Units	Calculated Impact Fee per Service Unit
Water Supply	All	$147,719,764	80,343	$1,839
Flow	Inside Loop 410	7,658,952	6,423	1,192
	Outside Loop 410	116,401,358	73,920	1,575
System Development	High Elevation	21,071,949	18,818	1,120
	Middle Elevation	36,462,283	41,501	879
	Low Elevation	12,323,038	20,024	615
Treatment	Medio Creek	23,653,796	17,234	1,373
	Leon Creek / Dos Rios	91,789,543	89,840	1,022
Collection	Medio Creek	10,285,377	17,234	597
	Upper Medina(1)	8,877,790	14,224	1,383
	Lower Medina	12,097,872	15,945	759
	Upper Collection(2)	34,328,678	50,727	1,878
	Middle Collection(3)	36,098,134	57,936	1,202
	Lower Collection	42,757,964	73,899	579

(1) Maximum Impact Fee per Service Unit includes Lower Medina fee

(2) Maximum Impact Fee per Service Unit includes Middle Collection fee

(3) Maximum Impact Fee per Service Unit includes Lower Collection fee

4.2. Credit Calculation

Chapter 395 of the Local Government Code requires utilities to calculate a credit for growth-related CIP, to be subtracted from the impact fee. The credit is based on the amount of projected future rate revenues or taxes expected to be generated by the new development and used to pay for capital improvements identified in the CIP. This credit provides an adjustment to benefit fee payers who will pay for CIP in both the impact fee and their future rates and taxes. Utilities can calculate this credit and apply it to the calculated impact fee or, alternatively, can avoid having to calculate the credit by opting to use the statutory credit equal to 50% of the calculated impact fee. SAWS has opted to calculate the credit.

SAWS does not receive tax revenue from the City of San Antonio. Therefore, the impact fee credit is based on the cost of growth-related CIP that is projected to be in future rates of the projected new development. Those costs include debt service payments on outstanding debt for the existing available capacity that has been included in the eligible study period capacity and projected future principal payments for future debt on eligible growth-related CIP. Interest payments on future debt are not included in the credit because they are not included in the impact fee calculation.

4.2.1. Credit for Existing Debt

For the existing available capacity, it is assumed that 65% of the asset value was financed with debt. Per SAWS staff, SAWS has historically financed approximately 65% of its CIP with debt and 35% with cash. Outstanding water supply debt is not included in the credit calculation because capacity at existing water supply facilities is not included in the calculated Water Supply impact fee.

The amount of water delivery outstanding debt is estimated by applying the ratio of existing water delivery assets to existing wastewater assets after subtracting the water supply outstanding debt, which was provided by SAWS staff, from the total outstanding debt. Then the proportion of the annual debt service payments for the study period that is related to the existing available capacity for water delivery is determined, as shown in Table 4-2.

Table 4-2: Eligible Existing Water Delivery Debt Service from New Development

Line No.	Description	Value
1	2011 Total Debt Service	$115,894,000
2	Outstanding Water Delivery Debt	$728,177,656
3	Debt-funded CIP / Total CIP	65%
4	Total Outstanding Debt	$1,759,700,000
5	2011 Existing Water Delivery Debt Service (1*2*3/4)	$31,172,600
6	Eligible Existing Water Delivery Capacity	$64,451,290
7	2011 Eligible Existing Water Delivery Debt Service (5*6/2)	$2,759,099
8	2011 Beginning Water Delivery Service Units	587,073
9	2011 Projected New Service Units	7,579
10	2011 Year-end Water Delivery Service Units (8+9)	594,652
11	2011 Eligible Existing Water Delivery Debt Service per Service Unit (7/10)	$4.64
12	2011 Eligible Existing Water Delivery Debt Service from EDUs (9*11)	$35,163
13	**Sum of Study Period Eligible Existing Water Delivery Debt Service from EDUs**	**$6,458,474**

These calculations are completed for each year in the study period and then the eligible existing debt service to be recovered from new development is summed to determine the credit for existing debt, as shown in Line 13 of Table 4-2.

This credit is allocated among the impact fees and service areas based on the proportion of eligible existing water delivery capacity value. Table 4-3 provides the water delivery credit for existing debt by impact fee and service area.

Table 4-3: Water Delivery Existing Debt Credit by Service Area

Impact Fee	Service Area	Infrastructure Type	Credit for Existing Debt
Flow	Inside Loop 410	N/A	$526,500
	Outside Loop 410	N/A	3,810,181
	Subtotal Flow		**$4,336,682**
System Development	High Elevation	Well Pumps	$121,346
		High Service and Booster Pump Stations	90,686
		Elevated Storage	47,249
		Ground Storage Tanks	290
		Transmission Mains	231,987
	Subtotal High		**$491,557**
	Middle Elevation	Well Pumps	$267,614
		High Service and Booster Pump Stations	320,511
		Elevated Storage	123,571
		Ground Storage Tanks	12,541
		Transmission Mains	345,150
	Subtotal Middle		**$1,069,387**
	Low Elevation	Well Pumps	$129,122
		High Service and Booster Pump Stations	172,388
		Elevated Storage	63,320
		Ground Storage Tanks	33,034
		Transmission Mains	162,984
	Subtotal Low		**$560,848**
Total			**$6,458,474**

The amount of wastewater outstanding debt is estimated by applying the ratio of existing wastewater assets to existing water delivery assets after subtracting the water supply outstanding debt, which was provided by SAWS staff, from the total outstanding debt. Then the proportion of the annual debt service payments for the study period that is related to the existing available capacity for wastewater service is determined in Table 4-4.

Table 4-4: Eligible Existing Wastewater Debt Service from New Development

Line No.	Description	Value
1	2011 Total Debt Service	$115,894,000
2	Outstanding Wastewater Debt	$678,133,769
3	Debt-funded CIP / Total CIP	65%
4	Total Outstanding Debt	$1,759,700,000
5	2011 Existing Wastewater Debt Service (1*2*3/4)	$29,030,268
6	Eligible Existing Wastewater Capacity	$82,807,362
7	2011 Eligible Existing Wastewater Debt Service (5*6/2)	$3,544,905
8	2011 Beginning Wastewater Service Units	703,317
9	2011 Projected New Service Units	10,038
10	2011 Year-end Wastewater Service Units (8+9)	713,355
11	2011 Eligible Existing Wastewater Debt Service per Service Unit (7/10)	$4.97
12	2011 Eligible Existing Wastewater Debt Service from EDUs (9*11)	$49,880
13	**Sum of Study Period Eligible Existing Wastewater Debt Service from EDUs**	**$9,038,022**

These calculations are performed for each year in the study period and then the eligible existing debt service to be recovered from new development is summed to determine the credit for existing debt, as shown in Line 13 of Table 4-4.

This credit is allocated among the impact fees and service areas based on the proportion of eligible existing wastewater capacity value. Table 4-5 provides the wastewater credit for existing debt by impact fee and service area.

Table 4-5: Credit for Existing Debt

Impact Fee Category	Service Area	Credit for Existing Debt
Treatment	Medio Creek	$1,771,073
	Leon Creek / Dos Rios	2,405,265
	Subtotal Treatment	**$4,176,338**
Collection	Medio Creek	231,576
	Upper Medina	85,964
	Lower Medina	17,945
	Upper Collection	1,031,892
	Middle Collection	1,813,393
	Lower Collection	1,680,914
	Subtotal Collection	**$4,861,684**
Total		**$9,038,022**

4.2.2. Credit for Future CIP

SAWS plans to fund most, but not all, of its growth-related CIP with cash from its impact fee revenues. However, it plans to fund all of the Water Supply CIP with debt. For purposes of calculating the credit, equal annual funding of the Water Supply CIP over the 10-year study period is assumed, i.e., 10% of the total eligible CIP is funded each year. Annual principal payments for the eligible Water Supply CIP for each year of the study period are projected using a term of 30 years and an annual interest rate of 5.00%. Based on these assumptions, the principal payment per service unit and the total principal to be recovered from new development are calculated in Table 4-6.

Table 4-6: Eligible Future Water Supply Principal from New Development

Line No.	Description	Value
1	Total Eligible Future Water Supply CIP	$147,719,764
2	Percentage of Future Water Supply CIP to be Funded with Debt	100%
3	Annual Allocation of Future Water Supply CIP	10%
4	Annual Eligible Debt-funded Future Water Supply CIP (1*2*3)	$14,771,976
5	Annual Interest Rate	5.00%
6	Bond Term (years)	30
7	Issuance Costs	1.50%
8	2011 Water Supply Principal Payment	$225,696
9	2011 Beginning Water Supply Service Units	587,073
10	2011 Projected New Service Units	7,579
11	2011 Year-end Water Supply Service Units (9+10)	594,652
12	2011 Eligible Existing Water Supply Principal per Service Unit (8/11)	$0.38
13	2011 Eligible Existing Water Supply Principal from EDUs (10*12)	$2,876
14	**Sum of Study Period Eligible Existing Water Supply Principal from EDUs**	**$14,725,259**

These calculations are completed for each year in the study period and then the water supply principal to be recovered from new development is summed to determine the credit for future CIP, as shown in Line 14 of Table 4-6.

Based on SAWS' past experience, it is assumed that 20% of the Water Delivery CIP may be funded with debt and paid with rate revenues. Therefore, 20% of the projected annual principal payments on future Water Delivery CIP are included in the credit calculation.

As with the Water Supply CIP, equal annual funding of the Water Delivery CIP over the 10-year study period is assumed, i.e., 10% of the total eligible Water Delivery CIP is funded each year. Annual principal payments for the eligible Water Delivery CIP for each year of the study period are projected using a term of 30 years and an annual interest rate of 5.00%. Based on these assumptions, the principal payment per service unit and the total principal to be recovered from new development are calculated in Table 4-7.

Table 4-7: Eligible Future Water Delivery Principal from New Development

Line No.	Description	Value
1	Total Eligible Future Water Delivery CIP	$99,966,780
2	Percentage of Future Water Delivery CIP to be Funded with Debt	20%
3	Annual Allocation of Future Water Delivery CIP	10%
4	Annual Eligible Debt-funded Future Water Delivery CIP (1*2*3)	$1,999,336
5	Annual Interest Rate	5.00%
6	Bond Term (years)	30
7	Issuance Costs	1.50%
8	2011 Water Delivery Principal Payment	$31,006
9	2011 Beginning Water Delivery Service Units	587,073
10	2011 Projected New Service Units	7,579
11	2011 Year-end Water Delivery Service Units (9+10)	594,652
12	2011 Eligible Existing Water Delivery Principal per Service Unit (8/11)	$0.05
13	2011 Eligible Existing Water Delivery Principal from EDUs (10*12)	$395
14	**Sum of Study Period Eligible Existing Water Delivery Principal from EDUs**	**$2,790,905**

These calculations are completed for each year in the study period and then the water delivery principal to be recovered from new development is summed to determine the credit for future Water Delivery CIP, as shown in Line 14 of Table 4-7.

This credit is allocated among the impact fees and service areas based on the proportion of eligible existing water delivery capacity value. Table 4-8 provides the water delivery credit for existing debt by impact fee and service area.

Table 4-8: Water Delivery Future CIP Credit by Service Area

Impact Fee	Service Area	Infrastructure Type	Credit for Future Debt
Flow	Inside Loop 410	N/A	$227,517
	Outside Loop 410	N/A	1,646,496
	Subtotal Flow		**$1,874,013**
System Development	High Elevation	Well Pumps	$52,437
		High Service and	39,188
		Elevated Storage	20,418
		Ground Storage Tanks	125
		Transmission Mains	100,249
	Subtotal High		**$212,417**
	Middle Elevation	Well Pumps	$115,644
		High Service and	138,503
		Elevated Storage	53,399
		Ground Storage Tanks	5,419
		Transmission Mains	149,150
	Subtotal Middle		**$462,115**
	Low Elevation	Well Pumps	$55,798
		High Service and	74,494
		Elevated Storage	27,362
		Ground Storage Tanks	14,275
		Transmission Mains	70,431
	Subtotal Low		**$242,360**
Total			**$2,790,905**

For the Wastewater CIP, SAWS plans to fund the entire Medina River Sewer Outfall (MRSO) project with debt. As with the Water Delivery CIP, it is also assumed that 20% of the remaining Wastewater CIP may be funded with debt and paid with rate revenues. Equal funding of the debt-funded Wastewater CIP over the 10-year study period is assumed so 10% of the total eligible CIP is funded each year. Annual principal payments for the eligible Wastewater CIP for each year of the study period are projected using a term of 30 years and interest rate of 5.00%. Then the principal payment per service unit and the total principal to be recovered from new development are calculated in Table 4-9.

Table 4-9: Eligible Future Wastewater Principal from New Development

Line No.	Description	Value
1	Total Eligible Future Wastewater CIP	$139,180,663
2	Percentage of Future Wastewater CIP to be Funded with Debt	20%
3	Annual Allocation of Future Wastewater CIP	10%
4	Annual Eligible Debt-funded Future Wastewater CIP (1*2*3)	$2,783,613
5	Annual Interest Rate	5.00%
6	Bond Term (years)	30
7	Issuance Costs	1.50%
8	2011 Wastewater Principal Payment	$63,442
9	2011 Beginning Wastewater Service Units	703,317
10	2011 Projected New Service Units	10,038
11	2011 Year-end Wastewater Service Units (9+10)	713,355
12	2011 Eligible Existing Wastewater Principal per Service Unit (8/11)	$0.09
13	2011 Eligible Existing Wastewater Principal from EDUs (10*12)	$893
14	**Sum of Study Period Eligible Existing Wastewater Principal from EDUs**	**$5,234,502**

These calculations are performed for each year in the study period and then the wastewater principal to be recovered from new development is summed to determine the credit for future CIP, as shown in Line 14 of Table 4-9.

This credit is allocated among the impact fees and service areas based on the proportion of eligible existing wastewater capacity value. Table 4-10 provides the wastewater credit for future CIP by impact fee and service area.

Table 4-10: Credit for Future CIP

Impact Fee Category	Service Area	Credit for Future CIP
Treatment	Medio Creek	$1,025,743
	Leon Creek / Dos Rios	1,393,044
	Subtotal Treatment	**$2,418,787**
Collection	Medio Creek	134,121
	Upper Medina	49,787
	Lower Medina	10,393
	Upper Collection	597,635
	Middle Collection	1,050,253
	Lower Collection	973,526
	Subtotal Collection	**$2,815,715**
Total		**$5,234,502**

4.3. Maximum Impact Fees

4.3.1. Maximum Impact Fees per Service Unit

The maximum impact fees per service unit include both the value of existing infrastructure with capacity available to serve projected new development from 2011 to 2020 and the value of new water supply, water delivery and wastewater capacity available to serve new development from 2011 to 2020. Table 4-11 shows the calculated impact fees, rate credits, and maximum impact fees by service area.

Table 4-11: Maximum Impact Fees per Service Unit

Impact Fee	Service Area	Calculated Impact Fee per EDU	Rate Credit per EDU	Maximum Impact Fee per EDU
Water Supply	All	$1,839	$183	$1,656
Flow	Inside 410	1,192	82	1,110
	Outside 410	1,575	74	1,501
System Development	High Elevation	1,120	56	1,064
	Middle Elevation	879	38	841
	Low Elevation	615	32	583
Treatment	Medio Creek	1,373	103	1,270
	Dos Rios/Leon Creek	1,022	29	993
Collection	Medio Creek	597	30	567
	Upper Medina	1,383	252	1,131
	Lower Medina	759	128	631
	Upper Collection	1,878	92	1,786
	Middle Collection	1,202	58	1,144
	Lower Collection	579	26	553

4.3.2. Service Units

The differentiated costs between meter sizes are allocated through the application of the equivalent meter concept. Since the 5/8” water meter is the most frequently used meter by the residential customer, it is equivalent to 1.0 EDU or service unit, which represents 313 gpd of water usage and 240 gpd of wastewater discharge. Table 4-12 presents the EDU equivalency factors for all meter sizes.

Table 4-12: EDU Equivalency Factors

Meter Size	EDU Equivalency Factor
5/8"	1.00
3/4"	1.50
1"	2.00
1-1/2"	5.00
2"	14.00
3"	30.00
4"	50.00
6"	105.00
8"	135.00
10"	190.00
12"	360.00

The Maximum Impact Fee for any meter size can be obtained by multiplying the Maximum Impact Fee per EDU presented in Table 4-11 by the corresponding EDU equivalency factor presented in Table 4-12.