



# Memorandum

September 25, 2018

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To:	Fieldbrook Glendale Community Services District	Ref. No.:	11159235
From:	Alex Crowe	Tel:	707.443.8326
CC:	Rebecca Crow, PE; Neal Carnam, PE		
<b>Subject:</b>	<b>FGCSD Rate Study – Alternative Rate Structure Options</b>		

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## INTRODUCTION

The Fieldbrook Glendale Community Services District (FGCSD or District) contracted with GHD to conduct an assessment and evaluation of the District's existing sewer rates and to develop alternative rate structures to meet system revenue requirements. The District's current sewer rate structure and rate increase schedule was implemented in 2006. There currently exists a large deficit between Sewer system expenses and revenues, thus the District requires an alternative rate structure in order to adequately fund sewer utility operations and projected capital costs. An ideal rate structure covers all operational expenses through changes that are fair and equitable for the customers. In order to do this, an accurate projection of future operational expenses is required, and various practical options are assessed for consideration.

FGCSD operates and maintains a wastewater collection system and discharges to the City of Arcata for wastewater treatment and disposal. The System was constructed in 1989 – 1990 and includes approximately 4 miles of sewer force mains and 4.8 miles of gravity sewer mains and two pump stations. Over the past few years the District has experienced a significant increase in operational expenses. The main source for this is the increased cost for sewer treatment and disposal paid to the City of Arcata.

The District is billed by the City of Arcata as an individual customer for sewage service. There is a small base rate, but the majority of the cost is based on sewage flow volumes discharged to be treated. Recently, the District recognized a significant increase in this expense and began investigating the cause. It was found that the City of Arcata significantly increased their sewer rates to address problems within their system and the District was not notified of the increase. Once the District realized the increase in rates for sewerage service, this study was commissioned.

As the wastewater charges are based on flow, one area investigated to control costs was determining if sewer flows had increased and why. This is a common occurrence for aging sewer systems and it is typically due to increased inflow and infiltration (I/I). Inflow is stormwater entering a sewer system at points of direct connection. These sources are typically improper and/or illegal connections to the sewer system, such as roof drains. Infiltration is groundwater entering a sewer system through cracks and/or leaks in the sewer pipes. These can occur over time due to ground settlement or movements caused by earthquakes. Several I/I issues were discovered during these investigations, and the issues are currently being addressed by the District through various capital improvement projects and ongoing system evaluations. I/I is something that needs to be addressed regularly.



These investigations also found that the sewer system has a problem with nonbiodegradable items, such as baby wipes and plastics, including sanitary products that should be disposed of with solid waste at the landfill instead of into the sewer system. The issue caused by nonbiodegradable items is that they will clog up pumps and other mechanical equipment, resulting in higher maintenance costs.

While there has been a slight increase in wastewater flow volumes, the main reason for the increases in expenses is due to the increasing sewer rates, adopted by the City of Arcata in 2014. Arcata has been increasing sewer rates by approximately 10% annually, while FGCS D has only been increasing rates by approximately 2% annually, the amount equivalent to the Consumer Price Index (CPI), per District Ordinance 2000-02. This has created a large revenue gap between the amount District customers are charged for the sewer utility, and the amount the District pays the City of Arcata for the service.

## **REVENUE REQUIREMENT**

At the June Board meeting, FGCS D Board of Directors reviewed a draft of the five year budget projection for the District's Sewer fund. This budget was updated based on board comments and updated annual budget totals for FY 2017-18. The updated budget projection is shown in Table 1. This projection was developed through a review of the expenses outlined in the 2015, 2016, and 2017 audited financial reports, as well as information provided by the City of Arcata on the District's monthly sewer flows to the City. Figure 1 and Table 2 show a breakdown of the various cost components, along with the revenues under the current rate structure.

The District's near-term capital improvement needs are shown in Table 3. Recently, the District has incurred capital improvement expenses due to investigation and mitigation of the I/I issue as well as the replacement of one of the District's main pumps (costing approx. \$30,000). In addressing the I/I issue, the District expects to see some reduction in the flow volume for treatment.

In order to budget for future capital improvement projects, an estimated annual capital improvement expense has been set at 33% of the system's depreciation value. Depreciation is an accounting value that takes into account the cost and expected life of the various components of the system. If you were to collect 100% of the depreciation amount every year, you would accumulate enough funds to replace the entire system when it has reached the end of its "life". The majority of the system's value is in the sewer pipes and manholes. These have depreciation lives estimated at 40 years, even though they will actually last much longer. What generally happens as a practical matter is that if money is spent to maintain these components they can last 100 years or more. Other components that need to be replaced, like pumps and valves, are included in the future capital improvement projects. For this system the current annual depreciation value is \$93,819 so an annual capital improvement expense of \$30,960 is recommended and included in the annual budget for this rate study.

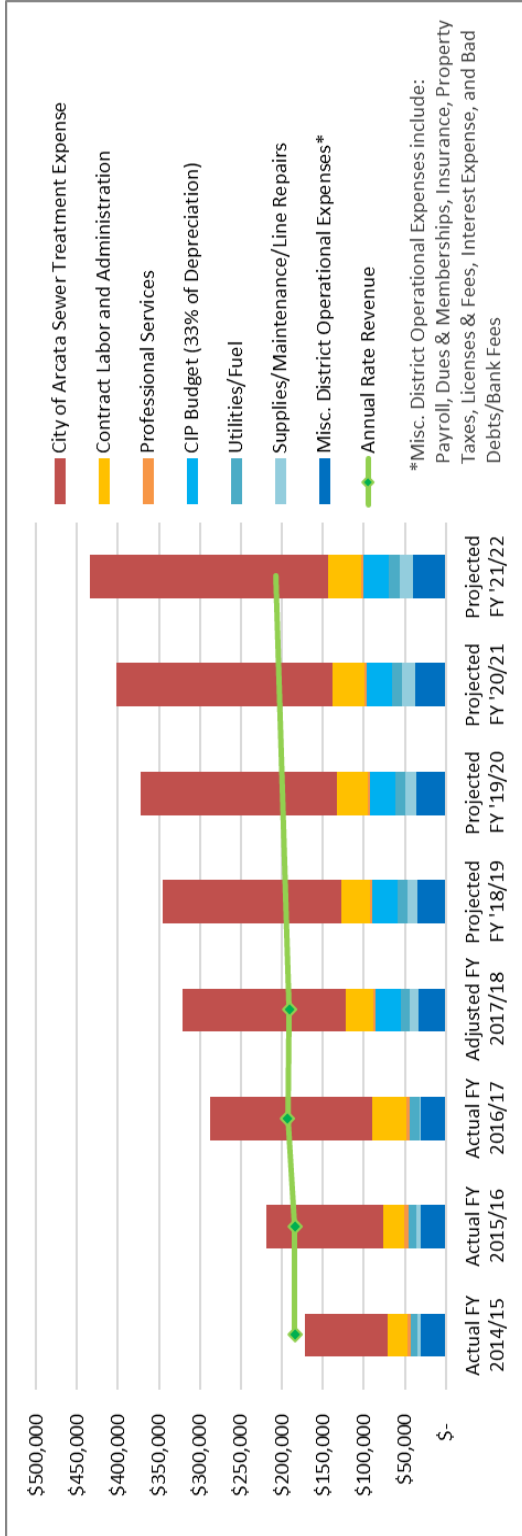


**Table 1. 5 Year Budget Projection (8.20.2018 update)**

LINE ITEM	Fixed %	Variable %	Projected Annual Change	(July 2018) Adjusted FY 2017/18	Projected FY 2018/19	Projected FY 2019/20	Projected FY 2020/21	Projected FY 2021/22
Payroll	100	0	5.0%	\$ 23,590	\$ 24,770	\$ 26,008	\$ 27,308	\$ 28,674
Sewer Treatment	20	80	10.0%	\$ 198,239	\$ 218,063	\$ 239,869	\$ 263,856	\$ 290,242
Contract Labor and Administration	100	0	5.0%	\$ 33,661	\$ 35,344	\$ 37,111	\$ 38,967	\$ 40,915
Professional Services	100	0	0%	\$ 2,402	\$ 2,402	\$ 2,402	\$ 2,402	\$ 2,402
Dues and Memberships	100	0	7.0%	\$ 4,880	\$ 5,222	\$ 5,587	\$ 5,978	\$ 6,397
Insurance	100	0	2.0%	\$ 571	\$ 582	\$ 594	\$ 606	\$ 618
Utilities	0	100	6.0%	\$ 10,973	\$ 11,631	\$ 12,329	\$ 13,069	\$ 13,853
Fuel	0	100	2.0%	\$ -	\$ -	\$ -	\$ -	\$ -
Property Taxes	100	0	0%	\$ 324	\$ 324	\$ 324	\$ 324	\$ 324
Supplies	50	50	0%	\$ 1,270	\$ 1,270	\$ 1,270	\$ 1,270	\$ 1,270
Maintenance/Line Repairs	50	50	10.0%	\$ 10,486	\$ 11,535	\$ 12,688	\$ 13,957	\$ 15,353
Bad Debts/Bank Fees	100	0	0%	\$ 192	\$ 192	\$ 192	\$ 192	\$ 192
Interest Expense	100	0	0%	\$ -	\$ -	\$ -	\$ -	\$ -
Licenses & Fees	100	0	0%	\$ 3,067	\$ 3,067	\$ 3,067	\$ 3,067	\$ 3,067
33% of Depreciation	100	0	0%	\$ 30,960	\$ 30,960	\$ 30,960	\$ 30,960	\$ 30,960
Other Expenses	100	0	0%	\$ -	\$ -	\$ -	\$ -	\$ -
Non-operating Revenue (Capital Investment)	100	0	0%	\$ -	\$ -	\$ -	\$ -	\$ -
Other Revenues (Fees, Grants, etc.)	100	0	0%	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Annual Operating Budget</b>	<b>50%</b>	<b>50%</b>		<b>\$ 320,615</b>	<b>\$ 345,362</b>	<b>\$ 372,402</b>	<b>\$ 401,957</b>	<b>\$ 434,266</b>



Figure 1. & Table 2. District Sewer Utility Operational Expenses and Rate Revenues



\*Misc. District Operational Expenses include: Payroll, Dues & Memberships, Insurance, Property Taxes, Licenses & Fees, Interest Expense, and Bad Debts/Bank Fees

LINE ITEM	Actual FY 2014/15	Actual FY 2015/16	Actual FY 2016/17	Actual FY 2017/18	Actual FY 2018/19	Actual FY 2019/20	Adjusted FY 2017/18	Projected FY '18/19	Projected FY '19/20	Projected FY '20/21	Projected FY '21/22
City of Arcata Sewer Treatment Expense	\$ 101,176	\$ 142,692	\$ 198,228	\$ 198,239	\$ 218,063	\$ 239,869	\$ 198,239	\$ 218,063	\$ 239,869	\$ 263,856	\$ 290,242
Contract Labor and Administration	\$ 23,884	\$ 26,048	\$ 40,910	\$ 33,661	\$ 35,344	\$ 37,111	\$ 33,661	\$ 35,344	\$ 37,111	\$ 38,967	\$ 40,915
Professional Services	\$ 4,312	\$ 4,323	\$ 4,937	\$ 2,402	\$ 2,402	\$ 2,402	\$ 2,402	\$ 2,402	\$ 2,402	\$ 2,402	\$ 2,402
CIP Budget (33% of Depreciation)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 30,960	\$ 30,960	\$ 30,960	\$ 30,960
Utilities/Fuel	\$ 7,045	\$ 9,597	\$ 11,157	\$ 10,973	\$ 11,631	\$ 12,329	\$ 10,973	\$ 11,631	\$ 12,329	\$ 13,069	\$ 13,853
Supplies/Maintenance/Line Repairs	\$ 4,622	\$ 5,391	\$ 1,236	\$ 11,756	\$ 12,805	\$ 13,958	\$ 11,756	\$ 12,805	\$ 13,958	\$ 15,227	\$ 16,623
Misc. District Operational Expenses*	\$ 30,451	\$ 30,895	\$ 30,960	\$ 32,624	\$ 34,157	\$ 35,772	\$ 32,624	\$ 34,157	\$ 35,772	\$ 37,476	\$ 39,272
<b>Annual Operating Budget</b>	<b>\$ 171,490</b>	<b>\$ 218,946</b>	<b>\$ 287,428</b>	<b>\$ 320,615</b>	<b>\$ 345,362</b>	<b>\$ 372,402</b>	<b>\$ 320,615</b>	<b>\$ 345,362</b>	<b>\$ 372,402</b>	<b>\$ 401,957</b>	<b>\$ 434,266</b>
<b>Annual Rate Revenue</b> (Projections assume 2% annual increases)	\$ 183,971	\$ 184,595	\$ 192,744	\$ 191,124	\$ 194,946	\$ 198,845	\$ 191,124	\$ 194,946	\$ 198,845	\$ 202,822	\$ 206,879
<b>Annual Operating Deficit</b>	\$12,481	<b>(\$34,351)</b>	<b>(\$94,684)</b>	<b>(\$129,491)</b>	<b>(\$150,415)</b>	<b>(\$173,557)</b>	<b>(\$129,491)</b>	<b>(\$150,415)</b>	<b>(\$173,557)</b>	<b>(\$199,134)</b>	<b>(\$227,388)</b>

\*Misc. District Operational Expenses include: Payroll, Dues and Memberships, Insurance, Property Taxes, Licenses & Fees, Interest Expense, and Bad Debts/Bank Fees



**Table 3. Future Capital Improvement Projects (to be addressed within the next 5 years)**

Location	Equipment	Condition	Needs	2017 Est. Cost	Timeframe
Pump Station #1	Generator	Good	Generator Building	—	—
	Pump 1	Good	Replaced 2016	—	—
	Pump 2	30 years old	Refurbish? Send to factory TBD	\$15,000	1-5 years
	Backup Pump	Refurbished 30 year old Pump #1	Finalize refurbish (or not) ?		
Pump Station #2	Pump 1	Good	Replaced 2013	—	—
	Pump 2	30 years old	Replace	\$10,000	1-5 years
	Generator	Mobile backup generator available at Fire House. This generator will need to be replaced to meet current Air Board Standards.	Not considered critical, as this Pump Station's wet well and inflow line have the capacity to hold flows until temporary generator can be purchased.		Long-term
Both Lift stations	Wet wells	Partially filled with sediment/grease	Need to be pumped out and cleaned of sediment and grease. Coordinate with City of Arcata.	TBD	Next 2 years
	Telemetry System	Not working, if any	<ul style="list-style-type: none"> <li>Minimum: add light to signal if there is an issue, or other alert/messaging system.</li> </ul>	\$2,000	1-2 years
			<ul style="list-style-type: none"> <li>Alternate upgrade telemetry for pump tail/high water level alarms.</li> </ul>	TBD	TBD
Sewer System Lines	Multiple locations (approx. 6)	TBD	Hydro & Camera sewer lines to determine their condition.	TBD	Summer 18
Air Relief Valves	12 Air Relief Valves from Glendale to Arcata	Annual maintenance has not been regularly performed. Sewer technician is starting the process and, as of May 2018, one unit was found working and a second unit was found to be leaking. The condition of the remaining Air Relief Valves should be evaluated and a regular maintenance schedule set up.	Inspect, clean, and replace Air Relief Valves if needed. Equipment from City of Arcata would be needed.	TBD	Next 2 years
			Obtain one backup Air Relief Valves new to have on hand.	approx. \$1,200 ea.	Next 2 years



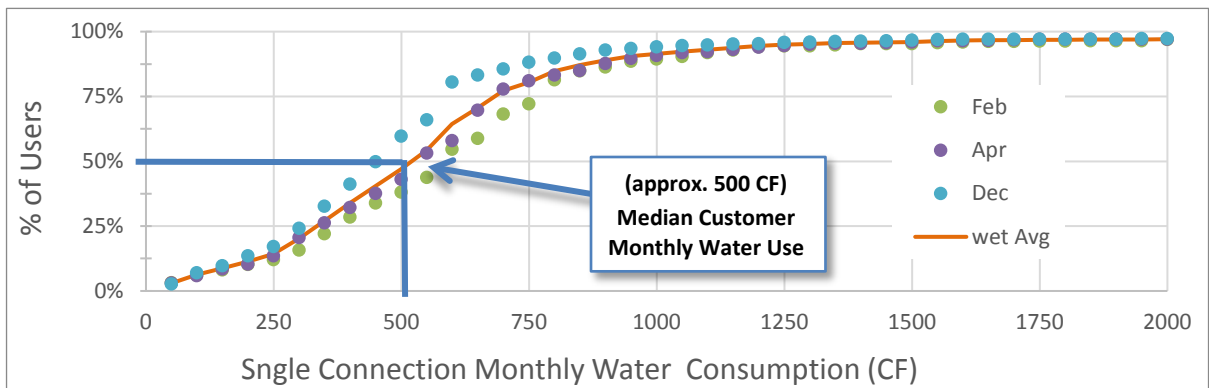
## RATE ANALYSIS

The primary objective in designing a new rate structure is to increase District income to meet the revenue requirement; this can be done in various ways. The secondary objective in designing a new rate structure is to create a structure that is fair and equitable. This rate analysis examines the various customer classes utilizing the service to determine a fair structure that equitably allocates the revenue requirement across customer classes.

The budget projected for FY 2018/2019 is approximately \$344,000. Using this as the revenue requirement, or target income to achieve from District sewer rate revenue, five alternative rate structures were developed. Several rate structures incorporate a volumetric charge for sewer service based on water use which is described further below.

Figure 2 shows the distribution of customers by level of consumption. From this we can see that the median customer water use is approximately 500 CF per month. A low water use customer consumes approximately 300 CF per month, a high water use customer consumes approximately 800 CF per month, and a very high use customer consumes 1500 CF per month (only approximately 5% of customers are above this). These customer benchmarks are used to evaluate the effects of different rate structures on different customer types.

**Figure 2. Wet Month Cumulative Frequency Chart**



Note that the analysis presented in Figure 2 uses only measurements taken in wet months (November through April). This is because water consumption measurements during these months more accurately reflect customer sewer flows.

Table 4 and Figure 3 show District sewer utility customers' monthly water use information, including the percent difference between wet and dry flows. Figure 4 shows a comparison of the District's flows, as metered by the City of Arcata, versus the metered water use of the District sewer utility customers. In reviewing the seasonal variations, it is recommended the District include a 15% summer water use allowance. This would mean that District customers will be billed based on 85% of their actual water

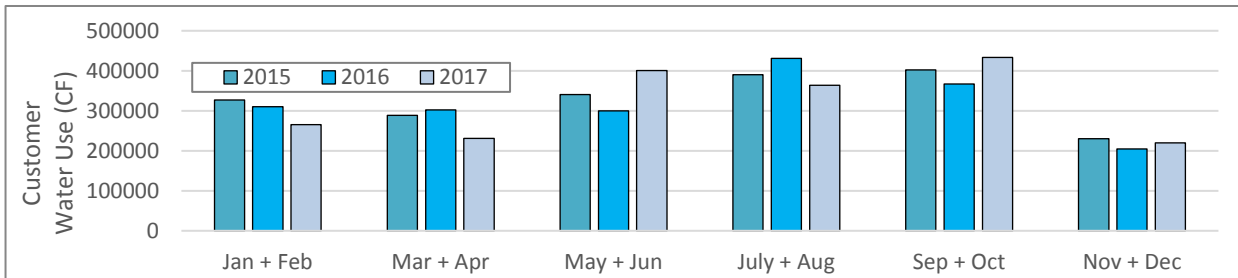


consumption during the dry season from May 1 - October 31. This adjustment has been made in the current set of rate models.

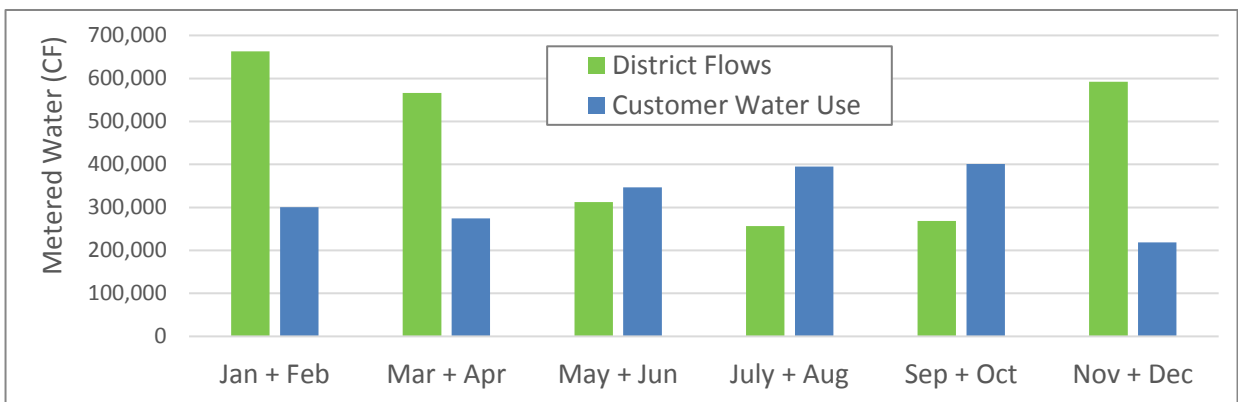
**Table 4. Seasonal Comparison of Individual District Customer Monthly Metered Water Use 2015-2017**

	Wet Month (Nov-Apr) Average Water Use	Dry Month (May-Oct) Average Water Use	% Difference
3-yr. All Customers:	640 CF	910 CF	17%
3-yr. Domestic only:	630 CF	880 CF	17%
2017 (Domestic)	550 CF	850 CF	21%
2016 (Domestic)	650 CF	880 CF	15%
2015 (Domestic)	690 CF	930 CF	15%

**Figure 3. District Customer Bi-Monthly (2 Month) Metered Water Use for 2015, 2016, & 2017**



**Figure 4. 2015-2017 Average Bi-Monthly District Flows vs Customer Use**



In order to most accurately examine and predict the impact of each alternative rate structure, annual scenarios were modeled using actual FGCS D sewer customers' metered water consumption measurements from 2017, with a 15% allowance for summer water use. Given that each model is set to achieve the same amount in revenue, the value of the **average** bill for an individual customer will be approximately the same amount for each alternative; however, several variables in how the rates are structured will determine how District revenues are collected from individual customers. The following sections describe the existing rates and five alternative rate structures.



**Existing FGCS D Sewer Rate Structure**

The current rate structure has one base rate for all customers, and business customers pay a base rate up to 1600 CF of water use, with an additional fee for use exceeding that amount, per 100 CF of water consumed (per 2-month metering cycle). This rate analysis assumes that the District will revert to monthly billings based on actual meter readings.

**Table 5. Current FGCS D Rate Structure (FY 2017 / '18)**

Customer Type	Base Rate per Service Connection	Consumption included with Base per 2-month cycle (CF)	Use Rate (per 100 CF)
Domestic:	\$70.36	-	-
Business:	\$70.36	1600	\$6.86

Calculated Annual Revenue	Revenue Source Breakdown	
\$189,987	from base:	\$181,529 96%
	from variable:	\$8,458 4%

Table 6 summarizes the various alternative rate models developed, and provides examples of customer bills for each tier of water use. The sections below present each rate alternative:

**Alternative 1- Current flat rate structure, mainly increasing base rates.**

Base Rate: \$130.17 (85% Increase)  
 Use rate: \$7.00 (2% Increase)

This alternative examines the scenario of making no changes to the structure of the existing rates. This alternative would retain the flat rate for all customers, with a use rate applied to business customers exceeding 800 CF per month. This alternative includes the current typical annual increase to the use rate of 2% (only applied to business customers), but would require a base rate increase of 85% to meet the revenue goal. Although not included as an alternative here, the option of extending the current business rate structure across all customer types was also investigated. That scenario was found to require a base rate increase of 70% (to \$119.61).

**Alternative 2- All consumption billed (0 Consumption included in Base Rate).**

Base Rate: \$70.36 (0% Increase)  
 Use rate: \$9.54 (39% Increase)

Alternative 2 maintains the current base rate and adds a use rate for all sewer volumes and does not include any water use allocation in the base rate. This structure would encourage water conservation and customers would have the greatest control over monthly bills.

**Alternative 3- Base rate includes 200 CF of customer water consumption.**

Base Rate: \$91.47 (30% Increase)  
 Use rate: \$8.51 (24% Increase)

This alternative provides a rate scenario with a small amount of consumption included in the base rate. Approximately 11% of current District customers use less than 200 CF of water per month.





**Alternative 4- Base rate includes 400 CF of customer water consumption (same as City of Arcata).**

Base Rate: \$100.61 (43% Increase)  
 Use rate: \$9.40 (23% Increase)

This alternative examines implementing a rate structure with 400 CF of monthly consumption included in the base rate. Approximately 34% of current District customers use less than 400 CF of water per month.

**Alternative 5- Base rate includes 200 CF of customer water consumption.**

Base Rate: \$70.36 (0% Increase)  
 Use rate: \$12.83 (87% Increase)

This alternative provides a rate scenario with a small amount of consumption included in the base rate, while still maintaining the current base rate. This alternative results in the lowest monthly costs for low use customers, but the highest monthly costs for larger water users.

**Table 6. Summary of Alternative Rates Structures and Monthly Customer Billing**

	Base Rate Increase	85%	0%	30%	43%	0%
	Use Rate Increase	2%	39%	24%	37%	87%
Rate Structure Options:	Existing	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Monthly Base Rate	\$70.36	<b>\$130.17</b>	<b>\$70.36</b>	<b>\$91.47</b>	<b>\$100.61</b>	<b>\$70.36</b>
Usage Rate (per 100 cubic feet)	\$6.86*	<b>\$7.00*</b>	<b>\$9.54</b>	<b>\$8.51</b>	<b>\$9.40</b>	<b>\$12.83</b>
Consumption Included in Base Rate (CF)	800*	<b>800*</b>	<b>0</b>	<b>200</b>	<b>400</b>	<b>200</b>
Base Rate Revenue (Fixed):	96%	97%	53%	69%	75%	53%
Use rate Revenue (Variable):	4%	3%	47%	31%	25%	47%
Low User Monthly Bill (user @ 300 CF/month)	\$70.36	\$130.17	\$98.97	\$99.97	\$100.61	\$83.19
Median User Monthly Bill (user @ 500 CF/month)	\$70.36	\$130.17	\$118.04	\$116.99	\$110.01	\$108.84
High User Monthly Bill (user @ 800 CF/month)	\$70.36	\$130.17	\$146.64	\$142.51	\$138.21	\$147.33
Very High User Monthly Bill (user @ 1500 CF/month)	\$135.53*	\$179.15*	\$213.39	\$202.05	\$204.00	\$237.13
<b>Calculated Annual Revenue</b>	<b>\$189,987</b>	<b>\$344,456</b>	<b>\$344,473</b>	<b>\$344,169</b>	<b>\$344,488</b>	<b>\$344,673</b>
Customers with Monthly Use under the Base Consumption amount	98%	98%	0%	11%	34%	11%

\*only applied to business connections

Following District review and public discussion, a new rate structure can be selected for inclusion in a new rate ordinance. The new ordinance should also include a “pass through” provision for increases in charges adopted by the City of Arcata and an annual increase to account for increases in the CPI.