



RETAIL RATE STUDY

2017

UPDATED 5/3/17

LACOSTA ENVIRONMENTAL, LLC



**City of Graham
Water Rate Study
April 10, 2017**

Background

In 2017 the City of Graham contracted with LaCosta Environmental (LCE) to design retail water rates for the City that would cover the cost of providing retail water service based on budgeted projections for the year 2017.

The City of Graham (City) is a home rule municipality governed by an elected mayor and a four member City Council who appoint a City Manager. The City has one surface water treatment plant with a single water source, Lake Edelman. Pumps draw water from Lake Edelman, which is connected by a channel to Lake Graham, and discharge to the water treatment plant. Chemical treatment is added to the water as it enters the plant before going through flocculation, sedimentation and filtration. Water flows from the filters to storage tanks and is distributed to the system through a network of water mains. The City with a population of about 8,964 provides water service to approximately 4,500 customers. The City's customer base is primarily residential although approximately 35 percent of the water supplied is used by wholesale customers.

The City's Public Works department is responsible for the operation and maintenance of drinking water treatment and distribution. The City owns its source lake and does not purchase water. The City has multiple proprietary funds that account for the City's drinking water activities. For these rate-making purposes operating revenues and expenses will include respectively, charges to customers for water service and the costs associated with providing those services including administrative costs. These costs to operate and maintain the water treatment plant and distribution facilities are used determine the basis for the water rates charged to customers for water use.

The purpose of this report is to provide information and describe various alternatives for implementing a water rate structure for the City of Graham to cover costs and replace aging infrastructure based on the Fiscal Year 2017 budget. "Revenues are the lifeblood of a water utility. Without adequate revenues, the quality of service will deteriorate from the lack of proper maintenance and system improvements." ¹ A water rate change is generally recommended for the following reasons:

- Rate Stability
- Customer Understanding
- Revenue Stability
- Affordability for Essential Use
- Consistency with Drought Contingency Plan
- Promotion of Conservation
- Fairness to the Public

¹ American Water Works Association Manual of Water Supply Practices – Principles of Water Rates, Fees, and Charges (AWWA Manual M1), p. 11

Methodology

LCE referenced water utility ratemaking practices to calculate the proposed rates as promulgated by the American Water Works Association (AWWA) and described by the AWWA's "M1 Manual." For this Study, the proposed rates are designed to meet the current 2017 revenue requirements for the City using budgeted projections provided by the City.

A water rate structure is a schedule of fees designed to recover the utility's costs. The costs of providing drinking water to customers should be recovered fairly from customers in proportion to the cost to serve them. The City water utility must generate enough revenue, primarily from water sales, to ensure proper operation and maintenance (O&M), develop infrastructure, and preserve the utility's financial integrity.

The rate design study determines how service fee revenues will be collected from customers in a fair and equitable manner while also addressing the City's goals and objectives for pricing. This study's alternative rate structures are designed to fund the utility's 2017 projected costs of providing retail service while proportionally allocating costs among customer classes.

The adequacy of water revenues (the total revenues required by the utility to meet its cash expenses including O&M and capital related costs) was measured by comparing revenues generated under the City's existing rates with potential revenues generated under various alternative rate structures. The amount of water sales revenue was projected from water rates based on historical, metered, customer billing data and budget figures provided by the City. Although major capital improvements are typically debt financed, it is common practice² to finance a portion of the water utility's capital improvement program from annual revenues. Per the City's request, a reserve amount has been added to the projected utility cost of service.

Recommendations for Future Study

Most water use is considered to be relatively insensitive to the price of water (inelastic). However, some uses such as lawn watering and industrial sales may be more sensitive to changes in price. Rate increases may reduce water use. The number of customers served, water demand, inflation, and operating and maintenance conditions can change within a projection period. Therefore, the evaluation of past rate performance and projections of future rate adequacy require ongoing rate-making planning to project future revenue needs. Financial constraints with respect to reserves should be determined in accordance with accepted accounting practices and City policy. Future rate design should also include a consideration of residential (single family and mutli-family), commercial, industrial, and wholesale rates.

²American Water Works Association Manual of Water Supply Practices – Principles of Water Rates, Fees, and Charges (AWWA Manual M1), p. 33

Existing Rates

The basic components of the existing water rate schedule include a fixed minimum customer monthly charge based on meter size and an inclining tier volume charge for water use based on residential or wholesale volume. Use is determined by monthly water meter billing. The last water rate change occurred in 2016. Table 1 summarizes the number of water accounts and 2016 water use by meter size. Appendix A summarizes the current rate structure as set out by ordinance.

Table 1: Summary of Meter Sizes

Meter Size	Connections	Gals Billed
5/8	3483	239,827,600
3/4	4	146,700
1	398	46,451,118
1 1/2	181	32,248,400
2	130	14,753,200
4	14	5,547,200
6	3	207,800
TOTAL	4213	339182018

The current water rate structure consists of a fixed minimum customer monthly charge based on meter size and an inclining two tier volume charge for water use based on residential or wholesale volume. The projected 2017 water revenues for the City derived from fiscal year 2016 water sales at current rates are shown in Table 2 below.

Table 2: Revenues Projected from Current Rates

Meter Size	2016 Active Retail Meters	Gals Billed	Rate (thousand gals)				Gallons	Revenue	\$/Gallon	Gallons	Revenue	\$/Gallon	Gallons	Revenue	2016 Total Revenue
			0-2000	2000-10000	10000-100000	100000+ gals									
Retail															
5/8	3,483	239,827,600	\$18.00	\$3.42	\$4.14	8,968,000	\$62,884	\$0.00342	97,524,000	\$333,332	\$0.00414	135,437,600	\$560,712	\$956,938	
3/4	4	146,700	\$18.00	\$3.42	\$4.14	8,000	\$72	\$0.00342	112,000	\$383	\$0.00414	26,700	\$111	\$566	
1	398	46,451,118	\$22.50	\$3.42	\$4.14	796,000	\$8,955	\$0.00342	11,344,000	\$38,112	\$0.00414	34,511,118	\$142,876	\$189,944	
1 1/2	181	32,248,400	\$45.00	\$3.42	\$4.14	362,000	\$8,145	\$0.00342	5,068,000	\$17,333	\$0.00414	28,818,400	\$111,028	\$136,506	
2	130	14,753,200	\$70.00	\$3.42	\$4.14	260,000	\$9,100	\$0.00342	3,640,000	\$12,449	\$0.00414	10,853,200	\$44,932	\$66,481	
4	14	5,547,200	\$144.00	\$3.42	\$4.14	28,000	\$2,016	\$0.00342	392,000	\$1,341	\$0.00414	5,127,200	\$21,227	\$24,583	
6	3	207,800	\$198.00	\$3.42	\$4.14	6,000	\$594	\$0.00342	84,000	\$287	\$0.00414	117,800	\$488	\$1,369	
Total		339,287,018				8,426,000	\$91,576		117,964,000	\$403,437		212,892,018	\$881,373	\$1,376,186	
Wholesale															
4	3	\$7,834,400	\$1,680.00	\$3.42	\$3.42	6,000	\$5,040	\$0.00342	84,000	\$287	\$0.00342	\$7,744,400	\$197,486	\$302,813	
6	1	125,032,000	\$3,363.00	\$3.42	\$3.42	2,000	\$1,363	\$0.00342	28,000	\$96	\$0.00342	125,002,000	\$427,507	\$430,868	
Total		182,866,400				8,000	\$8,403		112,000	\$383		282,746,400	\$624,993	\$633,779	
Retail and Wholesale Total	8,217	\$22,148,418				8,434,000	\$99,979		118,076,000	\$403,820		295,638,418	\$1,506,366	\$2,010,165	

Water Fund operating and capital outlay expenses are projected to exceed water revenues under current water rates. Major capital improvements have recently been implemented and more are expected over the next five years. Additional revenues are required to balance the Water Fund.

Water Fund revenues generated from current rates and other revenues did not exceed operational and capital outlay expenses for Fiscal Year 2016 and the City has inadequate reserves to fund its related capital costs, therefore, if there are no rate changes in Fiscal Year 2017 the Water Fund would run an operational deficit and available reserves would not be sufficient to fund necessary expenses. Based on the City's estimates, the Water Fund will be unable to maintain fiscal sustainability and solvency under the current rates in future years.

Operating Expenses

Operating expenses consist of operation and maintenance (O&M) costs, capital costs, and capital repair and replacement reserves.

Water Fund variable costs are those O&M expenses that occur while providing water service. O&M expenses are projected to decrease from \$2.6 million in Year 2015 to \$2.3 million in Year 2017 based on budgeted projections. The City's preliminary Fiscal Year 2017 budget values were used as the basis for projecting O&M costs. Table 3 shows projected O&M expenses.

Table 3: Projected FY 2017 O&M Expenses

VARIABLE COSTS			
Water Fund		Acct 70	Budget
			FY2016-17
Administrative		500	
F	Personal Services	1	\$415,833
F	Materials & Supplies	2	\$32,250
F	Contract Services	3	\$367,801
F	Capital Outlay	4	\$0
F	Debt Service	5	\$0
F	Reserve		\$0
Rate Total*			\$815,884
Budget Total			\$837,057
Distribution/Maintenance		501	
V	Personal Services	1	\$292,445
V	Materials & Supplies	2	\$231,800
V	Contract Services	3	\$155,950
F	Capital Outlay	4	\$295,278
F	Debt Service	5	\$337,379
F	Reserve		\$0
Rate Total*			\$1,312,852
Budget Total			\$1,302,852
Treatment		502	
V	Personal Services	1	\$301,917
V	Materials & Supplies	2	\$168,450
V	Contract Services	3	\$272,350
F	Capital Outlay	4	\$0
F	Debt Service	5	\$1,180,069
F	Reserve		\$0
Rate Total*			\$1,922,786
Budget Total			\$1,948,122
Lakes		503	
V	Personal Services	1	\$0
V	Materials & Supplies	2	\$1,700
V	Contract Services	3	\$64,224
F	Capital Outlay	4	\$25,000
F	Debt Service	5	\$6,855
F	Reserve		\$0
Rate Total*			\$97,779
Budget Total			\$107,779
Total Expense			\$4,149,301
O&M Total			\$2,304,720
Total Capital/Debt			\$1,844,581
*rate total does not include category "Bad Debt"			
Retail Gals (thousand)		339,272	

Water Fund fixed costs are capital expenses generally associated with water related capital outlay and debt service expenses. Capital expenses are projected to decrease from \$7.7 million in Year 2015 to \$1.8 million in Year 2017 based on budgeted projections. The City's preliminary Fiscal Year 2017 budget values were used as the basis for projecting Water Fund capital costs. Table 4 shows projected fixed expenses.

Table 4: Projected FY 2017 Capital Expenses

FIXED COSTS			
Water Fund		Acct 70	Budget
Administrative		500	
F	Personal Services	1	\$415,833.00
F	Materials & Supplies	2	\$32,750.00
F	Contract Services	3	\$367,801.00
F	Capital Outlay	4	\$0.00
F	Debt Service	5	\$0.00
F	Reserve		\$0.00
	Rate Total*		\$815,884.00
	Budget Total		\$837,057.00
Distribution/Maintenance		501	
V	Personal Services	1	\$292,445.00
V	Materials & Supplies	2	\$231,800.00
V	Contract Services	3	\$155,950.00
F	Capital Outlay	4	\$295,278.00
F	Debt Service	5	\$337,379.00
F	Reserve		\$0.00
	Rate Total*		\$1,312,852.00
	Budget Total		\$1,302,852.00
Treatment		502	
V	Personal Services	1	\$301,917.00
V	Materials & Supplies	2	\$168,450.00
V	Contract Services	3	\$272,350.00
F	Capital Outlay	4	\$0.00
F	Debt Service	5	\$1,180,069.00
F	Reserve		\$0.00
	Rate Total*		\$1,922,786.00
	Budget Total		\$1,943,122.00
Lakes		503	
V	Personal Services	1	\$0.00
V	Materials & Supplies	2	\$1,700.00
V	Contract Services	3	\$64,224.00
F	Capital Outlay	4	\$25,000.00
F	Debt Service	5	\$6,855.00
F	Reserve		\$0.00
	Rate Total*		\$97,779.00
	Budget Total		\$107,779.00
	Total Expense		\$4,149,301
	O&M Total		\$2,304,720
	Total Capital/Debt		\$1,844,581
	*rate total does not include category "Bad Debt"		
	20% Reserve		\$368,916
	Total Fixed Costs		\$2,213,497
	Retail Meter Equiv		5006.4
	20% Reserve Base Rate		\$36.84

Capital Repair and Replacement (R&R) reserve costs are used primarily to meet the City's annual Water Fund capital improvement requirements. The ideal target for a capital reserve should be to have a reserve sufficient to fund a year's worth of capital costs which would ensure that necessary capital improvements are not delayed or deferred due to cash flow concerns.

At this time there appears to be no existing Water Fund reserve for capital expenses. A reserve based on 20 per cent of capital expenses at \$370,000 per year accumulated over a five year period will likely cover capital costs.

Rate Structure Options

LCE reviewed the current rate structure and consumption data as part of updating the City's rate structure for retail customers. Rates should reflect the actual cost of providing water. A customer with a higher than peak rate of use requires the utility to provide larger capacity pumps, pipes and other facilities. Increasing block rates recover class-specific costs of service while sending a conservation oriented price signal. The number and width of tiers allows the City to more accurately assign the cost of water use appropriately to customers.

Like the City's current rate structure, the proposed rates will include fixed minimum customer monthly charges (base rates) based on meter size and inclining tier volume charges (gallorage rates) for water use based on retail volumes. The City's base rate charges include a per account charge component based on operating costs that include capital and debt outlay plus a meter size charge component. The tiered rates for the gallorage charges increase as water consumption increases.

Fixed Costs in Rates

For fixed or capital related costs that are recovered through the City's proposed fixed meter charge or base rate, the costs are spread over all accounts and by meter size.

Variable Costs in Rates

Gallorage charges are allocated among customer classes based upon the demand they exert on the system. Costs are assigned to the various customer classes in proportion to the water service rendered. Individual customer demands vary depending on the volume of water used by the customer compared to peak use, which drives up the costs of sizing infrastructure to meet this demand.

Allocating the costs of service, as discussed in AWWA's M1 Manual, means grouping customers with similar system demands into customer classes. Rates are then developed for each customer class, with each individual customer paying the customer class proportionate allocated cost of service. Some specific costs are borne by specific classes based on the groups that use water at a peak rate. This is consistent with the additional cost of providing service because the City's water system is designed to meet peak demands. There are additional costs associated with designing, constructing and maintaining facilities required to meet these peak demands and these should be allocated to those customers whose water use requires the up-size facilities to meet peak demand.

Base Rate

LCE used the AWWA meter capacity ratios in calculating the meter component cost of the base rate. These costs are assigned based on meter size. Larger meters have the potential to demand more capacity and exert more peak demand than smaller meters. Table 5 shows the capacity ratios and costs allocated over the number of equivalent meters. The base rate is derived by taking the sum of fixed costs in the amount of \$2,213,497 and dividing that total by the number of weighted equivalent meters (5006).

Table 5: Meter Ratio Base Rate Charges

Retail		BASE RATE	\$23.00			
		AWWA Eq				
Meter Equiv	Meter Size	Weight	Base Rate	Accounts	Monthly	Annual
3483	5/8	1.00	\$23.00	3,483	\$80,109	\$961,308
4.4	3/4	1.10	\$25.30	4	\$101	\$1,214
557.2	1	1.40	\$32.20	398	\$12,816	\$153,787
325.8	1 1/2	1.80	\$41.40	181	\$7,493	\$89,921
377	2	2.90	\$66.70	130	\$8,671	\$104,052
196	4	14.00	\$322.00	14	\$4,508	\$54,096
63	6	21.00	\$483.00	3	\$1,449	\$17,388
Total 5006.4 Meters					Rev Generated	\$1,381,766

Gallage Rate

LCE generally proposes the implementation of a 5-tiered rate structure for Retail (Residential and Commercial) accounts. Tables 6 and 7 identify two 5-tier options.

Table 6: Option I

Tier	Gallons		Rate	% Total Gals	Gallons Billed FY 2016	Revenues
Tier 1	0	4000	3.42	5%	16,852,000	\$57,634
Tier 2	4001	10000	4.80	7%	25,278,000	\$121,334
Tier 3	10001	20000	6.79	17%	58,982,000	\$400,488
Tier 4	20001	30000	7.38	20%	67,408,000	\$497,471
Tier 5	30001		11.95	50%	170,752,018	\$2,040,487
						\$3,117,414

Table 7: Option II

Tier	Gallons		Rate	% Total Gals	Gals Bill FY2016	Revenues
Tier 1	0	4000	3.42	5%	16,852,000	\$57,634
Tier 2	4001	10000	4.86	7%	25,278,000	\$122,851
Tier 3	10001	30000	6.90	30%	101,112,000	\$697,673
Tier 4	30000	50000	9.79	32%	109,538,000	\$1,072,377
Tier 5	50000		13.91	25%	86,492,018	\$1,203,104
						\$3,153,689

The consumption and peak use characteristics of customers were analyzed to appropriately allocate costs between each tier. The first tier is designed to recover costs associated with providing water for basic indoor water needs. The second tier is designed to recover costs associated with providing reasonable and efficient outdoor water usage. The third, fourth, and fifth tiers are designed to recover costs associated with usage above peak use.

Indoor water use was approximated using billing data for the winter months of January and February when minimal outdoor water use occurs. This indoor use averages 3,900 gallons monthly for the City retail customer. The average water use overall used to approximate reasonable use is 6,700 gallons per month.

Peak use was determined by calculating the ratio between average day and maximum day use and using the percentage above average as a peaking threshold for the third tier. For 2016 the average day use was 2.9 million gallons (MG). The maximum day use for the City was 54% higher at 5.4 MG and this percentage increase applied to average use creates a peak use threshold of 10,332 gallons for Tier 3.

Customer Impact

Table 8 shows example water bills for each option for a 5/8" meter using 6700 gallons per month, 16,000 gallons per month, 36,000 gallons per month, and 58,000 gallons per month.

Table 8: Sample Water Bills

5/8 Meter	Gallons	Existing Rate	Option I	Option II
	6,700			
Base Rate		\$18.00	\$23.00	\$23.00
Gallonage Rate		\$16.07	\$26.64	\$26.80
Total Customer Bill		\$34.07	\$49.64	\$49.80
	16,000			
Base Rate		\$18.00	\$23.00	\$23.00
Gallonage Rate		\$47.88	\$83.22	\$84.24
Total Customer Bill		\$65.88	\$106.22	\$107.24
	36,000			
Base Rate		\$18.00	\$23.00	\$23.00
Gallonage Rate		\$120.60	\$255.88	\$239.58
Total Customer Bill		\$138.60	\$278.88	\$262.58
	58,000			
Base Rate		\$18.00	\$23.00	\$23.00
Gallonage Rate		\$120.60	\$518.78	\$274.06
Total Customer Bill		\$138.60	\$541.78	\$510.92

Conclusion

Water Fund operating and capital outlay expenses are projected to exceed water revenues under current water rates. The City's Water Fund will not be able to maintain fiscal sustainability and solvency under the current rates in the future.

Like the City's current rate structure, the proposed rates will include an inclining fixed minimum customer monthly charge (base rate) based on meter size and an inclining tier volume charge (gallonage rate) based on retail volume of water used. This rate study recommends implementation of a fixed customer charge (base rate) that is assessed to all accounts based on meter size on a monthly basis and serves as a minimum charge even when no water is used. The base rate will provide a stable source of revenue that is not influenced by fluctuations in water use.

A healthy reserve fund balance covers fluctuating cash flow and allows actual expenditures to exceed actual revenues during an individual year. The City's recommended goal may want to consider maintaining a fund balance equivalent to 20 percent of capital outlay costs. A fund reserve is recommended to provide a contingency for unexpected capital costs and replacement programs.

Rate increases may reduce water use. The number of customers served, water demand, inflation, and operating and maintenance conditions can change within a projection period. Therefore, the evaluation of past rate performance and projections of future rate adequacy require ongoing rate-making planning to project future revenue needs. Financial constraints with respect to reserves should be determined in accordance with accepted accounting practice. Rate design should also include a consideration of residential (single family and multi-family), commercial, industrial, and wholesale rates. Re-evaluation of rates every year is recommended to assess the adequacy of rates for keeping pace with inflation and capital improvement expenditures.

Disclaimer

The recommendations presented in this Rate Study represent a combination of the best information available from the City and LCE's expertise. The Rate Study relies in part on assumptions about future events and events beyond the control of the project team. This Rate Study is solely intended to support the City's decision-making process with regard to water rates and cannot ensure how much water revenue will actually be generated.

Appendix A

ORDINANCE NO. 1052

AN ORDINANCE AMENDING CERTAIN SECTIONS OF CHAPTER 25 OF THE CITY OF GRAHAM CODE OF ORDINANCES, PRESCRIBING WATER AND SEWER RATES, AND DECLARING AN EMERGENCY.

BE IT ORDAINED by the Governing Body of the City of Graham, Texas that:

Section 1. Section 25-13 of the Code of Ordinances is hereby amended to read as follows:
(a) The following monthly charges are hereby fixed as the rates to be charged to and paid by all retail and residential users of treated water within the corporate limits of the city and outside the corporate limits of the city, except that treated water contracted for by rural water supply systems (wholesale customers) shall be charged at the wholesale rate.

- (1) An effective rate per 1000 gallons of \$5.01 developed as follows:
- (2) First 2,000 gallons, minimum charge..... based on meter size as follows:

5/8 inch.....	\$ 18.00
¾ inch.....	\$ 18.00
1 inch.....	\$ 22.50
1 1/2inch...	\$ 45.00
2 inch.....	\$ 70.00
4 inch.....	\$144.00
6 inch.....	\$198.00

- (3) All over 2,000 gallons will be charged at the following rates:

2,000-30,000 gallons	\$3.42 per thousand gallons
30,000+ gallons	\$4.14 per thousand gallons

(b) Wholesale customers will be charged the following monthly rates:

- (1) An effective rate per 1000 gallons of \$3.91 developed as follows:
- (2) First 2,000 gallons, minimum charge..... based on meter size

5/8 inch.....	\$67.00
¾ inch.....	\$101.00

1 inch.....	\$168.00
1 1/2inch...	\$336.00
2 inch.....	\$538.00
3 inch.....	\$1,009.00
4 inch.....	\$1,680.00
6 inch.....	\$3,363.00

(3) All over 2,000 gallons, per thousand gallons will be charged at the following rates:

2,000-30,000 gallons	\$3.42 per thousand gallons
30,000+ gallons	\$3.42 per thousand gallons

Section 2. All other provisions and sub-sections contained in Chapter 25 of the Code of Ordinances shall remain in full force and effect and in nowise be affected by this ordinance.

Section 3. It is hereby declared that an emergency exists and the Charter requirement for three separate readings of Ordinances is suspended; and this ordinance shall be in full force and effect upon its passage by the unanimous vote of the full Council body.

READ, PASSED, APPROVED and ADOPTED this the ____ day of _____ 2016.

ATTEST:

John Chiles Graham, Mayor

Sharon McFadden, City Secretary