RAFTELIS
FINANCIAL CONSULTANTS, INC.

Ventura Water

Water Shortage Rate Study

Final Report | May 2015

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May 6, 2015

Ms. Shana Epstein
General Manager
Ventura Water
P.O. Box 99, 336 Sanjon Road
Ventura, CA 93002

Subject: Water Shortage Rate Study Report

Dear Ms. Epstein:

Raftelis Financial Consultants, Inc. (RFC) is pleased to provide this Water Shortage Rate Study Report (Report) for the City of San Buenaventura – Ventura Water (City).

The major objectives of the study include the following:

1. Develop conservation targets for each customer class for each of the five mandatory water shortage stages
2. Develop Water Shortage Rates which incorporate the mandatory reductions in customer consumption associated with each Stage and include any incremental operating costs (or reductions in costs) associated with each stage
3. Demonstrate the impact of water shortage rates on typical residential customer bills

The Report summarizes the key findings and recommendations related to the development of the Water Shortage Rates.

It has been a pleasure working with you, and we thank you and the City staff for the support provided during the course of this study.

Sincerely,

RAFTELIS FINANCIAL CONSULTANTS, INC.

Sudhir Pardiwala
Executive Vice President

Hannah Phan
Senior Consultant

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1. INTRODUCTION

1.1 BACKGROUND

The City's water utility provides water service to approximately 30,000 residential, commercial, irrigation, and industrial accounts. The City receives water from three main sources: the Ventura River, Lake Casitas, and local groundwater wells. The water utility is responsible for operating and maintaining three water treatment plants, 380 miles of distribution pipelines, 23 pump stations, 16,000 valves, 3,700 fire hydrants, and 31 reservoirs.

The City operates the water system as a separate, self-supporting enterprise, with revenues and expenditures accounted for separately from its other enterprises and activities. These functions receive no funding from the City's General Fund.

The City approved four-years of rates starting July 1, 2014, and has implemented the first year increases based on a report prepared by RFC titled, *Cost of Service and Rate Design Study Report,* dated January 2014. On September 22, 2014 the City Council declared a Water Shortage Emergency as local water supplies continued to drop during the third year of California's historic drought. In addition to water waste prohibitions, the Council approved the Water Shortage Task Force's recommendation to move to a Stage 3 Water Shortage Emergency.

1.2 SCOPE OF THE STUDY

The City of San Buenaventura – Ventura Water (City) engaged Raftelis Financial Consultants, Inc. (RFC) to develop Water Shortage Rates to ensure adequate recovery resulting from reduced sales for each of the five mandatory Water Shortage Stages shown in **Table 1.1**.

Table 1.1: Water Shortage Stages

Stage	Overall Reduction
Stage 1	10% Voluntary
Stage 2	10% Mandatory
Stage 3	20% Mandatory
Stage 4	30% Mandatory
Stage 5	40% Mandatory
Stage 6	50% Mandatory

The City desires to adopt a water shortage rate program that can be implemented any time in the future. As a result, RFC has developed a more general approach that may be utilized for this goal. This report documents the key assumptions involved in the development of the Water Shortage Rates, an overview of the Water Shortage Rate calculations and a summary of the potential impact of the Water Shortage Rates on City customers.

During the course of the engagement, RFC developed several water shortage rate structure options and presented them to the City's Water Shortage Task Force (Task Force). Ultimately, the Task Force selected a 4-tier revenue neutral option for residential customers which assumes percentage decreases in consumption, by customer class and tier to achieve the overall consumption reduction for each Water Shortage Stage and calculates the resultant rates accordingly. The adopted rates still apply to the fixed bi-monthly meter charge.

Additionally, RFC has provided the City with a generalized formula that may be used to set water shortage rates in the future. This formula, based on the calculated rates discussed in the following sections, allows the City to set water shortage rates using a fixed multiplier in each class and tier.

2. ASSUMPTIONS

The Water Shortage Rates presented below are based on the City's adopted FY 2016 rates, which have been modified to encourage conservation as the Water Shortage Stage increases from Stage 2 (10 percent mandatory reduction) to Stage 6 (50 percent mandatory reduction). Rates for Stage 1, which is based on a 10 percent *voluntary* reduction, are excluded from this analysis and thus will be the normal water rates.

2.1 REVENUE REQUIREMENTS

The baseline for the rate calculations are the revenue requirements projected for FY 2016. From this baseline the expenditures were revised to include any water shortage related costs and any savings associated with reduced water production. Additional water shortage related costs (see **Table 3.2**) are anticipated in Stages 3 through 6 and are associated with customer incentive and waste enforcement programs, which will be implemented if a Stage 3 water shortage is declared. In addition to the anticipated incremental *costs*, the City anticipates some incremental *savings* due to decreased water production (and associated savings in electrical and chemical costs) as customer conservation occurs. These savings are anticipated to begin in Stage 3 and increase throughout the remaining three stages as conservation increases in each stage.

The proposed rates are calculated to be revenue neutral, which means that the projected revenues under the proposed rates will not generate additional revenues other than the identified revenue requirements for FY 2016, plus any water shortage related costs and less any water production savings, if the demand reduction is achieved.

2.2 CONSUMPTION

Table 2.1 below indicates the baseline forecast consumption for FY 2016. As indicated the majority of consumption is related to residential users. The consumption levels indicated below are the projected FY 2016 water sales by customer class under normal conditions. These usage levels by customer class serve as a baseline for the consumption assumptions used in each water shortage stage.

The guiding principles used to develop the water shortage consumption targets for each class are:

- Provide essential usage to residential customers for health and sanitation needs; this lifeline usage allocation will not be impacted by higher rates;
- Outdoor irrigation is considered to be discretionary and is subject to higher conservation targets to achieve the desired level of reduction in each stage;
- A new Non-residential Irrigation class would be created and would have the same target conservation as the outdoor residential irrigation usage;
- The remaining non-residential usage would be considered to be essential indoor usage and targeted for smaller conservation at half the overall target.

Based on guidance from the Task Force, RFC designed tiers and the desired conservation to be achieved from each tier and customer class. The current first tier would be divided into two tiers so that all residential customers would receive an allocation for health and sanitation needs of 6 hundred cubic feet (HCF) per dwelling unit bi-monthly. This tier would not be impacted by the water shortage rates and all residential customers would benefit from this allocation. The remainder of the current first tier, 8 HCF for single family and 4 HCF for multi-family, then becomes the second tier.[1] The current second and third tier become the third and fourth tiers, respectively. The first tier is considered essential usage and will not be targeted for conservation. The second tier is essentially indoor usage but will be targeted for minimal conservation. The third tier is basically considered to be outdoor usage and subject to a higher level of conservation. The fourth tier is excessive usage subject to the highest level of conservation to ensure that the overall target of usage reduction is achieved. A similar logic is used for non-residential usage; since most of the non-residential usage is indoor, it is targeted for a lower level of conservation: the target for non-residential is set at half of the overall target. This recognizes that non-residential customers have less discretionary usage and it minimizes the economic impacts to these customers. To ensure that non-residential irrigation is treated the same as residential irrigation a new class called Non-Residential Irrigation is created. The target reduction is set at the average reduction of Tiers 3 and 4. The Municipal Institutional Interruptible Irrigation (III), or Institutional/Interruptible in this report, rate is provided to the City's irrigation meters for public parks at a lower rate since they can be interrupted as necessary. This usage is not merely for aesthetics but also functional as it serves needs of all sections of the community. Since this usage provides a public benefit the Water Shortage Task Force approved a target reduction that is the same as residential Tier 3 for this usage recognizing the needs and benefits provided to the community.

An example of how the tiers and targets work is shown in **Table 2.1**. In Stage 3, an overall mandatory reduction of 20 percent is required. **Table 2.1** further indicates the assumed adjustment required to achieve Stage 3 usage reductions as well as the estimated usage once those reductions have been achieved. There are several items to note regarding the estimated Stage 3 usage: the additional tier has been added to reflect an essential bi-monthly usage level of 6 HCF; no reductions in usage at this essential level were assumed, as it is unlikely usage will decrease below the essential level; non-residential usage is targeted to conserve half of the 20 percent or ten percent; and, the new non-residential irrigation class is created to differentiate between indoor non-residential needs and outdoor non-residential needs. Consequently, the remaining classes must decrease their usage at an average reduction greater than 20 percent to achieve the overall 20 percent reduction target. Irrigation usage is expected to decrease substantially more than indoor usage since it is considered less essential and discretionary.

[1] The differences between SFR and MFR tier volumes are explained in the City's Cost of Service and Rate Design Study Report dated March 2012, which is incorporated here by reference.

Table 2.1: Baseline and Adjusted Water Shortage Consumption (Stage 3)[2]

Customer Class		Bi-monthly Tier	Base Usage (hcf)	New Bi-monthly Tier	Estimated Usage (hcf) (Add'l Tier)	% Reduction (Stage 3)	Estimated Usage (hcf) (Stage 3)
Inside City							
SFR							
	Tier 1	14	1,618,515	6	762,792	0%	762,792
	Tier 2	30	884,623	14	855,723	-15%	727,365
	Tier 3	> 30	454,199	30	884,623	-35%	575,005
	Tier 4			> 30	454,199	-35%	295,230
	TOTAL		**2,957,338**		**2,957,338**		**2,360,391**
MFR	(per unit)						
	Tier 1	10	1,077,400	6	697,869	0%	697,869
	Tier 2	16	346,637	10	379,531	-15%	322,601
	Tier 3	> 16	162,931	16	346,637	-35%	225,314
	Tier 4			> 16	162,931	-35%	105,905
	TOTAL		**1,586,968**		**1,586,968**		**1,351,690**
Non-Residential			946,429		946,429	-10%	851,786
Non-Residential Irrigation			717,943		717,943	-35%	466,663
Institutional/Interruptible			194,102		194,102	-35%	126,166
Untreated Water			26,292		26,292	-35%	17,090

The consumption forecast for each of the remaining Water Shortage Stages was determined using the same logic, assuming in each case that usage at 6 HCF or below would remain the same and is shown in **Table 2.2**. The total reduction for each stage matches the targeted overall reduction shown in **Table 1.1**.

[2] Totals may not add up due to rounding.

Table 2.2: Targeted Reductions for Each Stage

Customer Class		Bi-monthly Tier	Stage 2 Reduction	Stage 3 Reduction	Stage 4 Reduction	Stage 5 Reduction	Stage 6 Reduction
SFR							
	Tier 1	6	0%	0%	0%	0%	0%
	Tier 2	14	-10%	-15%	-25%	-35%	-50%
	Tier 3	30	-16%	-35%	-50%	-65%	-80%
	Tier 4	> 30	-16%	-35%	-55%	-80%	-90%
MFR	(per unit)						
	Tier 1	6	0%	0%	0%	0%	0%
	Tier 2	10	-10%	-15%	-25%	-35%	-50%
	Tier 3	16	-16%	-35%	-50%	-65%	-80%
	Tier 4	> 16	-16%	-35%	-55%	-80%	-90%
Non-Residential			-10%	-10%	-15%	-20%	-25%
Non-Residential Irrigation			-16%	-35%	-53%	-73%	-85%
Institutional/Interruptible			-16%	-35%	-50%	-65%	-80%
Untreated Water			-16%	-35%	-50%	-65%	-80%

3. WATER SHORTAGE RATE DESIGN

3.1 EXISTING ADOPTED RATES

As mentioned above the basis for the water shortage rate design is the projected revenue requirements from commodity rates and customer units for FY 2016. **Table 3.1** shows the approved FY 2016 commodity rates. As indicated the current rate structure is an inclining block structure for residential customers whose unit rates increase as customer consumption crosses certain thresholds. The current Tier cut-offs are 14 and 30 HCF bi-monthly for Single Family Residential (SFR) customers. That is, consumption from 0 to 14 HCF is billed at $2.40 per HCF, consumption from 15 to 30 HCF is billed at $3.35 per HCF and any consumption greater than 30 HCF is billed at $5.66 per HCF. For Multi-Family Residential (MFR) Tier cut-offs are 10 and 16 HCF bi-monthly. Non-residential users pay the indicated uniform rates per HCF. The Outside City rate differential was revised in the March 2012 Cost of Service and Rate Design Study Report and was updated in the January 2014 Cost of Service and Rate Design Study Report. The three elements that are included are the cost of water, with the least expensive sources being provided to Inside-City customers, $0.45/HCF. The cost of protecting the assets of the water enterprise that are borne by the City's general fund and include police and fire, $0.10/HCF; and finally the property taxes that would be due on the water system assets, $0.05/HCF.

Table 3.1: FY 2016 Adopted Rates

Bi-Monthly Rates		Effective July 1, 2015
Volume Rates ($/hcf)		
SFR		
Tier 1	0 to 14	$2.40
Tier 2	15 to 30	$3.35
Tier 3	> 30	$5.66
MFR		
Tier 1	0 to 10	$2.40
Tier 2	11 to 16	$3.35
Tier 3	> 16	$5.66
Non-Residential		$3.09
Institutional/Interruptible*		$2.39
Reclaimed Water		$0.82
Untreated Water		$2.49
Outside City Rates		$0.60/hcf

*Municipal Institutional Interruptible Irrigation (III)

3.2 WATER SHORTAGE RATE CALCULATIONS AND PROPOSED RATES

The proposed rates are based on the five Water Shortage Stages for which consumption reduction is considered mandatory (i.e. Stages 2 through 6) and are adjusted upward with each stage to ensure adequate revenue recovery, reflect the severity of the water shortage and achieve the desired reduction in consumption. As discussed above, the Task Force was presented with a variety of options to address the need for conservation via the City's rate structure. The option ultimately selected by the Task Force and by City Council on March 9, 2015 includes an additional tier for essential usage with inclining block rates thereafter and neutral revenue recovery. That is, the Water Shortage Rates for each stage recover the FY 2016 revenue requirement, which is approximately $20.8 million, less the incremental water production savings, and any additional water shortage related costs.

Table 3.2 shows the additional water shortage related costs for each Stage, as identified by City staff. These costs are included in the proposed rate calculations under the "Shortage Cost" column in **Table 3.3**.

Table 3.2: Water Shortage Related Costs

Expenses	Stage 3 – 20%	Stage 4 – 30%	Stage 5 – 40%	Stage 6 – 50%
Incentive Program	$825,000	$440,000	$440,000	$0
Water Waste Enforcement	$122,000	$122,000	$122,000	$122,000
Customer Outreach	$100,000	$100,000	$100,000	$100,000
Customer Response (+Surveys)	$87,000	$87,000	$87,000	$87,000
TOTAL EXPENSES	**$1,134,000**	**$749,000**	**$749,000**	**$309,000**

3.2.1 Water Shortage Rates Detailed Calculation

Table 3.3 shows the detailed calculations of the reductions in normal use and the rates for Water Shortage Stage 3. The calculations involved the following steps:

- *First*, the baseline (normal) consumption was determined for each tier and each customer class.
- *Second*, the percentage reductions in consumption required to achieve the overall 20 percent reduction was applied for each tier and each customer class. These percentages are based on extensive discussions with City staff, an analysis of existing customer demand and our experience with similar studies of this nature. Note that no reductions were assumed for Tier 1 lifeline usage, which at 6 HCF bi-monthly, is considered to be essential indoor use and therefore unlikely to exhibit any reductions in usage.

- *Third*, the revenues to be recovered from each class and tier are determined at the same level as they would be for normal usage but adjusted for water production savings, and the corresponding rate is based on the reduced consumption for each class and tier.
- *Finally*, an allocation of water shortage related costs (**Table 3.2**) was added to each customer class and each tier. In the case of Stage 3, the water shortage related costs are $1.13 million, which are recovered from all customer classes in proportion to their usage. The calculated unit water shortage cost for Stage 3 is $0.22 per HCF. However, in the residential class, the water shortage related costs are allocated to Tiers 2 through 4 only. Thus, the unit water shortage cost to recover all the costs for the residential class is $0.35 per HCF because Tier 1 has no shortage cost allocation. Since Tier 1 represents essential minimum indoor usage, no costs are allocated to this tier. All residential users will benefit from the Tier 1 lifeline rates ensuring proportional benefit consistent with Proposition 218.

Under these rates each class pays its fair share of costs based on cost of service.

Table 3.3: Water Shortage Rate Calculation Stage 3 (20% Mandatory Reduction)

Customer Class	New Bi-monthly Tier	Estimated Usage (hcf) (Add'l Tier)	% Reduction (Stage 3)	Estimated Usage (hcf) (Stage 3)	Revised Rates (Stage 3)	Shortage Cost ($/hcf) (Stage 3)	Total Rate ($/hcf) (Stage 3)
Inside City							
SFR							
Tier 1	6	762,792	0%	762,792	$2.40	$0.00	$2.40
Tier 2	14	855,723	-15%	727,365	$2.90	$0.35	$3.25
Tier 3	30	884,623	-35%	575,005	$5.20	$0.35	$5.55
Tier 4	> 30	454,199	-35%	295,230	$8.00	$0.35	$8.35
TOTAL		**2,957,338**		**2,360,391**			
MFR (per unit)							
Tier 1	6	697,869	0%	697,869	$2.40	$0.00	$2.40
Tier 2	10	379,531	-15%	322,601	$2.90	$0.35	$3.25
Tier 3	16	346,637	-35%	225,314	$5.20	$0.35	$5.55
Tier 4	> 16	162,931	-35%	105,905	$8.00	$0.35	$8.35
TOTAL		**1,586,968**		**1,351,690**			
Non-Residential		946,429	-10%	851,786	$3.39	$0.22	$3.61
Non-Residential Irrigation		717,943	-35%	466,663	$4.71	$0.22	$4.93
Institutional/Interruptible		194,102	-35%	126,166	$3.63	$0.22	$3.85
Untreated Water		26,292	-35%	17,090	$3.79	$0.22	$4.01

3.2.2 Proposed Water Shortage Rates

The calculation summarized above was done for all Stages to produce the rates indicated in **Table 3.4**. Note that the rates indicated are for Inside City users. Outside City rates will continue to be an additional $0.60 per HCF, as detailed in the City's Cost of Service and Rate Design Study Report dated March 2012. Any changes in water purchase costs will be passed on to customers.

Table 3.4: Proposed Water Shortage Rates for FY 2016

Customer Class	Bi-monthly Tier	Base Rates ($/hcf)	Stage 2 Rate ($/hcf)	Stage 3 Rate ($/hcf)	Stage 4 Rate ($/hcf)	Stage 5 Rate ($/hcf)	Stage 6 Rate ($/hcf)
SFR							
Tier 1	6	$2.40	$2.40	$2.40	$2.40	$2.40	$2.40
Tier 2	14	$2.40	$2.70	$3.25	$3.49	$4.09	$5.04
Tier 3	30	$3.35	$4.00	$5.55	$6.99	$9.99	$16.99
Tier 4	> 30	$5.66	$6.70	$8.35	$12.29	$26.39	$49.24
MFR (per unit)							
Tier 1	6	$2.40	$2.40	$2.40	$2.40	$2.40	$2.40
Tier 2	10	$2.40	$2.70	$3.25	$3.49	$4.09	$5.04
Tier 3	16	$3.35	$4.00	$5.55	$6.99	$9.99	$16.99
Tier 4	> 16	$5.66	$6.70	$8.35	$12.29	$26.39	$49.24
Non-Residential		$3.09	$3.44	$3.61	$3.71	$3.92	$4.03
Non-Residential Irrigation		$3.09	$3.68	$4.93	$6.58	$11.30	$20.51
Institutional/Interruptible		$2.39	$2.85	$3.85	$4.86	$6.89	$11.86
Untreated Water		$2.49	$2.97	$4.01	$5.06	$7.17	$12.36

Table 3.5 shows the proposed water shortage rate multipliers based on the calculated rates in **Table 3.4**. These multipliers may be used to determine water shortage rates in the future as long as the cost structure remains relatively consistent with the current structure. Even though the multiplier for Tier 4 is less than Tier 3 in Stages 2 and 3, because it is applied to a higher base rate, the resulting Tier 4 shortage rates are still significantly higher than the Tier 3 rates, as shown in **Table 3.4**.

Table 3.5: Proposed Water Shortage Rates Multipliers

Customer Class	Bi-monthly Tier	Base Rates ($/hcf)	Stage 2 Increase	Stage 3 Increase	Stage 4 Increase	Stage 5 Increase	Stage 6 Increase
SFR							
Tier 1	6	$2.40	1.000	1.000	1.000	1.000	1.000
Tier 2	14	$2.40	1.125	1.355	1.455	1.705	2.100
Tier 3	30	$3.35	1.195	1.657	2.087	2.983	5.072
Tier 4	> 30	$5.66	1.184	1.476	2.172	4.663	8.700
MFR (per unit)							
Tier 1	6	$2.40	1.000	1.000	1.000	1.000	1.000
Tier 2	10	$2.40	1.125	1.355	1.455	1.705	2.100
Tier 3	16	$3.35	1.195	1.657	2.087	2.983	5.072
Tier 4	> 16	$5.66	1.184	1.476	2.172	4.663	8.700
Non-Residential		$3.09	1.114	1.169	1.201	1.269	1.305
Non-Residential Irrigation		$3.09	1.191	1.596	2.130	3.657	6.638
Institutional/Interruptible		$2.39	1.193	1.611	2.034	2.883	4.963
Untreated Water		$2.49	1.193	1.611	2.033	2.880	4.964

It should be noted that the proposed rates are based on the current water costs from United Water Conservation District, Casitas Municipal Water District, and Fox Canyon Groundwater Management Agency (GMA). In the event that the City incurs penalty charges from Fox Canyon GMA and/or increases in shortage-related water supply costs from United Water Conservation District and/or Casitas Municipal Water District, the City will pass on the additional charges to all customers, except Residential Tier 1, in the form of an excess water usage charge. This excess water use charge will be assessed based on the actual water consumption in each customer class compared to the expected water consumption in each shortage stage. This assumes that the City will be assessed the penalty/shortage-related costs at the end of the year and will then pass on these charges to customers classes, except Residential Tier 1, in proportion to the excess usage from each class.

4. PROJECTED IMPACTS OF WATER SHORTAGE RATES

Table 4.1 below indicates the bill impacts on residential customers of the proposed water shortage rates. The impacts shown are for the Stage 3 (i.e. 20 percent mandatory reduction) water shortage rates. It is important to note that the impacts will grow as rates are increased in Stages 4 through 6. Currently, the typical SFR customer uses an average of 21 HCF on a bi-monthly basis and incurs a bi-monthly water bill of approximately $86.33. Under Stage 3 Water Shortage Rates, that same customer would face a bill of $108.53 (an increase of $22.20) if that customer does not reduce their usage. If usage is reduced by the required 20 percent, the average SFR user would see minimal change in their bi-monthly bill.

Table 4.1: Residential Bill Impacts – Stage 3

SFR	Normal Bi-monthly Usage (hcf)	Current Bi-monthly Bill	Shortage Bi-monthly Bill	Difference $	Shortage Bi-monthly Usage (hcf)	Shortage Bi-monthly Bill	Difference $
Very Low	5	$41.28	$41.28	$0.00	4	$38.88	($2.40)
Low	12	$58.08	$63.18	$5.10	10	$56.68	($1.40)
Average	**21**	**$86.33**	**$108.53**	**$22.20**	**17**	**$86.33**	**$0.00**
High	35	$144.78	$200.23	$55.45	28	$147.38	$2.60
Very High	50	$229.68	$325.48	$95.80	40	$241.98	$12.30

Note: Assume 3/4" meter, includes drought-related expenses

MFR	Normal Bi-monthly Usage (hcf)	Current Bi-monthly Bill	Shortage Bi-monthly Bill	Difference $	Shortage Bi-monthly Usage (hcf)	Shortage Bi-monthly Bill	Difference $
Very Low	3	$36.48	$36.48	$0.00	3	$36.48	$0.00
Low	8	$48.48	$50.18	$1.70	7	$46.93	($1.55)
Average	**13**	**$63.33**	**$73.33**	**$10.00**	**11**	**$62.23**	**($1.10)**
High	22	$107.34	$140.08	$32.74	18	$106.68	($0.66)
Very High	35	$180.92	$248.63	$67.71	28	$190.18	$9.26

Note: Assume 3/4" meter, includes drought-related expenses

5. APPENDIX

Tables 5.1 and 5.2 show the bi-monthly bill distribution per dwelling unit for Inside City SFR and MFR customers, based on FY 2013 usage data provided by the City. The bill distribution is used to estimate the water consumption in each tier block in order to identify appropriate tier break that would meet the City's conservation objectives. For MFR customers, each dwelling unit is treated as if it was a separate unit and receives a separate bill. For example, if an MFR account has 10 dwelling units using 50 HCF per month, it would be treated as 10 separate bills each using 5 HCF per month.

The tables are set up in the following manner:

- "Block" column – this column represents the defined tier block. In this case, the tiers are identified in 1 HCF increment from 0 HCF to 25 HCF, then in 5 HCF increment from 25 HCF to 50 HCF, then in 10 HCF increment from 50 HCF to 100 HCF, etc.
- "Bills" column – this column represents the number of customer bills ending in each tier block. For example, there are 1,182 SFR bills that use 2 HCF in the entire fiscal year.
- "Usage" column – this column represents the total usage of each bill ending in each tier block.
- "Cumulative Bill" column – this column represents the cumulative number of bills ending in each tier block. For example, at 10 HCF, there are 27,767 bills that use 10 HCF or less in the entire fiscal year.
- "Cumulative Usage" column – this column represents the cumulative usage of bills ending in each tier block.
- "Usage in Block" column – this column represents the total amount of usage in each corresponding tier block, since bills in the higher tiers also include usage in the lower tiers. So for example, at 5 hcf, the usage for all users that use 5 hcf or more and the cumulative usage at 4 hcf is included at that level.
- "% Bills" column – this column shows the percentage of bills in each tier block. The calculation is based on the "Cumulative Bills" column. This is used to estimate how many bills would be impacted at various tier blocks.
- "% Usage" column – this column shows the percentage of total usage in each tier block. The calculation is based on the "Usage in Block" column. This is used to estimate the usage in each tier block for help in selecting appropriate tier breaks. For example, SFR Tier 1 stops at 6 HCF, which according to **Table 5.1**, represents approximately 26 percent of the total usage and 10 percent of the annual bills. SFR Tier 2 stops at 14 HCF, which represents approximately 55 percent of the total usage and 35 percent of the annual bills use less than 14 HCF per month. The "% Usage" column is used to estimate the usage in each tier as shown in **Tables 2.1 and 3.3**.

Table 5.1: SFR Bi-Monthly Bill Distribution – Inside City

Block	Bills	Usage	Cumulative Bills	Cumulative Usage	Usage in block	% Bills	% Usage
0	2,501	0	2,501	0	0	2%	0%
1	1,043	1,043	3,544	1,043	132,621	3%	4%
2	1,182	2,364	4,726	3,407	264,199	3%	9%
3	1,546	4,638	6,272	8,045	394,595	5%	13%
4	1,922	7,688	8,194	15,733	523,445	6%	17%
5	2,368	11,840	10,562	27,573	650,373	8%	22%
6	2,664	15,984	13,226	43,557	774,933	10%	26%
7	3,047	21,329	16,273	64,886	896,829	12%	30%
8	3,536	28,288	19,809	93,174	1,015,678	15%	34%
9	3,801	34,209	23,610	127,383	1,130,991	17%	38%
10	4,157	41,570	27,767	168,953	1,242,503	21%	41%
11	4,468	49,148	32,235	218,101	1,349,858	24%	45%
12	4,759	57,108	36,994	275,209	1,452,745	27%	48%
13	4,724	61,412	41,718	336,621	1,550,873	31%	52%
14	4,940	69,160	46,658	405,781	1,644,277	35%	55%
15	4,866	72,990	51,524	478,771	1,732,741	38%	58%
16	4,824	77,184	56,348	555,955	1,816,339	42%	60%
17	4,799	81,583	61,147	637,538	1,895,113	45%	63%
18	4,547	81,846	65,694	719,384	1,969,088	49%	66%
19	4,596	87,324	70,290	806,708	2,038,516	52%	68%
20	4,374	87,480	74,664	894,188	2,103,348	55%	70%
21	4,238	88,998	78,902	983,186	2,163,806	58%	72%
22	3,975	87,450	82,877	1,070,636	2,220,026	61%	74%
23	3,773	86,779	86,650	1,157,415	2,272,271	64%	76%
24	3,679	88,296	90,329	1,245,711	2,320,743	67%	77%
25	3,360	84,000	93,689	1,329,711	2,365,536	69%	79%
30	2,458	73,740	107,571	1,716,451	2,542,981	80%	85%
35	1,604	56,140	116,962	2,024,725	2,660,325	87%	89%
40	992	39,680	122,963	2,251,786	2,738,146	91%	91%
45	639	28,755	126,869	2,419,046	2,790,431	94%	93%
50	444	22,200	129,382	2,539,291	2,826,291	96%	94%
60	168	10,080	132,030	2,684,359	2,869,879	98%	96%
70	81	5,670	133,356	2,770,442	2,894,062	99%	96%
80	52	4,160	133,999	2,818,769	2,908,609	99%	97%
90	26	2,340	134,330	2,846,970	2,918,250	99%	97%
100	17	1,700	134,538	2,866,776	2,925,176	100%	97%
125	3	375	134,838	2,899,987	2,935,487	100%	98%
150	5	750	134,937	2,913,547	2,941,297	100%	98%
175	3	525	134,986	2,921,498	2,945,298	100%	98%
201	2	402	135,018	2,927,505	2,948,409	100%	98%
300	1	300	135,069	2,939,359	2,955,259	100%	98%
409	1	409	135,086	2,945,194	2,959,918	100%	99%
506	1	506	135,095	2,949,210	2,962,872	100%	99%
629	1	629	135,100	2,952,007	2,965,845	100%	99%
704	1	704	135,102	2,953,348	2,967,428	100%	99%
858	1	858	135,105	2,955,641	2,970,227	100%	99%
899	1	899	135,106	2,956,540	2,970,924	100%	99%
1037	1	1,037	135,107	2,957,577	2,973,132	100%	99%
2110	1	2,110	135,108	2,959,687	2,989,227	100%	99%
3406	1	3,406	135,116	2,980,735	3,001,171	100%	100%
4195	1	4,195	135,120	2,995,471	3,003,861	100%	100%
40170	1	40,170	135,123	3,044,580	3,004,410	100%	100%

Table 5.2: MFR Bi-Monthly Bill Distribution per Dwelling Unit – Inside City

Block	Bills	Usage	Cumulative Bills	Cumulative Usage	Usage in block	% Bills	% Usage
0	133,015	0	133,015	0	0	53%	0%
1	469	469	133,484	469	116,544	53%	8%
2	1,524	3,048	135,008	3,517	232,619	54%	15%
3	1,475	4,425	136,483	7,942	347,170	55%	23%
4	2,756	11,024	139,239	18,966	460,246	56%	30%
5	3,646	18,230	142,885	37,196	570,566	57%	37%
6	5,011	30,066	147,896	67,262	677,240	59%	44%
7	5,690	39,830	153,586	107,092	778,903	62%	51%
8	7,330	58,640	160,916	165,732	874,876	64%	57%
9	6,610	59,490	167,526	225,222	963,519	67%	63%
10	6,507	65,070	174,033	290,292	1,045,552	70%	68%
11	6,855	75,405	180,888	365,697	1,121,078	72%	73%
12	7,894	94,728	188,782	460,425	1,189,749	76%	77%
13	8,784	114,192	197,566	574,617	1,250,526	79%	81%
14	8,839	123,746	206,405	698,363	1,302,519	83%	85%
15	6,884	103,260	213,289	801,623	1,345,673	85%	87%
16	6,505	104,080	219,794	905,703	1,381,943	88%	90%
17	5,039	85,663	224,833	991,366	1,411,708	90%	92%
18	4,369	78,642	229,202	1,070,008	1,436,434	92%	93%
19	3,877	73,663	233,079	1,143,671	1,456,791	93%	95%
20	3,804	76,080	236,883	1,219,751	1,473,271	95%	96%
21	3,108	65,268	239,991	1,285,019	1,485,947	96%	96%
22	2,480	54,560	242,471	1,339,579	1,495,515	97%	97%
23	1,194	27,462	243,665	1,367,041	1,502,603	98%	98%
24	1,294	31,056	244,959	1,398,097	1,508,497	98%	98%
25	702	17,550	245,661	1,415,647	1,513,097	98%	98%
30	346	10,380	248,131	1,484,260	1,527,100	99%	99%
35	90	3,150	248,948	1,510,810	1,532,195	100%	99%
40	24	960	249,286	1,523,338	1,534,258	100%	100%
45	14	630	249,382	1,527,466	1,535,431	100%	100%
50	6	300	249,432	1,529,839	1,536,189	100%	100%
60	6	360	249,472	1,532,047	1,537,267	100%	100%
70	0	0	249,513	1,534,677	1,537,897	100%	100%
80	4	320	249,531	1,536,049	1,538,289	100%	100%
90	0	0	249,535	1,536,393	1,538,553	100%	100%
100	0	0	249,539	1,536,785	1,538,785	100%	100%
125	0	0	249,550	1,538,060	1,539,185	100%	100%
150	1	150	249,551	1,538,210	1,539,410	100%	100%
175	0	0	249,551	1,538,210	1,539,610	100%	100%
200	0	0	249,551	1,538,210	1,539,810	100%	100%
237	2	474	249,556	1,539,308	1,540,019	100%	100%