Rate Structure Analysis and Proposal for Willits, Calif.

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Introduction

The following analysis will demonstrate that the current water rate structure used in Willits is inappropriate in 2 ways. First, it gives a relative advantage to customers with a large amount of usage per connection. Secondly, the per-unit cost of water actually decreases with increased usage. Both of these trends discourage the conservation of water. In essence it means that those who use less water are de facto subsidizing those who use more. Based on this analysis, we will propose an alternative rate structure that would resolve these problems.

Problems with the current structure

Currently, the water customers are charged in the usual manner with a combination of base charge + water usage. The base charge is determined by the meter size of the connection according to the following chart:

Meter size	Base charge
5/8" x 3/4"	$21.80
3/4"	$32.70
1"	$54.50
1 ½"	$109.00
2"	$174.40
3"	$348.80
4"	$490.50
6"	$1090.00

Water usage is billed at a "flat" rate of $2.30 per unit (=748 gallons).

The following set of tables shows a representative cross-section of current billing rates (albeit for single-family connections only – which, however, represents 50% of the overall water usage in Willits). This data reflects the current price structure with a base rate of $21.80/mo. plus $2.30/unit. The first table assumes a usage level of 2 units per user in the household. The next assumes 3 units/user and the next assumes 4 units/user. The tables clearly show that the per-user-cost decreases as the number of users per household increases. Similarly, the overall per-unit cost decreases with increased usage regardless of the number of users per connection.

Current Fee Structure:

base	$ 21.80
per unit	$ 2.30

#units/user -----> 2

#users	bill amount	per user	per unit
1	$ 26.40	$ 26.40	$ 13.20
2	$ 31.00	$ 15.50	$ 7.75
3	$ 35.60	$ 11.87	$ 5.93
4	$ 40.20	$ 10.05	$ 5.03
5	$ 44.80	$ 8.96	$ 4.48
6	$ 49.40	$ 8.23	$ 4.12

#units/user -----> 3

#users	bill amount	per user	per unit
1	$ 28.70	$ 28.70	$ 9.57
2	$ 35.60	$ 17.80	$ 5.93
3	$ 42.50	$ 14.17	$ 4.72
4	$ 49.40	$ 12.35	$ 4.12
5	$ 56.30	$ 11.26	$ 3.75
6	$ 63.20	$ 10.53	$ 3.51

#units/user -----> 4

#users	bill amount	per user	per unit
1	$ 31.00	$ 31.00	$ 7.75
2	$ 40.20	$ 20.10	$ 5.03
3	$ 49.40	$ 16.47	$ 4.12
4	$ 58.60	$ 14.65	$ 3.66
5	$ 67.80	$ 13.56	$ 3.39
6	$ 77.00	$ 12.83	$ 3.21

The previous tables demonstrate that de facto we have a tiered-rate system. However, unlike the usual notion that a tiered rate typically implies an increase in charge with an increase in usage, this system actually means you effectively pay less (per unit) the more water you use.

To make this point clear, we will consider the impact on billing that an evenly distributed charge would have. Using the 2006/2007 budget figures, we assume a total usage revenue of $1,700,000. The average per unit charge would thus be $4.43 (based on the actual meter usage of 880 acre ft. in 2006). The following chart demonstrates the impact of the current billing structure, which results in a grossly unfair distribution of expense.

#units	current charge	at $4.43/unit	saving/mo.	saving/yr.
0	$ 21.80	$ -	$ 21.80	$ 261.60
1	$ 24.10	$ 4.43	$ 19.67	$ 236.04
2	$ 26.40	$ 8.86	$ 17.54	$ 210.48
3	$ 28.70	$ 13.29	$ 15.41	$ 184.92
4	$ 31.00	$ 17.72	$ 13.28	$ 159.36
5	$ 33.30	$ 22.15	$ 11.15	$ 133.80
6	$ 35.60	$ 26.58	$ 9.02	$ 108.24
7	$ 37.90	$ 31.01	$ 6.89	$ 82.68
8	$ 40.20	$ 35.44	$ 4.76	$ 57.12
9	$ 42.50	$ 39.87	$ 2.63	$ 31.56
10	$ 44.80	$ 44.30	$ 0.50	$ 6.00
11	$ 47.10	$ 48.73	$ (1.63)	$ (19.56)
12	$ 49.40	$ 53.16	$ (3.76)	$ (45.12)
13	$ 51.70	$ 57.59	$ (5.89)	$ (70.68)
14	$ 54.00	$ 62.02	$ (8.02)	$ (96.24)
15	$ 56.30	$ 66.45	$ (10.15)	$ (121.80)
16	$ 58.60	$ 70.88	$ (12.28)	$ (147.36)
17	$ 60.90	$ 75.31	$ (14.41)	$ (172.92)
18	$ 63.20	$ 79.74	$ (16.54)	$ (198.48)
19	$ 65.50	$ 84.17	$ (18.67)	$ (224.04)
20	$ 67.80	$ 88.60	$ (20.80)	$ (249.60)

The negative savings amounts in the chart for connections using 11 units/mo. or more show the level at which this usage is being subsidized by customers using less than the average. Thus, the customer that only uses 3 units/mo., for example, pays $184.92/yr. more than their fair share, whereas another customer using 20 units/mo. pays $249.60/yr. less than their fair share. The same analysis can be applied to the users with any meter size.

A Corrective Proposal

This proposal assumes that a sharp differential in per-user-cost for the same amount of water usage is grossly unfair. More importantly, it also assumes that, in order to encourage water conservation, the per-unit cost should not decrease with usage.

Based on the preceding analysis, we conclude that the application of a base rate in the monthly billing process leads inevitably to an unjust distribution of cost across the customer base and should therefore be dropped altogether. Instead, a single unit cost should be applied that is calculated to cover all current water usage revenues (and is adjusted for future increases in system operating costs, maintenance and enhancements) – as the above charts indicate.

However, in order to encourage water conservation further, we think that the unit cost should also be based on the amount of water conservation that the city needs to target in order to avoid unnecessary increases in water supply. So, for example, if the city sets the goal of achieving 38% water savings over the current average usage level of 886 acre ft. per year, it would need to base its calculations on a usage level of 549 AF. This would

mean that the cost per unit would have to be set at $7.10. Thus, we would adjust our previous table as follows:

#units	current charge	at $7.10/unit	saving/mo.	saving/yr.
0	$ 21.80	$ -	$ 21.80	$ 261.60
1	$ 24.10	$ 7.10	$ 17.00	$ 204.00
2	$ 26.40	$ 14.20	$ 12.20	$ 146.40
3	$ 28.70	$ 21.30	$ 7.40	$ 88.80
4	$ 31.00	$ 28.40	$ 2.60	$ 31.20
5	$ 33.30	$ 35.50	$ (2.20)	$ (26.40)
6	$ 35.60	$ 42.60	$ (7.00)	$ (84.00)
7	$ 37.90	$ 49.70	$ (11.80)	$ (141.60)
8	$ 40.20	$ 56.80	$ (16.60)	$ (199.20)
9	$ 42.50	$ 63.90	$ (21.40)	$ (256.80)
10	$ 44.80	$ 71.00	$ (26.20)	$ (314.40)

This table indicates that even with the increased unit cost, those users below the targeted conservation rate could save money, whereas profligate users would pay more.

> *Note: The rate calculated and applied in our example is based on past billing. It may not be sufficient to cover projected operating expenses in the future and additional charges required for infrastructure maintenance and improvements.*

Will this be unfair to large families?

As has been pointed out already, the current billing system is disproportionately slanted in favor of single connections with higher usage. While it is true that larger households will be paying more under the proposed rate structure, it is also true that it would be easier for larger families to save more water, since, for example, they share a yard and other water needs such as washing dishes. If a large family is able to manage their water budget wisely they will be able to reduce their bill and save money. For example, the (close to statistically average) family of 3 that now uses 3 units per person and pays $42.50/mo. would pay $42.60/mo. according to the new flat rate of $7.10/unit, if they were able to cut their consumption back to 2 units/person/mo. – which is what we would want to encourage them to do. Note also that applying a similar scheme to multi-user dwellings will have a much more dramatic impact on making the rate system fair, since they would typically be paying disproportionately less per unit under the current rate structure.

What would we do with the potential extra revenue?

The proposal to restructure fees to cover operating costs with the targeted level of water conservation does imply that revenues could increase significantly, if users do not decrease their usage for whatever reason. This means that the water agency would accumulate capital, which might not be allowed under current regulations. We are assuming, though, that this extra capital could be set aside and/or used to cover current and future water projects that are required for system maintenance and enhancements or for any future projects to acquire new sources of water, should our conservation efforts fail to be sufficient. This only means that those who refuse to conserve will also be those

who bear the lion's share of costs required to expand the system because of their profligate habits. That would only seem to be the fair way to go. Why should those who make the effort to conserve be forced to pay the increased fees that are caused by those who do not?

In conclusion

The summary of suggested changes is as follows:

1. The base charge should be dropped.
2. The cost per unit should be based on the projected system operating costs and the desired amount of water usage according to the targeted level of conservation.
3. Any surplus income for water use overage, should be used to finance ongoing and/or future system enhancements.
4. The proposed rate restructuring must be accompanied by a serious education and outreach program and should be complemented with a financial aid program to help lower-income families retrofit their homes with water conserving features and appliances. This will be discussed in detail in the context of another proposal.