

14 November 2014

Mr. Tony Parrott  
Director of Water & Sewers  
City of Cincinnati  
1600 Gest Street  
Cincinnati, OH 45204

Subject: 2014 Comprehensive Cost of Service & Rate Design Study – Draft Final Report

Dear Mr. Parrott:

In accordance with our agreement, we are pleased to submit this draft report summarizing a comprehensive review and analysis of the District's wastewater rate structure. This report describes the methodology and analysis undertaken in completing the study, the results of the study, and recommendations for changes to the wastewater rate structure. Based upon a review of the preliminary results, Black & Veatch will update the analysis, as necessary and submit a final report incorporating decisions regarding the 2015 rate schedule.

We appreciate the opportunity to be of service to the District in this very important matter. If you have any questions, please call me at (636)-288-2892 or email me at [lemoinepr@bv.com](mailto:lemoinepr@bv.com).

Very truly yours,  
BLACK & VEATCH CORPORATION



Pamela Lemoine  
Principal Consultant  
Management Consulting Division

**DRAFT FINAL REPORT**

# **COMPREHENSIVE WASTEWATER REVENUE REQUIREMENT, COST OF SERVICE AND RATE DESIGN STUDY**

**B&V PROJECT NO. 178803**

**PREPARED FOR**

**Metropolitan Sewer District of Greater Cincinnati**

**14 NOVEMBER 2014**



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# 1 Introduction

The Metropolitan Sewer District of Greater Cincinnati and the Department of Sewers, City of Cincinnati was created through legislation, enacted April 10, 1968, by the Board of Hamilton County Commissioners and the City Council of Cincinnati. The legislation provided for consolidation of sanitary wastewater service embracing most of the political subdivisions of Hamilton County including the City of Cincinnati, and all unincorporated areas in the County. Warren County is a participant in the District on the basis of an agreement signed in 1970. The City of Cincinnati, through the Department of Sewers, is the sole and complete management agency of the Metropolitan Sewer District, hereinafter referred to as the District, for the Hamilton County Commissioners.”

## 1.1 GENERAL BACKGROUND

The present wastewater system has been developed and constructed over the years in a continuing effort to improve water quality in area streams and provide better service to the metropolitan community. In order to comply with increasingly stringent state and federal environmental regulations, to provide for renewal and replacements, and to accommodate growth, the District has been required to construct major improvements to existing facilities which will enable the District to meet these requirements. A significant portion of the cost of these improvements in the past, which were required to meet the requirements of the Federal Clean Water Act, were partially financed through the receipt of U.S. Environmental Protection Agency (EPA) grants. Inasmuch as the federal grants program has been phased out, the local share of the District’s major capital improvement costs, especially those to correct future known capacity problems and to address special compliance project needs, are to be financed primarily through the issuance of municipal bonds.

In June of 2004, MSD entered into a Global Consent Decree with the U.S. EPA, U.S. Department of Justice, and the State of Ohio (“Regulators”) to significantly reduce the number of Sanitary Sewer Overflows, Combined Sewer Overflows, and Water-In-Basement issues. In June of 2006, the District submitted a Long Term Control Plan, intended to meet the requirements of the consent decree. Subsequently, the District and Regulators met regularly to negotiate a final Wet Weather Improvement Program (“WWIP”). On June 5, 2009, the District received conditional approval of its final Wet Weather Improvement Program. This study incorporates the impact of the consent decree as well as all other funding needs, including on-going asset management (i.e., renewal and replacement of the system).

Costs of operating, maintaining, and financing system improvements are met primarily from revenue derived from charges to users. Increased requirements due to new programs associated with the compliance of the consent decree, financing costs of major new facilities, and recognition of inflationary costs associated with day to day operation require more revenue than can be recovered under the schedule of rates implemented January 9, 2014.

Additional requirements of the EPA, related to federal grant funding of construction costs, require that the District comply with specific regulations regarding “user charges.” The system of user charges must be in accordance with the Federal Clean Water Act of 1977 (PL 95-217) as amended, and EPA rules and regulations. In order to comply with these requirements and to assure adequate revenue for system operation, maintenance, replacement (OM&R), and capital requirements, the

District authorized this comprehensive study of revenue, revenue requirements, cost of service, and development of charges for wastewater service.

## **1.2 PURPOSE**

This report presents the results of an analysis of the costs of providing wastewater service in the District with projected revenue from the various classes of customers under existing rates.

Revenue shown for 2014 reflects the previously approved rate increase effective January 9, 2014. Revenue needs, including required system-wide revenue increases, are projected for years 2014-2019 that are estimated to provide adequate funds to meet the revenue requirements of the District in each year of the study period, and which will meet EPA requirements. The needs for annual revenue adjustments subsequent to 2014 have also been identified.

## **1.3 SCOPE**

Included in this report are the results of comprehensive studies of projected revenue under existing rates, revenue requirements, customer cost of service, and rates for wastewater service.

The comparison of projected revenue requirements with projected revenue under existing rates is indicative of the degree of adequacy of the overall level of those rates to meet projected costs. The costs to be met during an initial period of adequacy are allocated to classes of customers and type of service, and rates adequate to meet those costs are designed. The proposed rates will provide sufficient revenue to meet system needs and provide for charging each class of customer its proportionate share of system costs. Recognition is also given to meeting EPA user charge criteria related to the receipt of grant awards on construction projects.

## 2 Summary of Findings

The findings of the report are summarized in this section. During the course of Black & Veatch's study, various assumptions were made regarding the forecast of inflation and bond interest rates affecting the projection of future operation and maintenance expenses and debt service payments on proposed bond sales to finance the District's major capital improvement program. The following summarizes the principal findings from Black & Veatch's studies and the overall indicated rate increases that will be required to support MSD operations.

1. The District is estimated to be currently serving approximately 226,000 customer accounts based on 2013 billing records. The projected number of customers, by customer class, is based on a detailed evaluation of past trends in the number of accounts as well as an evaluation of the impact of implementation of the capital improvement program, and associated necessary rate increases, on individual customer classes. The resulting projections reflect the assumption that the number of customers served by the District will remain unchanged during the study period, with the exception of the Multi-family customer class, which is projected to experience a 1.5% decline in 2014 over 2013 levels, followed by zero growth. Although revenue is projected to be generated by fees associated with new connections, any new growth will be more than offset by the decline in existing customers.
2. The District has experienced a trend of declining volume per customer for many years, and this trend is expected to continue, at least in the near term, with the pace of reduction declining over time. As a result of an analysis of historical trends, this study incorporates an assumed decrease in volume per account as follows:
  - Single Family Residential:
    - 2014 = 3.0% decline over prior year
    - 2015 = 2.5% decline over prior year
    - 2016 = 2.0% decline over prior year
    - 2017 = 1.5% decline over prior year
    - 2018 = 1.0% decline over prior year
    - 2019 = 0.50% decline over prior year
  - Multi-family:
    - 2014 = 1.0% decline over prior year
    - 2015 = 1.0% decline over prior year
    - 2016 = 0.5% decline over prior year
    - 2017 = 0.5% decline over prior year
    - 2018 = 0.25% decline over prior year
    - 2019 = 0.25% decline over prior year
  - Commercial:
    - 2014 = 3.0% decline over prior year
    - 2015 = 2.0% decline over prior year
    - 2016 = 1.0% decline over prior year
    - 2017 = 0.5% decline over prior year
    - 2018 = 0.5% decline over prior year
    - 2019 = 0.5% decline over prior year

- Industrial:
  - 2014 = 4.0% decline over prior year
  - 2015 = 4.0% decline over prior year
  - 2016 = 2.0% decline over prior year
  - 2017 = 1.0% decline over prior year
  - 2018 = 1.0% decline over prior year
  - 2019 = 1.0% decline over prior year

3. Revenues of the District required to meet the costs of providing wastewater service to customers is derived principally from sewerage service charges, excess strength surcharges, and industrial pretreatment charges. Other revenue sources include the sale of permits and licenses, plan review and inspection fees, connection charges, interest earned from the investment of available funds and other miscellaneous sources. Future revenue levels are predicated on a no-growth scenario, declining volume per customer, and revenue derived from charges for service which are estimated to be approximately to \$236,113,000 by 2015 under present rates.
4. The District has developed a proposed five-year capital improvement program totaling \$791.15 million for the period 2015 to 2019. Including anticipated spending for 2014, total cash needs for the six-year period 2014-2019 is anticipated to be approximately \$990.4 million to fully fund the capital improvement program and previously certified projects, excluding project contingency. The District is projecting project contingency add \$62 million over the 2014-2019 projection period. To finance the capital program, several funding sources are planned to be used including funds on hand, the sale of proposed revenue bonds, low interest loans, annual connection fees, net operating revenues, and interest earnings from the construction fund. It is projected that the District will be required to issue \$380 million billion in proposed revenue bonds and \$315 million in proposed low interest loans over the study period.
5. The District's annual revenue requirements consist of operation and maintenance expenses, debt service payments for existing and proposed bonds, annual equipment purchases, and the necessity to generate sufficient excess net operating revenues to maintain desired debt service coverage levels. These annual revenue requirements are projected to increase over the study period. Operating expenses, as forecasted, are projected to escalate from \$102,938,000 to \$134,529,000 due to general inflationary increases as well as projection of increased operating costs due to implementation of the capital program. Debt service payments are projected to increase from \$98,413,000 to \$133,096,000 during the study period due to the issuance of additional long-term debt.
6. System-wide revenue increases, and ultimately rate increases to customers, are being driven by capital program requirements. Such capital projects include both those set forth in the WWIP as well as asset management projects, as committed to under the WWIP. As shown in Figure 2-1, operation and maintenance expenses and debt service requirements comprise approximately 82 percent of the District's total revenue requirements over the planning period. While operation and maintenance expenses are projected to increase due to inflation and the impact of the capital program on operations, debt service requirements are projected to increase substantially to provide funding for the capital program. Debt Service alone increases from approximately 35 percent of total revenue requirement to approximately 45 percent of total revenue requirements

over the six-year study period. Total capital requirements, including the transfer to the Surplus fund, debt service, and equipment purchases, average 59 percent.

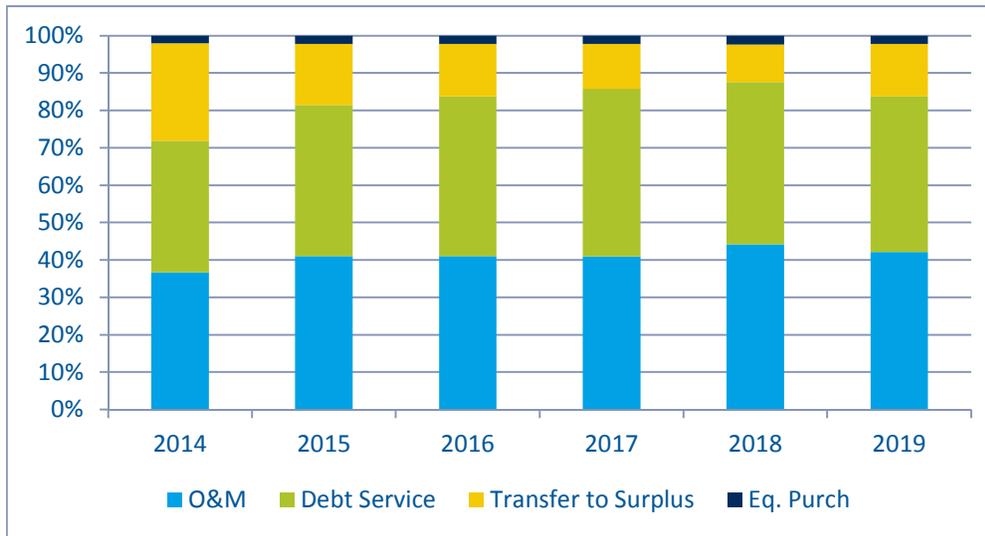


Figure 2-1 Breakdown of Annual Revenue Requirements

7. A 5.45 revenue increase effective in January 9, 2014, was approved by the Hamilton County Commissioners, and reflect a 6 percent increase in minimum charges and volume charges. Surcharge rates were held constant. The rates were based on a 2013 analysis of system-wide revenue requirements, and incorporated in calculating projected wastewater revenues under existing rates. While such rates are projected to be sufficient for 2014, they are indicated to be insufficient to recover the District’s future revenue requirements during the proposed study period. As such, a series of subsequent annual revenue adjustments are indicated to be required, as follows:

- 2015 = 7.0 percent
- 2016 = 4.0 percent
- 2017 = 4.0 percent
- 2018 = 4.0 percent
- 2019 = 4.0 percent

As indicated, the projected system-wide revenue increase for 2015 is estimated to be 7.0 percent. The projected adjustments in the level of wastewater service charge revenues are projected to produce sufficient revenues to meet the District’s cash obligations or revenue requirements and provide adequate debt service coverage.

8. The total revenue requirements to be derived from charges for wastewater service are synonymous with, and are the definition of, the total cost of service. The District’s estimated annual cost of service to be met from wastewater charges, totaling \$272,511,500 for the 2015 test year, or the period of adequacy for which the rates are to be in effect, consist of the operation and maintenance expenses, user charge replacements, and capital costs, as summarized in Table 2-1.

Table 2-1 Cost of Service Requirements – Test Year 2015

Line No.	Description	Test Year 2015
1	Operation and Maintenance Expense	\$110,189,200
2	User Charge Replacements	4,972,700
3	Capital Costs	<u>157,349,600</u>
4	Total Cost of Service to be Met from Rates	\$272,511,500

9. Detailed cost of service studies were made for the 2015 test year to establish costs of providing wastewater service to the individual customer classes served. Such studies involved an analysis of costs by system function including those related to the volume, capacity, and strength of wastewater, and to customer billing and industrial pretreatment program requirements. A summary of the District’s allocated cost of service by these functional classifications is shown in Table 2-2.

Table 2-2 Summary of Functional Cost Components - 2015 Test Year

Line No.	Cost Component	Total Cost of Service
		\$
1	<b>Volume Related Cost</b>	25,034,917
2	<b>Capacity Related Cost</b>	161,759,494
3	<b>Strength Related Cost</b>	
4	Suspended Solids	26,282,581
5	BOD	31,075,326
6	TKN	3,675,068
7	<b>Customer Cost</b>	5,638,646
	<b>Industrial Monitoring &amp; Surveillance</b>	
8	Surcharge	941,787
9	Pretreatment	2,264,523
10	<b>Water In Basement</b>	15,839,159
11	<b>Total Cost of Service</b>	<u>272,511,500</u>

10. A comparison of the resultant total cost of service allocated to each customer class based upon their respective service requirements with revenue under existing rates and the indicated revenue increase required from each class is shown in Table 2-3.

Table 2-3 Summary of Functional Cost Components – 2015 Test Year

Line No.	Customer Class	Revenue Under Existing Rates	Total Cost of Service	Adjusted Cost of Service	Indicated Revenue Increase Required	Indicated Revenue Adjustment
		\$	\$	\$	\$	%
1	Residential	111,606,909	121,768,625	131,096,184	19,489,275	17.46%
2	Commercial	48,203,654	47,702,803	51,063,821	2,860,166	5.93%
3	Industrial	28,319,273	26,778,475	27,630,084	(689,189)	-2.43%
4	Multifamily	47,982,876	47,156,875	50,021,979	2,039,103	4.25%
5	Surcharge	17,970,903	11,001,039	11,001,039	(6,969,863)	-38.78%
6	Industrial Pretreatment					
7	Minimum Charge (a)	0	566,131	0	0	N/A
8	Annual Fee	563,408	339,678	339,678	(223,730)	-39.71%
9	Monitoring Charges	36,592	1,358,714	1,358,714	1,322,122	3613.14%
10	Industrial Pretreatment	600,000	2,264,523	1,698,392	1,098,392	183.07%
11	Water In Basement (b)	0	15,839,159	0		
12	Total	254,683,615	272,511,500	272,511,500	17,827,885	7.00%

(a) Reallocated to Industrial users.

(b) Water In Basement costs allocated to Residential, Commercial, and Multi Family classes based on number of connections

11. Based upon results from the detailed cost of service study for the 2015 test year, three (3) alternative rate schedules have been developed in such a manner as to achieve a system-wide revenue increase of 7.0 percent. Based upon review and discussion, it is anticipated that additional alternatives may be evaluated prior to adoption of a final 2015 rate schedule.

### 3 Revenue

The revenue for the District to meet costs of wastewater service is derived principally from sewerage service charges and excess strength surcharges. Other revenue sources include pretreatment charges, the sale of permits and licenses, plan review and inspection charges, connection charges, interest earned from the investment of available funds and other miscellaneous sources. The level of future revenue is projected through an analysis of historical system growth in terms of number of customers, wastewater volume, and revenue derived from charges for service.

#### 3.1 CUSTOMER GROWTH

Table 3-1 presents a summary of the historical and projected average number of customer accounts, billable wastewater flow volume, and overall average flow per account. Customer classification (i.e., residential, commercial, multi-family and industrial) is based upon data maintained by the Greater Cincinnati Water Works (GCWW).

The projected number of customers served by MSD, by customer class, is based on a detailed evaluation of past trends in the number of accounts as well as an evaluation of current economic conditions, the impact of implementation of the capital improvement program, and associated necessary rate increases, on individual customer classes. The resulting projections reflect no change in customer accounts during the study period, with the exception of the Multi-Family customer class, wherein a decline in 2014 of 1.5 percent from 2013 levels is assumed. Although revenue is projected to be generated by fees associated with new connections, any new growth will be more than offset by the decline in existing customers.

The GCWW provides water service to residences and businesses in the City of Cincinnati and to areas outside the City in Hamilton County. As such, the GCWW bills approximately 90 percent of the District's wastewater customers, with the remaining 10 percent billed by other political subdivisions in the County.

Table 3-1 Historical and Projected Accounts

Line No.	Description	Historical		Projected					
		2012	2013	2014	2015	2016	2017	2018	2019
<b>CWW</b>									
Bi-Monthly Customers									
1	Residential	59	59	59	59	59	59	59	59
2	Commercial	0	0	0	0	0	0	0	0
3	Industrial	0	0	0	0	0	0	0	0
4	Multi-Family	0	0	0	0	0	0	0	0
5	Subtotal	59	59	59	59	59	59	59	59
Monthly									
6	Residential	18	18	18	18	18	18	18	18
7	Commercial	392	388	388	388	388	388	388	388
8	Industrial	281	283	283	283	283	283	283	283
9	Multi-Family	293	304	300	300	300	300	300	300
10	Resid-Pmt Plan	6,832	8,346	8,346	8,346	8,346	8,346	8,346	8,346
11	Subtotal	7,815	9,338	9,333	9,333	9,333	9,333	9,333	9,333
Quarterly									
12	Residential	159,588	159,257	159,257	159,257	159,257	159,257	159,257	159,257
13	Commercial	12,265	12,294	12,294	12,294	12,294	12,294	12,294	12,294
14	Industrial	135	132	132	132	132	132	132	132
15	Multi-Family	21,491	21,096	20,780	20,780	20,780	20,780	20,780	20,780
16	Subtotal	193,478	192,779	192,463	192,463	192,463	192,463	192,463	192,463
17	Total CWW	201,351	202,176	201,854	201,854	201,854	201,854	201,854	201,854
<b>Political Bodies</b>									
18	Residential	21,741	21,741	21,741	21,741	21,741	21,741	21,741	21,741
19	Commercial	2,378	2,378	2,378	2,378	2,378	2,378	2,378	2,378
20	Industrial	38	38	38	38	38	38	38	38
21	Warren Co.	1	1	1	1	1	1	1	1
22	Subtotal	24,158	24,158	24,158	24,158	24,158	24,158	24,158	24,158
23	<b>Total</b>	<b>225,509</b>	<b>226,334</b>	<b>226,012</b>	<b>226,012</b>	<b>226,012</b>	<b>226,012</b>	<b>226,012</b>	<b>226,012</b>

Table 3-2 presents a summary of the historical and projected billable wastewater flow volume. The projection of total billable wastewater volume requires an analysis of not only historical total billable volume, but also an analysis of billed volume per customer. This is necessary in order to fully reflect any change in customer behavior that could impact total billable volume. During this study, a detailed analysis of historical billing data was conducted. Based upon the analysis, it was determined that billed volume per customer continues to decline. This is a trend that has been occurring for many years, and is consistent with the trend being experienced by utilities across the United States. Several factors are likely contributing to a decline in billed volume per customer, including the installation of higher efficiency fixtures and appliances, and increased awareness of environmental concerns and resulting changes in behavior. Economic conditions can also have an impact on billed volume per customer, and current economic conditions likely also contribute to the magnitude of the recent decline.

Based on this analysis, volume per customer has been projected to continue to decline over the study period as follows:

- Single Family Residential:
  - 2014 = 3.0% decline over prior year
  - 2015 = 2.5% decline over prior year

- 2016 = 2.0% decline over prior year
- 2017 = 1.5% decline over prior year
- 2018 = 1.0% decline over prior year
- 2019 = 0.50% decline over prior year
- Multi-family:
  - 2014 = 1.0% decline over prior year
  - 2015 = 1.0% decline over prior year
  - 2016 = 0.5% decline over prior year
  - 2017 = 0.5% decline over prior year
  - 2018 = 0.25% decline over prior year
  - 2019 = 0.25% decline over prior year
- Commercial:
  - 2014 = 3.0% decline over prior year
  - 2015 = 2.0% decline over prior year
  - 2016 = 1.0% decline over prior year
  - 2017 = 0.5% decline over prior year
  - 2018 = 0.5% decline over prior year
  - 2019 = 0.5% decline over prior year
- Industrial:
  - 2014 = 4.0% decline over prior year
  - 2015 = 4.0% decline over prior year
  - 2016 = 2.0% decline over prior year
  - 2017 = 1.0% decline over prior year
  - 2018 = 1.0% decline over prior year
  - 2019 = 1.0% decline over prior year

As shown in Table 3-2, total water usage or billable wastewater volume is projected at 33,647,557 hundred cubic feet (Ccf) for 2011. As previously discussed, billable wastewater volume is projected to decrease in 2011 and 2012 and remain constant thereafter, reflecting no change in the number of customers and the above assumptions regarding volume per customer.

Table 3-2 Historical and Projected Billable Volumes

Line No.	Description	Historical		Projected					
		2012 ccf	2013 ccf	2014 ccf	2015 ccf	2016 ccf	2017 ccf	2018 ccf	2019 ccf
<b>CWW</b>									
Bi-Monthly Customers									
1	Residential	4,559	4,278	4,150	4,046	3,965	3,906	3,867	3,847
2	Commercial	0	0	0	0	0	0	0	0
3	Industrial	0	0	0	0	0	0	0	0
4	Multi-Family	0	0	0	0	0	0	0	0
5	Subtotal	4,559	4,278	4,150	4,046	3,965	3,906	3,867	3,847
Monthly									
6	Residential	142,026	130,124	126,220	123,065	120,603	118,794	117,606	117,018
7	Commercial	1,706,758	1,619,390	1,570,809	1,539,393	1,523,999	1,516,379	1,508,797	1,501,253
8	Industrial	5,432,912	5,195,970	4,988,132	4,788,606	4,692,834	4,645,906	4,599,447	4,553,452
9	Multi-Family	1,926,605	1,868,908	1,822,465	1,804,241	1,795,220	1,786,244	1,781,778	1,777,323
10	Resid-Pmt Plan	587,170	688,435	667,782	651,087	638,066	628,495	622,210	619,099
10	Subtotal	9,795,471	9,502,828	9,175,408	8,906,392	8,770,722	8,695,817	8,629,838	8,568,146
Quarterly									
11	Residential	9,775,641	9,521,105	9,235,472	9,004,585	8,824,493	8,692,126	8,605,205	8,562,179
12	Commercial	4,136,986	3,947,583	3,829,155	3,752,572	3,715,046	3,696,471	3,677,989	3,659,599
13	Industrial	509,057	488,609	469,065	450,302	441,296	436,883	432,515	428,189
14	Multi-Family	4,885,190	4,751,484	4,633,410	4,587,076	4,564,141	4,541,320	4,529,967	4,518,642
15	Subtotal	19,306,873	18,708,781	18,167,102	17,794,535	17,544,977	17,366,800	17,245,675	17,168,609
16	Total CWW	29,106,903	28,215,887	27,346,660	26,704,973	26,319,663	26,066,523	25,879,379	25,740,601
<b>Political Bodies</b>									
17	Residential	1,272,497	1,272,497	1,234,322	1,203,464	1,179,395	1,161,704	1,150,087	1,144,336
18	Commercial	1,250,003	1,250,003	1,212,503	1,188,253	1,176,370	1,170,488	1,164,636	1,158,813
19	Industrial	145,099	145,099	139,295	133,723	131,049	129,738	128,441	127,157
20	Warren Co.	240,740	240,740	233,518	228,847	226,559	225,426	224,299	223,177
21	Subtotal	2,908,339	2,908,339	2,819,638	2,754,287	2,713,373	2,687,357	2,667,463	2,653,483
22	<b>Total</b>	<b>32,015,242</b>	<b>31,124,226</b>	<b>30,166,298</b>	<b>29,459,261</b>	<b>29,033,036</b>	<b>28,753,880</b>	<b>28,546,841</b>	<b>28,394,085</b>

### 3.2 WASTEWATER REVENUE UNDER EXISTING RATES

The District primarily derives revenues from a schedule of wastewater rates that includes a minimum bill, a block quantity volume charge, and an extra strength surcharge for excess pollutant customers. Charges are applied either monthly or quarterly according to customer distinction. A schedule of current rates is shown in Table 3-3.

The minimum charge per quarter includes the first 900 (500 cubic feet for monthly bills) of contributed wastewater volume and is based upon the size of water service meter associated with the service. Two additional declining rate blocks are applied to those volumes exceeding the minimum. The Extra Strength Surcharges are applied to specific monitored and tested customers and apply rates per hundred cubic feet for the strength components Biochemical Oxygen Demand (BOD), Suspended Solids (SS) and Total Kjeldahl Nitrogen (TKN), each exceeding 300, 240 and 25 milligrams per liter (mg/l) respectively.

In January 2014, the District implemented a 5.45 percent revenue increase as previously approved by the County Commissioners, reflecting a 6.0 percent increase in minimum charges and volume charges. Surcharge rates were held constant at 2013 levels. Revenues under such increased rates are reflected in the 2014 total revenue from user charges.

The District's sewer service revenue is projected by applying the wastewater rate structure to the appropriate projected unit of measure for each customer class. These revenue projections are summarized in Table 3-4. Total projected sewer service revenue, from user rates, is expected to average \$234,822,000 for the 2014 to 2019 projection period.

Revenues from extra strength and industrial wastes are projected to contribute an additional \$18,571,000 per year to the operating revenues.

Other operating and non-operating revenues of the District consist of revenues derived from other fees including connection charges, plan review, tap permits, and septic tank disposal. As shown on Table 3-5, other operating revenue is projected to remain constant at \$4,590,000 per year throughout the study period, connection charges and tap fees is projected to remain constant at \$2,148,000 per year throughout the study period, and revenue from interest earnings on all funds is projected to remain constant at \$5,699,000 during the study period.

Table 3-3 Existing Rates

**Minimum Monthly Charge - \$/Bill - 2014**

<u>Line No.</u>	<u>Meter Size</u> Inches	<u>Number of Family Units</u>	<u>Quarterly Usage</u> Cf	<u>Quarterly Charge</u> \$	<u>Monthly Usage</u> Cf	<u>Monthly Charge</u> \$
1	5/8"	1	900	\$ 110.71	500	\$ 53.88
2	3/4"	2-3	900	\$ 142.75	500	\$ 64.61
3	1"	4-5	900	\$ 195.70	500	\$ 83.15
4	1 1/2"	6-12	900	\$ 332.56	500	\$ 128.21
5	2"	13-20	900	\$ 471.07	500	\$ 176.69
6	3"	21-50	900	\$1,208.95	500	\$ 433.05
7	4"	51-115	900	\$2,002.17	500	\$ 717.06
8	6"	116-250	900	\$3,955.82	500	\$1,402.92
9	8"	Over 250	900	\$5,902.62	500	\$2,085.35
10	10"		900	\$7,887.50	500	\$2,802.36
11	12"		900	\$9,106.83	500	\$3,263.05

**Volume Charge - \$/ccf - 2014**

	<u>Quarterly</u> Cf	<u>Monthly</u> Cf	<u>Rate</u> \$
12 First (cf)	900	500	\$ 0
13 To (cf)	15,000	5,000	\$ 5.546
14 Over (cf)	15,000	5,000	\$ 4.435

**Extra Strength Charges - \$ per mg/l per 1,000 cubic feet - 2014**

	<u>Rate</u> \$
15 Suspended Solids (TSS)	\$ 0.002921
16 Biochemical Oxygen Demand (BOD)	\$ 0.004989
17 Nitrogen Oxygen Demand (TKN)	\$ 0.004369

Table 3-4 Projected User Charge Revenues Under Existing Rates

Line No.	Description	Projected					
		2014	2015	2016	2017	2018	2019
		\$	\$	\$	\$	\$	\$
<b>CWW</b>							
Bi-Monthly Customers							
1	Residential	44,039	43,872	43,742	43,646	43,583	43,552
2	Commercial	0	0	0	0	0	0
3	Industrial	0	0	0	0	0	0
4	Multi-Family	0	0	0	0	0	0
5	Subtotal	44,039	43,872	43,742	43,646	43,583	43,552
Monthly							
6	Residential	721,064	707,228	696,437	688,505	683,297	680,718
7	Commercial	8,186,744	8,047,883	7,979,841	7,946,160	7,912,648	7,879,303
8	Industrial	25,263,401	24,386,191	23,965,131	23,758,811	23,554,555	23,352,341
9	Multi-Family	10,370,449	10,289,836	10,249,932	10,210,228	10,190,476	10,170,772
10	Resid-Pmt Plan	5,082,934	5,047,635	5,020,102	4,999,865	4,986,576	4,979,998
11	Subtotal	49,624,593	48,478,774	47,911,443	47,603,570	47,327,551	47,063,132
Quarterly							
12	Residential	94,950,770	94,350,250	93,881,844	93,537,565	93,311,489	93,199,582
13	Commercial	29,619,823	29,274,521	29,105,323	29,021,570	28,938,236	28,855,319
14	Industrial	3,350,088	3,265,875	3,225,452	3,205,645	3,186,036	3,166,623
15	Multi-Family	37,895,184	37,693,040	37,592,978	37,493,417	37,443,885	37,394,477
16	Subtotal	165,815,866	164,583,685	163,805,597	163,258,197	162,879,646	162,616,000
17	Total CWW	215,484,498	213,106,332	211,760,782	210,905,413	210,250,780	209,722,685
<b>Political Bodies</b>							
18	Residential	10,455,523	10,455,523	10,455,523	10,455,523	10,455,523	10,455,523
19	Commercial	10,987,643	10,881,250	10,829,117	10,803,312	10,777,635	10,752,087
20	Industrial	680,831	667,207	660,668	657,463	654,291	651,150
21	Warren Co.	1,022,858	1,002,401	992,377	987,415	982,478	977,565
22	Subtotal	23,146,855	23,006,381	22,937,685	22,903,713	22,869,927	22,836,326
23	<b>Total</b>	<b>238,631,353</b>	<b>236,112,712</b>	<b>234,698,467</b>	<b>233,809,126</b>	<b>233,120,707</b>	<b>232,559,010</b>

Table 3-5 Operating and Non-Operating Revenue

Line No.	Description	2015	2016	2017	2018	2019
		\$1,000	\$1,000	\$1,000	\$1,000	\$1,000
1	Sewerage Service Charge	236,113	234,698	233,809	233,121	232,559
2	Sewerage Surcharges	17,971	17,971	17,971	17,971	17,971
3	Pretreatment Monitoring	600	600	600	600	600
4	Subtotal	254,684	253,269	252,380	251,692	251,130
5	Other Operating Revenue					
6	Rental Income	156	156	156	156	156
7	Septic Tank Disposal	1,602	1,602	1,602	1,602	1,602
8	Tap Permits-Licenses	32	32	32	32	32
9	Inspection-Plan Review	236	236	236	236	236
10	Other (a)	2,564	2,564	2,564	2,564	2,564
11	Total Other Operating Revenue	4,590	4,590	4,590	4,590	4,590
12	Connection Fee Revenue (b)	2,148	2,148	2,148	2,148	2,148
13	Interest-Trust Accounts (c)	5,699	5,699	5,699	5,699	5,699
14	<b>Total Revenue</b>	<b>267,121</b>	<b>265,706</b>	<b>264,817</b>	<b>264,129</b>	<b>263,567</b>

- (a) Includes fines, assessments, purchasing agent sales, expense reimbursements, and other miscellaneous revenue sources.
- (b) Connection charges and tap-in fees are shown separate from other operating revenues as these funds are used as a source of financing for the District's capital improvement program.
- (c) Reflects interest income on operating, surplus, and trusted accounts.

## 4 Revenue Requirements

The revenue required to adequately provide for the continued operation of the District must be sufficient to meet the cash requirements of operation and maintenance (O&M) of the system; principal, interest, and reserve payments on revenue and other bond indebtedness; and recurring annual capital expenditures for replacements, system betterments, and extensions not debt financed.

Operation and maintenance expenses are those expenditures necessary to transport and treat customers' wastes as well as maintain the system in good working order. Routine annual capital expenditures, which include equipment replacements, consist of recurring annual replacements, minor extensions, and betterments which are normally revenue financed. Other capital costs include principal and interest payments, bond covenant-required payments, and the costs of infrequent major capital improvements paid directly from annual operating revenues.

### 4.1 OPERATION AND MAINTENANCE EXPENSE

Table 4-1 presents a summary of actual and projected O&M expenditures for 2014 through 2019 by operating division. Major cost items for each division generally include personal services and employee fringe benefits; the cost of purchased electric power, gas and other treatment chemicals; and other contractual service and material costs.

Operation & maintenance expenditures for 2014 are based on the 2014 approved budget and expenditures for 2015 are based on the proposed 2015 budget submitted to the County in August 2014. 2016-2019 operation and maintenance expenditures are projected to increase for annual price escalations over 2015 proposed budget. Benefits are forecasted to increase at a rate of 5 percent per year during the study period. Chemical and power costs are projected to increase 4 percent per year. All other operation and maintenance expense elements are assumed to increase at a rate of 3 percent per year to recognize the effects of inflation. As indicated in Table 4-1, annual operating and maintenance costs are projected to increase from \$102,938,000 in 2014 to \$134,529,000 in 2019.

Table 4-1 Projected Operation and Maintenance Expense

Line No.	Description	Projected					
		2014	2015	2016	2017	2018	2019
		\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000
1	<b>Office of the Director</b>	10,071	14,001	14,437	14,888	15,353	15,833
2	<b>Wastewater Administration</b>						
3	Billing & Collecting	3,840	4,878	5,024	5,175	5,330	5,490
4	All Other	4,252	3,935	4,072	4,213	4,360	4,513
5	Total	8,092	8,812	9,096	9,388	9,691	10,003
6	<b>Information Technology</b>	6,052	5,804	5,992	6,187	6,388	6,596
7	<b>Project/Business Development</b>	1,741	1,963	2,032	2,103	2,177	2,253
8	<b>Project Delivery</b>	4,725	4,009	4,152	4,299	4,453	4,612
9	<b>Wastewater Collection</b>	21,005	22,988	23,748	24,533	25,346	26,187
10	<b>Wastewater Treatment</b>						
11	Superintendent	1,600	1,423	1,473	1,525	1,580	1,636
12	Mill Creek	17,884	19,711	20,409	21,132	21,882	22,660
13	Little Miami	5,440	6,054	6,267	6,487	6,715	6,952
14	Muddy Creek	2,760	2,921	3,024	3,130	3,241	3,356
15	Sycamore	1,845	2,036	2,107	2,180	2,256	2,334
16	Taylor Creek	1,797	2,090	2,164	2,240	2,319	2,401
17	Polk Run	1,514	1,636	1,692	1,750	1,810	1,872
18	Equipment Maintenance	9,073	10,465	10,817	11,182	11,560	11,951
19	Total Wastewater Treatment	41,912	46,336	47,952	49,626	51,362	53,161
20	<b>Industrial Waste Management</b>	6,760	6,056	6,266	6,484	6,711	6,945
21	<b>Water in Basement</b>	8,433	11,882	12,242	12,613	12,996	13,390
22	<b>Total O&amp;M</b>	108,791	121,851	125,916	130,122	134,475	138,980
23	Incremental Expenditures	0	0	600	1,800	2,500	2,800
24	Office Equipment & Motorized Vehicles	(5,854)	(6,443)	(6,636)	(6,835)	(7,040)	(7,251)
25	<b>Total Net O&amp;M Expense</b>	102,938	115,409	119,880	125,087	129,935	134,529

## 4.2 CAPITAL IMPROVEMENT PROGRAM

The District has developed a multi-year capital improvement program (CIP) covering its anticipated commitments for the period from 2014 through 2019. A summary of the capital improvement program, totaling \$1,052,392,000 is shown in Table 4-2. The approved capital program reflects spent or encumbered monies as well as the planned contract certifications for each year over the study period. For 2014, annual expenditures are based on the approved 2014 CIP budget. For years 2015-2019, annual expenditures are based on the proposed CIP budget submitted to the County in August 2014.

Table 4-2 Capital Improvement Program <sup>(a)</sup>

No.	Description	Projected					Total Cost	
		2014	2015	2016	2017	2018		2019
		\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	
1	<b>OWDA Projects</b>	79,200	79,200	79,200	24,750	24,750	24,750	311,850
2	<b>Program Contingency</b>	12,000	10,000	10,000	10,000	10,000	10,000	62,000
3	<b>All Other CIP</b>	120,046	229,679	134,286	92,539	46,256	55,736	678,542
4	<b>Total Forecasted Capital Program</b>	<b>211,246</b>	<b>318,879</b>	<b>223,486</b>	<b>127,289</b>	<b>81,006</b>	<b>90,486</b>	<b>1,052,392</b>

#### 4.2.1 Capital Improvement Program Financing Plan

Annual expenditures for the CIP are anticipated to be met from a combination of available funds on hand, interest earnings, connection fee revenues, and transfers from the Surplus Fund as shown in Table 4-3. Connection fee revenue is anticipated to remain at 2014 levels throughout the study period, at \$2,148,000 per year, as shown in Line 2 of Table 4-3. Transfers from the Surplus Fund are the primary source of funding for the capital program and are anticipated to vary in each year of the study period as shown in Line 3 of Table 4-3, reflecting projected annual encumbrances in each year. Surplus Fund revenues include proceeds from revenue bonds and cash financed capital from the Operating Fund, as well as interest earnings on balances within the Surplus Account, Bond Reserve Fund and Replacement and Improvement Account. Interest on the average balance within Fund 704 is projected at a rate of one percent annually as indicated on Line 4 of Table 4-3.

Table 4-3 Capital Improvement Financing Plan  
(Fund 704)

Line No.	Description	Projected					2019
		2014	2015	2016	2017	2018	
		\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000
<b>Source of Funds</b>							
1	Beginning of Year Balance	52,100	34,633	37,461	35,687	35,651	36,904
2	Connection Fees	2,148	2,148	2,148	2,148	2,148	2,148
3	Transfer from / (to) Surplus Account	100,000	230,000	130,000	90,000	45,000	55,000
4	Interest Income	432	359	364	355	361	376
5	<b>Total Source of Funds</b>	<b>154,680</b>	<b>267,140</b>	<b>169,973</b>	<b>128,190</b>	<b>83,160</b>	<b>94,428</b>
<b>Application of Funds</b>							
6	Major Capital Improvements	120,046	229,679	134,286	92,539	46,256	55,736
7	<b>Total Use of Funds</b>	<b>120,046</b>	<b>229,679</b>	<b>134,286</b>	<b>92,539</b>	<b>46,256</b>	<b>55,736</b>
8	<b>End of Year Balance</b>	<b>34,633</b>	<b>37,461</b>	<b>35,687</b>	<b>35,651</b>	<b>36,904</b>	<b>38,692</b>

The application of funds summarized in Line 6 of Table 4-3 indicates the estimated total annual encumbrances, not including projects funded by OWDA/WPCLF loans, and represents the total amount required to be funded from revenue bonds and other cash sources. Because the cost of projects funded by low interest loans are reimbursed directly by loan programs at the time expenses are incurred, both the loan proceeds and associated capital costs are excluded from the determination of capital funding needs.

In addition to the major capital improvements shown on Line 6 of Table 4-3, and OWDA/WPCLF projects, the District also plans for Project Contingency spending as shown on Line 2 of Table 4-2, which is anticipated to be separately funded from the Surplus Fund.

As previously discussed, Surplus Fund revenues are comprised of revenue bond proceeds, interest income, transfers from the Bond Reserve Account as allowed by the Bond Indenture, and transfers from the Operating Fund, as outlines in the Bond Indenture. Table 4-4 summarizes the sources of funding within the Surplus Fund, as well as the indicated transfer to the Construction Account (Fund 704). The actual Surplus Fund balance will vary substantially throughout the year based upon the need for transfers to the Construction Account and the timing of revenue bond issuances. As such, a minimum beginning of year balance of \$215-220 million has been assumed, reflecting recent practice that has allowed for some flexibility in timing revenue bond issuances to ensure adequate funding for the CIP.

Table 4-4 Surplus Fund

Line No.	Description	Projected					
		2014	2015	2016	2017	2018	2019
		\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000
<b>Sources and Uses of Funds</b>							
1	Beginning of Year Balance	281,000	243,480	226,527	222,368	217,278	222,607
2	Revenue Bond Proceeds	0	174,074	91,618	54,971	27,485	0
3	Interest Income	2,322	2,215	2,182	2,170	2,201	2,225
4	Transfer from / (to) Bond Reserve Account	(912)	940	1,048	1,107	1,141	18,917
5	Transfer from / (to) Operating Account	73,070	45,819	40,994	36,661	29,502	44,308
6	Transfer to Contingency Fund	(12,000)	(10,000)	(10,000)	(10,000)	(10,000)	(10,000)
7	Transfer to Construction Account	(100,000)	(230,000)	(130,000)	(90,000)	(45,000)	(55,000)
8	End of Year Balance	243,480	226,527	222,368	217,278	222,607	223,057

#### 4.2.2 Debt Service Requirements

A summary of the District's existing and proposed debt service requirements is shown in Table 4-5. Existing debt service requirements are related to the 2003A, 2005A, 2005B, 2006A, 2007A, 2009A, 2009B, 2010A and 2010B, and 2013 Series revenue bonds; separate Ohio Water Development Authority (OWDA) contract loans and a capital lease for the Wastewater Engineering Building<sup>1</sup>.

Debt service requirements on the proposed revenue bond issues required during the study period are based upon equal annual principal and interest payments over a period of 25 years at an estimated net effective interest rate of 5.4 percent. Bonds are assumed to be issued on July 1 of each year 2015 through 2018, with no bond issuance anticipated in 2019.

As shown in Table 4-5, \$380 million in revenue bonds and \$315 million in low interest loans are projected over the planning period. Debt service payments on low interest loans are assumed to begin two years after issuance.

<sup>1</sup> The analysis presented herein was completed prior to the issuance of Hamilton County's 2014A and 2015A Refunding Bonds issuance.

Table 4-5 Existing and Projected Long-Term Debt Service

Line No.	Description	Issue Amount \$1,000	Projected					
			2014 \$1,000	2015 \$1,000	2016 \$1,000	2017 \$1,000	2018 \$1,000	2019 \$1,000
1	<b>Existing Revenue Bonds</b>		77,646	80,444	80,313	80,864	63,099	63,094
	<b>Proposed Revenue Bonds</b>							
2	2014 Series	0	0	0	0	0	0	0
3	2015 Series	190,000		5,844	14,026	14,026	14,026	14,026
4	2016 Series	100,000			3,076	7,382	7,382	7,382
5	2017 Series	60,000				1,846	4,429	4,429
6	2018 Series	30,000					923	2,215
7	2019 Series	0						0
8	Total Revenue Bonds	380,000	77,646	86,288	97,416	104,119	89,860	91,147
9	<b>Existing Other Debt (a)</b>		20,767	27,453	27,071	26,527	26,218	25,070
	<b>Proposed Other Debt (a)</b>							
10	2014 Series	80,000	0	0	465	5,578	5,578	5,578
11	2015 Series	80,000		0	0	465	5,578	5,578
12	2016 Series	80,000			0	0	465	5,578
13	2017 Series	25,000				0	0	145
14	2018 Series	25,000					0	0
15	2019 Series	25,000						0
16	Total Other Debt	315,000	20,767	27,453	27,536	32,570	37,839	41,949
17	<b>Total Debt Service</b>		98,413	113,742	124,951	136,689	127,699	133,096

(a) Includes OWDA, OPWC, WPCLF bonds, and capital lease.

### 4.3 REVENUE REQUIREMENT LEVELS

There are three approaches to establishing utility revenue requirements. The first approach identifies the cash requirements of utilities – operation and maintenance expense, principal and interest to satisfy debt service requirements of bonds or loan programs, capital improvements funded from revenues, and deposits to reserve funds. The second addresses the utilities’ financial statements. Operation and maintenance expenses and bond or loan generated debt service interest are the same as in the cash approach. However, the financial statements recognize depreciation of existing assets instead of actual cash spent on capital related items. The third approach addresses covenants that the utilities have made to bond holders, financing agents, or mandated policies in regards to minimum reserve balances. The financial plan presented herein was developed to satisfy annual revenue requirements based on the cash needs of the utility and to sustain appropriate fund balances and coverage requirements.

The pro forma operation statement or cash flow analysis presented in Table 4-6 provides a basis for evaluation of the adequacy of revenues under existing rates to meet the projected revenue requirements of the District for the period 2014 through 2019. Revenue under existing rates, as shown in Line 2, reflect calculated revenue under rates effective January 9, 2014. The indicated increased revenue levels shown on Lines 4 through 8 of Table 4-6 are based on the effective dates and magnitude of required revenue adjustments considered necessary to meet the revenue requirement obligations of the District as well as required revenue bond coverage provisions. The effective amount of increased revenues shown during the first year of each annual rate adjustment

includes an allowance for the effect of bill proration and billing lag on the level of revenues to be received.

Total revenue requirements are summarized on Line 22 of Table 4-7. The ending balance/deficit available shown on Line 23 is the projected Operating Reserve end-of-year cash balance from the annual operation of the Utility. Operating reserve requirements are listed on Line 25 and are needed to maintain the mandated two month's expenditures requirement in the Operating Fund. Funds in excess of this requirement are assumed to be transferred to the Surplus Fund, as shown in Line 21.

Presented at the bottom of Table 4-6 is an analysis of the District's ability to provide adequate debt service coverage on revenue bonds and total debt service obligations. The District's current revenue bond rate covenant requires that system net revenues (total revenue less operation and maintenance expense) be sufficient to provide at least 125 percent coverage of the annual revenue bond debt service requirements due each year, and 110 percent coverage of total debt service obligations. The revenue increases projected in this study reflect the level of funding necessary to recover all annual expenditures and maintain revenue bond debt coverage at the District's stated policy level of 150 percent or higher. While the existing revenue bond rate covenant requires a minimum of 125 percent for revenue bond debt coverage, the current District policy is for bond debt coverage to be equal to or greater than 150 percent, and is established to help maintain stability of the District's financial condition while implementing the anticipated size of the final Wet Weather Improvement Program.

Table 4-6 Estimated Revenues and Revenue Requirements under Increased Rates <sup>(a)</sup>

Line No.	Description	Projected					
		2014	2015	2016	2017	2018	2019
		\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000
<b>Revenues:</b>							
1	Revenue from Rates:						
2	Revenue from Existing Rates	257,202	254,684	253,269	252,380	251,692	251,130
3	Increased Revenue						
4	1/1/15 - 7.00%		15,361	17,729	17,667	17,618	17,579
5	1/1/16 - 4.00%			9,340	10,802	10,772	10,748
6	1/1/17 - 4.00%				9,680	11,203	11,178
7	1/1/18 - 4.00%					10,039	11,625
8	1/1/19 - 4.00%						10,418
7	Total Revenue from Rates	257,202	270,045	280,338	290,528	301,325	312,679
9	Other Operating Revenues	4,590	4,590	4,590	4,590	4,590	4,590
10	Non Operating Revenues	4,122	4,002	3,935	3,851	3,863	3,917
11	Total Operating Revenues	265,914	278,636	288,864	298,969	309,779	321,186
<b>Revenue Requirements:</b>							
12	O&M Expenses	102,938	115,409	119,880	125,087	129,935	134,529
13	Debt Service Requirements						
14	Existing Revenue Bonds	77,646	80,444	80,313	80,864	63,099	63,094
15	Proposed Revenue Bonds	0	5,844	17,102	23,254	26,761	28,053
16	Total Revenue Bonds	77,646	86,288	97,416	104,119	89,860	91,147
17	Other Existing Debt Obligations	20,767	27,453	27,071	26,527	26,218	25,070
18	Other New Debt Obligations	0	0	465	6,043	11,621	16,879
19	Total Debt Service	98,413	113,742	124,951	136,689	127,699	133,096
20	Annual Equipment Purchases	5,854	6,443	6,636	6,835	7,040	7,251
21	Transfer to Surplus Account	73,070	45,819	40,994	36,661	29,502	44,308
22	Total Revenue Requirements	280,274	281,411	292,461	305,273	294,176	319,184
23	Annual Net Balance	(14,360)	(2,775)	(3,597)	(6,303)	15,602	2,002
24	Cumulative Annual Balance	62,740	59,965	56,368	50,065	65,667	67,669
25	Minimum Required Operating Balance	16,921	18,971	19,706	20,562	21,359	22,114
<b>Debt Service Coverage:</b>							
26	Net Revenue from Operations	162,976	163,228	168,983	173,882	179,844	186,657
27	Connection Fee Revenue	2,148	2,148	2,148	2,148	2,148	2,148
28	Other Interest Income (b)	3,117	3,098	3,173	3,221	3,284	3,320
29	Revenue Available for Coverage	168,241	168,474	174,305	179,251	185,276	192,125
<b>Debt Service Coverage for:</b>							
30	Revenue Bonds	217%	195%	179%	172%	206%	211%
31	Minimum Required	125%	125%	125%	125%	125%	125%
32	MSD Policy	150%	150%	150%	150%	150%	150%
33	Total Debt Service	171%	148%	139%	131%	145%	144%
34	Minimum Required	110%	110%	110%	110%	110%	110%
35	MSD Policy	130%	130%	130%	130%	130%	130%

(a) Beginning of year account balances at December 2013 represent unencumbered funds available to meet ongoing obligations of the sewer system.

(b) Includes interest earnings on cash invested in the Bond Reserve and Surplus Fund accounts.

As shown in Figure 4-1, operation and maintenance expenses and debt service requirements average approximately 82 percent of the District’s total revenue requirements over the planning period. Other requirements include annual equipment purchases and generation of sufficient amounts of net revenues to meet required revenue bond coverage provisions, which is used to provide cash financing of capital improvements.

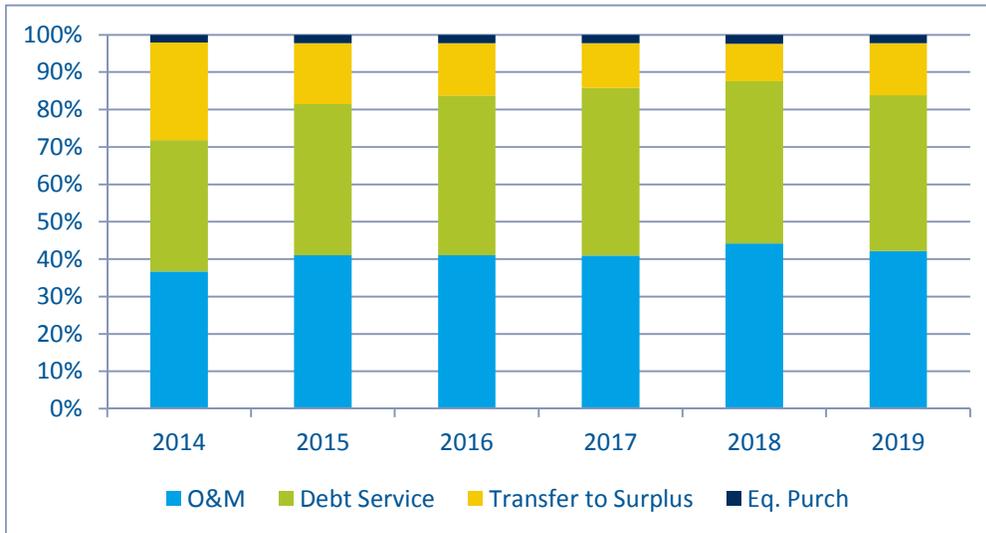


Figure 4-1 Breakdown of Annual Revenue Requirements

Over the planning period, the total revenue requirements of the District are expected to increase, primarily due to the implementation of the capital program. As shown in Figure 4-2, operation and maintenance expenses are projected to increase due to inflation and the impact of the capital program on operations, and debt service costs and funds transferred to the Surplus Fund (to be used for capital funding) are expected to also increase over the study period.

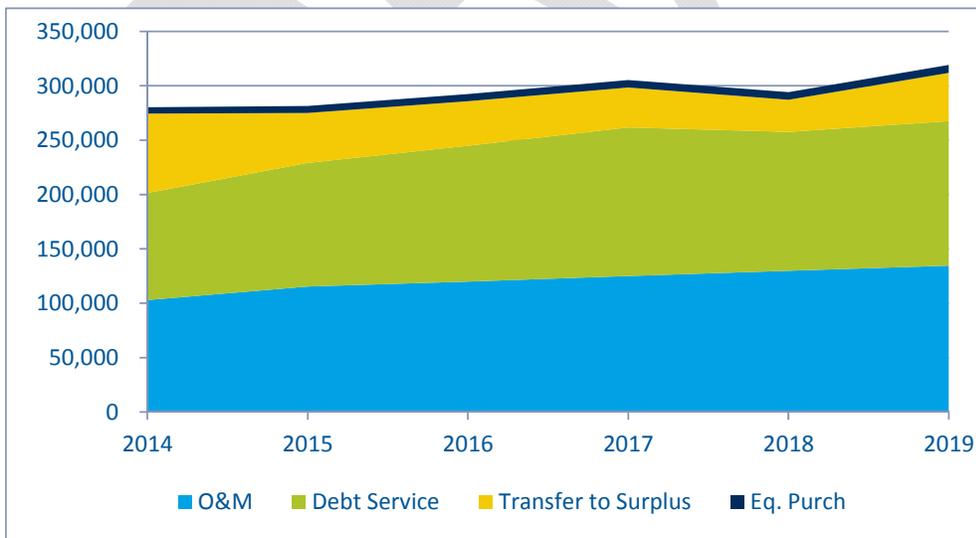


Figure 4-2 Summary of Annual Revenue Requirements

## 5 Cost of Service Allocation

The revenue requirements to be derived from rates and charges for wastewater service are synonymous with the definition of the cost of service. In developing equitable rate structures, revenue requirements are allocable to the various customer classifications according to the service rendered. Allocations of these requirements to customer classes should take into account the quantity of wastewater contributed, peak rates of wastewater flow, strength of wastewater, number of customers, and other relevant factors. Cost of service considerations must also recognize EPA rules and regulations required under the Federal Clean Water Act, as amended, relating to “user charges” as subsequently discussed.

EPA user charge requirements mandated under the Federal Clean Water Act, which the District must comply with, cover only the O&M expense portion, including replacements, of the total costs. These costs are often referred to as OM&R. The O&M expenses, shown on Line 10, Column 1 of Table 5-1, represent the net expense of the District to be met from user charges and include a portion of the cost burden associated with equipment replacements needed to maintain the expected service life of individual property units as defined by EPA. While the District has established accounting procedures to separately identify equipment replacements once incurred, the District’s budgetary system for forecasting expenditures does not specifically identify equipment replacement costs separately. The total of the net O&M expense amount of \$110,189,000 and the additional replacement cost allowance of \$4,973,000, or a total of \$115,162,000, comprise the total OM&R cost element considered subject to EPA user charge requirements as used in these cost analyses and shown in subsequent tables.

Capital costs consist of debt service on existing and proposed bonds, and additional funding related to capital improvement program requirements. The total annual capital costs for 2015 to be recovered through wastewater charges, as shown in column 3 of Table 5-1, is estimated to be \$157,350,000.

The total cost of service to be met from wastewater charges is estimated to be \$272,512,000 as shown on Line 10, column 4 of Table 5-1.

Table 5-1 Cost of Service to be Recovered from Rates - Test Year 2015

Line No.	Description	O&M Expense \$1,000	User Charge Replacement \$1,000	Capital Costs \$1,000	Total \$1,000
<b>Revenue Requirements:</b>					
1	Operation and Maintenance Expense	115,409			115,409
2	User Charge Replacements		5,000		5,000
3	Debt Service Requirements			113,742	113,742
4	Capital Outlay (a)			6,443	6,443
4	Total	115,409	5,000	120,184	240,593
<b>Less Other Revenue Sources:</b>					
5	Surplus Fund Transfer and Change in Operating Balance			38,044	38,044
6	Other Operating Revenue	(4,590)			(4,590)
7	Nonoperating Revenue	(1,641)	(71)	(2,289)	(4,002)
8	Annualized Revenue Adjustments (b)	1,012	44	1,411	2,467
9	Total	(5,219)	(27)	37,165	31,919
10	Total Cost of Service	110,189	4,973	157,350	272,512

- (a) Revenue financed capital outlay has been reduced by an amount necessary to fund indicated user charge replacements as required under federal rules and regulations of the Clean Water Act.
- (b) Represents effect of partial year rate adjustment and billing lag following an increase in revenues.

## 5.1 FUNCTIONAL COST COMPONENTS

In developing an equitable rate structure, revenue requirements are allocated to the various customer classifications according to the cost of service rendered. Customers are classified to reflect groups of customers with similar service requirements who can be served at similar cost. Each class represents a particular type of service requirement or load on the System in terms of customer related infiltration/inflow (I/I), volume related I/I, flow, BOD strength, SS strength, TKN strength, and number of customers served.

As a basis for allocating costs of service among customer classes, costs are first allocated to functional cost components, then allocated to cost categories, and subsequently distributed to customer classes. In this study there are five primary cost components: (1) flow, or volume costs, (2) capacity costs, (3) wastewater strength costs, (4) customer costs, and (5) directly assigned costs.

Volume costs are those which vary directly with the quantity of wastewater contributed and include capital costs related to investment in system facilities which are sized on the basis of wastewater volume, O&M expense related to those facilities, and the expense of volume related treatment chemicals and electric power associated with the volume of wastewater treated.

Capacity related costs include capital costs related to investment in system facilities which are sized on the basis of maximum rates of wastewater flow and the operation and maintenance expense related to those facilities.

Wastewater strength costs consist of the operation and maintenance expense and capital costs related to system facilities which are designed principally on the basis of the quantity of pollutants in the wastewater. Strength costs are further separated into components varying with SS, BOD, and TKN loadings.

Customer costs are those costs which tend to vary in proportion to the number of customers served. These include customer related billing and collection expense.

Pretreatment costs are those costs required for the administration, monitoring, and enforcement of the District's industrial waste monitoring and pretreatment program. These costs vary in proportion to the number of businesses and industries subject to categorical pretreatment standards, and to the degree in which these businesses must be monitored to insure compliance with wastewater discharge requirements. These costs are directly assigned to those customers that incur the cost.

## **5.2 ALLOCATION TO COST COMPONENTS**

Each element of cost is allocated to functional cost components on the basis of the parameter or parameters having the most significant influence on the magnitude of that element of cost. O&M expense items are allocated directly to appropriate cost components, while the allocation of capital and replacement costs is based upon a detailed allocation of related capital investment. The separation of costs into functional components provides a means for distributing such costs to the various classes of customers on the basis of their respective responsibilities for each particular type of service.

In the allocation of O&M expense and investment, costs are allocated directly to cost components to the extent possible. General and administrative cost elements are then allocated on the basis of the allocation of other costs to which they are most nearly related.

### **5.2.1 Plant Investment, Replacement, and Capital Costs**

The estimated test year plant investment in wastewater facilities consists of plant in service as of December 31, 2013, construction work in progress, and the estimated cost of capital improvements through 2013. Allocation of the existing and planned investment in wastewater facilities to functional cost components is shown in Table 5-2.

Table 5-2 Allocation of Plant Investment to Functional Cost Components – Test Year 2015

Line No.	Description	Total	Volume	Capacity	Wastewater Strength			Water in Basement
					SS	BOD	TKN	
		\$	\$	\$	\$	\$	\$	\$
<b>Plant in Service:</b>								
1	Major Treatment							
2	Preliminary Treatment	12,769,430	0	12,769,430	0	0	0	0
3	Primary Sedimentation	461,157	461,157	0	0	0	0	0
4	Pumping	6,031,799	0	6,031,799	0	0	0	0
5	Power Generation	300,945	300,945	0	0	0	0	0
6	Aeration Basins	5,149,665	2,574,833	0	0	2,259,597	315,235	0
7	Aeration Equipment	2,048,188	0	0	0	1,837,238	210,950	0
8	Secondary Sedimentation	6,261,064	6,261,064	0	0	0	0	0
9	Chlorination/Disinfection	13,614,212	13,614,212	0	0	0	0	0
10	Sludge Handling/ Treatment	6,784,231	0	0	3,392,116	3,114,351	277,764	0
11	Sludge Dewatering/ Disposal	80,441,867	0	0	40,220,933	36,440,368	3,780,566	0
12	Outfall	848,393	0	848,393	0	0	0	0
13	General Treatment	115,579,338	19,930,278	16,871,396	37,404,142	37,441,456	3,932,066	0
14	<b>Total Major Plant</b>	<b>250,290,290</b>	<b>43,142,489</b>	<b>36,521,018</b>	<b>81,017,191</b>	<b>81,093,010</b>	<b>8,516,582</b>	<b>0</b>
15	Minor Treatment Plants	8,498,638	2,634,578	1,699,728	1,104,823	3,059,510	0	0
16	Laboratory	5,014,345	1,554,447	1,002,869	651,865	1,805,164	0	0
17	Collection System	721,856,147	0	721,856,147	0	0	0	0
18	Pumping & Lift Stations	24,493,269	0	24,493,269	0	0	0	0
19	General & Administrative	62,003,545	2,915,129	48,177,878	5,094,958	5,291,353	524,228	1,042,920
20	Developer Contributed Mains	0	0	0	0	0	0	0
21	Non-Rate Base Studies	0	0	0	0	0	0	0
22	<b>Total Plant in Service</b>	<b>1,072,156,234</b>	<b>50,246,642</b>	<b>833,750,908</b>	<b>87,868,837</b>	<b>91,249,037</b>	<b>9,040,810</b>	<b>1,042,920</b>
<b>Less</b>								
23	Grants	(3,431,547)	0	(3,332,469)	(49,539)	(44,585)	(4,954)	0
24	Developer Contributed Mains	0	0	0	0	0	0	0
25	Non-Rate Base Studies	0	0	0	0	0	0	0
26	<b>Total Net Investment</b>	<b>1,068,724,687</b>	<b>50,246,642</b>	<b>830,418,439</b>	<b>87,819,298</b>	<b>91,204,452</b>	<b>9,035,856</b>	<b>1,042,920</b>
27	<b>CWIP (Work in Progress)</b>	<b>309,498,816</b>	<b>44,587,403</b>	<b>212,214,103</b>	<b>24,961,901</b>	<b>25,651,672</b>	<b>1,963,256</b>	<b>120,480</b>
28	<b>Net Investment Plus CWIP</b>	<b>1,379,266,422</b>	<b>94,834,046</b>	<b>1,042,632,542</b>	<b>112,781,199</b>	<b>116,856,124</b>	<b>10,999,111</b>	<b>1,163,401</b>

The investment in existing plant and capital additions is allocated to cost components on a design or cost causative basis recognizing the principal function governing the design of the facility. For example, raw wastewater pumping and preliminary treatment facilities are basically designed to meet peak hydraulic flow requirements and are allocated to the capacity cost function. Primary and secondary clarifiers, aeration and chlorination basins, are designed in relation to the volume of wastewater flow and detention time and are allocated to the volume cost component. Equipment for aeration facilities are generally designed in accordance with the BOD and TKN strength loadings. Since the sludge which is removed from the wastewater in the treatment process results from the reduction of suspended solids, BOD, and TKN concentrations, the costs associated with sludge handling and disposal facilities are allocated proportionately between the strength cost components.

The investment for general elements of the treatment plant, such as garage and shop facilities, is included in treatment general plant and is allocated in relation to total treatment plant investment in other facilities. The allocation of major treatment plant investment to functional cost components, as shown on Line 14 of Table 5-2 is the sum of the respective allocations of the investment for each individual major treatment plant facility using the methods discussed above.

The investment in other treatment facilities, representing several package and smaller treatment plants, is allocated to cost components based upon estimated functional requirements of the major plants. Collection system facilities including pump and lift stations are basically designed to meet peak hydraulic flow requirements; therefore, the investment in these facilities is allocated entirely to the capacity related cost component. The investment in general plant facilities, including vehicles,

furniture, and miscellaneous equipment not directly allocable to a specific cost function, is allocated in relation to the total investment in other system facilities.

The resulting allocation of total net investment shown on Line 28 of Table 5-2 is the basis for recovery of the test year 2015 capital cost of \$157,350,000 and replacement costs of \$4,973,000.

### **5.3 ALLOCATION OF OPERATION AND MAINTENANCE EXPENSE**

Projected operation and maintenance expense for the test year is allocated to cost components in generally the same manner as plant investment. The results of the allocation are shown in Table 5-3.

Treatment plant O&M expenses; excluding electric power, natural gas, and chemical costs, are allocated to the volume, capacity, SS, BOD, TKN, surcharge, and pretreatment related cost components based upon the estimated operating expense associated with each function. Electric power expense for raw wastewater pumping and preliminary treatment, and the cost of chemicals are allocated to the volume component. Costs for sludge handling and disposal are allocated to SS, BOD, and TKN components reflecting the functions for which these costs were incurred. Operation supervision, equipment maintenance, and laboratory expense are allocated on the basis of other allocated treatment operation and maintenance expense less power and chemical costs.

Expenses for the maintenance and repair of the wastewater collection system are allocated to the capacity cost function. Capital projects and engineering related expenses are allocated on the basis of the projected investment in total capital additions. Expenses associated with the industrial waste activities for the laboratory, extra strength surcharge, and pretreatment monitoring and surveillance are allocated to cost components in direct proportion to the estimated expense associated with each. Billing and collection expense is allocated to the customer related cost function. General expenses related to Administration and the Director's Office are allocated among cost components in proportion to the total of all other expense, less power, natural gas, and chemical costs.

The total 2015 O&M expense is projected to be \$115,408,590, as shown on Line 21 of Table 5-3.

### **5.4 SUMMARY OF ALLOCATION TO FUNCTIONAL COST COMPONENTS**

Table 5-4 presents a summary of the test year cost of service consisting of the previous allocation of operating expense, replacement, and capital costs to functional cost components.

Table 5-3 Allocation of Operation and Maintenance Expense to Functional Cost Components - Test Year 2015

Line No.	Description	Total	Volume	Capacity	Wastewater Strength			Cust./Bill.	Surcharge	Pretreatment	Water In Basement
					SS	BOD	TKN				
		\$	\$	\$	\$	\$	\$	\$	\$	\$	
<b>Wastewater Treatment:</b>											
1	Office of the Director - 410	14,000,916	1,419,146	5,619,787	1,556,597	1,806,388	266,754	832,117	138,983	334,184	2,026,960
2	Wastewater Engineering - 420	1,962,982	179,130	1,321,274	208,602	227,618	26,358	0	0	0	0
3	Project Delivery- 421	4,009,410	393,323	2,678,386	422,863	461,409	53,430	0	0	0	0
4	Wastewater Administration - 430	8,812,482	398,830	1,579,359	437,459	507,659	74,967	5,111,583	39,059	93,918	569,647
5	Information Technology - 431	5,803,805	588,279	2,329,573	645,257	748,803	110,578	344,938	57,613	138,530	840,236
6	Wastewater Treatment - 441	1,422,680	320,932	358,767	334,600	375,636	32,745	0	0	0	0
7	Wastewater Treatment - 442 (Mill Creek)	19,710,801	4,723,518	2,981,602	4,985,681	6,216,963	803,038	0	0	0	0
8	Wastewater Treatment - 443 (Little Miami)	6,054,420	1,286,574	1,005,337	1,344,874	2,122,496	295,139	0	0	0	0
9	Wastewater Treatment - 444 (Muddy Creek)	2,921,002	1,046,741	596,798	490,052	787,411	0	0	0	0	0
10	Wastewater Treatment - 445 (Sycamore)	2,036,036	601,222	409,947	393,824	631,042	0	0	0	0	0
11	Wastewater Treatment - 446 (Colerain/Taylor Creek)	2,090,428	506,087	406,933	300,793	876,615	0	0	0	0	0
12	Wastewater Treatment - 447 (Polk Run)	1,636,153	460,078	361,144	275,781	539,149	0	0	0	0	0
13	Wastewater Treatment - 449 (Equipment Main.)	10,464,541	2,636,093	2,549,211	2,377,495	2,669,073	232,669	0	0	0	0
14	Wastewater Collection - 450	22,988,179	136,948	22,851,231	0	0	0	0	0	0	0
15	Industrial Waste - 460	6,055,652	629,225	0	736,888	1,179,021	736,888	0	814,696	1,958,933	0
16	Water-in-Basement - 470	11,881,702	0	0	0	0	0	0	0	0	11,881,702
17	<b>Total O&amp;M Expense</b>	<b>121,851,190</b>	<b>15,326,126</b>	<b>45,049,348</b>	<b>14,510,767</b>	<b>19,149,283</b>	<b>2,632,566</b>	<b>6,288,637</b>	<b>1,050,351</b>	<b>2,525,564</b>	<b>15,318,546</b>
18	Plus: Incremental O&M Expenses	0	0	0	0	0	0	0	0	0	0
19	Less: Office Equipment & Motorized Vehicles	(6,442,600)	(653,028)	(2,585,977)	(716,277)	(831,219)	(122,748)	(382,903)	(63,954)	(153,777)	(932,717)
20	Less: Force Accounts	0	0	0	0	0	0	0	0	0	0
21	<b>Total Net O&amp;M Expenditures</b>	<b>115,408,590</b>	<b>14,673,099</b>	<b>42,463,372</b>	<b>13,794,490</b>	<b>18,318,064</b>	<b>2,509,818</b>	<b>5,905,734</b>	<b>986,398</b>	<b>2,371,788</b>	<b>14,385,829</b>

Table 5-4 Summary of Allocation to Functional Cost Components – Text Year 2015

Line No.	Cost Component	Operating Expense	Replacement Costs	Capital Costs	Total Cost of Service
		\$	\$	\$	\$
1	<b>Volume Related Cost</b>	14,009,503	337,761	10,687,653	25,034,917
2	<b>Capacity Related Cost</b>	40,542,952	3,713,436	117,503,105	161,759,494
3	<b>Strength Related Cost</b>				
4	Suspended Solids	13,170,630	401,681	12,710,270	26,282,581
5	BOD	17,489,624	416,194	13,169,508	31,075,326
6	TKN	2,396,311	39,174	1,239,583	3,675,068
7	<b>Customer Cost</b>	5,638,646	0	0	5,638,646
	<b>Industrial Monitoring &amp; Surveillance</b>				
8	Surcharge	941,787	0	0	941,787
9	Pretreatment	2,264,523	0	0	2,264,523
10	<b>Water In Basement</b>	13,735,225	64,453	2,039,481	15,839,159
11	<b>Total Cost of Service</b>	<b>110,189,200</b>	<b>4,972,700</b>	<b>157,349,600</b>	<b>272,511,500</b>

## 5.5 DISTRIBUTION OF COSTS TO CUSTOMER CLASSES

The total cost responsibility of each class of service may be established by developing unit costs of service for each cost function and assigning those costs to the customer classes based on the respective service requirements of each class.

### 5.5.1 Customer Classifications

Wastewater customers have been separated into six principal categories including residential, commercial, industrial, multifamily, surcharge, pretreatment and water-in-basement. Each class represents a particular type of service requirement or load on the system in terms of wastewater volume, capacity, strength, number of customers served, and direct cost responsibility. The individual customers are billed on either a quarterly or monthly billing period.

As previously discussed, residential, multi-family, commercial and industrial customer classification is based upon information provided in GCWW billing data. The surcharge category represents customers billed for excess strength waste discharges to the wastewater system. The pretreatment category includes all industrial and business related customers having wastewater discharge characteristics that are considered subject to regulated national categorical standards.

### 5.5.2 Units of Service

The determination of customer class responsibility for costs of service requires that each general customer class be allocated a portion of the volume, capacity, strength, and customer costs of service according to its respective service requirements, and that all costs directly associated with a specific customer class be allocated to that class.

Volume related costs vary with and are allocated on the basis of the volume of wastewater conveyed and treated by the wastewater system. Capacity related costs are those associated with providing maximum capacity for the conveyance of wastewater, and are distributed to customer classes on the

basis of estimated maximum rates of wastewater flow. Strength costs are related to the function of reducing wastewater SS, BOD, and TKN concentrations and are allocated to customer classes in proportion to respective strength loadings. Customer costs, which consist of billing and collection costs, are allocated on the basis of the number of customer equivalent bills. Pretreatment costs are those costs required to administer the industrial pretreatment program and are allocated in part to all nonresidential customers on the basis of equivalent meters, and to pretreatment customers on the basis of permitted industries and the number of sampling/monitoring events required.

The estimated test year service requirements or units of service for the various customer classes are shown in Table 5-5. Estimates of annual wastewater volume and number of bills are based on projections of the number of wastewater customers and their corresponding water use, adjusted to exclude exempted water used but not discharged to the wastewater system. Historical data and information regarding wastewater customers and water use were provided from utility records. An analysis of wastewater bills rendered during a recent period was used as a basis for estimating the wastewater volume of each customer class during the test year.

Wastewater collected and treated by the District consists of two elements: (1) contributed sanitary wastewater flow, and (2) infiltration/ inflow (I/I) of ground water and stormwater runoff into the sewers. Contributed wastewater flow is that portion of the annual water use or other discharge of each customer class which enters the sanitary wastewater system. Estimates of the contributed volume of each class is generally based upon wastewater billing records that exclude estimated water use not reaching the wastewater system, such as that used for lawn sprinkling and car washing or included in manufactured products.

Table 5-5 Estimated Units of Service – Test Year 2015

Line No.	Description	Residential	Commercial	Industrial	Multi Family	Surcharge	Pretreatment	Water in Basement	Total
<b>1</b>	<b>Wastewater Volume - 1,000 Ccf</b>								
2	Contributed Wastewater Volume	11,215	6,480	5,373	6,391				29,459
3	Infiltration/Inflow	30,422	10,570	4,447	10,414				55,854
4	Total	41,637	17,051	9,819	16,806				85,313
<b>5</b>	<b>Wastewater Capacity Flow Rate - Ccf/day</b>								
6	Contributed Wastewater Volume	46,090	26,631	22,080	26,266				121,067
7	Infiltration/Inflow	250,046	86,880	36,547	85,597				459,070
8	Total	296,136	113,511	58,627	111,863				580,137
	<b>Wastewater Strength - 1,000 pounds</b>								
9	Suspended Solids	38,369	17,796	12,061	17,547	4,177			89,950
10	BOD	22,320	11,366	8,481	11,209	19,154			72,530
11	TKN	3,067	1,292	775	1,274	1,317			7,725
	<b>Customer Billing Units</b>								
12	Equivalent Bills	824,700	63,400	4,100	86,700	999			979,899
13	<b>Surcharge</b>								
14	<b>Water in Basement</b>							330,700	330,700
	<b>Pretreatment</b>								
15	Equivalent Meters						74,200		
16	Customers						184		
17	Sampling Events						228		

Ccf - Hundred cubic feet

Ccf/day - Hundred cubic feet per day

Based on an evaluation of historical plant loading data, it is estimated that the amount of flow entering the sewers through I/I will average 65 percent of the total wastewater flow reaching the

treatment plants. Each customer class should bear its proportionate share of the costs associated with I/I as the wastewater system must be adequate to convey and process the total flow. Recognizing that the major cost responsibility for I/I is allocable on an individual connection basis, three-fourths of the I/I volume is allocated to customer classes based on estimated customer equivalent connections with the remaining one-fourth allocated on the basis of contributed volume.

The responsibility for collection system capacity cost varies with the estimated peak flow rates of contributed wastewater and infiltration attributable to each customer class. Infiltration/inflow is estimated to comprise 75 percent of the total peak flow.

The SS, BOD, and TKN responsibility of each customer class is based on estimated average domestic strength concentrations and contributed wastewater volume for each class. Average SS, BOD, and TKN concentrations of contributed domestic sewage are estimated to be 277 mg/l, 224 mg/l, and 14 mg/l, respectively. An average I/I strength allowance of 100 mg/l, 35 mg/l and 11 mg/l for SS, BOD and TKN respectively was also used to balance total wastewater loadings contributed by normal and excess strength users with the total wastewater loadings received at the treatment plants.

Suspended solids, BOD, and TKN strengths in excess of normal domestic limits are assigned to a surcharge classification, and are shown separately in Table 5-5. The estimates of excess strength quantities for surcharge customers are based on extra strength data provided by historical surcharge billings of the District.

The annual number of equivalent bills applicable to each class of wastewater service is based upon the respective number of bills rendered and estimated ratios of average billing and collection costs of various sized meters to that of a 5/8 inch meter.

Pretreatment units of service represent the number of industrial customers subject to categorical standards, the number of sampling events considered necessary to monitor affected industries, and the number of equivalent metered connections considered to share in a portion of the costs for administering the pretreatment program.

## **5.6 COST OF SERVICE ALLOCATIONS**

The costs of service are distributed to the various customer classes by applying the unit costs of service to respective service requirements. The test year unit cost of service for each functional cost component is based on the total cost divided by the applicable units of service as shown in Table 5-6. The total unit costs of service applied to the respective requirements for each customer class results in the total cost of service for each customer class.

## **5.7 ADEQUACY OF EXISTING RATES TO MEET COST OF SERVICE**

Presented in Table 5-7 is a comparison of the allocated cost of service and revenue under existing rates by individual customer class and for the system in total.

The indicated revenue increase required over existing rates for each domestic user class (residential, commercial, industrial and multifamily) indicates where emphasis should be directed in the subsequent rate design of sewer service charges. Pretreatment related fees will need to be modified to recover the total costs of the District's industrial pretreatment program.

The \$17,827,885, or 7 percent, overall increase in the level of wastewater service revenues is considered necessary to meet the projected revenue requirements for the 2015 test year (includes necessary adjustment to reflect delays in billing due to quarterly billing cycle). This overall level of revenue needs to be produced by the proposed rates developed and presented in subsequent sections of this report.

Table 5-6 Unit Costs of Service and Customer Class Allocation – Test Year 2015

Line No.	Description	Wastewater Strength						Industrial Monitoring and Surveillance				Water In Basement	
		Total	Volume	Capacity	SS	BOD	TKN	Billing	Surcharge	Customer	Sampling		Permits
		\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
<b>Cost of Service:</b>													
1	Operation & Maintenance Expense	110,189,200	14,009,503	40,542,952	13,170,630	17,489,624	2,396,311	5,638,646	941,787	566,131	1,358,714	339,678	13,735,225
2	Replacement Costs	4,972,700	337,761	3,713,436	401,681	416,194	39,174	0	0	0	0	0	64,453
3	Subtotal	115,161,900	14,347,264	44,256,388	13,572,311	17,905,818	2,435,485	5,638,646	941,787	566,131	1,358,714	339,678	13,799,678
3	Other Capital Costs	157,349,600	10,687,653	117,503,105	12,710,270	13,169,508	1,239,583	0	0	0	0	0	2,039,481
4	Total Cost of Service	272,511,500	25,034,917	161,759,494	26,282,581	31,075,326	3,675,068	5,638,646	941,787	566,131	1,358,714	339,678	15,839,159
<b>Units of Service:</b>													
5	Total		85,312,834	580,137	89,950	72,530	7,725	979,899		74,200	228	184	330,700
	Units		Ccf	Ccf/day	1,000 lbs.	1,000 lbs.	1,000 lbs.	Eq. Bills		Eq. Meters	Sampling Events	Customers	Connections
<b>Unit Cost of Service:</b>													
6	Operation & Maintenance Expense		0.1642	69.8851	146.4218	241.1353	310.2133	5.7543		7.6298	5.95927	1.84608	41.53
7	Replacement Costs		0.0040	6.4010	4.4656	5.7382	5.0713	0.0000		0.0000	0.00	0.00	0.19
8	Subtotal		0.1682	76.2861	150.8874	246.8735	315.2846	5.7543		7.6298	5.95927	1.84608	41.73
9	Other Capital Costs		0.1253	202.5437	141.3038	181.5724	160.4697	0.0000		0.0000	0.00	0.00	6.17
10	Total Unit Cost of Service		0.2934	278.8298	292.1912	428.4458	475.7543	5.7543		7.6298	5.95927	1.84608	47.90
<b>Allocation to Customer Classes:</b>													
<b>Residential</b>													
11	Units of Service		41,637,177	296,136	38,369	22,320	3,067	824,700					
12	OM&R Costs	46,605,457	7,002,224	22,591,060	5,789,397	5,510,216	966,978	4,745,582					
13	Other Capital Costs	75,163,168	5,216,140	59,980,487	5,421,685	4,052,696	492,161	0					
14	Total	121,768,625	12,218,364	82,571,547	11,211,083	9,562,911	1,459,138	4,745,582					
<b>Commercial</b>													
15	Units of Service		17,050,712	113,511	17,796	11,366	1,292	63,400					
16	OM&R Costs	17,790,097	2,867,459	8,659,311	2,685,191	2,805,964	407,348	364,823					
17	Other Capital Costs	29,912,707	2,136,046	22,990,940	2,514,642	2,063,752	207,327	0					
18	Total	47,702,803	5,003,505	31,650,251	5,199,834	4,869,716	614,675	364,823					
<b>Industrial</b>													
19	Units of Service		9,819,274	58,627	12,061	8,481	775	4,100					
20	OM&R Costs	10,305,281	1,651,331	4,472,425	1,819,852	2,093,734	244,346	23,593					
21	Other Capital Costs	16,473,195	1,230,120	11,874,531	1,704,265	1,539,915	124,364	0					
22	Total	26,778,475	2,881,451	16,346,956	3,524,118	3,633,649	368,710	23,593					
<b>Multifamily</b>													
23	Units of Service		16,805,670	111,863	17,547	11,209	1,274	86,700					
24	OM&R Costs	17,675,238	2,826,250	8,533,592	2,647,621	2,767,205	401,673	498,899					
25	Other Capital Costs	29,481,637	2,105,348	22,657,148	2,479,458	2,035,245	204,438	0					
26	Total	47,156,875	4,931,597	31,190,740	5,127,078	4,802,450	606,111	498,899					
<b>Surcharge</b>													
27	Units of Service				4,177	19,154	1,317	999					
28	OM&R Costs	6,721,626			630,249	4,728,700	415,141	5,749	941,787				
29	Other Capital Costs	4,279,413			590,219	3,477,900	211,293	0					
30	Total	11,001,039			1,220,469	8,206,600	626,434	5,749	941,787				
<b>Industrial Pretreatment</b>													
31	Units of Service								74,200	228	184		
32	OM&R Costs	2,264,523							566,131	1,358,714	339,678		
33	Other Capital Costs	0							0	0	0		
34	Total	2,264,523							566,131	1,358,714	339,678		
<b>Water in Basement</b>													
35	Units of Service												330,700
36	OM&R Costs	13,799,678											13,799,678
37	Other Capital Costs	2,039,481											2,039,481
38	Total	15,839,159											15,839,159
39	<b>Total Cost of Service</b>	<b>272,511,500</b>	<b>25,034,917</b>	<b>161,759,494</b>	<b>26,282,581</b>	<b>31,075,326</b>	<b>3,675,068</b>	<b>5,638,646</b>	<b>941,787</b>	<b>566,131</b>	<b>1,358,714</b>	<b>339,678</b>	<b>15,839,159</b>

Ccf - 100 cubic feet  
Ccf/day - Hundred cubic feet per day

Table 5-7 Comparison of Allocated Cost of Service with Revenues under Existing Rates - Test Year 2015

Line No.	Cost Component	Revenue Under Existing Rates	Total Cost of Service	Adjusted Cost of Service	Revenue Under Existing Rates as a % of Adj. COS	Indicated Revenue Increase Required	Indicated Revenue Adjustment
		\$	\$	\$		\$	%
1	<b>Residential</b>	111,606,909	121,768,625	131,096,184	85.1%	\$ 19,489,275	17.46%
2	<b>Commercial</b>	48,203,654	47,702,803	51,063,821	94.4%	\$ 2,860,166	5.93%
3	<b>Industrial</b>	28,319,273	26,778,475	27,630,084	102.5%	\$ (689,189)	-2.43%
4	<b>Multifamily</b>	47,982,876	47,156,875	50,021,979	95.9%	\$ 2,039,103	4.25%
5	<b>Surcharge</b>	17,970,903	11,001,039	11,001,039	163.4%	\$ (6,969,863)	-38.78%
6	<b>Industrial Pretreatment</b>						
7	Minimum Charge	0	566,131	0		\$ 0	
8	Annual Fee	563,408	339,678	339,678	165.9%	\$ (223,730)	-39.71%
9	Monitoring Charges	36,592	1,358,714	1,358,714	2.7%	\$ 1,322,122	3613.14%
10	<b>Industrial Pretreatment</b>	600,000	2,264,523	1,698,392	35.3%	1,098,392	183.07%
11	<b>Water In Basement</b>	0	15,839,159	0		0	
12	<b>Total</b>	<b>254,683,615</b>	<b>272,511,500</b>	<b>272,511,500</b>	<b>93.5%</b>	<b>17,827,885</b>	<b>7.00%</b>

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## 6 Proposed Wastewater Rate Adjustments

The initial consideration in the derivation of rate schedules for utility service is the establishment of equitable charges to the customers commensurate with the cost of providing that service. While the cost of service allocations to customer classes should not be construed as literal or exact determinations, they offer a guide to the necessity for, and the extent of, rate adjustments. Practical considerations sometimes modify rate adjustments by taking into account additional factors such as the extent of change from previous rate levels, existing contracts, and past local policies and practices.

### 6.1 EXISTING RATES

A summary of the existing sewer rates was presented earlier in Table 4-3 of the Revenue Requirements chapter. The existing schedule of sewerage service charges provides for a monthly or quarterly minimum charge depending on a customer's meter size or number of family unit equivalents and a commodity charge. The minimum charge includes a corresponding usage allowance of either 500 cubic feet per month or 900 cubic feet per quarter. For usage above the minimum allowance a commodity charge is assessed.

For residential customers consisting of one and two family units, the quarterly service charges are applicable to metered water use during the current billing period or a winter quarter billing period, whichever is less. The winter period represents the quarterly billing period most closely corresponding to usage during the months of October through April. All non-residential customers are billed on the basis of actual water used throughout the year with consideration given to either water used but not discharged to the wastewater system, or wastewater contributed from other sources such as wells or other water suppliers.

A sewerage surcharge is levied on customers contributing quantities of high strength wastes to the wastewater system. The existing surcharge is attributable to a customer's strength concentrations of suspended solids, BOD, and TKN in excess of the range of normal strength wastewater. Strength wastewater limits are presently defined by the District Cost of Service Rates as not exceeding 300 mg/l of suspended solids, 240 mg/l of BOD, and 25 mg/l of TKN. The existing sewerage surcharge rates, as shown in Table 4-3, are expressed as unit charges per hundred cubic feet (Ccf) for each mg/l of strength above the normal limits. To the extent that the strength of any pollutant parameter is less than 80 percent of the corresponding value for normal strength wastewater limits contributed by customers and described in the units of service section, a credit is allowed as an offset against surcharges otherwise due.

All costs related to the industrial pretreatment program are recovered by a three part system of charges consisting of a minimum charge, an annual administrative fee, and a monitoring charge. The minimum charge is applicable to all non-residential customers receiving service through a 1-inch or larger meter and billed similarly as, and in conjunction with, other sewerage service charge minimums.

The annual administrative fee and monitoring charge are applicable to those industrial users required to be permitted under the District's program. These charges were designed to recover the remaining costs of administering the program as well as recovering the costs of sampling and monitoring pretreatment customers.

## 6.2 PROPOSED WASTEWATER RATE ADJUSTMENTS

The overall level of revenue requirements and cost of service allocations described in this report provide information for adjusting wastewater rates. The preceding cost of service allocation sections of the report illustrates the changes needed to recover costs of service from customer classes served and provide the total level of revenue required. Three alternative rate schedules were developed for consideration, as discussed below.

### 6.2.1 Option 1: “Across-the-Board” Increase

Table 6-1 presents a schedule of sewerage service charges, designed using the same form of rate structure as the existing service charges and reflect an increase of 7.0 percent for all rates over those implemented in January 2014. Table 6-2 presents the schedule of sewerage surcharges, based on an “across-the-board” increase scenario. To comply with Federal EPA rules and regulations, the District has developed and implemented an industrial pretreatment program. In order to finance the costs associated with this program, a continuation of the existing three part system of charges is proposed. This system includes a minimum charge, an annual administrative fee, and a monitoring charge. The proposed rates presented in Table 6-3 indicate an increase of 7.0 percent.

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Table 6-1 Sewerage Service Charges – Option 1 - Test Year 2015

**Minimum Charge**

The minimum charge shall be based on the size of the water meter used to serve the premises, or the size of the premise served, as determined by the number of units therein, whichever results in the larger minimum charge.

The minimum charge shall include the allowance for the first 500 cubic feet of water used in the case of monthly bills; and the first 900 cubic feet of water used, in the case of quarterly bills.

The minimum charge rates shall be as follows:

Meter Size	Number of Family Units	Quarterly Bills		Monthly Bills	
		OM&R	Total	OM&R	Total
Inches					
5/8"	1	\$ 66.05	\$ 118.46	\$ 34.20	\$ 57.65
3/4"	2-3	\$ 83.05	\$ 152.74	\$ 39.86	\$ 69.13
1"	4-5	\$ 116.87	\$ 209.40	\$ 50.65	\$ 88.97
1 ½"	6-12	\$ 194.08	\$ 355.84	\$ 76.04	\$ 137.18
2"	13-20	\$ 273.62	\$ 504.04	\$ 103.77	\$ 189.06
3"	21-50	\$ 613.99	\$ 1,293.58	\$ 216.10	\$ 463.36
4"	51-115	\$ 1,017.51	\$ 2,142.32	\$ 360.49	\$ 767.25
6"	116-250	\$ 2,002.94	\$ 4,232.73	\$ 698.08	\$ 1,501.12
8"	Over 250	\$ 2,988.42	\$ 6,315.80	\$ 1,035.72	\$ 2,231.32
10"		\$ 3,997.24	\$ 8,439.63	\$ 1,396.71	\$ 2,998.53
12"		\$ 4,625.93	\$ 9,744.31	\$ 1,636.67	\$ 3,491.46

**Commodity Charge**

The commodity charge shall be based on the quantity of water used on the premises served as same is measured by a water meter or meters therein used, which meters must be acceptable to the Municipality that collects such charge.

The commodity charges for each 100 cubic feet (Ccf) consumed are as follows:

	Minimum		
	OM&R	Total	
First 500 cubic feet per month; or 900 cubic feet per quarter -			
Next 4,500 cubic feet per month; or 14,100 cubic feet per quarter -	\$ 2.486	\$ 5.934	/Ccf
Over 5,000 cubic feet per month; or 15,000 cubic feet per quarter -	\$ 2.486	\$ 4.746	/Ccf

**Basis of Charge**

For residential water service accounts (one and two family residences) a quarterly minimum and commodity charge shall be based upon water used during a winter quarterly billing period. Said winter period being the quarterly billing period most closely corresponding to usage during the months of October through April. Said charges shall be payable with each bill rendered throughout the year.

All non-residential customers shall be charged based upon the water used during billing period that is subject to a sewerage charge. The District will consider applications, fully supported, for adjustment due to nonsewered water use. All well water and water reaching the system from other sources will be considered in the basis for charge.

Table 6-2 Sewerage Surcharges – Option 1 - Test Year 2015

For customers having high strength waste discharge, the surcharge, which is in addition to other sewerage service charges, shall be computed on the following basis:

Suspended Solids (TSS)	\$ 0.003125	per 100 cubic feet for each mg/l of SS strength above 300 mg/l
Biochemical Oxygen Demand (BOD)	\$ 0.005338	per 100 cubic feet for each mg/l of BOD strength above 240 mg/l
Nitrogen Oxygen Demand (TKN)	\$ 0.004675	per 100 cubic feet for each mg/l of Total Kjeldahl Nitrogen (TKN) strength above 25 mg/l.

**Provision**

Provided, however, that to the extent the strength of a pollutant is less than eighty percent (80%) of the corresponding value for normal strength sewage, a credit shall be allowed as an offset against surcharge otherwise due, the credit shall be calculated by multiplying the above specified surcharge rate for the pollutant in question times the difference between actual pollutant concentration in mg/l and eighty percent (80%) of the corresponding value for normal sewage. No credit shall be allowed in excess of surcharge otherwise due.

Suspended Solids (TSS)	\$ 0.5008	per pound of excess strength
Biochemical Oxygen Demand (BOD)	\$ 0.8554	per pound of excess strength
Nitrogen Oxygen Demand (TKN)	\$ 0.7492	per pound of excess strength

Table 6-3 Industrial Pretreatment Charges – Option 1 - Test Year 2015

All users required to apply for and obtain a wastewater discharge permit or which are subject to federal pretreatment standards, as specified in the MSD Rules and Regulations, shall be subject to the payment of a pretreatment charge(s), as determined by the Director. Said pretreatment charge(s) shall be sufficient to recover, in whole or in part, the costs for the MSD Pretreatment Program including investigations, record keeping, administration, and monitoring of industrial waste discharges to the system.

Each industrial user shall pay a pretreatment charge(s) as follows:

Annual Administrative Charge \$ 3,276 per annum

Maximum Monitoring Charge \$ 19,166 per monitoring event

The monitoring charge shall become effective at such time as an industrial user is subject to compliance to one or more pretreatment standards.

Further, any user which discharges any toxic pollutants which cause an increase in the cost of managing effluent or sludge from the District's treatment system shall pay for such increased costs.

#### 6.2.1.1 Revenue Recovery under Option 1 Rates

As previously discussed, the Option #1 rate schedule would increase all rates by the average system-wide increase of 7.0 percent and maintain current cost recovery by customer class, as indicated in Table 6-4.

Table 6-4 Comparison of Allocated Cost of Service with Revenue under Option #1 Rates

Line No.	Customer Class	Total Adjusted Cost of Service \$	Revenue Under Existing Rates \$	Revenue Under Proposed Rates \$	Cost of Service Recovery Under Proposed Rates %
1	Residential	131,096,184	111,606,909	119,419,506	91.09%
2	Commercial	51,063,821	48,203,654	51,577,939	101.01%
3	Industrial	27,630,084	28,319,273	30,301,850	109.67%
4	Multifamily	50,021,979	47,982,876	51,341,646	102.64%
5	Surcharge	11,001,039	17,970,903	19,227,903	174.78%
6	Industrial Pretreatment	1,698,392	600,000	642,000	37.80%
7	Total	272,511,500	254,683,615	272,510,845	100.00%

#### 6.2.1.2 Typical Bills under Option #1

A comparison of typical bills under the proposed schedule of sewerage service charge rates with those under existing rates is shown in Table 6-5. As shown, all rates would increase at the system-wide average of 7.0 percent.

Table 6-5 Typical Customer Sewer Bills under Existing and Option #1 Rates

Meter Size Inches	Usage Ccf	Existing	Option #1 2015		
		Bill \$	Bill \$	Increase \$	Increase %
<b>Quarterly</b>					
5/8"	0	110.71	118.46	7.75	7.00%
5/8"	3	110.71	118.46	7.75	7.00%
5/8"	6	110.71	118.46	7.75	7.00%
5/8"	9	110.71	118.46	7.75	7.00%
5/8"	12	127.35	136.26	8.91	7.00%
5/8"	15	143.99	154.07	10.08	7.00%
5/8"	20	171.72	183.74	12.02	7.00%
5/8"	25	199.45	213.41	13.96	7.00%
3/4"	30	259.22	277.36	18.14	7.00%
3/4"	50	370.14	396.04	25.91	7.00%
1"	75	561.74	601.06	39.32	7.00%
1"	100	700.39	749.41	49.03	7.00%
1 ½"	150	1,114.55	1,192.56	78.02	7.00%
2"	200	1,474.81	1,578.04	103.23	7.00%
2"	300	1,918.31	2,052.59	134.28	7.00%
3"	500	3,543.19	3,791.23	248.04	7.00%
3"	1,000	5,760.69	6,163.98	403.29	7.00%
4"	5,000	24,293.91	25,994.72	1,700.81	7.00%
6"	10,000	48,422.56	51,812.63	3,390.07	7.00%
8"	20,000	94,719.36	101,350.70	6,631.34	7.00%
10"	20,000	96,704.24	103,474.53	6,770.29	7.00%
12"	20,000	97,923.57	104,779.21	6,855.64	7.00%
<b>Monthly</b>					
5/8"	0	53.88	57.65	3.77	7.00%
5/8"	3	53.88	57.65	3.77	7.00%
5/8"	6	59.43	63.58	4.16	7.00%
5/8"	9	76.06	81.39	5.32	7.00%
5/8"	12	92.70	99.19	6.49	7.00%
5/8"	15	109.34	116.99	7.65	7.00%
5/8"	20	137.07	146.66	9.59	7.00%
5/8"	25	164.80	176.33	11.53	7.00%
3/4"	30	203.26	217.49	14.23	7.00%
3/4"	50	314.18	336.17	21.99	7.00%
1"	75	443.60	474.65	31.05	7.00%
1"	100	554.47	593.28	38.81	7.00%
1 ½"	150	821.28	878.77	57.49	7.00%
2"	200	1,091.51	1,167.92	76.41	7.00%
2"	300	1,535.01	1,642.47	107.46	7.00%
3"	500	2,678.37	2,865.87	187.50	7.00%
3"	1,000	4,895.87	5,238.62	342.75	7.00%
4"	5,000	22,919.88	24,524.51	1,604.63	7.00%
6"	10,000	45,780.74	48,985.88	3,205.14	7.00%
8"	20,000	90,813.17	97,171.08	6,357.91	7.00%
10"	20,000	91,530.18	97,938.29	6,408.11	7.00%
12"	20,000	91,990.87	98,431.22	6,440.35	7.00%

### 6.2.2 Option 2: Existing Rate Structure – Move Toward Cost of Service

Table 6-6 presents a schedule of sewerage service charges, designed using the same form of rate structure as the existing service charges, with adjustments made to move toward cost of service recovery by customer class. Table 6-7 presents the schedule of sewerage surcharges, which reflect no change over those implemented in January 2014. To comply with Federal EPA rules and regulations, the District has developed and implemented an industrial pretreatment program. In order to finance the costs associated with this program, a continuation of the existing three part system of charges is proposed. This system includes a minimum charge, an annual administrative fee, and a monitoring charge. The proposed rates presented in Table 6-8 indicate no change over those implemented in January 2014.

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Table 6-6 Sewerage Service Charges – Option 2 - Test Year 2015

**Minimum Charge**

The minimum charge shall be based on the size of the water meter used to serve the premises, or the size of the premise served, as determined by the number of units therein, whichever results in the larger minimum charge.

The minimum charge shall include the allowance for the first 500 cubic feet of water used in the case of monthly bills; and the first 900 cubic feet of water used, in the case of quarterly bills.

The minimum charge rates shall be as follows:

Meter Size	Number of Family Units	Quarterly Bills		Monthly Bills	
		OM&R	Total	OM&R	Total
Inches					
5/8"	1	\$ 48.54	\$ 114.58	\$ 25.06	\$ 54.18
3/4"	2-3	\$ 62.56	\$ 150.38	\$ 29.25	\$ 65.22
1"	4-5	\$ 82.92	\$ 202.18	\$ 36.47	\$ 83.59
1 ½"	6-12	\$ 141.07	\$ 350.21	\$ 57.09	\$ 136.08
2"	13-20	\$ 210.48	\$ 509.49	\$ 81.71	\$ 192.56
3"	21-50	\$ 497.73	\$ 1,214.32	\$ 179.89	\$ 433.48
4"	51-115	\$ 824.93	\$ 2,017.38	\$ 296.29	\$ 719.02
6"	116-250	\$ 1,630.12	\$ 3,993.73	\$ 578.38	\$ 1,411.41
8"	Over 250	\$ 2,410.47	\$ 5,909.14	\$ 860.47	\$ 2,103.81
10"		\$ 3,240.51	\$ 7,946.41	\$ 1,153.65	\$ 2,823.34
12"		\$ 3,723.62	\$ 9,132.22	\$ 1,337.28	\$ 3,273.99

**Commodity Charge**

The commodity charge shall be based on the quantity of water used on the premises served as same is measured by a water meter or meters therein used, which meters must be acceptable to the Municipality that collects such charge.

The commodity charges for each 100 cubic feet (Ccf) consumed are as follows:

	Minimum		
	OM&R	Total	
First 500 cubic feet per month; or 900 cubic feet per quarter -			
Next 4,500 cubic feet per month; or 14,100 cubic feet per quarter -	\$ 1.592	\$ 7.331	/Ccf
Over 5,000 cubic feet per month; or 15,000 cubic feet per quarter -	\$ 1.592	\$ 4.005	/Ccf

**Basis of Charge**

For residential water service accounts (one and two family residences) a quarterly minimum and commodity charge shall be based upon water used during a winter quarterly billing period. Said winter period being the quarterly billing period most closely corresponding to usage during the months of October through April. Said charges shall be payable with each bill rendered throughout the year.

All non-residential customers shall be charged based upon the water used during billing period that is subject to a sewerage charge. The District will consider applications, fully supported, for adjustment due to nonsewered water use. All well water and water reaching the system from other sources will be considered in the basis for charge.

Table 6-7 Sewerage Surcharges – Option 2 - Test Year 2015

For customers having high strength waste discharge, the surcharge, which is in addition to other sewerage service charges, shall be computed on the following basis:

Suspended Solids (TSS)	\$ 0.002921	per 100 cubic feet for each mg/l of SS strength above 300 mg/l
Biochemical Oxygen Demand (BOD)	\$ 0.004989	per 100 cubic feet for each mg/l of BOD strength above 240 mg/l
Nitrogen Oxygen Demand (TKN)	\$ 0.004369	per 100 cubic feet for each mg/l of Total Kjeldahl Nitrogen (TKN) strength above 25 mg/l.

**Provision**

Provided, however, that to the extent the strength of a pollutant is less than eighty percent (80%) of the corresponding value for normal strength sewage, a credit shall be allowed as an offset against surcharge otherwise due, the credit shall be calculated by multiplying the above specified surcharge rate for the pollutant in question times the difference between actual pollutant concentration in mg/l and eighty percent (80%) of the corresponding value for normal sewage. No credit shall be allowed in excess of surcharge otherwise due.

Suspended Solids (TSS)	\$ 0.4681	per pound of excess strength
Biochemical Oxygen Demand (BOD)	\$ 0.7995	per pound of excess strength
Nitrogen Oxygen Demand (TKN)	\$ 0.7002	per pound of excess strength

Table 6-8 Industrial Pretreatment Charges – Option 2 - Test Year 2015

All users required to apply for and obtain a wastewater discharge permit or which are subject to federal pretreatment standards, as specified in the MSD Rules and Regulations, shall be subject to the payment of a pretreatment charge(s), as determined by the Director. Said pretreatment charge(s) shall be sufficient to recover, in whole or in part, the costs for the MSD Pretreatment Program including investigations, record keeping, administration, and monitoring of industrial waste discharges to the system.

Each industrial user shall pay a pretreatment charge(s) as follows:

Annual Administrative Charge \$ 3,062 per annum

Maximum Monitoring Charge \$ 17,912 per monitoring event

The monitoring charge shall become effective at such time as an industrial user is subject to compliance to one or more pretreatment standards.

Further, any user which discharges any toxic pollutants which cause an increase in the cost of managing effluent or sludge from the District's treatment system shall pay for such increased costs.

**6.2.2.1 Revenue Recovery under Option 2 Rates**

As previously discussed, the Option #2 rate schedule would recover the necessary 7.0 percent increase in revenue required by the utility, while moving toward cost of service over multi-year period. The resulting revenue recovery by customer class is indicated in Table 6-9.

Table 6-9 Comparison of Allocated Cost of Service with Revenue under Option #2 Rates

Line No.	Customer Class	Total Adjusted Cost of Service	Revenue Under Existing Rates	Revenue Under Proposed Rates	Cost of Service Recovery Under Proposed Rates
		\$	\$	\$	%
1	Residential	131,096,184	111,606,909	122,452,020	93.41%
2	Commercial	51,063,821	48,203,654	52,906,364	103.61%
3	Industrial	27,630,084	28,319,273	26,659,256	96.49%
4	Multifamily	50,021,979	47,982,876	52,410,873	104.78%
5	Surcharge	11,001,039	17,970,903	17,970,903	163.36%
6	Industrial Pretreatment	1,698,392	600,000	600,000	35.33%
7	Total	272,511,500	254,683,615	272,999,416	100.18%

**6.2.2.2 Typical Bills under Option #2**

A comparison of typical bills under the Option #2 schedule of sewerage service charge rates with those under existing rates is shown in Table 6-10.

Table 6-10 Typical Customer Sewer Bills under Existing and Option #2 Rates

Meter Size Inches	Usage Ccf	Existing	Option #2 2015		
		Bill \$	Bill \$	Increase \$	Increase %
<b>Quarterly</b>					
5/8"	0	110.71	114.58	3.87	3.50%
5/8"	3	110.71	114.58	3.87	3.50%
5/8"	6	110.71	114.58	3.87	3.50%
5/8"	9	110.71	114.58	3.87	3.50%
5/8"	12	127.35	136.57	9.23	7.24%
5/8"	15	143.99	158.57	14.58	10.13%
5/8"	20	171.72	195.22	23.51	13.69%
5/8"	25	199.45	231.88	32.43	16.26%
3/4"	30	259.22	304.34	45.12	17.41%
3/4"	50	370.14	450.96	80.82	21.84%
1"	75	561.74	686.04	124.30	22.13%
1"	100	700.39	869.32	168.93	24.12%
1 ½"	150	1,114.55	1,383.91	269.36	24.17%
2"	200	1,474.81	1,743.45	268.65	18.22%
2"	300	1,918.31	2,143.98	225.68	11.76%
3"	500	3,543.19	3,649.87	106.69	3.01%
3"	1,000	5,760.69	5,652.52	(108.16)	-1.88%
4"	5,000	24,293.91	22,476.78	(1,817.12)	-7.48%
6"	10,000	48,422.56	44,479.63	(3,942.92)	-8.14%
8"	20,000	94,719.36	86,448.04	(8,271.31)	-8.73%
10"	20,000	96,704.24	88,485.31	(8,218.92)	-8.50%
12"	20,000	97,923.57	89,671.12	(8,252.44)	-8.43%
<b>Monthly</b>					
5/8"	0	53.88	54.18	0.30	0.56%
5/8"	3	53.88	54.18	0.30	0.56%
5/8"	6	59.43	61.51	2.09	3.51%
5/8"	9	76.06	83.50	7.44	9.78%
5/8"	12	92.70	105.50	12.80	13.80%
5/8"	15	109.34	127.49	18.15	16.60%
5/8"	20	137.07	164.15	27.08	19.75%
5/8"	25	164.80	200.80	36.00	21.85%
3/4"	30	203.26	248.50	45.24	22.26%
3/4"	50	314.18	395.12	80.94	25.76%
1"	75	443.60	513.63	70.03	15.79%
1"	100	554.47	613.76	59.29	10.69%
1 ½"	150	821.28	866.51	45.23	5.51%
2"	200	1,091.51	1,123.26	31.75	2.91%
2"	300	1,535.01	1,523.79	(11.22)	-0.73%
3"	500	2,678.37	2,565.77	(112.60)	-4.20%
3"	1,000	4,895.87	4,568.42	(327.45)	-6.69%
4"	5,000	22,919.88	20,875.16	(2,044.72)	-8.92%
6"	10,000	45,780.74	41,594.05	(4,186.69)	-9.15%
8"	20,000	90,813.17	82,339.45	(8,473.72)	-9.33%
10"	20,000	91,530.18	83,058.98	(8,471.20)	-9.26%
12"	20,000	91,990.87	83,509.63	(8,481.24)	-9.22%

### 6.2.3 Option 3: Change in Multi-Family Billing

Table 6-11 presents a schedule of sewerage service charges, designed using the same form of rate structure as the existing service charges with the exception of Multi-family billing. Under Option #3, Multi-family customers would be billed based only on meter size, not “the greater of meter size or number of units.” The rate structure is designed to generate the system-wide revenue increase of 7.0 percent. Table 6-12 presents the schedule of sewerage surcharges, which reflect no change over those implemented in January 2014. To comply with Federal EPA rules and regulations, the District has developed and implemented an industrial pretreatment program. In order to finance the costs associated with this program, a continuation of the existing three part system of charges is proposed. This system includes a minimum charge, an annual administrative fee, and a monitoring charge. The proposed rates presented in Table 6-13 indicate no change over those implemented in January 2014.

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Table 6-11 Sewerage Service Charges – Option 3 - Test Year 2015

**Minimum Charge**

The minimum charge shall be based on the size of the water meter used to serve the premises.

The minimum charge shall include the allowance for the first 500 cubic feet of water used in the case of monthly bills; and the first 900 cubic feet of water used, in the case of quarterly bills.

The minimum charge rates shall be as follows:

Meter Size Inches	Quarterly Bills		Monthly Bills	
	OM&R	Total	OM&R	Total
5/8"	\$ 49.68	\$ 116.15	\$ 23.28	\$ 49.90
3/4"	\$ 64.95	\$ 154.58	\$ 28.37	\$ 62.72
1"	\$ 86.33	\$ 208.38	\$ 35.49	\$ 80.66
1 ½"	\$ 147.40	\$ 362.11	\$ 55.85	\$ 131.90
2"	\$ 219.85	\$ 527.21	\$ 80.00	\$ 186.92
3"	\$ 504.72	\$ 1,219.74	\$ 174.95	\$ 417.77
4"	\$ 828.44	\$ 2,006.71	\$ 282.86	\$ 680.10
6"	\$ 1,637.72	\$ 3,974.14	\$ 552.62	\$ 1,335.90
8"	\$ 2,447.02	\$ 5,941.57	\$ 822.39	\$ 1,991.71
10"	\$ 3,256.31	\$ 7,909.00	\$ 1,092.15	\$ 2,647.52
12"	\$ 3,741.88	\$ 9,089.45	\$ 1,254.01	\$ 3,041.01

**Commodity Charge**

The commodity charge shall be based on the quantity of water used on the premises served as same is measured by a water meter or meters therein used, which meters must be acceptable to the Municipality that collects such charge.

The commodity charges for each 100 cubic feet (Ccf) consumed are as follows:

	Minimum	
	OM&R	Total
First 500 cubic feet per month; or 900 cubic feet per quarter -		
Next 4,500 cubic feet per month; or 14,100 cubic feet per quarter -	\$ 1.592	\$ 7.195 /Ccf
Over 5,000 cubic feet per month; or 15,000 cubic feet per quarter -	\$ 1.592	\$ 3.948 /Ccf

**Basis of Charge**

For residential water service accounts (one and two family residences) a quarterly minimum and commodity charge shall be based upon water used during a winter quarterly billing period. Said winter period being the quarterly billing period most closely corresponding to usage during the months of October through April. Said charges shall be payable with each bill rendered throughout the year.

All non-residential customers shall be charged based upon the water used during billing period that is subject to a sewerage charge. The District will consider applications, fully supported, for adjustment due to nonsewered water use. All well water and water reaching the system from other sources will be considered in the basis for charge.

Table 6-12 Sewerage Surcharges – Option 3 - Test Year 2015

For customers having high strength waste discharge, the surcharge, which is in addition to other sewerage service charges, shall be computed on the following basis:

Suspended Solids (TSS)	\$ 0.002921	per 100 cubic feet for each mg/l of SS strength above 300 mg/l
Biochemical Oxygen Demand (BOD)	\$ 0.004989	per 100 cubic feet for each mg/l of BOD strength above 240 mg/l
Nitrogen Oxygen Demand (TKN)	\$ 0.004369	per 100 cubic feet for each mg/l of Total Kjeldahl Nitrogen (TKN) strength above 25 mg/l.

**Provision**

Provided, however, that to the extent the strength of a pollutant is less than eighty percent (80%) of the corresponding value for normal strength sewage, a credit shall be allowed as an offset against surcharge otherwise due, the credit shall be calculated by multiplying the above specified surcharge rate for the pollutant in question times the difference between actual pollutant concentration in mg/l and eighty percent (80%) of the corresponding value for normal sewage. No credit shall be allowed in excess of surcharge otherwise due.

Suspended Solids (TSS)	\$ 0.4681	per pound of excess strength
Biochemical Oxygen Demand (BOD)	\$ 0.7995	per pound of excess strength
Nitrogen Oxygen Demand (TKN)	\$ 0.7002	per pound of excess strength

Table 6-13 Industrial Pretreatment Charges – Option 3 - Test Year 2015

All users required to apply for and obtain a wastewater discharge permit or which are subject to federal pretreatment standards, as specified in the MSD Rules and Regulations, shall be subject to the payment of a pretreatment charge(s), as determined by the Director. Said pretreatment charge(s) shall be sufficient to recover, in whole or in part, the costs for the MSD Pretreatment Program including investigations, record keeping, administration, and monitoring of industrial waste discharges to the system.

Each industrial user shall pay a pretreatment charge(s) as follows:

Annual Administrative Charge \$ 3,062 per annum

Maximum Monitoring Charge \$ 17,912 per monitoring event

The monitoring charge shall become effective at such time as an industrial user is subject to compliance to one or more pretreatment standards.

Further, any user which discharges any toxic pollutants which cause an increase in the cost of managing effluent or sludge from the District's treatment system shall pay for such increased costs.

### 6.2.3.1 Revenue Recovery under Option #3 Rates

As previously discussed, the Option #3 rate schedule would increase all rates by the average system-wide increase of 7.0 percent and maintain current cost recovery by customer class, as indicated in Table 6-14.

Table 6-14 Comparison of Allocated Cost of Service with Revenue under Option #3 Rates

Line No.	Customer Class	Total Adjusted Cost of Service	Revenue Under Existing Rates	Revenue Under Proposed Rates	Cost of Service Recovery Under Proposed Rates
		\$	\$	\$	%
1	Residential	132,465,571	111,606,909	123,117,045	92.94%
2	Commercial	51,300,768	48,203,654	52,790,349	102.90%
3	Industrial	27,478,418	28,319,273	26,152,484	95.17%
4	Multifamily	44,949,910	44,506,678	48,439,135	107.76%
5	Surcharge	10,898,937	17,970,903	17,970,903	164.89%
6	Industrial Pretreatment	1,698,296	600,000	600,000	35.33%
7	Total	268,791,900	251,207,417	269,069,916	100.10%

### 6.2.3.2 Typical Bills under Option #3 Rates

A comparison of typical bills under the Option #3 schedule of sewerage service charge rates with those under existing rates is shown in Table 6-15.

Table 6-15 Typical Customer Sewer Bills under Existing and Option #3 Rates

Meter Size Inches	Usage Ccf	Existing	Option #3 2015		
		Bill \$	Bill \$	Increase \$	Increase %
<b>Quarterly</b>					
5/8"	0	110.71	116.15	5.44	4.91%
5/8"	3	110.71	116.15	5.44	4.91%
5/8"	6	110.71	116.15	5.44	4.91%
5/8"	9	110.71	116.15	5.44	4.91%
5/8"	12	127.35	137.73	10.39	8.16%
5/8"	15	143.99	159.32	15.33	10.65%
5/8"	20	171.72	195.29	23.58	13.73%
5/8"	25	199.45	231.27	31.82	15.96%
3/4"	30	259.22	305.67	46.46	17.92%
3/4"	50	370.14	449.57	79.43	21.46%
1"	75	561.74	683.24	121.51	21.63%
1"	100	700.39	863.12	162.73	23.23%
1 ½"	150	1,114.55	1,376.59	262.04	23.51%
2"	200	1,474.81	1,739.09	264.28	17.92%
2"	300	1,918.31	2,133.88	215.57	11.24%
3"	500	3,543.19	3,615.99	72.80	2.05%
3"	1,000	5,760.69	5,589.94	(170.75)	-2.96%
4"	5,000	24,293.91	22,168.51	(2,125.40)	-8.75%
6"	10,000	48,422.56	43,875.44	(4,547.12)	-9.39%
8"	20,000	94,719.36	85,321.87	(9,397.49)	-9.92%
10"	20,000	96,704.24	87,289.30	(9,414.94)	-9.74%
12"	20,000	97,923.57	88,469.75	(9,453.82)	-9.65%
<b>Monthly</b>					
5/8"	0	53.88	49.90	(3.98)	-7.39%
5/8"	3	53.88	49.90	(3.98)	-7.39%
5/8"	6	59.43	57.09	(2.33)	-3.92%
5/8"	9	76.06	78.68	2.62	3.44%
5/8"	12	92.70	100.26	7.56	8.16%
5/8"	15	109.34	121.85	12.51	11.44%
5/8"	20	137.07	157.82	20.75	15.14%
5/8"	25	164.80	193.80	29.00	17.60%
3/4"	30	203.26	242.59	39.33	19.35%
3/4"	50	314.18	386.49	72.31	23.02%
1"	75	443.60	503.13	59.53	13.42%
1"	100	554.47	601.83	47.36	8.54%
1 ½"	150	821.28	850.46	29.18	3.55%
2"	200	1,091.51	1,102.88	11.37	1.04%
2"	300	1,535.01	1,497.67	(37.34)	-2.43%
3"	500	2,678.37	2,518.10	(160.27)	-5.98%
3"	1,000	4,895.87	4,492.05	(403.82)	-8.25%
4"	5,000	22,919.88	20,545.98	(2,373.90)	-10.36%
6"	10,000	45,780.74	40,941.28	(4,839.46)	-10.57%
8"	20,000	90,813.17	81,076.09	(9,737.08)	-10.72%
10"	20,000	91,530.18	81,731.90	(9,798.28)	-10.70%
12"	20,000	91,990.87	82,125.39	(9,865.48)	-10.72%

## 7 Conclusion

The results of this analysis indicate that a series of revenue increases are expected to be required from 2015-2019 to help provide proper funding of all District programs. As discussed in this report, the alternative rate schedules summarized in Section 6 are designed to recover the total system-wide revenue needs of the District. The three alternative rate designs presented herein are designed to recover the anticipated revenue needs of the District in 2015 while addressing certain policy considerations, as previously discussed. Based upon review and discussion, it is anticipated that additional alternatives may be evaluated prior to adopting a final 2015 rate schedule.

Because of the magnitude of the capital program moving forward, and the potential impact in individual years that could occur due to changes in the timing of projects, it is recommended that the revenue requirement analysis be conducted annually to ensure that revenues remain sufficient to provide adequate funding for the capital improvement program without unanticipated, large increases in rates in a single year. It is further recommended that a detailed cost allocation and rate design study be completed at a minimum of every two years, as it is expected that due to the nature of the WWIP, shifts in allocated costs by customer class could result in rate increases for each class that are different from the average revenue increase, and the shift could be significant over time.