

**Rate Study  
for  
Water, Sewer, and Street Sweeping Services  
by the  
Mission Hills Community Services District**

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**Mission Hills Community Services District 2011 Rate Study**  
**Executive Summary**

This report presents the result of a Rate Study for the Mission Hills Community Services District's water, sewer, and street sweeping services. It is the intent of this report that the proposed new service charges meet the requirement of Proposition 218 for increasing property related fees or charges. To that end, rates are proposed so that (a) revenues from the fees will not exceed the funds required to provide the service, and (b) the fees will not exceed the proportional cost of service attributable to each parcel served.

**Proposed Service Rates**

Existing and proposed water, wastewater and street sweeping rates are shown below. Water rates include a fixed, "Basic Monthly" charge based on meter size, plus a tiered use charge based on water use. Sewer charges include a fixed, "Basic Monthly" charge, as well as a use charge that is adjusted annually, based on each customer's average water use during the months of December, January, and February.

Table ES3. Existing and Proposed Charges

		Existing Monthly Charges	Proposed Monthly Charges	
<b>Water Basic Monthly</b>	3/4" meter	\$16.60	\$26.46	
	1" meter	\$20.75	\$29.45	
	1.5" meter	\$41.50	\$33.44	
	2" meter	\$75.52	\$44.41	
	3" meter	\$234.48	\$125.20	
	4" meter	\$425.38	\$155.12	
<b>Rate Stabilization</b>		\$4.65	\$0.00	
			Residential	Non-Residential
<b>Water Use per Unit</b>	0-10 units	\$0.90	\$1.61	\$1.27
	11-20 units	\$1.25	\$2.25	\$1.78
	21-30 units	\$1.45	\$2.57	\$2.03
	30 plus units	\$1.75	\$3.05	\$2.41
<b>Sewer Basic Monthly</b>		\$31.50	\$6.69	
<b>Sewer Use per Unit of Water, Dec-Feb avg.</b>		\$0.00	\$2.99	\$3.25
<b>Street Sweeping Monthly</b>		\$1.10	\$1.32	

The proposed charges are expected to increase the average monthly water charges from \$44.36 to \$62.12, an increase of approximately 40%. Average monthly sewer charges will increase from \$31.76 to \$38.22, an increase of approximately 20%. Average monthly total bills will increase from \$77.22 to \$101.66, an increase of approximately 32%.

Not all customers will see their total monthly charges change by this average amount: 20% of customers will see their rates stay the same or decrease, 34% of customers will see their rates increase by \$25 or more, 14% of customers will see their monthly rate increase by \$50 or more, and 4% of customers will see their total monthly charges increase by \$100 or more.

To account for inflation, it is recommended that the Consumer Price Index for water and sewer and trash collection services published by the Bureau of Labor Statistics be used and the service charges be adjusted annually.

## Methods Used to Determine Required Service Charges

The 2011-2012 District Budget was used as the basis to project future revenue needs. Depreciation expenses from the budget were included as expenses to fund reserves for asset replacement costs. Distributions from the existing reserve fund were not included in the calculation of revenue requirements.

Table ES1. Revenue and Expense Projections, 2011-12 Budget Year

Category	Water	Sewer	Street Sweeping	Total
O&M Expenses	\$ 764,020	\$ 514,622	\$ 17,989	\$ 1,296,631
Non-O&M Expenses	220,180	85,320	-	305,500
Total Expenses	\$ 984,200	\$ 599,942	\$ 17,989	\$ 1,602,131
Revenue (excluding Service Charges)	39,586	23,414	-	63,000
Required Service Charge Revenue	\$ 944,614	\$ 576,528	\$ 17,989	\$ 1,539,131

The “Base-Extra Capacity” methodology, as described in detail in “Water Rates” -- AWWA Manual No. M1, was used to allocate the required charges among basic, extra capacity, fire protection, and per-customer services provided by the District.

Table ES2. Required Service Charges Allocated to Cost Components

Design/Use Basis	Base	Peak Day	Peak Hour	Fire	Meter	Customer	Total
<u>System Total Combined Allocation Proportions</u>							
Water System	39.1%	8.6%	7.6%	6.9%	19.8%	18.0%	100.0%
Sewer System	62.8%	6.0%	13.7%			17.5%	100.0%
Street Sweeping						100.0%	100.0%
<u>System Total Combined Service Charge Needed</u>							
Water System	\$ 369,298	\$ 81,650	\$ 71,328	\$ 65,444	\$ 186,817	\$ 170,077	\$ 944,614
Sewer System	\$ 362,276	\$ 34,366	\$ 79,068			\$ 100,818	\$ 576,528
Street Sweeping						\$ 17,989	\$ 17,989

Two customer classes were established: Residential and Non-Residential. The required charges were allocated to customer classes based on use characteristics of each customer class. . Because charges will increase for many customers, it was assumed that overall water use rates would decline by 5%. Total costs were allocated so that fees collected would match total expected costs.

## **Mission Hills Community Services District 2011 Rate Study**

### **Purpose of Report**

The purpose of this report is to provide information to assist the Mission Hills Community Services District in setting new service charges for water, sewer, and street sweeping services. It is the intent of this report that the proposed new service charges meet the requirement of Proposition 218 for increasing property related fees or charges. To that end, rates are proposed so that (a) revenues from the fees will not exceed the funds required to provide the service, and (b) the fees will not exceed the proportional cost of service attributable to each parcel served.

### **Scope of Work**

Upon request by the Mission Hills Community Services District, the following tasks were performed by Garing Taylor & Associates:

#### **Customer Database for Notification**

GTA produced a database containing information needed to provide notice to property owners within the District. For each parcel within the District the database contains the assessor's parcel number (APN), owner's name and mailing address, parcel address, and a list of services provided by the District to the parcel.

#### **Rate Study – Water and Sewer**

GTA conducted a rate study for water and sewer services provided by the District. The "Base-Extra Capacity" methodology, as described in detail in "Water Rates" -- AWWA Manual No. M1, was used. Costs were projected based on District-supplied financial projections, engineering records, and use records. Costs were allocated for basic service, extra capacity, fire protection, and per-customer services. These costs were allocated to customer classes based on use characteristics of each customer class. Total costs were allocated so that fees collected match total expected costs for the next three years.

#### **Results – Recommended Water, Sewer, and Street Sweeping Rates**

The allocation methodology and results are discussed below.

### **Methodology and Results**

#### **Revenue Requirements Projections**

Revenue requirements were projected based on the District's 2011-2012 Budget, as shown in Appendix A. These projections make use of the "cash needs" approach, as per AWWA guidance. "*Cash needs* refer to the total revenues required by the utility to meet its cash expenditures..." This cash needs approach should not be confused with the accounting term *cash* as compared to *accrual* as an accounting method.

#### **Reserves for Capital Replacement and Inclusion of Depreciation as an Expense**

The District's 2011-2012 Budget includes depreciation as an expense. These projected depreciation expenses are based on straight-line depreciation of fixed assets based on the cost of the asset. For the purposes of this rate study, these depreciation expenses are assumed to be used to fund a reserve for future replacement of these assets. However, because replacement costs typically are greater than original costs, it is likely that the depreciation expenses shown in the budget underestimate the appropriate reserve funding level needed for these future replacements.

In addition, we are aware that the District has an existing reserve fund with a positive balance. As shown on the budget, the District expects to draw down that reserve fund during the next fiscal year to cover any shortfall between costs and revenue. Note that estimating these future replacement costs and developing a plan to build and maintain a sufficient reserve fund is beyond the scope of this report. We recommend that such a study be undertaken soon, so that the District can be prepared for these replacement costs as they arise.

*Expense Projections*

Annual Operation and Maintenance (O&M) expenses comprise the bulk of the expenses of the District and include wages, salaries, and benefits, repairs and maintenance, utility costs, office expenses, and other miscellaneous costs. These expenses exclude depreciation expenses and capital-related costs, as per AWWA guidance.

Non-O&M costs include debt principal and interest (if any), contributions to specific reserves, and costs of capital expenditures that are not debt financed. As noted above, depreciation expenses shown on the 2011-12 budget are treated as contributions to reserves for future asset replacement costs.

For purposes of setting rates, expenses are projected to remain steady for the next three years, without taking account for inflation. To adjust for inflation, it is recommended that the rates be adjusted annually based on the Consumer Price Index for water and sewer and trash collection services published by the Bureau of Labor Statistics. This index had a value of 178.640 for June 2011, an increase of 5.2% from June 2010 (<http://www.bls.gov/cpi/cpid1106.pdf>).

*Revenue Projections (excluding Service Charges)*

District revenues are projected to include income from fines and other fees, as well as interest earned from various reserve funds.

*Projected Service-Charge Requirements*

The difference between expense and revenue projections is the revenue that must be collected as service charges to District customers.

These projections are summarized below in Table 1.

**Table 1. Revenue and Expense Projections, 2011-12 Budget Year**

Category	Water	Sewer	Street Sweeping	Total
O&M Expenses	\$ 764,020	\$ 514,622	\$ 17,989	\$ 1,296,631
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Required Service Charge Revenue	\$ 944,614	\$ 576,528	\$ 17,989	\$ 1,539,131

Allocation of Itemized Water and Sewer Expenses to Cost Components

The District supplies water and sewer services to meet the varying demands of its customers. Because water and sewer use varies with time, the systems are designed and operated to

meet peak demands. In addition, the system is operated to meet fire protection demands, meter service to each customer, and provide billing and informational services to each customer.

Many of the itemized expenses incurred by the District are associated with specific *functions* of the system and can therefore be attributed to meeting the average annual demand, the peak daily demand, or the peak hourly demand. Other itemized costs can be attributed to providing fire protection service, metering service, or customer service. In addition, a number of itemized costs can be attributed to administering the water and systems as a whole.

These considerations form the basis of the “base-extra capacity” method of allocating costs based on the function served by the component incurring the expense.

All itemized district expenses were allocated among the following *cost components*:

- Administration
- Base
- Peak Daily
- Peak Hourly
- Fire
- Metering
- Customer Service

Itemized expenses were allocated among these functional cost components as described below.

#### *Administration Costs*

The following costs were treated as administration costs and were then re-allocated to the other cost components on the basis of the allocation of all other expenses, exclusive of power and chemical costs, as recommended by AWWA:

- Insurance
- Memberships in various organizations
- Office expenses
- Contractual and Professional Services for Telephone Service, Uniform Service, and the USGS Study
- Travel to seminars and trainings
- Uncollectable accounts
- Telephone fees
- Governmental Fees and Charges

### *Base Costs*

Base costs are those O&M and capital costs required in order to provide water or collect and treat wastewater at an average rate of use. These costs would generally vary with the amount of water used or wastewater collected, or would be incurred regardless of the amount of service provided. The following costs were treated as base costs and were allocated to the base cost component of both the water system and the sewer system:

- Energy costs
- Vehicle expenses
- Operating supplies (chemicals, small tools, etc.)
- Safety Equipment
- Contractual and Professional Services for System Maintenance
- General purpose items expensed under “Repairs and Maintenance”
- Research and Monitoring
- Dump fees
- Set-asides for future sludge removal
- Cost of tools and other equipment
- Building improvement to the carport and lift station
- Contingencies

### *Extra Capacity Costs*

The “base-extra capacity” method of allocating costs takes into account the average quantity of water delivered, or wastewater collected, and also the peak rate at which it is delivered or collected. The increased costs associated with meeting peak demands are allocated so that users with higher peak demands pay proportionately more.

Extra capacity costs are those O&M and capital costs required in order to meet peak rates of use. These extra capacity costs are further subdivided into costs to meet maximum day and maximum hour demands.

Note that components sized to meet peak hour demands are also used to meet peak day demands and average (base) demands. Likewise, system components sized to meet peak day demands are also used to meet base demands. Therefore, costs for these components are allocated in a manner that equitably shares costs among peak hourly, peak daily, and base cost components, based on the magnitude of the respective demands, as described below.

### *Base Cost Allocation*

Items that are designed to meet the average demand are allocated 100% to the base cost component.

### *Max Day Cost Allocation*

The following costs were treated as maximum day costs, and were allocated among base and max day costs components as described below.

- Water treatment plant expenses
- Well operation and maintenance costs
- Wastewater treatment plant expenses

Each system component that is associated with meeting peak daily demands also is used to meet average daily, or base, demands. Therefore, the associated costs can be allocated to both maximum day and average daily (base) cost components based on the Maximum Day peaking factor, as described below.

For example, consider the \$1,200 budgeted for air release valves, media, and gaskets for the water treatment plant. The treatment plant is run at a constant rate each day. This daily rate changes as daily demand rises or falls. Therefore, the treatment plant was designed and is operated to meet peak daily demand. The 2005 Master Plan reported a Maximum Day peaking factor of 2.75, based on District records. The system also meets the average daily demand which is only 36% of the peak daily demand ( $1.00 / 2.75 = 36\%$ ). Therefore the cost for air release valves, media, and gaskets can be attributed 64% to meet peak daily demand, and 36% to meet average daily (base) demand.

Likewise, the Max Day peaking factor for the wastewater system has been estimated to be 1.3, based on District influent records from June 2010 to May 2011. Therefore the cost for components sized to meet peak day demands can be attributed 23% ( $0.3/1.3 = 23\%$ ) to meet peak daily demand, and 77% to meet average daily (base) demand.

### *Peak Hour Cost Allocation*

The following costs were treated as peak hour costs, and were allocated among base, peak day, and peak hour costs components as described below.

- Water Distribution System expenses
- Wastewater collection system expenses

For the water system, the Maximum Day peaking factor is 2.75, as reported in the 2005 Master plan. Analysis of the modeled tank levels in the 2005 Master Plan shows the Max Hour flow rate to be 2511 gpm. Comparison to the Average annual demand of 479 gpm results in a Max Hour peaking factor of 5.24. System components that are designed and operated to meet peak hourly demands are also used to meet maximum day and average day demands. Their costs can be allocated to these costs components as follows.

Average annual (base) demand is 19% of peak hourly demand ( $1.00 / 5.24 = 19\%$ ). Therefore, 19% of costs associated with system components used to meet Peak Hour demands can be allocated to the Base cost component.

Because the system has a Max Day peaking factor of 2.75, the the peaking factor for the *excess capacity* needed to meet Max Day demands is 1.75 ( $2.75 - 1.00 = 1.75$ ). This excess capacity needed to meet Max Day demands is 33% of the Peak Hour demand ( $1.75 / 5.24 = 33\%$ ). Therefore, 33% of costs associated with system components used to meet Peak Hour demands can be allocated to the Max Day cost component.

The remaining 48% of costs associated with system components that are designed and operated to meet peak hourly demands are therefore allocated to the Max Hour cost component.

An identical method was used for the wastewater system. The Max Day peaking factor for the wastewater system was estimated to be 2.0, as reported in the 2005 Master plan. Therefore the cost for components sized to meet peak hourly demands can be attributed 35% to peak hour demands, 15% to meet peak daily demand, and 50% to meet average daily (base) demand.

*Reservoir Costs*

The water system reservoirs are operated to be at least 70% full. The top 30% is used to accommodate the varying flow rates encountered each day. Therefore 30% of the cost of the reservoir is allocated to the Peak Hour cost component. The remaining 70% of the reservoir is available for fire protection, or for use when the Districts water sources (Wells 5, 6, and 7) are unable to produce. Therefore, the remaining 70% of the reservoir cost is split equally between Fire Protection and Base cost components

The cost allocation used for base, peak day, peak hour, and reservoir costs are summarized below in Table 2.

Table 2. System Component Cost Allocation Proportions

Design/Use Basis	Peaking Factor	Base Cost Component	Peak Day Cost Component	Peak Hour Cost Component	Fire Cost Component
<u>Water System</u>					
Base	1	100%			
Peak Day	2.75	36%	64%		
Peak Hour	5.24	19%	33%	48%	
Reservoir	n/a	35%		30%	35%
<u>Sewer System</u>					
Base	1	100%			
Peak Day	1.30	77%	23%		
Peak Hour	2.00	50%	15%	35%	

*Fire Protection Costs*

Costs for the O&M and capital costs associated with fire hydrants is allocated to the fire protection cost component.

*Meters and Connections Costs*

These costs are for maintenance and capital costs of providing meters and other connections to the system. All costs were allocated to the meter cost component.

*Customer Service Costs*

For the water system, customer service costs include costs for meter reading, billing, collecting, and accounting. For both systems, customer service costs include costs for printing notices that are sent to each customer and advertising costs for public notices.

*Results - Total Combined Allocation Proportions*

These allocation proportions were applied to itemized expenses from water and sewer system budgets for 2011-2012, as shown in Appendix A. The purpose of this allocation was to determine

the relative contribution of each cost component to the overall cost of each system. The total combined allocations of itemized expenses are summarized below in Tables 3 and 4.

Table 3. Combined Water Cost Allocation Factors

Base	Peak Day	Peak Hour	Fire	Meters	Customer Service	Total
FY 2011-2012 Itemized and Allocated Water Costs						
\$246,801	\$54,566	\$ 47,668	\$ 43,736	\$124,850	\$ 113,662	\$ 631,283
Combined Water Cost Allocation Factor						
39.1%	8.6%	7.6%	6.9%	19.8%	18.0%	100.0%

Table 4. Combined Sewer Cost Allocation Factors

Base	Peak Day	Peak Hour	Customer Service	Total
FY 2011-2012 Itemized and Allocated Sewer Costs				
\$ 246,746	\$ 23,407	\$ 53,853	\$ 68,667	\$ 392,673
Combined Sewer Cost Allocation Factor				
62.8%	6.0%	13.7%	17.49%	100%

#### Allocation of Revenue Requirements

These cost allocation factors were then used to allocate the total required service charge revenue among the various cost components, as shown below in Table 5. Note that the total service charges match the required revenue values previously shown in Table 1.

Table 5. Required Service Charges Allocated to Cost Components

Design/Use Basis	Base	Peak Day	Peak Hour	Fire	Meter	Customer	Total
<u>System Total Combined Allocation Proportions</u>							
Water System	39.1%	8.6%	7.6%	6.9%	19.8%	18.0%	100.0%
Sewer System	62.8%	6.0%	13.7%			17.5%	100.0%
Street Sweeping						100.0%	100.0%
<u>System Total Combined Service Charge Needed</u>							
Water System	\$ 369,298	\$ 81,650	\$ 71,328	\$65,444	\$186,81	\$ 170,077	\$944,614
Sewer System	\$ 362,276	\$ 34,366	\$ 79,068			\$ 100,818	\$576,528
Street Sweeping						\$ 17,989	\$ 17,989

#### Costs Allocated to Customer Classes

To fairly allocate the Cost Components to the water service customers, it is necessary to estimate the Max Day and Max Hour peaking factors for each class of customer. The methods used to estimate these peaking factors are presented below.

### *Customer Classes*

Examination of District billing records and Santa Barbara County assessors parcel data allow the District's water customers to be classified as follows:

Residential: single-family or duplex homes served by a single meter

Non-Residential: any customer that is not a Residential customer

District Facilities\*

(\* service is not billed, but water use is metered)

Note that the "Base-Extra Capacity" method used in this study allocates costs to different customer classes according to the different needs of each customer class for Peak Day and Peak Hour demands. As discussed below, these peak demands are estimated from monthly variability in water sales, specifically the ratio between maximum monthly (MM) demand and average annual (AA) demand. A t-test statistical analysis of billing records shows that Non-Residential and Residential customer classes have a significantly different MM:AA ratio. Statistical analyses that further subdivided these two classes did not reveal any customer sub-classes whose MM:AA ratios were significantly different from any other sub-class. Therefore, it is reasonable to limit the number of customer classes to two (ignoring the District facilities that are not billed) when setting water charge rates.

### *Water Use Characteristics of Each Customer Class*

Because detailed hour-by-hour demand information is not available for individual customers, Max Day and Max Hour peaking factors were estimated. The process used to estimate these factors follows American Water Works Association guidance.

The first step is to calculate the Maximum Month (MM) to Annual Average (AA) demand for each class of customer, and for the system as a whole. The results of this calculation are shown below in Table 6.

The next step is to estimate the Max Day peaking factor. Each customer class's MM:AA ratio, is multiplied by the system-wide Max Day to Max Month (MD:MM) ratio (1.87) to arrive at an estimate of the Max Day to Annual Average (MD:AA) ratio for that customer class.

The final step is to estimate the Max Hour peaking factor. A uniform assumption was used regarding the number of hours per day that water would be used on a day of maximum demand (MD) that also produced the peak hourly demand (PH). The PH:MD ratio is multiplied by the MD:AA ratio to obtain the PH:AA ratio, also known as the Max Hour peaking factor.

These calculations and estimations are shown below in Table 6.

**Table 6. Water Peaking Factor Estimates for Customer Classes**

Customer Class	Average Total Meter Units (1 unit = 748 gal) per Month	Max Monthly (MM) Meter Units per Month	MM : AA ratio	System Max Day : Max Month (MD:MM) ratio	Max Day : Annual Avg ratio	Hours of Use in 24 hour period	Peak Hour : Max Day ratio (PH:MD)	Peak Hour to Annual Average ratio (PH:AA)
Non-Residential	1,851	3,385	1.83	1.87	3.42	12.50	1.92	6.58
District Facilities	62	129	2.08	1.87	3.89	12.50	1.92	7.47
Residential	20,093	29,862	1.49	1.87	2.78	12.50	1.92	5.35
<b>System Total</b>	<b>22,006</b>	<b>32,307</b>	<b>1.47</b>					

As a check on the reasonableness of the assumptions used to estimate these peaking factors, the non-coincident maximum daily and maximum hour demands of each customer class is calculated, and then compared to the coincident (i.e. system-wide) maximum daily and maximum hour demands. The ratio of the total coincident demands to the non-coincident demands is a measure of system diversity.

The calculation of system diversity is shown below in Table 7. According to the American Water Works Association a typical diversity ratio is between 1.10 and 1.40. As can be seen, the resulting diversity ratios are lower than typical values. However, given the dominance of one customer class in the District (over 90% of the annual demand comes from residential service), lower system diversity values are not unreasonable.

**Table 7. Test for System Diversity**

Customer Class	Average Monthly Use (units/month)	Max Day Capacity Factor (MD : AA ratio)	Non-coincident MD demand (units/month)	Peak Hour Capacity Factor (PH : AA ratio)	Non-coincident Peak Hour demand (units/month)
Non-Residential	1,851	3.42	6,341	6.58	12,174
District Facilities	62	3.89	242	7.47	464
Residential	20,093	2.78	55,937	5.35	107,399
<b>Total Non-coincident Demand</b>			<b>62,520</b>		<b>120,038</b>
<b>Total Coincidental System Demand</b>	<b>22,006</b>	<b>2.75</b>	<b>60,517</b>	<b>5.24</b>	<b>115,361</b>
<b>System Diversity</b>			<b>1.03</b>		<b>1.04</b>

*Allocation of Functional Water Cost Components Among Customer Classes*

The Max Day and Max Hour peaking factors are used to allocate functional cost components to the various (billable) customer classes, as described below.

Base costs are to be allocated according to the total amount of water delivered. Therefore, the base units for allocation are the billable annual use, converted to gallons per day.

Max Day excess capacity costs are allocated on the basis of the excess capacity (i.e., above the base flow rate) needed to meet Max Day demand of each customer class. The average annual use is multiplied by the Max Day capacity factor to obtain the Max Day demand. Then

the average annual demand is subtracted. What remains is the Max Day excess capacity and is used to allocate Max Day cost components.

In like manner, Max Hour excess capacity costs are allocated on the basis of the excess capacity (i.e., above the Max Day capacity) needed to meet Max Hour demand of each customer class. The average annual use is multiplied by the Max Hour capacity factor to obtain the Max Hour demand. Then the Max Day demand is subtracted. What remains is the excess Max Hour capacity and is used to allocate Max Day cost components.

Table 8A. Units of Water Service (Base, Excess Capacity, Meter and Customer Service) by Customer Class

Customer Class	Base		Maximum Day			Maximum Hour			Meter	Cust. Service
	Annual Use (gallons)	Base Units (billable annual use in gallons per day)	Max Day Cap. Factor	Total Cap. (gallons per day)	Max Day Excess Capacity Units (gallons per day)	Peak Hour Cap. Factor	Total Capacity (gallons per day)	Max Hour Excess Capacity Units (gallons per day)	Equiv. Meters and Services	Bills
Non-Residential	16,618,316	45,530	3.42	155,930	110,401	6.58	299,386	143,456	66.0	23
District Facilities	557,260									
Residential	180,352,524	494,117	2.78	1,375,596	881,480	5.35	2,641,145	1,265,549	1,353.1	1,244
<b>Total Units</b>	<b>197,528,100</b>	<b>539,646</b>			<b>991,880</b>			<b>1,409,004</b>	<b>1,419.1</b>	<b>1,267</b>

*Allocation of Meter Cost Components Among Customer Classes*

Meter Costs are allocated based on the number of “equivalent meters”. A 1” meter is more expensive to install, service, and replace than a 3/4” meter. Likewise for a 2” meter. To properly allocate the metering cost component, it is necessary to estimate the relative costs of each size of meter. Because this information is not readily available, typical ratios of meter costs are taken from the America Water Works Association, and are used to calculate “equivalent meters” for each customer category, as shown below. These values are used in Table 8A.

Table 8B. Equivalent Meter Ratios

Meter Size (inches diameter)	Equivalent 0.75” meter and service ratio (calculated here)	Equivalent 5/8” meter and service ratio (Source: AWWA Manual M1)
0.75	1.00	1.1
1	1.27	1.4
1.5	1.64	1.8
2	2.64	2.9
3	10.00	11.0
4	12.73	14.0

*Allocation of Functional Sewer Cost Components Among Customer Classes*

System water demand is highly seasonal due to irrigation uses. However, monthly wastewater volumes are relatively constant, as can be seen in Figure 1.

This figure shows that:

1. During the months of December, January, and February, almost all the water sold returns as wastewater.
2. The average annual wastewater rate is very near the wastewater rate for the months of December, January, and February.

Therefore, in the absence of individual wastewater meters, we may use the water sales for the months of December, January, and February as an equitable basis to allocate sewer costs among the various customer classes.

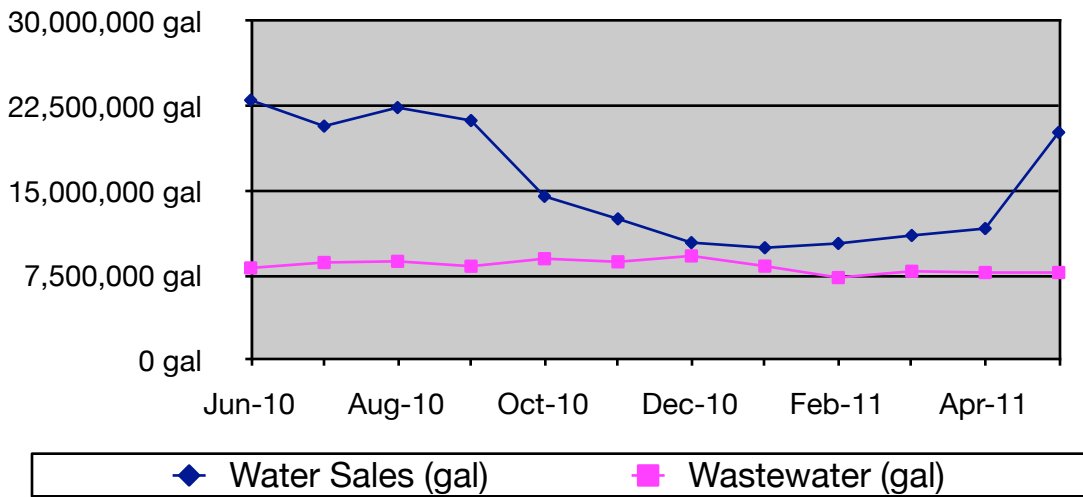


Figure 1. MHCSD Water Sales and Wastewater Flows, June 2010 through May 2011.

The Max Day and Max Hour peaking factors are used to allocate functional cost components to the various (billable) customer classes, as described above for the water system. However, only the months of December, January, and February are used. The results are shown below.

Table 9. Units of Sewer Service (Base, Excess Capacity, Meter and Customer Service) by Customer Class

Customer Class	Base		Maximum Day			Maximum Hour			Customer Service
	Water Use Dec – Feb 2011 (gallons)	Base Units (billable use in gallons per day)	Max Day Cap. Factor	Total Cap. (gpd)	Max Day Excess Cap. Units (gpd)	Peak Hour Cap. Factor	Total Cap. (gpd)	Max Hour Excess Cap. Units (gpd)	Sewer Connections
Non-Residential District	1,042,712	11,586	1.57	18,143	6,557	3.17	36,745	18,602	14
Residential	29,847,070	331,634	1.29	428,089	96,455	2.61	867,016	438,927	1,242
<b>Total Units</b>	<b>31,008,714</b>	<b>343,220</b>			<b>103,012</b>			<b>457,529</b>	<b>1,256</b>

*Allocation of Customer Service Cost Components Among Customer Classes*

Customer Service costs are allocated based on the number of customers billed.

*Allocation of Street Sweeping Service Cost Components Among Customer Classes*

Street Sweeping Service costs are allocated based on the number of water customers that receive street sweeping services through the District.

*Allocation of Fire Service Cost Components Among Customer Classes*

The fire service cost component is allocated based on number of customers because the costs cover provisions for fire hydrants throughout the system which provide fire protection to all customers equally.

The revenue required for each cost component (previously calculated in Table 5) is divided by its respective units of service to determine the revenue required per unit of service, as shown below in Tables 10A, 10B, and 10C.

Table 10A. Annual Water Revenue Required per Unit of Service

	Total	Base	Max Day	Max Hour	Fire	Meter	Customer Service
Units of Service		gallons per day	gallons per day	gallons per day	Water Customers	equivalent meters	Water Customers
Units		539,646	991,880	1,409,004	1,267	1,419.1	1,267
Required Revenue	\$944,614	\$369,298	\$81,650	\$71,328	\$65,444	\$186,817	\$170,077
Revenue per Unit of Service		\$0.6843	\$0.0823	\$0.0506	\$51.65	\$131.65	\$134.24

Table 10B. Annual Sewer Revenue Required per Unit of Service

	Total	Base	Max Day	Max Hour	Customer Service
<b>Units of Service</b>		gallons per day	gallons per day	gallons per day	Sewer Connections
<b>Units</b>		343,220	103,012	457,529	1,256
<b>Required Revenue</b>	\$576,528	\$362,276	\$34,366	\$79,068	\$100,818
<b>Revenue per Unit of Service</b>		\$1.0555	\$0.3336	\$0.1728	\$80.27

Table 10C. Annual Street Sweeping Revenue Required per Unit of Service

	Total	Street Sweeping
<b>Units of Service</b>		Water Customers
<b>Units</b>		1139
<b>Required Revenue</b>	\$17,989	\$17,989
<b>Revenue per Unit of Service</b>		\$15.79

Finally, the water and sewer revenue required per unit of service is multiplied by the units of service for each customer class to determine the revenue required for each class/cost component combination, as shown below in Tables 11A and 11B.

Table 11A. Annual Water System Costs Allocated to Customer Classes

Customer Class	Total	Base	Max Day	Max Hour	Fire	Meter	Customer Service
<b>Non-Residential</b>							
<b>Units</b>		45,530	110,401	143,456	23	66.0	23
<b>Allocated Cost per Unit</b>		\$0.6843	\$0.0823	\$0.0506	\$51.65	\$131.65	\$134.24
<b>Allocated Cost</b>	\$60,472	\$31,157	\$9,088	\$7,262	\$1,188	\$8,689	\$3,087
<b>Residential</b>							
<b>Units</b>		494,117	881,480	1,265,549	1,244	1,353.1	1,244
<b>Allocated Cost per Unit</b>		\$0.6843	\$0.0823	\$0.0506	\$51.65	\$131.65	\$134.24
<b>Allocated Cost</b>	\$884,142	\$338,141	\$72,562	\$64,066	\$64,256	\$178,129	\$166,989
<b>Total</b>							
<b>Units</b>		539,646	991,880	1,409,004	1,267	1,419	1,267
<b>Allocated Cost per Unit</b>		\$0.6843	\$0.0823	\$0.0506	\$51.65	\$131.65	\$134.24
<b>Total Allocated Costs</b>	\$944,614	\$369,298	\$81,650	\$71,328	\$65,444	\$186,817	\$170,077

Table 11B. Sewer System Costs Allocated to Customer Classes

Customer Class	Total	Base	Max Day	Max Hour	Customer Service
<b>Non-Residential</b>					
Units		11,586	6,557	18,602	14
Allocated Cost per Unit		\$1.0555	\$0.3336	\$0.1728	\$80.27
Allocated Cost	\$18,755	\$12,229	\$2,188	\$3,215	\$1,124
<b>Residential</b>					
Units		331,634	96,455	438,927	1,242
Allocated Cost per Unit		\$1.0555	\$0.3336	\$0.1728	\$80.27
Allocated Cost	\$557,773	\$350,047	\$32,179	\$75,853	\$99,694
<b>Totals</b>					
Units		343,220	103,012	457,529	1,256
Allocated Cost per Unit		\$1.0555	\$0.3336	\$0.1728	\$80.27
Allocated Cost	\$576,528	\$362,276	\$34,366	\$79,068	\$100,818

Setting Water Rates to Match Revenue Needs

A set of tiered water rates was developed to generate the revenue required for the 2011-12 fiscal year budget. The rates were adjusted to generate this revenue if water use continues as shown in the monthly billing records from Jun 1, 2010 to May 31, 2011, assuming a 5% drop in consumption for all users. These rates include a “Basic Service Charge” based on meter size and a “Water Use Rate” based on the amount of water used. The Basic Service Charge includes costs for the meter, for water for fire protection, and for customer service. These rates are summarized below.

Table 12. Per-Customer Basic Service Charges

Meter Size (inches diameter)	Basic Service Charge
0.75	\$26.46
1	\$29.45
1.5	\$33.44
2	\$44.41
3	\$125.20
4	\$155.12

Table 13. Tiered Water Use Rates by Customer Class

Customer Class	Water Use Rates, per Unit (748 gallons) per month			
	Tier 1 (0–10 units per month)	Tier 2 (11–20 units per month)	Tier 3 (21–30 units per month)	Tier 4 (31 or more units per month)
Non-Residential	\$1.27	\$1.78	\$2.03	\$2.41
Residential	\$1.61	\$2.25	\$2.57	\$3.05

If we assume that future water use will match water use from June 2010 to May 2011, less 5%, the following revenues will be generated by these water service rates.

Table 14. Projected Revenue Generated by Proposed Water Rates

Customer Class	Annual Revenue Generated	Target Annual Revenue
Non-Residential	\$60,498	\$60,472
Residential	\$884,527	\$884,142
<b>System Total</b>	<b>\$945,024</b>	<b>\$944,614</b>

Setting Sewer Rates to Match Revenue Needs

A set of sewer rates was developed to generate the revenue required for the 2011-12 fiscal year budget. A fixed monthly charge is calculated for each customer by applying the proposed rates to each customer's average water use during December, January, and February. That rate is then applied all year long.

The sewer rates were adjusted to generate this revenue if water use continues as shown in the monthly billing records from Jun 1, 2010 to May 31, 2011, less 5%. These rates are summarized below.

Table 15. Basic Monthly Sewer Charge - All Customer Classes

Basic Monthly Sewer Charge per Customer
\$6.69

Table 16A. Sewer Use Rates by Customer Class

Customer Class	Monthly Sewer Use Charge per Unit (748 gallons) of Water Used, Based on 3-month Average Water Use (Dec-Feb)
Non-Residential	\$3.25
Residential	\$2.99

In cases where insufficient data is available to determine the December through February average water use (for example, when changes in occupancy occur), it is recommended that the new occupant be charged an Interim Monthly Sewer Use Fee according to the following table, until sufficient data is collected:

Table 16B. Interim Sewer Use Rates by Customer Class and Meter Size

Customer Class	Water Meter size	Interim Fixed Monthly Sewer Use Fee	Interim Variable Monthly Sewer Use Fee (per Unit of water used)
Non-Residential	3/4"		\$3.32
Non-Residential	1" and larger		\$1.62
Residential	3/4"	\$25.09	
Residential	1" and larger	\$42.63	

If we assume that future water use will match water use from June 2010 to May 2011, less 5%, the following revenues will be generated by these sewer service rates.

Table 17. Revenue Generated by Proposed Sewer Rates

Customer Class	Annual Revenue Generated	Target Annual Revenue
Non-Residential	\$18,761	\$18,755
Residential	\$557,780	\$557,773
<b>System Total</b>	<b>\$576,542</b>	<b>\$576,528</b>

Setting Street Sweeping Rates to Match Revenue Needs

A reasonable allocation of street sweeping charges can be based on the number of water customers in the District that also receive street sweeping services. With that in mind, the following street sweeping rate is proposed:

Table 18. Street Sweeping Charges per Customer

Customers	1139
Required Revenue	\$17,989
Annual Revenue per Customer	\$15.79
Monthly Charge per Customer	\$1.32

Comparison with Existing Rates

For comparison purposes, existing and proposed water, wastewater and street sweeping rates are shown below.

Table 19. Comparison of Existing to Proposed Charges

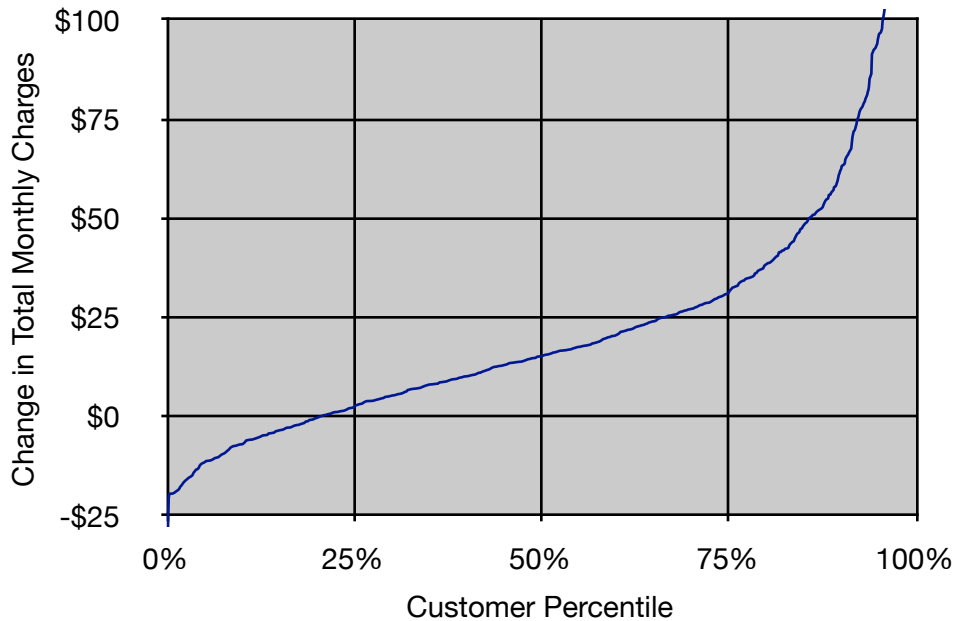
		Existing Monthly Charges	Proposed Monthly Charges	
<b>Water Basic Monthly</b>	3/4" meter	\$16.60	\$26.46	
	1" meter	\$20.75	\$29.45	
	1.5" meter	\$41.50	\$33.44	
	2" meter	\$75.52	\$44.41	
	3" meter	\$234.48	\$125.20	
	4" meter	\$425.38	\$155.12	
<b>Rate Stabilization</b>		\$4.65	\$0.00	
<b>Water Use per Unit</b>			Residential	Non-Residential
	0-10 units	\$0.90	\$1.61	\$1.27
	11-20 units	\$1.25	\$2.25	\$1.78
	21-30 units	\$1.45	\$2.57	\$2.03
	30 plus units	\$1.75	\$3.05	\$2.41
<b>Sewer Basic Monthly</b>		\$31.50	\$6.69	
<b>Sewer Use per Unit of Water, Dec-Feb avg.</b>		\$0.00	\$2.99	\$3.25
<b>Street Sweeping Monthly</b>		\$1.10	\$1.32	

The proposed charges are expected to increase the average monthly water charges from \$44.36 to \$62.12, an increase of approximately 40%. Average monthly sewer charges will increase from

\$31.76 to \$38.22, an increase of approximately 20%. Average monthly total bills will increase from \$77.22 to \$101.66, an increase of approximately 32%.

Not all customers will see their total monthly charges change by this average amount: 20% of customers will see their rates stay the same or decrease, 34% of customers will see their rates increase by \$25 or more, 14% of customers will see their monthly rate increase by \$50 or more, and 4% of customers will see their total monthly charges increase by \$100 or more. These results are illustrated below in Figure 2.

**Figure 2. Change from Existing Monthly Total Charges**



Setting Water, Sewer, and Street Sweeping Rates to Match Future Revenue Needs

At least two factors may arise that could make these proposed service charge rates inadequate: inflation of District costs and reduced water consumption.

To account for inflation, it is recommended that the service charges be adjusted annually, based on the Consumer Price Index for water and sewer and trash collection services published by the Bureau of Labor Statistics (<http://www.bls.gov/cpi/cpid1106.pdf>). This index had a value of 178.640 for June 2011, and increase of 5.2% from June 2010.

Because the tiered water rates may increase the water bills of large users, it is likely that these users will reduce their consumption. It is beyond the scope of this study to predict the scale of this likely reduction, or to what extent it may be offset by increases in use by smaller customers. However, we have assumed a modest reduction in use (5% less than reported use from June 2010 through May 2011) to account for the expected drop in consumption. Should future revenues not meet future costs due to reduced water use, it may be necessary to reallocate costs, using the methods outlined in this report.

Appendix A: District Budget and Itemized Water and Sewer Budgets

## Appendix B: Water and Sewer Budgets Allocated to Cost Components

Appendix B-1. Water Department

Appendix B-2. Sewer Department

Appendix C: Water and Sewer Depreciation Allocated to Cost Components

Appendix C-1. Water Department

Appendix C-2. Sewer Department