Water and Sewer Capacity Fees

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Prepared by:

TischlerBise
Fiscal, Economic & Planning Consultants

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TischlerBise
Fiscal, Economic & Planning Consultants

4701 SANGAMORE ROAD | SUITE N210 | BETHESDA, MD 20816
T: 800.424.4318 | F: 301.320.4860

80 ANNANDALE ROAD | PASADENA, CA 91105-1404
T: 818.790.6170 | F: 818.790.6235

WWW.TISCHLERBISE.COM

-OVERVIEW-

The City of Siloam Springs has retained TischlerBise to prepare a capacity fee study for water and wastewater. Under the City's authority to provide utility systems, Siloam Springs may impose capacity fees to ensure public health, safety and welfare. Capacity fees are one-time payments used to fund capital improvements needed to expand the utility systems. The recommended capacity fees for the City are proportionate and reasonably related to the capital facility demands of new development. This report documents the data, methodology, and results of the capacity fee study.

To derive the water and sewer capacity fees, TischlerBise evaluated alternative methodologies and documented appropriate demand indicators by type of development. Capital costs are based on local data and current dollars. The formulas used to calculate the capacity fees are diagrammed in a flow chart at the beginning of the water and sewer sections. Also, for both fees the report includes a summary table indicating the specific factors used to derive the capacity fee. These factors are also referred to as Level-Of-Service (LOS) standards.

CAPACITY FEE CALCULATION METHODOLOGY

Any one of several legitimate methods may be used to calculate utility capacity fees. The choice of a particular method depends primarily on the service characteristics and planning requirements for the facility type being addressed. Each method has advantages and disadvantages in a particular situation, and to some extent they are interchangeable, because they all allocate facility costs in proportion to the needs created by development.

Reduced to its simplest terms, the process of calculating utility capacity fees involves only two steps: determining the cost of development-related capital improvements, and allocating those costs equitably to various types of development. In practice, though, the calculation of capacity fees can become quite complicated because of the many variables involved in defining the relationship between development and the need for facilities. The following paragraphs discuss three basic methods for calculating utility capacity fees and how those methods can be applied.

There are three basic methods used to calculate the various components of Siloam Springs's utility capacity fees. The plan-based method is commonly used for utilities, because they have adopted plans and commonly accepted service delivery standards to guide capital improvements. The incremental expansion method documents the current LOS for non-capacity, support facilities, like buildings and equipment. Siloam Springs will expand the

support facilities and equipment as needed to accommodate new development. A third method, known as the cost recovery approach, is based on the rationale that new development is paying for its share of the useful life and remaining pro rata capacity of existing facilities. For example, large-size trunk lines were sized to accommodate additional water or sewer flow anticipated from future development.

Figure 1 summarizes the method(s) used to derive the capacity fees for water and sewer systems.

Figure 1. Summary of Proposed Capacity Fee Methods and Cost Components

Type of Public Facility	Incremental Expansion	Plan Based
Water	▪ Vehicles/Equipment ▪ Administrative Space	▪ Treatment Capacity Expansion ▪ Storage Capacity Expansion ▪ Piping Capacity Expansion ▪ Distribution Capacity Expansion
Wastewater	▪ Vehicles/Equipment ▪ Administrative Space	▪ Treatment Capacity Expansion

Figure 2 provides a schedule of the maximum justifiable water and sewer capacity fees for Siloam Springs. As Figure 2 indicates, both water and sewer capacity fees are based on the size of each water meter that is connected to the utility system.

The City may adopt capacity fees that are less than the amounts shown. However, a reduction in capacity fee revenue will necessitate an increase in other revenues, a decrease in planned capital expenditures and/or a decrease in the City's LOS standards. Capacity fees are not a general revenue-raising mechanism. The purpose of imposing capacity fees is to fund the construction of capital improvements necessary to accommodate new development.

Figure 2. Schedule of Justifiable Capacity Fees

All Development *Meter Size (inches)*	*Type*	*Capacity Ratio*	*Water*	*Wastewater*	***TOTAL***
0.75	Displacement	1.0	$701	$3,948	**$4,650**
1.00	Displacement	1.3	$873	$5,084	**$5,958**
1.50	Displacement	3.3	$2,021	$12,661	**$14,683**
2.00	Displacement	5.3	$3,155	$20,146	**$23,302**
3.00	Compound	11.0	$6,438	$41,813	**$48,251**
3.00	Turbine	12.0	$6,990	$45,459	**$52,450**
4.00	Compound	17.0	$9,875	$64,497	**$74,372**
4.00	Turbine	20.5	$11,885	$77,768	**$89,654**
6.00	Compound	33.0	$19,064	$125,152	**$144,217**
6.00	Turbine	41.2	$23,765	$156,180	**$179,946**
8.00	Compound	53.3	$30,724	$202,109	**$232,833**
8.00	Turbine	60.2	$34,643	$227,975	**$262,618**

All costs in the capacity fee calculations are given in current dollars with no assumed inflation rate over time. Necessary cost adjustments can be made as part of the recommended annual evaluation and update of capacity fees. One approach is to adjust for inflation in construction costs by means of an index like the one published by Engineering News Record (ENR). This index could be applied against the calculated capacity fees. If cost estimates change significantly, the fees should be recalculated.

-DEVELOPMENT AND DEMAND DATA-

Both existing and planned development must be addressed as part of the analysis required to support the establishment of capacity fees. This chapter of the report organizes and correlates information on existing and planned development to provide a framework for the capacity fee analysis contained in subsequent chapters of the report. The information in this chapter forms a basis for establishing levels of service, analyzing facility needs, and allocating the cost of capital facilities between existing and future development and among various types of new development.

CURRENT AND FUTURE CITY DEVELOPMENT BASE

The following provides the demographic data and development projections that TischlerBise will use in the impact fee analysis for the City of Siloam Springs. As noted above, the data will serve in the study as the basis for measuring the increased demand for services in the future, establishing levels of service provided by the City, as well as allocating the cost of capital facilities between existing and future development and among various types of new development.

Figure 3 provides population, housing unit, and employment data for the 2007 to 2026 time period. The following pages provide a discussion of the assumptions and data used to generate the data in Figure 3.

Figure 3. City of Siloam Springs Growth Indicators

						2007 to 2026	
	2007	2011	2016	2021	2026	Total Increase	Annual Increase
Population[1]	14,469	16,835	19,995	23,154	26,314	11,845	623
Employment[2]	7,011	8,310	9,933	11,557	13,180	6,169	325
Housing Units[3]	5,722	6,782	8,107	9,432	10,757	5,035	265
Service Population[4]	21,480	25,145	29,928	34,711	39,494	18,014	948
Nonresidential Space[5]	2,460,785	2,975,550	3,556,884	4,138,218	4,719,551	2,258,767	118,882

[1]Population projection based on the 2006 special census (population and housing units)and building permit activity in 2006. Projections are based on projected housing units, current occupancy rates (to derive households), and persons per housing unit from the 2006 special census data.

[2]Employment projections based on the 2005 job estimates (ESRI) and 2005 jobs to housing ratio of 1.27.

[3]Housing units projections based on the 2006 preliminary special census and the permit data (provided by the City) for 2000-2006.

[4] Service population is the sum of the City's population and employment.

[5] Data derived from square per employee multipliers published by Institute of Transportation Engineers (2003).

Housing Units. Figure 3 above shows that the number of housing units in Siloam Springs is projected to increase from 5,722 units in 2007 to over 10,750 by 2026, an increase of nearly 88 percent. The housing projection is based on the number of current units and historical trends in

building permit data since 2000. The average annual number of residential permits from 2000 to 2007 was 265.

Population. The existing population estimate that is used in this analysis is an estimate as of January 1, 2007. This estimate was made using the April 2006 estimate of 13,990 persons prepared by the United States Census Bureau in a special census requested by the City. To this was added the population associated with additional building permits in 2006 (201 units multiplied by 2.38 persons per housing unit), for an estimated population of 14,469. This figure includes 824 persons in group quarters (removed for the persons per unit calculation, but used overall as part of the service population of the City in the impact fee calculations). Table 5 above shows that Siloam Springs's 2026 population is projected to be almost 26,315 residents, an increase of more than 11,845 residents between 2006 and 2026. This result is comparable to the projected increases the City developed using an annexation study. The City determined a possible (maximum) increase to 2026 of 16,600 persons if land around the City is annexed. The more conservative figures developed for the impact fee study would leave the option of other land uses for the annexed areas other than strictly residential. The projection method (of four developed) TischlerBise used in this study was selected as most appropriate since, as noted, it is most consistent with the City's projections and is based on historical growth over the past six years.

Nonresidential Floor Space. Figure 6 below shows that the estimated total nonresidential floor area in Siloam Springs in 2007 is approximately 2.5 million square feet. This estimate is based on the nonresidential prototypes shown previously in Figure 4. Both tables were used in the analysis to convert the square feet per employee (far right column of Figure 4) into nonresidential floor area by type, as the City was unable to provide estimated floor areas for these specific land uses. The estimate of 2.5 million square feet is based on the the number of jobs currently in the City and the nonresidential prototypes shown in Figure 4. For example, the retail/commercial percent of employment (47.2 percent) is multiplied by total jobs (7,011) to arrive at the total number of jobs attributed to retail. This figure is then multiplied by the square feet of space needed per job (i.e., "square feet per employee"—400, in this case) to arrive at the estimated current nonresidential floor area in Siloam Springs for retail/commercial (1.3 million square feet).

Figure 4. Estimate of Employment and Nonresidential Floor Area

	2007 Employment*	Percent of Employment	Square Feet per Employee#	2006 Non-Res Floor Area##
Retail/Commerical				
Retail Trade	2,562			
Hotel/Lodging	35			
Other Services	534			
Automotive Services	63			
Entertainment	112			
Subtotal	3,306	47.2%	400	1,322,000
Office				
Finance/Ins./Real Estate	367			
Health Services	628			
Legal Services	20			
Subtotal	1,015	14.5%	223	226,000
Institutional				
Government/Institutional	972			
Subtotal	972	13.9%	173	168,000
Goods Production				
Agriculture	165			
Construction	190			
Manufacturing	407			
Wholesale Trade	840			
Comm, Trans, & Utilities	116			
Subtotal	1,718	24.5%	433	744,000
Total	7,011	100.0%		2,460,000

*Employment by development type based on employment data by industry obtained from ESRI/InfoUSA

#Square feet per employee calculated from trip rates except for Shopping Center data, which are derived from the Urban Land Institute's Development Handbook and Dollars and Cents of Shopping Centers.

##Calculated using estimated square feet per employee, percent of employment, and total jobs.

Employment. In 2007, there were 7,011 jobs in Siloam Springs according to the information published by ESRI/InfoUSA. This estimate was matched with the number of housing units in 2006 to derive a job to housing ratio of 1.23 jobs for each housing unit in Siloam Springs. To project the number of jobs in the City to 2026, this ratio was multiplied by the projected number of housing units. However, should the housing units not increase as predicted, then the projected number of jobs is likely too high. For example, in 2011 the projected number of housing units is currently 6,782. Multiplied by the current ratio of 1.23, the number of projected jobs is 8,310.

SUMMARY OF PROJECTION INFORMATION

Figure 8 summarizes the development data and projections that will be used in subsequent chapters for Siloam Springs's capacity fee study. The figures indicate the following:

- Based on the projection methodologies discussed above, 5,035 new residential units are projected to be constructed in Siloam Springs between 2007 and 2026, an 88 percent increase over the City's current housing stock. On an annual basis, this projection converts to an average of 265 new housing units per year.

- The projected residential development will have an impact on Siloam Springs's population, with the City expected to add almost 11,850 new residents between 2007 and 2026.

- The residential development will drive employment growth in Siloam Springs over the study period, assuming that the City's current ratio of jobs to occupied housing units remains stable. It is anticipated that nearly 6,170 new jobs will be added in the City between 2007 and 2026.

- The consultant estimates that there is approximately 2.46 million square feet of nonresidential floor area in Siloam Springs in 2006. Between 2007 and 2026, it is expected that the City could add approximately 2.3 million square feet of nonresidential space, with the largest share of this space being for retail/commercial uses.

Figure 5. City of Siloam Springs Development Projections, 2007-2026

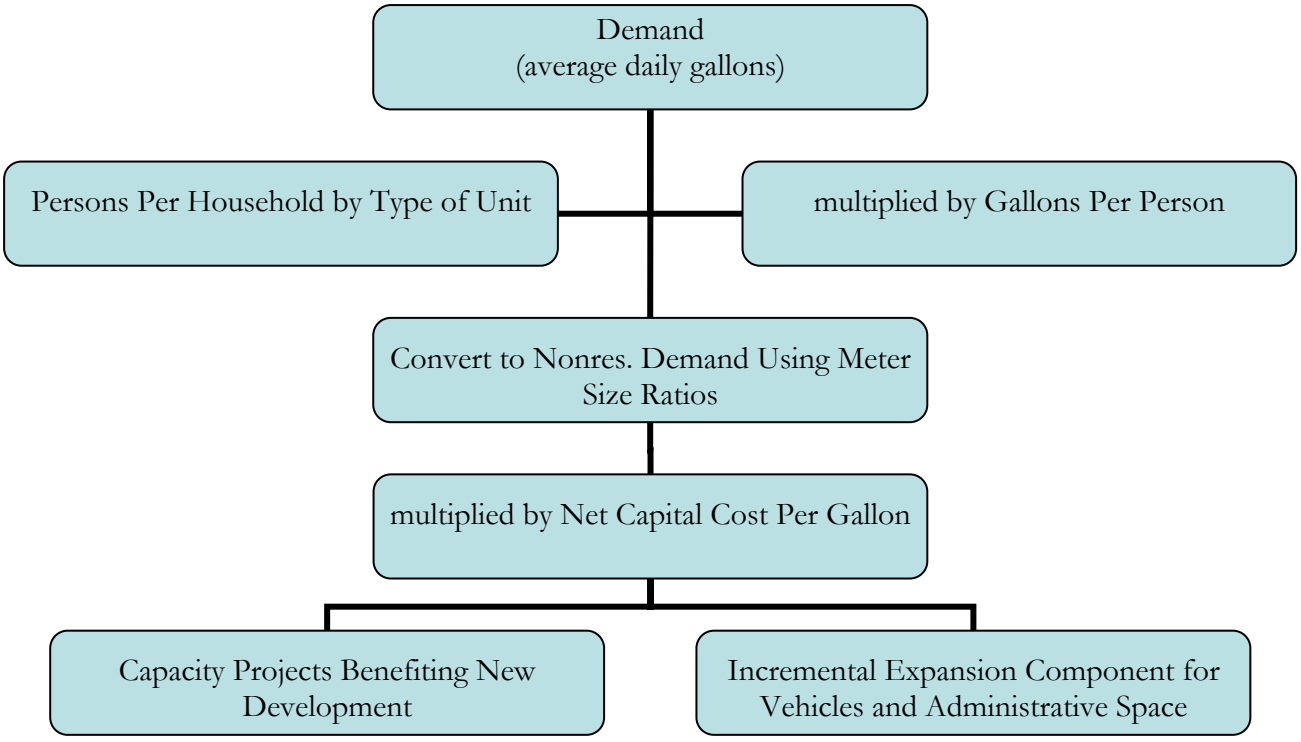
Demand Variable	2007	2011	2016	2021	2026	Numerical Change 2007-26	Annual Increase
Population							
Population	14,469	16,835	19,995	23,154	26,314	11,845	623
Housing Units	5,722	6,782	8,107	9,432	10,757	5,035	265
Housing Units							
Single Family	3,734	4,426	5,290	6,155	7,020	3,286	173
Multi-Family	1,712	2,029	2,426	2,822	3,218	1,506	79
Mobile Home	276	327	391	455	519	243	13
Total Units	5,722	6,782	8,107	9,432	10,757	5,035	265
Vacancy Rate	11.0%	11.0%	11.0%	11.0%	11.0%		
Employment							
Total Employment	7,011	8,310	9,933	11,557	13,180	6,169	325
Jobs to Housing Ratio	1.23	1.23	1.23	1.23	1.23		
Percent Retail / Commercial	47%	47%	47%	47%	47%		
Percent Office / Inst	28%	28%	28%	28%	28%		
Percent Industrial	25%	25%	25%	25%	25%		
Nonresidential Space (000's)							
Retail / Commercial	1,322	1,567	1,874	2,180	2,486	1,164	61
Office / Instit	394	546	649	752	855	461	24
Industrial	744	917	1,089	1,261	1,434	689	36
Total	2,461	3,031	3,612	4,193	4,775	2,314	122

-WATER-

METHODOLOGY

The water capacity fees are based on the net capital cost per gallon of system capacity. As shown in Figure 6, two basic steps have been used to determine the net capital cost. The major cost factor is for growth-related capital improvements needed to accommodate additional demands on the water system. Capital projects are identified in the Siloam Springs 10-Year Water Master Plan. If Siloam Springs were to stop growing, these growth-related improvements would not be constructed. The cost of growth-related capital improvement projects was divided by the incremental increase in daily capacity as a result of the capital improvements. The second cost factor is vehicles/equipment and administrative space that will be expanded incrementally in the future. As shown in Figure 6, the capital cost per gallon of capacity was multiplied by the water rate per capita to yield the proportionate capacity fee by type of housing. Nonresidential fees are derived from capacity ratios according to the size of the new connection's water meter using capacity ratios from the American Water Works Association.

Figure 6: Water Capacity Fee Methodology



SYSTEM DEMAND

Water use for residential and nonresidential customers was determined using data from the City's billing records. It is important to note that a small percentage of the water system's capacity is utilized by development in West Siloam Springs and Watts, Oklahoma. As shown in Figure 7, Siloam Springs has an estimated 6,176 connections with average daily demand of 3.36 million gallons per day. This equates to average daily demand of 544 gallons per day per connection and 230 gallons per day per residential connection.

Figure 7: Water Average Daily Demand Factors

	*Gallons/Day**	*Customers**	*Gallons/ Customer*	*MGD*	*GPCD#*
Residential	1,277,477	5,551	230	1.28	97
Nonresidential	2,085,104	625	3,336	2.09	
	3,362,581	6,176	544		

* Provided by City staff (Public Works Director).

Gallons per capita per day based on average household size of 2.38

FUTURE SYSTEM DEMAND

Future average daily water demand factors used in the capacity fee calculation are shown below in Figure 8. As Figure 8 indicates, total system average daily demand is projected at 6.11 million gallons per day by the year 2027.

Figure 8: Projected Culinary Water System Demand

	Fiscal Year	Million Gallons Per Day (avg)
Base	2007	3.36
1	2008	3.48
2	2009	3.61
3	2010	3.75
4	2011	3.89
5	2012	4.03
6	2013	4.17
7	2014	4.31
8	2015	4.45
9	2016	4.58
10	2017	4.72
11	2018	4.86
12	2019	5.00
13	2020	5.14
14	2021	5.28
15	2022	5.42
16	2023	5.55
17	2024	5.69
18	2025	5.83
19	2026	5.97
20	2027	6.11

TischlerBise developed the water system demand projections utilizing factors from current systems usage. These factors are shown below in Figure 9.

Figure 9: Water System Demand Projection Factors

Gallons per Residential Customer	230
Persons Per Unit	2.38
Gallons per Person	97
Percentage of Future Housing Units as Water Customers	100%
Gallons from Nonresidential Development	2,085,104
Jobs	7,011
Gallons per Job	297
Nonresidenital Customers	625
Jobs per Nonresidential Customer	11

WATER SYSTEM CAPACITY CAPITAL FACILITY PLAN

The culinary water capacity fee uses a plan-based approach for system improvements. This is represented in the capital facility plan shown below. The costs for the culinary water system improvements are from information contained in the *10-Year Master Plan of the Water Distribution System*, prepared by Carter-Burgess, provided by the City of Siloam Springs Department of Public Works.

As shown below in Figure 10, the City plans to spend approximately $13.34 million on water system improvement between now and 2026. Section A of the capital facilities plan shows treatment projects to be constructed between now and 2026. The estimated cost of these projects is $4.875 million. The net increase in average daily treatment capacity as a result of these projects is projected to be 10.5 million gallons per day. This results in a capital cost per gallon of capacity of $0.46.

Section B of the capital facilities plan contains distribution projects that will benefit new growth through 2026. The estimated cost of these projects is $465,000. To determine the cost per demand unit, net increase in average daily distribution capacity through 2026 (6.624 million gallons per day) is used. This results in a capital cost per gallon of capacity of $0.07.

Section C of the capital facilities plan contains growth-related storage facilities to be constructed between now and 2026. The estimated cost of these projects is $4.75 million. These projects will increase storage capacity by 4.5 million gallons per day. This results in a capital cost per gallon of capacity of $1.06.

Section D of the capital facilities plan contains growth-related piping projects to be constructed between now and 2026. The estimated cost of these projects is $3.25 million. These projects will

increase piping capacity by 11.6 million gallons per day. This results in a capital cost per gallon of capacity of $0.90.

Figure 10: Culinary Water System Capital Facilities Plan

A. Treatment Projects

Project	*2007-2011*	*2012-2016*	*2017-2021*	*2022-2026*	***TOTAL***	*Added by Project*
Upgrade Treatment Plant	$1,625,000	$0	$0	$0	**$1,625,000**	4,500,000
New Treatment Plant	$0	$0	$250,000	$3,000,000	**$3,250,000**	6,000,000
TOTAL	$1,625,000	$0	$250,000	$3,000,000	**$4,875,000**	10,500,000
Net Increase in Treatment Capacity from 2007 to 2026 (avg gal/day)					10,500,000	
Cpaital Cost per Gallon of Capacity					$0.46	

B. Distribution Projects

Project	*2007-2011*	*2012-2016*	*2017-2021*	*2022-2026*	***TOTAL***	*Added by Project*
Raw Pumps	$0	$0	$375,000	$0	$375,000	3,312,000
Distribution Zone 1	$0	$0	$50,000	$0	$50,000	2,592,000
Distribution Zone 2	$0	$40,000	$0	$0	$40,000	720,000
TOTAL	$0	$40,000	$425,000	$0	$465,000	6,624,000
Net Increase in Distribution Capacity from 2007 to 2026 (avg gal/day)					6,624,000	
Cpaital Cost per Gallon of Capacity					$0.07	

C. Storage Projects

Project	*2007-2011*	*2012-2016*	*2017-2021*	*2022-2026*	***TOTAL***	*Added by Project*
Distribution Zone 1	$2,000,000	$0	$0	$2,250,000	$4,250,000	4,000,000
Distribution Zone 2	$500,000	$0	$0	$0	$500,000	500,000
TOTAL	$2,500,000	$0	$0	$2,250,000	$4,750,000	4,500,000
Net Increase in Storage Capacity from 2007 to 2026 (avg gal/day)					4,500,000	
Cpaital Cost per Gallon of Capacity					$1.06	

D. Piping Projects

Project	*2007-2011*	*2012-2016*	*2017-2021*	*2022-2026*	***TOTAL***	*Added by Project*
Pipeline from City Lake	$0	$0	$0	$2,250,000	$2,250,000	8,000,000
Parallel Raw Pipeline	$1,000,000	$0	$0	$0	$1,000,000	3,600,000
TOTAL	$1,000,000	$0	$0	$2,250,000	$3,250,000	11,600,000
Net Increase in Piping Capacity from 2007 to 2026 (avg gal/day)					3,600,000	
Cpaital Cost per Gallon of Capacity					$0.90	

CFP TOTAL	**$5,125,000**	**$40,000**	**$675,000**	**$7,500,000**	**$13,340,000**

WATER SYSTEM VEHICLES INCREMENTAL EXPANSION COMPONENT

The cost per demand unit for water system vehicles and equipment is derived using an incremental expansion approach. Vehicle and equipment costs shown at the top of Figure 11 are based on information provided by the City on the cost of replacing existing vehicles and/or

equipment in the department's inventory. As shown in Figure 11, the estimated replacement costs totals $409,800.

In order to determine the cost per demand unit for water system vehicles, the total estimated replacement cost ($409,800) is divided by the current number of water customers (6,176), for a cost per connection of $66.35.

Figure 11. Water System Vehicles Incremental Expansion Level-of-Service Standards

Division/Vehicles	*# of Units*	*Cost/ Unit#*	*TOTAL*
Water			
Dodge (truck)	1	$20,000	$20,000
Chevrolet (truck)	1	$20,000	$20,000
Boston Whaler (boat)	1	$15,000	$15,000
Kawasaki (ATV)	1	$4,500	$4,500
Snapper (mower)	1	$10,000	$10,000
Dodge 1/2 Ton*	1	$10,000	$10,000
Air Compressor*	1	$9,000	$9,000
Backhoes*	3	$35,000	$105,000
Ford Van*	1	$7,000	$7,000
Ford 1 Ton Dump Truck*	1	$12,500	$12,500
Ford 1 Ton Crew Cab*	1	$12,500	$12,500
John Deere Tractor*	1	$7,500	$7,500
Jet Rodder*	1	$15,200	$15,200
1 3/4 Ton Dump Truck*	1	$17,500	$17,500
Chevy 1/2 Ton Service Truck*	1	$12,500	$12,500
Chevy 1/2 Ton 4x4*	1	$10,000	$10,000
Komatsu Track Hoe*	1	$115,000	$115,000
6" Trash Pump*	1	$6,600	$6,600
TOTAL	20		$409,800
LOS			
Vehicles/equipment per customer			0.0032
Demand Units			
Water customers			6,176
Cost			
Per Customer			$66.35

City of Siloam Springs Public Works Department.
*Cost for these vehicles is split equally between water and sewer

WATER SYSTEM ADMINISTRATIVE SPACE INCREMENTAL EXPANSION COMPONENT

To adequately supply potable water to new development, the City of Siloam Springs also needs non-capacity items such administrative building space. These costs are allocated to cost per connection, since connections are the best proxy for affecting demand.

The cost per demand unit for water system administrative space is derived using an incremental expansion approach. Administrative space is summarized at the top of Figure 12. As Figure 12 indicates, the City water system currently utilizes 2,900 square feet of space and has a replacement value of $377,000, which is based on a replacement cost of $130 per square foot (provided by the City).

In order to determine the cost per demand unit for water system administrative space, the total estimated replacement cost ($377,000) is divided by the current number of water customers (6,176), for a cost per connection of $61.04.

Figure 12. Water Administrative Space Incremental Expansion Level-of-Service Standards

Buildings	*Square Feet*	*Replacement Cost***
Water Administration*	2,900	$377,000
TOTAL	2,900	$377,000

Demand Units FY2007	
Water customers	6,176
Cost	
Per Customer	$61.04

* Includes the Office and Fluoride Feed and Office and Operations buildings.

** Based on replacement cost of $130 sf provided by City staff

WATER CAPACITY FEE

The standards used to derive the water capacity fees are shown in the boxed area of Figure 13. All development within Siloam Springs's water service area will be assessed the fees shown below.

For the smallest meter size, the fee is derived by multiplying the gallons per day per residential connection by total capital cost per gallon of capacity. The next step in the fee calculation is to

add the average cost per water customer for administrative space and vehicles/equipment. For example, 230 gallons per day per residential connection multiplied by $2.49 (capital cost per gallon of capacity) equals $574 (truncated). Adding $127.40 (capital cost per connection) yields a capacity fee of $701 for the smallest meter size. For larger meter sizes, include the capacity ratio in the fee formula (before adding the $127.40 for property and equipment).

Figure 13. Water Capacity Fee

	Standards:
Cost Summary	
Gallons per Day per Residential Connection	230
Planned Treatment Projects Cost per Gallon	$0.46
Planned Distribution Projects Cost per Gallon	$0.07
Planned Storage Projects Cost per Gallon	$1.06
Planned Piping Projects Cost per Gallon	$0.90
Capital Cost per Gallon of Capacity	$2.49
Support Facilities Cost per Customer	$61.04
Support Vehicles & Equipment Cost per Customer	$66.35
Capital Cost per Customer	$127.40

Development Fees

All Development

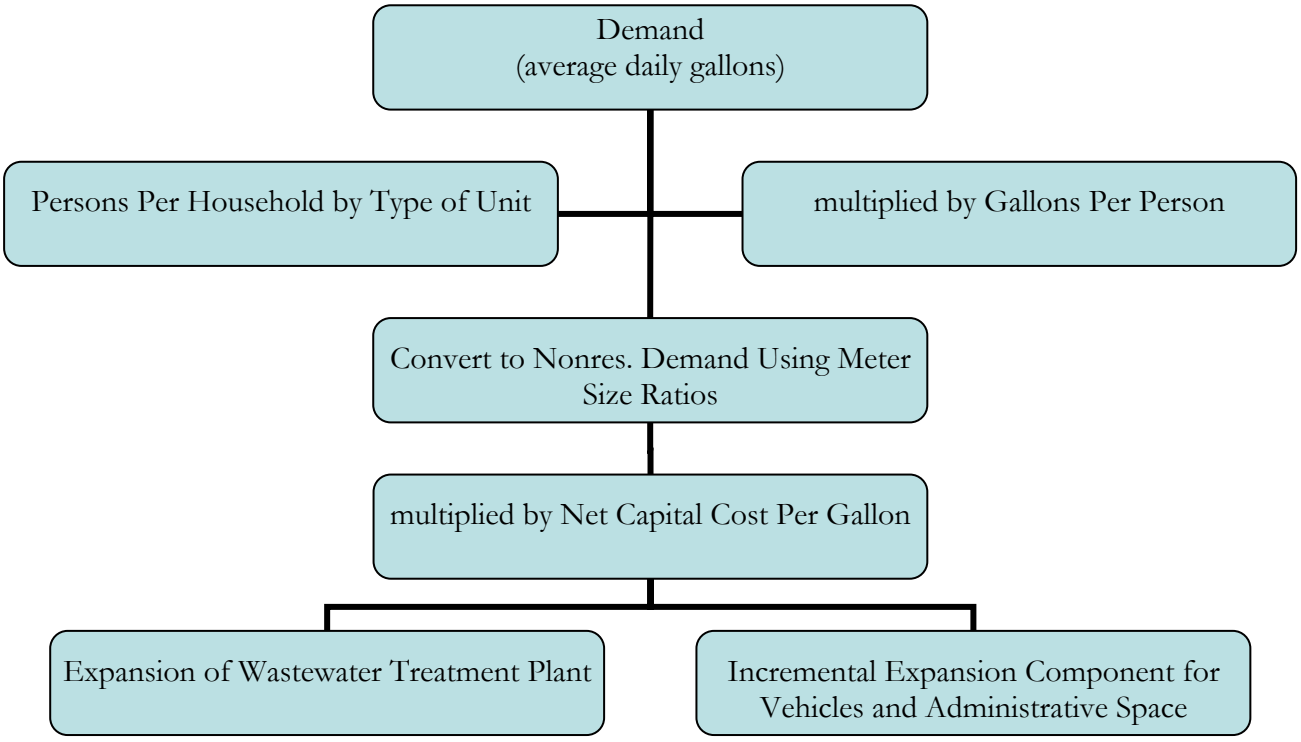
Meter Size (inches)	*Type*	*Capacity Ratio*	*Capacity Total*	*Non-capacity Total*	*TOTAL*
0.75	Displacement	1.0	$574	$127	$701
1.00	Displacement	1.3	$746	$127	$873
1.50	Displacement	3.3	$1,894	$127	$2,021
2.00	Displacement	5.3	$3,028	$127	$3,155
3.00	Compound	11.0	$6,311	$127	$6,438
3.00	Turbine	12.0	$6,863	$127	$6,990
4.00	Compound	17.0	$9,747	$127	$9,875
4.00	Turbine	20.5	$11,758	$127	$11,885
6.00	Compound	33.0	$18,937	$127	$19,064
6.00	Turbine	41.2	$23,638	$127	$23,765
8.00	Compound	53.3	$30,596	$127	$30,724
8.00	Turbine	60.2	$34,515	$127	$34,643

-WASTEWATER-

METHODOLOGY

The wastewater impact fees are based on the capital cost per gallon of capacity. As shown in Figure 14, two basic steps have been used to determine the capital cost per demand unit. The major cost factor is for growth-related capital improvements needed to accommodate additional demands on the wastewater system. The cost of growth-related capital improvement projects was divided by the incremental increase in daily capacity as a result of the capital improvements. The second cost factor is vehicles/equipment used in the provision of wastewater facilities as well administrative space. As shown in Figure 14, the capital cost per gallon of capacity was multiplied by a wastewater generation rate per capita to yield the proportionate capacity fee by type of housing. Nonresidential fees are derived from capacity ratios according to the size of the new connection's water meter using capacity ratios from the American Water Works Association.

Figure 14: Wastewater Impact Fee Methodology



SYSTEM DEMAND

Wastewater demand from residential and nonresidential customers was determined using data from the City's billing records. As shown in Figure 15, Siloam Springs has an estimated 5,025 connections with average daily demand of 2.245 million gallons per day. This equates to average daily demand of 447 gallons per day per connection and 170 gallons per day per residential connection.

Figure 15: Wastewater Average Daily Demand Factors

	*Gallons/Day**	*Customers**	*Gallons/ Customer*	*MGD*	*GPCD#*
Residential	749,730	4,400	170	0.75	72
Nonresidential	1,496,137	625	2,394	1.50	
	2,245,867	5,025	447		

* Provided by City staff (Public Works Director).

Gallons per capita per day based on average household size of 2.38

FUTURE SYSTEM DEMAND

Future average daily wastewater demand factors used in the capacity fee calculation are shown below in Figure 16. As Figure 16 indicates, total system average daily demand is projected at 4.24 million gallons per day by the year 2027.

Figure 16: Projected Wastewater System Demand

	Fiscal Year	Million Gallons Per Day (avg)
Base	2007	2.25
1	2008	2.33
2	2009	2.43
3	2010	2.53
4	2011	2.63
5	2012	2.73
6	2013	2.83
7	2014	2.93
8	2015	3.03
9	2016	3.13
10	2017	3.23
11	2018	3.33
12	2019	3.43
13	2020	3.53
14	2021	3.64
15	2022	3.74
16	2023	3.84
17	2024	3.94
18	2025	4.04
19	2026	4.14
20	2027	4.24

TischlerBise developed the wastewater system demand projections utilizing factors from current system's usage. These factors are shown below in Figure 17.

Figure 17: Wastewater System Demand Projection Factors

Gallons per Residential Customer	170
Persons Per Household	2.38
Gallons per Person	72
Percentage of Future Housing Units as Sewer Customers	100%
Gallons from Nonresidential Development	1,496,137
Jobs	7,011
Gallons per Job	213
Nonresidenital Customers	625
Jobs per Nonresidential Customer	11

CAPITAL FACILITY PLAN

The wastewater impact fee uses a plan-based approach for system improvements. This is represented in the capital facility plan shown below. The cost for the wastewater system improvement is from information provided by the Siloam Springs Department of Public Works.

As shown below in Figure 18, the only growth-related wastewater capacity project the City plans over the next 20-years is a 900,000 gallon per day wastewater treatment facility expansion. The estimated cost of this project is $20 million. This results in a capital cost per gallon of capacity of $22.22.

Figure 18: Wastewater System Capital Facilities Plan

A. Treatment Projects

Project	*2007-2011*	*2012-2016*	*2017-2021*	*2022-2026*	***TOTAL***
WWTP-Phase II Expansion	$20,000,000	$0	$0	$0	$20,000,000
TOTAL	$20,000,000	$0	$0	$0	$20,000,000
Net Increase in Treatment Capacity from 2007 to 2026 (avg gal/day)					900,000
Cpaital Cost per Gallon of Capacity					$22.22

Source: City of Siloam Springs

WASTEWATER SYSTEM VEHICLES INCREMENTAL EXPANSION COMPONENT

The cost per demand unit for wastewater system vehicles and equipment is derived using an incremental expansion approach. Vehicle and equipment costs shown at the top of Figure 19

are based on information provided by the City on the cost of replacing existing vehicles and/or equipment in the department's inventory. As shown in Figure 19, the estimated replacement costs totals $475,300.

In order to determine the cost per demand unit for wastewater system vehicles, the total estimated replacement cost ($475,300) is divided by the current number of water customers (5,025), for a cost per connection of $94.59.

Figure 19. Wastewater System Vehicles Incremental Expansion Level-of-Service Standards

Division/Vehicles	*# of Units*	*Cost/ Unit#*	*TOTAL*
Sewer			
Dodge (truck)	1	$20,000	$20,000
Ford (truck)	1	$22,000	$22,000
Backhoe	1	$70,000	$70,000
Tractor	1	$11,000	$11,000
Mower	1	$12,000	$12,000
Dodge 1/2 Ton*	1	$10,000	$10,000
Air Compressor*	1	$9,000	$9,000
Backhoes*	3	$35,000	$105,000
Ford Van*	1	$7,000	$7,000
Ford 1 Ton Dump Truck*	1	$12,500	$12,500
Ford 1 Ton Crew Cab*	1	$12,500	$12,500
John Deere Tractor*	1	$7,500	$7,500
Jet Rodder*	1	$15,200	$15,200
1 3/4 Ton Dump Truck*	1	$17,500	$17,500
Chevy 1/2 Ton Service Truck*	1	$12,500	$12,500
Chevy 1/2 Ton 4x4*	1	$10,000	$10,000
Komatsu Track Hoe*	1	$115,000	$115,000
6" Trash Pump*	1	$6,600	$6,600
TOTAL	20		$475,300

LOS	
Vehicles/equipment per customer	0.0010
Demand Units	
Wastewater customers	5,025
Cost	
Per Customer	$94.59

City of Siloam Springs Public Works Department.
*Cost for these vehicles is split equally between water and sewer

WASTEWATER SYSTEM ADMINISTRATIVE SPACE EXPANSION COMPONENT

To adequately supply wastewater services to new development, the City of Siloam Springs also needs non-capacity items such administrative building space. These costs are allocated to cost per connection, since connections are the best proxy for affecting demand.

The cost per demand unit for wastewater system administrative space is derived using an incremental expansion approach. Administrative space is summarized at the top of Figure 20. As Figure 20 indicates, the City wastewater system currently utilizes 2,623 square feet of space and has a replacement value of $340,990, which is based on a replacement cost of $130 per square foot (provided by the City).

In order to determine the cost per demand unit for wastewater system administrative space, the total estimated replacement cost ($340,990) is divided by the current number of wastewater customers (5,025), for a cost per connection of $67.86.

Figure 20. Wastewater Administrative Space Incremental Expansion Level-of-Service Standards

Buildings	*Square Feet*	*Replacement Cost***
Sewer Administration*	2,623	$340,990
TOTAL	2,623	$340,990
Demand Units		
Sewer customers		5,025
Cost		
Per Customer		$67.86

* Includes the office and break room buildings and the maintenance shed.
** Provided by City staff

WASTEWATER CAPACITY FEE

Figure 21 provides a summary of the standards used to derive the wastewater capacity fees. Fees for nonresidential development are based on water meter sizes and their capacity relative to a one-inch meter. Capacity ratios convert the capacity fee for the average detached residential unit into a proportionate fee for larger meter sizes. The capacity ratios by meter size are from the American Water Works Association (i.e., maximum gallons per minute data from Manual 1, page 24).

Figure 21: Wastewater Capacity Fee Schedule

	Standards:
Cost Summary	
Gallons per Day per Residential Connection	170
Planned Treatment Projects Cost per Gallon	$22.22
Capital Cost per Gallon of Capacity	$22.22
Support Facilities Cost per Customer	$67.86
Support Vehicles & Equipment Cost per Customer	$94.59
Net Capital Cost per Customer	$162.45

Development Fees

All Development

Meter Size (inches)	*Type*	*Capacity Ratio*	*Capacity Total*	*Non-capacity Total*	*TOTAL*
0.75	Displacement	1.0	$3,786	$162	$3,948
1.00	Displacement	1.3	$4,922	$162	$5,084
1.50	Displacement	3.3	$12,499	$162	$12,661
2.00	Displacement	5.3	$19,984	$162	$20,146
3.00	Compound	11.0	$41,651	$162	$41,813
3.00	Turbine	12.0	$45,297	$162	$45,459
4.00	Compound	17.0	$64,335	$162	$64,497
4.00	Turbine	20.5	$77,606	$162	$77,768
6.00	Compound	33.0	$124,990	$162	$125,152
6.00	Turbine	41.2	$156,018	$162	$156,180
8.00	Compound	53.3	$201,947	$162	$202,109
8.00	Turbine	60.2	$227,813	$162	$227,975

-IMPLEMENTATION AND ADMINISTRATION-

All costs in the capacity fee calculations are given in current dollars with no assumed inflation rate over time. Necessary cost adjustments can be made as part of the recommended annual evaluation and update of capacity fees. One approach is to adjust for inflation in construction costs by means of an index like the one published by Engineering News Record (ENR). This index can be applied against the calculated capacity fee. If cost estimates change significantly the City should redo the fee calculations.

TischlerBise recommends accounting procedures to ensure capacity fee revenue is spent to substantially benefit new development. Monies received should be placed in a separate fund and accounted for separately and may only be used for the types of system improvements used to derive the capacity fees. Interest earned on monies in the separate capacity fee account should be credited to this fund.

Both sewer and water are citywide systems for which there is one collection and expenditure zone.