YOLO COUNTY PUBLIC WORKS DEPARTMENT

EL MACERO WASTEWATER COST ANALYSIS

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EXECUTIVE SUMMARY

The El Macero County Service Area ("El Macero" or CSA) receives water and wastewater services from the City of Davis (the "City"). In 2007 the City began to base wastewater charges on average monthly water use from November through February. This is a fairly common industry practice, and assumes that all water used during this period is predominantly indoor use, and therefore enters the collection system for treatment. El Macero claims the City's method is overcharging them for wastewater services because they have large lots that require irrigation during winter months. Yolo County (the "County") commissioned Bartle Wells Associates (BWA) to analyze if El Macero's claims have merit and, if so, to develop a potential alternative methodology to be proposed to the City.

BWA first performed a billing comparison between El Macero residents and an average City resident. This comparison shows that an El Macero resident consistently pays significantly more than an average City customer. Furthermore, an analysis of winter water use indicates the probability that El Macero residential water use in these months is predominantly indoors is incredibly small. When the proportion of water volume used for billing is compared to relative lot sizes, there is a very high probability that these proportions are the same. This strongly indicates that the higher water use by El Macero residents in the winter months is used for irrigation purposes, and therefore does not return to the collection system for treatment but either infiltrates into soil, runs off or evaporates.

The current billing methodology employed by the City is based on winter water use. While generally a more accurate and just methodology for cost recovery from individual customers, this process has several extra unique billing steps as applied to the CSA and eliminates much of the accuracy and resolution of the winter water use method's intent. This means it is not a suitable method, in general, for the City's block use customers, like El Macero.

In considering a more effective billing methodology to mitigate the overcharging of El Macero residents for wastewater that isn't treated, three options were considered. They were:

1. Establish a cap for winter water usage when assessing future El Macero sewer billings based on the City's current rate and an upper 95% of average City resident usage
2. Charge the County for El Macero residents at the average City resident usage based on the City's current rate
3. Charge the County for El Macero's proportional share of sewer expenses based on population

Based on the analysis, Option 3 (population ratio) may be the best option for all parties involved. It is easy to calculate, simple to implement as a billing option and most efficiently recovers costs of service for a block user group, like the El Macero County Service Area. Of the other two, Option 2 (average winter water use) would be more favorable to Option 1 (establishing a cap) simply because it requires fewer calculation steps. However, all three options effectively resolve the issue in dispute—the current billing method employed by the City is overcharging El Macero residents for sewer use based on water used for irrigation purposes and is therefore not entering the treatment system.

INTRODUCTION

The El Macero County Service Area ("El Macero" or CSA) is in Yolo County (the "County") just adjacent to the City of Davis (the "City"). El Macero consists of 410 single family homes, 37 condominiums, a club house and a golf course. The City provides water and wastewater services to all El Macero residents and facilities.

In 2007 the City began to base wastewater charges on winter water usage. The principle behind this methodology is that during winter months, commonly November through February, a typical household's water use is predominantly indoor usage and therefore enters the collection system for treatment. This is a fairly common industry practice and is generally more equitable in cost-of-service distribution than older methods; however the assumption of predominant indoor water use during this time period isn't always accurate and can vary region-to-region, or even house-to-house, depending upon several factors.

El Macero claims the City's methodology is including water used for irrigation in their sewer service charges. The County can demonstrate El Macero residents have larger lots on average than City residents that require more irrigation during the winter months. Thus, not all water usage enters the collection system for treatment.

The County commissioned Bartle Wells Associates (BWA) to analyze the City's current billing methodology in relation to the CSA's concerns. This report evaluates billings, per capita usage, and lot sizes then draws upon the findings to make a reasonable, independent conclusion. BWA was able to acquire some data from the City and some from the County. The analysis requires a minimum of three consecutive years of data—data from 2009/10 through 2011/12 is used. Each table that follows will have any additional assumptions noted.

BILLING COMPARISON

Before determining if lot size and other factors are skewing the City's billing of sewer services, BWA must first establish whether or not the City's methodology may potentially be overcharging the CSA. The best approach is to compare the average billing per residential customer for both City and El Macero residents. This section discusses the current billing methodology used by the City, compares average billings, and discusses the findings of the average billing approach.

Current Billing Methodology

The City currently bills its residential sewer customers based upon three types of rates. For residential cost recovery the City bills fixed charges as a Base Rate for administration costs and a Unit Rate to recover costs associated with wastewater strength factors. In addition to the fixed charges, the City also bills a Volume Rate based upon the average of metered water use, in hundred cubic feet (hcf), during the winter months from November through February. This charge is to recover costs associated with wastewater flow. Therefore, a typical residential sewer bill will have the following components:

1. Base Rate Charge to recover administrative costs
2. Unit Rate Charge to recover costs with treating wastewater strength
3. Volume Rate Charge to recover costs associated with actual flow

One of the major advantages of the City's current billing methodology is that it allocates cost-of-service more accurately among customer classes. In general, consumers within a customer class are more accurately billed for their actual usage. It allows for specific users to be billed specifically for their use. Other, older methodologies will generalize the usage of a particular customer class and all members within that class will pay proportionately the same, regardless of actual individual use. Thus, winter water use billing increases the resolution of individual behavior and thereby more accurately recovers costs; assuming that all water used during the four winter months is indoor usage and is returned to the collection system for treatment. This methodology does not provide a more accurate measure of recovering sewer service costs if a significant amount of water is used outdoors during the winter months.

Currently, the City will read water meters during the winter months to set the wastewater rate for the following year. Then the City will bill each City customer bi-monthly and directly. For the El Macero CSA, the City bills the County in 6 month increments. The County will then collect the fee from the CSA. The CSA will treat the bill as a block rate and divide the charge amongst the home owners. This process has several extra steps than the process by which the City bills its residents and eliminates much of the accuracy and resolution of the winter water use method's intent. This means it is not a suitable method, in general, for the City's block use customers, like El Macero.

Compared Average Billings

This section evaluates the average billings for City and El Macero residents. Table 1 gives an annual residential customer count supplied by the City. El Macero accounts are just over one percent of total residential accounts served.

Table 1: Residential Customer Count

Description	2009/10	2010/11	2011/12
Davis Single Family Residences	14,576	15,032	14,602
Davis Multi Family Residences	23,763	21,228	24,146
El Macero SFR	410	410	410
El Macero Condo	37	37	37
Total	38,786	36,707	39,195
El Macero Units	447	447	447
Percent El Macero Units	1.15%	1.22%	1.14%

Source: City of Davis, Yolo County

Table 2 calculates the average winter water use used for billing for the average City residential customer. The average City residential customer is billed for sewer use of about five hcf of water use. That is to say, the average City residential customer uses about five hcf of water each month from November through February. This is the volume that establishes the monthly flow used in sewer collection billings for the next year.

Table 2: Average Davis Winter Water Use

	2009/10		2010/11		2011/12 *	
	Nov/Dec	Jan/Feb	Nov/Dec	Jan/Feb	Nov/Dec	Jan/Feb
Total Bi-Monthly Residential Winter Water Use (hcf)	416,997	349,525	381,639	348,016	410,738	348,016
Average Monthly Residential Winter Water Use (hcf)	208,499	174,763	190,820	174,008	205,369	174,008
Total Residential Units (From Table 1)	38,786	38,786	36,707	36,707	39,195	39,195
Average Residential Monthly Winter Water Use per Unit (hcf)	5.38	4.51	5.20	4.74	5.24	4.44
Average Used for Annual Billing per Unit (hcf)		4.94		4.97		4.84

* Usage data for Jan/Feb 2012 is assumed to be equal to data from Jan/Feb 2011
Source: City of Davis

Table 3 calculates the average City residential monthly sewer bill based on the average flow calculated in Table 2. The Fixed Rates are the sum of the Base Rates and the Unit Rates. The Volume Rate is the Residential Volume Rate times the Average Use in hcf. The total is the sum of the Fixed Rates and the Volume Rates. For the past three years, the average Davis single family residence has paid less than $35 per month for sewer service.

Table 3: Davis Average Annual Billing

	2009/10	2010/11	2011/12
Base Rate			
Single Family	$2.57	$2.68	$2.67
Condo	$2.57	$2.68	$2.67
Unit Rate			
Single Family	$17.76	$18.46	$18.44
Condo	$13.52	$14.05	$14.04
Residential Volume Rate	$2.49	$2.54	$2.69
Average Use in hcf (From Table 2)	4.94	4.97	4.84
Average Billing			
Fixed Rate Billing			
Single Family	$20.33	$21.14	$21.11
Condo	$16.09	$16.73	$16.71
Volume Rate Billing	$12.30	$12.62	$13.02
Total Average Bill			
Single Family	$32.63	$33.76	$34.13
Condo	$28.39	$29.35	$29.73

Source: City of Davis

Table 4 performs two functions: 1) Calculates the average monthly bill for an El Macero resident; and 2) Compares the average billings between a City and an El Macero average resident. The average monthly billing for an El Macero resident is significantly larger, and consistently at least 50% more than that of an average City resident.

Table 4: Billing Comparison			
	2009/10	2010/11	2011/12
Annual El Macero Billing	$297,000	$280,000	$280,000
Total El Macero Units (From Table 1)	447	447	447
Annual Bill per El Macero Unit	$664.43	$626.40	$626.40
Monthly Bill per El Macero Unit	$55.37	$52.20	$52.20
Davis Average Bill per Single Family (From Table 3)	$32.63	$33.76	$34.13
Difference in Monthly Billings	$22.74	$18.44	$18.07
Percent Difference in Billings	69.7%	54.6%	53.0%
Source: Yolo County			

Table 5 performs a statistical *t-test* on the relative billings. The results show there is a significant difference between what an average El Macero resident pays for sewer service compared to an average Davis resident. The resulting *p*-value indicates there is a 0.08% probability that these billings are the same. This means that all El Macero residents are billed in the upper 99.92% of Davis area customers.

Table 5: Statistical *t-test* on Billings	
Average El Macero Monthly Billing	53.26
Average Davis Resident Monthly Billing	33.51
El Macero Billing Standard Deviation	1.83
Davis Resident Billing Standard Deviation	0.78
Number of Samples	3
t-test Degrees of Freedom (n1+n2)-2	4
t-test Value	17.20
t-test 95% Significance Value	2.78
p-value	0.0008

The results of the average billing comparison indicate there may be excessive billing to the El Macero County Service area, and in turn to individual El Macero residents. The next section looks at per capita water usage for both City and El Macero residents to discern if El Macero residents use more water on average than City residents.

WINTER WATER USE COMPARISON

The results from the Compared Average Billing section indicate the El Macero average sewer bill is significantly larger than that of the average City resident. The question now becomes does an El Macero resident use more water than a City resident, on average. Table 6 uses the City's billing rates and the annual El Macero billings to derive the winter water use billed to the CSA. The results show that El Macero residents are billed for about 13.8 hcf, on average. This value is almost three times that of an average City resident, as shown in Table 2 and Table 7.

Table 6: El Macero Per Unit Water Use

	2009/10	2010/11	2011/12
Base Rate			
Single Family	$2.57	$2.68	$2.67
Condo	$2.57	$2.68	$2.67
Unit Rate			
Single Family	$17.76	$18.46	$18.44
Condo	$13.52	$14.05	$14.04
Residential Volume Rate	$2.49	$2.54	$2.69
El Macero Unit Count			
Single Family	410	410	410
Condo	37	37	37
Revenue From Base Rate *			
Single Family	$12,600	$13,200	$13,100
Condo	$1,100	$1,200	$1,200
Total	$13,700	$14,400	$14,300
Revenue From Unit Rate *			
Single Family	$87,400	$90,800	$90,700
Condo	$6,000	$6,200	$6,200
Total	$93,400	$97,000	$96,900
Total Billed *	$297,000	$280,000	$280,000
Amount Billed for Volume *	$203,600	$183,000	$183,100
Amount Billed for Volume per Unit per Month	$38	$34	$34
Monthly Volume Billed per Unit (hcf)	15.3	13.4	12.6
Average Monthly Volume Billed per Unit (hcf)			13.8

* Values are rounded to nearest $100's
Source: City of Davis, Yolo County

The results from Table 6 indicate that El Macero resident winter water usage may not be being used for the same purposes as City residents. If we assume an average City resident's winter water use is predominantly indoors, and is the average indoor use for all people living in the same region, then we can test if an average El Macero's resident's winter water use is also predominantly indoors by using a statistical *t-test*.

Table 7 calculates the *t-test* value to be approximately 11.33. For us to be 95% sure the water use is similar requires a value less than 2.78. This means the probability value (*p*-value) is only 0.76% that the average per capita El Macero residential winter water use is the same as a Davis resident. Conversely, we can say all El Macero residential winter water use is in the highest 99.24% of all Davis residential usage.

Table 7: Statistical *t-test* on Winter Water Usage

	hcf
Davis Average Winter Water Use Billed per Unit (From Table 2)	4.92
Davis Winter Water Use Standard Deviation	0.07
El Macero Average Winter Water Use Billed per Unit (From Table 6)	13.76
El Macero Winter Water Use Standard Deviation	1.35
Number of Samples	3
t-test Degrees of Freedom (n1+n2)-2	4
t-test Value	11.33
t-test 95% Significance Value	2.78
p-value	0.0076

The results of the per capita water use comparison indicate that the winter water use in the CSA is not being used in the same way as winter water use for City residents, and thus may not be entering the collection system for treatment. The next section looks at the potential of yard irrigation accounting for the water use discrepancy by comparing lot sizes proportionally to billings.

LOT PROPORTIONS

This section investigates the possibility that the disproportionate billing from extensive water use established in the previous sections is due to irrigation. One way to check this is to compare proportionality of average lot sizes between City single family residential (SFR) lots and El Macero SFR lots with the proportionality of billings.

Table 8 compares the average SFR lot sizes and calculates a proportionality of El Macero SFR lots to City SFR lots. We assume the average City lot size is 1/6th of an acre, or about 7,200 square feet. This is generally consistent with typical zoning policy for urban areas. The results show the average El Macero SFR lot is typically about 2.3 times larger than their City counterparts. This seems reasonable considering El Macero is more rural.

Table 8: Average Lot Size Comparison

	Lot Size (Sqft)
Average Davis SFR Lot Size *	7,200
Average El Macero SFR Lot Size	16,475
Proportionality of El Macero Lots to Davis Lots	2.29

* Assumed to be 1/6th of an acre
Source: Yolo County Assessor's Office

Table 9 uses information presented in Table 3 and Table 4, and compares the billings for volume charges only; that is to say the Unit Rate and the Base Rate have been removed from the monthly billings. The table establishes the proportion of billings for volume used and the average over three years. This average proportional volume billing shows that on average El Macero homes are typically charged about 2.57 times that of an average City home.

Table 9: Proportional Billing of Volume Usage			
	2009/10	2010/11	2011/12
Average Davis Monthly Volume Billing *	$12.30	$12.62	$13.02
Average El Macero Monthly Volume Billing **	$35.04	$31.06	$31.09
Proportional Volume Billing El Macero to Davis	2.85	2.46	2.39
Average Proportional Volume Billing			2.57

* From Table 3
** Billing from Table 4 less fixed charges from Table 3

From Table 7, we've established that a typical El Macero resident uses significantly more water in winter months than a typical City resident. And, if we make the assumption that a typical City resident's winter water use is predominantly indoors, and is a typical amount of water for any such individual living in that region, we can assume the extra water used by an El Macero resident is not used entirely for indoor use. The purpose of Table 10 is to perform a *z-test* to test if there is no difference between the extra billing proportion and the lot sizes.

Table 10: Statistical Analysis of Lot Ratio to Billing Proportion	
Average Proportional Billing (from Table 8)	2.57
Proportional Billing Standard Deviation	0.25
Lot Ratio (from Table 7)	2.29
z-test	0.65
z-critical value	1.96
p-value	0.242

The *z-test* value is significantly less than the z-critical value, which means there is a good probability that the difference in billings is proportional to the difference in lot sizes. This, in turn, would significantly imply that the extra winter water usage is in fact going to irrigation purposes and not entering the collection system for treatment.

BILLING ALTERNATIVES

In considering the discrepancy with the City's sewer billing system as it relates to El Macero residents, some alternate billing methodologies might be appropriate to ensure an equitable cost recovery for the City and a fair payment for services from the County on behalf of El Macero. While there are several different possible approaches, this report only considers the following three alternatives:

1. Establish a cap for winter water usage when assessing future El Macero sewer billings
2. Charge the County for El Macero residents at the average City resident usage
3. Charge the County El Macero's proportional share of sewer expenses based on population

The following sections discuss each alternative listed above in terms of benefits and trade-offs. A final comparison is made between the three alternatives to arrive at a reasonable recommendation.

Winter Water Use Cap

Establishing a cap for winter water use that's allowable for sewer billing can be relatively easy to determine and apply. In this example, BWA uses the average and the standard deviation of the previous three years' average winter water use for City residents and sets the cap at the 95th percentile of usage. This means that all El Macero residents will be charged the equivalent of the top 5% of an average City residential water use variation for sewer service. Table 11 provides an example of how it would be calculated for sewer billings beginning in March 2012.

Table 11: Winter Water Use Cap for El Macero Billing

	2009/10	2010/11	2011/12
Davis Average Winter Water Use (hcf/month) (From Table 2)	4.94	4.97	4.84
Davis Three-Year Average			4.92
Standard Deviation			0.07
El Macero Winter Water Billing Cap (average + 1.96 * standard deviation)			5.05

Table 12 gives an example calculation of the annual revenue generated from the winter water cap approach. This example assumes the Unit Rate for a single family residence is applied to all El Macero units and does not discern between condo or house.

Table 12: Capped Revenue from El Macero	
	2011/12
El Macero Winter Water Billing Cap (hcf)	5.05
El Macero Units	447
Base Rate	$2.67
Total Annual Base Rate Collected	$14,321.88
Unit Rate *	$18.44
Total Annual Unit Rate Collected	$98,912.16
Volume Rate	$2.69
Total Annual Volume Rate Collected	$72,871.07
TOTAL ANNUAL REVENUE	$186,105.11
* Applies Single Family Unit Rate to all El Macero connections	

The benefits of this approach are as follows:

1. Calculation can be done in Excel
2. Uses actual water use data and can track community conservation over time
3. Uses higher percentile to account for possibly more fixtures on larger premises.

The trade-offs of this approach are as follows:

1. Requires staff time to perform research and calculation
2. Assumes El Macero residents inherently use more indoor water than most City residents
3. Low standard deviation allows for low variation, so the "cap" becomes the actual bill

Average Winter Water Use

Using the annual average winter water usage of City residents to charge El Macero residents for sewer services is very similar to the Winter Water Use Cap methodology described previously, except that it puts the winter water use at the current average for each year. Table 13 shows an example of how this methodology would be applied.

Table 13: Average Use Revenue from El Macero			
	2009/10	2010/11	2011/12
Davis Average Winter Water Use (hcf/month)	4.94	4.97	4.84
El Macero Units	447	447	447
Base Rate	$2.57	2.68	2.67
Total Annual Base Rate Collected	$13,785.48	$14,375.52	$14,321.88
Unit Rate *	$17.76	$18.46	$18.44
Total Annual Unit Rate Collected	$95,264.64	$99,019.44	$98,912.16
Volume Rate	$2.49	$2.54	$2.69
Total Annual Volume Rate Collected	$65,989.94	$67,706.62	$69,831.50
TOTAL ANNUAL REVENUE	$175,040.06	$181,101.58	$183,065.54
* Applies Single Family Unit Rate to all El Macero connections			

Inspection of the 2011/12 revenue from this approach and compared with the Winter Water Use Cap approach is an annual difference of approximately $3,000 between these two methodologies. The advantage of this approach over the Winter Water Use Cap is that there are two less calculation steps required. In general, this makes using the Average Winter Water Use approach easier to apply without sacrificing significant revenue. The overall benefits are as follows:

1. Easier calculation than Winter Water Use Cap calculation and can be done in Excel
2. Uses actual water use data and can track potential community conservation over time
3. Does not sacrifice significant revenue in trade for accuracy

The trade-offs of this approach are as follows:

1. Requires some staff time to determine average winter water use
2. Assumes no single El Macero resident uses more indoor water than an average City resident
3. Bills El Macero residents based on larger community usage

Population Ratio

This approach diverges significantly from the previous two, in that it doesn't rely on water use at all, but rather takes the annual sewer enterprise expenses and bills the CSA a portion of the costs based on the population percentage of El Macero residents to City residents. The principle behind this approach is that each El Macero resident pays their exact proportion of costs for service. Table 14 provides an example of how the population ratios are calculated.

Table 14: Population Ratios			
Population	2009/10	2010/11	2011/12
El Macero *	989	989	989
Davis **	62,947	65,705	66,016
El Macero Population Percentage	1.57%	1.51%	1.50%

* Source: El Macero Home Owner's Association Internal Count
** Source: United States Census Bureau

Table 14 shows that the El Macero population is around 1.5% of total population of City residents. Table 15 provides an example of how the CSA would be billed based upon the population percentage of the sewer enterprise's total annual expenses.

Table 15: Population Ratio Revenue			
	2009/10	2010/11	2011/12
Total Sewer Expenses *	$5,801,400	$6,602,400	$6,764,500
Population Ratio (From Table 13)	1.57%	1.51%	1.50%
El Macero Billings	$91,100	$99,400	$101,300

* Rounded to nearest $100. Source: City of Davis Budgets

Table 14 shows this is significantly less revenue than the other two methods discussed. However, this method is easy to calculate and pays for a fair share of operations and maintenance and capital costs associated with providing service. An alternative approach would be to use the enterprise's revenue requirements instead of expenses if cash financings for large projects are required or if reserves need to be replenished.

The benefits of this methodology are as follows:

1. Easiest option to calculate and implement
2. El Macero residents pay their fair share of cost-of-service on the whole
3. Compliant with State Water Resources Control Board's revenue program guidelines

The only real trade-off from this approach is that it does require a minimal amount of staff time to implement, however this is significantly less than the other two alternatives. One trade-off may be the reduced revenue, but in 2011/2012 the sewer enterprise's revenue requirements were approximately $13 million. If based on this figure, this methodology would have raised only about $80,000 less than the current methodology.

Comparative Analysis

This section summarizes, compares and contrasts the three alternative methodologies. Three criteria are used for ranking each option. They are:

1. Ease of calculation and implementation.
2. Accurately recovers costs for services for the City
3. Resolves the issue of dispute between the two parties

Table 16 provides a matrix for the comparison and ranks them in order from 1 to 3, with 1 being the best of the three and 3 being the least best of the three. It also lists calculated revenue examples for each option for the 2011/12 metering year.

Table 16: Comparative Analysis of Options

Option	2011/12 Revenue	Ease of Calculation	Accurate to Cost of Service	Resolves Water Use Issue
Winter Water Use Cap	$186,100	3	2	1
Winter Water Use Average	$183,100	2	2	1
Population Ratio	$101,300	1	1	1

Ease of Calculation and Implementation

The population ratio option is the easiest to calculate and implement. It merely requires one step to research the populations, one step to create the proportionality and one step to create the bill. The other two options are more complex, yet relatively easy compared to physical meter reading. However, they each require a spreadsheet program to evaluate the winter water use average, and then require additional calculations to include the Base and Unit rates.

Accurately Recovers Cost of Service

If costs-of-services are represented by expenses or revenue requirements, the population ratio is the best option because it recovers an exact share based on actual users. Obviously it is impractical to bill everyone in this manner, but for block user groups it is highly efficient for cost recovery. The other two options do recover costs sufficiently and are marginally equal to each other, but make broad assumptions about the El Macero residents, and are thus less efficient for block user groups.

Resolves Issue of Dispute

All three resolve the issue of dispute—sewer billings are including water used for irrigation and not recaptured by the system. Although the first two still rely on water usage, it removes the focus from the individual watering requirements of El Macero's large lots (for which the City's Water Enterprise will charge the CSA accordingly) and normalizes the bills to a local average. The population ratio option is completely removed from water use.

CONCLUSION

The billing comparison shows that El Macero residents are consistently paying significantly higher sewer bills than average City residents. Furthermore, an analysis of winter water use indicates that El Macero residents do, in fact, use more water in these months; however the probability that their water use in these months is predominantly indoors is incredibly small. When the proportion of water volume used for billing is compared to relative lot sizes, there is a very high probability that these proportions are the same. This strongly indicates that the higher water use by El Macero residents in the winter months is used for irrigation purposes, and therefore does not enter to the collection system for treatment but either infiltrates into soil, runs off or evaporates.

The current billing methodology employed by the City is based on winter water use. While generally a more accurate and just methodology for cost recovery from individual customers, this process has several extra unique billing steps as applied to the CSA and eliminates much of the accuracy and resolution of the winter water use method's intent. This means it is not a suitable method, in general, for the City's block use customers, like El Macero.

In considering a more effective billing methodology to mitigate the overcharging of El Macero residents for wastewater that isn't treated, three options were considered. They were:

1. Establish a cap for winter water usage when assessing future El Macero sewer billings
2. Charge the County for El Macero residents at the average City resident usage
3. Charge the County El Macero's proportional share of sewer expenses based on population

Based on the analysis, Option 3 (population ratio) may be the best option for all parties involved. It is easy to calculate, simple to implement as a billing option and most efficiently recovers costs of service for a block user group, like the El Macero County Service Area. Of the other two, Option 2 (winter water use average) would be more favorable to Option 1 (establishing a cap) simply because it requires fewer calculation steps. The capped option is a marginal third. However, all three options do effectively resolve the issue in dispute—the current billing method employed by the City is overcharging El Macero residents for sewer use based on water used for irrigation purposes and is therefore not entering the treatment system.