

Madison Water Utility – Proposed Water Rates

December 23, 2014

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Objectives

- Rate Design
 - Design rates to recover as close to the allocated cost for each customer class as possible– limited potential to increase rates
 - Encourage reduction of water use during peak season and throughout the year
 - Rates (including conservation rates) must be fair and justified, supported by the Utility's costs and actual demand patterns unique to each customer class
 - Changing one piece of the rate structure affects the other pieces – i.e. higher rates for one tier means lower rates for another



Alternative Rate Design

- Changes to rates:
 - Fixed charges per meter:
 - Reduced overall fixed charges to more closely align with the overall increase in rates ~ 30%
 - Volumetric rates:
 - Residential
 - 5-tier inclining block structure, applied year-round
 - Commercial
 - 2-tier inclining block structure



Residential

- Summary of Analysis
 - Customers were split into groups based on average usage
 - As customers use more water on average, they tend to use even greater amounts of water during the peak season, compared to their average usage
 - This pattern justifies charging higher rates as usage increases
 - As seen before, most customers tend to use more water during the peak season, regardless of size
 - In reviewing demographics and housing characteristics, it appears that many customers use more water than 58 gallons/person on average

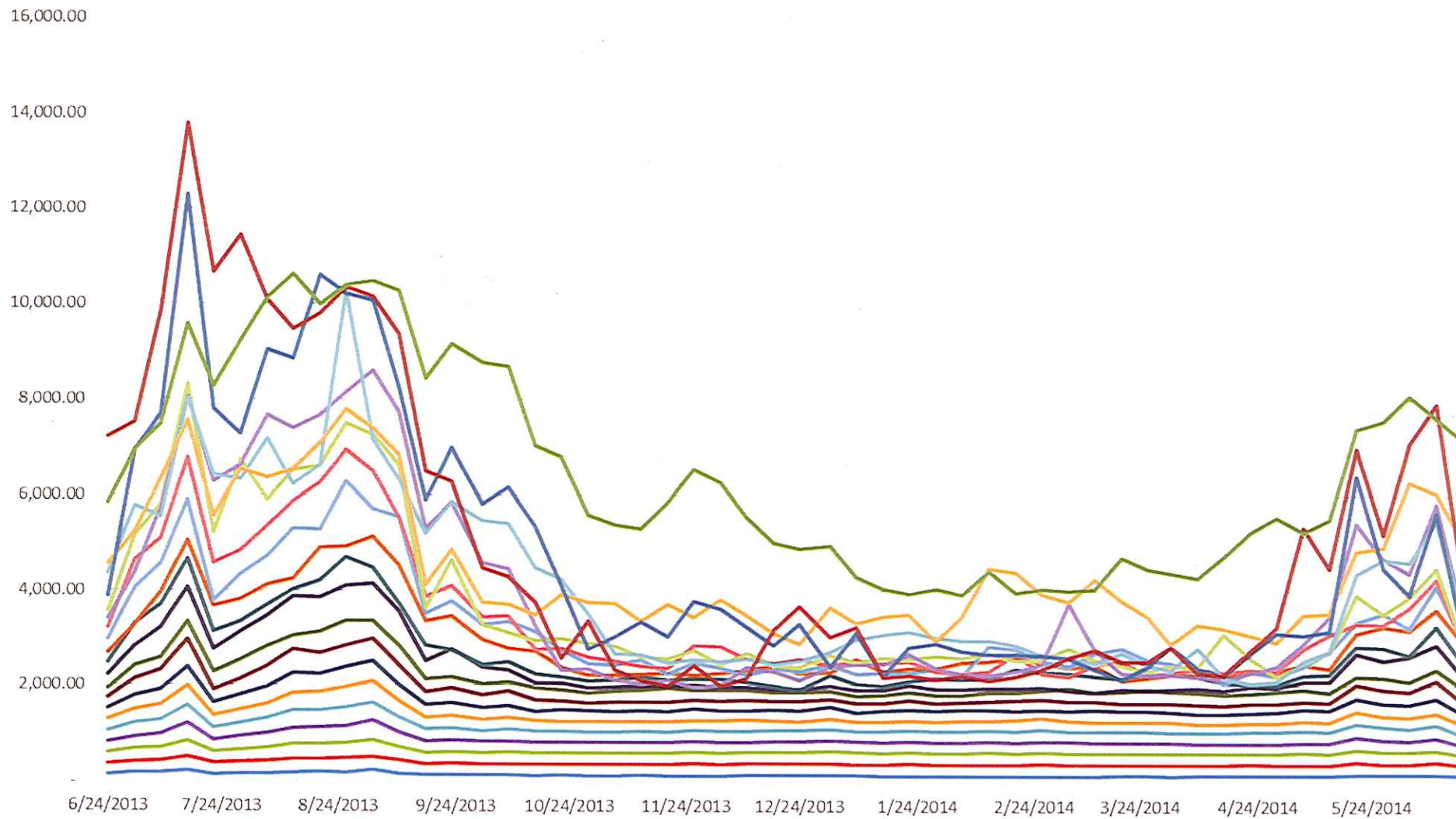


Residential

	AVG WEEK	MAX WEEK	MW:AW
Customers that average less than 1,000 gallons / month	142	231	1.63
Customers that average between 1,001 and 2,000 gallons / month	389	517	1.33
Customers that average between 2,001 and 3,000 gallons / month	633	861	1.36
Customers that average between 3,001 and 4,000 gallons / month	879	1,270	1.44
Customers that average between 4,001 and 5,000 gallons / month	1,131	1,655	1.46
Customers that average between 5,001 and 6,000 gallons / month	1,381	2,090	1.51
Customers that average between 6,001 and 7,000 gallons / month	1,634	2,514	1.54
Customers that average between 7,001 and 8,000 gallons / month	1,894	2,991	1.58
Customers that average between 8,001 and 9,000 gallons / month	2,142	3,355	1.57
Customers that average between 9,001 and 10,000 gallons / month	2,407	4,148	1.72
Customers that average between 10,001 and 11,000 gallons / month	2,629	4,698	1.79
Customers that average between 11,001 and 12,000 gallons / month	2,920	5,131	1.76
Customers that average between 12,001 and 13,000 gallons / month	3,183	6,285	1.97
Customers that average between 13,001 and 14,000 gallons / month	3,374	6,960	2.06
Customers that average between 14,001 and 15,000 gallons / month	3,641	8,328	2.29
Customers that average between 15,001 and 16,000 gallons / month	3,868	8,600	2.22
Customers that average between 16,001 and 17,000 gallons / month	4,049	10,289	2.54
Customers that average between 17,001 and 18,000 gallons / month	4,447	7,811	1.76
Customers that average between 18,001 and 19,000 gallons / month	4,671	12,311	2.64
Customers that average between 19,001 and 20,000 gallons / month	4,957	13,798	2.78
Customers that average over 20,000 gallons / month	6,467	10,637	1.64

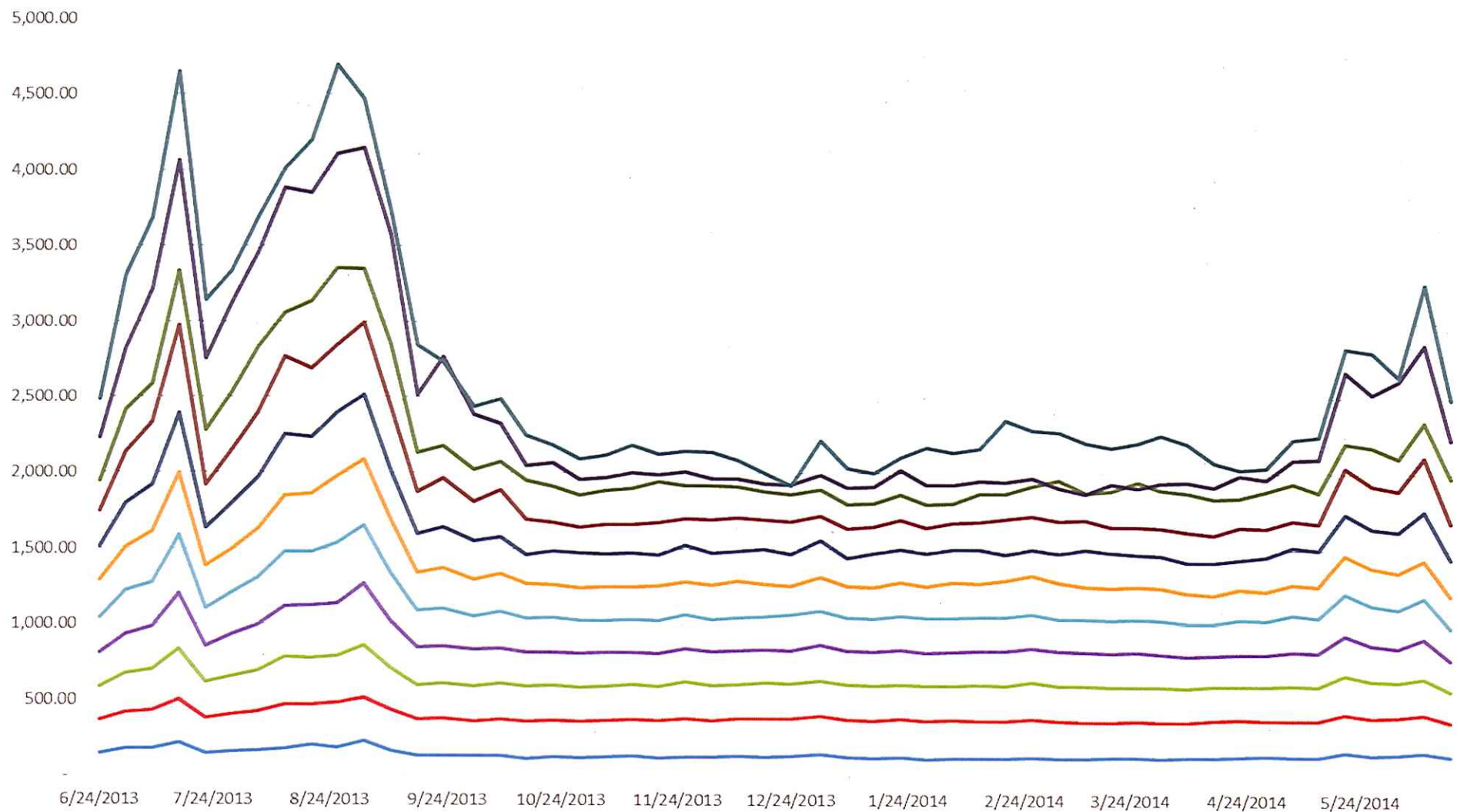
Residential

WEEKLY USAGE PER METER



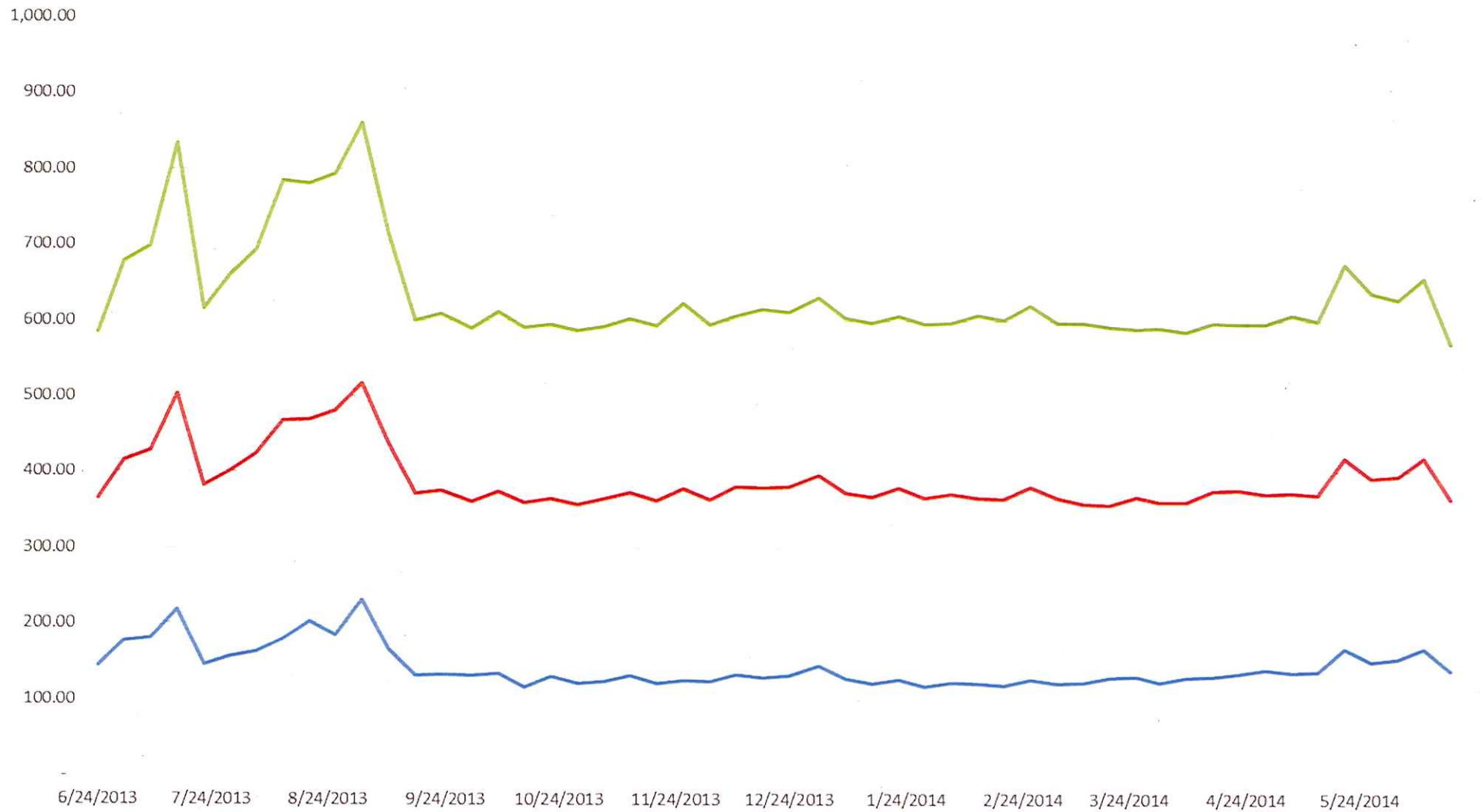
Residential

WEEKLY USAGE PER METER



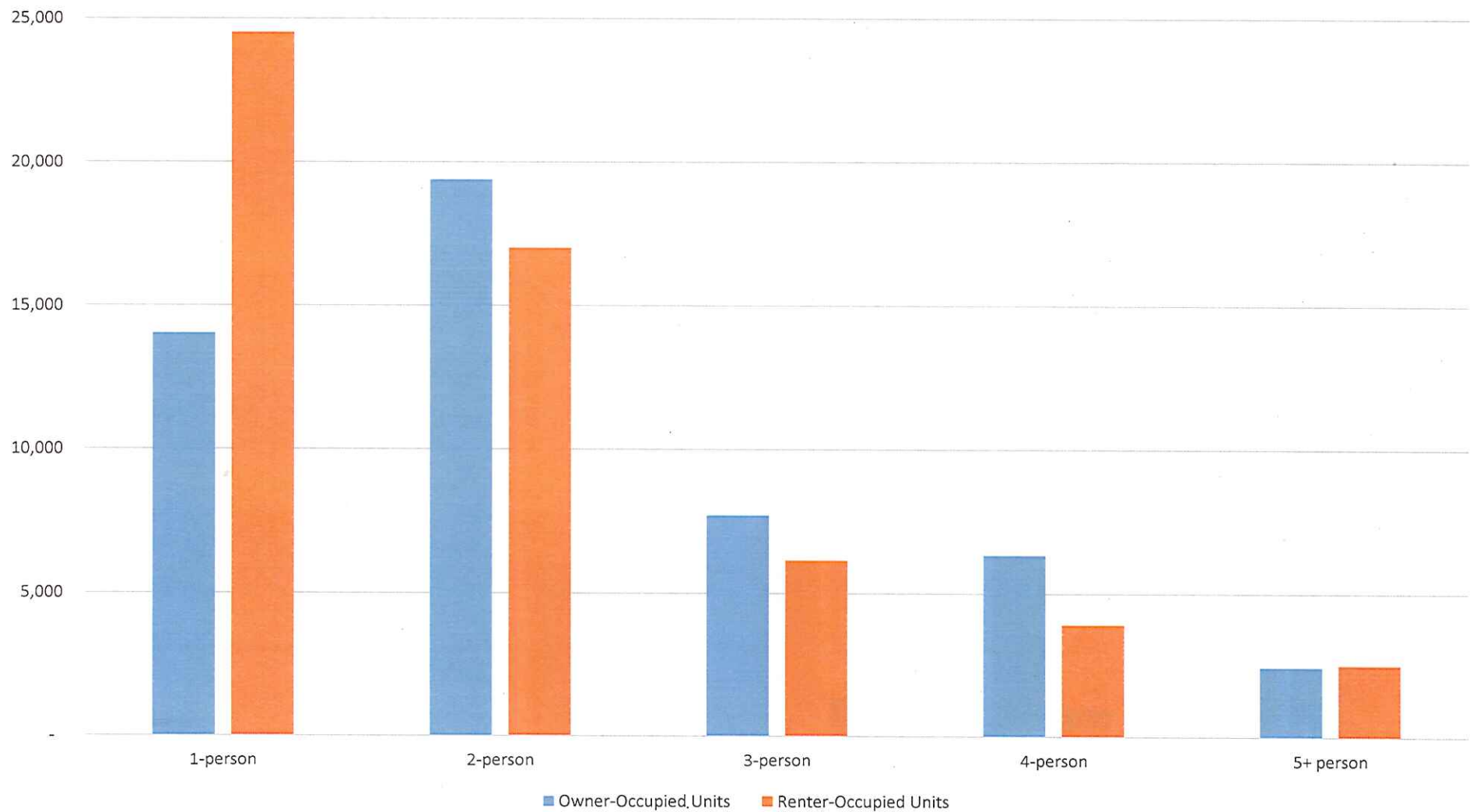
Residential

WEEKLY USAGE PER METER



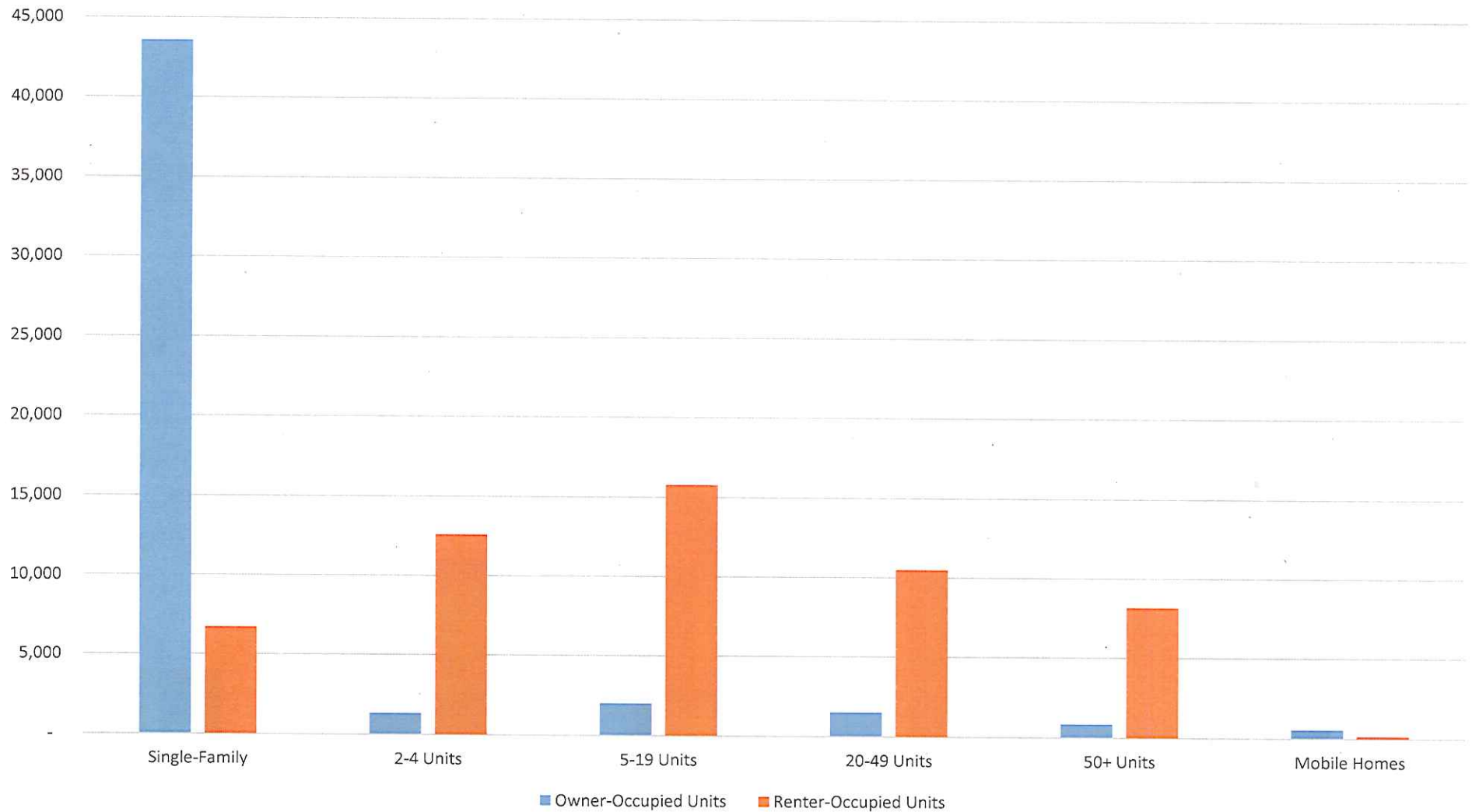
Residential

Households by Size and Ownership



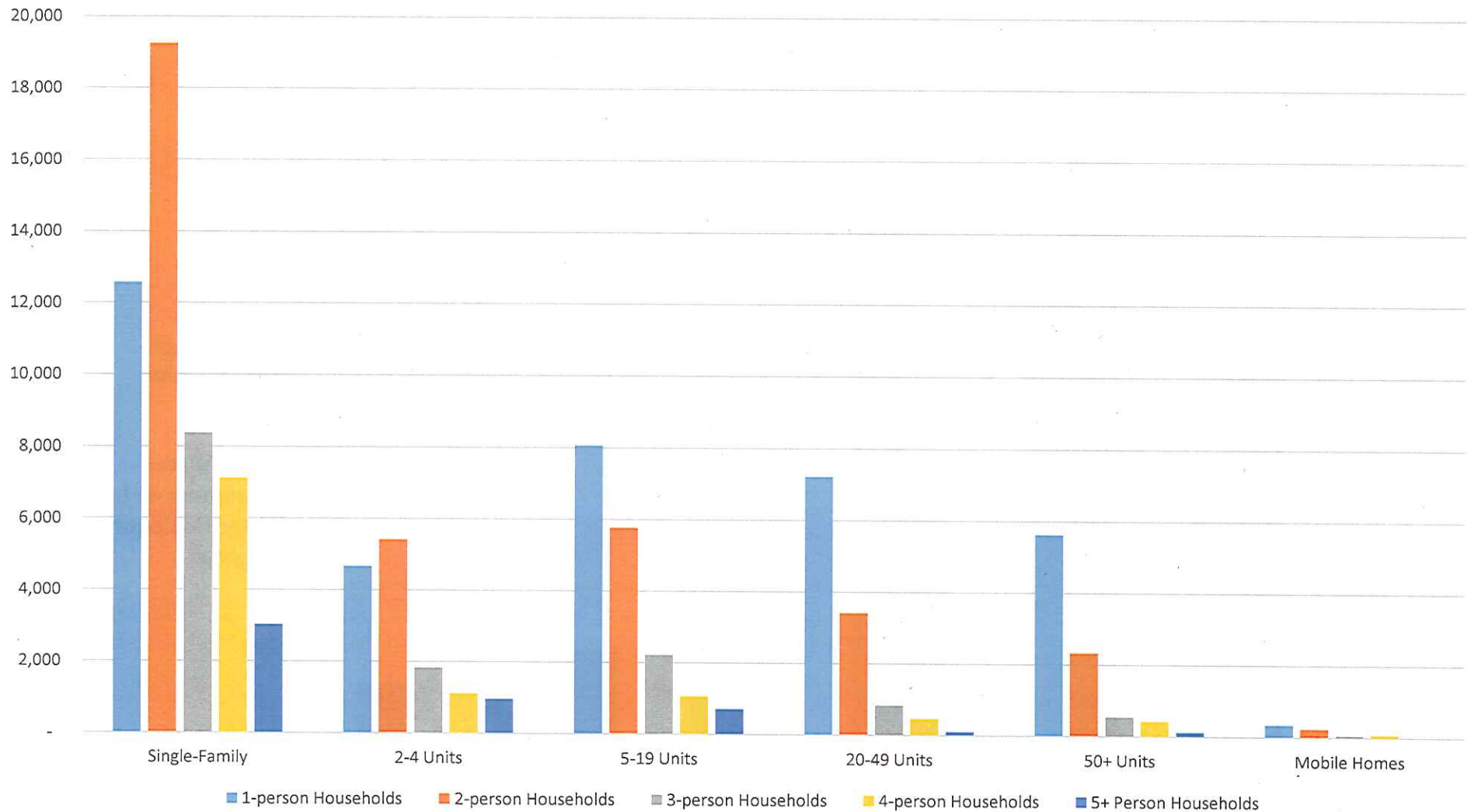
Residential

Housing Units by Building Type and Ownership

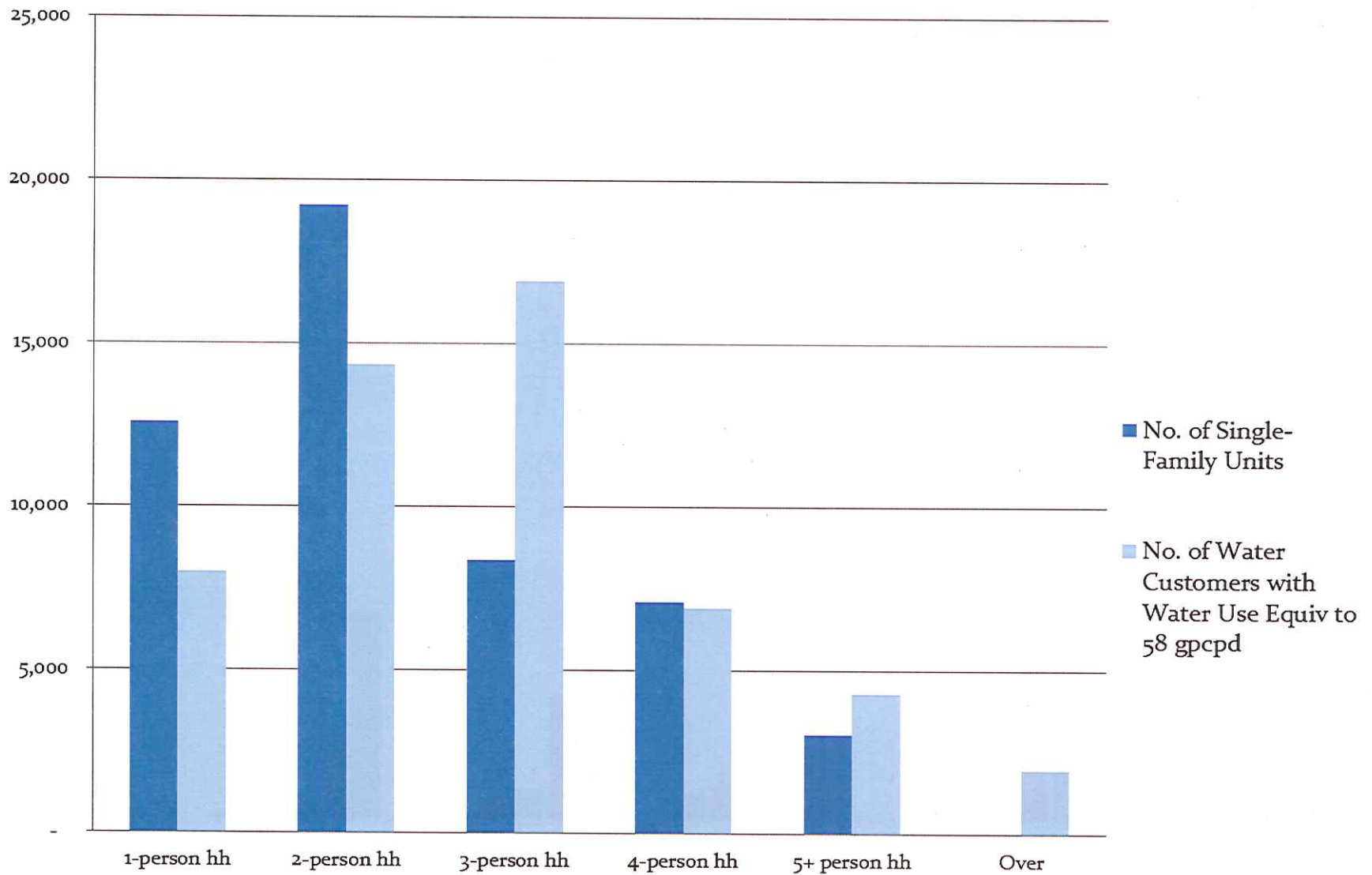


Residential

Households by Size and Type

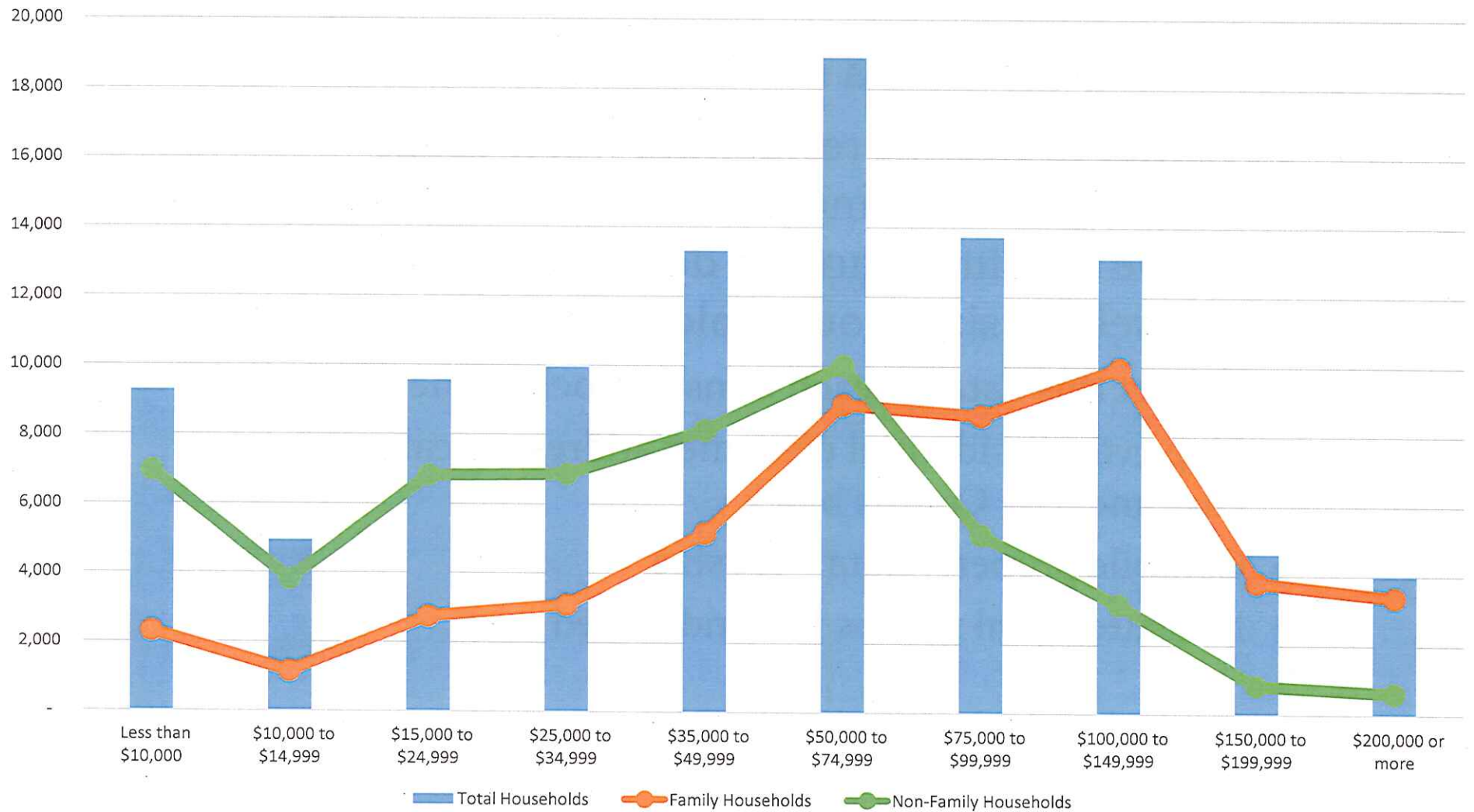


Residential



Residential

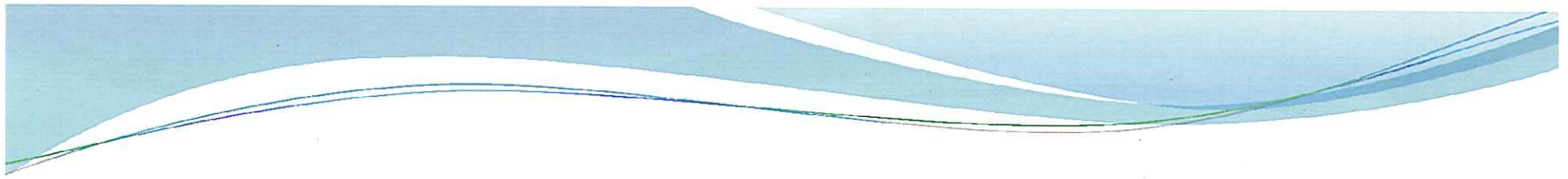
Households by Annual Income





Residential

- Future long-term data needs / analysis
 - Potential to analyze residential water usage characteristics on a more detailed level in order to examine any differences in demand patterns on the basis of household size, household income, lot size, etc.
 - Collect this data for each Census block in the City
 - Map every residential customer address to categorize customers by Census block
 - Compile property data – lot size
 - Measure aerial photos for landscaped area



Multi-Family

- Summary of Analysis
 - Customers were split into groups based on average level of usage
 - Each group of customers exhibited similar, and relatively low, levels of peak usage compared to their average usage
 - Because of this homogenous demand regardless of customer size, there is little reason or justification to charge larger customers higher rates

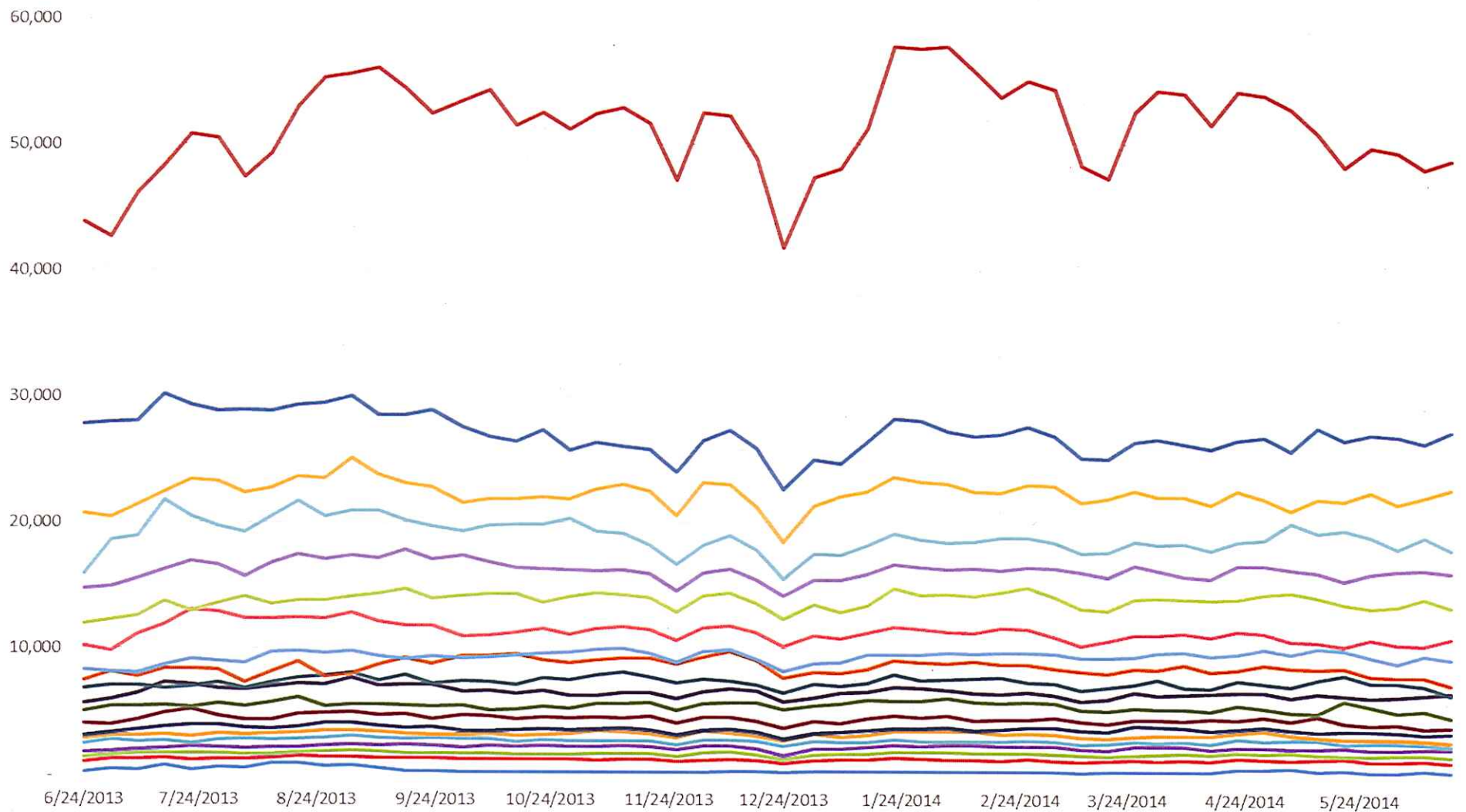


Multi-Family

	AVG WEEK	MAX WEEK	MW:AW
Customers that average less than 4,000 gallons / month	431	959	2.23
Customers that average between 4,000 and 6,000 gallons / month	1,287	1,492	1.16
Customers that average between 6,000 and 8,000 gallons / month	1,755	1,984	1.13
Customers that average between 8,000 and 10,000 gallons / month	2,250	2,458	1.09
Customers that average between 10,000 and 12,000 gallons / month	2,772	3,154	1.14
Customers that average between 12,000 and 14,000 gallons / month	3,254	3,587	1.10
Customers that average between 14,000 and 16,000 gallons / month	3,677	4,173	1.13
Customers that average between 16,000 and 20,000 gallons / month	4,485	5,243	1.17
Customers that average between 20,000 and 24,000 gallons / month	5,526	6,169	1.12
Customers that average between 24,000 and 28,000 gallons / month	6,614	7,740	1.17
Customers that average between 28,000 and 32,000 gallons / month	7,395	8,190	1.11
Customers that average between 32,000 and 36,000 gallons / month	8,574	9,787	1.14
Customers that average between 36,000 and 40,000 gallons / month	9,419	10,095	1.07
Customers that average between 40,000 and 50,000 gallons / month	11,331	13,036	1.15
Customers that average between 50,000 and 60,000 gallons / month	13,848	14,925	1.08
Customers that average between 60,000 and 70,000 gallons / month	16,227	17,853	1.10
Customers that average between 70,000 and 80,000 gallons / month	18,962	21,788	1.15
Customers that average between 80,000 and 100,000 gallons / month	22,328	25,181	1.13
Customers that average between 100,000 and 120,000 gallons / month	27,118	30,213	1.11
Customers that average more than 120,000 gallons / month	51,379	57,794	1.12

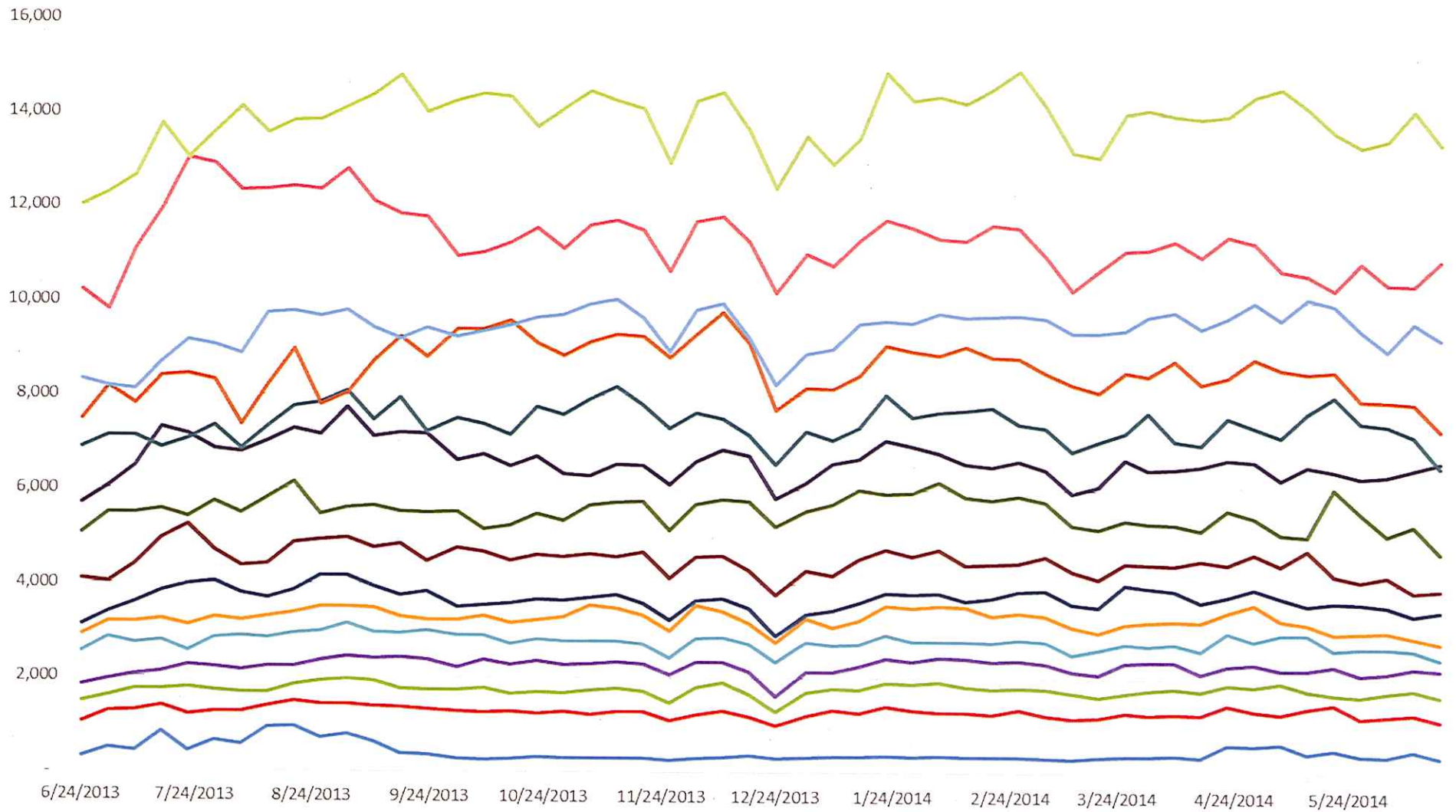
Multi-Family

Per Meter Weekly Usage



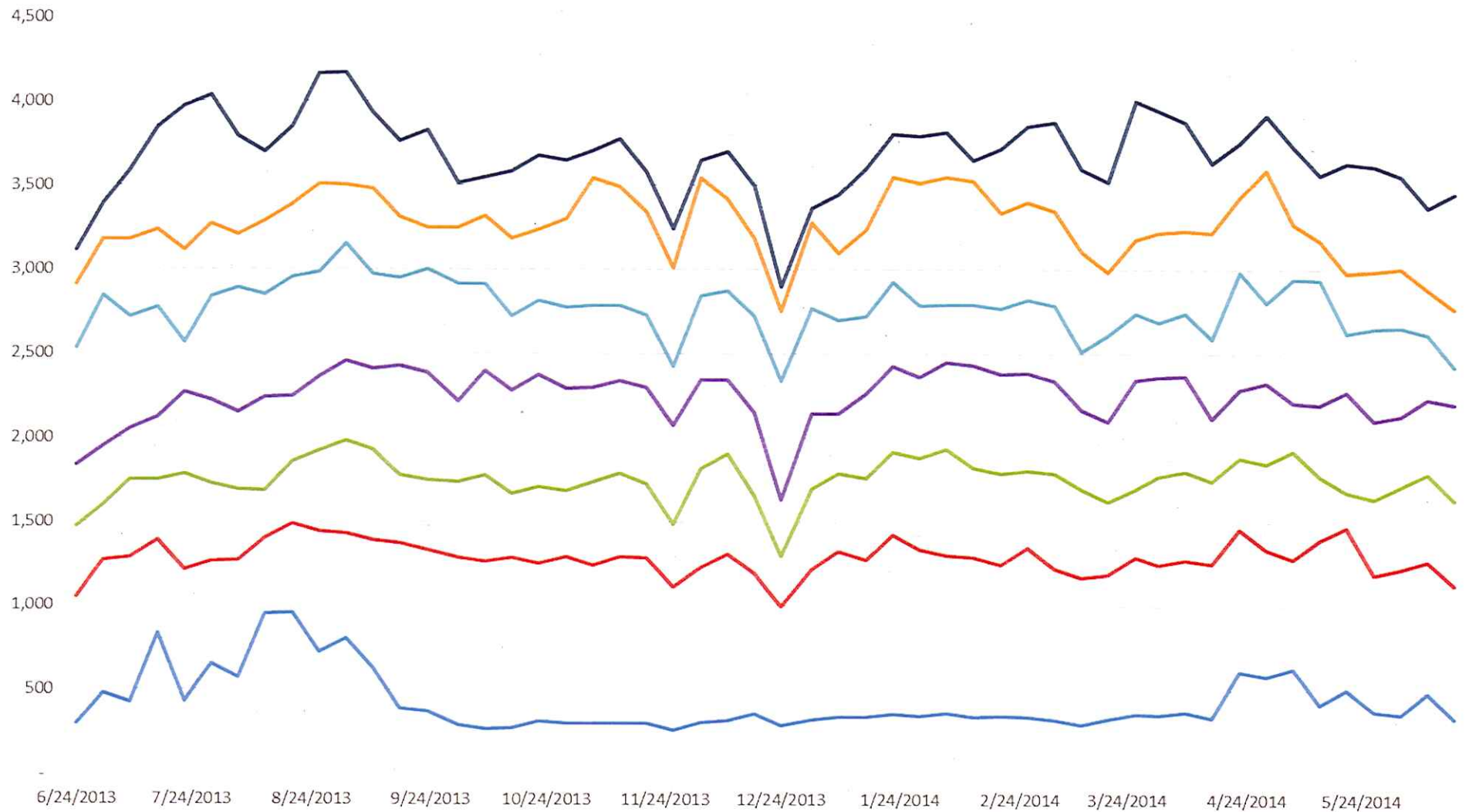
Multi-Family

Per Meter Weekly Usage



Multi-Family

Per Meter Weekly Usage





Multi-Family

- Future long-term data needs / analysis
 - Compile the number of residential units that are served by each meter
 - Compile the number of bedrooms per residential unit
 - Analyze the same data on a per unit basis
- Based on the relatively stable demand patterns of the class, it might be expected that per unit and/or bedroom water usage is consistent for all multi-family customers



Commercial

- Summary of Analysis
 - Customers were split into groups based on average level of usage
 - There was a significant pattern that larger customers tended to have higher peak usage relative to their average water usage
 - Based on this demand pattern, it is reasonable to design rates that charge larger customers higher rates per water usage
 - However, as customer size varies widely, the clearest method to do this was to determine the level of usage that represents the dividing line between demand patterns
 - The vast majority of the usage for the Commercial class is above this point, coming from fewer than half of the customers



Commercial

	AVG WEEK	MAX WEEK	MW:AW
Customers that average less than 1,000 gallons per month	105	130	1.23
Customers that average between 1,000 and 2,000 gallons per month	368	456	1.24
Customers that average between 2,000 and 3,000 gallons per month	625	787	1.26
Customers that average between 3,000 and 4,000 gallons per month	872	1,153	1.32
Customers that average between 4,000 and 5,000 gallons per month	1,162	1,632	1.40
Customers that average between 5,000 and 6,000 gallons per month	1,427	1,958	1.37
Customers that average between 6,000 and 8,000 gallons per month	1,735	2,175	1.25
Customers that average between 8,000 and 10,000 gallons per month	2,307	3,194	1.38
Customers that average between 10,000 and 12,000 gallons per month	2,799	3,985	1.42
Customers that average between 12,000 and 16,000 gallons per month	3,538	5,745	1.62
Customers that average between 16,000 and 20,000 gallons per month	4,594	7,388	1.61
Customers that average between 20,000 and 25,000 gallons per month	5,606	8,241	1.47
Customers that average between 25,000 and 30,000 gallons per month	7,253	13,363	1.84
Customers that average between 30,000 and 40,000 gallons per month	8,991	13,834	1.54
Customers that average between 40,000 and 60,000 gallons per month	12,962	21,020	1.62
Customers that average between 60,000 and 80,000 gallons per month	17,903	32,203	1.80
Customers that average between 80,000 and 120,000 gallons per month	24,703	44,743	1.81
Customers that average between 120,000 and 200,000 gallons per month	39,312	59,659	1.52
Customers that average over 200,000 gallons per month	124,684	186,086	1.49

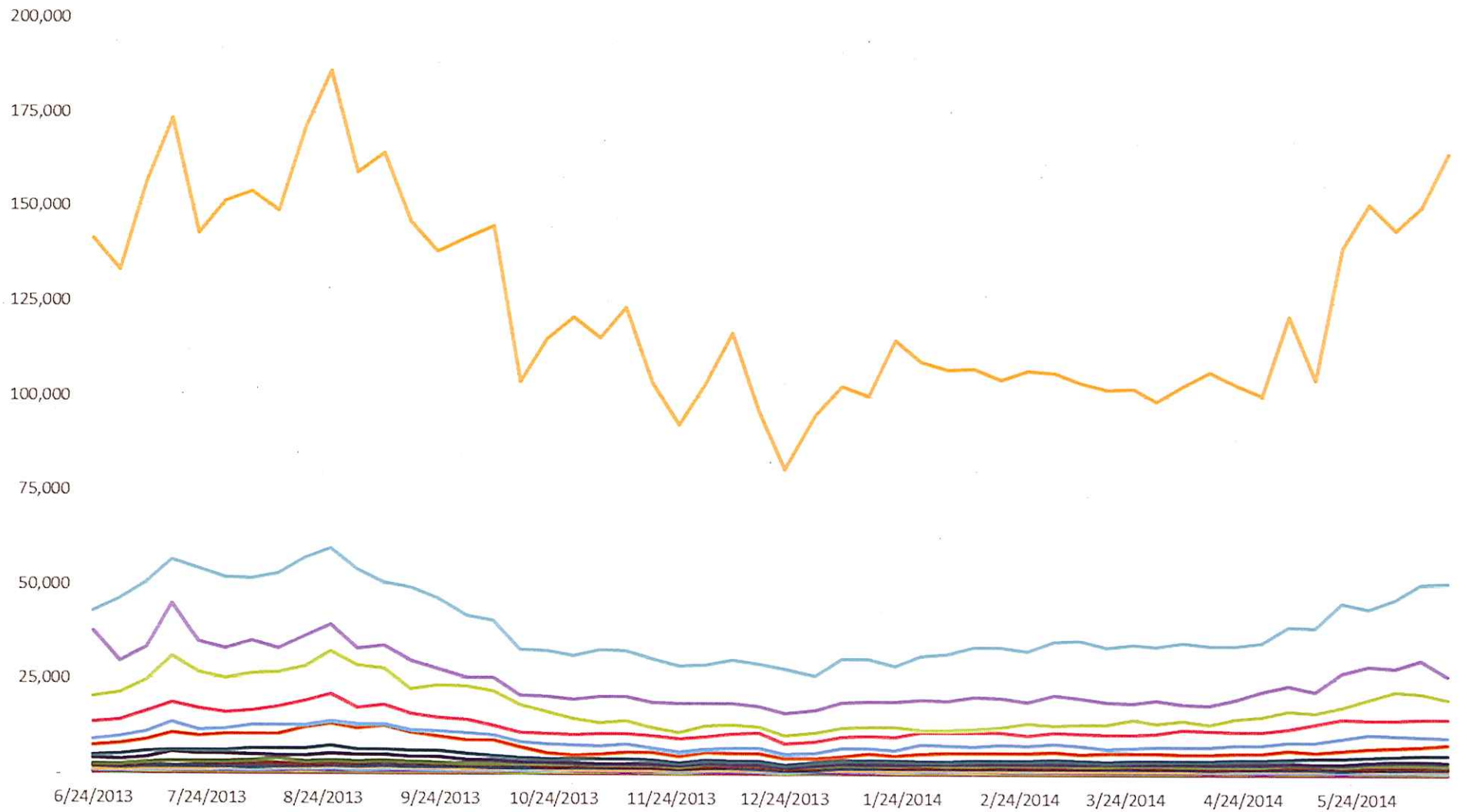


Commercial

	AVG WEEK	MAX WEEK	MW:A W
Customers that average up to 16,000 gallons per month	1,227	1,593	1.30
Customers that average over 16,000 gallons per month	22,401	34,715	1.55

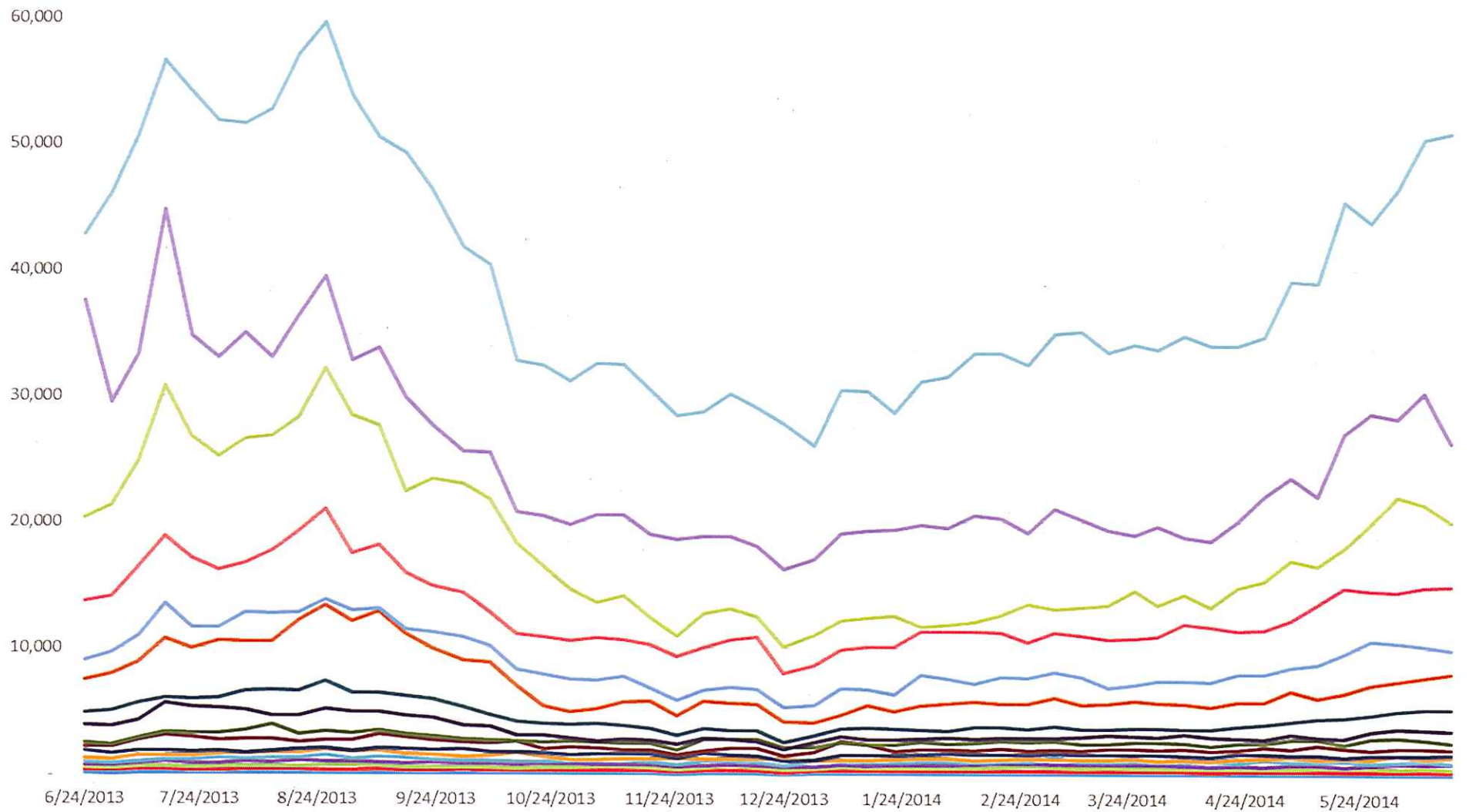
Commercial

WEEKLY USAGE PER METER



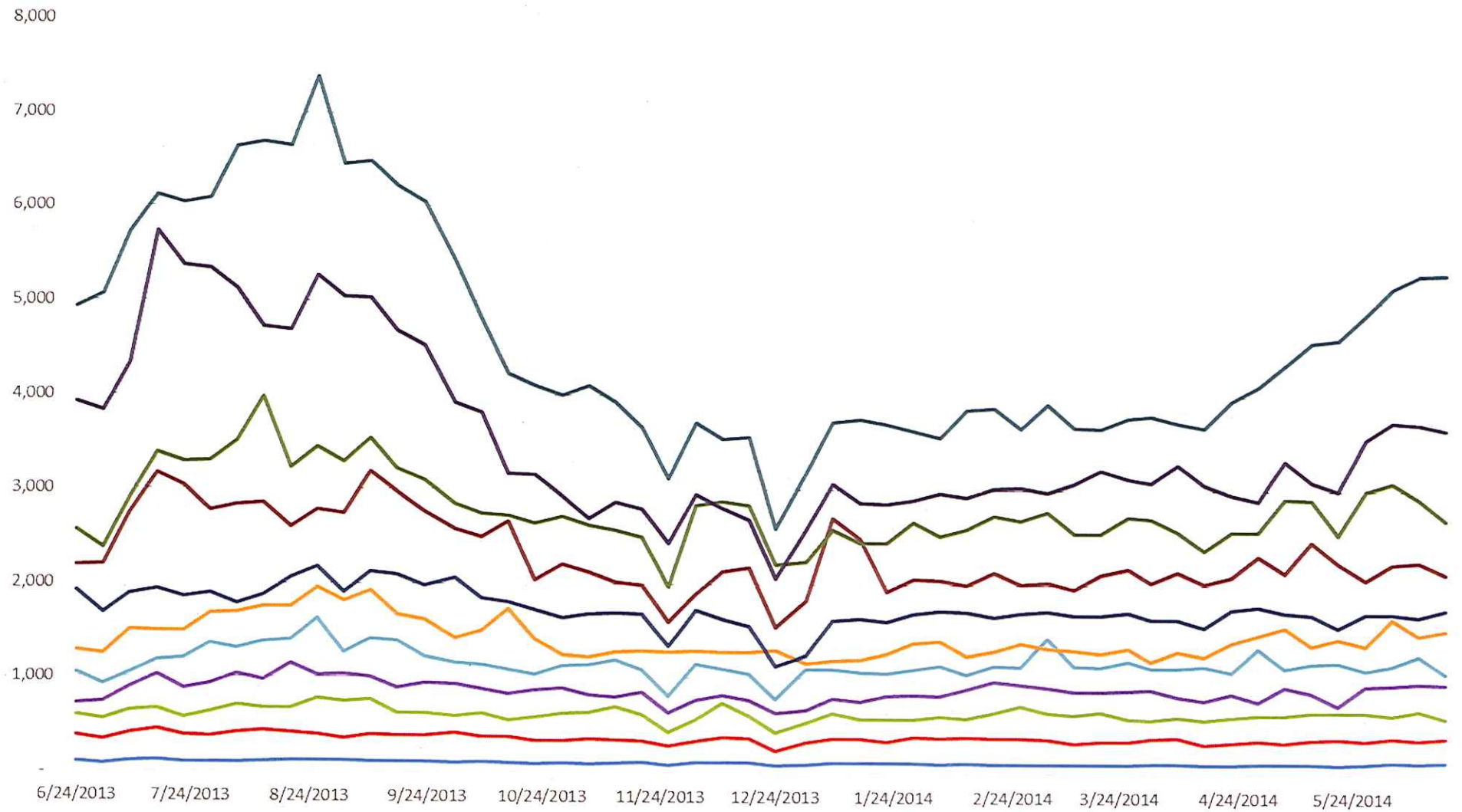
Commercial

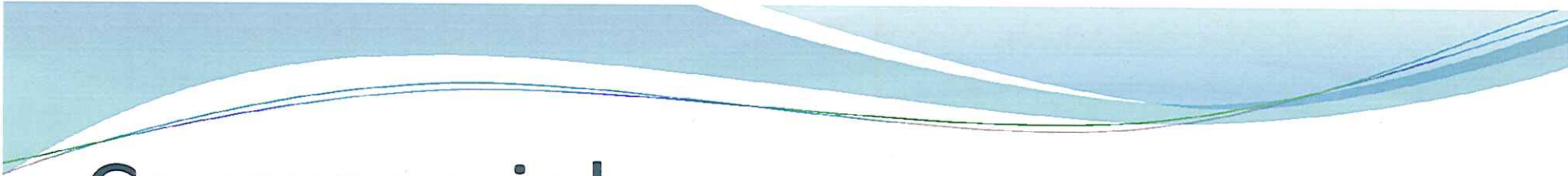
WEEKLY USAGE PER METER



Commercial

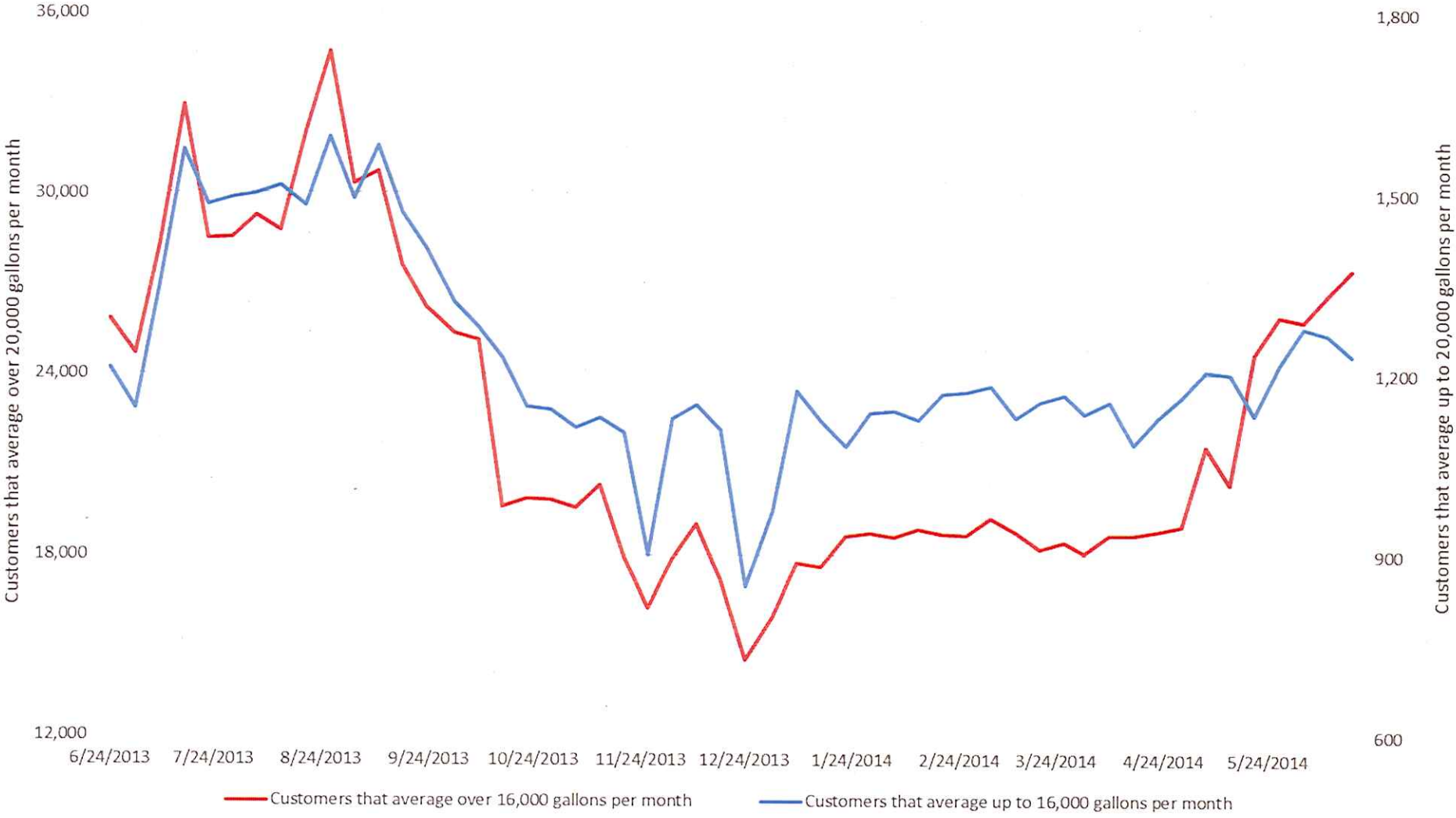
WEEKLY USAGE PER METER





Commercial

WEEKLY USAGE PER METER





Commercial

- Future long-term data needs / analysis
 - More data would need to be collected to determine why these patterns are emerging and if a different rate structure would be more advantageous to address this
 - Compile information on the type of business of the customer (hospital, hotel, restaurant, office, retail store, etc...)
 - Conduct customer survey to measure efficiency, identify reasons for water usage fluctuation, potential for conservation, etc...
 - Use results to analyze potential for adjustment in rates, blocks, customer class definitions...

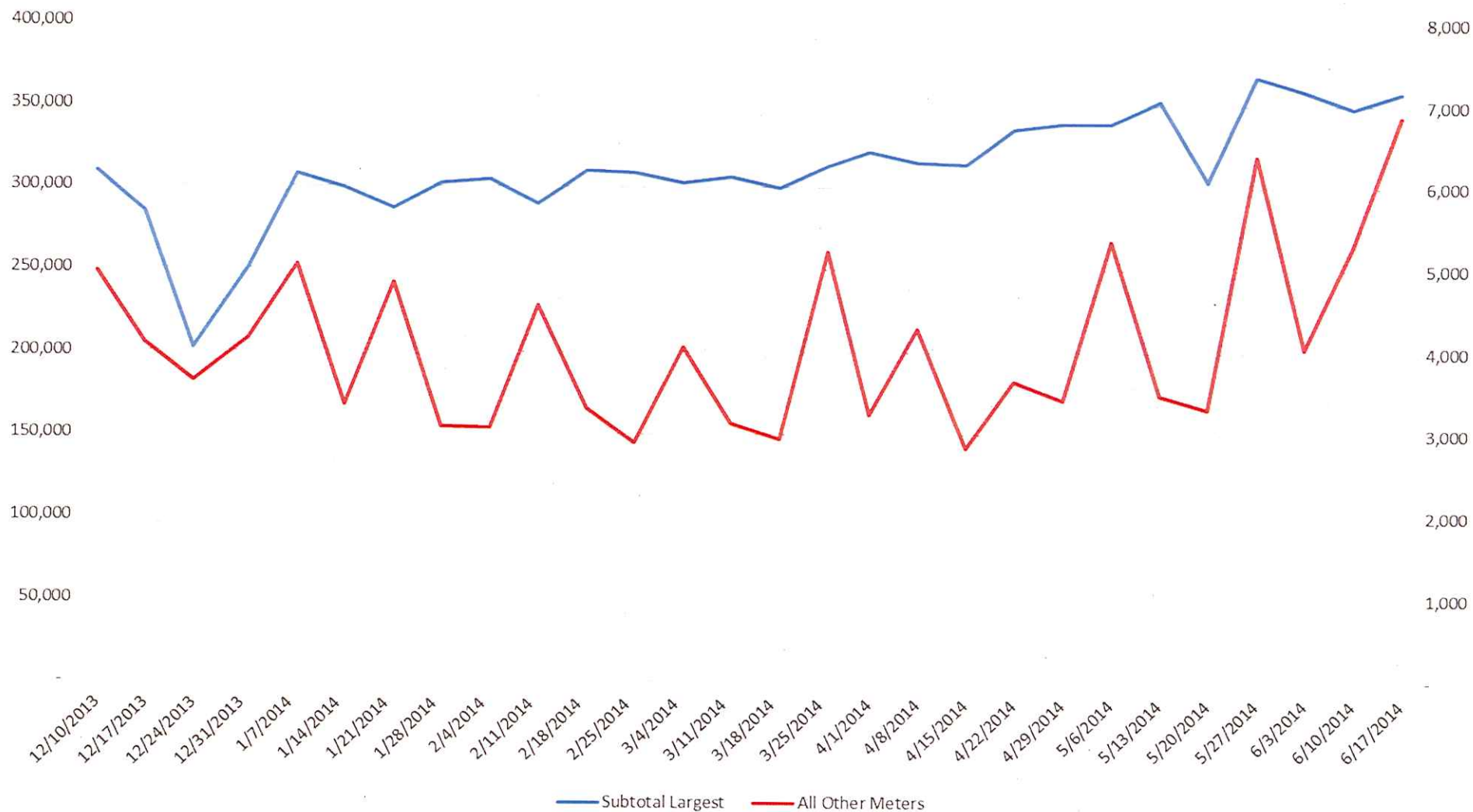


Industrial

- Summary of Analysis
 - As this class contains so few customers, they were not split into groups; instead, the very largest were examined more closely and the smaller meters were grouped together for comparison
 - Individual customers' demand patterns vary widely – collectively, the smaller customers as a group show significantly higher peak usage relative to their collective average usage
 - This would actually indicate cause for lower rates for customers with higher usage; however, as small customers consist of such a low proportion of class usage, the effect of such a structure would be negligible

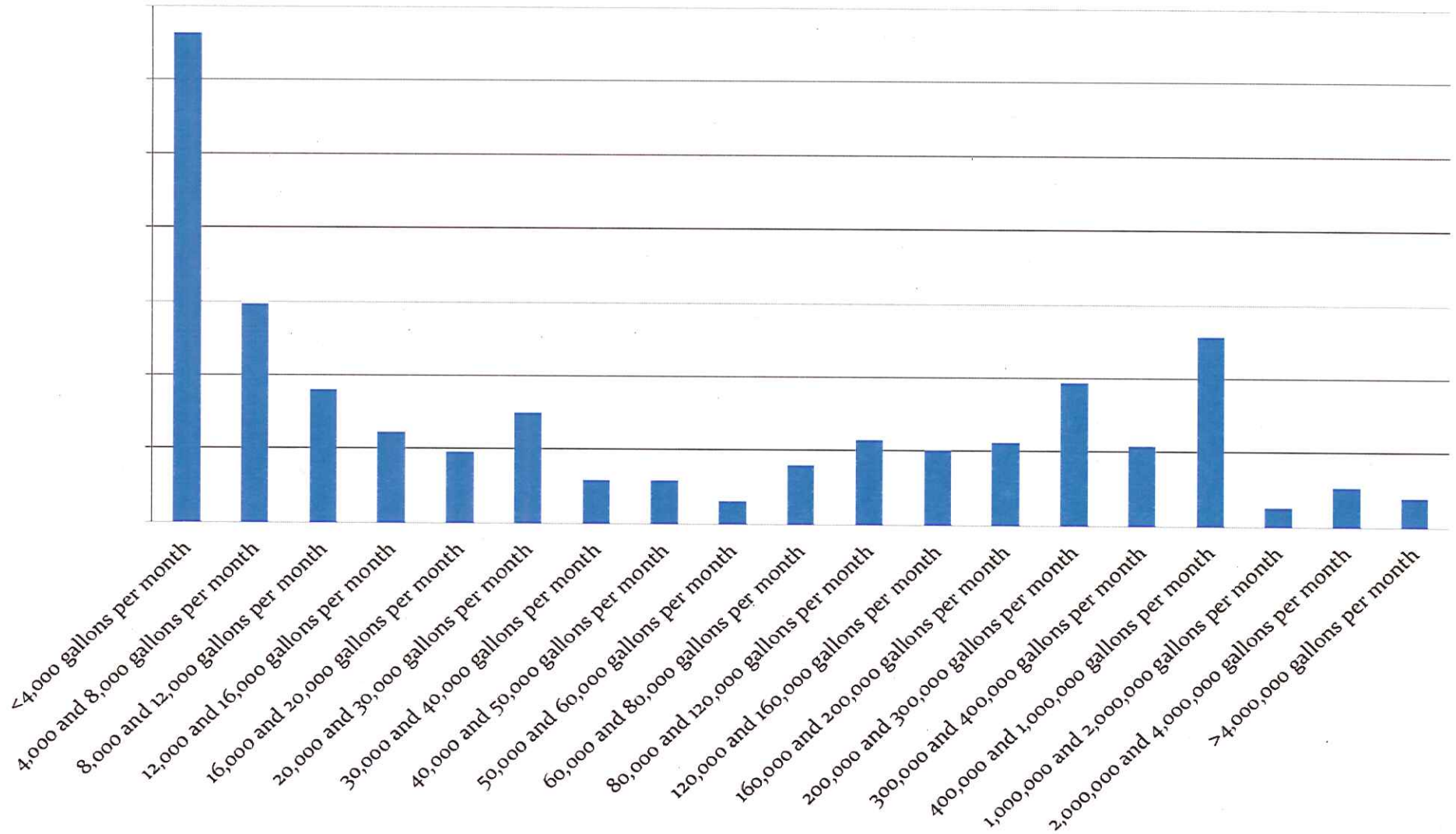
Industrial

WEEKLY USAGE PER METER



Industrial

AVERAGE METER COUNT BY USAGE





Industrial

- Future long-term data needs / analysis
 - Conduct customer survey about efficiency, reasons for water usage fluctuation, potential for conservation, etc..., especially for the largest customers



Public Authority

- Summary of Analysis
 - Customers were split into groups based on average level of usage, as well as the different subclasses: Municipal, Government, UW
 - Customers exhibited a very wide variability in terms of both average water usage and peak water usage relative to average water usage
 - The 3 subclasses, as well as customers within the subclasses, showed inconsistent demand patterns
 - The commonality among the subclasses and individual customers was general high peak usage relative to average usage; however, they often occurred at different times

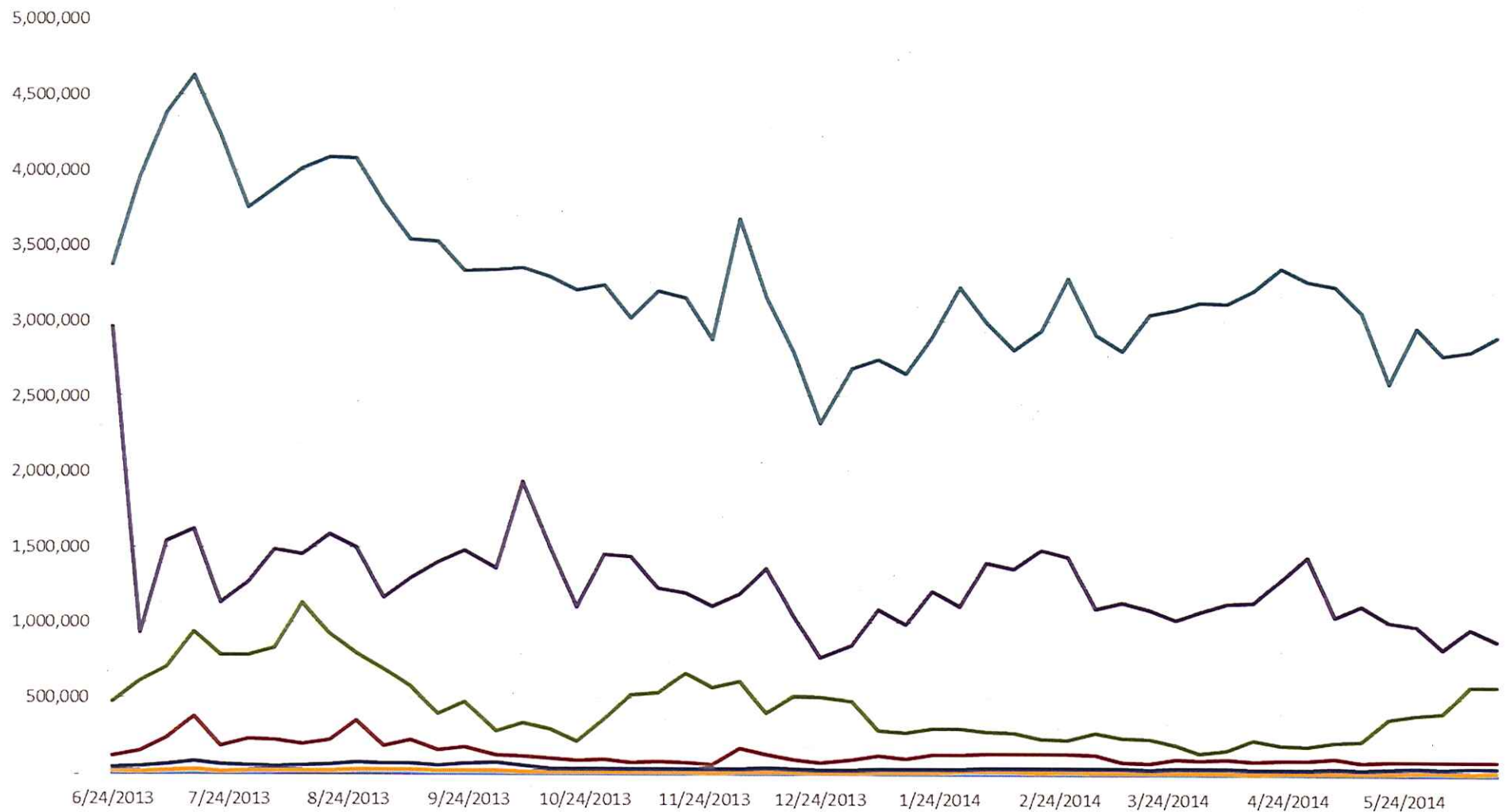


Public Authority

	AVG WEEK	MAX WEEK	MW:AW
Customers that average less than 4,000 gallons / month	382	724	1.89
Customers that average between 4,000 and 8,000 gallons / month	1,492	3,173	2.13
Customers that average between 8,000 and 16,000 gallons / month	2,754	4,231	1.54
Customers that average between 16,000 and 30,000 gallons / month	5,637	9,790	1.74
Customers that average between 30,000 and 60,000 gallons / month	10,971	20,455	1.86
Customers that average between 60,000 and 120,000 gallons / month	20,276	32,386	1.60
Customers that average between 120,000 and 300,000 gallons / month	48,185	82,509	1.71
Customers that average between 300,000 and 1,000,000 gallons / month	135,482	380,202	2.81
Customers that average between 1,000,000 and 4,000,000 gallons / month	448,910	1,133,814	2.53
Customers that average between 4,000,000 and 8,000,000 gallons / month	1,266,703	2,960,300	2.34
Customers that average more than 8,000,000 gallons / month	3,263,654	4,626,300	1.42

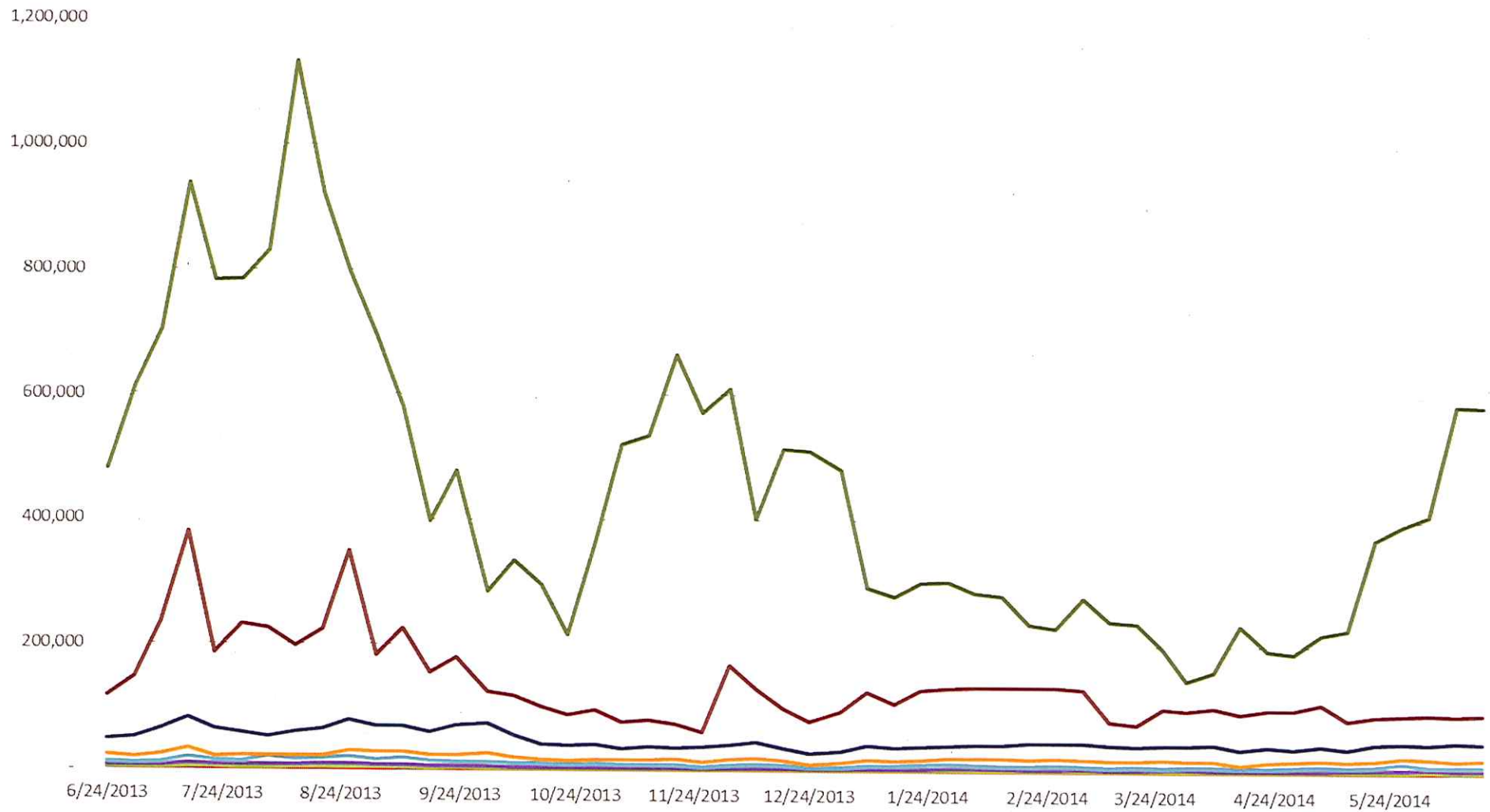
Public Authority

WEEKLY USAGE PER METER



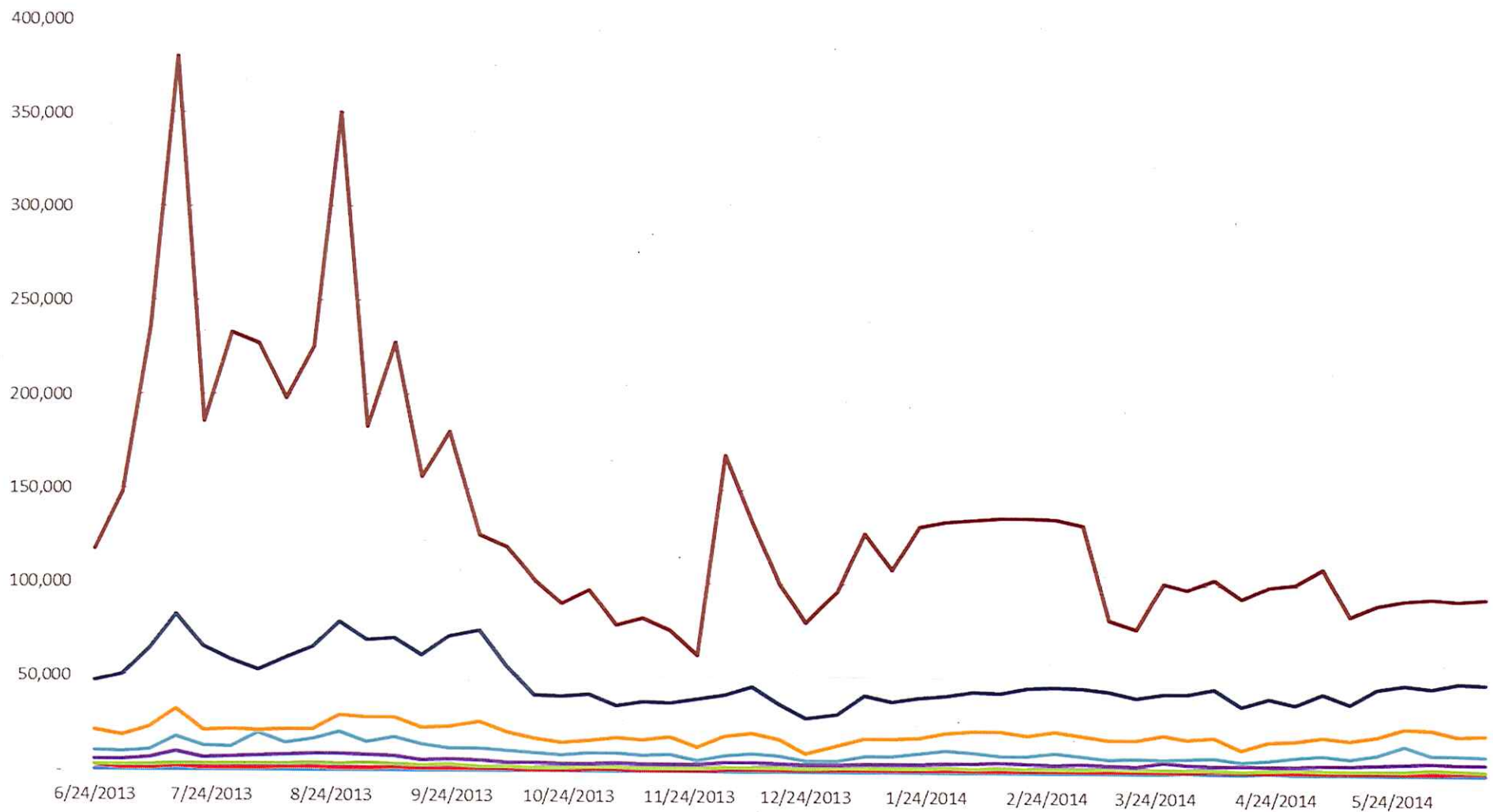
Public Authority

WEEKLY USAGE PER METER



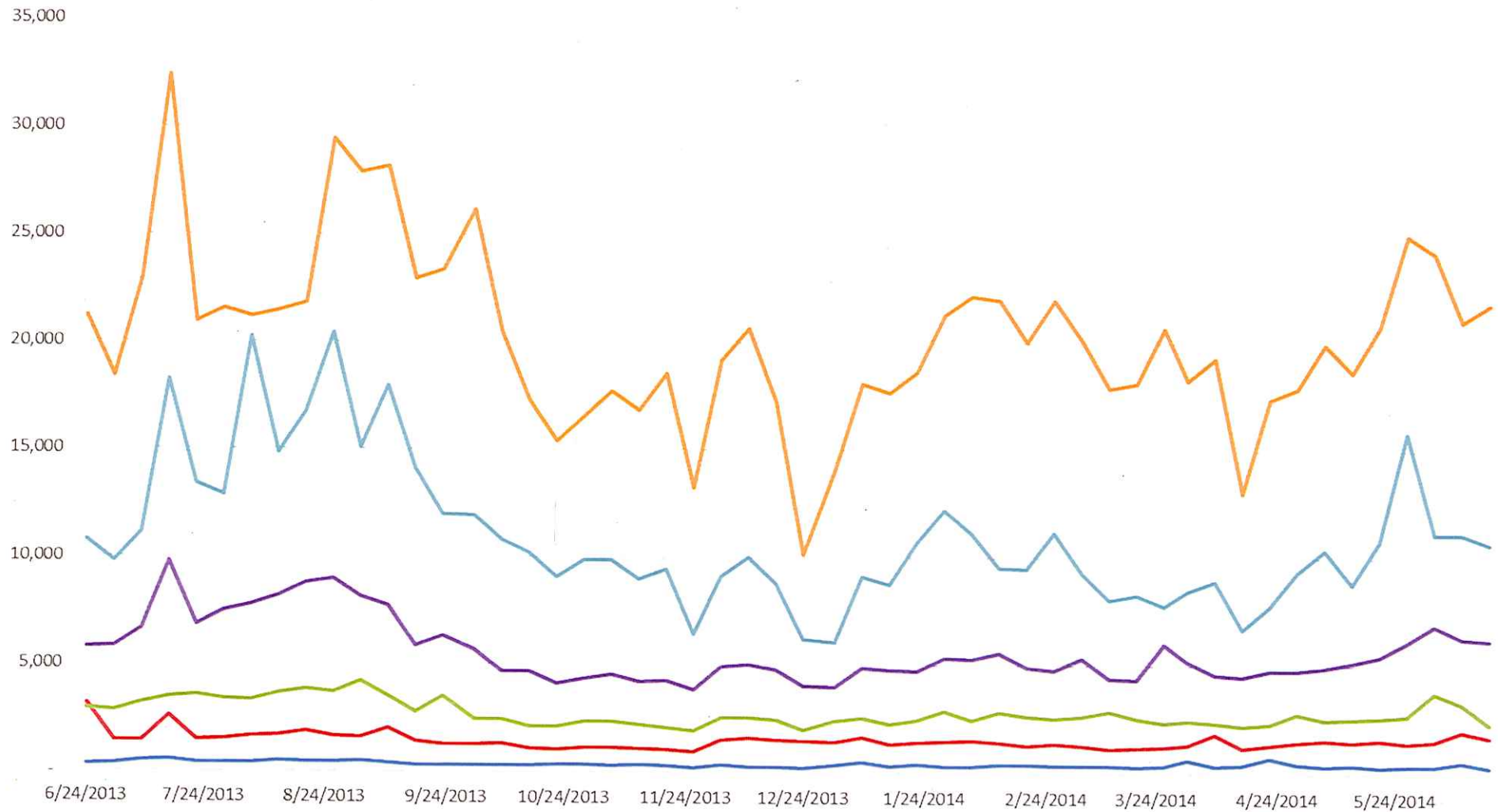
Public Authority

WEEKLY USAGE PER METER



Public Authority

WEEKLY USAGE PER METER





Public Authority

- Future long-term data needs / analysis
 - Outreach to those customers for evaluation of opportunities for conservation
 - Potential for more detailed analysis of hourly usage by subclass



Fixed Charges (Total)

Meter Size	Existing Charge per Month	Proposed Charge per Month – Alt. A	Proposed Charge per Month – Alt. B
5/8"	\$6.00	\$8.62	\$7.73
3/4"	\$9.50	\$13.70	\$12.70
1"	\$17.25	\$24.65	\$23.05
1 1/2"	\$30.00	\$42.65	\$39.90
2"	\$56.00	\$78.95	\$75.00
3"	\$155.00	\$216.60	\$209.35
4"	\$320.00	\$445.70	\$433.95
6"	\$577.50	\$803.90	\$783.40
8"	\$1,120.00	\$1,556.40	\$1,522.40
10"	\$1,926.00	\$2,673.70	\$2,621.00

Residential Rates

Existing Rate - \$2.81 / 1,000 gallons

Proposed Rates – Alt. A

Residential (during off-peak season bills October – May)	With higher fixed charge	With lower fixed charge
All Usage	\$2.96	\$3.19

Residential (during peak season bills June – September)	With higher fixed charge	With lower fixed charge
First 6,000 Gallons / Month	\$2.96	\$3.19
Over 6,000 Gallons / Month	\$4.48	\$4.82

Proposed Rates – Alt. B

Residential (Year- Round)	(per thousand gallons)
First 3,000 Gallons / Month	\$2.91
Next 3,000 Gallons / Month	\$3.33
Next 3,000 Gallons / Month	\$3.68
Next 5,000 Gallons / Month	\$4.58
Over 14,000 Gallons / Month	\$5.16

Non-Residential Rates

Existing Rates

Non-Residential (including Multi-Family)	(per thousand gallons)
First 62,331 Gallons / Month	\$2.34
Over 62,331 Gallons / Month	\$1.83

Proposed Rates – Alt. A

Multi-Family	Higher Fixed	Lower Fixed
All Usage	\$2.61	\$2.64

Commercial	Higher Fixed	Lower Fixed
All Usage	\$2.69	\$2.72

Industrial	Higher Fixed	Lower Fixed
All Usage	\$2.54	\$2.53

Public Authority	Higher Fixed	Lower Fixed
All Usage	\$3.33	\$3.34

Non-Residential Rates

Existing Rates

Non-Residential (including Multi-Family)	(per thousand gallons)
First 62,331 Gallons / Month	\$2.34
Over 62,331 Gallons / Month	\$1.83

Proposed Rates – Alt. B

Multi-Family	(per thousand gallons)
All Usage	\$2.64
Commercial	(per thousand gallons)
First 16,000 Gallons / Month	\$2.50
Over 16,000 Gallons / Month	\$2.79
Industrial	(per thousand gallons)
All Usage	\$2.53
Public Authority	(per thousand gallons)
All Usage	\$3.34

Wholesale Rates

Existing Rates

Wholesale	(per thousand gallons)
Fitchburg	\$2.19
Maple Bluff, Shorewood Hills, Waunona	\$2.07

Proposed Rates – Alt. B

Fitchburg	(per thousand gallons)
All Usage	\$2.90

Maple Bluff	(per thousand gallons)
All Usage	\$2.08

Shorewood Hills	(per thousand gallons)
All Usage	\$1.52

Waunona Sanitary District	(per thousand gallons)
All Usage	\$1.57

Residential Customer Bill Impacts under Alt. B

Customer Type	Meter Size (Inches)	Volume Gallons	Monthly Bill with Public Fire Protection			
			Bill at Old Rates	Bill at New Rates	Dollar Change	Percentage Change
Small Residential (Off-Peak)	5/8	2,000	\$11.62	\$13.55	\$1.93	16.6%
Small Residential (Peak)	5/8	2,500	\$13.03	\$15.01	\$1.98	15.2%
Small Residential (Annual)			\$145.06	\$168.42	\$23.36	16.1%
Average Residential (Off-Peak)	5/8	4,000	\$17.24	\$19.79	\$2.55	14.8%
Average Residential (Peak)	5/8	5,000	\$20.05	\$23.12	\$3.07	15.3%
Average Residential (Annual)			\$218.12	\$250.80	\$32.68	15.0%
Large Residential (Off-Peak)	5/8	10,000	\$34.10	\$42.07	\$7.97	23.4%
Large Residential (Peak)	5/8	14,000	\$45.34	\$60.39	\$15.05	33.2%
Large Residential (Annual)			\$454.16	\$578.12	\$123.96	27.3%
Very Large Residential (Off-Peak)	5/8	16,000	\$50.96	\$70.71	\$19.75	38.8%
Very Large Residential (Peak)	5/8	30,000	\$90.30	\$142.95	\$52.65	58.3%
Very Large Residential (Annual)			\$768.88	\$1,137.48	\$368.60	47.9%

Non-Residential Customer Bill Impacts under Alt. B

Customer Type	Meter Size (Inches)	Volume Gallons	Monthly Bill with Public Fire Protection			
			Bill at Old Rates	Bill at New Rates	Dollar Change	Percentage Change
Average Multi-Family	5/8	40,000	\$99.60	\$113.33	\$13.73	13.8%
Large Multi-Family	1	500,000	\$964.04	\$1,343.05	\$379.01	39.3%
Commercial	5/8	8,000	\$24.72	\$27.73	\$3.01	12.2%
Commercial	1	32,000	\$92.13	\$106.53	\$14.40	15.6%
Commercial	1 1/2	100,000	\$244.79	\$313.10	\$68.31	27.9%
Commercial	2	250,000	\$545.29	\$766.70	\$221.41	40.6%
Commercial	6	4,600,000	\$9,027.29	\$13,611.60	\$4,584.31	50.8%
Industrial	1	65,000	\$167.99	\$187.50	\$19.51	11.6%
Industrial	4	900,000	\$1,998.79	\$2,710.95	\$712.16	35.6%
Industrial	6	7,000,000	\$13,419.29	\$18,493.40	\$5,074.11	37.8%
Industrial	6	17,000,000	\$31,719.29	\$43,793.40	\$12,074.11	38.1%
Public Authority	1	125,000	\$277.79	\$440.55	\$162.76	58.6%
Public Authority	4	4,500,000	\$8,586.79	\$15,463.95	\$6,877.16	80.1%
Public Authority	8	6,000,000	\$12,131.79	\$21,562.40	\$9,430.61	77.7%
Public Authority	10	18,000,000	\$34,897.79	\$62,741.00	\$27,843.21	79.8%



Further Information

- Alliance for Water Efficiency report – Building Better Water Rates for an Uncertain World: *Balancing Revenue Management, Resource Efficiency, and Fiscal Sustainability*
 - <http://www.financingsustainablewater.org/tools/building-better-water-rates-uncertain-world>