North of River Sanitary District No. 1

Sewer Capacity Fee Study

60545074

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North of River Sanitary District No. 1

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SEWER CAPACITY FEE STUDY

SECTION I: INTRODUCTION

The purpose of this Sewer Capacity Fee Study (SCFS) is to review and recommend changes to the current sewer capacity fees that are charged to new connections to the District's sewerage system so that adequate funds will be available to construct the improvements needed to meet projected growth.

As developed in the District's 2018 Master Sewer Plan Update (MSP) dated March 2018**,** the average day sewage flow from the Study Area (the District's current Sphere of Influence [SOI]) will be approximately 30 million gallons per day (MGD) at build-out. Assuming a 2% growth rate as forecasted for Kern County by the State Department of Finance, it will take about 85 years for the sewage flow to increase to 30 MGD from the current average day flow of 5.4 MGD. While the MSP provides a conceptual plan for facility improvements to serve the buildout condition of 30 MGD, the primary focus of the MSP was to investigate the projected needs of the District's sewage collection and treatment plant through the year 2030.

The construction costs of the sewerage improvements developed in the MSP are based on January 2018 dollars. Some of the events which will affect construction cost and timing of improvements include changes in:

- Inflation;
- Regulatory requirements;
- Technology;
- Development patterns; and,
- Rate of increase in sewage flow.

The MSP and SCFS describe the proposed sewerage system improvements in light of today's regulations, costs, and technology. Due to the uncertainties described above, the SCFS and the MSP should be reviewed periodically, at least once every five years, and revisions made to the documents as necessary to reflect changed conditions.

SECTION II: CITY OF SHAFTER'S AND KERN COUNTY'S (CSA-71) CAPACITY RIGHTS

A Joint Powers Agreement (JPA), dated February 6, 1991, was entered into by:

- North of River Sanitary District No. 1 (NORSD);
- Kern County (CSA-71); and,
- City of Shafter.

The City of Shafter's capacity rights in the existing Outfall Sewer and Wastewater Treatment Plant (WWTP) as of January 2018 are summarized in **Table 1**.

Table 1
City of Shafter Capacity Rights in Existing Facilities

Existing Facility	Reach	Capacity Right Average Day Flows
Outfall Sewer	7th Standard Road Outfall Santa Fe Way to WWTP	3 MGD
WWTP (including effluent disposal)		2.5 MGD

Under terms of the JPA, Shafter has the right to purchase additional capacity in any of the facilities mentioned in **Table 1**. The terms of purchase shall be negotiated by NORSD and Shafter.

The existing WWTP is currently permitted to treat 7.5 MGD, provided that Provision No. 26 of the Waste Discharge Requirements (WDRs) pertaining to Effluent Nitrogen Limitation is met. The City of Shafter currently owns 2.5 MGD of the WWTP's (and effluent disposal facility's) capacities. NORSD's share of existing WWTP and effluent disposal facilities is 5.0 MGD.

With respect to CSA-71 the JPA states, "…..*County shall be permitted to use wastewater treatment plant capacity upon payment of a Connection Fee* (Sewer Capacity Fee) *as each sewer user in CSA-71 is connected to the public sewer herein described* (the Outfall Sewer). *The connection fees to be paid to NORSD shall be in the same amount as NORSD charges to equivalent sewer users in its own District for the purchase of capacity in the wastewater treatment plant and disposal facilities which are the subject of this JPA*."

SECTION III: SUMMARY OF SEWERAGE IMPROVEMENTS DESCRIBED IN MASTER SEWER PLAN

The sewerage improvements proposed in the MSP that will be funded by Sewer Capacity Fees are briefly described as follows.

- A second trunk sewer (Parallel Trunk Sewer) will be needed paralleling the existing Outfall Sewer extending from the site of the original WWTP just west of Highway 99 and south of Olive Drive to the existing WWTP site on 7th Standard Road. The existing Outfall Sewer was built in 1991. An alternative Parallel Trunk Sewer alignment is proposed along Kratzmeyer and Snow Roads.
- The existing WWTP utilizes a trickling filter process which does not remove nitrogen from the treated effluent. The WDRs adopted by the Regional Water Quality Control Board in 2009 requires that effluent that may reach the underlying groundwater have total nitrogen (TN) concentrations of not more than 10 mg/L.
- As sewage flow into the WWTP approaches 7.5 MGD, the plant will be upgraded and expanded to a design capacity of 12 MGD. An activated sludge process will be added because it produces better quality effluent than the trickling filter process including the ability to reduce nitrogen concentration to less than the 10 mg/L concentration required in the WDR. The activated sludge process will be expanded as needed due to increasing flows.

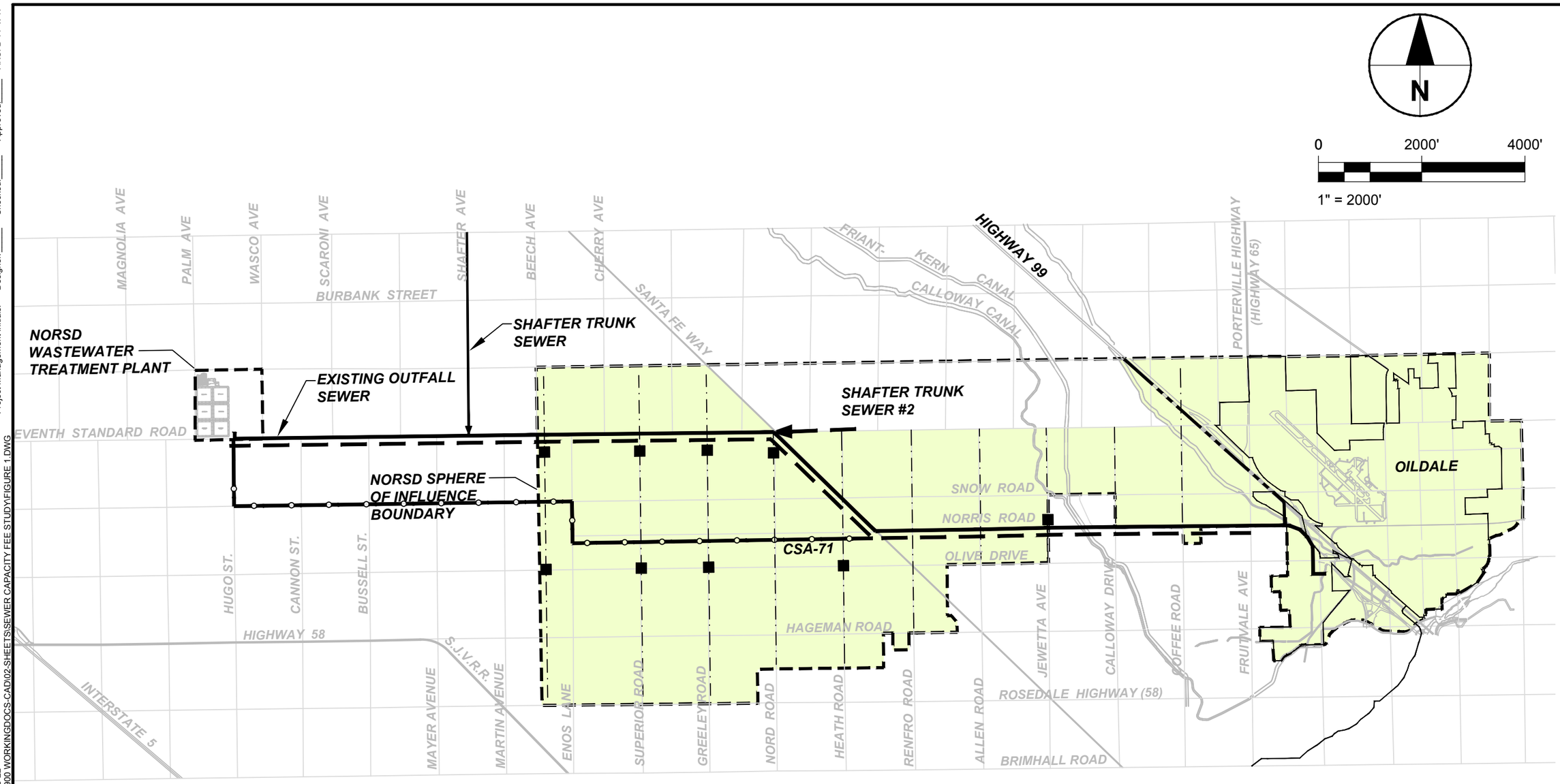
- The trickling filter is proposed to remain physically in place through the expansion to 12 MGD as well as the expansion to 18 MGD. The trickling filter is proposed to be demolished as a part of the future expansion to 24 MGD.

Table 2 summarizes information from the MSP and provides a preliminary schedule of construction projects (through approximately the year 2050) and construction costs in January 2018 dollars. To escalate the cost to a future date, the Construction Cost Index published by *Engineering News Record* or similar indices should be used. For future reference, the January 2018 Engineering News Record Construction Cost Index is 10878. It is important to note that these costs were prepared for budgetary purposes only. The scope of work for each phase and the associated costs presented are based on preliminary estimates and limited information, and are subject to change after more detailed engineering is completed and each project is better defined.

Table 2
Summary of Preliminary Construction Schedule and Construction Cost Opinions
(January 2018 Dollars)

APPROX. YEAR	FLOW RANGE (MGD)	FACILITIES CONSTRUCTED	CONSTRUCTION COST OPINONS ($M)		
			TRUNK SEWERS	WWTP	TOTAL COST
2025	6.4 - 7.4	WWTP upgrade and expansion to 12 MGD		85	85
2035	8.5 - 9.0	Parallel Trunk Sewer (PTS) from beginning to Renfro Road and Norris Road	34		34
2045	9.5 - 10.0	Extend PTS from Renfro Road to Santa Fe Way and 7th Standard Road	18		18
2050	10.3 - 11.8	WWTP expansion to 18 MGD		48	48
TOTAL			**52**	**133**	**185**

Figure 1 is taken from the MSP and shows the District's Sphere of Influence boundary (Study Area) and the locations and alignments of the existing Outfall Sewer, proposed Parallel Trunk Sewer (and its alternate alignment), and proposed Interceptor Sewers. This SCFS does not include the cost of Interceptor Sewers described in the MSP. Interceptor Sewers, including their lift stations, would be funded and constructed by the developers.



LEGEND

- INTERCEPTOR SEWER LIFT STATION
- EXISTING OUTFALL SEWER
- PROPOSED PARALLEL TRUNK SEWER (7TH STANDARD PARALLEL)
- PROPOSED ALTERNATE PARALLEL TRUNK SEWER (KRATZMEYER / SNOW ALTERNATIVE)
- PROPOSED INTERCEPTOR SEWER
- CSA-71 / OILDALE DIVISION LINE
- STUDY AREA

AECOM

Figure: 1

STUDY AREA AND
PROPOSED PARALLEL
TRUNK SEWER

NORTH OF RIVER SANITARY DISTRICT
2018 SEWER CAPACITY FEE STUDY
NORTH OF RIVER SANITARY DISTRICT
Project No.: 60545074 Date: 2018-03-22

SECTION IV: DEFINITION OF SINGLE FAMILY RESIDENTIAL EQUIVALENTS

As in the previous SCFS, the costs of the proposed sewerage improvements needed to serve future sewage customers are allocated in terms of *Single Family Residential Equivalents* (SFRE). Flows (gallons per day [gpd]) and strength (Biochemical Oxygen Demand [BOD] and Total Suspended Solids [TSS]) of sewage discharges vary considerably between the various sewer users. Therefore, the value of a SFRE is used to calculate sewer capacity fees for new connections based on the characteristics of the sewage discharge from the new connection relative to that of a typical single family home.

A single family home is assigned a value of one SFRE and the sewer capacity fee is expressed as cost per SFRE ($/SFRE). Different SFRE values are assigned to different "classes" of sewer users based on their sewage flows and strengths. The resulting $/SFRE value is multiplied by the SFRE value to calculate the sewer capacity fee for the different classes of new sewer connections.

For the purposes of this SFCS, one SFRE is assumed to discharge:

- 300 gpd;
- 295 mg/L of BOD = 0.73 pounds per day and,
- 540 mg/L of TSS = 1.35 pounds per day.

Although the calculated flow/SFRE to the WWTP for 2017 is 195 gpd, the value of 300 gpd per SFRE is appropriate for planning and development purposes (for adequate sizing and timing of the Parallel Trunk Sewer, for example) since the flow at the WWTP reflects a significant attenuation of the peak flows.

Table 3 is taken from the MSP and shows the current and future numbers of SFRE expected to be connected to the sewerage system by the time build-out is reached.

Table 3
NUMBER OF SINGLE FAMILY RESIDENTIAL EQUIVALENTS AT BUILD-OUT

Area	Current SFRE	Additional SFRE at Build-out	Total SFRE at Build-out
Oildale	15,551	10,498	26,049
CSA-71	5,116	57,895	63,011
Totals	**20,667**	**68,393**	**89,060**

As noted in the MSP, "Oildale" refers to that part of NORSD's service area located east of Highway 99 and "CSA-71" refers to that part of NORSD's service area to the west of Highway 99.

SECTION V: REPAYMENT OF BORROWED SEWER FUNDS

Several years ago, the District borrowed from the District's Reserve for Capital Outlay to pay operation and maintenance (O&M) costs. The Reserve for Capital Outlay is the repository for revenues from sewer capacity fees. Borrowing from the fund is acceptable provided that the borrowed funds are repaid.

The District borrowed a total of $8.9M from the Reserve for Capital Outlay for the Fiscal Years (FY) 2000/01 through 2006/07. If the money had not been borrowed but had remained invested with the Kern County Treasurer, it would have increased to about $11.5M in 2012. This figure was calculated using the County's interest earning rates for the years 2000 through 2012. The interest rates during that period varied from a high of about 7% to less than 1% per year and averaged about 3%.

The District began repaying the $11.5M in 2013. The funds to repay the borrowed money come from a component added to the sewer service charge which is collected by the County through property tax bills. A charge of $38 per SFRE has been added to the District's sewer service charge and will be collected for a period of 20 years in order to repay the borrowed funds with interest.

SECTION VI: CALCULATION OF PROPOSED SEWER CAPACITY FEES

The calculations for the proposed Sewer Capacity Fee per SFRE are presented in **Table 4**. As with the previous SCFS, the calculations are based on the assumption that sewerage facilities will be constructed on a "pay-as-you-go" basis. That is, no debt would be incurred to finance the improvements. Not only does debt financing increase the cost due to bond issuance costs and interest on the bonds, but the salability of bonds is dependent on an assured revenue stream sufficient to meet bond service requirements. Sewer capacity fee revenues do not meet this criterion since they are collected as new developments are connected to the system. The number of new developments will vary considerably from year to year and will not provide the required stable revenue source. The District's existing customers would be responsible for paying debt service obligations that could not be met by sewer capacity fee revenue.

The repayment of borrowed sewer funds as described in **Section V** is also included in the calculations in **Table 4**. Other assumptions upon which the Sewer Capacity Fee calculations were based are listed at the top of **Table 4.**

Changes from the previous SFCS are described below.

- Projections of average daily flow for the NORSD are calculated for two conditions.
  1. Based on the assumed flow of 300 gpd/SFRE (for the design of sewerage conveyance facilities)
  2. Based on the estimated 2017 flow of 195 gpd/SFRE (for the design of WWTP facilities)
- A column has been added showing the estimated average day flow for Shafter which is proposed to increase at 3% annually per the MSP.
- The Sewer Capacity Fund Interest rate has been reduced to 2.0% per year based on actual interest rates experienced by the fund.

- The Initial Sewer Capacity Fund balance is $25.2 million based on the District's FY 2016/17 audit.
- The Sewer Capacity Fee for 2018 is proposed to increase from $7,087 per SFRE to $7,450 per SFRE.
- The facilities to be constructed and estimated construction costs are updated based on the MSP and are the same as shown in **Table 2**.

The proposed upgrade and expansion to 12 MGD shown in year 2025 will provide benefits to the District's existing customers as well as capacity for new customers. The benefits to existing customers include:

- Addition of activated sludge process for removal of nitrogen from effluent to meet current WDRs;
- Redundancy in treatment processes (the current plant has no redundancy);
- Repair of existing cogeneration facilities; and
- Addition of a workshop area for plant operators.

For the purposes of this SCFS, the benefit to existing customers is preliminarily estimated to be one-third of the total cost of the upgrade and expansion. This factor will need to be reevaluated when the costs of the improvements for existing customers can be better defined. As shown in **Table 4**, the cost allocated to new customers would be approximately $70 million in 2025 dollars.

SECTION VII: IMPLEMENTATION OF SEWER CAPACITY FEES

The sewer capacity fees for most new sewer connections can be expressed in terms of SFREs. The District's Ordinance No. 2000-01 specifies the equivalent SFREs for a number of different classes of sewer dischargers. (A copy of the ordinance is available for viewing at the office of the District.) Sewer capacity fees for new connections which are addressed in the ordinance are calculated by multiplying the SFRE for the particular new sewer connection by the sewer capacity fee for one SFRE.

For new sewer connections that are not addressed in the District's ordinance, the SFRE are calculated on a case by case basis by comparing the quantity (gpd) and quality (BOD, TSS, other) of the proposed connection to that for a typical single family residence.

SECTION VIII: CONCLUSIONS

As shown in **Table 4**, the capacity fee for 2018 is proposed to be $7,450 per SFRE and to increase annually by 4.25%.

This SFCS should be reviewed periodically, at least once every five years, and revisions made as necessary to reflect changed conditions.

NORTH OF RIVER SANITARY DISTRICT
TABLE 4
2018 SEWER CAPACITY FEE STUDY
CALCULATION OF SEWER CAPACITY FEES

ANNUAL INCREASE IN SEWAGE FLOW (NORSD)	**2.0%**		ANNUAL INCREASE IN SEWAGE FLOW (SHAFTER)	**3.0%**	
TOTAL CONNECTIONS AT BUILD-OUT (NORSD)	**89,060**		INITIAL SEWER CAPACITY FEE FUND	**25.2**	$M
ASSUMED FLOW PER SFRE FOR SEWER (NORSD)	**300**	gpd	SEWER CAPACITY FEE FUND INTEREST	**2.0%**	PER YEAR
ESTIMATED 2017 FLOW PER SFRE (NORSD)	**195**	gpd	CONSTRUCTION INFLATION RATE	**3.0%**	PER YEAR
INITIAL SEWER CAPACITY FEE (2018)	**$7,450**		SEWER CAPACITY FEE ANNUAL ADJUSTMENT	**4.25%**	PER YEAR
REPAYMENT FROM SEWER SERVICE CHARGES[1]	**$38**	$/YR/SFRE			

YEAR	AVG. DAY FLOW FOR SEWER (MGD)[2]	AVG. DAY FLOW AT WWTP (MGD)[3]	EST. SHAFTER AVG. DAY FLOW (MGD)	NEW SFRE	TOTAL SFRE	FROM SEWER SVRC. CHG.[1] ($/SFRE)	SEWER CAP. FEE ($/SFRE)	FACILITIES CONSTRUCTED	2018 TRUNK SEWER CONST. COST ($M)	2018 WWTP CONST. COST ($M)	2018 CONST. COST ($M)	FUTURE ADJ. CONST. COST ($M)	EXISTING CUSTOMER SHARE ($M)	NEW CUSTOMER SHARE ($M)	FROM SEWER SRVC. CHG.[1] ($M)	SEWER CAP. FEE REV. ($M)	INT. ON SEWER FUND ($M)	BEGIN YEAR FUNDS AVAIL. ($M)	END OF YEAR SEWER CAP. FEE FUND ($M)
2017	6.20	5.44	1.40		20,667														25.2
2018	6.32	5.56	1.44	413	21,080	38	7,450								0.8	3.1	0.5	25.2	29.6
2019	6.45	5.69	1.49	422	21,502	38	7,767								0.8	3.3	0.6	29.6	34.3
2020	6.58	5.82	1.53	430	21,932	38	8,097								0.8	3.5	0.7	34.3	39.3
2021	6.71	5.95	1.58	439	22,371	38	8,441								0.9	3.7	0.8	39.3	44.6
2022	6.85	6.08	1.62	447	22,818	38	8,800								0.9	3.9	0.9	44.6	50.3
2023	6.98	6.22	1.67	456	23,274	38	9,174								0.9	4.2	1.0	50.3	56.4
2024	7.12	6.36	1.72	465	23,740	38	9,563								0.9	4.5	1.1	56.4	62.9
2025	7.26	6.51	1.77	475	24,215	38	9,970	WWTP UPGRADE AND EXPANSION TO 12 MGD		85	85	105	35	70	0.9	4.7	1.3	62.9	0.1
2026	7.41	6.65	1.83	484	24,699	38	10,394								0.9	5.0	0.0	0.1	6.1
2027	7.56	6.81	1.88	494	25,193	38	10,835								1.0	5.4	0.1	6.1	12.5
2028	7.71	6.96	1.94	504	25,697	38	11,296								1.0	5.7	0.2	12.5	19.4
2029	7.86	7.12	2.00	514	26,211	38	11,776								1.0	6.1	0.4	19.4	26.8
2030	8.02	7.28	2.06	524	26,735	38	12,276								1.0	6.4	0.5	26.8	34.8
2031	8.18	7.45	2.12	535	27,270	38	12,798								1.0	6.8	0.7	34.8	43.4
2032	8.34	7.62	2.18	545	27,815		13,342									7.3	0.9	43.4	51.5
2033	8.51	7.79	2.25	556	28,371		13,909									7.7	1.0	51.5	60.3
2034	8.68	7.97	2.31	567	28,939		14,500									8.2	1.2	60.3	69.7
2035	8.86	8.15	2.38	579	29,518		15,116	PARALLEL TRUNK SEWER BEGINNING TO RENFRO RD	34		34	56		56		8.7	1.4	69.7	23.7
2036	9.03	8.34	2.45	590	30,108		15,759									9.3	0.5	23.7	33.5
2037	9.21	8.50	2.50	602	30,710		16,429									9.9	0.7	33.5	44.0
2038	9.40	8.62	2.50	614	31,324		17,127									10.5	0.9	44.0	55.4
2039	9.59	8.75	2.50	626	31,951		17,855									11.2	1.1	55.4	67.7
2040	9.78	8.87	2.50	639	32,590		18,614									11.9	1.4	67.7	81.0
2041	9.97	9.00	2.50	652	33,242		19,405									12.6	1.6	81.0	95.2
2042	10.17	9.13	2.50	665	33,906		20,229									13.4	1.9	95.2	110.6
2043	10.38	9.26	2.50	678	34,585		21,089									14.3	2.2	110.6	127.1
2044	10.58	9.40	2.50	692	35,276		21,985									15.2	2.5	127.1	144.9
2045	10.79	9.53	2.50	706	35,982		22,920	EXTEND PARALLEL TRUNK SEWER FROM RENFRO TO SANTA FE WAY AND 7TH STD. RD.	18		18	40		40		16.2	2.9	144.9	123.9
2046	11.01	9.67	2.50	720	36,701		23,894									17.2	2.5	123.9	143.6
2047	11.23	9.82	2.50	734	37,435		24,909									18.3	2.9	143.6	164.8
2048	11.46	9.96	2.50	749	38,184		25,968									19.4	3.3	164.8	187.5
2049	11.68	10.11	2.50	764	38,948		27,072									20.7	3.8	187.5	211.9
2050	11.92	10.27	2.50	779	39,727		28,222	WWTP EXPANSION TO 18 MGD		48	48	124		124		22.0	4.2	211.9	114.6
TOTALS									**52**	**133**	**185**	**324**	**35**	**289**	**12.8**	**320.4**	**45.6**		

Notes:

1) Repayment of funds ($11.5 million with interest) borrowed from the Sewer Capcity Fee Fund to pay District operating expenses during FY 2000/01 through FY 2006/07. $38/SFRE is collected as a part of the annual Sewer Service Charge beginning in 2013. Repayment is estimated to be complete in FY 2031/32.
2) Calculated based on the Assumed Flow per SFRE for Sewer of 300 gpd.
3) Calculated based on the Estimated 2017 Flow per SFRE at the WWTP of 195 gpd.