

MEETING:	REGULAR MEETING OF THE UTILITY ADVISORY COMMITTEE
DATE AND TIME:	Wednesday, June 28, 2023 5:00 PM
LOCATION:	Germantown Village Hall Board Room N112 W17001 Mequon Road

NOTICE: Citizens not wishing to attend the meeting personally may submit any public comments by sending an email to comments@germantownwi.gov by 4 p.m. on the day of the meeting so that it can be provided to the members of the body for their consideration.

AGENDA

- I. **CALL TO ORDER:** *This meeting has been given public notice in accordance with Section 19.83 and 19.84, Wis. Stats, in such form that will apprise the general public and news media of subject matter that is intended for consideration and action.*
- II. **ROLL CALL:**
- III. **APPROVAL OF MINUTES**
 - A. April 12, 2023 Meeting
- IV. **CITIZEN INPUT:**
- V. **UNFINISHED BUSINESS**
 - A. Update on Tyler Munis Utility Billing Implementation
 - B. Overview of Capacity Analysis of Village Conveyance System and Lift Stations
 - C. Update on Water Utility Cash Flow Analysis
- VI. **NEW BUSINESS:**
 - A. Proposals for a Sewer Utility Rate Study
- VII. **ADJOURNMENT:**

UPON REASONABLE NOTICE, efforts will be made to accommodate the needs of disabled individuals through appropriate aids and services. For additional information or to request this service, please contact the Village Clerk at (262)250-4740 at least 2 days prior to the meeting.

VILLAGE OF GERMANTOWN
N112 W17001 MEQUON ROAD
GERMANTOWN, WI 53022

MEETING: **UTILITY ADVISORY COMMITTEE**

DATE AND TIME: **WEDNESDAY, APRIL 12, 2023 5:00 P.M.**

LOCATION: **Germantown Village Hall Board Room
N112 W17001 Mequon Road**

- i. Call to Order: 5:02 PM – Village Board Room
- ii. Roll Call: Rick Miller, Scott Hefle, Steve Wesolowski, Jim Hansen (Dan Campbell Absent).
 - a. Others in attendance: Administrator Kreklow
- iii. Approval of Minutes: March 8th Meeting
 - a. Motion Approve: Jim Hansen
 - b. Second: Steve Wesolowski
 - c. Ayes: Unanimous
 - d. Nays:
 - e. Abstain:
- iv. Public Comment

Melanie Smythe: Commented on role of Utility Advisory Committee and suggested that the Committee consider how they fit into the cycle of other Village committee meetings.

Jan Miller: Commented on process for approving Sanitary Sewer Service Area Amendment, summer sewer service credit and RFP for Sewer Utility Rate Study.

- v. New Business
 - a. Update on SEWRPC Sanitary Sewer Service Area Amendment and Facility Plan Update, and application to expand Water Service Area

Administrator Kreklow provided an overview of 2050 Land Use Plan Amendment, amendment to Sanitary Sewer Service Amendment submitted to SEWRPC

Wesolowski made a motion that the parcel(s) on the North of Lannon Road and west of Appleton Avenue, with a back boundary of the creek in the back of those properties, be added to the sanitary sewer service area. Second, Hansen. Approved 4-0

- b. Update on Tyler Munis Utility Billing Implementation

Discussed status of implementation of Tyler Munis Utility billing implementation and potential Village Board change to Summer Sewer Service Credit.

c. RFP for Sewer Utility Rate Study

Discussed process for vendor selection and how the RFP would be distributed to vendors that may be interested in submitting a proposal.

Wesolowski made motion to forward RFP to Public Works committee, seconded by Hefle, 4-0

Next Meeting: Wednesday, May 31st 5:00PM

Meeting Adjourned at 6:31

BUSINESS OF THE UTILITY ADVISORY COMMITTEE

MEETING DATE: June 28, 2023

PLACEMENT: Presentation

ITEM TITLE: Update on Tyler Munis Utility Billing Implementation

SUBMITTED BY:

SUMMARY EXPLANATION:

ATTACHMENT:

RECOMMENDATION:

ACTION BY Committee:

BUSINESS OF THE UTILITY ADVISORY COMMITTEE

MEETING DATE: June 28, 2023

PLACEMENT: Presentation

ITEM TITLE: Overview of Capacity Analysis of Village Conveyance System and Lift Stations

SUBMITTED BY:

SUMMARY EXPLANATION:

ATTACHMENT:

RECOMMENDATION:

ACTION BY Committee:

BUSINESS OF THE UTILITY ADVISORY COMMITTEE

MEETING DATE: June 28, 2023

PLACEMENT: Presentation

ITEM TITLE: Update on Water Utility Cash Flow Analysis

SUBMITTED BY:

SUMMARY EXPLANATION:

ATTACHMENT:

RECOMMENDATION:

ACTION BY Committee:

BUSINESS OF THE UTILITY ADVISORY COMMITTEE

MEETING DATE: June 28, 2023

PLACEMENT: Action Item

ITEM TITLE: Proposals for a Sewer Utility Rate Study

SUBMITTED BY:

SUMMARY EXPLANATION:

ATTACHMENT:

1. Ehlers Proposal
2. Raftelis_Proposal
3. Ruekert Muelke Proposal

RECOMMENDATION:

ACTION BY Committee:

JUNE 5, 2023

PROPOSAL TO PROVIDE A 2023 SEWER UTILITY RATE STUDY FOR:

The Village of Germantown, Wisconsin



Ehlers
N19W24400 Riverwood Drive, Suite 100
Waukesha, WI 53188

Municipal Advisor Registration Number: K0165
SEC CIK Number: 0001604197

ehlers-inc.com

EHLERS' ADVISORS:

Jon Cameron

Senior Municipal Advisor
jcameron@ehlers-inc.com
262-796-6179

Brian Roemer

Municipal Advisor
broemer@ehlers-inc.com
262-796-6178

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June 5, 2023

Steven Kreklow
Village Administrator
Village of Germantown
N112 W17001 Mequon Road
Germantown, Wisconsin 53022



Submitted electronically to: skreklow@germantownwi.gov

Dear Mr. Kreklow,

Ehlers is excited to present this proposal to provide a Sewer Utility Rate Study for the Village of Germantown. We have reviewed and thoroughly understand the required scope of work listed in the RFP. We believe our combined decades of expertise in fiscal studies and municipal law, along with our collaborative project delivery approach provide a compelling relationship option for the Village to consider.

For over 65 years, Ehlers has helped clients build strong and vibrant communities through financial planning, debt issuance and management and economic development services. **In the last five years alone, our firm has completed over 250 utility rate studies aimed to deliver each client the tools to make informed decisions for their utilities and customers.**

We believe the following factors set our team apart from competing firms and position us as the most qualified to deliver the services required:

Expertise. Given the volume of fiscal studies and in depth legal analysis our combined team undertakes each year and the variety of complex issues we have faced in doing so, we can clearly demonstrate the practical experience needed to develop objective recommendations that will fulfill the Village's objective of ensuring Sewer rate structures that fairly distribute the cost of service among users.

Accessible Team Players. Ehlers' advisors pride themselves on being responsive, meeting deadlines, and having a team of individuals assigned to each client. Our suburban Milwaukee office locations offers a convenient option for meeting in person and our assigned project staff can easily travel to you for collaborative planning sessions and presentations.

Independent, Best-Practice Approach. Ehlers' fiduciary responsibility is to our municipal clients alone. We are committed to placing your interests above our own at all times and adhering to industry best practices.

Client-First Values. Ehlers delivers transparent communication, proactive client service and an unwavering dedication to deploying client resources in the most efficient and effective way possible. We will provide the Village with ongoing dialog, idea-sharing, independent analysis, presentation of customized options and a competitive, value-oriented fee schedule.

SUBMITTAL LETTER

Thank you for including us in this RFP process. We appreciate your consideration and look forward to discussing how we can best serve the Village of Germantown.

Respectfully submitted,



Jon Cameron
Senior Municipal Advisor
jcameron@ehlers-inc.com
262-796-6179



Brian Roemer
Municipal Advisor
broemer@ehlers-inc.com
262-796-6178

Example Rate Study

Ehlers invites you to review a Test Year 2022 Sewer Rate Study we completed for the Village of Kewaskum, Wisconsin. The executive summary and key findings follow below, and the full 46-page report can be found in [Appendix A](#).

FINANCIAL MANAGEMENT PLANNING



SECTION 1 - EXECUTIVE SUMMARY

1.1 Introduction and Overview

The Village engaged Ehlers in November 2021 to perform a Sewer Rate Study (the “Study”) as a result of the Village looking to fund a several upcoming projects and noncompliance with their Redemption Fund. In order to finance the projects, the Village will need to adopt a sewer rate adjustment. The Village plans to finance the larger projects through the Wisconsin Department of Natural Resources (“DNR”) Clean Water Fund Loan Program (“CWFL” or “CWFLP”). The primary goal of the study is to make recommendations for self-sufficient user rates to meet all operating and capital expenses of the Utility.

Along with the Study, the Village has engaged Ehlers to complete a long-range cash flow analysis for the Utility which develops recommendations for future rate increases required to support the Utility’s Capital Improvement Plan (“CIP”), and projected increases to the sewer operating budget. Lastly, the study develops recommendations about how to pay for capital projects in each year through a combination of debt instruments and available cash. This Executive Summary identifies the findings, recognizes the methodology used, and reviews the results of the Study completed for the Village.

1.2 Key Findings

- The Utility’s last rate increase was effective for January 1, 2016.
- Historically, the utility collects per customer as determined in Section 94-219 of the Sewer Use Ordinance.
- Presently, all customers pay a quarterly minimum service (fixed) charge of \$29.41 and a volumetric rate of \$13.28 per 1,000 gallons.
 - Sewer usage is determined by the customer’s water usage unless otherwise noted.
- We recommend the Utility continue to charge users a fixed and volumetric rate each billing period (quarterly).
- To fund its CIP, we recommend the Utility use debt and cash financing.
- Based on our projections, if the Village adopts the recommended rates, the sewer rate revenue generated will adequately meet the Utility’s revenue needs to fund all the Utility’s financial obligations for the planning period.
- Over the planning period, the typical residential customer at average consumption will experience a 23.4% (\$44.12) increase to their total quarterly sewer bill at the recommended rates.

Qualifications & Team Structure

Ehlers will serve as the lead advisory firm responsible for all aspects of this engagement. We do not intend to subcontract any of the required work. Jon Cameron will be the Village's primary contact and project manager. He will be assisted by Brian Roemer and Lisa Trebatoski.

MUNICIPAL ADVISORS

Jon Cameron

Senior Municipal Advisor
*Project Management, Utility Analysis,
Projections, Reporting*

Brian Roemer

Municipal Advisor
Quality Assurance

Lisa Trebatoski

Associate Municipal Advisor
Utility Analysis, Financial Projections, Reporting

Professional biographies for the assigned team, including training and certifications, follow below:



Jon Cameron

Senior Municipal Advisor | Project Manager

Jon is a Municipal Advisor on our Wisconsin Municipal Finance Team, advising local governments, public utilities and special districts on the design and implementation of custom financial solutions. He also serves as the leader of our Utility Rate Studies Team for Wisconsin municipalities. Prior to joining Ehlers in 2013, Jon was an Economic Consultant and Principal/Senior Consultant with two other municipal consulting firms. Clients rely on Jon for his ability to present complex analysis in an easy-to-understand format. Jon holds a Master of Public Administration Degree, as well as the Series 50 - Municipal Advisor Representative license. He is an active member of the American Water Works Association - Wisconsin Chapter. [See Jon's full resume.](#)



Brian Roemer
Municipal Advisor

Brian began his career at Ehlers in 2016 as an intern and was quickly promoted to Municipal Advisor with our Wisconsin Municipal Finance Team. Before joining the firm, Brian worked in the financial services industry for five years. Since joining Ehlers, he has amassed strong experience in utility rate studies, cash flow analysis, debt issuance and financial management planning. He is well known and highly regarded for his ability to ensure accuracy and quality in Utility Rate Study calculations and reporting. Brian holds a Master of Business Administration degree, along with the Series 50 - Municipal Advisor Representative license. He is an active member of the American Water Works Association - Wisconsin Chapter and serves on its Young Professionals Committee. [See Brian's full resume.](#)



Lisa Trebatoski
Associate Municipal Advisor

Lisa is an Associate Municipal Advisor with our Wisconsin Municipal Finance Team where assists clients with project management, economic development and redevelopment, long-term financial planning, and fiscal studies. She brings 20 years of direct local government experience to her role with the firm, most recently serving as the Deputy Clerk and Treasurer for the City of Watertown, Wisconsin. Prior to that, Lisa was the Clerk and Treasurer for the Village of Johnson Creek, Wisconsin. Lisa holds a Bachelor of Business Administration - Finance, as well as the Series 50 - Municipal Advisor Representative license. She is also an active member of the American Water Works Association - Wisconsin Chapter. [See Lisa's full resume.](#)

Experience

Ehlers and the team assigned to this engagement bring decades of collective experience conducting fiscal studies for municipalities across Wisconsin, Minnesota, Illinois, Colorado, and Kansas. **As we mentioned in our submittal letter, in the last five years alone, we have completed more than 250 utility rate studies for our clients.** Volume aside, we believe our experience is best demonstrated by our performance on similar projects, as illustrated by the following case studies. We invite you to contact the references we've included along with them.

The Town of Grand Chute, Wisconsin 2022 - Present

ENGAGEMENT HIGHLIGHTS:

- » Conducted a cost of service sewer rate study and stormwater rate analysis for the Town's Sanitary District No. 2 and Sanitary District No. 3
- » Prepared multiple 10-year cash flow analysis under different rate scenarios including no rate increase for 10-years for both utilities, continuing with current special assessment practices, and linear rate increase projections
- » Developed a financing plan for 10-year capital plans for both utilities that involved the use of existing reserves, while being mindful of minimum recommended reserve levels based upon industry standard benchmarking standards
- » Conducted workshop sessions with the Town Board on the current financial position of both utilities and the recommended rate increases under multiple scenarios

Both the Sewer and Stormwater utilities have historically operated in a good financial position and accumulated significant fund balances. However, both utilities have significant capital improvement needs over the next 10-years and beyond. As part of the user rate study, Ehlers developed sewer user rates on a cost-of-service basis for 2023 and prepared recommendations for stormwater user rates. In addition, we prepared a long range cash flow analysis for both utilities under a number of scenarios that considered funding both utilities' 10-year capital plans largely with cash based on several different user rate options (needed rate increases, no rate increases, continuing special assessment practices vs. doing away with assessments). Ehlers is currently finalizing this study with the Town's staff.

REFERENCE:

Katie Schwartz, PE
Director of Public Works
 1900 W. Grand Chute Blvd.
 Grand Chute, WI 54913-9613
 920-832-1581
katie.schwartz@grandchutewi.gov

The City of Oshkosh, Wisconsin 2014 - Present

ENGAGEMENT HIGHLIGHTS:

- » Perform annual update of cost of service rate study, which includes development of high strength surcharge rates for industrial customers and development of user rates for Sanitary Districts served by the City
- » Perform annual long-range cash flow analysis and financing plan for the water, sewer and storm water utilities, then present it to the Common Council as part of the City's annual budgeting process

Ehlers' long-range cash flow analysis includes the preparation of the 10-year financing plan, showing the capital improvement costs within each utility by year, estimated source of financing and amount of annual cash on hand applied to offset each borrowing, estimated annual principal and interest payments for each borrowing, and the estimated user rate increases to accommodate capital improvement projects by year. It also includes a benchmark analysis of number of days cash on hand and debt coverage on all revenue bonds and compares it to applicable rating agency standards.

Using the information from the annual long-range cash flow analysis, we have completed multiple cost of services sewer rates studies over the past several years. The purpose of a cost of service study is to calculate user rates for the coming year such that they are fair and equitable to all customer classes, and to ensure that rates are based upon the principles of cost causation. This way, rates are equitably designed to provide required coverage for existing and proposed sewer utility debt and adjusted for future capital needs, flow projections, and customer changes. Lastly, we have designed the rate structures to recover the costs caused by several Sanitary Districts that discharge to the City's treatment plant.

REFERENCE:

James Rabe
Director of Public Works
215 Church Avenue
Oshkosh, WI 54903
920-236-5011
jrabe@ci.oshkosh.wi.us

**The City of Waukesha, Wisconsin
2013 - Present****ENGAGEMENT HIGHLIGHTS:**

- » Perform annual detailed sewer utility cost of service study and long-range financial management plan
- » City is implementing over \$180 million of collection system and treatment facility upgrades over the next 20 years
- » City has agreements to serve portions of surrounding municipalities which is built into the model

Ehlers collaborates with the City annually to perform a detailed cost of service rate study update, including the development of a separate return flow user rate to pay for debt associated with the sewer portion of City's change to Lake Michigan drinking water. In addition to performing the cost of service study, Ehlers also updates a long-range cash flow analysis and capital funding plan annually to account for future treatment plant and collection system improvements. The City updates its capital needs list each year and works with Ehlers to identify the future potential funding methods for upcoming projects and the associated user rate impacts. We present both studies to the Board of Public Works for approval of the user rates for the next calendar year, and to update the governing body on potential rate increases over the next several years. This method has been a valuable part of the annual budgeting process and has helped to ensure the successful implementation of several larger scale capital improvement projects.

REFERENCE:

Jeff Herenda
Wastewater Treatment Facility Manager
201 Delafield Street
Waukesha, WI 53188
262-524-3629
jharenda@ci.waukesha-wi.gov

**The City of Sheboygan Falls, Wisconsin
2017 - Present**

ENGAGEMENT HIGHLIGHTS:

- » Performed a cost of service wastewater utility rate study and long-range cash flow analysis to ensure the system had adequate rates
- » Completed annual updates to the long-range cash flow analysis for budgeting purposes

The City of Sheboygan Falls discharges its wastewater to the City of Sheboygan system for treatment. Ehlers works with the City to perform an annual Sewer Rate Study to design and collect revenues that best align with the City of Sheboygan's charges for treatment, other operating expenses, and development of a Replacement Charge to recover future capital expenditures. In addition, Ehlers provides a look into affordability based on income level for utility bills over a 10-year period.

REFERENCE:

Shad Tenpas
City Administrator | Utility Manager
375 Buffalo Street
Sheboygan Falls, WI 53805
920-467-7900, Ext: 117
shad@shebfalls.com

Project Approach

Ehlers approaches its studies with a keen awareness that any adjustments to utility rates will impact all stakeholders: the constituents who pay the user fee or charge, Germantown's financial health, and Village staff who need to implement and effectively communicate proposed rate changes.



We work as a team with Village staff so that all potential impacts of the Sewer Utility rate structure will be considered and factored into recommended options. We also break complex data and modeling down into a straight-forward format so decision-makers can make informed decisions and effectively communicate rate impacts to their constituents.

Ehlers will complete the proposed scope of work in seven steps. Our approach is flexible and what we believe will deliver the information, recommendations, and facilitated discussions essential to making financial decisions with confidence and accuracy. As the project proceeds, we can adapt the work plan as needed, without incurring extra time or expense.

Step 1: Facilitate Project Kickoff Meeting

To begin this project, Ehlers will discuss the following:

- » Information needs and submission timing
- » A more detailed project timeline including the potential timing of meetings to review the study results with staff and to present the final study with the Utility Advisory Committee, the Public Works & Highways Committee and Village Board
- » The Utility's 5-year Capital Improvement Plan (CIP) and goals for funding capital projects
- » Goals for unrestricted cash targets and the use of cash within the Utility (if available) to help fund the CIP
- » Potential operational changes that the Village anticipates for the sewer utility and the timing of the impact. Included in this item will be a preliminary discussion on the impacts of the desired 5-year scenarios the Village would like modeled for analysis (i.e. decreasing sewer user rates, keeping rates status quo, or potential rate increases)

SECTION 3: EXPERIENCE & PROJECT APPROACH

- » Potential concerns with the current user rate structure, any billing concerns and desired possible changes along with initial strategies for rate payer education and communication

Milestone: After the kickoff meeting, Ehlers will update the project schedule in this proposal accordingly and submit to Village staff for final approval.

Step 2: Gather Necessary Information

Ehlers will compile the following information for analysis:

- » Current schedule of user rates
- » A copy of the last completed user rate study, if applicable
- » Annual audits for the past three years (we currently have this information)
- » Year to date actual expenses and revenues
- » The 2023 utility budget
- » The 5-year utility CIP
- » Detailed sewer billing records for the past 3 years showing billed sewer consumption by customer class by class and meter size
- » Any available information on upcoming developments and population growth over the study planning period that would increase the customer base and usage, or conversely any information on customers reducing usage or moving out of the municipality
- » Monthly or quarterly bills from MMSD specifically showing billable sewer volumes for the municipality for the past three years
- » Current number of un-metered customers within the utility, if any
- » Most current depreciation schedule for all sewer utility assets, showing current year depreciation expense and accumulated depreciation for all sewer assets

Step 3: Prepare Fiscal Sensitivity Analysis

In this step, Ehlers will:

- » Conduct a historical cash flow analysis to examine the adequacy of existing sewer user rates to fund all operations of the utility
- » Calculate the borrowing capacity under existing sewer user rates for the utility.
- » Prepare a historical benchmarking analysis for the utility showing the amount of restricted and unrestricted cash on hand compared to industry standards such as Moody's and Standard & Poor's
- » Discuss with staff and model within the sensitivity analysis any anticipated regulatory or other operational changes and calculate their impact on user rates

Milestone: Ehlers will review the fiscal sensitivity analysis with Village staff and update, as needed.

Step 4: Review Existing User Rate Structure

In this step, Ehlers will:

- » Review the utility's existing user rate structure and discuss with staff any recommended changes. This may include reviewing the rationale for differential user rates for residential and non-residential users
- » Incorporate any recommended changes into the calculation of sewer user rates

Milestone: Ehlers will prepare a brief memo to staff summarizing the existing user rate structure and any recommended change.

Step 5: Develop Revenue Requirement and Cost of Service User Rate Calculation for the Test Year

Based on the available budget, debt and asset detail, Ehlers will develop the revenue requirements for the utility under either a cash-based or utility-based method.

- » Cash-based revenue requirement recovers operations and maintenance expense, taxes, debt service payments, revenue bond debt coverage, cash funded capital and deposit to equipment replacement fund
- » Utility-based revenue requirement recovers operations and maintenance expense, taxes, depreciation expense and a rate of return on the net book value of assets in service. Together depreciation expense and rate of return will be sufficient to meet debt service, debt coverage, cash funded capital and any deposit to the equipment replacement fund

In this step, we will also prepare user rate calculations based on a cost-of-service study including:

- » Allocating the revenue requirements for the test year to the appropriate utility functions (fixed and volumetric function allocations)
- » Calculating the user rates for all customer classes based on the revenue requirements allocated to each utility function divided by the appropriate billable units (includes volume charges and meter charges by sizes)
- » Ensuring calculated user rates are fair and equitable to all customer classes based on a proportionality test

Finally, Ehlers will create a cash flow analysis for the test year to ensure that the calculated user rates will meet the cash flow needs of the utility. We will also prepare a comparison of sewer user rates to other comparable communities, as well as an affordability analysis comparing sewer rates and total utility bills against median household income levels within the Village.

Milestone: Ehlers will review revenue requirement and user rate calculations with Village staff and adjust, as necessary.

Step 6: Prepare Cash Flow Analysis Scenarios and CIP Funding Plan

In this step, Ehlers will:

- » Work with Village staff to develop a funding plan for the sewer utility's CIP through the 5-year planning period. The funding plan preparation will include evaluating the use of cash vs. borrowing and benchmarking analysis to show if or when the use of cash could be applied
- » Prepare preliminary debt sizing and debt service schedules for projects forecasted to be debt financed
- » Create a long-range cash flow analysis at least through the CIP planning period showing forecasted revenues and expenses, including the modeling out of any operational or regulatory changes, increases to wastewater treatment from MMSD and proposed capital expenses (debt service or cash funded)
- » Forecast when and to what magnitude future rate increases may be needed to accommodate new capital projects or operational changes. Changes to customer usage can also be discussed and incorporated into the cash flow model
- » Prepare a long-range benchmarking forecast showing projected restricted and un-restricted cash on hand compared to industry standards over time, as well as applicable rate of return and other asset condition metrics
- » Use the cash flow model established to show any recommended rate increases over a five-year planning period and model requested alternative cash flow models including a 5-year scenario showing declining user rates, and another scenario showing no rate increases over the 5-year planning period
 - * **NOTE:** The alternative cash flow scenarios will identify any declines in system reserves relative to minimum recommended standards, assess the ability to reinvest in the sewer system, impacts to operating and maintenance costs and assess the ability to maintain adequate revenues to pay debt service and maintain adequate debt coverage.
- » Deliver a written recommendation stating which of the considered alternate cash flow scenarios the City should pursue

Milestone: Ehlers will review the funding plan and cash flow analysis with Village staff and adjust, as needed.

Step 7: Complete Report and Present Recommendations

To complete the project, Ehlers will:

- » Draft a report including all project tables and an executive summary describing the findings and recommendations
- » Review the report with staff and make any appropriate changes
- » Prepare a final report and submit via PDF and/or paper copy
- » Prepare and present the report and findings at separate meetings of the Utility Advisory Committee, the Public Works & Highways Committee and the Village Board.

Milestone: Ehlers will submit its report and present the study to the governing bodies noted above. We will then complete any final modifications to the report, as directed, and deliver a final report to the Village.

Comparable Wisconsin Communities

Ehlers presented four case studies representing comparable projects and community characteristics with those of Germantown in [Section 3](#).

Proposed Compensation

Ehlers will perform the scope of services identified for this sewer utility rate study for a not-to-exceed fee of \$12,750. We will invoice the Village monthly for work completed until such time that the project is complete or we have reached the not-to-exceed total fee amount.

Proposed Project Timeline

Ehlers is available to begin work on this project during the final week of June, 2023. Depending on timing for the staff review meetings **we can deliver the final project report on October 16, 2023.**

The table below illustrates our project schedule and work plan, which mirrors the steps we detailed in **Section 3**.

Project Tasks	Start Date	End Date
Kickoff meeting	6/26/2023	6/30/2023
Information gathering	6/26/2023	7/12/2023
Fiscal Sensitivity Analysis	6/30/2023	7/12/2023
Review with staff	7/12/2023	7/12/2023
Review Existing User Rates Structure	7/10/2023	7/14/2023
Memo	7/19/2023	7/19/2023
Revenue Requirement and Rate Calculation	7/12/2023	8/2/2023
Review Rates with staff	8/3/2023	8/3/2023
Cash Flow Analysis Scenarios and Funding PI	7/19/2023	8/9/2023
Review Analysis with staff	8/10/2023	8/16/2023
Draft Report Prep and review with staff	8/17/2023	9/7/2023
Final Report Submittal	9/11/2023	9/15/2023
Utility Advisory Committee Meeting	9/26/2023	9/26/2023
Public Works & Highway Committee	10/3/2023	10/3/2023
Village Board Meeting	10/16/2023	10/16/2023

May 16, 2022

TEST YEAR 2022 SEWER RATE STUDY:

Village of Kewaskum, WI



Prepared by:

Ehlers
N21W23350 Ridgeview
Parkway West, Suite 100
Waukesha, WI 53188

Advisors:

Brian Roemer
Municipal Advisor
Joe Murray
Senior Municipal Advisor

BUILDING COMMUNITIES. IT'S WHAT WE DO.

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TY22 Sewer URS
Village of Kewaskum, WI
Prepared 5/12/2022



SECTION 1 – EXECUTIVE SUMMARY

1.1 Introduction and Overview

The Village engaged Ehlers in November 2021 to perform a Sewer Rate Study (the “Study”) as a result of the Village looking to fund a several upcoming projects and noncompliance with their Redemption Fund. In order to finance the projects, the Village will need to adopt a sewer rate adjustment. The Village plans to finance the larger projects through the Wisconsin Department of Natural Resources (“DNR”) Clean Water Fund Loan Program (“CWFL” or “CWFLP”). The primary goal of the study is to make recommendations for self-sufficient user rates to meet all operating and capital expenses of the Utility.

Along with the Study, the Village has engaged Ehlers to complete a long-range cash flow analysis for the Utility which develops recommendations for future rate increases required to support the Utility’s Capital Improvement Plan (“CIP”), and projected increases to the sewer operating budget. Lastly, the study develops recommendations about how to pay for capital projects in each year through a combination of debt instruments and available cash. This Executive Summary identifies the findings, recognizes the methodology used, and reviews the results of the Study completed for the Village.

1.2 Key Findings

- The Utility’s last rate increase was effective for January 1, 2016.
- Historically, the utility collects per customer as determined in Section 94-219 of the Sewer Use Ordinance.
- Presently, all customers pay a quarterly minimum service (fixed) charge of \$29.41 and a volumetric rate of \$13.28 per 1,000 gallons.
 - Sewer usage is determined by the customer’s water usage unless otherwise noted.
- We recommend the Utility continue to charge users a fixed and volumetric rate each billing period (quarterly).
- To fund its CIP, we recommend the Utility use debt and cash financing.
- As of 3/1/2022 the Sewer Utility has the following principal outstanding:
 - G.O: \$400,000 and Revenue: \$4,536,146.
- As of 12/31/2020 the Sewer Utility owes the General Fund \$2,166,582.

FINANCIAL MANAGEMENT PLANNING



- Based on our projections, if the Village adopts the recommended rates, the sewer rate revenue generated will adequately meet the Utility's revenue needs to fund all the Utility's financial obligations for the planning period.
- Over the planning period, the typical residential customer at average consumption will experience a 23.4% (\$44.12) increase to their total quarterly sewer bill at the recommended rates.

Further description and analysis of these findings are found in this Executive Summary, the Study and its Sections.

1.3 Study Objectives

The Utility is not subject to regulation from the Wisconsin Public Service Commission like the Water Utility. Therefore, when designing rates, we consider many generally accepted practices and industry standards. The subsequent guidelines were followed in completing the rate design portion of the Study.

- Rates should be fair and equitable to all customers
- Rates should be easy to administer and to understand
- Rates should be defensible

1.4 Study Purpose

Several goals were established for the Study, including:

1. Assess financial performance trends in recent past.
2. Develop user rates at a level where the Utility is self-sufficient, meaning it is generating adequate revenues from user rates to pay for all outstanding financial obligations.
3. Develop user rates at a level where the Utility is building adequate cash to maintain certain benchmarked levels and fund future CIP projects.
4. Specifically develop rates so that the Village could finance the WWTF through the CWFL Program, fix the cash reserves issues, and repay the General Fund.
5. Incorporate the Village's CIP for the Sewer utility.
6. Develop a rate structure that is fair and equitable for all customer classes.

1.5 Study Assumptions

- The study develops recommended user rates based on a 2022 test year.
- The recommended rates follow the Village's Sewer Use Ordinance Section 94-219.
 - Based on Section 94-219(b)(1) the study was completed using the Cash-Basis to determine a revenue requirement, explained further in the "Study Methodology" Section.

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FINANCIAL MANAGEMENT PLANNING



- Flow projections are based on historical averages.
- After historical analysis, discussions with staff, and recent economic events no material growth assumptions were made for meter counts or flows during the planning period beyond 2022.
- Operating expenses beyond the 2022 budget were projected at 3% increases.

1.6 Study Methodology

Rate development and planning require projections of future revenue needs. To establish those revenue needs, there are two generally accepted methodologies, the cash and utility-based methods. Under the utility-based method, a revenue requirement is established for a test year using several components. These components include: the Utility's 2022 budgeted operation and maintenance expenses, transfers, depreciation, and a "fair" return on rate base. Conversely, the cash-based method looks at the Utility's 2022 budgeted operation and maintenance expenses, transfers, debt service and cash funded capital. The components added together less other revenues not generated through user rates serve as the requirement that should be recovered through user rates.

SECTION 2 - RECOMMENDATIONS

- Based on historical performance and the results of the Study, we recommend the Village adopt a sewer rate resolution at an upcoming Village Board of Trustees meeting. We recommend a minimum adjustment to rates as depicted on **TABLE 11.2**. This results in a projected Sewer Sales Revenue increase of 23.44%. Based on the assumptions in this study these rate adjustments will help the Utility pay for its financial obligations and have positive unrestricted cash by 2029.
- We recommend implementing the first phase increase no later than July 1, 2022.
- The Village should look use a mixture of cash and debt to finance future capital needs where external funding is not available including but not limited to grants and special assessments. In addition, the Village should look to repay the General Fund as seen on **TABLE 19**.
- When looking to issue future debt the Village should structure around existing debt to maintain level changes in debt service so continued appropriate debt service coverage can be maintained annually.
- The Village should implement biannual rate review process and consider inflationary increases to keep up with increasing operating expenses.



SECTION 3 - ALTERNATIVE

The Village asked we analyze an alternative rate implementation plan with phased-in increases over three years. The results of this analysis are shown in **APPENDIX A**. Over the planning period and several increases, the typical residential customer at average consumption will experience a similar increase to their total quarterly bill at the recommended rates only in an expanded timeline.



Test Year 2022 Sewer Utility Rate Study

Section 1 — Sewer Fund Historical Analysis

Village of Kewaskum, WI



Table 1
Sewer Rate Performance

Village of Kewaskum, WI

		Shown with no increase				Est	Budget
Component	Description	2017	2018	2019	2020	2021	2022
Cash Basis							
1	Operating and Maintenance	\$488,650	\$564,141	\$558,846	\$523,012	\$568,555	\$597,285
2	Debt	\$895,707	\$917,694	\$979,249	\$1,613,955	\$723,869	\$719,436
3	Cash Funded Capital	\$41,773	\$101,455	\$95,407	\$0	\$0	\$38,504
Less:							
	Other Revenue	\$19,655	\$109,073	\$107,633	\$64,520	\$102,513	\$100,750
	Interest Income	\$8,417	\$12,508	\$15,853	\$6,077	\$3,500	\$3,500
	Revenue Requirement (Costs less Other Income)	\$1,398,058	\$1,461,709	\$1,510,016	\$2,066,370	\$1,186,412	\$1,250,974
	User Rates Revenue	\$1,318,789	\$1,347,883	\$1,377,020	\$1,396,825	\$1,293,792	\$1,435,510
	Rate Adequacy	(\$79,269)	(\$113,826)	(\$132,996)	(\$669,545)	\$107,381	\$184,536
Utility Basis							
1	Operating and Maintenance	\$488,650	\$564,141	\$558,846	\$523,012	\$568,555	\$597,285
2	Depreciation	\$353,921	\$359,614	\$362,848	\$364,995	\$364,995	\$365,471
	NIRB	\$26,605,766	\$27,296,821	\$27,843,714	\$28,324,141	\$28,758,615	\$29,136,586
3	Recommended ROI (2.5%)	\$665,144	\$682,421	\$696,093	\$708,104	\$718,965	\$728,415
Less:							
	Other Revenue	\$19,655	\$109,073	\$107,633	\$64,520	\$102,513	\$100,750
	Interest Income	\$8,417	\$12,508	\$15,853	\$6,077	\$3,500	\$3,500
	Revenue Requirement (Costs less Other Income)	\$1,479,643	\$1,484,595	\$1,494,301	\$1,525,514	\$1,546,503	\$1,586,921
	User Rates Revenue	\$1,318,789	\$1,347,883	\$1,377,020	\$1,396,825	\$1,293,792	\$1,435,510
	Rate Adequacy	(\$160,854)	(\$136,712)	(\$117,281)	(\$128,689)	(\$252,710)	(\$151,410)

Table 2 Sewer Utility Rate Performance Charts

Village of Kewaskum, WI

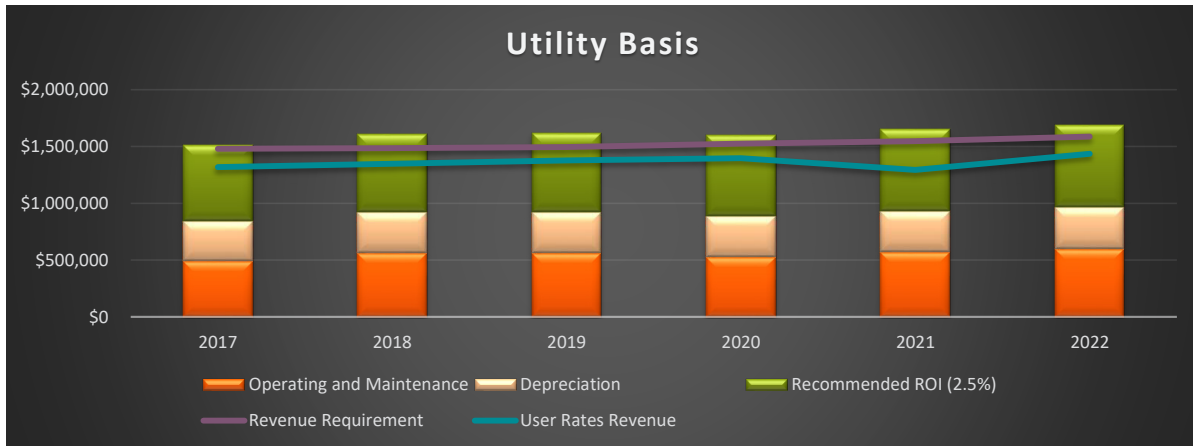
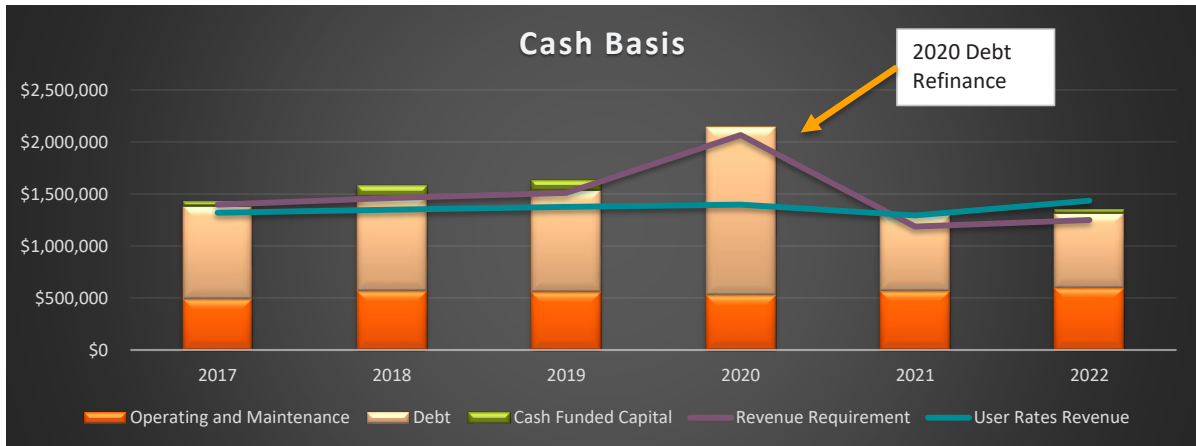


Table 3
Sewer Utility Cash Flow Analysis - Historical 2017-2021
Village of Kewaskum, WI

	Actual				Estimated 2021
	2017	2018	2019	2020	
Revenues					
Total Revenues from User Rates	\$1,318,789	\$1,347,883	\$1,377,020	\$1,396,825	\$1,293,792
Percent Increase to User Rates					
Other Revenues					
Interest Income	\$8,417	\$12,508	\$15,853	\$6,077	\$3,500
Other Income	(\$17,758)	(\$9,031)	(\$17,758)	(\$17,758)	\$3,963
Total Other Revenues	(\$9,341)	\$3,477	(\$1,905)	(\$11,681)	\$7,463
Total Revenues	\$1,309,448	\$1,351,360	\$1,375,115	\$1,385,144	\$1,301,255
Expenses					
Operating and Maintenance	\$488,650	\$564,141	\$558,846	\$523,012	\$568,555
PILOT Payment	\$0	\$0	\$0	\$0	\$0
Net Before Debt Service and Capital Expenditures	\$820,798	\$787,219	\$816,269	\$862,132	\$732,700
Existing Debt P&I	\$895,707	\$917,694	\$979,249	\$1,613,955	\$723,869
Transfer In/(Out); Cap. Contrib.	\$98,629	\$107,517	\$106,034	\$62,986	\$79,175
Capital Improvements	\$341,616	\$350,375	\$95,407	\$147,906	\$0
Bonds Issued/Grants/Aid	\$299,843	\$248,920	\$0	\$832,730	\$0
Reconcile to Audit	\$22,627	\$137,551	(\$59,194)	\$67,078	\$0
Net Annual Cash Flow	\$4,574	\$13,138	(\$211,547)	\$63,065	\$88,006
Restricted and Unrestricted Cash Balance:					
Balance at first of year	\$554,150	\$558,724	\$571,862	\$360,315	\$423,380
Net Annual Cash Flow Addition/(subtraction)	\$4,574	\$13,138	(\$211,547)	\$63,065	\$88,006
Balance at end of year	\$558,724	\$571,862	\$360,315	\$423,380	\$511,386

Notes:

Table 4
Sewer Utility Financial Benchmarking Analysis

Village of Kewaskum, WI

	Actual				Estimated 2021	Budget 2022
	2017	2018	2019	2020		
Target minimum cash balance						
Target minimum working capital - Ehlers ¹	1,199,765	1,258,672	1,875,461	1,008,147	1,018,078	1,091,160
Actual Days Cash Available - PSC ²	269	254	164	208	274	357
Actual Days Cash Available - Moody's ³	0	2	(145)	(113)	(49)	(276)
Target minimum working capital - S&P ⁴	0	2	(145)	(113)	(49)	(276)
Actual working capital-cash balance						
Over (Under) Ehlers target	(641,041)	(686,810)	(1,515,146)	(584,767)	(506,692)	(414,689)
Over (Under) PSC target (90 days)	179	164	74	118	184	267
Over (Under) Moody's target (150 days)	(150)	(148)	(295)	(263)	(199)	(426)
Over (Under) S&P target (150 days)	(150)	(148)	(295)	(263)	(199)	(426)

Notes:

- 1) Target capital equals 6 mos of next year's operating expenses, including depreciation, plus 100% of debt.
- 2) PSC formula = O&M expense + taxes + interest on long term debt ÷ 365 to get expense per day. Then Unrestricted Cash + expense per day
- 3) Moody's Formula = [(Unrestricted Cash + Liquid Investments) * 365 days] + Total O&M Expenses less Depreciation
- 4) S&P Formula = [(Unrestricted Cash + Liquid Investments) * 365 days] + Total O&M Expenses less Depreciation; include designated reserve funds: ERFs, RSFs, etc

Rate of Return

Average Utility Plant in Service	21,966,039	22,308,951	22,499,072	22,620,796	22,690,275	22,702,775
Less: Utility Plant Accumulated Depreciation	(4,639,727)	(4,987,870)	(5,344,642)	(5,703,345)	(6,068,340)	(6,433,811)
Average Net Investment Rate Base (NIRB)	26,605,766	27,296,821	27,843,714	28,324,141	28,758,615	29,136,586
Net Operating Income	476,218	424,128	455,326	508,818	382,005	492,754
ROR	1.79%	1.55%	1.64%	1.80%	1.33%	1.69%
Typical	2.50%					

Cost Recovery

Operating Revenues	1,318,789	1,347,883	1,377,020	1,396,825	1,315,555	1,455,510
Operating Expenses incl. Depr & Amortization	842,571	923,755	921,694	888,007	933,550	962,756
Cost Recovery	1.57	1.46	1.49	1.57	1.41	1.51
Cost Recovery w/o Depr.	2.70	2.39	2.46	2.67	2.31	2.44

Notes:

This operating ratio indicates whether operating revenues (mostly charges to customers) were sufficient to cover operations and capital (in the form of depreciation) for the water and/or wastewater utility in the fiscal year. A ratio of less than 1 could be a sign of financial concern. In general, this ratio should be higher than 1 to accommodate future capital investments.

Leverage

Total Long-Term Debt	9,863,196	9,449,742	8,758,458	8,234,468	6,702,728	5,867,077
Total Net Assets	21,966,039	22,308,951	22,499,072	22,620,796	22,690,275	22,702,775
Debt-to Equity Ratio	0.45	0.42	0.39	0.36	0.30	0.26

Notes:

This indicator measures the existing level of leveraging of assets, and is used by funders and bond rating agencies to evaluate the risk of providing additional loans to the utility. The ratio indicates the amount of long-term debt that exists for every \$1 of assets (fund equity). A utility with a ratio greater than 1.0 has more long-term debt than equity in the system's assets. There are no natural benchmarks for this indicator, and funders and bond rating agencies will assess this ratio in various ways. In general, the higher this ratio, the more likely the utility will be considered to be over-leveraged and the more difficult it will be for the utility to obtain additional loans. For this ratio, Net Assets are equal to the Net Investment Rate Base of the utility.

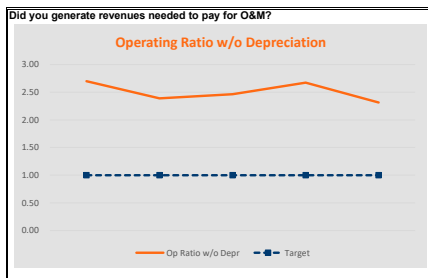
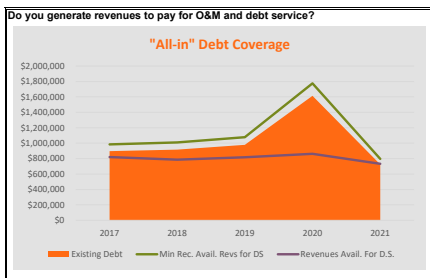
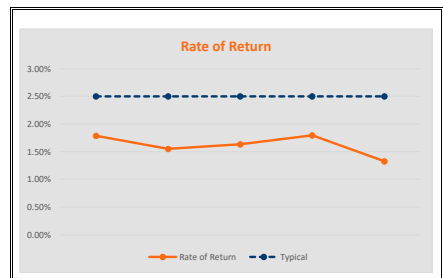
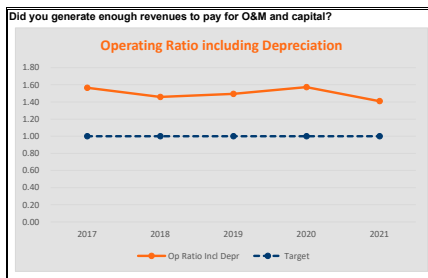
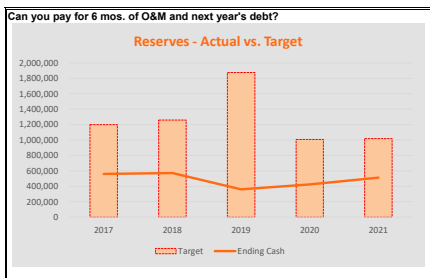
Condition of Assets:

Accumulated Depreciation Expense	4,639,727	4,987,870	5,344,642	5,703,345	6,068,340	6,433,811
Average Total Plant in Service	21,966,039	22,308,951	22,499,072	22,620,796	22,690,275	22,709,527
Asset Depreciation	17.44%	18.27%	19.20%	20.14%	21.10%	22.08%

Notes:

This indicator of infrastructure condition estimates the portion of the average expected life of the utility's physical assets that has already passed. As this ratio approaches 100%, the capital assets become fully depreciated, and infrastructure needs replacement or rehabilitation. The accuracy of this indicator relies heavily on the accuracy of the depreciation schedule, and historic pricing likely distorts this indicator (newer utilities may be slightly disadvantaged as a result).

Table 5
Sewer Utility Financial Health Charts
Village of Kewaskum, WI





Test Year 2022 Sewer Utility Rate Study

Section 2 — Sewer Utility Rate Study

Village of Kewaskum, WI



Table 6
Projected Test Year 2022 WWTF Flows and Loadings

Village of Kewaskum, WI

	Flow (1,000 Gal)				BOD (Lbs)	TSS (Lbs)	P (Lbs)
	2019	2020	2021	2022			
Inside Customers							
Residential	51,385	54,901	55,300	55,000	91,740	114,675	1,835
Commercial	17,580	32,849	17,594	17,500	29,190	36,488	584
Industrial	1,532	1,310	1,244	1,200	2,002	2,502	40
Public Authority	1,783	3,628	6,335	3,750	6,255	7,819	125
Subtotal Inside Customers	72,279	92,688	80,472	77,450	129,187	161,483	2,584
Unmetered Customers							
Family Dairies	1,400	1,400	1,400	1,400	1,747	2,183	35
Kewaskum Foods	800	800	800	800	998	1,248	20
Subtotal Unmetered Customers	2,200	2,200	2,200	2,200	2,745	3,431	55
Wastewater Treatment Facility							
Total Billable	74,479	94,888	82,672	79,650	131,931	164,914	2,639
Inflow/Infiltration (I/I)	116,416	93,889	63,732	9,800			
Total WWTF	190,895	188,777	146,404	89,450			
I/I %	61.0%	49.7%	43.5%	11.0%			
Total For Rate Calcs				79,650	131,931	164,914	2,639

Notes:

Table 7
Projected Test Year 2022 Meter Counts

Village of Kewaskum, WI

Meter Size	Total Meters				Total
	Inside Customers				
	Residential	Commercial	Industrial	Public Authority	
5/8" or 3/4"	1,538	70	3	7	1,618
1"	6	13	6	4	29
1 1/4"					-
1 1/2"	1	19			20
2"		13	2	2	17
3"					-
4"			1	1	2
6"					-
8"					-
	1,545	115	12	14	1,686

Meter Size	Equiv. Ratio	Equivalent Meters				Total
		Inside Customers				
		Residential	Commercial	Industrial	Public Authority	
5/8" or 3/4"	1.00	1,538.0	70.0	3.0	7.0	1,618.0
1"	1.75	10.5	22.8	10.5	7.0	50.8
1 1/4"	2.90	-	-	-	-	-
1 1/2"	4.00	4.0	76.0	-	-	80.0
2"	7.00	-	91.0	14.0	14.0	119.0
3"	16.00	-	-	-	-	-
4"	28.00	-	-	28.0	28.0	56.0
6"	60.00	-	-	-	-	-
8"	110.00	-	-	-	-	-
		1,552.5	259.8	55.5	56.0	1,923.8

Table 8
2022 Adopted Budget for Sewer Utility

Village of Kewaskum, WI

Account Number	Account Description	2021 BUDGET	YTD 6/30/2021 ACTUAL	2022 BUDGET
SUPERVISION LABOR				
603-82000-130	SUP: WAGES	110,365	45,604	95,616
603-82000-140	SUP: O.T.	3,000	2,545	4,000
603-82000-145	SUP: P.T. WAGES	2,800	0	2,800
603-82000-150	SUP: LONGEVITY	30	0	36
603-82000-160	SUP: VACATION	4,300	0	4,042
603-82000-165	SUP: HOLIDAY	4,300	0	4,462
603-82000-170	SUP: SICK	2,000	0	1,215
603-82100-355	POWER PURCHASED	77,000	45,092	77,000
603-82300-333	CHEMICALS	10,000	4,763	13,000
603-82500-359	SLUDGE HAULING	42,000	29,178	48,000
603-82700-330	OPERATE SUP & EXP	18,000	6,515	18,000
603-82800-322	VEHICLE: MAINT	5,000	0	5,000
603-82800-332	VEHICLE: FUEL/MILEAGE	2,000	347	2,000
MAINT COLLECTION SYS				
603-83100-321	MAINT COLLECTION SYS	25,000	17,363	25,000
603-83200-321	MAINT LIFT STATION	2,500	0	2,500
603-83300-321	MAINT TREATMENT EQUIP	11,000	2,109	10,000
603-83400-323	MAINT PLANT STRUCTURES	3,000	866	4,000
603-83500-110	MAINT OF METERS SALARIES	0	0	0
603-83500-130	MAINT OF METERS WAGES	6,200	4,961	6,236
603-83500-140	MAINT OF METERS OT	0	50	0
603-83500-160	MAINTENANCE OF METERS VACATION	0	0	264
603-83500-170	MAINTENANCE OF METERS SICK	0	0	80
603-83500-329	MAINT OF METERS	1,000	0	250
ACCOUNTING & COLLECTING				
603-84000-130	A/C: WAGES	0	0	0
603-84000-359	AUDIT CONTRACT	4,500	0	4,500
603-84200-110	MTR RDG: SALARIES	0	0	0
603-84200-130	MTR RDG: WAGES	2,300	1,554	2,079
603-84200-140	MTR RDG: O.T.	0	0	0
603-84200-145	MTR RDG: P.T. WAGES	0	0	0
603-84200-160	MTR RDG: VACATION	0	0	88
603-84200-165	MTR RDG: HOLIDAY	0	0	97
603-84200-170	MTR RDG: SICK	0	0	27
603-84300-359	AUDIT CONTRACT	0	0	0
603-84300-384	UNCOLLECTIBLE ACCTS	1,000	4	1,000
ADMIN & GENERAL				
603-85000-110	ADM & GEN: SALARIES	12,300	5,721	30,867
603-85000-130	ADM & GEN: WAGES	31,000	20,429	27,829
603-85000-140	ADM & GEN: O.T.	7,000	2,371	3,000
603-85000-145	ADM & GEN: P.T. WAGES	-	-	0
603-85000-150	ADM & GEN: LONGEVITY	-	1,360	0
603-85000-160	ADM & GEN: VACATION	3,800	1,219	2,487
603-85000-165	ADM & GEN: HOLIDAY	2,000	538	2,735
603-85000-170	ADM & GEN: SICK	2,200	519	746
603-85100-331	OFFICE EXPENSES & SUPPLIES	8,500	2,648	10,300
603-85200-369	OUTSIDE SERVICES	30,000	8,059	40,000
603-85300-365	PROPERTY & LIAB INS	12,600	29,559	25,000
603-85400-220	SEWER: W.R.	20,000	6,222	7,450
603-85400-221	W.R. GASB 68 ADJUSTMENT	-	-	-
603-85400-230	SEWER: LIFE INS	550	416	530
603-85400-240	SEWER: HEALTH	50,000	35,193	49,120
603-85600-310	LABORATORY EXPENSE	10,700	4,000	12,000
603-85600-312	SEWER DUES	-	-	400
603-85600-314	SEWER TRAINING	500	545	1,000
603-85600-357	UTILITY EXPENSE	23,000	10,516	30,000
603-85600-399	SEWER MISC	4,500	453	4,500
603-85700-358	SEWER RENT	6,100	3,156	6,100
Total		562,045	293,876	585,356

Table 10 Rate Computation Worksheet

Village of Kewaskum, WI

Calculation of Inside Customer Rates				
Fixed Charges (Annual)				
<u>Charge Type</u>		<u>Costs</u>	<u>Billable Units</u>	<u>Rate</u>
Customer Charge		\$0.00	1,686	\$0.00
Meter/Connection Charge		\$295,654.56	1,924	\$153.69
	<u>Meter Size</u>	<u>Equiv Ratio</u>	<u>Meter/Connection Charge</u>	<u>Customer Charge</u>
	5/8" or 3/4"	1	\$153.69	\$0.00
	1"	1.75	\$268.96	\$0.00
	1 1/4"	2.9	\$445.70	\$0.00
	1 1/2"	4	\$614.76	\$0.00
	2"	7	\$1,075.83	\$0.00
	3"	16	\$2,459.04	\$0.00
	4"	28	\$4,303.32	\$0.00
	6"	60	\$9,221.40	\$0.00
	8"	110	\$16,905.90	\$0.00
				<u>Total Fixed Charge</u>
				\$153.69
Volumetric Charges				
<u>Charge Type</u>	<u>Cost</u>	<u>Billable Units</u> <u>(1,000 Gal or lbs)</u>	<u>Rate/Unit</u>	
Flow Charge per 1000 Gal	\$474,714	79,650	\$5.96	
Conveyance Charge per 1000 Gal	\$67,916	79,650	\$0.85	
BOD Charge per lb.	\$461,554	131,931	\$3.50	
TSS Charge per lb.	\$234,023	164,914	\$1.42	
P Charge per lb.	\$47,338	2,639	\$17.94	
BOD Charge per 1000 Gal			\$5.84	
TSS Charge per 1000 Gal			\$2.96	
P Charge per 1000 Gal			\$0.60	
Total Volumetric Rate per 1000 Gal			\$16.21	
Rate Summary				
Annual Fixed charge per connection				\$153.69
Total Volumetric Rate per 1000 Gal				\$16.21
BOD Charge per lb.				\$3.498
TSS Charge per lb.				\$1.419
P Charge per lb.				\$17.940
N Charge per lb.				

Table 11.1 Rate Summary (Quarterly Charges)

Village of Kewaskum, WI

	Current	COS	Test Year Proposed
Domestic Sewer Customers			
<u>Meter Size</u>			
5/8" or 3/4"	\$29.41	\$38.42	\$38.42
1"	\$50.33	\$67.24	\$67.24
1 1/4"	\$79.47	\$111.43	\$111.43
1 1/2"	\$116.55	\$153.69	\$153.69
2"	\$203.97	\$268.96	\$268.96
3"	\$468.86	\$614.76	\$614.76
4"	\$834.42	\$1,075.83	\$1,075.83
6"	\$1,875.46	\$2,305.35	\$2,305.35
8"	\$3,337.67	\$4,226.48	\$4,226.48
Volumetric Rate per 1000 Gal	\$13.28	\$16.21	\$16.21
High Strength Industrial			
BOD Charge per lb.	\$2.750	\$3.498	\$3.50
TSS Charge per lb.	\$1.170	\$1.419	\$1.42
P Charge per lb.	\$14.750	\$17.940	\$17.94

Table 11.2 Rate Summary (Quarterly Charges) Phased-In

Village of Kewaskum, WI

	Current	COS	7/1/2022 Proposed	7/1/2023 Proposed
Domestic Sewer Customers				
<u>Meter Size</u>				
5/8" or 3/4"	\$29.41	\$38.42	\$33.92	\$38.42
1"	\$50.33	\$67.24	\$58.78	\$67.24
1 1/4"	\$79.47	\$111.43	\$95.45	\$111.43
1 1/2"	\$116.55	\$153.69	\$135.12	\$153.69
2"	\$203.97	\$268.96	\$236.46	\$268.96
3"	\$468.86	\$614.76	\$541.81	\$614.76
4"	\$834.42	\$1,075.83	\$955.13	\$1,075.83
6"	\$1,875.46	\$2,305.35	\$2,090.41	\$2,305.35
8"	\$3,337.67	\$4,226.48	\$3,782.07	\$4,226.48
Volumetric Rate per 1000 Gal	\$13.28	\$16.21	\$14.74	\$16.21
High Strength Industrial				
BOD Charge per lb.	\$2.750	\$3.498	\$3.124	\$3.498
TSS Charge per lb.	\$1.170	\$1.419	\$1.295	\$1.419
P Charge per lb.	\$14.750	\$17.940	\$16.345	\$17.940

Table 12 Revenue Check (Based on COS)

Village of Kewaskum, WI

		Units	Rate	Annual Total
Fixed Charge				
	<u>Meter Size</u>			
	5/8" or 3/4"	1,618	\$38.42	\$ 248,670.42
	1"	29	\$67.24	\$ 7,799.77
	1 1/4"	0	\$111.43	-
	1 1/2"	20	\$153.69	\$ 12,295.20
	2"	17	\$268.96	\$ 18,289.11
	3"	0	\$614.76	-
	4"	2	\$1,075.83	\$ 8,606.64
	6"	0	\$2,305.35	-
	8"	0	\$4,226.48	-
Subtotal		1,686		\$295,661
Volumetric Charges				
Residential	Flow (000 gal)	55,000	\$16.21	\$891,292
Commercial	Flow (000 gal)	17,500	\$16.21	\$283,593
Industrial	Flow (000 gal)	1,200	\$16.21	\$19,446
Public Authority	Flow (000 gal)	3,750	\$16.21	\$60,770
Subtotal		77,450		\$1,255,101
High Strength Industrial				
Industrial Excess BOD	Lbs	0	\$3.498	\$0.00
Industrial Excess TSS	Lbs	0	\$1.419	\$0.00
Industrial Excess P	Lbs	0	\$17.940	\$0.00
Subtotal		0		\$0
Unmetered Users				
Family Dairies	Flow (000 gal)	1,400	\$16.21	\$22,687
Kewaskum Foods	Flow (000 gal)	800	\$16.21	\$12,964
Subtotal				\$35,652
Total Revenues				\$1,586,414
Revenue Requirements				\$1,581,200
Difference				\$5,214

Notes:

1) Difference due to rounding

Table 13 Revenue Summary (Proposed Rates)

Village of Kewaskum, WI

		Units	Rate	Annual Total
Fixed Charge				
	<u>Meter Size</u>			
	5/8" or 3/4"	1,618	\$38.42	\$248,670
	1"	29	\$67.24	\$7,800
	1 1/4"	0	\$111.43	\$0
	1 1/2"	20	\$153.69	\$12,295
	2"	17	\$268.96	\$18,289
	3"	0	\$614.76	\$0
	4"	2	\$1,075.83	\$8,607
	6"	0	\$2,305.35	\$0
	8"	0	\$4,226.48	\$0
Subtotal		1,686		295,661
Volumetric Charges				
Residential	Flow (000 gal)	55,000	\$16.21	\$891,292
Commercial	Flow (000 gal)	17,500	\$16.21	\$283,593
Industrial	Flow (000 gal)	1,200	\$16.21	\$19,446
Public Authority	Flow (000 gal)	3,750	\$16.21	\$60,770
Enter Customer Classes in Projected FI	Flow (000 gal)	0	\$16.21	\$0
Enter Customer Classes in Projected FI	Flow (000 gal)	0	\$16.21	\$0
Septic Tank Waste	Flow (000 gal)	0	\$490.96	\$0
Chemical Toilet Waste	Flow (000 gal)	0	\$23,279.63	\$0
Mixed Loads	Flow (000 gal)	0	\$817.52	\$0
Holding Tank Waste	Flow (000 gal)	0	\$114.08	\$0
Subtotal		77,450		\$1,255,101
High Strength Industrial				
Industrial Excess BOD	Lbs	0	\$3.50	\$0
Industrial Excess TSS	Lbs	0	\$1.42	\$0
Industrial Excess P	Lbs	0	\$17.94	\$0
Subtotal		0		\$0
Unmetered Users				
Family Dairies		1,400	\$16.21	\$22,687
Kewaskum Foods		800	\$16.21	\$12,964
Subtotal				\$35,652
Total Revenues				\$1,586,414
Revenue Requirements				\$1,581,200
Difference				\$5,214

Notes:

1) Difference due to rounding

Table 14 Test Year Cash Flow Analysis

Village of Kewaskum, WI

	2022
<u>Cash Sources</u>	
Revenues from User Rates ⁽¹⁾	\$1,586,414
Other Income ⁽²⁾	\$20,000
Investment Income on Unrestricted Cash	\$3,500
Total Cash Sources	\$1,609,914
<u>Cash Uses</u>	
O&M	\$585,356
Other	\$0
Net Before Debt Service	\$1,024,558
<u>Debt Service</u>	
Debt Service P&I	\$783,619
Cash Funded Capital	\$25,000
Transfer in/(out)	(\$1,650)
Net Cash Flow	\$214,289
<u>Total Unrestricted Cash Balance</u>	
Beginning Year Est. Balance	(\$451,579)
Net Additions (Subtractions)	\$214,289
End of Year Unrestricted Cash Balance	(\$237,290)
<u>Equipment Replacement Fund Balance</u>	
Beginning Year Balance	\$439,227
Additions from Rates	\$209,075
Fund Expenditures	\$0
Interest Income	\$2,196
End Year Replacement Fund Balance	\$650,498

Notes:

- 1) Full year of revenues from proposed user rates
- 2) Miscellaneous revenue and late fees.

Table 15
Comparison of Existing and Proposed Bills

Village of Kewaskum, WI

Customer	Usage Level	Meter Size	Usage 1,000 Gal	Current Bill	Quarterly	Dollar Change	Percent Change
					Proposed Bill		
Residential	Low User	5/8" or 3/4"	9.00	\$148.93	\$184.27	\$35.34	23.7%
Residential	Avg. User	5/8" or 3/4"	12.00	\$188.77	\$232.89	\$44.12	23.4%
Residential	High User	5/8" or 3/4"	15.00	\$228.61	\$281.50	\$52.89	23.1%
Commercial	Low User	5/8" or 3/4"	75.00	\$1,025.41	\$1,253.82	\$228.41	22.3%
Commercial	Avg. User	5/8" or 3/4"	100.00	\$1,357.41	\$1,658.95	\$301.54	22.2%
Commercial	High User	5/8" or 3/4"	125.00	\$1,689.41	\$2,064.09	\$374.68	22.2%
Industrial	Low User	1"	75.00	\$1,046.33	\$1,282.64	\$236.31	22.6%
Industrial	Avg. User	1"	100.00	\$1,378.33	\$1,687.77	\$309.44	22.5%
Industrial	High User	1"	125.00	\$1,710.33	\$2,092.90	\$382.57	22.4%
Public	Low User	1"	75.00	\$1,046.33	\$1,282.64	\$236.31	22.6%
Public	Avg. User	1"	100.00	\$1,378.33	\$1,687.77	\$309.44	22.5%
Public	High User	1"	125.00	\$1,710.33	\$2,092.90	\$382.57	22.4%

Notes:

- 1) Meter sizes chosen based on highest number of users for each class
- 2) Average user is defined as the total estimated test year flow for the class divided by the projected number of users in the class.



Test Year 2022 Sewer Utility Rate Study

Section 3 — Sewer Fund Long-Range Cash Flow Analysis

Village of Kewaskum, WI



Table 16
Sewer Utility Capital Improvement Plan

Village of Kewaskum, WI

Projects	Funding	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Totals
SCADA Upgrade (30%)	Grants/Aids	13,504	13,504									27,008
Vac. Truck & Jetter	G.O. Debt			150,000								150,000
Ehlers Assumption for cash funded capital	Cash								25,000	25,000	25,000	75,000
Upgrades @ Knights Ave Lift Station	Revenue Debt				400,000							400,000
WWTP Upgrades	Revenue Debt						6,000,000					6,000,000
US-45 project (Sewer Portion)	Revenue Debt		1,167,494									1,167,494
Actual CIP Costs		13,504	1,180,998	150,000	400,000	0	6,000,000	0	25,000	25,000	25,000	7,819,502
Sources of Funding												
G.O. Debt		0	0	150,000	0	0	0	0	0	0	0	150,000
Revenue Debt		0	1,167,494	0	400,000	0	6,000,000	0	0	0	0	7,567,494
Grants/Aids		13,504	13,504	0	0	0	0	0	0	0	0	27,008
Special Assessment		0	0	0	0	0	0	0	0	0	0	0
User Fees		0	0	0	0	0	0	0	0	0	0	0
Tax Levy		0	0	0	0	0	0	0	0	0	0	0
Equipment Replacement Fund		0	0	0	0	0	0	0	0	0	0	0
Cash		0	0	0	0	0	0	0	25,000	25,000	25,000	75,000
Total		13,504	1,180,998	150,000	400,000	0	6,000,000	0	25,000	25,000	25,000	7,819,502

Notes:

Table 17
Capital Improvements Financing Plan

Village of Kewaskum, WI

	2023		2024		2027	
	CWF Loan	Sewer Portion	G.O. Notes	Sewer Portion	CWF Loan	Sewer Portion
	2023 Sewer Projects		2024 Sewer Projects		2027 Sewer Projects	
CIP Projects ¹						
Sewer	1,567,494	1,567,494	150,000	150,000	6,000,000	6,000,000
Subtotal Project Costs	1,567,494	1,567,494	150,000	150,000	6,000,000	6,000,000
CIP Projects ¹	1,567,494	1,567,494	150,000	150,000	6,000,000	6,000,000
Estimated Issuance Expenses	22,500	22,500	2,000	2,000	22,500	22,500
Municipal Advisor (Ehlers)	7,500	7,500	0	0	7,500	7,500
Bond Counsel	15,000	15,000	0	0	15,000	15,000
Disclosure Counsel	0	0	0	0	0	0
Rating Fee - Moody's	0	0	0	0	0	0
Maximum Underwriter's Discount	0.00	0	0.00	0	0.00	0
Paying Agent	0	0	0	0	0	0
Bank Fees	0	0	2,000	2,000	0	0
Subtotal Issuance Expenses	22,500	22,500	2,000	2,000	22,500	22,500
TOTAL TO BE FINANCED	1,589,994	1,589,994	152,000	152,000	6,022,500	6,022,500
Rounding	-	-	-	-	-	-
NET BOND SIZE	1,589,994	1,589,994	152,000	152,000	6,022,500	6,022,500

Notes:

1) Source of Project Totals

Table 18
Sewer Utility Projected Debt Service Payments (PROPOSED)

Village of Kewaskum, WI

NAME		Clean Water Fund Loan				GO Bank Notes (Sewer Portion)				Clean Water Fund Loan				PROPOSED Sewer Utility Debt Service Summary				
AMT	DATED	\$1,589,994				\$152,000				\$6,022,500								
MATURE	RATE	6/28/2023				6/1/2024				6/24/2026								
		5/1				5/1				5/1								
		2.20%				4.00%				2.75%								
Year	Principal	Est. Rate ¹	Interest	Total	Principal	Est. Rate	Interest	Total	Principal	Est. Rate ²	Interest	Total	Total Prin	Total Int	Total P&I	Prin Outstanding	Year	
2022													0	0	0		2022	
2023	0	2.20%	11,951	11,951									0	11,951	11,951	1,589,994	2023	
2024	64,146	2.20%	34,274	98,420									64,146	34,274	98,420	1,677,848	2024	
2025	65,557	2.20%	32,848	98,405	0	4.00%	8,613	8,613					65,557	41,461	107,018	1,612,291	2025	
2026	66,999	2.20%	31,389	98,389	3,500	4.00%	6,010	9,510					70,499	37,399	107,899	1,541,792	2026	
2027	68,473	2.20%	29,899	98,372	3,500	4.00%	5,870	9,370	0	2.75%	58,427	58,427	71,973	94,196	166,169	7,492,319	2027	
2028	69,980	2.20%	28,376	98,356	48,500	4.00%	4,830	53,330	0	2.75%	165,619	165,619	118,480	198,825	317,305	7,373,839	2028	
2029	71,519	2.20%	26,820	98,339	48,500	4.00%	2,890	51,390	215,722	2.75%	162,653	378,375	335,742	192,362	528,104	7,038,097	2029	
2030	73,093	2.20%	25,229	98,322	48,000	4.00%	960	48,960	221,655	2.75%	156,639	378,293	342,747	182,828	525,575	6,695,350	2030	
2031	74,701	2.20%	23,603	98,304	0	4.00%	0	0	227,750	2.75%	150,459	378,210	302,451	174,063	476,514	6,392,899	2031	
2032	76,344	2.20%	21,942	98,286	0	4.00%	0	0	234,013	2.75%	144,110	378,123	310,357	166,052	476,409	6,082,542	2032	
2033	78,024	2.20%	20,244	98,267	0	4.00%	0	0	240,449	2.75%	137,586	378,035	318,472	157,830	476,302	5,764,069	2033	
2034	79,740	2.20%	18,508	98,249	0	4.00%	0	0	247,061	2.75%	130,883	377,944	326,801	149,391	476,193	5,437,268	2034	
2035	81,494	2.20%	16,735	98,229					253,855	2.75%	123,995	377,851	335,350	140,730	476,080	5,101,918	2035	
2036	83,287	2.20%	14,922	98,210					260,836	2.75%	116,918	377,755	344,124	131,841	475,964	4,757,795	2036	
2037	85,120	2.20%	13,070	98,189					268,009	2.75%	109,647	377,656	353,129	122,716	475,845	4,404,666	2037	
2038	86,992	2.20%	11,176	98,169					275,380	2.75%	102,175	377,555	362,372	113,352	475,723	4,042,294	2038	
2039	88,906	2.20%	9,242	98,148					282,952	2.75%	94,498	377,451	371,859	103,740	475,598	3,670,435	2039	
2040	90,862	2.20%	7,264	98,126					290,734	2.75%	86,610	377,344	381,596	93,874	475,470	3,288,840	2040	
2041	92,861	2.20%	5,243	98,104					298,729	2.75%	78,505	377,234	391,590	83,748	475,338	2,897,250	2041	
2042	94,904	2.20%	3,178	98,082					306,944	2.75%	70,177	377,121	401,848	73,355	475,202	2,495,402	2042	
2043	96,992	2.20%	1,067	98,059					315,385	2.75%	61,620	377,005	412,377	62,687	475,063	2,083,025	2043	
2044									324,058	2.75%	52,827	376,885	324,058	52,827	376,885	1,758,967	2044	
2045									332,970	2.75%	43,793	376,763	332,970	43,793	376,763	1,425,998	2045	
2046									342,126	2.75%	34,511	376,637	342,126	34,511	376,637	1,083,871	2046	
2047									351,535	2.75%	24,973	376,508	351,535	24,973	376,508	732,337	2047	
2048									361,202	2.75%	15,173	376,375	361,202	15,173	376,375	371,135	2048	
2049									371,135	2.75%	5,103	376,238	371,135	5,103	376,238	0	2049	
TOTALS	1,589,994		386,981	1,976,975	152,000		29,173	181,173	6,022,500		2,126,900	8,149,400	7,764,494	2,543,054	10,307,548		TOTALS	

Notes:

- 1) Rate assumes 55% of Q2 2022 EIF Market Rate plus 100 basis points (or 1.00%).
- 2) Rate assumes 2023 estimated rate plus 100 basis points (or 1.00%).

Legend:

0 Maturities subject to optional redemption (callable)

Table 19
Sewer Utility Schedule of G.O. Debt Outstanding

Village of Kewaskum, WI

NAME	Advance from General Fund			GO Notes (Sewer Portion) Series 2022A			Existing G.O. Sewer Debt Summary					
	DATED AMT	5/11/2022 \$2,166,582		2/9/2022 \$400,000			TOTAL PRIN	TOTAL INT	TOTAL P & I	PRINC OUTSTND	PRINC %PAID	YEAR
YEAR	Principal	Rate	Interest	Principal	Rate	Interest						
2021	0	0.00%	0				0	0	0	2,566,582	0.00%	2021
2022	0	0.00%	0	0	0.00%	0	0	0	0	2,566,582	0.00%	2022
2023	0	0.00%	0	50,000	1.00%	3,949	50,000	3,949	53,949	2,516,582	1.95%	2023
2024	0	0.00%	0	50,000	1.00%	6,250	50,000	6,250	56,250	2,466,582	3.90%	2024
2025	0	0.00%	0	50,000	2.00%	5,500	50,000	5,500	55,500	2,416,582	5.84%	2025
2026	0	0.00%	0	50,000	2.00%	4,500	50,000	4,500	54,500	2,366,582	7.79%	2026
2027	0	0.00%	0	50,000	2.00%	3,500	50,000	3,500	53,500	2,316,582	9.74%	2027
2028	0	0.00%	0	50,000	2.00%	2,500	50,000	2,500	52,500	2,266,582	11.69%	2028
2029	180,550	0.00%	0	50,000	2.00%	1,500	230,550	1,500	232,050	2,036,032	20.67%	2029
2030	180,550	0.00%	0	50,000	2.00%	500	230,550	500	231,050	1,805,482	29.65%	2030
2031	180,550	0.00%	0	0	2.00%	0	180,550	0	180,550	1,624,932	36.69%	2031
2032	180,550	0.00%	0				180,550	0	180,550	1,444,382	43.72%	2032
2033	180,550	0.00%	0				180,550	0	180,550	1,263,832	50.76%	2033
2034	180,550	0.00%	0				180,550	0	180,550	1,083,282	57.79%	2034
2035	180,550	0.00%	0				180,550	0	180,550	902,732	64.83%	2035
2036	180,550	0.00%	0				180,550	0	180,550	722,182	71.86%	2036
2037	180,550	0.00%	0				180,550	0	180,550	541,632	78.90%	2037
2038	180,550	0.00%	0				180,550	0	180,550	361,082	85.93%	2038
2039	180,550	0.00%	0				180,550	0	180,550	180,532	92.97%	2039
2040	180,532	0.00%	0				180,532	0	180,532	0	100.00%	2040
TOTALS	2,166,582		0	400,000		28,199	2,566,582	28,199	2,594,781			

Notes:

1) Per 2020 Audit page 33 no schedule has been established

Legend:

50,000 Maturities subject to optional redemption (Callable)

Table 20
Sewer Utility Cash Flow Analysis - Projected 2022-2031

Village of Kewaskum, WI

	Budget	Projected								
	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Revenues										
Total Revenues from User Rates ¹	\$1,435,510	\$1,594,916	\$1,678,811	\$1,678,811	\$1,678,811	\$1,678,811	\$1,678,811	\$1,678,811	\$1,678,811	\$1,678,811
Percent Increase to User Rates ²	11.10%	11.10%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Cumulative Percent Rate Increase	11.10%	23.44%	23.44%	23.44%	23.44%	23.44%	23.44%	23.44%	23.44%	23.44%
Dollar Amount Increase to Revenues		\$159,406	\$83,895	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Other Revenues										
Interest Income	\$3,500	\$3,509	\$3,332	\$4,123	\$3,851	\$4,531	\$5,021	\$5,502	\$5,964	\$6,382
Other Income	\$20,000	\$20,200	\$20,402	\$20,606	\$20,812	\$21,020	\$21,230	\$21,443	\$21,657	\$21,874
Total Other Revenues	\$23,500	\$23,709	\$23,734	\$24,729	\$24,663	\$25,551	\$26,251	\$26,945	\$27,621	\$28,256
Total Revenues	\$1,459,010	\$1,618,625	\$1,702,545	\$1,703,541	\$1,703,475	\$1,704,362	\$1,705,063	\$1,705,756	\$1,706,433	\$1,707,068
Expenses										
Operating and Maintenance ³	\$597,594	\$615,402	\$633,741	\$652,629	\$672,080	\$692,113	\$712,744	\$733,991	\$755,873	\$778,408
PILOT Payment	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Net Before Debt Service and Capital Expenditures	\$861,416	\$1,003,223	\$1,068,804	\$1,050,912	\$1,031,394	\$1,012,250	\$992,319	\$971,765	\$950,560	\$928,659
Debt Service										
Existing Debt P&I	\$719,436	\$771,667	\$652,027	\$651,122	\$649,964	\$648,352	\$481,043	\$232,050	\$231,050	\$180,550
New (2022-2031) Debt Service P&I	\$0	\$11,951	\$98,420	\$107,018	\$107,899	\$166,169	\$317,305	\$528,104	\$525,575	\$476,514
Total Debt Service	\$719,436	\$783,619	\$750,447	\$758,140	\$757,863	\$814,521	\$798,348	\$760,154	\$756,625	\$657,064
Transfer In (Out); Cap. Contrib.	\$61,300	(\$1,650)	(\$1,650)	(\$1,650)	(\$1,650)	(\$1,650)	(\$1,650)	(\$1,650)	(\$1,650)	(\$1,650)
Capital Improvements & COI	\$13,504	\$1,203,498	\$152,000	\$400,000	\$0	\$6,022,500	\$0	\$25,000	\$25,000	\$25,000
Bonds Issued/Grants/Aid	\$13,504	\$1,603,498	\$152,000	\$0	\$0	\$6,022,500	\$0	\$0	\$0	\$0
Net Annual Cash Flow	\$203,281	\$617,954	\$316,707	(\$108,878)	\$271,882	\$196,078	\$192,321	\$184,961	\$167,285	\$244,946
Restricted and Unrestricted Cash Balance:										
Balance at first of year	\$511,386	\$714,666	\$1,332,621	\$1,649,327	\$1,540,449	\$1,812,331	\$2,008,409	\$2,200,730	\$2,385,692	\$2,552,977
Net Annual Cash Flow Addition/(subtraction)	\$203,281	\$617,954	\$316,707	(\$108,878)	\$271,882	\$196,078	\$192,321	\$184,961	\$167,285	\$244,946
Balance at end of year	\$714,666	\$1,332,621	\$1,649,327	\$1,540,449	\$1,812,331	\$2,008,409	\$2,200,730	\$2,385,692	\$2,552,977	\$2,797,922

Notes:

- 1) Assumes no changes in customer count or usage beyond Test Year.
- 2) Assumes 3Q implementation for 2022 and 2023.
- 3) Assumes 3.00% annual inflation beyond budget year.

Legend:

- Increase depicted to maintain with assumed O&M inflation
- Increase needed above inflationary adjustment

Table 21
Sewer Utility Financial Benchmarking Analysis Projected 2022 - 2031

Village of Kewaskum, WI

	Budget	Projected								
	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Target minimum cash balance										
Target minimum working capital - Ehlers ¹	1,091,320	1,067,318	1,084,455	1,093,903	1,160,578	1,154,720	1,127,149	1,134,561	1,046,268	1,057,768
Actual Days Cash Available - PSC ²	377	690	823	756	888	909	874	938	992	1,072
Actual Days Cash Available - Moody's ³	(252)	11	65	(123)	(98)	(76)	30	116	219	321
Target minimum working capital - S&P ⁴	(252)	11	65	(123)	(98)	(76)	30	116	219	321
Actual working capital-cash balance										
Over (Under) Ehlers target	714,666	1,332,621	1,649,327	1,540,449	1,812,331	2,008,409	2,200,730	2,385,692	2,552,977	2,797,922
Over (Under) PSC target (90 days)	(376,653)	265,303	564,873	446,546	651,753	853,689	1,073,581	1,251,130	1,506,709	1,740,154
Over (Under) Moody's target (150 days)	287	600	733	666	798	819	784	848	902	982
Over (Under) S&P target (150 days)	(402)	(139)	(85)	(273)	(248)	(226)	(120)	(34)	69	171
	(402)	(139)	(85)	(273)	(248)	(226)	(120)	(34)	69	171

Notes:

- 1) Target capital equals 6 mos of next year's operating expenses, including depreciation, plus 100% of debt.
- 2) PSC formula = O&M expense + taxes + interest on long term debt ÷ 365 to get expense per day. Then Unrestricted Cash ÷ expense per day
- 3) Moody's Formula = [(Unrestricted Cash + Liquid Investments) * 365 days] ÷ Total O&M Expenses less Depreciation
- 4) S&P Formula = [(Unrestricted Cash + Liquid Investments) * 365 days] ÷ Total O&M Expenses less Depreciation; include designated reserve funds: ERFs, RSFs, etc

Rate of Return										
Average Utility Plant in Service	22,690,275	23,274,022	23,932,769	24,207,769	24,407,769	27,407,769	30,407,769	30,420,269	30,445,269	30,470,269
Less: Utility Plant Accumulated Depreciation	(4,973,188)	(5,353,299)	(5,764,496)	(6,184,356)	(6,614,115)	(7,118,125)	(7,770,635)	(8,423,454)	(9,077,201)	(9,731,876)
Average Net Investment Rate Base (NIRB)	27,663,463	28,627,321	29,697,265	30,392,125	31,021,884	34,525,894	38,178,404	38,843,723	39,522,470	40,202,145
Net Operating Income	492,754	619,603	654,275	626,929	597,784	503,709	334,788	313,444	290,849	267,602
ROR	1.78%	2.16%	2.20%	2.06%	1.93%	1.46%	0.88%	0.81%	0.74%	0.67%
Typical	2.50%									

Cost Recovery										
Operating Revenues	1,455,510	1,615,116	1,699,213	1,699,417	1,699,623	1,699,832	1,700,042	1,700,254	1,700,469	1,700,685
Operating Expenses incl. Depr & Amortization	962,756	995,513	1,044,938	1,072,488	1,101,840	1,196,122	1,365,253	1,386,810	1,409,620	1,433,084
Cost Recovery	1.51	1.62	1.63	1.58	1.54	1.42	1.25	1.23	1.21	1.19
Cost Recovery w/o Depr.	2.44	2.62	2.68	2.60	2.53	2.46	2.39	2.32	2.25	2.18
Notes:										
This operating ratio indicates whether operating revenues (mostly charges to customers) were sufficient to cover operations and capital (in the form of depreciation) for the water and/or wastewater utility in the fiscal year. A ratio of < 1 could be a sign of financial concern. In general, this ratio should be > 1 to accommodate future capital investments.										
Leverage										
Total Long-Term Debt	5,867,077	6,763,172	6,262,322	5,595,151	4,909,821	10,232,436	9,640,421	9,074,129	8,500,832	8,017,831
Total Net Assets	22,690,275	23,274,022	23,932,769	24,207,769	24,407,769	27,407,769	30,407,769	30,420,269	30,445,269	30,470,269
Debt-to Equity Ratio	0.26	0.29	0.26	0.23	0.20	0.37	0.32	0.30	0.28	0.26
Notes:										
This indicator measures the existing level of leveraging of assets, and is used by funders and rating agencies to evaluate the risk of providing additional loans to the utility. The ratio indicates the amount of long-term debt that exists for every \$1 of assets (fund equity). A utility with a ratio > 1 has more long-term debt than equity in the system's assets. There are no natural benchmarks for this indicator, and funders and rating agencies will assess this ratio in various ways. In general, the higher this ratio, the more likely the utility will be considered to be over-leveraged and the more difficult it will be for the utility to obtain additional loans. Net Assets are equal to the Net Investment Rate Base of the utility.										
Condition of Assets:										
Accumulated Depreciation Expense	4,973,188	5,353,299	5,764,496	6,184,356	6,614,115	7,118,125	7,770,635	8,423,454	9,077,201	9,731,876
Average Total Plant in Service	22,697,027	23,294,278	23,959,777	24,234,777	24,434,777	27,434,777	30,434,777	30,447,277	30,472,277	30,497,277
Asset Depreciation	17.97%	18.69%	19.39%	20.33%	21.30%	20.60%	20.34%	21.67%	22.95%	24.19%
Notes:										
This indicator of infrastructure condition estimates the portion of the average expected life of the utility's physical assets that has already passed. As this ratio approaches 100%, the capital assets become fully depreciated, and infrastructure needs replacement or rehabilitation. The accuracy of this indicator relies heavily on the accuracy of the depreciation schedule, and historic pricing likely distorts this indicator (newer utilities may be slightly disadvantaged as a result).										
Asset Efficiency:										
Total Assets	22,717,283	23,911,785	24,061,785	24,461,785	24,461,785	30,461,785	30,461,785	30,486,785	30,511,785	30,536,785
Revenue	1,435,510	1,594,916	1,678,811	1,678,811	1,678,811	1,678,811	1,678,811	1,678,811	1,678,811	1,678,811
Investment to produce \$1 Revenue	\$ 15.83	\$ 14.99	\$ 14.33	\$ 14.57	\$ 14.57	\$ 18.14	\$ 18.14	\$ 18.16	\$ 18.17	\$ 18.19
Notes:										
This indicator can vary from utility to utility based on several factors. These factors include but are not limited to Utility assets (WWTF, connection to existing system, etc.), types of customers (high strength, dairy, etc.), and size of system.										

Table 22
Sewer Utility Statement of Projected Revenue Bond Coverage
Village of Kewaskum, WI

Year	Total Operating Revenues	Less:		Existing Rev Debt	Future Rev Debt (2022-2031)	Total Sewer Debt Service	Coverage	Debt Service Capacity @ 1.1x
		Total O&M Expense	Amount Available for Debt Service	Total	Total			
2022	1,459,010	(597,594)	861,416	719,436	-	719,436	1.20	63,670
2023	1,618,625	(615,402)	1,003,223	717,718	11,951	729,670	1.37	182,351
2024	1,702,545	(633,741)	1,068,804	595,777	98,420	694,197	1.54	277,443
2025	1,703,541	(652,629)	1,050,912	595,622	107,018	702,640	1.50	252,734
2026	1,703,475	(672,080)	1,031,394	595,464	107,899	703,363	1.47	234,269
2027	1,704,362	(692,113)	1,012,250	594,852	166,169	761,021	1.33	159,206
2028	1,705,063	(712,744)	992,319	428,543	317,305	745,848	1.33	156,260
2029	1,705,756	(733,991)	971,765	-	528,104	528,104	1.84	355,319
2030	1,706,433	(755,873)	950,560	-	525,575	525,575	1.81	338,570
2031	1,707,068	(778,408)	928,659	-	476,514	476,514	1.95	367,722
2032	1,707,899	(801,617)	906,281	-	476,409	476,409	1.90	347,483
2033	1,708,739	(825,519)	883,219	-	476,302	476,302	1.85	326,624
2034	1,709,524	(850,136)	859,388	-	476,193	476,193	1.80	305,069
2035	1,709,524	(875,640)	833,884	-	476,080	476,080	1.75	281,996
2036	1,709,524	(901,909)	807,615	-	475,964	475,964	1.70	258,231
2037	1,709,524	(928,966)	780,557	-	475,845	475,845	1.64	233,752
2038	1,709,524	(956,835)	752,688	-	475,723	475,723	1.58	208,539
2039	1,709,524	(985,540)	723,984	-	475,598	475,598	1.58	208,664

Notes:

1) Revenue Coverage determined from 2008 CWF Loan.

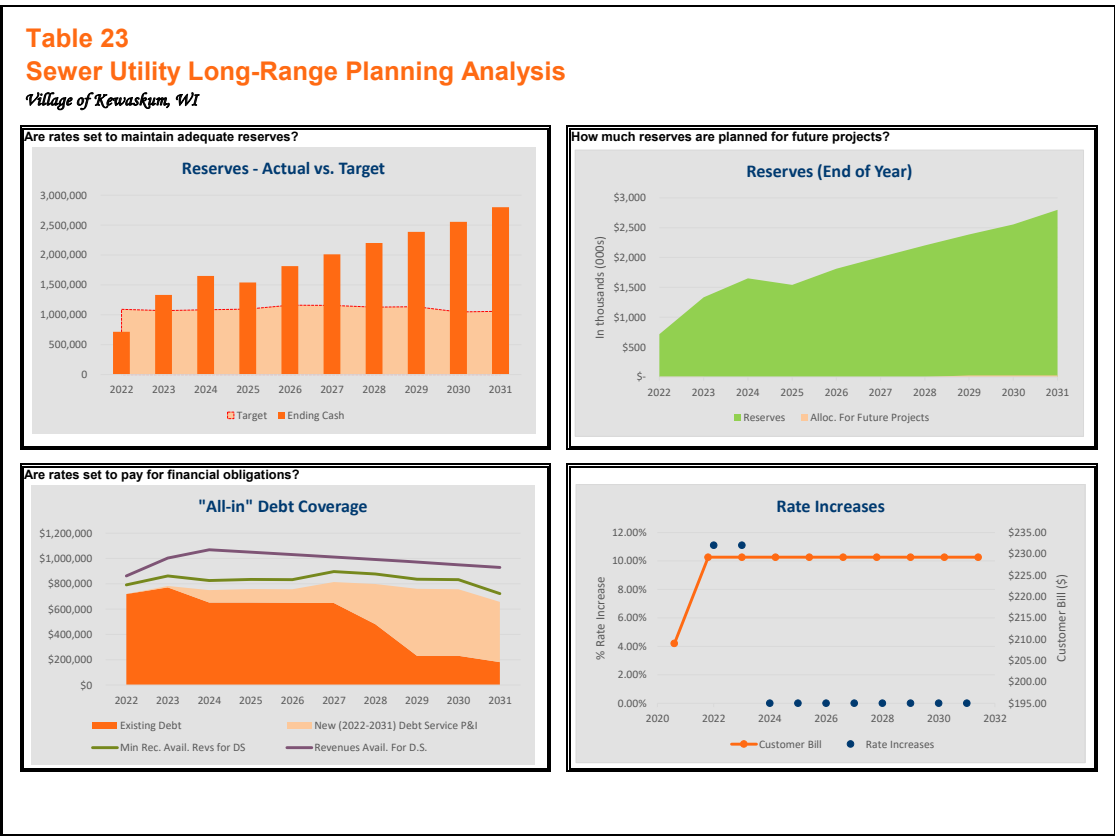


Table 24
Sewer Utility - Equipment Replacement Fund Analysis
Village of Germantown, WI

Fund Activity	Actual		Estimated	Budget	Projected								
	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Fund Balance Beginning of the Year ¹	425,316	434,896	437,042	439,227	650,498	862,826	1,076,215	1,290,671	1,506,199	1,722,805	1,731,419	1,740,077	1,748,777
Deposit to ERF ²				209,075	209,075	209,075	209,075	209,075	209,075	-	-	-	-
Expenditures				0	0	0	0	0	0	0	0	0	0
Interest Earnings ³	9,580	2,146	2,185	2,196	3,252	4,314	5,381	6,453	7,531	8,614	8,657	8,700	8,744
End of Year Balance¹	434,896	437,042	439,227	650,498	862,826	1,076,215	1,290,671	1,506,199	1,722,805	1,731,419	1,740,077	1,748,777	1,757,521
Fund Requirements													
EOY Mechanical Equipment Balance ⁴	5,618,065	6,787,018	6,787,018	6,800,522	6,814,026	6,964,026	6,964,026	6,964,026	8,464,026	8,464,026	8,489,026	8,514,026	8,539,026
Required % ⁵	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
Required Amount	1,123,613	1,357,404	1,357,404	1,360,104	1,362,805	1,392,805	1,392,805	1,392,805	1,692,805	1,692,805	1,697,805	1,702,805	1,707,805
In Compliance	NO	NO	NO	NO	NO	NO	NO	YES	YES	YES	YES	YES	YES
Over/(Under) Requirement	(688,717)	(920,362)	(918,176)	(709,606)	(499,979)	(316,590)	(102,134)	113,394	30,000	38,614	42,271	45,972	49,716

Notes:
¹ Source: Audited Financial Statements
² Actuals = estimated from YE less interest earnings. Projected amount to be deposited annually to build into full ERF funding compliance.
³ 2021 and beyond = estimated interest earnings at 0.5% interest
⁴ Source: Current Depreciation Schedule. Equipment, Computers and Vehicles accounts.
⁵ Per DNR. <https://dnr.wi.gov/Aid/documents/EIF/Guide/replace.html>



Test Year 2022 Sewer Utility Rate Study

Section 4 — Rate Impact Analysis

Village of Kewaskum, WI



Table 25
Projected Impact of CIP on Typical Residential Utility Bill

Village of Kewaskum, WI

Year	Increase	Sewer		Utility Bill (Quarterly)	Change Over Prior Year	Utility Bill (Annual)	Change Over Prior Year	% of MHI (65,664)	Year
		Sewer Vol. Charge ³	Sewer User Charge ³						
		1,000 Gal	Gen Service						
2021		13.28	29.41	\$ 188.77		\$ 755.08		1.15%	2021
2022	11.10%	14.75	32.68	\$ 209.73	\$ 20.96	\$ 838.93	\$ 83.85	1.28%	2022
2023	11.10%	14.26	32.41	\$ 203.48	\$ (6.26)	\$ 813.90	\$ (25.03)	1.24%	2023
2024	0.00%	15.23	35.42	\$ 218.18	\$ 14.71	\$ 872.72	\$ 58.82	1.33%	2024
2025	0.00%	16.21	38.42	\$ 232.89	\$ 14.71	\$ 931.54	\$ 58.82	1.42%	2025
2026	0.00%	16.21	38.42	\$ 232.89	\$ -	\$ 931.54	\$ -	1.42%	2026
2027	0.00%	16.21	38.42	\$ 232.89	\$ -	\$ 931.54	\$ -	1.42%	2027
2028	0.00%	16.21	38.42	\$ 232.89	\$ -	\$ 931.54	\$ -	1.42%	2028
2029	0.00%	16.21	38.42	\$ 232.89	\$ -	\$ 931.54	\$ -	1.42%	2029
2030	0.00%	16.21	38.42	\$ 232.89	\$ -	\$ 931.54	\$ -	1.42%	2030
2031	0.00%	16.21	38.42	\$ 232.89	\$ -	\$ 931.54	\$ -	1.42%	2031

Notes:

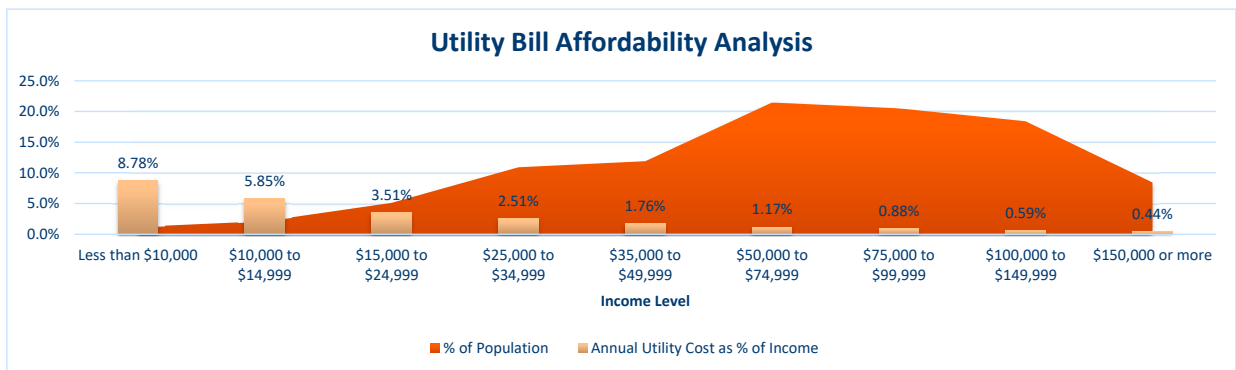
1. Current sewer volumetric rate is \$13.28 per 1,000 gallons.
2. The sewer facility charges include a qtrly charge of \$29.41 for a 5/8" or 3/4" meter.
3. The usage is assumed to be 12,000 Gallons per quarter

Legend:

2027 is the final year of the Capital Improvement Plan.

Table 26
Projected Impact of CIP on Typical Residential Utility Bill - Affordability

Village of Kewaskum, WI



Notes:

- 1) Utility Cost taken as a 5-year average of wastewater bills for an average (5/8"; 12,000 gal./qtr.) Residential User.
- 2) Village Income Level from U.S. Census Bureau's American Community Survey
- 3) 8.4% of residential customers are estimated to have less than \$25,000 of income. These households will have spent more than 7.63% of their income under the 4-year average for this plan.



Test Year 2022 Sewer Utility Rate Study

Appendix A — Phased-In Rate Implementation Analysis

Village of Kewaskum, WI



Table 11.2 Alternative Rate Summary (Quarterly Charges) Phased-In

Village of Kewaskum, WI

	Current	COS	7/1/2022 Proposed	7/1/2023 Proposed	7/1/2024 Proposed
Domestic Sewer Customers					
<u>Meter Size</u>					
5/8" or 3/4"	\$29.41	\$37.77	\$32.20	\$34.98	\$37.77
1"	\$50.33	\$66.09	\$55.58	\$60.84	\$66.09
1 1/4"	\$79.47	\$109.52	\$89.49	\$99.50	\$109.52
1 1/2"	\$116.55	\$151.06	\$128.05	\$139.56	\$151.06
2"	\$203.97	\$264.36	\$224.10	\$244.23	\$264.36
3"	\$468.86	\$604.24	\$513.99	\$559.11	\$604.24
4"	\$834.42	\$1,057.42	\$908.75	\$983.09	\$1,057.42
6"	\$1,875.46	\$2,265.90	\$2,005.61	\$2,135.75	\$2,265.90
8"	\$3,337.67	\$4,154.15	\$3,609.83	\$3,881.99	\$4,154.15
Volumetric Rate per 1000 Gal	\$13.28	\$15.95	\$14.17	\$15.06	\$15.95
High Strength Industrial					
BOD Charge per lb.	\$2.750	\$3.438	\$2.979	\$3.209	\$3.44
TSS Charge per lb.	\$1.170	\$1.397	\$1.246	\$1.321	\$1.40
P Charge per lb.	\$14.750	\$17.657	\$15.719	\$16.688	\$17.66

Table 20 Alternative Sewer Utility Cash Flow Analysis - Projected 2022-2031

Village of Kewaskum, WI

	Budget	Projected								
	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Revenues										
Total Revenues from User Rates ¹	\$1,409,511	\$1,512,139	\$1,622,238	\$1,679,222	\$1,679,222	\$1,679,222	\$1,679,222	\$1,679,222	\$1,679,222	\$1,679,222
Percent Increase to User Rates ²	7.28%	7.28%	7.28%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Cumulative Percent Rate Increase	7.28%	15.09%	23.47%	23.47%	23.47%	23.47%	23.47%	23.47%	23.47%	23.47%
Dollar Amount Increase to Revenues		\$102,627	\$110,100	\$56,984	\$0	\$0	\$0	\$0	\$0	\$0
Other Revenues										
Interest Income	\$3,500	\$3,509	\$3,060	\$3,709	\$3,437	\$4,117	\$4,607	\$5,088	\$5,550	\$5,968
Other Income	\$20,000	\$20,200	\$20,402	\$20,606	\$20,812	\$21,020	\$21,230	\$21,443	\$21,657	\$21,874
Total Other Revenues	\$23,500	\$23,709	\$23,462	\$24,315	\$24,249	\$25,137	\$25,837	\$26,530	\$27,207	\$27,842
Total Revenues	\$1,433,011	\$1,535,847	\$1,645,700	\$1,703,537	\$1,703,471	\$1,704,359	\$1,705,059	\$1,705,752	\$1,706,429	\$1,707,064
Expenses										
Operating and Maintenance ³	\$597,594	\$615,402	\$633,741	\$652,629	\$672,080	\$692,113	\$712,744	\$733,991	\$755,873	\$778,408
PILOT Payment	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Net Before Debt Service and Capital Expenditures	\$835,417	\$920,446	\$1,011,959	\$1,050,908	\$1,031,391	\$1,012,246	\$992,316	\$971,762	\$950,556	\$928,656
Debt Service										
Existing Debt P&I	\$719,436	\$771,667	\$652,027	\$651,122	\$649,964	\$648,352	\$481,043	\$232,050	\$231,050	\$180,550
New (2022-2031) Debt Service P&I	\$0	\$11,951	\$98,420	\$107,018	\$107,899	\$166,169	\$317,305	\$528,104	\$525,575	\$476,514
Total Debt Service	\$719,436	\$783,619	\$750,447	\$758,140	\$757,863	\$814,521	\$798,348	\$760,154	\$756,625	\$657,064
Transfer In (Out); Cap. Contrib.	\$61,300	(\$1,650)	(\$1,650)	(\$1,650)	(\$1,650)	(\$1,650)	(\$1,650)	(\$1,650)	(\$1,650)	(\$1,650)
Capital Improvements & COI	\$13,504	\$1,203,498	\$152,000	\$400,000	\$0	\$6,022,500	\$0	\$25,000	\$25,000	\$25,000
Bonds Issued/Grants/Aid	\$13,504	\$1,603,498	\$152,000	\$0	\$0	\$6,022,500	\$0	\$0	\$0	\$0
Net Annual Cash Flow	\$177,282	\$535,177	\$259,862	(\$108,882)	\$271,878	\$196,075	\$192,318	\$184,958	\$167,281	\$244,942
Restricted and Unrestricted Cash Balance:										
Balance at first of year	\$511,386	\$688,667	\$1,223,844	\$1,483,706	\$1,374,824	\$1,646,702	\$1,842,777	\$2,035,095	\$2,220,052	\$2,387,334
Net Annual Cash Flow Addition/(subtraction)	\$177,282	\$535,177	\$259,862	(\$108,882)	\$271,878	\$196,075	\$192,318	\$184,958	\$167,281	\$244,942
Balance at end of year	\$688,667	\$1,223,844	\$1,483,706	\$1,374,824	\$1,646,702	\$1,842,777	\$2,035,095	\$2,220,052	\$2,387,334	\$2,632,276

Notes:

- 1) Assumes no changes in customer count or usage beyond Test Year.
- 2) Assumes 3Q implementation for 2022, 2023, and 2024.
- 3) Assumes 3.00% annual inflation beyond budget year.

Legend:

- Increase depicted to maintain with assumed O&M inflation
- Increase needed above inflationary adjustment

Table 21 Alternative Sewer Utility Financial Benchmarking Analysis Projected 2022 - 2031

Village of Kewaskum, WI

	Budget	Projected								
	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Target minimum cash balance										
Target minimum working capital - Ehlers ¹	1,091,320	1,067,318	1,084,455	1,093,903	1,160,578	1,154,720	1,127,149	1,134,561	1,046,268	1,057,768
Actual Days Cash Available - PSC ²	363	634	740	675	807	834	808	873	928	1,009
Actual Days Cash Available - Moody's ³	(268)	(54)	(30)	(215)	(187)	(163)	(54)	33	139	244
Target minimum working capital - S&P ⁴	(268)	(54)	(30)	(215)	(187)	(163)	(54)	33	139	244
Actual working capital-cash balance										
Over (Under) Ehlers target	688,667	1,223,844	1,483,706	1,374,824	1,646,702	1,842,777	2,035,095	2,220,052	2,387,334	2,632,276
Over (Under) PSC target (90 days)	(402,652)	156,526	399,251	280,921	486,125	688,057	907,946	1,085,491	1,341,066	1,574,508
Over (Under) Moody's target (150 days)	273	544	650	585	717	744	718	783	838	919
Over (Under) S&P target (150 days)	(418)	(204)	(180)	(365)	(337)	(313)	(204)	(117)	(11)	94
	(418)	(204)	(180)	(365)	(337)	(313)	(204)	(117)	(11)	94

Notes:

- 1) Target capital equals 6 mos of next year's operating expenses, including depreciation, plus 100% of debt.
- 2) PSC formula = O&M expense + taxes + interest on long term debt ÷ 365 to get expense per day. Then Unrestricted Cash ÷ expense per day
- 3) Moody's Formula = [(Unrestricted Cash + Liquid Investments) * 365 days] ÷ Total O&M Expenses less Depreciation
- 4) S&P Formula = [(Unrestricted Cash + Liquid Investments) * 365 days] ÷ Total O&M Expenses less Depreciation; include designated reserve funds: ERFs, RSFs, etc

Rate of Return

Average Utility Plant in Service	22,690,275	23,274,022	23,932,769	24,207,769	24,407,769	27,407,769	30,407,769	30,420,269	30,445,269	30,470,269
Less: Utility Plant Accumulated Depreciation	(4,973,188)	(5,353,299)	(5,764,496)	(6,184,356)	(6,614,115)	(7,118,125)	(7,770,635)	(8,423,454)	(9,077,201)	(9,731,876)
Average Net Investment Rate Base (NIRB)	27,663,463	28,627,321	29,697,265	30,392,125	31,021,884	34,525,894	38,178,404	38,843,723	39,522,470	40,202,145
Net Operating Income	466,755	536,826	597,702	627,340	598,194	504,120	335,199	313,855	291,259	268,012
ROR	1.69%	1.88%	2.01%	2.06%	1.93%	1.46%	0.88%	0.81%	0.74%	0.67%
Typical	2.50%									

Cost Recovery										
Operating Revenues	1,429,511	1,532,339	1,642,640	1,699,828	1,700,034	1,700,242	1,700,452	1,700,665	1,700,879	1,701,096
Operating Expenses incl. Depr & Amortization	962,756	995,513	1,044,938	1,072,488	1,101,840	1,196,122	1,365,253	1,386,810	1,409,620	1,433,084
Cost Recovery	1.48	1.54	1.57	1.58	1.54	1.42	1.25	1.23	1.21	1.19
Cost Recovery w/o Depr.	2.39	2.49	2.59	2.60	2.53	2.46	2.39	2.32	2.25	2.19
Notes:										
This operating ratio indicates whether operating revenues (mostly charges to customers) were sufficient to cover operations and capital (in the form of depreciation) for the water and/or wastewater utility in the fiscal year. A ratio of < 1 could be a sign of financial concern. In general, this ratio should be > 1 to accommodate future capital investments.										
Leverage										
Total Long-Term Debt	5,867,077	6,763,172	6,262,322	5,595,151	4,909,821	10,232,436	9,640,421	9,074,129	8,500,832	8,017,831
Total Net Assets	22,690,275	23,274,022	23,932,769	24,207,769	24,407,769	27,407,769	30,407,769	30,420,269	30,445,269	30,470,269
Debt-to Equity Ratio	0.26	0.29	0.26	0.23	0.20	0.37	0.32	0.30	0.28	0.26
Notes:										
This indicator measures the existing level of leveraging of assets, and is used by funders and rating agencies to evaluate the risk of providing additional loans to the utility. The ratio indicates the amount of long-term debt that exists for every \$1 of assets (fund equity). A utility with a ratio > 1 has more long-term debt than equity in the system's assets. There are no natural benchmarks for this indicator, and funders and rating agencies will assess this ratio in various ways. In general, the higher this ratio, the more likely the utility will be considered to be over-leveraged and the more difficult it will be for the utility to obtain additional loans. Net Assets are equal to the Net Investment Rate Base of the utility.										
Condition of Assets:										
Accumulated Depreciation Expense	4,973,188	5,353,299	5,764,496	6,184,356	6,614,115	7,118,125	7,770,635	8,423,454	9,077,201	9,731,876
Average Total Plant in Service	22,697,027	23,294,278	23,959,777	24,234,777	24,434,777	27,434,777	30,434,777	30,447,277	30,472,277	30,497,277
Asset Depreciation	17.97%	18.69%	19.39%	20.33%	21.30%	20.60%	20.34%	21.67%	22.95%	24.19%
Notes:										
This indicator of infrastructure condition estimates the portion of the average expected life of the utility's physical assets that has already passed. As this ratio approaches 100%, the capital assets become fully depreciated, and infrastructure needs replacement or rehabilitation. The accuracy of this indicator relies heavily on the accuracy of the depreciation schedule, and historic pricing likely distorts this indicator (newer utilities may be slightly disadvantaged as a result).										
Asset Efficiency:										
Total Assets	22,717,283	23,911,785	24,061,785	24,461,785	24,461,785	30,461,785	30,461,785	30,486,785	30,511,785	30,536,785
Revenue	1,409,511	1,512,139	1,622,238	1,679,222	1,679,222	1,679,222	1,679,222	1,679,222	1,679,222	1,679,222
Investment to produce \$1 Revenue	\$ 16.12	\$ 15.81	\$ 14.83	\$ 14.57	\$ 14.57	\$ 18.14	\$ 18.14	\$ 18.16	\$ 18.17	\$ 18.19
Notes:										
This indicator can vary from utility to utility based on several factors. These factors include but are not limited to Utility assets (WWTF, connection to existing system, etc.), types of customers (high strength, dairy, etc.), and size of system.										

**Table 22 Alternative
Sewer Utility Statement of Projected Revenue Bond Coverage**

Village of Kewaskum, WI

Year	Total Operating Revenues	Less:		Existing Rev Debt	Future Rev Debt (2022-2031)		Total Sewer Debt Service	Coverage	Debt Service Capacity @ 1.1x
		Total O&M Expense	Amount Available for Debt Service	Total	Total				
2022	1,433,011	(597,594)	835,417	719,436	-	719,436	1.16	40,035	
2023	1,535,847	(615,402)	920,446	717,718	11,951	729,670	1.26	107,099	
2024	1,645,700	(633,741)	1,011,959	595,777	98,420	694,197	1.46	225,765	
2025	1,703,537	(652,629)	1,050,908	595,622	107,018	702,640	1.50	252,731	
2026	1,703,471	(672,080)	1,031,391	595,464	107,899	703,363	1.47	234,266	
2027	1,704,359	(692,113)	1,012,246	594,852	166,169	761,021	1.33	159,202	
2028	1,705,059	(712,744)	992,316	428,543	317,305	745,848	1.33	156,257	
2029	1,705,752	(733,991)	971,762	-	528,104	528,104	1.84	355,316	
2030	1,706,429	(755,873)	950,556	-	525,575	525,575	1.81	338,567	
2031	1,707,064	(778,408)	928,656	-	476,514	476,514	1.95	367,719	
2032	1,707,895	(801,617)	906,278	-	476,409	476,409	1.90	347,480	
2033	1,708,735	(825,519)	883,216	-	476,302	476,302	1.85	326,621	
2034	1,709,520	(850,136)	859,384	-	476,193	476,193	1.80	305,066	
2035	1,709,520	(875,640)	833,880	-	476,080	476,080	1.75	281,993	
2036	1,709,520	(901,909)	807,611	-	475,964	475,964	1.70	258,228	
2037	1,709,520	(928,966)	780,554	-	475,845	475,845	1.64	233,749	
2038	1,709,520	(956,835)	752,685	-	475,723	475,723	1.58	208,536	
2039	1,709,520	(985,540)	723,980	-	475,598	475,598	1.58	208,661	

Notes:

1) Revenue Coverage determined from 2008 CWF Loan.

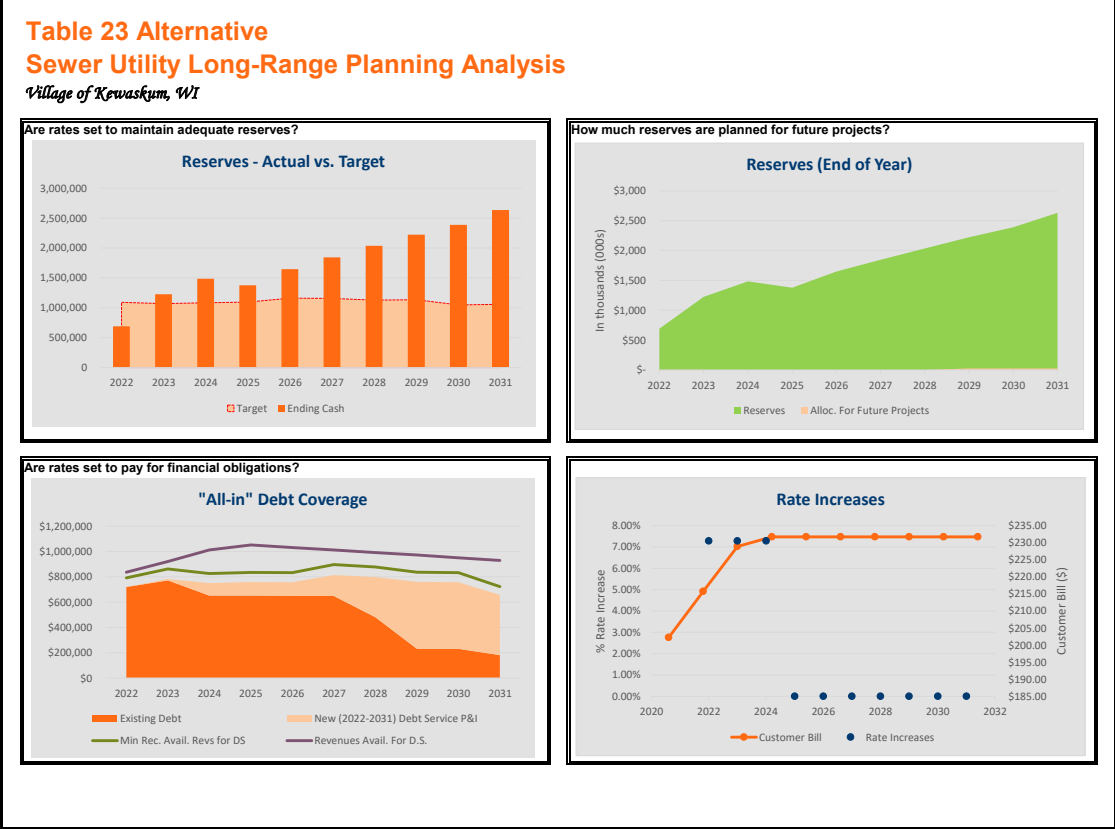


Table 25 Alternative
Projected Impact of CIP on Typical Residential Utility Bill

Village of Kewaskum, WI

Year	Sewer					Utility Bill (Annual)	Change Over Prior Year	% of MHI (65,664)	Year
	Increase	Sewer Vol. Charge ³	Sewer User Charge ³	Utility Bill (Quarterly)	Change Over Prior Year				
		1,000 Gal	Gen Service						
2021		13.28	29.41	\$ 188.77		\$ 755.08		1.15%	2021
2022	7.28%	14.17	32.20	\$ 202.25	\$ 13.48	\$ 809.00	\$ 53.92	1.23%	2022
2023	7.28%	15.06	34.98	\$ 215.73	\$ 13.48	\$ 862.92	\$ 53.92	1.31%	2023
2024	7.28%	15.95	37.77	\$ 229.21	\$ 13.48	\$ 916.84	\$ 53.92	1.40%	2024
2025	0.00%	15.95	37.77	\$ 229.21	\$ -	\$ 916.84	\$ -	1.40%	2025
2026	0.00%	15.95	37.77	\$ 229.21	\$ -	\$ 916.84	\$ -	1.40%	2026
2027	0.00%	15.95	37.77	\$ 229.21	\$ -	\$ 916.84	\$ -	1.40%	2027
2028	0.00%	15.95	37.77	\$ 229.21	\$ -	\$ 916.84	\$ -	1.40%	2028
2029	0.00%	15.95	37.77	\$ 229.21	\$ -	\$ 916.84	\$ -	1.40%	2029
2030	0.00%	15.95	37.77	\$ 229.21	\$ -	\$ 916.84	\$ -	1.40%	2030
2031	0.00%	15.95	37.77	\$ 229.21	\$ -	\$ 916.84	\$ -	1.40%	2031

Notes:

1. Current sewer volumetric rate is \$13.28 per 1,000 gallons.
2. The sewer facility charges include a qtrly charge of \$29.41 for a 5/8" or 3/4" meter.
3. The usage is assumed to be 12,000 Gallons per quarter

Legend:

2027 is the final year of the Capital Improvement Plan.

Village of Germantown

Sewer Utility Rate Study

PROPOSAL / JUNE 5, 2023



June 5, 2023

Mr. Steven Kreklow
Village Administrator
Village of Germantown
N112 W17001 Mequon Road
Germantown, WI 53022

Subject: Proposal for Sewer Utility Rate Study

Dear Mr. Kreklow:

Raftelis is pleased to submit our proposal related to the above-referenced Request for Proposals (RFP). We appreciate the opportunity to submit this proposal, which details our qualifications and experience within the water and wastewater utility industry as well as our approach for conducting the services requested by the Village of Germantown (Village).

Well Resourced Firm. Raftelis has the largest and most experienced practice in the nation conducting these types of studies. This means we bring broad and deep resources to bear on the challenges facing our clients. Our staff has assisted more than 1,000 utilities across the U.S., including some of the largest and most complex agencies in the nation. In the past year alone, Raftelis worked on more than 900 financial, organizational, and/or technology consulting projects for over 600 agencies in 44 states, the District of Columbia, and Canada. Our staff are involved in shaping industry standards by chairing and actively participating in various committees within the American Water Works Association (AWWA) and the Water Environment Federation (WEF). Our depth and breadth of resources will ensure that the City's objectives for this project are met.

Proven Process. The City is looking to partner with an experienced firm that can help them understand *why* certain options should be considered from an industry best practices perspective. Raftelis has a deep understanding of these practices because we are active in shaping them. While each community is unique, the challenges and opportunities facing the City are shared by many other communities throughout the United States. At Raftelis, we have developed a proven process for getting up to speed quickly and delivering actionable recommendations that meet the needs of our clients.

Experienced Project Team. Our team is both tested (in court and before state public service commissions) and trusted (with multiple clients that we have served for over 10 years). This combination of knowledge and experience means we have an unparalleled ability to efficiently and effectively deliver the scope of services identified in the City's RFP. Bill Stannard will serve as Project Director and will be responsible for overall project accountability. Bill has over 40 years' experience serving water and wastewater utility clients. I will serve as Project Manager and will ensure that the project stays on schedule, is within budget, and effectively meets the City's objectives. I have over 10 years' experience and have led numerous engagements of similar size and complexity. In addition, we will leverage the knowledge and experience of Brandon Vatter, regarding the capital planning elements of the study and Zach Green, who will provide quality assurance and quality control for project deliverables. Project deliverables will be completed by Joe Collins who has conducted numerous similar studies for clients large and small. As indicated in

our resumes, this team has experience serving a wide range of utility clients in Wisconsin (MMSD, New Water, Waukesha, Kaukauna) but also offers a broader nation-wide perspective that we will leverage to provide independent, fresh, actionable strategies to the Village.

We are proud of the resources that we offer and welcome the opportunity to work with the Village and its professional staff to meet the Village's objectives. If you have any questions regarding our proposal, please do not hesitate to reach out to us using the contact information below.

Sincerely,



Collin Drat

Senior Manager

P: 816.285.9023

E: cdrat@raftelis.com



Diversity and inclusion are an integral part of Raftelis' core values.

We are committed to doing our part to fight prejudice, racism, and discrimination by becoming more informed, disengaging with business partners that do not share this commitment, and encouraging our employees to use their skills to work toward a more just society that has no barriers to opportunity.



Raftelis is registered with the U.S. Securities and Exchange Commission (SEC) and the Municipal Securities Rulemaking Board (MSRB) as a Municipal Advisor.

Registration as a Municipal Advisor is a requirement under the Dodd-Frank Wall Street Reform and Consumer Protection Act. All firms that provide financial forecasts that include assumptions about the size, timing, and terms for possible future debt issues, as well as debt issuance support services for specific proposed bond issues, including bond feasibility studies and coverage forecasts, must be registered with the SEC and MSRB to legally provide financial opinions and advice. Raftelis' registration as a Municipal Advisor means our clients can be confident that Raftelis is fully qualified and capable of providing financial advice related to all aspects of financial planning in compliance with the applicable regulations of the SEC and the MSRB.

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Photo on cover courtesy of Jacek Dylag (Unsplash)

QUALIFICATIONS

Who is Raftelis

HELPING LOCAL GOVERNMENTS AND UTILITIES THRIVE

Local government and utility leaders partner with Raftelis to transform their organizations by enhancing performance, planning for the future, identifying top talent, improving their financial condition, and telling their story. We've helped more than 600 organizations in the last year alone.

We believe that Raftelis is the *right fit* for this project. We provide several key factors that will benefit the Village and help to make this project a success.

RESOURCES & EXPERTISE: This project will require the resources necessary to effectively staff the project and the skillsets to complete all of the required components. With more than 140 consultants, Raftelis has the largest water-industry financial and management consulting practice in the nation, including many of the industry's leading rate consultants and experts in key related areas, like stakeholder engagement and data analytics. Our depth of resources will allow us to provide the Village with the technical expertise necessary to meet your objectives.

DEFENSIBLE RECOMMENDATIONS: When your elected officials and customers are considering the validity of recommended changes, they want to be confident that they were developed by experts using the latest industry standard methodology. Our staff are involved in shaping industry standards by chairing committees within the American Water Works Association (AWWA) and the Water Environment Federation (WEF) and co-authoring many industry-standard books regarding utility finance and rate setting. Being so actively involved in the industry will allow us to keep the Village informed of emerging trends and issues and to be confident that our recommendations are insightful and founded on sound industry principles. In addition, with Raftelis' registration as a Municipal Advisor, you can be confident that we are fully qualified and capable of providing financial advice related to all aspects of utility financial planning in compliance with federal regulations.

HISTORY OF SIMILAR SUCCESSES: An extensive track record of past similar work will help to avoid potential pitfalls on this project and provide the know-how to bring it across the finish line. Raftelis staff has assisted 1,000+ utilities throughout the U.S. with financial and rate consulting services with wide-ranging needs and objectives. Our extensive experience will allow us to provide innovative and insightful recommendations to the Village and will provide validation for our proposed methodology ensuring that industry best practices are incorporated.

USER-FRIENDLY MODELING: A modeling tool that your staff can use for scenario analysis and financial planning now and into the future will be key for the Village going forward. Raftelis has developed some of the most sophisticated yet user-friendly financial/rate models available in the industry. Our models are tools that allow us to examine different policy options and cost allocations and their financial/customer impacts in real time. Our models are non-proprietary and are developed with the expectation that they will be used by the client as a financial planning tool long after the project is complete.

RATES THAT ARE ADOPTED: For the study to be a success, rates must be successfully approved and implemented. Even the most comprehensive rate study is of little use if the recommendations are not approved and implemented. Raftelis has assisted numerous agencies with getting proposed rates successfully adopted. We focus on effectively communicating with elected officials about the financial consequences and rationale behind recommendations to ensure stakeholder buy-in and successful rate adoption.

30 years serving the public sector

How we stack up

OUR TEAM INCLUDES

150+ consultants focused on finance/management/communication/technology for the public sector

2 chairs & **16** members of AWWA and WEF utility finance and management committees and subcommittees

& a Past President of AWWA

RAFTELIS HAS PROVIDED ASSISTANCE FOR

1,500+ public agencies and utilities

that serve more than

25% of the U.S. population

including the agencies serving

38 of the nation's 50 largest cities

in the past year alone, we worked on

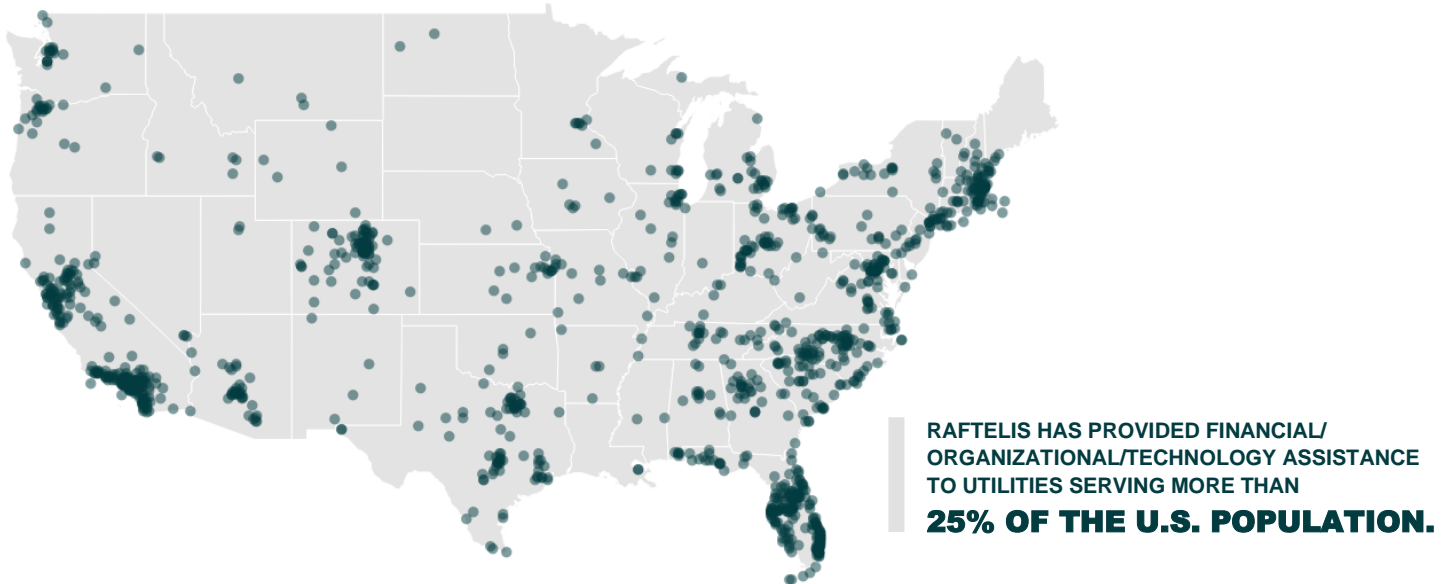
1,000+ projects for **600+** agencies in **46** states

EXPERIENCE

Experience

RAFTELIS HAS THE MOST EXPERIENCED UTILITY FINANCIAL AND MANAGEMENT CONSULTING PRACTICE IN THE NATION.

Our staff has assisted more than 1,500 local government agencies and utilities across the U.S., including some of the largest and most complex agencies in the nation. In the past year alone, Raftelis worked on more than 1,200 financial, organizational, and/or technology consulting projects for over 600 agencies in 46 states, the District of Columbia, and Canada. Below, we have provided descriptions of projects that we have worked on that are similar in scope to the Village’s project. We have included references for each of these clients and urge you to contact them to better understand our capabilities and the quality of service that we provide.



New Water WI

Reference: Beth Clausen, Director Business Services
 P: 920.438.1051 / E: bclausen@newwater.us

Raftelis has provided a wide range of services to Green Bay Metropolitan Sewerage District (now NEW Water) including financial planning and cost-of-service allocation for this regional wholesale wastewater utility. Our ongoing work for NEW Water includes extensive modeling and the full range of rate setting activities from concept to Commission approvals. The rate models evolved to support the budgeting process through a period of innovative capital investment and increasing customer scrutiny. Customers include 16 municipalities as well as local industrial (direct bill) customers. Customer agreements and resulting rate setting requirements at NEW Water require a degree of complexity that the models have been adapted to effectively support. Modeling complexity and a high standard for transparency has also created the challenge of effectively communicating complexity with customers, which has been addressed through extensive outreach and engagement. In addition to ongoing financial modeling support, recent Raftelis engagement with this client has helped to evolve the NEW Water capital charge through facilitated

customer workshops and associated analysis as well as efforts to update fixed asset allocation bases for capital cost allocation and recovery.

City of Kaukauna WI

Reference: Lawrie Kobza

P: 608.283.1788 / E: lkobza@boardmanclark.com

Raftelis was retained by Boardman & Clark LLP on behalf of their client the City of Kaukauna (the City) to provide expert opinions related to the Heart of the Valley Metropolitan Sewerage District's (HOVMSD) proposed methodology to allocate the capital costs associated with HOVMSD's interceptor rehabilitation project. HOVMSD owns and operates a regional interceptor main and wastewater treatment plant that accepts, treats and disposes sanitary sewage and industrial wastewater from the City of Kaukauna, the Villages of Kimberly, Little Chute and Combined Locks, and the Darboy Sanitary District. Raftelis worked with the City and its attorney to gather data and conduct the necessary analysis which was incorporated to an expert report provided to the City. The report formulated opinions regarding the appropriateness of the allocation employed by HOVMSD with respect to generally accepted ratemaking principles and Chapter 200 of the Wisconsin state statutes.

Waukesha Water Utility WI

Reference: Dan Duchniak, P.E., General Manager

P: 262.409.4440 / E: dduchniak@waukesha-water.com

On June 21, 2016, the Board of Great Lakes Governors voted in favor of the City of Waukesha's Application for a Lake Michigan Diversion with Return Flow. Raftelis has provided service to the Waukesha Water Utility (WWU) as part of the Program Management team being led by Greeley and Hansen (GH). The Program is a \$250+ million project to bring Lake Michigan water to City residents and return the flow back to the Lake's watershed. Our role has been to provide expertise to the financial management elements of the program, to offer support of financing mechanisms, loan programs, rate management, and other miscellaneous financial services.

At the start of the Program, Raftelis worked with WWU and GH Staff to develop a comprehensive financial management system that tracks invoicing from 15 program management sub-contractors, across 45 program tasks, and monitors progress against the total program budget, State and Federal requirements, and accounting standards. This financial management system has been enhanced multiple times to coincide with various phases of work, including construction. The tool is currently being used to assist the utility with program closeout and aligning the total costs with requirements of the Wisconsin Public Utilities Commission.

Raftelis has also provided rate management and interlocal agreement support for WWU as they look to negotiate long-term water supply and wastewater treatment services with the Cities of Milwaukee and Oak Creek. This included a risk focused comparison of two potential water suppliers, support in the development of WWU's wholesale service agreements, and assistance developing potential rates to recover the costs of new program. The most critical aspect of this engagement has been a detailed review and critique of the cost-of-service models of potential wholesale water suppliers the City of Oak Creek and Milwaukee Water Works.

Milwaukee MSD WI

Reference: Kevin Shafer, Executive Director
P: 414.225.2088 / E: kshafer@mmsd.com

The District engaged a project team led by Raftelis to review the District's current methodology for recovering costs from the 19 communities it serves and provide recommendations on how data from new metering infrastructure may be used to recover the costs in a more fair and equitable way that better reflects each community's contributed flows, including dry weather and wet weather inflow and infiltration. The Raftelis team also provided recommendations on how the cost of a green infrastructure capital program could be recovered while providing benefits in TMDL compliance to all member communities.



NATIONAL EXPERIENCE

This matrix shows a brief sample of some of the utilities throughout the U.S. and Canada that Raftelis staff has assisted and the services performed for these utilities.

State	Client	Finance						Organization					Technology				
		Affordability Analysis & Program Development	Capital Improvements Planning/Prioritization	Debt Issuance Support	Economic & Financial Evaluations	Financial Planning & Modeling	Rate, Charge, & Fee Studies	Stormwater Utility Development & Support	Organizational, Governance, & Operations Optimization	Performance Measurement & Benchmarking	Program Planning & Support	Stakeholder Engagement & Communication	Strategic Planning	Billing, Permitting, & Customer Information Audits	Business Process Development	Data Management, Analytics, & Visualization	Software Solutions
AL	Birmingham Water Works Board	●	●	●		●	●			●		●				●	
AR	Central Arkansas Water		●			●	●		●			●					
AR	Little Rock Water Reclamation Authority		●			●	●			●							
AZ	Phoenix, City of	●	●	●		●				●							
AZ	Pima County		●			●	●										
AZ	Tucson Water		●			●	●				●						
CA	Alameda County Water District		●	●		●	●										
CA	Anaheim, City of		●			●	●										
CA	Central Contra Costa Sanitation District		●			●	●		●	●							
CA	East Bay Municipal Utility District	●	●			●	●										
CA	Long Beach, City of	●		●		●	●										
CA	Los Angeles, City of					●	●										
CA	Metropolitan Water District of Southern California					●	●			●							
CA	Palo Alto, City of		●			●	●										
CA	San Diego, City of		●			●	●										
CA	San Juan Capistrano, City of		●			●	●										
CA	Santa Cruz, City of		●			●	●										
CA	Thousand Oaks, City of	●	●			●	●										
CA	Ventura, City of					●	●				●						
CO	Boulder, City of		●			●	●	●									
CO	Denver Wastewater Management Division			●			●		●	●		●					
CO	Denver Water						●									●	
CO	Greeley, City of		●	●	●	●	●	●									
CO	Metro Wastewater Reclamation District											●					
CT	Groton, City of		●		●	●	●		●		●	●			●	●	
DC	DC Water		●			●	●		●	●		●				●	
DE	Wilmington, City of								●			●					
FL	Emerald Coast Utilities Authority		●	●		●											
FL	Florida Keys Aqueduct Authority		●	●		●	●										
FL	Pompano Beach, City of		●			●	●		●								
FL	St. Johns County		●	●		●	●										
GA	Augusta, City of		●			●	●										

State	Client	Finance						Organization					Technology				
		Affordability Analysis & Program Development	Capital Improvements Planning/Prioritization	Debt Issuance Support	Economic & Financial Evaluations	Financial Planning & Modeling	Rate, Charge, & Fee Studies	Stormwater Utility Development & Support	Organizational, Governance, & Operations Optimization	Performance Measurement & Benchmarking	Program Planning & Support	Stakeholder Engagement & Communication	Strategic Planning	Billing, Permitting, & Customer Information Audits	Business Process Development	Data Management, Analytics, & Visualization	Software Solutions
GA	Columbus Water Works		●	●		●	●										
GA	Paulding County		●	●	●	●											
HI	Honolulu ENV, City and County of		●			●	●										
IL	Bloomington, City of		●			●	●										
IL	City of Naperville		●			●	●										
KS	Topeka, City of		●			●	●										
KS	Wichita, City of		●			●	●										
KY	Hardin County Water District #1		●			●	●										
LA	New Orleans, Sewerage & Water Board of		●	●		●	●	●		●		●				●	
MA	Boston Water & Sewer Commission		●			●	●	●	●		●	●				●	●
MA	Northampton, City of	●				●	●					●					
MD	Baltimore, City of	●	●			●	●	●	●			●	●			●	●
ME	Portland Water District					●	●										
MI	Detroit Water and Sewerage Department					●	●										
MI	Flint, City of					●	●									●	
MI	Saginaw, City of		●			●	●										
MO	Metropolitan St. Louis Sewer District		●	●		●	●	●	●								
MS	Jackson, City of	●	●			●	●		●							●	
NC	Asheville, City of		●	●		●	●		●			●					
NC	Charlotte Water	●	●			●	●										
NC	Durham, City of		●	●		●	●										
NC	Raleigh, City of		●	●		●	●	●	●		●						
NH	Concord, City of		●			●	●										
NJ	Brick Township Municipal Utilities Authority					●	●										
NJ	Jersey City Municipal Utilities Authority		●			●	●										
NV	Henderson, City of		●			●	●										
NY	Erie County Water Authority					●	●										
NY	New York City Water Board		●			●	●									●	
OH	Akron, City of		●			●	●					●					
OH	Franklin County		●			●	●		●								
OH	Montgomery County Environmental Services		●			●	●	●	●			●		●	●	●	●
OH	Northeast Ohio Regional Sewer District	●	●			●	●	●		●						●	●
OK	Chickasha, City of						●	●	●	●		●			●	●	

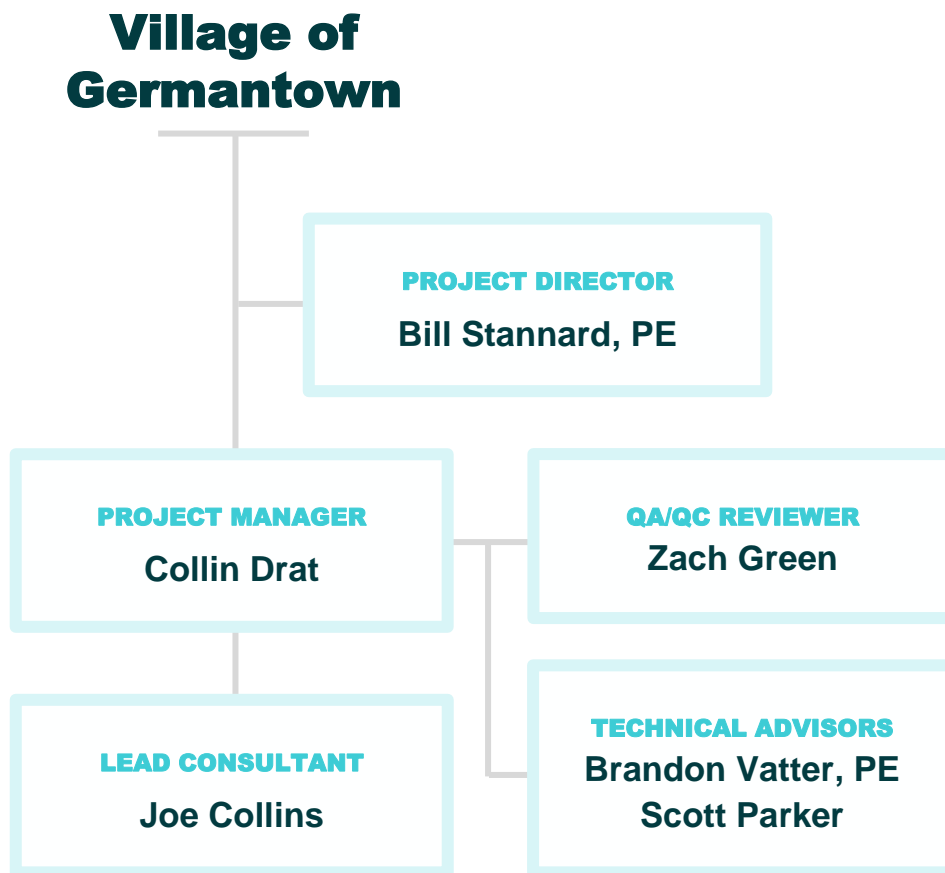
State	Client	Finance						Organization					Technology				
		Affordability Analysis & Program Development	Capital Improvements Planning/Prioritization	Debt Issuance Support	Economic & Financial Evaluations	Financial Planning & Modeling	Rate, Charge, & Fee Studies	Stormwater Utility Development & Support	Organizational, Governance, & Operations Optimization	Performance Measurement & Benchmarking	Program Planning & Support	Stakeholder Engagement & Communication	Strategic Planning	Billing, Permitting, & Customer Information Audits	Business Process Development	Data Management, Analytics, & Visualization	Software Solutions
OK	Oklahoma City Water Utilities, City of					●	●										
OK	Stillwater Utilities Authority					●	●										●
OR	Portland Bureau of Water, City of		●	●		●	●										●
PA	Capital Region Water	●	●	●		●	●	●			●	●					
PA	Philadelphia Water Department	●	●	●		●	●		●	●	●	●			●	●	●
PA	Pittsburgh Water and Sewer Authority	●	●	●	●	●	●		●	●		●	●		●	●	●
RI	Newport, City of		●	●		●	●										
RI	Providence Water Supply Board		●			●	●		●	●							
SC	Greenville Water					●	●		●								
SC	Mount Pleasant Waterworks		●			●	●					●					
TN	Johnson City, City of	●	●	●		●	●										
TN	Metro Water Services of Nashville and Davidson County		●	●		●	●	●		●		●	●				
TX	Austin, City of		●	●		●	●			●							
TX	Dallas, City of		●			●	●	●					●		●	●	
TX	El Paso Water Utilities		●	●		●	●						●			●	●
TX	North Texas Municipal Water District		●		●				●	●		●	●		●		●
TX	Round Rock, City of						●										
TX	San Antonio Water System	●	●			●	●						●				
UT	Salt Lake City					●	●						●				
VA	Newport News Department of Public Utilities		●	●		●	●					●				●	
VA	Richmond Department of Public Utilities	●	●			●	●	●					●				●
VA	Suffolk, City of		●	●		●	●										
VT	Burlington, City of		●	●		●											
WA	Tacoma, City of				●		●					●					●
WI	Milwaukee Metropolitan Sewerage District		●			●	●										
WI	Milwaukee Water Works		●			●	●										
WV	Charleston Sanitary Board						●										
Can	Calgary, City of		●			●			●								●
PR	Puerto Rico Aqueduct and Sewer Authority		●	●		●			●	●			●				

Project Team

WE HAVE DEVELOPED A TEAM OF CONSULTANTS WHO SPECIALIZE IN THE SPECIFIC ELEMENTS THAT WILL BE CRITICAL TO THE SUCCESS OF THE VILLAGE'S PROJECT.

Our team includes senior-level professionals to provide experienced project leadership with support from talented consultant staff. This close-knit group has frequently collaborated on similar successful projects, providing the Village with confidence in our capabilities.

Here, we have included an organizational chart showing the structure of our project team. In the appendix, we have included resumes for each of our team members as well as a description of their role on the project.



PROJECT APPROACH

Project Approach

We have developed the following proposed services based on our extensive experience in completing comprehensive water and wastewater rate studies for other utilities while taking into account the considerations identified by the Village of Germantown in its Request for Proposals (RFP). The approach has been tailored to address the specific objectives and concerns identified in the RFP while maintaining those elements that we believe are essential for a successful project.

Task 1: Project Initiation and Management

Task 1.1 – Project Planning

The project team will conduct a kick-off meeting with Village staff to confirm the project approach, work plan, schedule, and priorities. A successful kick-off meeting ensures that Village staff and the project team agree on the project's goals and expectations. We will develop a kick-off meeting package that contains the meeting agenda and presentation materials to guide the discussion. Following the meeting we will provide a brief memorandum summarizing the discussion and any action items.

Task 1.2 – Initial Data Request, Review and Evaluation of Data, and Supplemental Data Requests

We will provide a data request list upon receipt of notice to proceed from the Village. Prior to the kick-off meeting, we will thoroughly review the data provided by the Village. It is critical to appropriately use the most accurate data possible. This means clearly communicating the types of data we need from the Village and ensuring we received what we asked for and are using it for the appropriate purpose. Raftelis staff will work closely with the Village's point person in each area (e.g., finance, operations, and customer service) to ensure that we all agree on the intended use of what is being provided. In addition, we have found that beginning to work with the data provided by our clients in advance makes for a much more productive kick-off meeting as it allows us to begin framing preliminary analyses, formulate any questions, and come fully prepared to discuss any issues.

Task 1.3 – Ongoing Project Management and Quality Assurance/Quality Control

Effective ongoing project management ensures that Village staff are receiving the support they need at all times. This means regular and responsive communication, timely provision of deliverables, and prompt communication of any issues or challenges. One of Raftelis' key project management objectives is to serve as an asset to Village staff, enhancing their capabilities and bringing a broader industry perspective to bear on any challenges.

Quality Assurance and Quality Control (QA/QC) is critical to the success of the project because errors undermine the credibility of the process and ultimate recommendations. Our QA/QC process involves: verifying the appropriateness of the data, which is generally accurate of its original intended purpose but may need to be adjusted for our intended use; verifying the accuracy of the calculations via an external reviewer, draft copies of calculations provided to staff and built-in error checking within the model; and verifying the appropriateness of the methodology leveraging the experience of our project director.

Task 3: Development of Financial Plans

The financial plans identify the overall level of revenue necessary to fund operations and maintenance expense (O&M), routine repair and replacement capital expenditures, and repayment of debt service (current and future) while also achieving the Village's financial management objectives. This involves the following subtasks: a projection of revenue under existing rates (Task 2.1); a projection of O&M expense (Task 2.2); a projection of routine and major capital expenditures (Task 2.3); a projection of revenue adjustments based on a detailed cash flow analysis (Task 2.4); and stress testing of critical assumptions via sensitivity analysis (Task 2.5). The Village's financial plan will be established for a minimum of 5 years, but longer plans do not require any additional effort on our part, provided the data (primarily a long-term capital improvement plan) is available.

Task 2.1 — Projection of Revenue Under Existing Rates

Raftelis will develop revenue projections under existing rates and projected customer usage by customer class. This will serve as a baseline for revenues if no adjustments to rate levels or structures are made. In Task 2.4, we will compare these baseline revenue projections to projected expenditures to determine the overall level of revenue necessary (including revenue increases) to fund these projected expenditures and achieve the Village's financial performance objectives.

Using historical customer billing data, we will evaluate trends in customer accounts and usage per account. Using this data, we will seek to establish a normalized usage per account, which avoids assigning undue weight to usage in wetter or drier periods. The weather normalization analysis will establish a statistical relationship between the usage per account of the Village's customer classes and weather variables such as precipitation, temperature, cooling degree days and a monthly trend variable which accounts for any seasonal patterns not explained by weather. The focus of the analysis will be months which significantly deviate from longer term normal weather patterns (e.g., a hotter than normal July). Once established, we will use this relationship to remove the impact of extreme fluctuations in weather from the historical monthly data. This approach will isolate the longer-term trend in customer class usage, which can be used for normalized forward looking projections of customer usage per account and by customer class.

We will then calculate revenues under existing rates at projected consumption levels. We will compare these revenues to the operating and capital expenses forecast in Tasks 2.2 and 2.3 to understand the sufficiency of existing revenues to fund projected expenditures. In Task 2.5 we will conduct sensitivity analyses around this baseline revenue projection to test the financial impact of any deviations from the projected baseline revenues based on higher or lower than expected usage.

Task 2.2 — Projection of O&M Expense

The Village's budget will serve as the starting point for the projection of O&M expense. To project O&M expenses for the forecast period, we typically make three adjustments: 1) budget performance adjustments; 2) incremental expense adjustments; and 3) inflationary adjustments.

Budget performance adjustments will be made based on a detailed review of budgeted O&M expense compared to actual performance. To the extent that the utility tends to outperform in certain areas (i.e., spend less than budgeted), we will discuss potential adjustments so that the projection of baseline O&M (i.e., before any incremental expenses and inflationary adjustments) is a reasonable reflection of what is likely to occur.

Incremental expense adjustments account for expected future changes in O&M expense that exceed inflation. There are two reasons such adjustments are typically made. First, the Village anticipates adding new personnel or

programs that are not currently captured in the existing budgets. In this case, an adjustment will be made to include the costs of those additional personnel or programs. The current budget may also include one-time expenses that are not expected to be incurred in the future. In this case, the one-time expense will either be excluded from future years or, if it occurs periodically, normalized in future years. To the extent that the current year budget represents a snapshot for the year in question, the incremental expense adjustments ensure future years carry forward the appropriate level of O&M expense.

Inflationary adjustments account for expected future inflation in O&M expense after accounting for budget performance and any incremental expenses. Inflationary adjustments will be based on the best and most relevant data possible. Expenses driven by customer growth and usage (e.g., power and chemicals) will be adjusted based on the projections in Task 2.1. Personnel costs will be adjusted based on planned compensation adjustments from the Village. The recent rise in general inflation represents an additional risk to municipal utilities as compared to the more moderate inflation of the past few decades. Raftelis will work with Village staff to ensure that category specific inflation (e.g., chemicals, materials and supplies) is appropriately incorporated into the existing budget and future projections. For more general inflation Raftelis typically reviews external sources (i.e., St. Louis Federal Reserve Bank's FRED Database, Philadelphia Federal Reserve Bank's Survey of Professional Forecasters) and adjusts as needed for the unique circumstances of the utility industry generally and each client specifically.

Task 2.3 — Projection of Routine and Major Capital Expenditures

Task 2.3 involves developing a capital improvement financing plan that identifies the Village's capital projects (routine and major) and the mix of cash and debt used to finance them. The cash flow impact of the capital financing plan is incorporated into the cash flow analysis in Task 2.4 as annual cash outlays (i.e., PAYGO or revenue-funded capital) and new debt service.

To develop the capital financing plan, we will review the Village's capital improvement and asset management plans and work with Village staff to ensure that the appropriate level of investment is balanced against the potential rate implications. To the extent that the CIP is in current year dollars, we will include adjustments for future construction cost inflation based on an analysis of trends for the appropriate cost indices (e.g., Engineering News Record). We will also incorporate any projects that the Village already has in progress from prior approved CIPs that will be completed in the first few years of the forecast period. The CIP will incorporate both routine repair and replacement expenditures as well as major capital improvements. Given the recurring nature of routine expenditures (i.e., sewer line replacement), many utilities employ a PAYGO funding approach. Major capital improvements are often funded with debt to spread out the financial burden on customers and to ensure that the cost of major improvements is borne by all customers, not just current customers. We will work with Village staff to develop an optimal mix of cash and debt financing¹ to achieve the Village's financial management objectives. The projected capital costs, including PAYGO and any new debt service, will be incorporated into the cash flow projections in Task 2.4.

Task 2.4 — Utility Cash Flow Forecasts and Revenue Adjustments

We will develop a detailed cash flow forecast for the multi-year planning horizon. This forecast will compare existing revenues (Task 2.1) to forecast expenditures (Tasks 2.2 and 2.3), identifying any deficiencies in funding under existing revenues. Throughout Task 2.4, we will discuss the Village's existing financial policies and objectives (formal and informal). This will include a review of the performance of the utility relative to key financial ratios

¹ Under the Dodd-Frank Wall Street Reform and Consumer Protection Act, all firms that provide debt issuance support services, including financial feasibility studies, must be registered with the SEC and MSRB to legally provide official opinions and related services. Raftelis' registration allows our clients to be confident that Raftelis is fully qualified and capable of providing financial advice related to debt issuances in compliance with the applicable regulations of the SEC and the MSRB.

(e.g., days cash, capital structure, and debt service coverage). Throughout these discussions, we will provide recommendations to ensure the Village's financial management strategies align with industry best practices.

We will structure rate adjustments to achieve the Village's strategic financial management objectives and maintain alignment with best financial management practices regarding debt service coverage ratios and reserve balances. Where possible, revenue adjustments will be smoothed, mitigating the impact on customers in any given year. The ultimate outcome of Task 2.4 will be the identification of the overall level of revenue required (including any adjustments to revenue) to fund the provision of safe and reliable wastewater service in a financially sustainable manner. This revenue requirement will be attributed to the Village's customer classes based on their use of the wastewater system in Task 3.

Task 2.5 — Stress Testing and Sensitivity Analysis

Forecasting involves uncertainty, which means actual results will always vary somewhat from projections. That said, there are three approaches which can help mitigate the impact of these deviations. First, it is critical ensure that the data being used are accurate and appropriate for the intended purpose (see Task 1.3). Second, it is important to maintain risk-based reserves for situations where revenues or expenses vary significantly from projections (evaluated in Task 2.4).

The final approach involves scrutiny of critical assumptions and sensitivity analysis. This begins with understanding the influence each assumption has on the overall forecast. The more impactful the assumption, the more scrutiny is required. Sensitivity analysis involves modifying critical assumptions and evaluating their impact on the financial forecast under different scenarios. We anticipate incorporating sensitivity analysis around both projected revenues and expenditures (i.e., impact of 10% variance from projections on overall performance).

Task 4: Cost of Service Analysis

The project team will utilize our experience combined with industry best practices, as outlined in Water Environment Federation's Manual of Practice No. 27 (MOP 27), to assign the revenue requirement determined in Task 2 to the Village's customer classes. The driving principle behind the cost-of-service analysis is cost causation.

The cost of designing, constructing, operating, and maintaining a wastewater system is directly attributable to meeting customer demands. That said, not all customers place the same level of demand on the Village's utility systems. By extension, this also means that not all customers cause the Village to incur the same level of cost. Customers that place greater demands on the utility system cause the Village to incur greater costs and vice versa. Accordingly, it is appropriate to group customers into classes based on these characteristics in order to develop rates that recover costs from these customers in proportion to the manner in which they cause (by their demand patterns) them to be incurred by the Village. A cost-of-service analysis applies the principle of cost causation by aligning utility costs with the customers that cause them to be incurred.

This involves the five following subtasks:

- Task 3.1 – Functionalize Revenue Requirement
- Task 3.2 – Allocate Functionalized Revenue Requirement to Cost Components
- Task 3.3 – Determine Customer Class Units of Service
- Task 3.4 – Calculate Unit Cost of Service
- Task 3.5 – Distribute Revenue Requirement to Customer Classes

The results of this process are summarized in a comparison of revenue generation by customer class under existing rates to cost of service (Task 3.6). A cost-of-service analysis is typically performed for a “test year,” which uses the total revenue requirement from a future year as the basis for cost allocation. The project team will work with Village staff to develop an appropriate test year depending on the timing of when any rate changes would potentially be implemented.

Task 3.1 — Functionalize Revenue Requirement

Applying the principle of cost causation requires a determination of how the costs incurred relate to the design and operation of the wastewater systems. The functionalization step allocates the revenue requirement to the various functions Village performs in order to deliver service. The cost of each function is then related to the demand characteristics, which drive variation in those costs (Task 3.2) and ultimately to customer classes based on their proportionate share of that demand (Tasks 3.3 through 3.5).

Task 3.1 involves allocating the revenue requirement to these functions. The project team will work closely with Village staff to determine allocations that reasonably align the costs incurred with each function.

The approach to functionalizing O&M expense will depend on the level of detail with which the Village tracks these costs. The Village’s approved budget does not appear to break-down O&M expense by functional category. Raftelis will work with Village staff to develop appropriate functional allocations for operating expenses.

Capital costs, which include PAYGO capital and debt service will be functionalized based on the Village’s detailed fixed asset record. Use of existing investment is a common approach for allocating capital costs and is based on the presumption that, over time, a utility will reinvest in its system in proportion to the existing asset base. Over time (i.e., from study to study) this will tend to produce smoother changes in cost allocation, as opposed to determining cost of service based on the current capital needs. That said, Raftelis can also investigate a blended approach which uses current assets along with projected capital spending to determine a blended allocation for future capital costs.

Task 3.2 — Allocate Functionalized Revenue Requirement to Cost Components

The cost of each function from Task 3.1 is driven by different types of customer demand. Task 3.2 attributes the functionalized costs to these cost components. The result is an understanding of the proportion of the revenue requirement that can be attributed to each type of customer demand. This allows for a distribution of the revenue requirement based on customer demands in Tasks 3.3 through 3.5.

The Village’s wastewater system was designed around the volume contributed by customers. Volume includes sanitary flow that is the result of customers direct contribution of wastewater into the Village’s collection system and infiltration and inflow (I/I). Infiltration in many systems is largely driven by aging customer sewer laterals, which deteriorate over time resulting in root intrusion, cracks, joint misalignment, and general leakage, causing groundwater penetration, especially during heavy rain events. The age and condition of the sewer collection system also contributes to infiltration. Inflow can be caused by directly connected residential storm drainage systems, broken or missing cleanout caps, faulty manhole covers or frames, and other issues.

The cost drivers related to wastewater customer demand include:

- Sanitary flow
- I/I
- Customer bills

Costs that are driven by wastewater volumes are allocated to sanitary flow and I/I. Other costs, such as customer service and billing, are incurred on a per customer basis. Functions that are driven by multiple demand components will be allocated between those components based on the design and operation of the infrastructure used to meet the type of demand in question.

Task 3.3 — Determine Customer Class Units of Service

While Tasks 3.1 and 3.2 allocate the revenue requirement according to the various types of customer demand, Task 3.3 determines the level of that demand for each customer class. This allows for the assignment of the revenue requirement to each customer class proportionate to their share of the type of demand, which drives variation in those costs. This involves a detailed analysis of customer usage information to determine the units of service that relate to each cost component.

Ultimately, Task 3.3 determines the demand customers place on the Village's wastewater system so that they can be related to the cost of meeting each component of demand (in Task 3.4) and distributed to individual customer classes (in Task 3.5).

Task 3.4 — Calculate Unit Cost of Service

Task 3.4 involves determining the unit cost of each component of demand. This involves dividing the costs (by component) determined in Task 3.2 by the units of service (by component) determined in Task 3.3. The result is a unit cost of service for each component of demand.

Task 3.5 — Distribute Revenue Requirement to Customer Classes

Tasks 3.1 through 3.4 associate wastewater utility costs with the types of demand that cause them to be incurred and determine each customer class's share of each type of demand. The result is a unit cost of service that recognizes differences in customer class level of service and ownership status. Task 3.5 distributes these costs to customer classes by multiplying the applicable unit cost for each component of demand by each customer class's units of service. The outcome is an understanding of each customer class's responsibility for the overall revenue requirement identified in Task 2.6 based on level of service, ownership status, and usage characteristics.

Task 3.6 — Comparison of Class Cost of Service to Revenues Under Existing Rates

Raftelis will develop a comparison of class cost of service to class revenue generation under the Village's existing rates. This comparison will identify variances between the level cost each class causes the Village to incur and the revenue currently recovered from that class. To the extent that significant variances are identified, these can be used as a guide for recommended rate adjustments in Task 4 such as:

Task 4: Rate Design

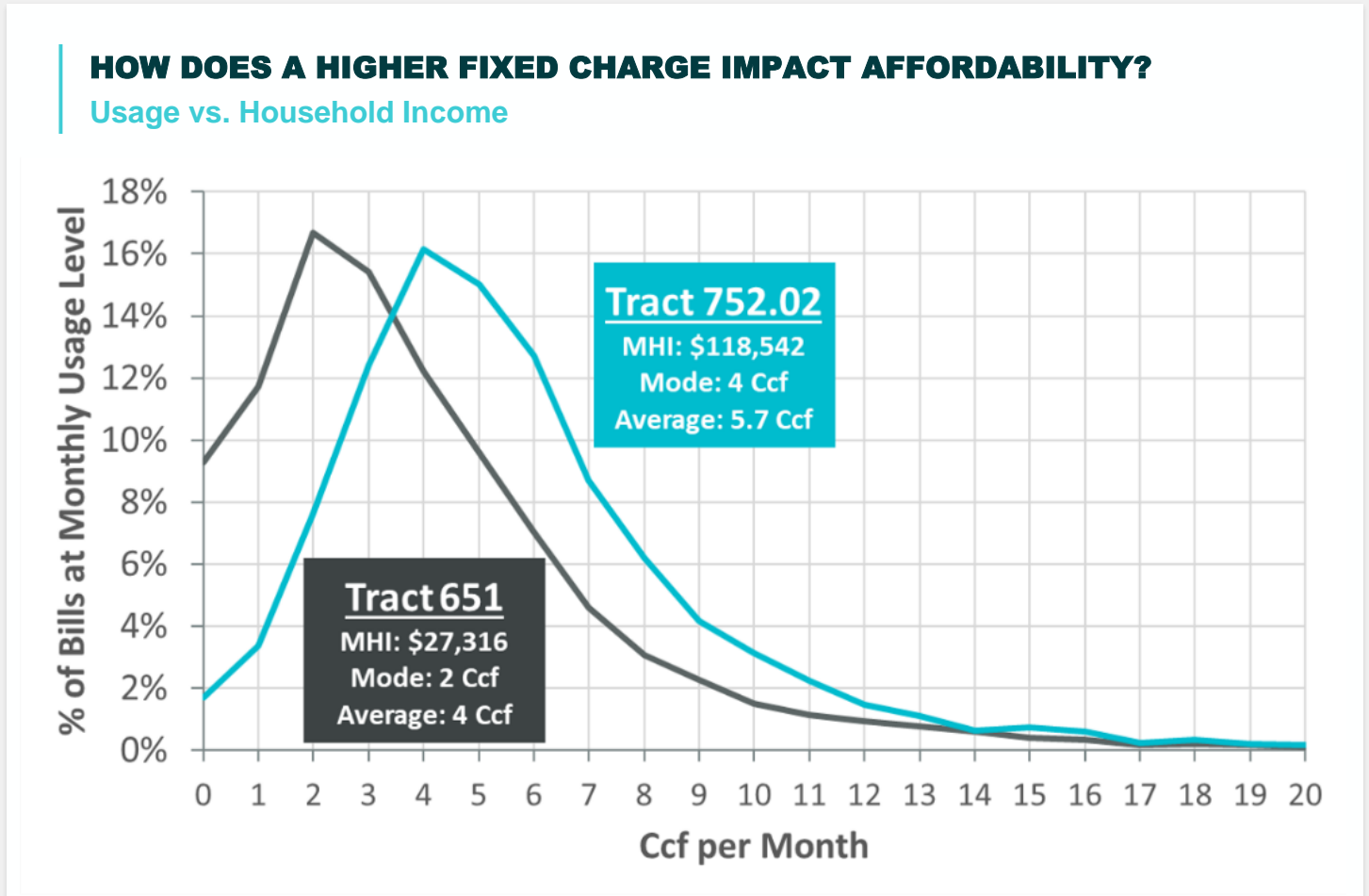
Task 4.1 — Calculate Rates in Accordance with Village Objectives

The project team will design rate alternatives that will recover the revenue requirement, align with the Village's objectives, and take into account the revenue responsibility indicated in the cost-of-service analysis. All rate design options will, at a minimum, recover the revenue requirement identified in Task 2 and will be implementable within the Village's billing system. As noted above, Task 3 will identify the pure cost responsibility by class, which can serve as a guide for rate-setting decisions. Ultimately there is no single right answer to modifying the Village's rate structure as the manner in which the costs are recovered is a policy decision for the Village Board.

One common consideration is fixed revenue recovery. Typically a fixed charge would cover billing, collection, customer service costs and a readiness-to-serve component which recognizes that the Village incurs costs to make service available 24/7/365, regardless of how much water customers use. Increasing fixed revenue will impact lower volume customers, but these are not universally low income customers. In fact lower income customer often have larger household sizes and older plumbing and appliances, increasing their per person usage as compared to higher income customers.

The project team will work with Village staff to develop defensible, implementable, and sustainable alternatives that meet the needs of the Village. If changes from the existing structure are recommended, we will develop straightforward, understandable comparisons to include in Village Council presentation materials to help guide the decision-making process.

Below is a comparison we developed for another client which compares monthly usage for the highest and lowest income census tracts. While higher income households had higher usage on average, there is significant overlap between the two groups, suggesting that income is not universally



Task 4.2 — Assess Impacts on Customer Bills

Raftelis will prepare comparisons of typical customer bills under existing rates, and under each proposed alternative, for the Village’s review. At a minimum, this will include impacts on representative customers from each customer class. Raftelis can also develop a distribution of all potential impacts using detailed customer billing information if needed. This would identify the number and percentage of bills falling within certain impact ranges. We will also develop bill comparisons between the Village and other comparable communities.

Example: Calculation of Individual Bills to Determine Range of Impacts

Change in Avg. Quarterly Bill vs. Option 0 (Status Quo w/ 3% incr.)	Option 2a MEU Structure Reduced Fixed Revenue		Option 2b MEU Structure Reduced Fixed Revenue Secondary Meter Fee	
	Count	%	Count	%
Decrease > \$60	190	1%	310	2%
Decrease \$40 to \$59	2,360	16%	2,590	17%
Decrease \$20 to \$39	2,330	16%	2,930	20%
Decrease \$0 to \$19	5,150	34%	4,400	29%
Increase \$0 to \$19	2,320	16%	1,230	8%
Increase \$20 to \$39	780	5%	1,170	8%
Increase \$40 to \$59	310	2%	760	5%
Increase > \$60	1,520	10%	1,580	11%
Bill Decrease	10,030	67%	10,230	68%
Bill Increase	4,930	33%	4,740	32%

Task 5: Reports, Presentations and Meetings

Task 5.1 — Reports

Raftelis will prepare a preliminary report that overviews the process, significant assumptions, conclusions, and recommendations regarding the study for Village staff’s review. Raftelis will revise the report based on Village staff’s comments and will recirculate a revised preliminary report to Village staff for additional comment and revision if needed. Once the review of the report is completed and all comments are addressed, the revised preliminary report will be presented to the Utility Advisory Committee and the Public Works & Highways Committee. Following the presentation of the revised preliminary report, Raftelis will finalize the report, incorporating any feedback from the Utility Advisory Committee and the Public Works & Highways Committee and present the final report to the Village Board.

Task 5.2 — Presentations

Senior project team will present the revised preliminary and final reports and indicated above. We will provide drafts of any formal presentation materials to Village staff in advance for their review and comment.

Task 5.3 — Project Meetings

We anticipate the need for four (4) onsite meetings including an onsite kick-off meeting with Staff (and the Board if desired) separate presentations to the Utility Advisory Committee and the Public Works & Highways Committee and a final presentation to the Village Board. Outside of the onsite meetings, Raftelis will meet virtually with Village staff as needed.

PROPOSED COMPENSATION

Proposed Compensation

The following table provides a breakdown of our proposed **not to exceed** fee for this project, **\$39,160**. This table includes the estimated level of effort required for completing each task and the hourly billing rates for our project team members. Expenses include costs associated with travel and a \$10 per hour technology charge covering computers, networks, telephones, postage, etc.

Tasks	Hours						Total Fees & Expenses
	BS	CD	JC	ZG	BV	Total	
1. Project Initiation and Management	0	4	4		0	8	\$2,220
2. Development of Financial Plans	2	4	8	2	8	24	\$7,090
3. Cost of Service Analysis	2	4	8	2	0	16	\$4,730
4. Rate Design	2	8	16	2	0	28	\$7,990
5. Reports, Presentations and Meetings	2	16	24	2	0	44	\$12,430
Total Meetings / Hours	8	36	60	8	8	120	
Hourly Billing Rate	\$475	\$295	\$260	\$260	\$295		
Total Professional Fees	\$3,800	\$10,620	\$15,600	\$2,080	\$2,360	\$34,460	
Total Fees							\$34,460
Travel Expenses							\$3,500
Technology Charge*							\$1,200
Total Fees & Expenses							\$39,160

BS - Bill Stannard
 CD - Collin Drat
 JC - Joe Collins
 ZG - Zach Green
 BV - Brandon Vatter
 -

*Includes technology/communications charge - this is an hourly fee charged monthly for each hour worked on the project to recover telephone, facsimile, computer, postage/overnight delivery, conference calls, electronic/computer webinars, photocopies, etc.

PROPOSED PROJECT TIMELINE

Proposed Project Timeline

Studies of this nature typically take three to six months to complete from kick-off to final adoption of the rates. Raftelis can complete Tasks 1 – 4 and a preliminary report within 90 days of receiving all of the data needed for the study. Assuming a July 1 notice to proceed, the work would be substantially completed by the end of September, with presentations to the Utilities Advisory Committee, Public Works & Highways Committee and Village Board occurring at regularly scheduled meetings of each group as determined by the Village.



APPENDIX A: RESUMES

Appendix A: Resumes



Bill Stannard PE

PROJECT DIRECTOR

Chair Emeritus and Executive Vice President

ROLE

Bill will be responsible for overall project accountability.

PROFILE

Bill has more than 45 years of experience providing consulting services to investor- and municipally-owned utilities covering management, operation, economic, and financial matters. His extensive experience encompasses: formulation of financial systems and ordinances for compliance with regulations regarding the Clean Water Act and the Safe Drinking Water Act; comprehensive revenue requirements and cost-of-service studies; rate setting; consulting engineers and financial feasibility reports related to the sale of revenue bonds; financial feasibility analyses; organizational and management reviews; and utility competitiveness studies. He has served as an expert witness in rate litigation matters in federal and state courts and before arbitration panels and state public service commissions. Bill has also served as an arbitrator in resolving water and wastewater rate disputes. Bill is an active member of the WEF and AWWA. He served as chair of the WEF's task force charged with the development of a *Manual of Practice, Financing and Charges for Wastewater Systems*. Bill also authored a chapter entitled, "Selecting the Optimal Capital Financing Plan and Pricing Structure," for the Fourth Edition of the industry guidebook, *Water and Wastewater Finance and Pricing: The Changing Landscape*. He is a past-Chair of AWWA's Management and Leadership Division, was a Trustee of AWWA's Technical and Education Council, and a past-Chair of AWWA's Finance, Accounting and Management Controls Committee. He is currently serving on the Environmental Protection Agency's Environments Finance Advisory Board.

EXAMPLE PROJECT EXPERIENCE

Milwaukee Metropolitan Sewerage District (WI)

Bill was project director for Raftelis' engagement with Milwaukee Metropolitan Sewerage District (MMSD). The District engaged a project team led by Raftelis to review the District's current methodology for recovering costs from the 19 communities it serves and provide recommendations on how data from new metering infrastructure may be used to recover the costs in a more fair and equitable way that better reflects each community's contributed flows, including dry weather and wet weather inflow and infiltration.

Waukesha Water Utility (WI)

Bill was project director for Raftelis' engagement with Waukesha Water Utility (WWU). WWU has faced challenges with radium in their current groundwater supply requiring them to construct the facilities necessary to attain water from Lake Michigan. The program is anticipated to cost in excess of \$280M and will have a large



Professional History

- Raftelis: Chairman of the Board (2017-present); Chief Executive Officer (2012-2016); President (2008-2016); Vice President (2002-2008)
- Black & Veatch: Senior Vice President (1996-2002); Vice President (1992-1996); project manager (1984-1992); Assistant project manager (1980-1984); staff consultant (1975-1980)

Education

- Bachelor of Science in Business Administration - Kansas State University (1975)
- Bachelor of Science in Civil Engineering - Kansas State University (1975)

Certifications

- Series 50 Municipal Advisor Representative

Professional Registrations

- Registered Professional Engineer: MI (6201028796); OH (PE 57725); MA (38847); KS - 1979 (8636)

Professional Memberships

- American Society of Civil Engineers
- AWWA: Past-Chair of the Management & Leadership Division, Former Trustee of the Technical & Education Council, Past-Chair & Current member of the Finance, Accounting & Management Controls Committee, current member of the Rates & Charges Committee
- WEF: Past-Chair of Task Force on Wastewater Charges
- WEF: Member Government Affairs Committee
- EPA Environmental Financial Advisory Board Member

impact on the customers of WWU. The Raftelis project team performed a wide variety of analyses for WWU including a risk focused comparison of two potential water suppliers, support in the development of WWU's wholesale service agreements, and assistance developing potential rates to recover the costs of new program. The most critical aspect of this engagement has been a detailed review and critique of the cost-of-service models of potential wholesale water suppliers the City of Oak Creek and Milwaukee Water Works.

Franklin Water Utility (WI)

Bill was project director for Raftelis' engagement with Franklin Water Utility (WWU). Franklin is considering switching water suppliers from the City of Oak Creek (Oak Creek) to Milwaukee Water Works (MWW). Raftelis developed cost projections for each option taking into account each utility's expected future operating and capital costs, a portion of which would be recovered from Franklin as a wholesale customer. The analysis also reflected Franklin's cost to connect to MWW and other upfront costs resulting from a switch. The Raftelis project team ultimately presented to staff and Franklin's board regarding the two options and additional sensitivity analysis around the most impactful assumptions.

City of Calgary Utilities and Environmental Protection Department (AB)

Bill also served as project director on a previous project for the Calgary Utilities and Environmental Protection Department. This project encompasses a project titled Water, Wastewater, and Drainage Utilities Financial Review. This project has encompassed a detailed assessment of the various financial risks faced by the city in the services provided to the citizens of Calgary by each of these three utility operations. The facets of the project included planning, capital improvement project implantation and financing, revenue streams, responding to growth and development, and governable and organizational structure.

Bill also serves as a technical expert in association with Mooreview Management Consulting for a comprehensive water, wastewater and stormwater cost-of-service and rate study. This project examined all aspects of the financial and rate elements of the City of Calgary (City) water, wastewater and stormwater services to its retail customers within the City as well as the surrounding communities receiving wholesale service. The cost-of-service portion of the study included a deep dive into the appropriate methodologies to ensure a fair and reasonable distribution of the City's utility costs to the various customer classes in support of the City's overarching financial and pricing objectives. The outcomes of the project included new schedules of rates as well as a computer-based model for use by the City in upcoming updates and assessments of the financial plan and necessary rates.

Regional Water Customer Group (Canada)

Since 2010 Bill has served as the rate consultant to the Regional Water Customer Group (RWCG) which makes up the wholesale customers receiving water service from EPCOR's Edmonton Water Utility. Bill played a significant role in the establishment of the cost-of-service methodology that was incorporated into a Memorandum Of Understanding (MOU) between EPCOR and the RWCG and filed with the Alberta Utilities Commission (AUC). This MOU ended many years of rate challenges before the AUC and has resulted in a significantly improved working relationship between EPCOR and the RWCG. Continued work includes review and evaluation of the annual true up cost-of-service analysis as well as review of EPCOR's proposed indicative rates.

Great Lakes Water Authority (MI)

The Great Lakes Water Authority was established in 2014 as part of the bankruptcy proceedings for the City of Detroit. The transition of the technical and financial operations of the regional systems to GLWA maintained many aspects of the historical cost of service methodology employed by the City of Detroit and the more than 60 wholesale customers. Since 2019 Bill serves as project director for various projects for the Great Lakes Water Authority (GLWA), including affordability and financial capability analyses as part of the GLWA Long Term Control Plan Update and in-depth evaluation reviews of alternative cost sharing mechanism for recovery of water

and wastewater operation and capital costs among the more than 60 cities, counties and districts making up the member partners of the GLWA water and wastewater systems. In addition, Bill has served as an expert witness on behalf of GLWA related to a class action suit challenging GLWA's industrial waste control charges.

City of Los Angeles (CA)

Bill served as principal-in-charge for the best practices study for the Los Angeles Wastewater Program. This project built on the City of Los Angeles' (City) efforts conducted during the five-years prior to the best practices study during which the City, working through its Labor Management Committee, had reduced the program's full-time employment by 28%. The best practices study covered every aspect of the organization including plants, collection system, engineering, finance, accounting, human resources, billing and collection, customer service, construction management, and many others. As a result, additional savings of nearly 20% were identified over the ensuing five-year period, utilizing normal attrition in lieu of layoffs. The projected savings incorporated business process changes that were identified and evaluated as part of the project with a significant portion of the savings to be achieved in the areas of support services and capital improvement programs.

City of San Diego (CA)

Bill serves as Project Director for a comprehensive study of the City's Water Department's financial planning, cost of service and rate design. The principal goal of the project is to determine cost-based rates for the City's retail service to its various classes of customers including single family residential, multi-family residential, commercial, industrial and institutional (ICI), and private fire protection. The process and methodology employed will reflect the requirements of the California as amended through Proposition 218. Prior to the current water system study Bill served as Project Director for a comprehensive financial planning, cost of service and rate study for the City's Wastewater System. This project also followed the processes and methodologies necessary to comply with the provisions of Proposition 218.

City of Cincinnati (OH)

Bill served as the partner-in-charge for the project team engaged by Cincinnati Water Works (CWW) to work with CWW's Executive Management Team in development of their first Strategic Business Plan. The work on this project included a complete employee survey, outreach with key external stakeholders, multiple workshops with the Executive Team and staff representatives for development of CWW's vision and mission, as well as goals, objectives and strategies, and leading multi-disciplined CWW teams in development of specific action plans. The result of this engagement was a comprehensive business plan which established a road map for the utility over the coming decades. Bill's work also included reviewing and evaluating levels of service provided to suburban communities and associated financial modeling of alternatives to current service levels.

PROJECT LIST

- Allegheny County Sanitary Authority (PA) - Rate study, industrial SC review
- Arlington County (VA) - Alternative rate structure analysis, financial planning, availability fee development, and public involvement program
- City of Cincinnati (OH) - Strategic business plan
- City of Columbus (OH) - Water and wastewater rate study
- City of Henderson (NV) - Water and wastewater rate study
- City of Kalamazoo (MI) – Water and wastewater financial planning and rate analyses
- City of Lee's Summit (MO) - Water and wastewater cost-of-service study
- City of Lexington (KY) - Water system valuation
- Loudoun County Sanitation District (VA) - Water and sewer rate study and bond feasibility study
- City of Loveland (OH) - Evaluation of wastewater service alternatives

- City of Macomb (MI) - Wastewater rate litigation assistance and feasibility analysis for acquisition
- Northeast Ohio Regional Sewer District (OH) - Financial planning, rate study and rate model
- Oakland County (MI) - Water and wastewater rate review and master plan financial analysis
- City of Olathe (KS) - Water and wastewater availability fees
- City of Portland (OR) - Wholesale service contract review and bond feasibility study
- City of Saginaw (MI) - Wholesale water contract negotiations, water cost-of-service study and water rate update
- San Antonio Water System (TX) - Strategic financial planning and water and sewer rate study
- San Francisco Public Utilities Commission (CA) - Wholesale contract development, reuse water pricing review, wheeling rate review
- City of Warren (MI) - Water rate litigation support
- City of Waukesha Water Utility (WI) – Financial evaluation of securing alternative water supply from Oak Creek or the City of Milwaukee and assistance with contract negotiation.
- City of Wichita (KS) - Wholesale water rates analysis
- United States Navy, Norfolk (VA) - Water rate review

RELEVANT PROFESSIONAL EXPERIENCE

- Invited Instructor: University of Colorado School of Engineering - Graduate Course on Utility Management and Finance

LITIGATION EXPERIENCE

Alpena (MI)

Bill served as an expert witness on behalf of the City of Alpena (City) in a water and wastewater rate dispute with its sole wholesale customer, Alpena Township. The principal issue raised by the Township challenged the reasonableness of the City's water and wastewater rates in accordance with the service contract and Michigan statutes and juris prudence. During the trial the parties began negotiation of a potential settlement during which Bill served in a principal role in negotiating terms and conditions with the Township's expert. A settlement was reached and entered by the Court.

Bay City (MI)

Bill served as an arbitrator representing Bay County and Hampton Township in a challenge of the City of Bay City's (City) wholesale water rates. The challenges to the water rates focused on the determination of the City's revenue requirements to be recovered from the water rates and the application of the "utility basis" in the determination of the wholesale cost-of-service. The neutral arbitrator agreed with the arguments presented by Bill and found in favor of Bay County and Hampton Township.

City of Detroit Water and Sewerage Board (MI)

Bill testified on behalf of the City of Detroit and its Water and Sewerage Department regarding its wastewater rates charged to its wholesale wastewater customers and its industrial retail customers on multiple occasions during the period 1977 through 1996. During this period, Bill testified on twelve occasions in depositions and in hearings in Federal Court. In addition to his testimony Bill was directly involved in the negotiation of four rate settlement agreements between the City of Detroit and the wholesale customers.

In another matter filed in Michigan Circuit Court, Bill testified on behalf of the City of Detroit (City) in support of the City's water rates charged to the City of Novi, Michigan. The Trial Court found in favor of the City of Detroit citing Bill's testimony as a fundamental basis for the decision.

Kalamazoo (MI)

Bill testified as an expert witness in support of the City of Kalamazoo in a wastewater rate dispute with its wholesale customers. Bill's testimony was provided in deposition conducted by the plaintiff's attorney and helped facilitate a settlement agreement between the parties establishing a process and methodology for determination of future wastewater rates.

Holland (MI)

Bill served as an expert witness on behalf of the City of Holland, Michigan in its arbitration on water rates with the City of Zeeland, Michigan. His testimony was provided in depositions and during the arbitration hearings. The findings of the arbitration panel were principally in support of the City of Holland's water rates.

Oakland County (MI)

Bill served as an expert witness on behalf of Oakland County which challenged the City of Detroit's (City) proposed Plan of Adjustment (POA) related to the City's Chapter 9 Bankruptcy filing. Bill's expert report presented his findings and opinions regarding the impact the POA would have on the City's ability to adequately fund its water and wastewater systems which provided essential service to approximately 2,000,000 people outside the city limits of Detroit. After his deposition, the Governor of the State encouraged the City and the three counties representing the wholesale customers to reach a settlement regarding the Detroit Water and Sewerage System. The ultimate settlement resulted in the creation of the Great Lakes Water Authority (GLWA) and the dropping of the challenges regarding the POA. This settlement allowed the City to proceed with its Bankruptcy and the creation of an effective governance structure for GLWA.

Lawrence (MA)

Bill served as an expert witness on behalf of the Merrimack Paper Company challenging the wastewater rates enacted by the City of Lawrence (City). Bill testified in deposition and in the hearing setting forth the results of his analyses and his opinions regarding the equity and fairness of the City's wastewater rates in relation to generally accepted wastewater rate making principles and industry standards. The District Court ruled in favor of the City which prompted Merrimack Paper to Appeal to the Commonwealth Supreme Court. Once the appeal was accepted for hearing by the Supreme Court the City agreed to enter into a settlement with Merrimack paper.

Newark (NJ)

Bill served as an expert witness for the Seton Leather Company in a suit challenging the equity of the City of Newark's (City) wastewater rates. Bill testified in deposition and during the Trial Court hearing on this matter. At the conclusion of the trial the Judge found in favor of Seton leather recognizing the testimony of Bill as a substantial basis for his decision. The City appealed the decision to the New Jersey Supreme Court who ruled in favor of the City due to the effect that implementing the Trial Court's decision would have on the residential customers of the City.

Billings (MT)

This matter started as a suit filed by the Billings Heights Water District (District) against the City of Billings (City) challenging water rates that had been adopted by the City. Bill was retained as an expert witness on behalf of the District and presented testimony in deposition. After the parties had deposed the experts, the Trial Judge worked with them to enter into a new contract that provided for arbitration to settle disputes. The City then revised its water rates incorporating many of the issues raised by Bill but still left other items with which the District disagreed. The case then moved to arbitration which was conducted as "baseball" arbitration with a single arbitrator rather than three. Bill testified in the arbitration hearing presenting his analyses and opinions regarding the rate issues. The Arbitrator concurred with many of Bill's issues and opinions, but due to the nature of baseball arbitration the ultimate finding favored the City.

Columbia (SC)

Bill served as an expert witness on behalf of the City of Columbia (City) in a call action suit filed against the City challenging the funding of the City's water and wastewater systems. Bill's expert report focused on the historical financial structure of the City's water and sewer systems and provide opinions regarding the City's compliance with the state user fee statute and the state revenue bond act. After his deposition, the parties reached a settlement which was entered by the Court and resulted in a positive outcome for the City.

PUBLIC SERVICE COMMISSION APPEARANCES

Indiana Utility Regulatory Commission

Bloomington. Bill served as expert rate consultant on six separate water rate cases before the Indiana Utility Regulatory Commission. Three of the cases were across the board adjustments to the rate structure based on the overall revenue requirement for the water utility. The other three cases included detailed cost-of-service and rate design determinations.

Columbus. Bill served as the expert rate consultant on two water rate cases before the Indiana Utility Regulatory Commission on behalf of the City of Columbus. The first case included a comprehensive cost-of-service study and rate design and the second case was based solely on development of proposed revenue requirements.

Evanston. Bill served as the expert rate consultant on behalf of the City of Evanston on two water rate cases heard by the Indiana Utility Regulatory Commission. Both cases included development of test year revenue requirements, comprehensive cost-of-service analyses and rate design.

Kentucky Public Service Commission

Boone County Kentucky Water District. Bill testified as an expert water rate consultant on behalf of Boone County before the Kentucky Public Service Commission in support of the Water District's proposed water impact fees. The Commission approved the District's application for implementation of these fees.

Missouri Public Service Commission

Liberty Utilities (Missouri Water), LLC. Bill testified as an expert witness on behalf of Silverleaf Resorts Inc. and Orange Lake Country Club, Inc. in opposition to certain aspects of Liberty Utilities proposed increase in its water and sewer rates in the systems providing service to Silverleaf Resorts and Orange Lake Country Club. The issues raised by Bill included the proposed capital structure and return on equity, the proposed rate design and the appropriateness of a phase in of the significant increase requested. The Commission's ruling has not yet been filed.

Wisconsin Public Service Commission

Oak Creek Water and Sewer Utility. Bill testified as an expert on behalf of the City of Franklin, WI, a wholesale water customer of the City of Oak Creek, in opposition to the City of Oak Creek's proposed increase in its water rates. The Commission found in favor of most of issues raised by Bill which resulted in a lower rate increase for service to the City of Franklin.

Collin Drat

PROJECT MANAGER

Senior Manager

ROLE

Collin will ensure that the project stays on schedule, is within budget, and effectively meets the City's objectives.

PROFILE

Collin has over 10 years' experience advising municipally owned water, wastewater, stormwater, electric and natural gas utilities throughout North America. Collin has conducted 80+ studies for dozens of utility clients in 20 states. This experience includes not only establishing cost justified utility rates but also critiquing and defending them in court and before state public service commissions.

KEY PROJECT EXPERIENCE

Franklin Water Utility (WI)

Collin served as lead consultant for Raftelis' engagement with Franklin Water Utility (Franklin). Franklin is considering switching water suppliers from the City of Oak Creek (Oak Creek) to Milwaukee Water Works (MWW). Collin developed cost projections for each option taking into account each utility's expected future operating and capital costs, a portion of which would be recovered from Franklin as a wholesale customer. The analysis also reflected Franklin's cost to connect to MWW and other upfront costs resulting from a switch. The Raftelis project team ultimately presented to staff and Franklin's board regarding the two options and additional sensitivity analysis around the most impactful assumptions.

Waukesha Water Utility (WI)

Collin served as the lead consultant on Raftelis' engagement with the Waukesha Water Utility (WWU). WWU has faced challenges with radium in their current groundwater supply requiring them to construct the facilities necessary to attain water from Lake Michigan. The program is anticipated to cost in excess of \$280M and will have a large impact on the customers of WWU. Collin has performed a wide variety of analyses for WWU including a risk focused comparison of two potential water suppliers, support in the development of WWU's wholesale service agreements, and assistance developing potential rates to recover the costs of new program. The most critical aspect of this engagement has been a detailed review and critique of the cost-of-service models of potential wholesale water suppliers the City of Oak Creek and Milwaukee Water Works.

City of Calgary (AB)

Collin provided analytical and technical support in association with Mooreview Management Consulting for a comprehensive water, wastewater cost-of-service and rate study. Collin assisted with analysis of water and wastewater customer data, cost of service model development and the production of presentation materials to support the Raftelis and the Mooreview project team.



Specialties

- Utility strategic financial planning
- Cost-of-service analysis
- Water, wastewater, & stormwater rate design
- Conservation rate design
- Statistical analysis

Professional History

- Raftelis: Senior Manager (2023-present); Manager (2019-2022); Senior Consultant (2016-2018); Consultant (2014-2015); Associate Consultant (2012-2013)

Education

- Master of Public Affairs (Public Finance) - Indiana University (2012)
- Bachelor of Arts in International Relations - Wheaton College (2010)

Professional Memberships

- AWWA
- Water Environment Federation (WEF): Utility Management Committee
- Finance and Administration Subcommittee for WEF
- AWWA/WEF Young Professionals Annual Summit: Chair (2020); Co-chair (2019)

Central Arkansas Water (AR)

Collin served as lead consultant for Raftelis' engagement with Central Arkansas Water (CAW). Raftelis was retained to develop a long-term financial forecast for CAW, a cost of service analysis which attributed CAW's costs to its various customer classes based on their use of the CAW system and rate design recommendations which aligned with CAW strategic objectives. Collin worked closely with Raftelis' project manager and support staff to develop a new rate model for CAW. The Raftelis team used this model to support working meetings with staff and the CAW board throughout the process. Collin also aided in the development and review of presentation materials throughout the study.

City of Bentonville (AR)

Raftelis has completed two engagements with the City of Bentonville. Collin currently served as lead consultant for Raftelis' first engagement, a water rate study. Raftelis developed a comprehensive water financial plan and cost of service study for the City. The study identified the funding needs for the water utility and rates which appropriately recovered those costs from the City's retail and wholesale customers based on their use of the City system. Raftelis recently completed a similar analysis for the City's wastewater utility, focusing on developing a plan to fund over \$100 million in anticipated capital improvements over the next 10 years. Collin served as the project manager for this engagement.

City of San Diego (CA)

The City of San Diego (City) engaged Raftelis to conduct a comprehensive financial planning, cost of service, and rate design study for its water utility. Collin served as lead consultant for this engagement, supervising consulting staff, coordinating and leading working meetings and preparing deliverables. A key aspect of this engagement involved restructuring the City's residential tier structure to encourage conservation in a cost-justified manner, taking into account Proposition 218 and ongoing litigation around the City's water rates.

City of Lawrence (KS)

Collin serves as the project manager for Raftelis' ongoing engagement with the City of Lawrence (City). The City serves 35,000 retail customers (including the University of Kansas) and 7 wholesale customers. Raftelis completed its initial rate study for the City in 2017. That engagement involved the development of a comprehensive 10-year financial plan, water and wastewater cost-of-service studies, conservation rate designs and system development charges. Since the initial study, Raftelis has been retained to update analysis for the 2018, 2019, 2020, 2021 and 2022 budget years. Raftelis also developed a stormwater financial planning model for the City and has been advising the City regarding updates to their stormwater rate structure to reflect current best practices. Collin serves as the project manager for the stormwater engagement.

City of Saginaw (MI)

Collin currently serves as the lead consultant for Raftelis' engagement with the City of Saginaw (City). This engagement involves the update of the City's water rate model to establish updated water service rates. A key aspect of this engagement involves the development of water service rates for the City's 18 wholesale customers. This required the development of a five-year financial plan and an allocation of operations and maintenance, depreciation and return on rate base to each of the City's wholesale customers, based on that customers unique contribution to the City's operating and capital costs. The City's wholesale customers currently pay a commodity charge which recovers the cost of providing water service based on their current demand and a capacity charge which recovers costs on the basis for their contracted average and maximum day demand.

City of Sterling Heights (MI)

Collin serves as project manager for Raftelis engagement with the City of Sterling Heights (City). Raftelis has been engaged to perform a financial planning, cost of service and rate study for the City. The study will identify the level

of revenue needed for ongoing financial sustainability and determine how it should be recovered from the City's customer classes. A key aspect of this engagement involves the determination of appropriate capital charges which will ensure that new customers pay for their share of capacity in the City's water and sewer system.

Providence Water (RI)

Collin served as the lead consultant for the Providence Water Supply Board (PWSB), preparing schedules for the Board's five most recent rate filings (Dk. 4571, Dk. 4406, Dk. 4571, Dk. 4618, Dk. 4994) with the Rhode Island Public Utilities Commission (RIPUC). These filings involve the development of detailed rate year revenue requirements, updating cost-of-service allocations and rate design. Collin prepared calculated rates in accordance with PWSB's existing rate structure as well as alternative rates designed to promote water conservation. In addition, Collin assisted in authoring expert testimony to the RIPUC, prepared responses to data requests and adjusted rate schedules as necessary.

City of Suffolk (VA)

Collin has been providing financial consulting services to the City of Suffolk (City) for over 10 years and currently serves as Raftelis' project manager. The scope of services includes an annual update of the City's rate study, monthly cash flow forecasting (production, consumption, revenue, delinquent accounts), a water audit, and a true-up determination for the City's wholesale customer Isle of Wight. In addition to these services Raftelis has supported the City on a number of as-needed analysis including affordability analysis, regionalization analysis, public and private fire protection rates, economic development rates, availability fees and among others.

PROJECT LIST

- Capital Regional Parkland Water Services Commission (AB) – Water Rate Study
- City of Calgary (AB) – Water and Wastewater Rate Study
- Regional Water Customers Group (AB) – Cost of Service Review, Demand Forecasting
- Strathcona County Utilities (AB) – Wastewater Rate Study
- Sturgeon County (AB) – Water and Wastewater Study
- Town of Stony Plain (AB) - Stormwater Financial Plan
- Central Arkansas Water (AR) – Water and Wastewater Rate Study
- City of Bentonville (AR) – Water Rate Study, Wastewater Rate Study
- Marana Water (AZ) – Water and Water Reclamation Rate Study, Impact Fee Study, Litigation Support
- City of San Diego (CA) – Water Rate Study
- City of Fort Morgan (CO) – Natural Gas Rate Study
- Clearwater Gas System (FL) – Natural Gas Rate Study (multiple)
- City of Bloomington (IL) – Wastewater and Stormwater Rate Study
- Northwest Water Commission (IL) – Valuation Study (multiple), Rate Analysis
- Silverleaf Resorts, Inc (IL, MO, TX) – Rate Case Support
- Village of Northfield (IL) - Water and Wastewater Rate Study
- City of Atchison (KS) - Water and Wastewater Rate Study
- City of Junction City (KS) – Water and Wastewater Rate Study (multiple)
- City of Lawrence (KS) – Water, Wastewater and Stormwater Rate Study (multiple), Utility Financial Policies
- City of Topeka (KS) – Water, Wastewater and Stormwater Rate Study
- Hardin County Water District No. 1 (KY) – Rate Case Support
- City of Baltimore (MD) – Stormwater Impervious Area Delineation
- Bloomfield Township (MI) – Water and Wastewater Rate Study (multiple)
- City of Alpena (MI) – Litigation Support
- City of Flint (MI) – Water and Wastewater Rate Study (multiple)

- City of Marquette (MI) – Water and Wastewater Rate Study (multiple)
- City of Marquette and Marquette Township (MI) – Joint Water Rate Study (multiple)
- City of Rochester (MI) – Water and Wastewater Rate Study (multiple)
- City of Saginaw (MI) – Water Rate Study (multiple)
- City of Sterling Heights (MI) – Water and Wastewater Rate Study
- Detroit Water and Sewerage Department (MI) – Water and Wastewater Rate Study, Fire Protection Study
- Marquette Charter Township (MI) - Fire Protection Study, Water Supply Valuation Study
- Port Huron Township (MI) – Wheeling Rate Study
- State of Michigan Department of Treasury (MI) – Various financial analysis regarding City of Flint
- City of Boulder City (NV) – Electric, Water, Wastewater, Solid Waste Rate Study (multiple)
- City of Aztec (NM) – Electric, Water and Wastewater Rate Study
- Masonic Villages at Sewickley (PA) – Litigation Support
- Gran Melia (PR) – Rate Case Support
- Providence Water (RI) – Rate Case Support
- City of Clarksville (TN) – Natural Gas Rate Study
- City of Cookeville (TN) – Water and Wastewater Rate Study, Natural Gas Rate Study, PGA Model
- City of Round Rock (TX) – Water and Wastewater Rate Study (multiple), Rate Case Support
- City of Alexandria (VA) – Rate Case Support (multiple)
- City of Suffolk (VA) – Water and Wastewater Rate Study (multiple), Availability (Impact) Fees
- Franklin Water Utility (WI) – Water Supplier Analysis
- Waukesha Water Utility (WI) – Water Supplier Analysis

PRESENTATIONS AND PUBLICATIONS

- “Making Cents of Affordability: How to Assess and Address Challenges in Your Community,” MOAWWA/MWEA Joint Annual Meeting, KWEA/KSAWWA Joint Conference (2022)
- “Smaller Utilities, Bigger Challenges: Small Utilities Gain the Most from Financial Planning and Stakeholder Outreach,” NACWA Clean Water Advocate (Winter 2020)
- "Financial Breakdown in the Vehicle City: Finding a Way Forward for Flint Finances in the Wake of the Water Crisis," AWWA/WEF Utility Management Conference (2017)
- "Ratemaking 101: Best Practices for the Financially Sustainable Utility," KWEA and KSAWWA Joint Annual Conference (2016)
- "Which Came First? An Integrative and Iterative Approach to Funding Infrastructure in Junction City," KWEA and KSAWWA Joint Annual Conference (2015)
- "Principals of Water, Wastewater and Stormwater Rate Setting," NYAWWA Edwin C. Tiffit Jr. Water Supply Symposium (2015)

Joe Collins

LEAD CONSULTANT

Senior Consultant

ROLE

Joe will lead the analysis and preparation of deliverables for the project.

PROFILE

Joe has a background in economics, public policy analysis, and municipal finance as well as utility energy management. Joe's areas of expertise include water and wastewater demand analysis, financial planning, cost-of-service analysis and rate design. Joe has developed decision support tools and analyses for some of the largest and most complex agencies in the nation.

KEY PROJECT EXPERIENCE

Metropolitan St. Louis Sewer District (MO)

Metropolitan St. Louis Sewer District (MSD) provides retail wastewater and stormwater services to the City and County of St. Louis, serving a population of approximately 1.3 million. MSD is interested in funding its stormwater management program through impervious area fees and, building on its longstanding relationship with Raftelis, has engaged the firm to provide stormwater funding and rate policy services. Joe aided in the development of the stormwater funding model and rate proposal and has begun work on MSD's forthcoming sewer rate proposal.

Little Blue Valley Sewer District (MO)

In July 2016, Raftelis was engaged by the Little Blue Valley Sewer District (District) to complete a financial feasibility evaluation of proposed revenue bonds. Joe evaluated historic and projected revenues, expenses, and debt service for the District and the sewer subdistrict it governs. In 2019, Raftelis was engaged to update an evaluation of the District's rate structure from 2015. Joe served as the lead consultant on this engagement as well.

City of Jefferson (MO)

Joe currently serves as the lead consultant for Raftelis' engagement with the City of Jefferson (City). Raftelis is developing a comprehensive sewer financial plan and cost of service study for the City. The study will identify the funding needed for several major system upgrades and ongoing maintenance while maintaining appropriate levels of reserves and debt service coverage ratios. The analysis will also identify the cost to serve each of the City's customer classes in proportion to their impact on the sewer system.

City of Lawrence (KS)

Joe served as the staff consultant for Raftelis' most recent engagement with the City of Lawrence (City). That engagement involved the development of a comprehensive 10-year financial plan, water and wastewater cost-of-service studies, wholesale rates, conservation rate designs and system development charges. Since the initial study, Raftelis has been retained to update analysis for the 2018, 2019 and 2020 budget years. Joe led the update of the rate analysis for the 2020 budget year. Joe also developed a stormwater financial plan for the City, to appropriately recover the cost of handling stormwater run-off from City customers.



Specialties

- Financial modeling
- Utility rate studies
- Bond feasibility reports
- Statistical analysis

Professional History

- Raftelis: Senior Consultant (2021-Present) Consultant (2019-2020) Associate Consultant (2016-2018)

Education

- Master of Public Administration - Indiana University (2016)
- Bachelor of Science in Economics - Truman State University (2014)

Professional Memberships

- AWWA
- WEF

Sterling Heights (MI)

Joe served as lead consulting for Raftelis' engagement with the City of Sterling Heights (City). Raftelis was engaged to perform a financial planning, cost of service and rate study for the City. The study identified the level of revenue needed for ongoing financial sustainability and determine how it should be recovered from the City's customer classes.

City of Atchison (KS)

Joe served as the lead consultant for Raftelis' engagement with the City of Atchison (City). Raftelis is developing a comprehensive water and wastewater financial plan and cost-of-service study. A unique aspect of this engagement involves the development of appropriate rates for the City's commercial and industrial customers, who represent approximately 50% of the City's annual water sales. The City also provides wholesale service to 4 rural water districts outside of the City. Raftelis is developing cost-of-service rates for these customers, which can be used in future contract negotiations.

City of Junction City (KS)

Joe serves as the lead consultant for Raftelis engagement with the City of Junction City. This engagement involves the development of comprehensive water and sewer financial plans and rate designs. Joe will be reviewing the previous financial business plans Raftelis developed as compared to the actual results and will be developing an updated plan, which will establish the level of rate revenue necessary to fund ongoing operations and capital reinvestment in a sustainable manner.

City of Edgerton (KS)

Raftelis has assisted the City of Edgerton (City) with various studies. Joe played a key role in the 2017 update of the water and sewer financial planning model Raftelis had previously developed for the city. The process included analysis of the City's customer demand, operating expenses, and future needs for expansion. He also assisted with an analysis of customer growth and wholesale sewer rates to evaluate the impacts of new development.

City of Columbia (MO)

Joe served as the staff consultant for Raftelis' engagement with the City of Columbia Department of Water and Light (CWL). Joe developed a rate and financial planning model to provide a forecast of rates, revenues, expenses, debt service, debt service coverage, and reserves over a 15-year forecast period. Joe has also developed cost-justified connection fees.

City of Perryville (MO)

Joe served as the staff consultant for Raftelis' engagement with the City of Perryville (City). The City sought to calculate rates sufficient to finance the construction of major wastewater treatment facility renovations and increased system maintenance costs. Joe assisted in developing a rate and financial planning model to provide a forecast of rates, revenues, expenses, debt service coverage, and reserves over a 10-year forecast period.

City of North Kansas City (MO)

Joe served as the staff consultant for Raftelis' engagement with the City of North Kansas City (City). Joe developed a utility rate and financial planning model, which would allow the City to evaluate the financial impacts of potential choices concerning future water supply, major water treatment facility renovations, and increased system maintenance costs.

Des Moines Water Works (IA)

Joe currently serves as a staff consultant for Raftelis' engagement with Des Moines Water Works (DMWW). This engagement involves a review of DMWW's existing cost-of-service and financial planning methodology and the development of an updated financial planning tool for the City to use going forward.

Great Lakes Water Authority (MI)

Joe served as the staff consultant for Raftelis' engagement with the Great Lakes Water Authority (GLWA). Raftelis worked closely with GLWA Staff as well as the Member Partners to review the existing charge methodology and propose updates to the methodology to meet the objectives of the Member Partner communities to simplify the methodology while ensuring it remained fair and equitable. Joe provided analytical support throughout the engagement.

Genesee County Drain Commission - Division of Water and Waste Services (MI)

The Genesee County Drain Commission's Division of Water and Waste Services (GCDC) provides potable water transmission and distribution and wastewater collection, conveyance, and treatment to over 200,000 customers within its 700 square mile service area. Raftelis was engaged to develop a water and wastewater financial planning, cost-of-service and rate model for GCDC. Joe currently serves as the lead consultant for this engagement. A key aspect of this engagement has involved capturing all of the various levels of service provided by GCDC to the various communities which it serves. The model developed by Joe will allocate the cost of providing water service to GCDC's customers in proportion to their use of GCDC's water and wastewater system.

Detroit Water and Sewerage Department (MI)

Joe served as a staff consultant for Raftelis' engagement with the Detroit Water and Sewerage Department (Department). The engagement involved financial planning and rate design for the water and sewer utilities. Key aspects of this engagement involve analyzing and projecting costs from wholesale provider Great Lakes Water Authority, analyzing customer affordability and developing rates which mitigate the impact on lower income customers. Joe also served as a staff consultant for the development of the Department's private fire line charge.

PROJECT LIST

- Allendale Township (MI) – Water and sewer rate and development charge study
- Amador Water Agency (CA) – Cost allocation plan
- City of Edwardsville (IL) – Water financial planning study
- City of El Segundo (CA) – Water and sewer rate study
- City of Henderson (NV) – Water and sewer rate study
- City of Ontario (CA) – Water rate study
- City of Rochester (MI) – Water and sewer rate study
- City of Suffolk (VA) – Water and sewer rate study
- City of Washington (IL) – Water and sewer rate study
- El Toro Water District – Water rate study
- Grand Blanc Township (MI) – Water and sewer rate study
- Jurupa Community Services District (CA) – Cost allocation plan
- Mammoth Community Water District (CA) – Sewer rate study
- Victor Valley Water Reclamation Authority (CA) – Recycled water rate study, JPA analysis
- Village of Northfield (IL) – Water and sewer rate study

Zach Green

QA/QC REVIEWER
Manager



ROLE

Zach will serve will provide quality assurance and quality control (QA/QC) review of project deliverables.

PROFILE

Zach has an interdisciplinary background in water sector economics, physical science, and utility management, in both public and private settings. He is a frequent speaker at local, state, and national conferences, with a current focus on utility financial and organizational assessment advisory services, cost-of-service and rate studies, cost-benefit analyses, shared service assessments, and affordability research. Zach’s typical projects aim to achieve deep collective understanding through facilitated multi-stakeholder strategic decision-making processes supported by strong analytical foundations.

KEY PROJECT EXPERIENCE

Central Brown County Water Authority (WI)

Analytics lead and strategic consulting facilitator for a regional collaboration study involving the CBCWA as well as the City of Green Bay Water Utility. This work sought to identify opportunities to collaborate on operational activities to achieve cost savings and level of service improvements for a suburban regional system and adjacent urban system. In the wake of the work a pilot effort on cross-connection control was advanced along with a website for information sharing and ongoing collaboration. The study included data gather, staff interviews, opportunity identification and prioritization as well as business case analyses of the emergent opportunities to evaluate each and clarify next steps.

New Water (WI)

As a staff consultant with Arcadis, evaluated status quo and alternative billing models using qualitative evaluation criteria developed with a regional wholesale wastewater authority and stakeholder advisory group. Responsible for modeling status quo billing using client data inputs and developing billing alternative cost impact models. Prepared presentation materials, meeting summaries and technical memorandum summarizing analytical results and customer feedback. Facilitated decision making workshops on the selection of an alternative billing methodology. Ongoing client support with Raftelis as project manager over several years that followed the billing methodology study for budgeting, financial planning, and cost-of-service allocation for this regional wholesale wastewater utility. Work includes extensive modeling and the full range of rate setting activities from concept to Commission approvals. Models evolved to support the budgeting process through a period of innovative capital investment and increasing customer scrutiny. Customers include 16 municipalities as well as local industrial (direct bill) customers. Customer agreements and resulting rate setting requirements at NEW Water require a degree of complexity that the models have been adapted to effectively

Specialties

- Cost-of-service studies
- Cost-benefit analysis
- Data collection & analysis
- Rate surveys
- Rate modeling & forecasting
- Regionalization alternative studies
- Strategic planning
- Workshop facilitation

Professional History

- Raftelis: Manager (2022-present); Senior Consultant (2018-2021)
- Arcadis US, Inc.: Consultant (2014-2018)
- Peter Wilcoxon, Maxwell School of Citizenship & Public Affairs at Syracuse University: Research Assistant (2013-2014)
- United States Department of Agriculture, Natural Resources Conservation Service: Intern (2012-2014)
- IQVIA (fka IMS Health): Consultant (2007-2012)
- Wood Mackenzie: Consultant (2006-2007)

Education

- Master of Public Administration - Maxwell School of Citizenship & Public Affairs at Syracuse University (2014)
- Master of Professional Studies - SUNY College of Environmental Science & Forestry (2014)
- Bachelor of Science in Applied Economics & Management - Cornell University (2006)

support. Modeling complexity and a high standard for transparency has also created the challenge of effectively communicating complexity with customers, which has been addressed through extensive outreach and engagement. In addition to ongoing financial modeling support, recent Raftelis engagement with this client has helped to evolve the NEW Water capital charge through facilitated customer workshops and associated analysis as well as efforts to update fixed asset allocation bases for capital cost allocation and recovery.

Albany Pool Communities (NY)

Supporting analyst for report covering peer community surveys, regulatory reviews, and feasibility analyses for a regional stormwater in-lieu fee and credit banking and trading program in Upstate New York.

American Water Works Association/U.S. Environmental Protection Agency (CO)

Lead researcher on household affordability and community financial capability measurement methodologies as part of a team of experts working with the AWWA, NACWA, and WEF at the request of USEPA. The study will first recommend a set of criteria that should be used to develop new and improved methodologies and will ultimately then recommend new methodologies to EPA for consideration. A full literature review of all existing research into these topics was conducted to support recommendations, which are being vetted through a series of workshops, before development of a final report that will be delivered to EPA. This report follows on the recent work also done on behalf of USEPA by NAPA.

City of Dayton Department of Water (OH)

Completed financial plan and cost-of-service studies ultimately in support of revised financial policies, methods, and priorities for this regional water and sewer utility. Work includes modeling, rate structure alternative analyses, meeting facilitation, and support in drafting clauses of revised agreements. Other work with this client has included WIFIA and DEFA SRF loan application support and associated modeling.

Empresa Baiana de Aguas e Saneamento (Brazil)

Performed cost-benefit, financial and regulatory analyses related to implementation of wastewater system improvements to achieve energy and operational efficiencies. Work includes baseline organizational assessment and net benefit modelling to identify project feasibility.

City of Flint (MI)

Lead financial consultant on an analysis of system components and organizational practices compared to industry standards and best practices to identify, prioritize and help fund necessary improvements to optimize the distribution system. This work also included the development of an Enterprise Asset Management (EAM) tool and support for developing and funding a new capital improvement plan.

City of Hackensack (NJ)

Worked with the City of Hackensack to analyze anticipated changes in property tax assessments associated with the implementation of a combined sewer asset management plan. Arcadis engineers reviewed and assessed condition and criticality for linear and facility assets and developed an investment plan over 20 years. The financial services group then built and updated a financial model to assess the tax impacts of the CIP while working with the client to agree on sound economic assumptions.

City of Jersey City (NJ)

This work included the development of an asset management plan and lead support on financial modelling for an associated capital improvement plan. Arcadis engineers reviewed and assessed condition and criticality for linear and facility assets and developed an investment plan over 20 years. The financial services team developed a

financial model to assess the rate impacts of the CIP and collaborated with the client to refine model inputs. Utility leadership found the tool useful for ongoing annual planning.

Narragansett Bay Commission (RI)

Conducted a desktop survey of peer utilities on behalf of Rhode Island's largest sewer utility to inform alternative rate designs in the face of expansive CSO regulatory and investment requirements. The project also includes financial plan and cost-of-service analytics leading to rate case development and provision of expert testimony before the State's public utility commission.

Nassau County Department of Public Works (NY)

As part of an overall grant management contract this project involved internal auditing to ensure sub-recipient grant compliance for two federal awards. Lead compliance document development and internal data audits for CDBG-DR grants and supported FEMA-PA and 406 mitigation audit work.

National Association of Clean Water Agencies (D.C.)

Lead modeler on a team of experts working to design a federal low income water assistance program for advocates (NACWA, WEF, AWWA and others) seeking to advance a solution to the national water affordability challenge with U.S. Congress in the wake of successful programs enacted during the Covid-19 pandemic. Modeling work was conducted to develop an estimate of national water assistance need using a novel approach that integrated several large datasets and included a dynamic scenario comparison dashboard. The model was well received in presentations with a client steering committees as well as an equity caucus that together represent a broad swath of water industry and low income community advocates and leaders.

Greater New Haven Water Pollution Control Authority (CT)

Executed an ordinance comparison analysis in preparation for the acquisition of a municipal wastewater system by a regional authority. Supported the development of a report/presentation intended to educate a municipal wastewater commission and the general public on the rationale, expected changes and key steps in regionalization of their wastewater system. Performed due diligence for wastewater asset purchase agreement.

New York City Department of Parks and Recreation (NY)

Prepared financial documents and supporting evidence for submission to the New York City Office of the Comptroller, Bureau of Accountancy - Directives Policy Unit FY2014 CAFR. This work is intended to help smooth the 2014 transition of the closed landfill from the Department of Environmental Protection to the Department of Parks and Recreation.

New York City Mayor's Office of Recovery and Resiliency (NY)

Supported the development of a database and workflow driven website designed to facilitate communication and accountability between the Mayor's Office and all City agencies for over 1,000 recovery and resiliency projects citywide valuing over \$20 billion in total. Lead integration with the Office of Management and Budget's grant tracking database. Designed GIS concept for public release and internal management purposes. Assigned as the primary funding, budget, contract and schedule data reviewer and liaison for several city agencies.

New York City Department of Sanitation (NY)

Lead financial analyst on a team of engineers and data scientists working to frame commercial solid waste zone design options for the New York City Department of Sanitation (City). Built and analyzed a database aggregating financials from 90 private solid waste carters licensed and operating in the City to collect refuse from commercial businesses. Crafted a report detailing financial ratios, profitability, and cost analyses to provide an updated and comprehensive picture of the solid waste carting market for commercial business waste in all five boroughs.

Norwalk Water Pollution Control Authority (CT)

Completed analytics and wrote report in support of an update to a 2009 study on consumption-based sewer billing. This study reviewed billing alternatives as well as the costs involved with potentially implementing those alternatives. The alternatives considered included one-part (volumetric) as well as two-part (fixed charge + volumetric) billing approaches. Also supported financial plan model updates and projections for a municipal wastewater authority. The work includes adjustments to debt financing and rate escalation assumptions to reduce costs and smooth increases for customers. This model also includes custom analyses to account for contracted services to a neighboring municipality.

Old Bridge Municipal Utilities Authority (NJ)

Project Manager for an intervention in a purchased water adjustment clause proceeding before the Office of Administrative Law. Work has included discovery, expert witness testimony, and technical analysis in support of a municipal entity challenging proposed charges from a private water utility provider that is attempting to recover costs from all customers for purchased water serving a portion of the system that excludes my client.

Pittsburgh Water & Sewer Authority

Lead modeler on EPA Financial Capability Assessment (FCA) cash flow analytics, census data analysis, and economic assessments.

Region of Peel (ON)

Served as the Assistant Project Manager and Task Lead for a large Ontario utility that provides water and wastewater services to over 300,000 customer accounts. Raftelis' Environmental Scan, led by Zach, included 20 North American utilities in Canada and the U.S. and served to identify industry rate practices and financial benchmarks for comparative review by the Region. This extensive scan included desktop reviews as well as in-depth-interviews with each included utility and the insights gathered through these efforts permeated future phases of work. Zach also led research into policies and metering alternatives for addressed unexpected high bills. The scan and high bill reviews were part of a broader scope framed as the development of a long-term financial plan and study of rate structure options and Zach was intimately involved in all project tasks. The project remains ongoing.

Rockland County Sewer District No. 1 (NY)

The Rockland County Sewer District (District) is interested in investigating consumption-based rate components. The current District sewer rate structure includes one charge based on assessed property value for capital cost recovery and another based on a fixed unit rate applied to assigned units based on the type of property for each account. Administering this unit-rate is costly and challenging, while consumption based rates could offer an equitable alternative. Through this study Raftelis is helping the District obtain and analyze water consumption data from several local utilities, conducting a peer rate survey, and working to make recommendations about alternative consumption-based rate structures using industry best practices and custom analytical solutions.

Sacramento Region (CA)

Lead analytical and strategic consulting efforts in support of a regional water supply utility collaboration study in the Sacramento metropolitan areas east of the City. Work included data gathering, workshop facilitation, staff interviews, and opportunity identification, prioritization, and analysis. Participants included 7 separate water suppliers seeking to achieve cost savings, level of service improvements, and supply optimization to ensure the sustainability of surface and ground water supplies.

Sacramento Suburban Water District and Carmichael Water District (CA)

Project manager for a study evaluating the business case for a potential water district combination that includes governance, organizational, leadership, operational, financial, and regulatory procedures assessments. The study

includes an extensive evaluation of water resource considerations covering the full history of water rights for each district, as well as how to navigate place of use, groundwater, surface water, groundwater banking, and other complexities to optimize supplies in an era of drought and changing regulations.

Solvi - Valorização Energética (Brazil)

Lead economic modeling as well as gas conditioning and power block conceptual design research as part of a United States Trade and Development Agency feasibility study for landfill-gas-to-energy projects at four sites in Brazil. Work involved cost-benefit modeling, discussions with technology vendors, gas flow, and power production modeling, and site layout considerations while working with an international multidisciplinary team of experts.

Suffolk County Department of Economic Development and Planning (NY)

Facilitated multi-stakeholder meeting and workshops, conducted peer community analyses, completed legislative research, and financial plan and rate modeling as part of the development of a wastewater management implementation plan. An innovative approach to wastewater management is needed to meet the needs of 1.5 million people, 75% of which are not connected to sewers. The program involves providing grants to homeowners to support the upgrade of septic systems to more advanced onsite treatment systems.

Tri-Village (NY)

Leading research on governance structure alternatives for three villages in Westchester County, New York facing water supply infrastructure investments and opportunities to reduce costs through shared services. Efforts include outlining and drafting proposed inter-municipal agreements for the way forward by consolidating and improving upon language from a series of existing agreements between the villages, while ensuring compliance with state grant requirements and meeting the needs of each community for the benefit of the collective Three Village Agency.

City of Virginia Beach (VA)

Lead analyst on financial modelling work that followed on from a series of Arcadis studies looking at regional alternatives for water and sewer billing methodologies. This scope leveraged sample billing data to calculate future year customer bills and aggregate sewer revenue under the existing billing methodology and a chosen alternative. The outcome allows the client to evaluate the impacts of possible billing methodology changes across different customer types. Other work for this client includes financial feasibility and cost-of-service model updates as well as annual true-ups for water supply services provided by the City of Virginia Beach.

Westchester County Department of Environmental Facilities (NY)

Leading the research, report writing and workshop facilitation for a study of alternative governance structures for local sewer collection systems in the New Rochelle Sanitary Sewer District. The County along with a Consortium of four municipalities has asked Arcadis to identify and review the range of potential alternative models for economically efficient approaches to reduce inflow and infiltration (I&I) and associated sanitary sewage overflows.

OTHER RELEVANT PROFESSIONAL EXPERIENCE

- AWWA Affordability Subcommittee, 2018-present
- Jersey Water Works Asset Management & Finance Committee, 2019-present
- Steering Committee for AWWA, Water Utility Council, Water Industry Technical Action Fund, “Demonstrating Affordability Metrics in Relation to Rulemaking”, 2022
- Participant in the Raftelis Bridge Program for emerging leaders, 2021
- Arcadis U.S., Inc. - Stormwater Technical Knowledge and Innovation Team, 2014-2018
- Developed internal Arcadis training modules on stormwater funding, public private partnerships (P3) and credit/incentives systems., 2015-2017

PUBLICATIONS

- “Affordability of Wastewater Service”, Second Edition, WEF, 2022
- “An Overview of Changes to the CSO Control Policy’s Financial Capability Assessment Guidance”. NJWEA New Jersey Effluents Magazine. 2022. Vol 54, No. 1
- “Developing a New Framework for Household Affordability and Financial Capability Assessment in the Water Sector”, AWWA, 2019
- “Addressing Customer Affordability Planning”, NYWEA ClearWaters Magazine, 2018, Vol. 48, No. 2
- “No Waiting on the Rain: Options for Fully Funding a Sustainable Stormwater Utility,” WEFTEC, 2014

PRESENTATIONS

- Raftelis / Stantec Customer Assistance Program Workshop Facilitator, Utility Management Conference 2022
- “Get Ready for Federal Infrastructure Funding”, NJWEA, 2022
- “How Much is Too Much? New Approaches to Water Service Affordability Measurement,” NJWEA, 2022, NYWEA Spring Technical Conference and Exhibition, 2019, AWWA Tift Symposium 2019, AEANJ/NJWEA 2019
- “Addressing Customer Affordability Through Integrated Asset and Financial Management Planning,” NYWEA’s 90th Annual Meeting & Exhibition, 2018, AWWA New York’s Water Event, 2018, WEFTEC, 2018

Brandon Vatter PE

TECHNICAL ADVISOR

Senior Manager

ROLE

Brandon will provide additional subject matter expertise regarding the capital planning and financing elements of the study.

PROFILE

Brandon has over 25 years of experience working directly with multiple public and private clients on the regulatory, consulting, water, wastewater and stormwater utility sides to deliver capital, operations, and asset management programs on-time, at or under budget, and in compliance with necessary regulatory obligations. Brandon's experience includes NPDES permit review and compliance, NPDES permit writing, Clean Water Act (CWA) consent decree negotiations with Federal EPA and ORSANCO, and CWA consent decree implementation. Brandon brings practical hands-on experience with asset management program development and implementation, planning & implementation of integrated watershed management plans, green and gray infrastructure projects for wet weather and consent decree compliance, hydraulic modeling, sewer and storm sewer design, wastewater collection and treatment facilities, solids processing facilities, nutrient removal studies, and water, stormwater and wastewater master planning. Brandon also brings practical field construction knowledge through performance of onsite construction management and inspections for multiple projects and has directed instrumentation, control, process coordination, and start-up for multiple projects.

With a strong technical, operations, and project management background, Brandon regularly provides guidance on necessary capital investments, capital delivery and throughput improvements, NPDES permit compliance and EPA regulatory compliance to meet the obligations, goals, and asset management needs of clients.

Brandon served from 2011 to 2022 for Hamilton County (OH) as lead technical reviewer and risk advisor for the MSDGC \$4 billion consent decree wet weather and capital improvement program. Brandon worked with the team and the County Administration to confirm MSDGC was complying with all NPDES permits and the consent decree wet weather improvement program. Worked with the County Administration to develop wastewater and stormwater management annual capital improvement programs over the last 5 years that met all regulatory and asset management requirements with zero percent rate increases to the ratepayers. MSDGC's annual operating and capital budget is about \$450M. Documented savings from 2010 to 2019 to the MSDGC ratepayers have been over \$80 million in operating budget savings and \$800 million dollars in capital budget savings. **This work prevented 30%**



Specialties

- Integrated watershed management technical expert
- Wet weather capital program development & risk advisor
- Asset management program development
- Capital program delivery technical expert
- Capital & operating program organizational review & efficiency improvements
- Cost efficiency & reductions reviews

Professional History

- Raftelis: Senior Manager (2019-present)
- Mott MacDonald: Senior Project Manager (2011-2019)
- Sanitation District No. 1 of Northern Kentucky: Program Manager, Director of Planning & Design (2004-2011)
- Black & Veatch Corporation: Project Manager (2001–2004)
- CH2M Hill: Project Manager (1997-2001)
- Ohio EPA, Division of Surface Water: Regulatory Compliance Officer (1994-1996)
- B.G. Danis Industries, Heavy Construction: Cost Estimator (1993-1994)

Education

- Bachelor of Science in Civil Engineering - University of Cincinnati (1997)

Professional Registrations

- Professional Engineer: OH, 66169, 2001

Professional Memberships

- WEF
- National Society of Professional Engineers
- NACWA
- Chi Epsilon

of rate increases due to operating expense avoidance and prevented over 20% of rate increases due to capital expense avoidance.

Prior to serving in those roles, **Brandon was the Director of Planning & Design for Northern Kentucky SD1 where he led 4.5 FTEs to deliver between \$100M to \$150M of stormwater and wastewater capital projects annually through highly efficient processes and procedures, staff training, and strategic and cost-effective use of consultant support.** He directed the planning & design of multiple wastewater and stormwater compliance projects within the combined and separate sewer systems to address storm water at its source to reduce overflow volume and comply with a Consent Decree and NPDES permit requirements.

Brandon lead a team to develop first of its kind integrated watershed management plans for the 16 watersheds in the NKSD1 service area to plan and implement singular projects that achieved the multiple objectives of reducing CSOs and SSOs, reducing

surface flooding, reducing pollutant loads from stormwater discharges, eliminating sewage basement backups, and achieving measurable improvement to in-stream water quality. **SD1's Integrated Plan was estimated to save the ratepayers over \$1 Billion compared to a traditional long-term control plan mandated by the Regulators.**

Brandon also led a team to develop SD1's Capacity Management Operations & Maintenance (CMOM), Nine Minimum Control (NMC) and overall utility-wide stormwater and wastewater asset management program to meet CWA regulatory requirements, increase efficiency and reduce costs across SD1's operations. The programs were developed by in-house staff, greatly increased efficiency and lowered costs, and moved the organization from a reactive to a proactive asset manager.

After Brandon's work at SD1, **Brandon lead a team to develop the Green First Integrated Watershed Management Plan for the Pittsburgh Water & Sewer Authority (PWSA) to achieve over 6 billion gallons of overflow reduction, reduce surface flooding, basement sewage flooding, and improve in-stream water quality at a lower cost** than a traditional gray infrastructure only plan to meet TMDL and overall Clean Water Act requirements.

Brandon served as PWSA's Stormwater Program Manager leading a team of internal PWSA staff to develop and implement a \$250M five-year stormwater management capital program. Brandon trained and assisted internal PWSA staff on project management planning and design for multiple GSI projects in high yield stormwater runoff locations across the City of Pittsburgh (City) to mitigate extreme storm events for infrastructure resiliency, address local surface and basement sewage flooding, as well as CSO reduction balanced with gray infrastructure techniques. All while making sure the projects were brought in on-budget and on schedule.

Brandon also assisted PWSA with developing a stormwater utility and the necessary asset management capital program for proactive renewal of existing stormwater infrastructure through a prioritized asset management program.

KEY PROJECT EXPERIENCE

Asset Management Program, Sanitation District No. 1 of Northern Kentucky (SD1)

While the Director of Planning & Design for SD1, Brandon lead the development of SD1's CMOM and NMC programs. The programs were focused on developing best business practices to implement an asset management program and developed by in-house staff. The results of the AM program greatly increased efficiency, lowered costs, and moved the organization from a reactive to a proactive organization.

- *Lowered cost of CCTV inspection by 25%*
- *Increased in-house crew CCTV inspection footage by 110%.*

- *Reduced pipeline repair and replacement costs by 70% while increasing annual asset renewal by 500%*
- *Automation saved \$725,000 in the first year* by reducing the number of pipes needing cleaning while simultaneously reducing dry weather SSOs by 24%.
- *Reduced dry weather SSOs by 54%.*
- SD1 was consistently at least *50% below the industry benchmark for dry weather SSOs* because of their CMOM program.
- Published in the EPA publication, *Innovative Internal Camera Inspection and Data Management for Effective Condition Assessment of Collection Systems*, dated April 2010 as a model to be used when developing automated asset management programs.
- SD1's asset management program was *used as a model for developing asset management programs in Columbus, Ohio, Boston Massachusetts, Clayton County, Georgia, Tuscaloosa, Alabama, and Puerto Rico.*

The asset management program included a nationally recognized prioritized and proactive asset management program that spans across 33 local member communities. The asset management program was over 1 billion dollars in total asset value consisting of 1,700 miles of sanitary sewers & associated MHs, 400 miles of storm sewers and associated structures & catch basins, 129 pump stations and force mains where previously no program existed. The program consisted of a Continuous Sewer Assessment Program (CSAP) for the sewers and manholes, including catch basin inspection and cleaning, and a preventative maintenance program (PMP) for the pump stations, force mains and air release valves. The goal of the CSAP was to inspect all 1,700 miles of gravity sewers within 10-years. CSAP consisted of cutting-edge decision logic diagrams that have been fully automated for both field and office staff utilizing technology in various forms for next action decision-making to inspect, clean, and/or rehab/replace a pipe segment only when needed.

The program is designed to prevent the need for repeated actions that provide no further asset life renewal and focus investment on the assets that have the least remaining useful life. The CSAP represents the future of asset management and is now the cornerstone of SD1's sewer asset management program.

The Preventative Maintenance Program (PMP) for the force mains and air release valves was developed based on a complete inventory of all record documents associated with each pump station and force main, field inspection of all 148 air release valves and 129 force mains (nearly 100 miles), CCTV inspection of all gravity sewers 1 mile downstream of force main discharges, and surge analyses and force main condition assessments of high criticality pump stations and force mains. The PMP developed complete integration of all data in one central location for each pump station and force main, regular field inspection and rehab/replacement of air release valves, fully utilizing SD1's computerized maintenance management system (CMMS) for logging inventory and tracking work associated with each pump station and force main, prioritized ongoing force main condition assessment, and recommendations for surge mitigation improvements at high criticality pump stations.

Given the proven success of this program for the sewer and storm water assets, asset management efforts expanded to all of SD1's enterprise assets including wastewater treatment and pump station vertical assets, facilities, fleet, and inventory control management. Transferring methods and utilization across other departments provided the integration and optimization of managing SD1's Capital Improvement Program. SD1's approach and asset management program logic has been used to develop several asset management program software solutions currently utilized in the utility industry. This work ultimately resulted in the development of a simple and effective continuous improvement process model to collect data and effectively manage SD1's business risk exposure. Key and measurable outcomes included the formal implementation of an AM Vision and Program, development of levels of service and key performance indicators, development of many operational SOPs, and development of effective communication strategies to internal and external stakeholders to achieve shared and unified support. Lead the study to update the sanitary and storm sewer collection system, treatment plants and pump stations total asset value for use in financial planning and bond rating. *Total asset value went from approximately \$600M to over*

\$1Billion as a result of this update study. A complete bottoms-up estimate was performed to update the value of each asset class.

Baltimore, MD

Working with the Department of Public Works (DPW) Finance Department to assess the utility's stormwater, water, sewer, and solid waste capital budgets and project delivery processes compared to Best-in-Class utilities to optimize and streamline the capital budget development process and project delivery processes with the goal of developing a six-year CIP that accurately reflects the capital dollars most likely to be spent in FY2024, and prioritizes the highest regulatory and asset management projects of the Stormwater, Water, Wastewater, and Solid Waste programs. Baltimore DPW's annual operating and capital budget is \$550M - \$600M. **Developing a Master Cash Flow Spending Tracking report and Master Program Schedule Summary to track project spending and schedule compliance to allow for accurate forecasts of necessary PAYGO and bond funds needed to support the capital program.**

Lafayette, CO

Brandon worked with finance and engineering staff to develop a 10-year capital improvement program for the water and sewer utilities based on Best in Class practices for asset management and new asset construction. The CIPs were then used in a 10-year rate study to account for necessary future costs and to optimize the amount and timing of rate increases. Brandon also reviewed the stormwater utility and provided Best in Class practices compared to the current program for future implementation.

Region of Peel, Canada

Assessed the utility's water and sewer asset management programs and overall capital delivery program for comparison against Best-in-Class Utilities. **Brandon reviewed current processes and procedures, identified gaps and provided recommendations and next steps for the Region to become a Best-in-Class Asset Management Utility and increase their capital projects delivery from about \$350M per year to over \$700M per year.** The Region's annual operating and capital budget is about \$900M. The identified gaps and recommended improvements were then incorporated into a 10-year rate study to account for necessary future costs and rate increases.

Bear Creek Special Utility District, TX

Brandon worked with finance and engineering staff to develop a 10-year capital improvement program for the water utility based on Best in Class practices for asset management and new asset construction based on the projects identified in their Master Plan. The CIP was then used in a 10-year rate study to account for necessary future costs and to optimize the amount and timing of rate increases.

Greenburgh, NY

Brandon reviewed the water utility's current CIP to recommend suggested improvements to meet Best in Class practices for annual water main replacement, valve & hydrant replacement program, asset management program development, GIS and CMMS improvements, and updates to their Master Plan. The Utility used this information to justify the needed rate increase and obtain town council support.

Charlotte, NC Stormwater Utility

Brandon reviewed the stormwater utility's current asset management program compared to Best in Class practices and provided recommendations for efficiency and cost reduction improvements to increase their rate of annual asset condition assessments and renewal. Next phase of the work will assist utility staff with implementing the recommendations.

St. Helena, CA

As part of a sewer and water rate study, **helped the water utility reduce their 10-year CIP cost by \$6.6M (8%) and identified an opportunity to save up to an additional \$646,000** with a follow-on chlorine dosing optimization engineering study. In addition, helped justify adding asset management funds to the sewer and water pipeline portion of their CIP to achieve best in class annual asset renewal.

Canandaigua, NY

As part of a water rate study, **helped the water utility reduce their 10-year CIP cost for their water treatment needs by 10% (\$2M) and identified an opportunity to save up to an additional 8% on their 10-year CIP (\$1.7M)** with a follow-on chlorine dosing optimization engineering study. In addition, helped justify adding asset management funds to the water distribution portion of their CIP to achieve best in class annual asset renewal.

Manor, TX

Brandon reviewed the stormwater utility's current operations and capital programs and asset management practices compared to Best in Class stormwater utility programs and provided recommendations for incremental and proactive improvements. The improvements were then incorporated into a stormwater rate study to account for necessary future costs and rate increases.

Spring Hill, TN

Brandon reviewed the stormwater utility's current operations and capital programs and asset management practices compared to Best in Class stormwater utility programs and provided recommendations for incremental and proactive improvements. The improvements were then incorporated into a stormwater rate study to account for necessary future costs and rate increases.

Pittsburgh Water and Sewer Authority (PA)

Served as Program Manager and worked with PWSA staff to develop the stormwater asset management program for PWSA, including the overall vision, goals & objectives, levels of service, and annual operating and capital budgets needs. Working with PWSA staff, developed and implemented a \$30M annual stormwater management capital program to support construction of new infrastructure and proactive renewal of existing stormwater infrastructure through a prioritized asset management program. Oversaw the planning and design of multiple stormwater management projects in high yield stormwater runoff locations across the City of Pittsburgh (City). Developed Green First Integrated Watershed Management Plan to achieve over 6 billion gallons of overflow reduction, reduce surface flooding, basement sewage flooding, and improve in-stream water quality at a lower cost than a traditional gray infrastructure only plan to meet TMDL and overall Clean Water Act requirements. Oversaw and provided guidance and training to PWSA project management staff for the design and construction of green infrastructure to mitigate extreme storm events for infrastructure resiliency, address local surface and basement sewage flooding, as well as CSO reduction balanced with gray infrastructure techniques.

Hamilton County (OH)

Lead technical reviewer and risk advisor for wet weather and capital program management oversight for the Hamilton County (County) Board of County Commissioners and County Administration. Brandon's and the team's role was to advise the County on regulatory compliance, asset management needs and budgets, and program management risks and opportunities to more cost-effectively and efficiently implement MSD of Greater Cincinnati's planned \$3.5 Billion (2006\$) Wet Weather Abatement Program to minimize impacts to sewer rates, address future regulatory risks, efficiently and cost-effectively renew the existing system assets, and minimize ongoing legacy costs of the ultimate program to achieve overall compliance with the Clean Water Act. Played a lead role to develop integrated watershed plans to take advantage of EPA's Integrated Planning Law to ensure the final plan adopted and implemented by MSDGC is the most cost-effective, reasonable, and practical approach for the Hamilton County ratepayers.

Brandon and the team saved Hamilton County in excess of \$900M in capital and operating cost reductions through our work.

The team has provided the County with assessments regarding every aspect of the program's organization, management organization, processes and procedures, planning and project sizing, cost-effectiveness, operating and capital costs reductions, strategy for regulatory compliance, including future regulations, asset management vision and execution, project execution, as well as a series of special studies, including the proper calibration and validation of the Collection System Hydrologic and Hydraulic Model (SWM) development. Technical assessments have covered a wide range of topics, including: the SWM; the flow monitoring program; asset management program, the sustainable infrastructure (Green) program; tunnels, pump stations, and relief sewers; new stormwater system; surface flooding and basement backup relief, regulatory compliance; water quality issues; and the various treatment technologies being demonstrated or planned.

Advised the County on policies and procedures to be implemented to address the implementation, monitoring, and effectiveness of planned storm sewer separation, post-construction stormwater MS4 permit requirements, and green infrastructure projects in conformance with their current MS4 NPDES permit, the Mill Creek TMDL, EPA Stormwater Regulations, and overall compliance with the Clean Water Act (CWA). Performed owner representative services for various design-build and construction manager at risk projects.

Assisted the County with the development of two Integrated Watershed Management Plans within their CSO and SSO Muddy Creek and SSO 700 watersheds to reduce the costs of their Consent Decree. IWM in these two watersheds has allowed the County to reduce costs by over \$150M for addressing overflows while providing greater water quality and community benefits.

Frankfort Sewer District (KY)

Led the development of a private source inflow & infiltration removal program for Frankfort Sewer District (FSD) including the development of a standard operating procedures manual for the program. Program includes utilization of GPS and field data tablet collection integrated with FSD's CMMS, a property owner cost-share program to properly remove I/I from private property. Included regular public, city leaders, and stakeholder presentations and interaction throughout.

Huntington Sanitary Board (WV)

Brandon provided strategic guidance and assistance to the Huntington Sanitary Board (HSB) to incorporate Integrated Watershed Management and a green infrastructure demonstration program into HSB's capital program and modifications to the CSO Long Term Control Plan. The IWM plan to be incorporated into their WVPDES WWTP Permit. This IWM plan will be an example of including CSO regulatory compliance under an integrated planning context within an NPDES permit as opposed to a Consent Order or Decree. WVDEP is working closely with HSB to modify their WVPDES WWTP permit to include green infrastructure and an IWM approach.

Huntington Stormwater Utility (WV)

Providing strategic guidance and assistance to the Huntington Stormwater Utility in the development of their stormwater utility in their separate and combined sewer systems. Performing stormwater management plan reviews for implementing green infrastructure to manage stormwater in extreme and typical year storm events for new and redevelopment throughout the City. Assisting with developing ordinances and standard protocols and procedures for GI maintenance inspections.

Philadelphia Water Department (PA)

Brandon served as a QA/QC reviewer for an annual contract to design multiple green infrastructure projects, multiple green streets and green parks throughout Philadelphia.

City of New York City (NY)

Brandon served as a QA/QC reviewer for an contract to design over 500 right of way bioswales in the Newtown Creek watershed in New York City for New York Department of Environmental Protection.

Huntington Sanitary Board (WV)

Assisted Huntington Sanitary Board (HSB) with identifying and evaluating the condition of critical assets within their collection system and wastewater treatment facility and developing the construction and capital renewal costs and needs for those critical assets. Work also included regulatory risk guidance for meeting the stringent requirements of their LTCP, presentations to the board and city council for funding approval, and assisting HSB with development of an asset management program.

Sanitation District No. 1 of Northern Kentucky (KY)

Developed an innovative and affordable combination of gray, green, and watershed-based improvement projects to eliminate over 100 SSOs, bring 92 CSOs into compliance, reduce urban flooding and basement backups, address dry weather source pollution, address MS4 permit compliance, TMDL compliance, and improve water quality. **This watershed-based approach will save the ratepayers of the Sanitation District No. 1 of Northern Kentucky (SD1) over \$1 Billion as compared to a traditional CSO and SSO approach.**

Led 4.5 FTEs to deliver between \$100M to \$150M of capital projects annually through highly efficient processes and procedures, staff training and strategic and cost-effective use of consultant support. Directed the planning & design of multiple stormwater compliance green BMPs and gray infrastructure projects within the combined and separate sewer systems to address storm water at its source in order to reduce overflow volume and comply with a Consent Decree and MS4 NPDES permit requirements. Examples: Bioretention basins, backyard and street-scale rain gardens, green streets, downspout disconnection to rain barrels and infiltration drains, storm sewer separation with water quality treatment, tree planters, downspout cisterns, Filterra boxes, infiltration basins, modular wetlands, rain gardens coupled with underground detention, etc. Additional Elements included managing a system-wide flow monitoring program of over 245 flow meters and 45 rain gauges for over 12 months to collect data for characterization and model development. Managed a year-long CSO, SSO and storm water outfall sampling program at approximately 30 locations to characterize the water quality associated with these discharges.

Development of a cutting-edge, highly accurate and validated collection system hydraulic model within InfoWorks able to accurately simulate SD1's 1,600 mile collection system, seasonal conditions, antecedent moisture, and varying groundwater levels within a single model. Because of its accuracy, this model was accepted by the regulators to use for quarterly and annual reporting of overflow frequency and volumes.

In July 2010, SD1 experienced a 100-year storm and 8 days later then experienced a 50-year storm. These events caused major flooding, public and private property damage, and basement backups throughout the combined sewer system (CSS) on both occasions. Brandon led the project to understand the root causes of the flooding and damage, evaluate alternatives to increase the level of protection against flooding and basement backups and select the desired solutions throughout the CSS to mitigate future flooding, backups, and damage and increase the level of resilience of the sewer infrastructure. Solutions were analyzed on a series of criteria including, level of protection against basement backups, future flooding, property damage, CSO reduction, water quality improvement, use of green infrastructure, and cost. The selected solutions included a combination of relatively low cost green and gray infrastructure to increase the resilience level of the infrastructure and level of protection against flooding and basement backups in the immediate term with longer-term solutions to be implemented with the CSO LTCP. The study found through an investment of \$15M, a majority of the basement backups (161 of 200) could be eliminated

and the infrastructure level of protection increased from the current 2-year storm to a 25-year storm protection level while also reducing CSO volume in the short-term by 35 MG.

Led the development of a public and private source inflow & infiltration removal program for SD1 which included the business case development of economic and non-economic factors, utilization of GPS and pentop technology for data collection, a 50/50 cost-share program with private property owners to properly remove I/I from private property, and regular public, city leaders, and stakeholder presentations and interaction. Projects were developed to holistically address both sanitary and storm assets renewal both on the public and private side and utilization of green infrastructure to provide both water quantity and quality benefits for storm water runoff. Projects are currently in various phases of development, design and construction.

Led the study to update the sanitary and storm sewer collection system, treatment plants and pump stations total asset value for use in financial planning and bond rating. Total asset value went from approximately \$600 million to over \$1 billion as a result of this update study. A complete bottoms-up estimate was performed to update the value of each asset class. Utilized current condition data collected for the sewers and pump stations to calculate asset values and remaining useful life. Data was prepared to be entered into SD1's CMMS for annual updates to asset value and remaining useful life categories for asset management yearly planning and rehabilitation/replacement cost forecasting.

Led a team of three consultants to develop and implement the nine minimum controls program for SD1's combined sewer system and 92 CSOs. NMC program was approved by the regulators and has been implemented. Innovative and cost-effective solids & floatables control program was developed consisting of simple S&F controls (bar racks, weirs/baffles, and net bags), regular diversion inspections, and a comprehensive approximate 12-year catch basin retrofit program. Project identified low-cost simple improvements to the combined sewer system to maximize conveyance to the treatment plant and reduce overflow volumes. One example was adjustment of start/stop elevations at a pump station to reduce typical year annual CSO volume by 80 MG; the equivalent of a six MG storage tank (\$30 million savings).

Led a team of three consultants to develop and implement plans for eliminating SSOs at 14 high priority pump stations and provided a backup power solution at 129 PSs. Both plans were approved by the regulators and projects are currently in various stages of design and construction to implement the plans.

As assistant project manager, managed and participated in design of approximately 61,000 feet of new 30-inch through 60-inch sanitary sewers and a new 15 mgd peak remote pumping station along with 15,000 feet of 24-inch force main. Worked with the Sanitation District to expand and replace their existing sanitary system infrastructure to treat current and future sanitary flows.

As assistant project manager & resident inspector, managed construction phase services and performed inspection for over 5,000 feet of 24-inch force main. Reviewed submittals and interfaced with the Contractor and SD1's full-time inspection staff to ensure a well-constructed project. Conducted training session on restrained joint pipe with SD1's inspection staff to familiarize staff with inspection and installation of restrained joint piping.

Led and managed multiple consultants for various sewer and pump station design projects from conception through preliminary and final design, and through various construction phases. Projects included:

- Pond Creek Pump Station, 7.2 MGD
- Burlington Pump Station, 3.0 MGD
- Riley Road Pump Station, 9.4 MGD
- Alex-Licking Pump Station, 3.6 MGD

- Sunset Pump Station, 1.3 MGD
- Diversion Pump Station, 17 MGD
- Ash St Pump Station, 7 MGD
- Lakeview PS Surge Tanks: Two, approximately 7,000 gallon surge tanks to reduce damaging surge pressures in the force main from 500 psi to less than 250 psi.

Eastern Regional Collection System

Approximately 35,000 feet of new sanitary sewers ranging in size from 8-inch to 54-inch. Approximately 26,000 feet of force mains ranging in size from 16-inch to 20-inch. Sewers were constructed to convey flow to the new Eastern Regional Water Reclamation Facility. Sewer infrastructure was sized to provide ultimate build-out growth capacity and eliminate eight MG of overflow volume in a typical year.

Western Regional Tunnel

Six miles of 12-foot bore diameter tunnel through shale and limestone, steel ribs and lagging initial support, 8.5-foot finished diameter T-lock lined RCP, approximately 4,600 ft of open-cut 8.5 foot diameter fiberglass reinforced polymer mortar pipe, approximately 702 feet of aerial pipe bridge across a low-lying creek and floodplain. Gravity flow control structure to control flows ranging from eight MGD to 250 MGD to the downstream treatment plant and store flows in the tunnel. Innovative features of the project: first project where both RCP and fiberglass reinforced polymer mortar pipe joints were tested for exterior pressure capacity in order to withstand 100 psi of groundwater pressure, surge analyses performed to design features into the tunnel to avoid transient waves during storm events, unique multiple redundant sluice gate gravity flow control shaft to regulate flows to the treatment plant.

Western Regional Collection System

Approximately 13 miles of new sanitary sewers ranging in size from 30-inch through 72-inch. Approximately 15,000 feet of 24-inch force main. Sewers were constructed to convey flow to the new 20 MGD Western Regional Water Reclamation Facility. Sewer infrastructure was sized to provide ultimate build-out growth capacity and eliminate 60 MG of overflow volume in a typical year.

River's Edge Inline Storage and Conveyance Project

8,000 feet of 84-inch and 110-inch Hobas pipe to replace the existing 27-inch Ohio River Interceptor in Dayton, KY. The project provides 2.2 MG of inline storage and reduces two local CSOs by 56 MG in a typical year. Unique aspects of the project included:

- Design/build project partnership with a local developer to take advantage of an opportunity associated with a proposed riverfront development.
- Challenging geotechnical conditions related to poor soils, settlement, and local and global stability. Involved surcharging the existing soils and laying portions of the sewer in "humps" to counteract the proposed settlement of the underlying soils. Involved the use of stone mattresses below the pipe to bridge areas of poor soils.
- Evaluation and mitigation of surge conditions in the storage pipe to ensure pipe was properly vented and damaging surge pressures did not develop due to fill and conveyance rates
- Two junction chambers between the existing combined sewers and the new conveyance pipe to eliminate a grade conflict between the pipes at both CSOs and also serve as solids & floatable control chambers.

Targeted Sewer Cleaning Project

Led the development and implementation of a comprehensive combination sonar and CCIV inspection and cleaning of the major interceptor sewers within the SD1 system. Approximately 80,000 feet of interceptor and key portions of the combined sewers along the Ohio and Licking Rivers were inspected utilizing above and below the waterline technology to assess condition and determine the amount of debris in the sewers. The interceptor sewers

were installed in the 1950s and had never been inspected until this project. The condition assessment allowed each pipe to be prioritized by structural and maintenance condition and led to the first phase of cleaning approximately 30,000 feet of interceptor sewer completed in 2009. Post-cleaning sonar and CC1V inspection of the sewers was performed with the cleaning to assess compliance with cleaning requirements (95% of the debris required to be removed) and to confirm post-cleaning structural condition of the sewer. Estimates predict that CSO volume would be reduced by 20 MG per year from this work.

Miscellaneous Sewer and Pump Station Upgrades

Involved in the day-to-day decision-making and project development for rehabilitation and replacement of the existing sewers, force mains, and pump stations infrastructure throughout the 1,600 mile collection system; Key decisions made: Should trenchless techniques such as pipe bursting, horizontal directional drilling, or cured-in-place lining be used over open-cut; should sewers be rerouted or upsized; what is the history of backups, flooding, dry weather overflows or FOG related problems; how do these repairs integrate with the CSAP and watershed plans.

Preventative Maintenance Program (PMP) for Pump Stations, Force Mains, and Air Release Valves

The PMP was developed based on a complete inventory of all record documents associated with each pump station and force main, field inspection of all 148 air release valves and 129 force mains (nearly 100 miles), CCTV inspection of all gravity sewers one mile downstream of force main discharges and surge analyses and force main condition assessments of high criticality pump stations and force mains. Inspection techniques of the force mains consisted of field walks, insertion probes to identify location, ground penetrating radar, surface location instruments, and the PPIC pipe-diver to locate and identify leaks and air pockets for high criticality force mains. As a result, the PMP called for complete integration of all data in one central location for each pump station and force main, regular field inspection and rehab/replacement of air release valves, fully utilizing SD1's computerized maintenance management system (gbaMS) for logging inventory and tracking work associated with each pump station and force main, prioritized ongoing force main condition assessment, and recommendations for surge mitigation improvements at high criticality pump stations.

City of Dayton (OH)

As assistant project manager, directed and performed design, inspection, construction phase services, and start-up for installation of two new dry chemical-type chlorine gas scrubbers. Designed outdoor fluoride storage tank with containment area and new chlorine gas vacuum feed systems.

Served as project engineer, performing design, inspection, construction phase services, and start-up for new sodium hypochlorite storage and feed facilities to replace the existing chlorine gas feed system. Improvements included three new 5,500 gallon storage tanks, tank fill system, and transfer and feed pumping to achieve a chlorine dosing rate of 2.0 mg/l at a peak flow of 210 mgd. New improvements were located on the second floor of the existing RAS pump station.

As project engineer, performed design, inspection, and construction phase services for improvements to the existing 21 O-mgd peak flow pump station. Improvements included wetwell and suction piping modifications for all pumps, screening improvements, new SCADA pump control system, and force main modifications, including installation of drain valve vaults.

As project engineer, evaluated chemical and biological phosphorus and total nitrogen removal alternatives and determined the most cost-effective method of achieving target phosphorus and total nitrogen removal based on each facility's existing infrastructure.

As project manager, directed and designed various improvements to the existing 72-mgd average and 190-mgd peak flow treatment facilities, including twenty new trickling filter motorized rotary distributors with a central PLC control system, fifteen new trickling filter ventilation fans; a new boiler building addition to house three new 11.7 million btuh heating water boilers for plant-wide service, heating water system upgrades for sludge heat exchangers and building heating supply; replacement, upgrades, and installation of 64 slide and sluice gates; new aeration basin drain system; WAS piping improvements; leak repair of existing concrete at the aeration basins; structural repair of failed effluent trough supports at the final clarifiers; valve and actuator replacement at the effluent filters; and design of a new instrumentation and control system for the aeration air supply system.

Served as assistant project manager for the preparation of a water and wastewater facilities master plan update covering expansion of the existing City of Dayton water supply and wastewater collection and treatment infrastructure to serve new outlying areas, including Clayton, Tri-cities, Dayton airport, and Miami County. Existing Stoner model was updated and used to check fire flows, demands, and evaluate new pipelines. Included routing and sizing of new water mains and booster pump stations to accommodate the future development and projected water demands and wastewater production.

Assistant project manager and lead designer for approximately 20,000 feet of new 16-inch and 20-inch water main to serve the City of Clayton maximum day and fire flow demands from the existing City of Dayton water supply infrastructure. Initial design maximum day and fire flow demands are 1.5 and 2.2 mgd, respectively, with ultimate maximum day demands of 3.7 mgd. Included stray current corrosion mitigation design to protect the new water main from an existing cathodically protected natural gas line.

Greater Cincinnati Water Works (OH)

As assistant project manager, performed and participated in a study and present value cost analysis development of alternatives for the C.M. Bolton WTP Wellfield Expansion Study. The study addressed an increase to the existing WTP's raw water supply from approximately 34 to 50 mgd. Alternatives for expansion by adding both horizontal collector wells and/or vertical wells in phases were examined along with O&M costs over a 30-year return period.

Metropolitan Sewer District of Greater Cincinnati (OH)

As assistant project manager, performed plant and neighborhood-wide odor sampling and modeling to determine processes that had the highest impact on off-site odors. Used air travel model to determine extent of offsite impact, number of occurrences per year, and improvements needed to reduce impacts. Work included preliminary design and lifecycle costing of odor control improvements for the top eight highest odor producing processes.

As Project Manager, managed and participated in design of approximately 2,063 feet of 60-inch casing pipe and 36-inch sanitary sewer to be installed by microtunneling to cross under the Great Miami River and connect to the Taylor Creek WWTP. The sewer is located in the Great Miami Aquifer requiring special design considerations for the sewer and manholes to combat groundwater forces and infiltration.

Northern Kentucky Water District (KY)

As assistant project manager, performed study, preliminary design, and cost estimating of various SCADA improvements to the Northern Kentucky Water District's complete distribution system facilities to migrate the existing system from telephone lines and Aquatrol based communication to radio and Wonderware based communication, remote control, and monitoring. Served as project manager for the PLC and Wonderware programming services for the final construction.

As Assistant Project Manager and Resident Engineer, managed and performed resident engineering, inspection, construction phase, and startup services for a new chemical and maintenance building construction and plant wide

SCADA system for the existing 40 mgd Ft. Thomas WTP. All existing chemical storage and feed systems were replaced. An automatic plant flow control system to automate raw water flow changes with finished water demands were implemented, along with remote operation of all chemical metering and filtering control.

Louisville Metropolitan Sewer District (KY)

Served as project engineer, working with plant staff to write the Operation and Maintenance manual for the Phase 2 Plant improvements project. The project consisted of increasing the annual average day hydraulic capacity from 15 to 19.5 mgd by adding additional raw water pumping, screening, and grit removal; constructing three new secondary clarifiers, and adding additional sludge pumping and final effluent flow monitoring.

Louisville Water Company (KY)

As project engineer, conducted a study of alternatives to rehabilitate and/or replace approximately 33,000 feet of existing 48-inch cast-iron unlined water main. Researched and developed cost opinions for various rehabilitation techniques, including joint seals with cement mortar or epoxy lining, cured-in-place liners, sliplining, pipe-bursting, and structural grout repair.

Greene County (OH)

As assistant project manager, designed improvements to wastewater facilities to increase capacity from 4.5 to 9.5 mgd, including installation of 3,000 feet of 66-inch PCCP sanitary sewer through the City of Bellbrook's potable water wellfield and delineated wetlands. Improvements to facilities included a preliminary treatment building with fine screening and screenings washing and compacting, aerated grit and grease removal facilities, a new 142-foot diameter aeration basin, new 121-foot secondary clarifier, a new aeration blower/generator building, and new flow control structures. Improvements also included RAS pump upgrades, drain pump station improvements, a biosolids storage pad, new plant-wide SCADA system, new engine generator, and screw pump station elimination.

As project engineer, performed inspection, hands-on startup, and process optimization for a seven dry ton per day sludge processing facility. Major processes included sludge dewatering with centrifuges, lime stabilization, and polymer feed facilities.

RELEVANT PROFESSIONAL EXPERIENCE

Sanitation District No. 1 of Northern Kentucky: Director of Planning and Design (2007-2011)

While the Director of Planning and Design for SD1, Brandon led the development of the Sanitation District No. 1 of Northern Kentucky's (SD1) CMOM and NMC programs. The programs were developed by in-house staff, greatly increased efficiency and lowered costs, and moved the organization from a reactive to a proactive organization.

- Lowered cost of CCTV inspection by 25%
- Increased in-house crew CCTV inspection footage by 110%.
- Automation saved \$725,000 in the first year by reducing the number of pipes needing cleaning while simultaneously reducing dry weather SSOs by 24%
- Reduced dry weather SSOs by 54%
- SD1 was consistently at least 50% below the industry benchmark for dry weather SSOs because of their CMOM program
- Published in the EPA publication, Innovative Internal Camera Inspection and Data Management for Effective Condition Assessment of Collection Systems, dated April 2010 as a model to be used when developing automated asset management programs
- SD1's CMOM program has been used as a model for developing sewer asset management programs in Columbus, Ohio, Boston Massachusetts, Clayton County, Georgia, Tuscaloosa, Alabama, and Puerto Rico

The CMOM and NMC programs include a nationally recognized prioritized and proactive asset management program that spans across 33 local member communities. The asset management program was over 1 billion dollars in total asset value consisting of 1,700 miles of sanitary sewers, 400 miles of storm sewers, 129 pump stations and force mains where previously no program existed. The program consists of a Continuous Sewer Assessment Program (CSAP) for the sewers and manholes and a preventative maintenance program (PMP) for the pump stations, force mains and air release valves. The goal of the CSAP is to inspect all 1,700 miles of gravity sewers within 10-years. CSAP consists of cutting edge decision logic diagrams that have been fully automated utilizing technology in various forms for next action decision-making to inspect, clean, and/or rehab/replace a pipe segment only when needed.

The CSAP represents the future of asset management and is now the cornerstone of SD1 's sewer asset management program.

PUBLICATIONS

- The Need for an Integrated Water Quality Affordability Strategy, NYWEA, June 2012, WEF Webinar, June 2012, WEFTEC USEPA Integrated Planning Panel, October 2012, Charleston, WV Infrastructure Task Force 2013, WEFTEC 2013, Great Lakes - St Lawrence GI Conf 2017
- Alternative Approaches to Affordability Workgroup, WEF, AWWA, US Conf of Mayors – Reviewer of guidance developed on alternative approaches for measuring a community's ability to afford needed water, wastewater and stormwater improvements and infrastructure, 2013
- Water Quality Trading, WEF Publication, Chapter Author – The Future of Water Quality Trading for CWA Compliance, 2014
- Green Infrastructure Implementation, WEF Publication, Chapter Author – Navigating the Institutional Landscape for Implementation of GI, 2013
- Ask the Experts, Green Infrastructure, Center for Watershed Protection - Watershed Science Bulletin, April 2013
- SD1's Innovative Continuous Sewer Assessment Program and Data Automation: Lessons Learned After Three Years of Implementation, WEFTEC 2011 & 2013.
- Developing and Defending Your Utility's Private Lateral Program: A Legal Perspective, KY/TN WEA Annual Conference, July 2011.
- Integrating Stormwater Controls Designed for Channel Protection, Water Quality, and Inflow/Infiltration Mitigation in Two Pilot Watersheds to Restore a More Natural Flow Regime in Urban Streams, Watershed Science Bulletin, Center for Watershed Protection, Spring 2012
- Peeking into the World of Private Source I/I Control, An Integrated Approach to SSO Control, KY/TN WEA Annual Conference, July 2011
- Sanitation District No.1 Partners with Development Community to Cost-Effectively Reduce Overflows into the Ohio River, WEF Collections System, 2008
- Backing Them Up - Staging Inline Storage and Green Infrastructure as Low Cost Steps Towards Controlling a Big CSO - Willow Run CSO, WEF Collections System, 2010
- Cleaning Large Diameter Interceptors: Everybody Knows They Need to Do It, But Doesn't Want to Admit It, WEF Collections System, 2010
- What if Industrial Flows Don't Make It to the Plant? Determining and Addressing Potential Water Quality Impacts of Non-Domestic Dischargers in a Combined Sewer System, WEF Collections System, 2010
- Knowing Your Pump Station's Stress Level, WEF Collections System, 2010
- Don't Let Your Model Sit on a Shelf: Are You Getting the Most Out of Your Model?, WEF Collections System, 2010 (Co-author)

- Understanding Tunnel Operation: The Use of Transient Analysis in the Planning and Design of the Northern Kentucky Western Regional Tunnel, WEFTEC, 2008
- Floatables Control is Surfacing Again, What Can You Do? WEFTEC, 2008
- Accurate Representation of Inflow and Infiltration in Separate Sewer System Models, Revolutionizing Infrastructure Sizing, WEF Collections System, 2007
- Developing an Accurate Model to Support Cost-Effective Collection System Design Solutions: Methods and Benefits, WEF Collections System, 2006
- Practical Applications of a System-Wide Model, KY-TN Water Professionals Conference, 2005
- Providing Sanitary Sewer Service Across the Great Miami River, WEFTEC, 2004
- How Should You Remove Your Nitrogen and Phosphorus? A Nutrient Removal Study for the City of Dayton, Ohio Advanced Wastewater Treatment Facilities (AWTF), OWEA Annual Conference, Dayton, Ohio, 2001
- Chlorine Risk Reduction Through the Use of Chlorine Gas Scrubbers, A Chlorine Risk Reduction Study for the City of Dayton, Ohio Water Treatment Plants, AWWA Southwest District, Ohio Section Meeting, 2000

PRESENTATIONS

- "Great, we now have a Stormwater Utility! Now how do we prioritize and fix all the problems?, multiple presentations, 2020 - 2022
- "Asset Management Made Easy - SD1's Continuous Sewer Assessment Program Implements Practical Asset Management," WEFTEC, 2014
- Integrated Watershed Management to Achieve more Cost-effective Regulatory Compliance, multiple presentations, 2012 - 2018
- "Proving that Bladder Surge Tanks Cured Excessive Surge Conditions in a 30" Force Main," WEFTEC, 2011
- "When Good Water's Gone Bad: Prevention and Control of Sewer System Overflows. SD1's Watershed Approach to Water Quality Improvement and Compliance with the Consent Decree," WEFTEC, 2011
- "Do Not Forget the Force Mains!!," WEF Collections System, 2010," Five Cities Plus Conference, 2010
- "SD1's Watershed Approach," WEFTEC, 2009
- "Asset Management Made Easy - SD1's Continuous Sewer Assessment Program Implements Practical Asset Management," WEFTEC, 2009
- "Integration of Field Inspection Data and Automated Analysis Streamlines Sewer System O&M and Rehabilitation Work for SD1," WEFTEC, 2009
- "Implementing a Sewer Overflow Consent Decree through Watershed Management," WEFTEC, 2008
- "Western Regional Conveyance and Storage Tunnel," KSPE Annual Conference, 2008
- "Steps to Implementing an Early Warning and Predictive Water Quality Monitoring Program," KY/TN AWWA/WEA Annual Conference, 2004

APPENDIX B: SAMPLE RATE STUDIES

Appendix B: Sample Rate Studies





Capital Charge Study – Workshop #1: Kickoff Meeting

April 21, 2022



Agenda

1. **Introductions**
2. **Purpose & History**
3. **Current Methodology**
4. **Potential Options**
5. **Advantages & Disadvantages**
6. **Discussion**
7. **Next Steps**



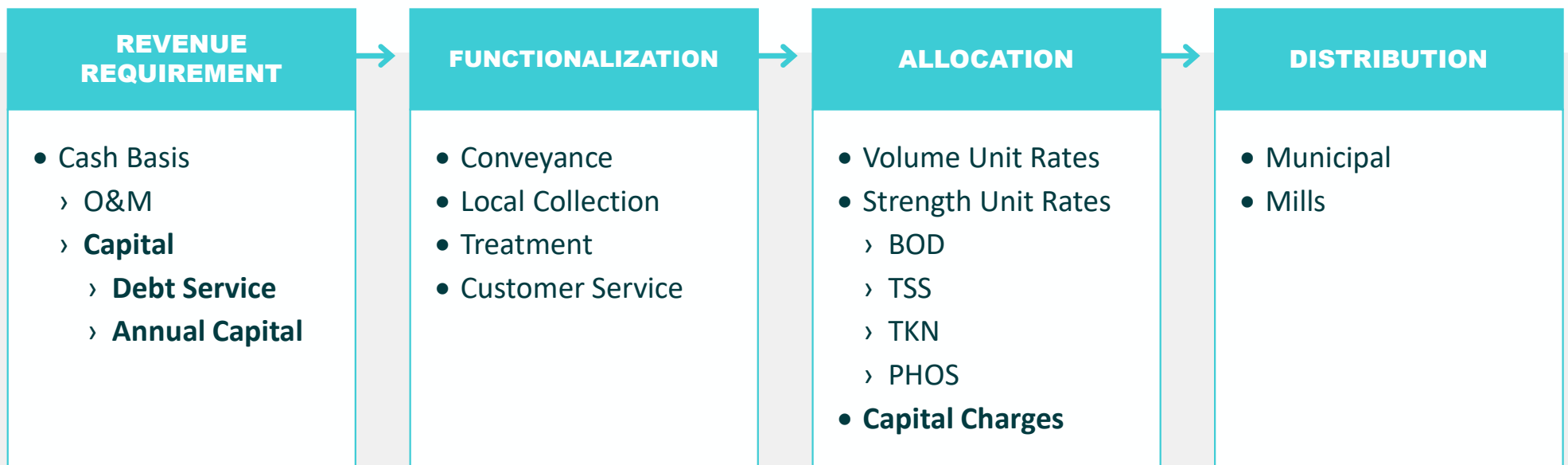
Purpose

Study Purpose & Meeting Objective

- **Study Purpose:** Develop and evaluate new capital charge billing approaches and make a recommendation to Commission.
- **Drivers:** Desire to explore ways to improve the capital charge billing process, including consideration of:
 - › Move from budgeted to actual units
 - › True-up procedure
 - › Revise the capital charge component from 65% to 100% of total capital
 - › Other approaches to be identified...
- **Meeting Objective:** Identify a set of preliminary capital charge billing options to carry forward for further analysis.
- **Stakeholder Advisory Group Role:** Serve in an advisory capacity to NEW Water to inform the Capital Charge Study process.

History

Wastewater Cost-of-Service Analysis Process



History of the Capital Charge

Concept: Implemented to stabilize a portion of annual cost and revenue.

Development: The capital charge was introduced in 2014 following completion of a prior Study “Rate Methodology for Cost of Service Allocation”.

Methodology: The capital charge is allocated to each customer based on proportion of customer’s budgeted flow and loads relative to total.

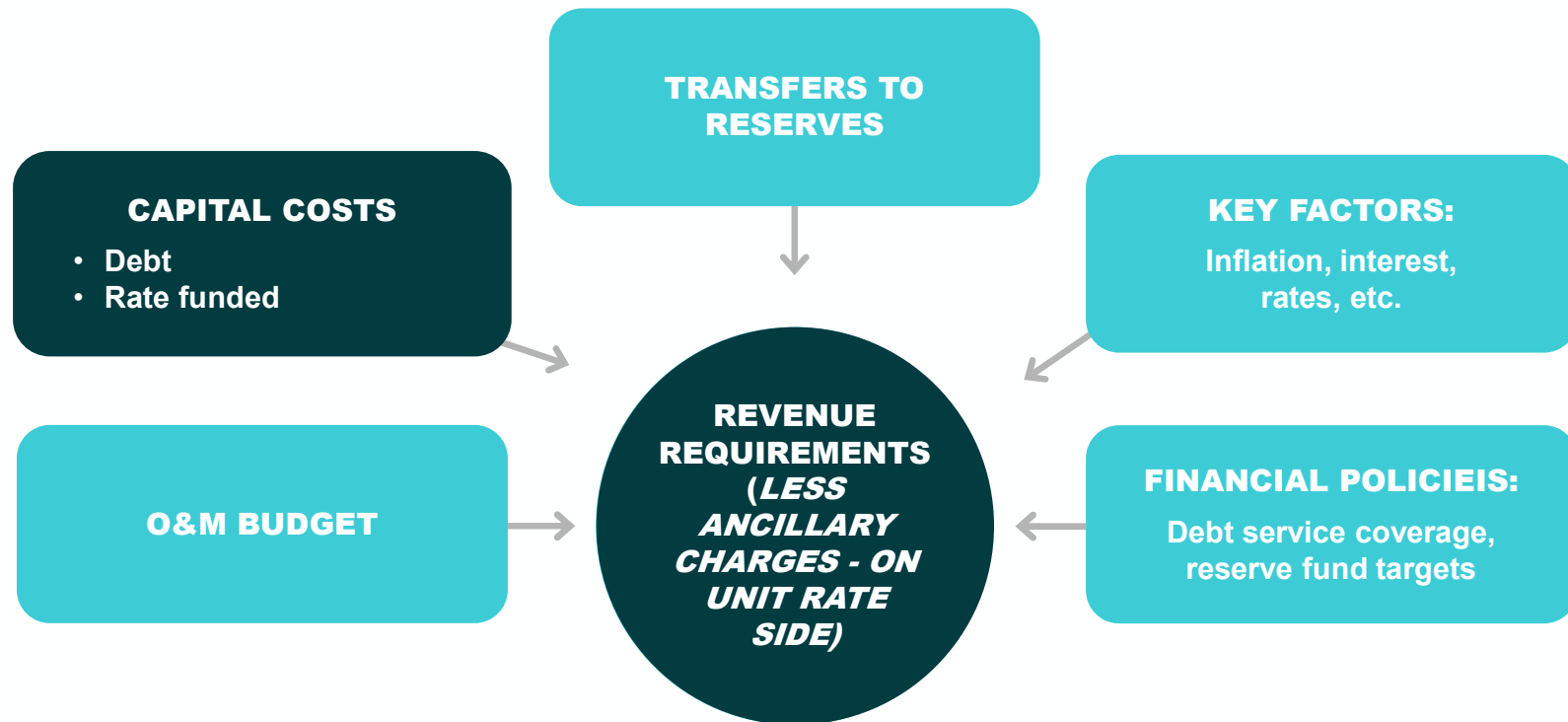
Note: *Not a new or additional charge*, but merely a different way to collect a portion of the Total Budget Requirement.

History of the Capital Charge

Budget Year	Amount of Capital Charge*	How Capital Charge Distributed/Collected
Pre 2014	No capital charge	All capital collected via parameter rates based on actual system use
2014	15% of total budget	Collected based on budgeted system use, equal across parameters
2015		
2016		
2017		
2018	45% of capital budget	Collected based on budgeted system use, across parameters consistent with our cost methodology
2019	65% of capital budget	
2020		
2021		
2022		

Current Approach

Identify Revenue Requirements



Wastewater Cost of Service Analysis

Allocation of Revenue Requirements

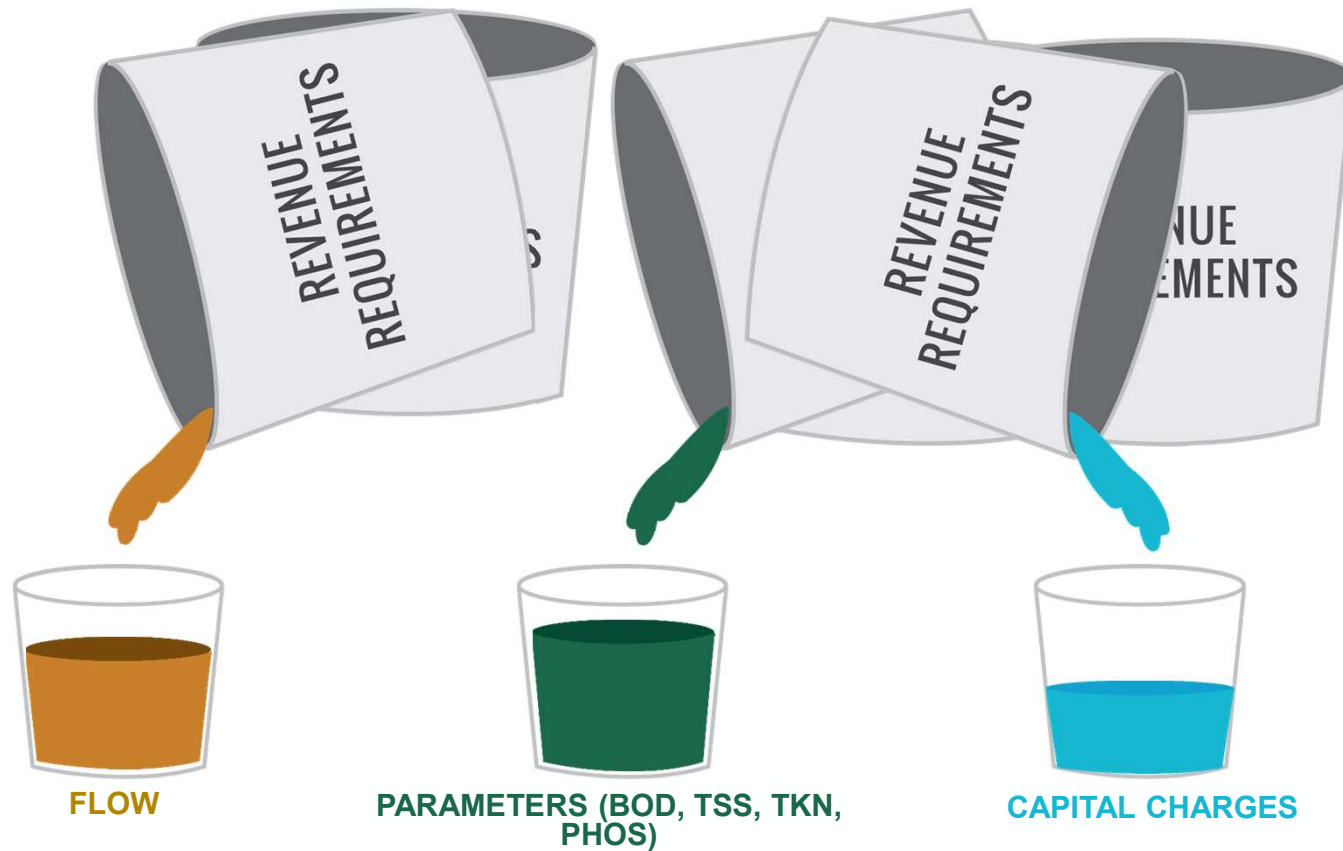


Illustration of Current Methodology

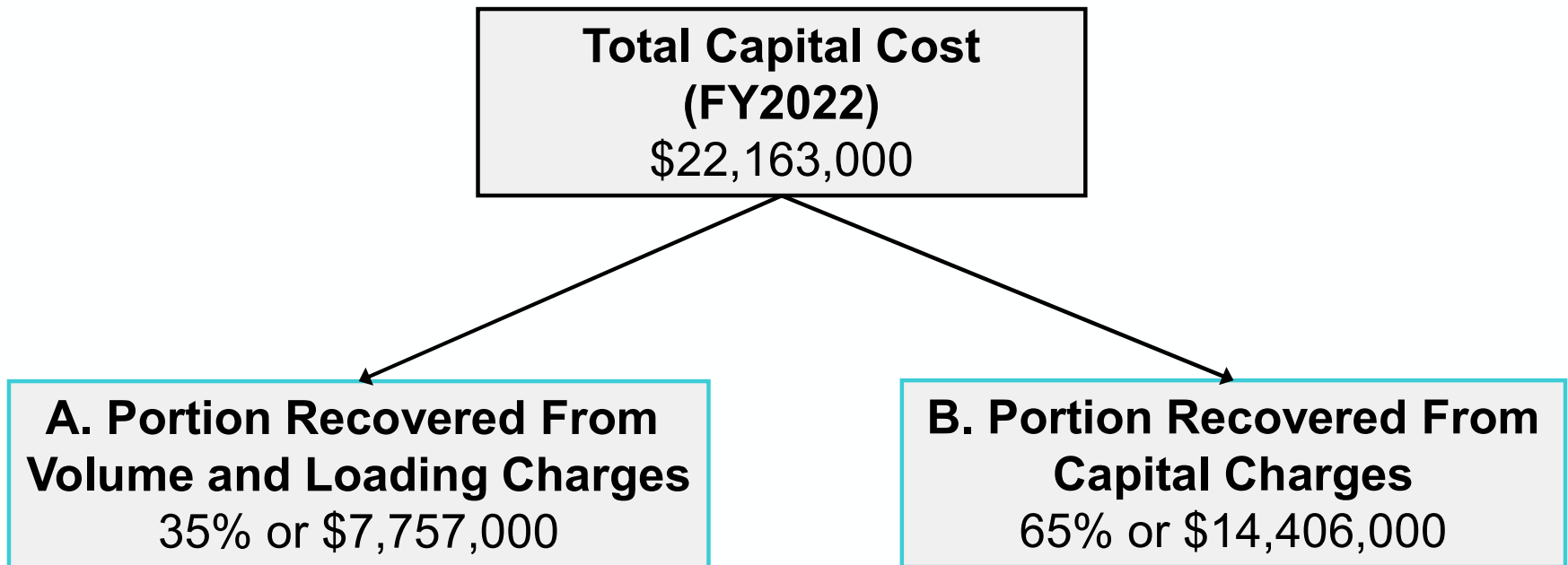


Illustration of cost distribution

Distribution of Budgeted Revenue Requirement

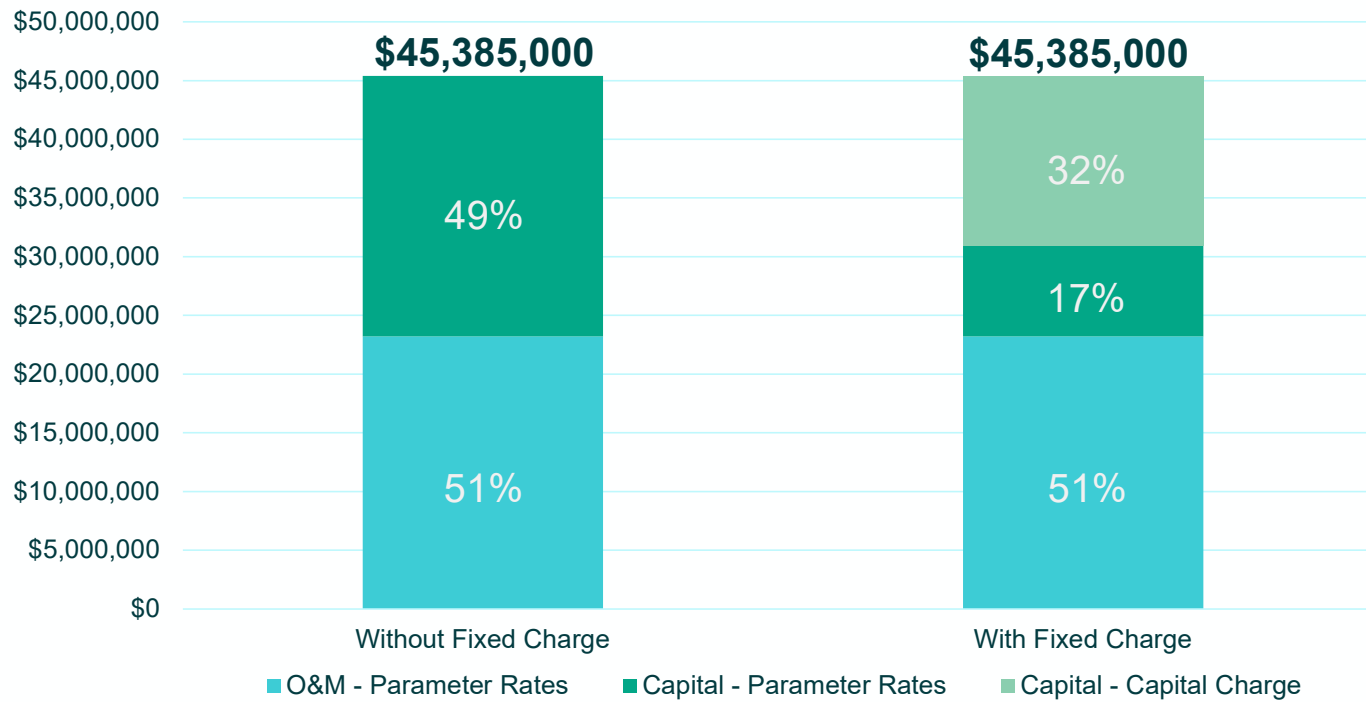


Illustration of Current Methodology

A. Portion From Volume & Loading Charges 35% or \$7,757,000

1. Adjust for GP, Mill Charges and Other Revenues
Remaining portion = \$4,025,000

2. Allocate costs to Parameters based on Fixed Asset Allocation

Customer	Flow	BOD	TSS	Phos	TKN
ALL	14.4%	33.2%	45.3%	3.1%	4.0%
ALL	\$0.58M	\$1.34M	\$1.82M	\$0.13M	\$0.16M

3. Divide by Flows and Loadings to Calculate Unit Rate and Bill Based on Actual Flows and Loadings

Customer	Flow	BOD	TSS	Phos	TKN
ALL	\$0.0500	\$0.0600	\$0.0900	\$0.3000	\$0.0500
Customer X	X MG	X LBS	X LBS	X LBS	X LBS

4. Customer X Portion = (\$0.0500 x X MG Flow) + (\$0.0600 x X LBS BOD...etc)

Illustration of Current Methodology

B. Portion from Capital Charge

65% or \$14,406,000

1. Allocate Capital Charge to Parameters based on Fixed Asset Allocation

Customer	Flow	BOD	TSS	Phos	TKN
ALL	14.4%	33.2%	45.3%	3.1%	4.0%
ALL	\$2.07M	\$4.79M	\$6.52M	\$0.45M	\$0.58M

2. Distribute Capital Charge to Customers based on Budgeted Flow / Strength

Customer	Flow	BOD	TSS	Phos	TKN
Customer X	2.1%	8.2%	4.2%	6.0%	8.9%

3. Customer X Portion = $(2.1\% \times \$2.07M) + (8.2\% \times \$4.79M) + \text{etc...}$

* Method results in the **same customer allocation as if there was no capital charge**, and the costs were recovered through the variable rates (assuming actual usage mirrored budgeted usage).

How are budgeted units estimated?

Volume:

- Historical billing data is analyzed using a weighted average with less weight on outlier years
- A 30-year precipitation average is reviewed
- Estimates are vetted to ensure results are within range
- A growth percentage is then added to baseline flow based on trends
- Feedback from customers to gather information on expected changes and review results

Loading:

- Historical billing data average (1 to 5 years) is the basis (note there is a data lag)
- More industry driven, so new / lost industries, and customer process changes included
- A growth percentage is then added to baseline flow based on trends
- Manual adjustments based on industry knowledge, feedback from customers, and observed trends are employed as needed

Note: All figures shown here are illustrative.

Using budgeted or actual units won't impact NEW Water revenues

Customer	Budgeted Units	%	Actual Units	%
Customer 1	5,000,000	50%	2,000,000	25%
Customer 2	5,000,000	50%	6,000,000	75%
Total	10,000,000	100%	8,000,000	100%

Cost	%	Customer	Unit Rate Revenue	Budget Based Capital Charge	Actuals Based Capital Charge
O&M + 35% Capital	\$25,000,000	Customer 1	\$5,000,000	\$10,000,000	\$5,000,000
65% Capital Charge	\$20,000,000	Customer 2	\$15,000,000	\$10,000,000	\$15,000,000
Item	Value	Total	\$20,000,000	\$20,000,000	\$20,000,000

Item	Value
O&M + 35% Capital	\$25,000,000
Units	10,000,000
Unit Rate	\$2.5 / unit

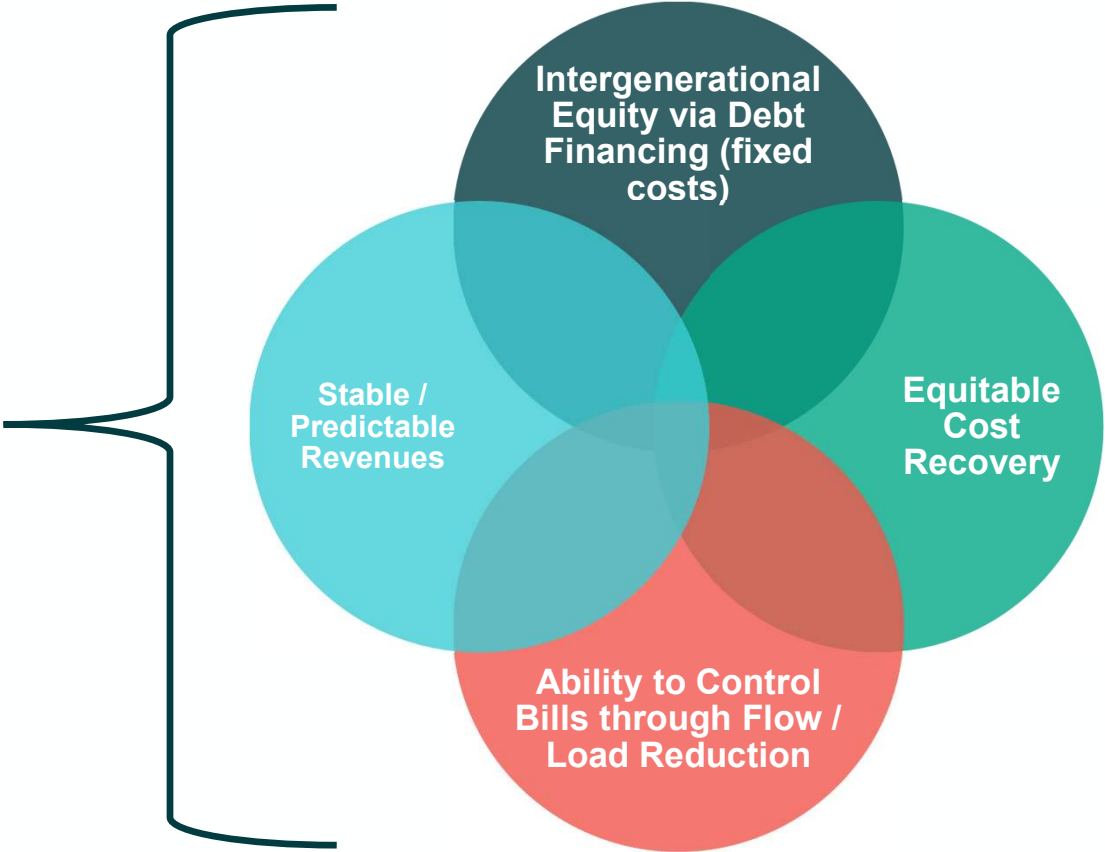
**\$5M Rate
Revenue
Shortfall**

**\$0 Change in Total Capital
Charge Revenue Regardless
of Basis, Just Mix Changes**

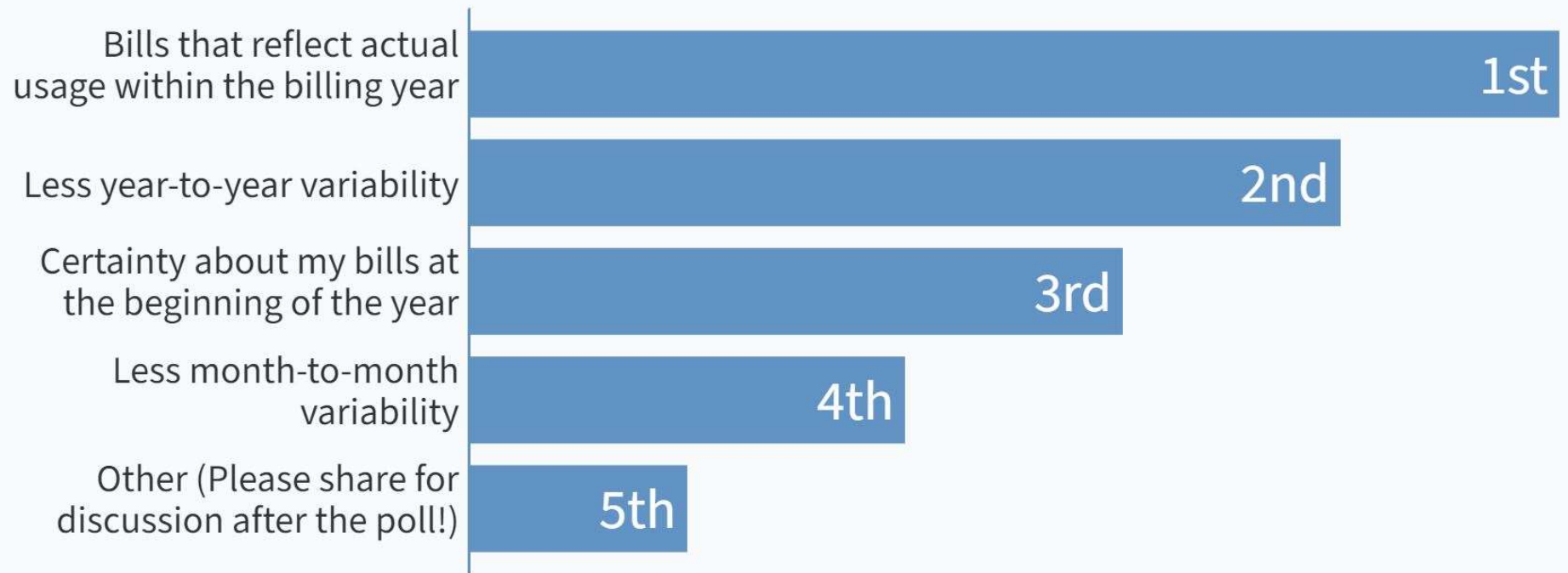
Options

What is the goal?

Achieve a balance...



What is most important to you regarding the capital charge? Please click each option in order of importance.



Preliminary options

1. Status quo

- **Process:** Capital charge allocated to customers based on budgeted units, capital charge is billed at 1/12th per month.
- **Examples:** NEW Water (See prior slides)

2. Year-end true-up

- **Process:** Use budgeted units during the year, redistribute capital charge at end of the year using actual units settled with December invoice payment (or to-be-determined deadline).
- **Examples:** DC Water

3. In-year true-up (or actuals)

- **Process:** Capital charge allocated to each customer adjusted using actuals every six months, quarterly, or just-in-time (monthly).
- **Examples:** Williamsport, PA

4. Rolling actuals

- **Process:** Capital charge allocated to customers each month using a rolling average of 3, 6, or 12 months of actuals.
- **Examples:** Unknown

5. Lagging actuals

- **Process:** Capital charge allocated to customers during the year based on the prior year or an average of 3 prior years of actuals.
- **Example:** Dayton Water (3-year average)

Additional feature

A. 65% to 100% capital charge

- **Process:** All capital costs would be billed on a capital charge basis.
- **Examples:** City of Wilmington, DE

Advantages vs. Disadvantages

Option #1: Status quo

Advantages

- Familiar process.
- Certainty to customers.
- Relatively less administratively burdensome than other options.
- Customers who deliver **more** flow/loads than budgeted may save on the capital charge portion of the bill.

Disadvantages

- Equity. Does not tie directly to actual usage, which is less equitable for customers.
- Customers who deliver **less** flow/loads than budgeted may pay more on the capital charge portion of the bill.

Option #2: Year-end true-up

Advantages

- More equitable than status quo.
- Relatively easy to administer compared to other options besides status quo.
- Similar to existing smoothing procedure.
- Common industry practice.

Disadvantages

- Could lead to surprises in customer year-end bills.
- Adds additional administrative effort (modest).
- Potential billing process changes.
- Reduces customer certainty about annual bill.
- Variation between budget and actuals may equalize over time, so annual efforts may not yield much net change for customers.

Option #3: In-year true-up (or actuals)

Advantages

- Improves equity compared to status quo option.
- Could result in lower magnitude changes than a year-end true-up.

Disadvantages

- Increases month to month customer variability.
- Adds administrative effort (modest).
- Requires billing process changes.
- Reduces customer certainty about annual bill.

Option 4: Rolling actuals

Advantages

- Potential for improved equity compared to status quo option.
- Reduces customer bill variability because units are smoothed.

Disadvantages

- Not as equitable as other options since units are from a different period than capital costs.
- Reduces customer certainty about annual bill.
- Could introduce seasonality issues (recommend rolling 12 months to avoid).
- Not a common industry practice.
- Adds administrative effort (modest).
- Requires billing process changes.

Option #5: Lagging actuals

Advantages

- Certainty to customers because units are known in advance.
- Relatively easy to administer compared to other options besides status quo.

Disadvantages

- Not as equitable as other options since units are from a different period than capital costs.
- Adds administrative effort (modest).
- Requires billing process changes.

Option A: 65% to 100% capital charge

Advantages

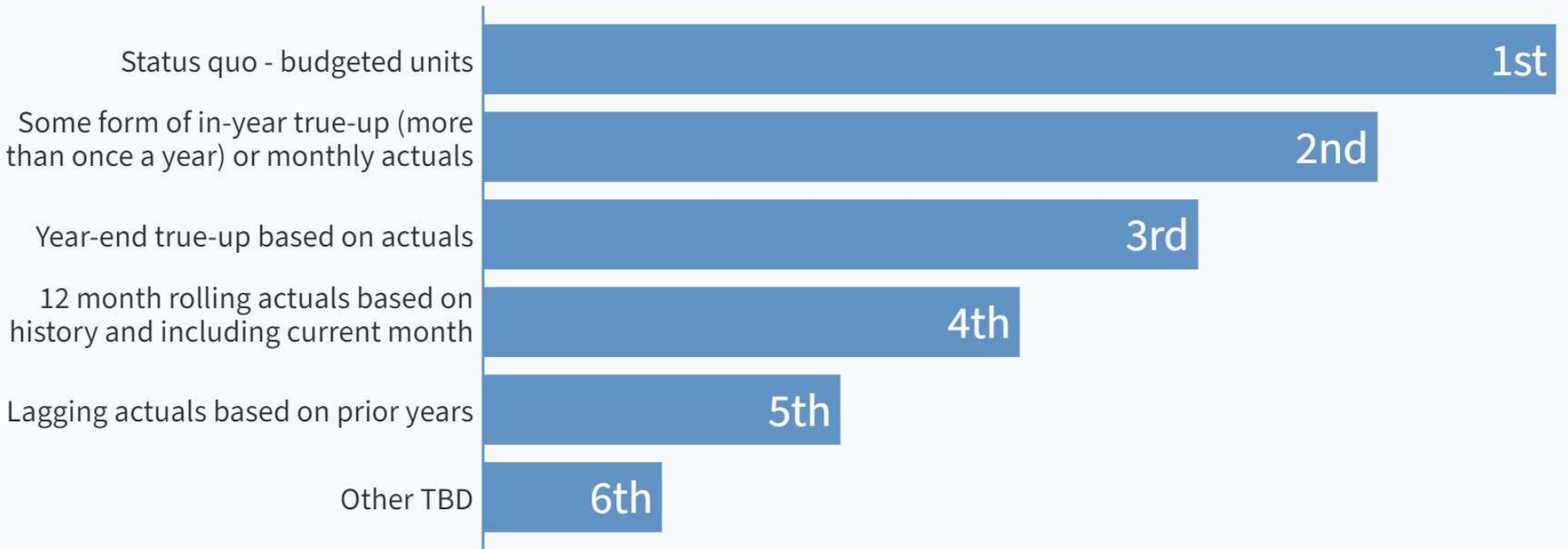
- Improves revenue stability for NEW Water.
- Improves bill predictability for customers (eliminate 35% variable capital cost recovery in unit rates).
- Could be paired with any prior option.
- Moves capital fixed costs to full capital charge basis.

Disadvantages

- End-users have less ability to impact their bill in a given year.
- May increase demand for some form of true-up because capital charges are higher.
- Sends less of a conservation signal for water and energy by reducing variable unit rates.

Discussion

Which capital charge billing options would you most like to study further? Please rank the following.



Next Steps

Next Steps



Task 1: Kickoff Meeting & Workshop #1



Task 2: Options Analysis & Workshop #2



Task 3: Path Forward Selection & Workshop #3



Task 4: Commission Meeting



Task 5: Summary Reporting



Task 6: OPTIONAL - Model Incorporation & User Guide Updates

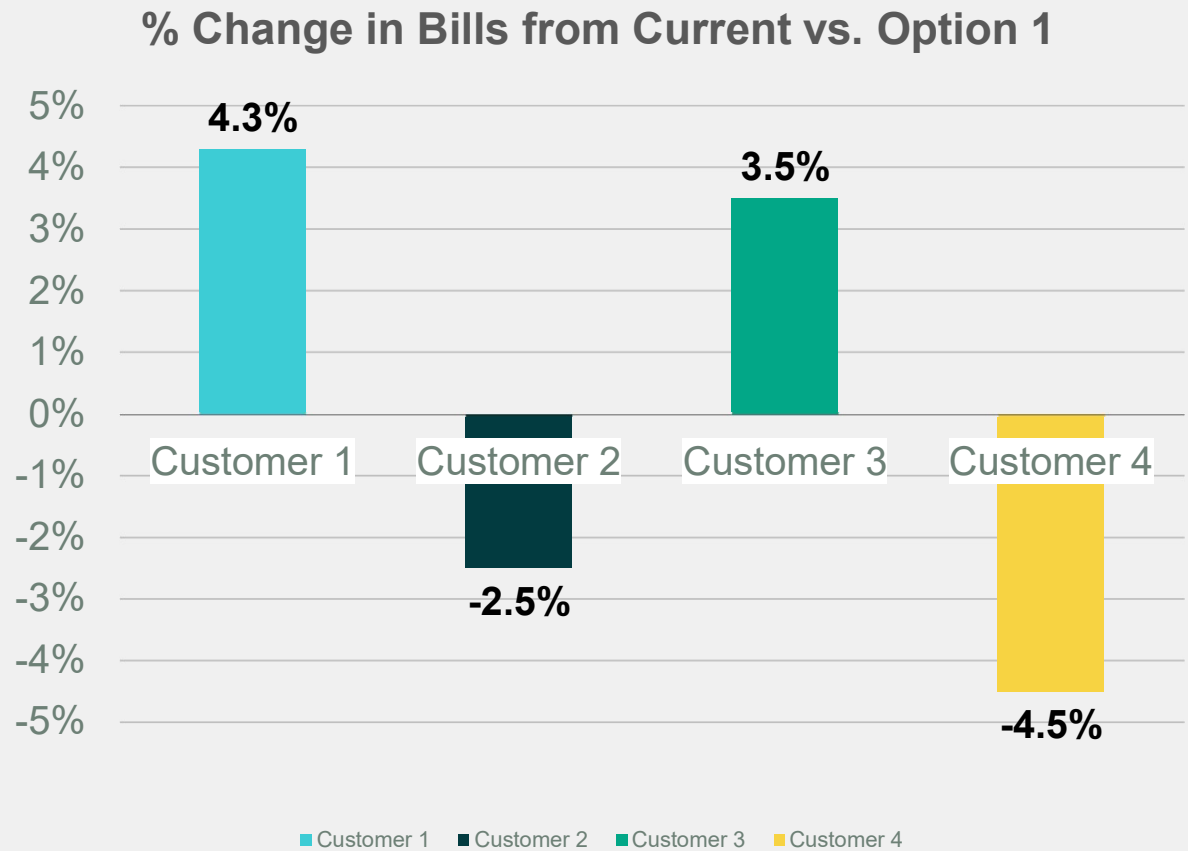
Example Analysis Views

Option #1: Table of impacts (\$ and %)

Customer	Current Capital Charge	Option 1 Capital Charge	\$ Change	% Change
Customer 1	\$#	\$#	Δ\$#	+ -X%
Customer 2	\$#	\$#	Δ\$#	+ -X%
Customer 3	\$#	\$#	Δ\$#	+ -X%
Customer 4	\$#	\$#	Δ\$#	+ -X%
...	\$#	\$#	Δ\$#	+ -X%
Customer n	\$#	\$#	Δ\$#	+ -X%
Totals	\$#	\$#	Δ\$#	+ -X%

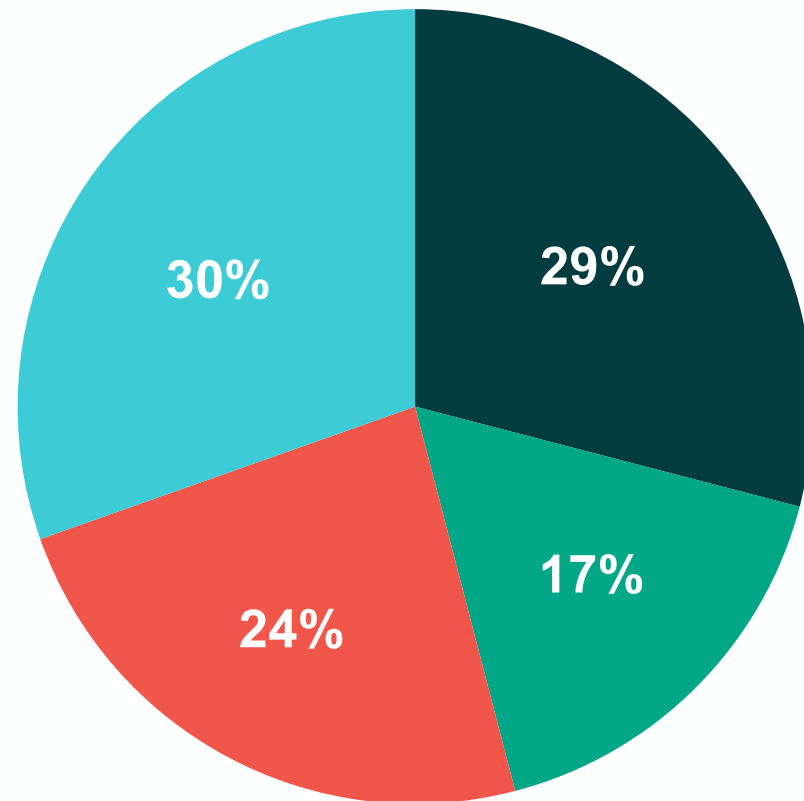
Option #1

Histogram of % bill changes



Option #1

Share of costs (%)

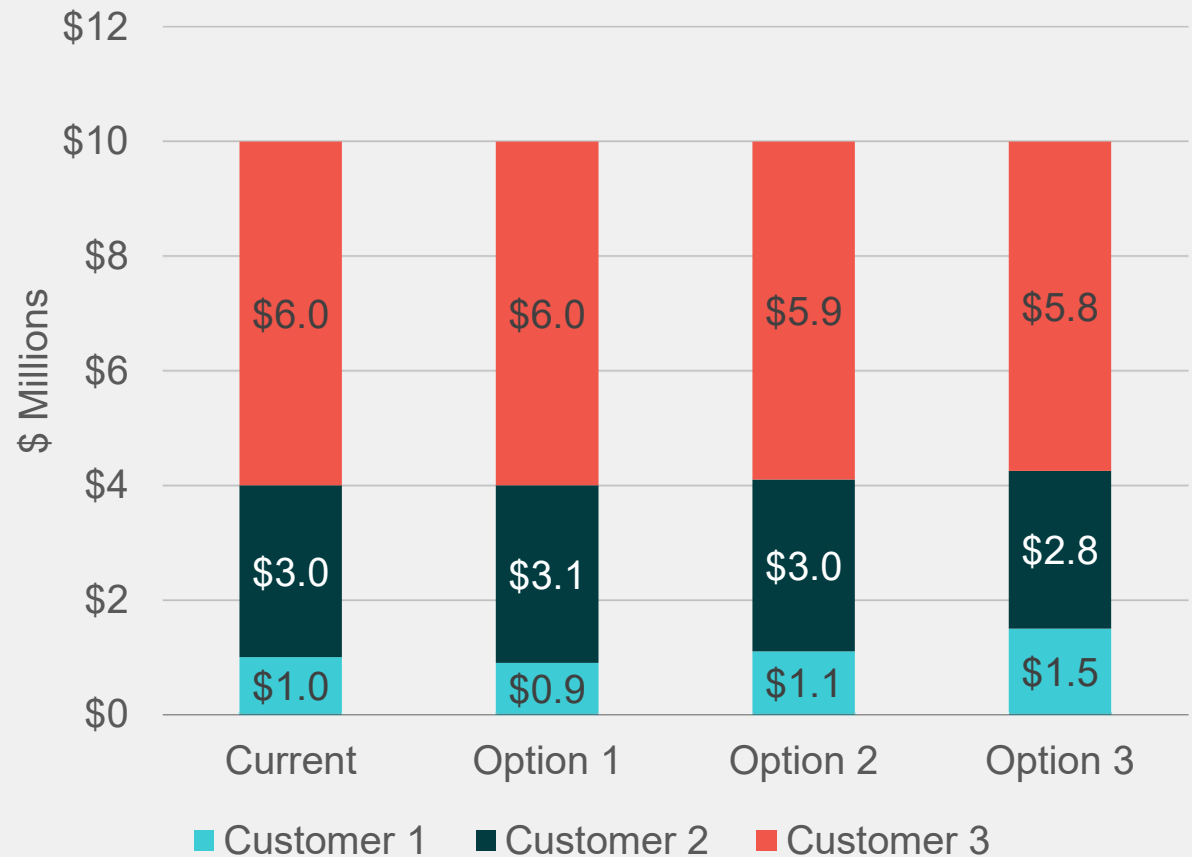


■ Customer 1 ■ Customer 2 ■ Customer 3 ■ Customer 4

All Options

Histogram comparing distribution of costs across options

Mix of Costs by Customer and Option





Thank you!

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Contact: Zachary Green
518 316 2079 / zgreen@raftelis.com



Capital Charge Study – Workshop #2: Options Analysis

June 9, 2022





Agenda

- 1. Revisit Study Purpose**
- 2. Recap of Workshop #1**
- 3. Options Analysis**
- 4. Discussion**
- 5. Next Steps**

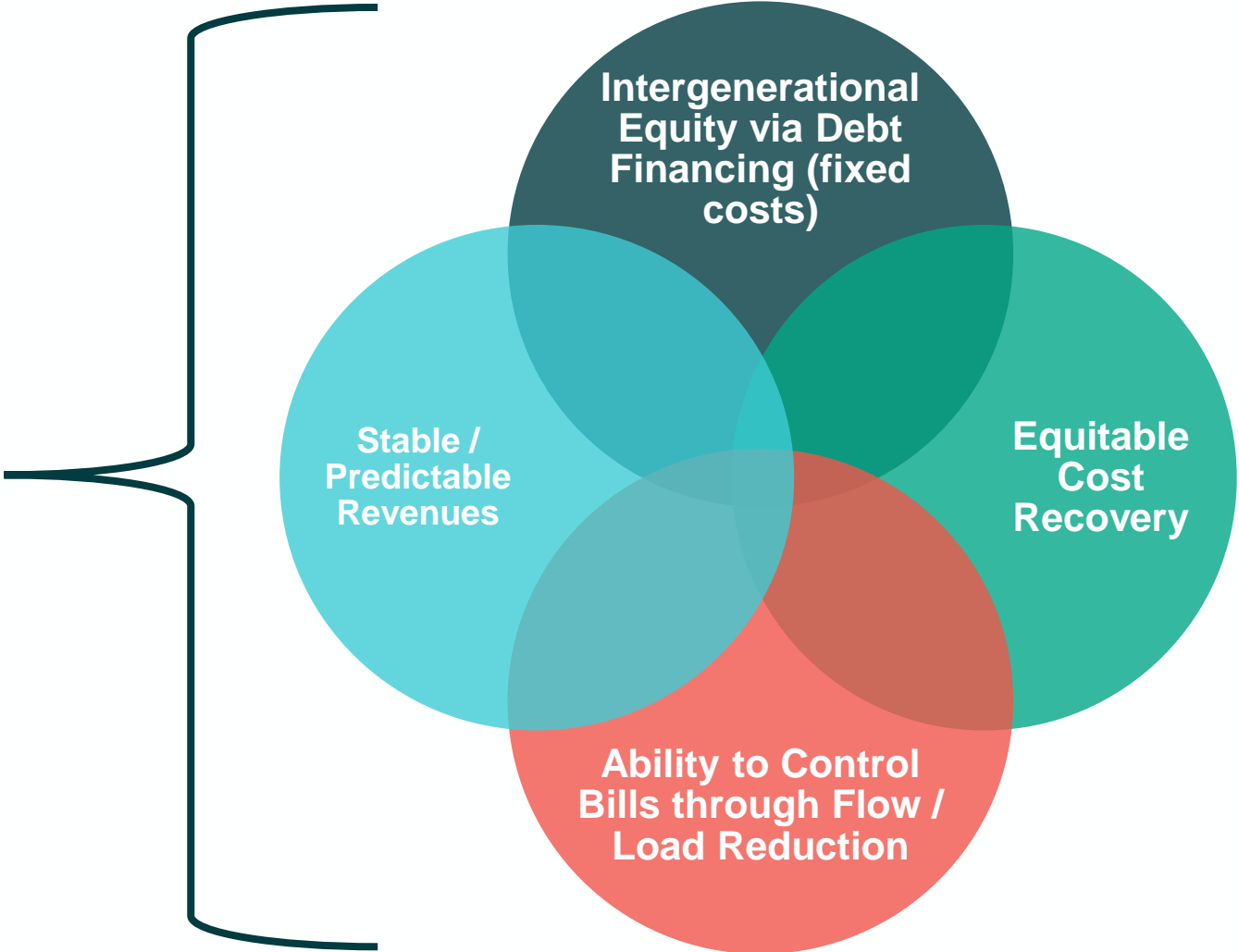
Purpose

Study Purpose & Meeting Objective

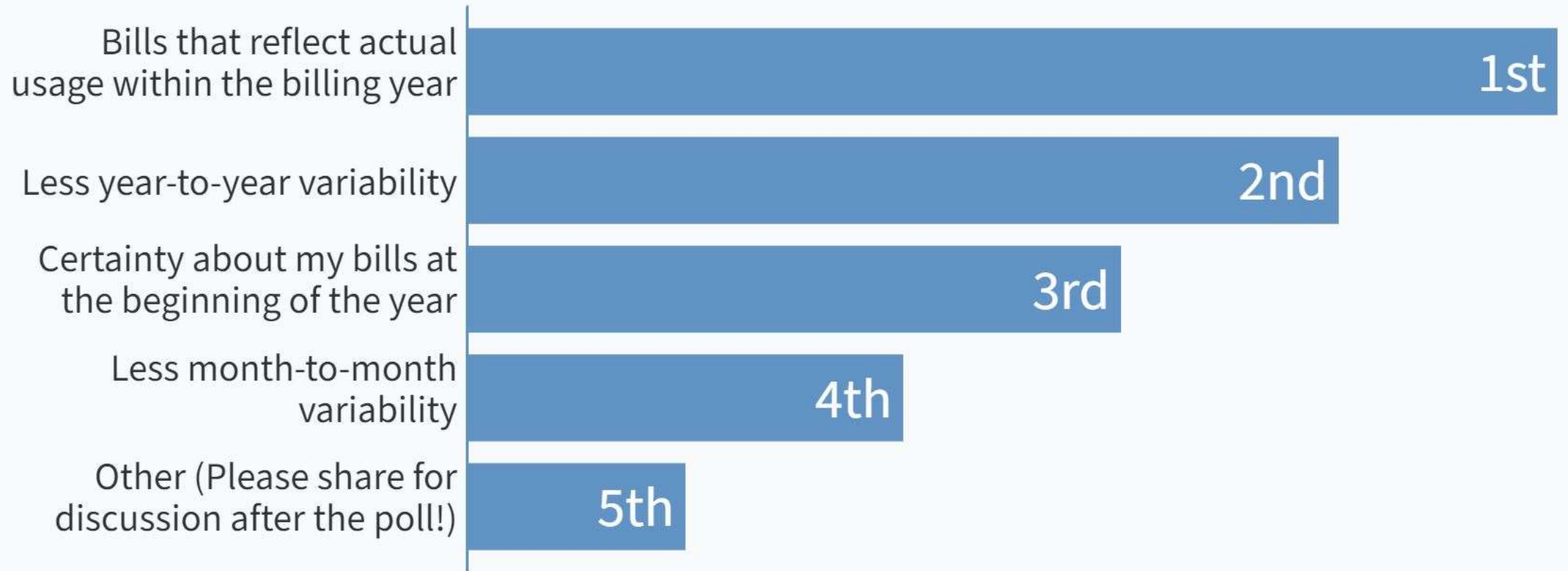
- **Study Purpose:** Develop and evaluate new capital charge billing approaches and make a recommendation to Commission.
- **Drivers:** Desire to explore ways to improve the capital charge billing process, including consideration of:
 - › Move from budgeted to actual units
 - › True-up procedure
 - › Revise the capital charge component from 65% to 100% of total capital
 - › Other approaches to be identified...
- **Meeting Objective:** Review data analysis of prioritized capital charge billing options and further refine preferred approaches.
- **Stakeholder Advisory Group Role:** Serve in an advisory capacity to NEW Water to inform the Capital Charge Study process.

What is the goal?

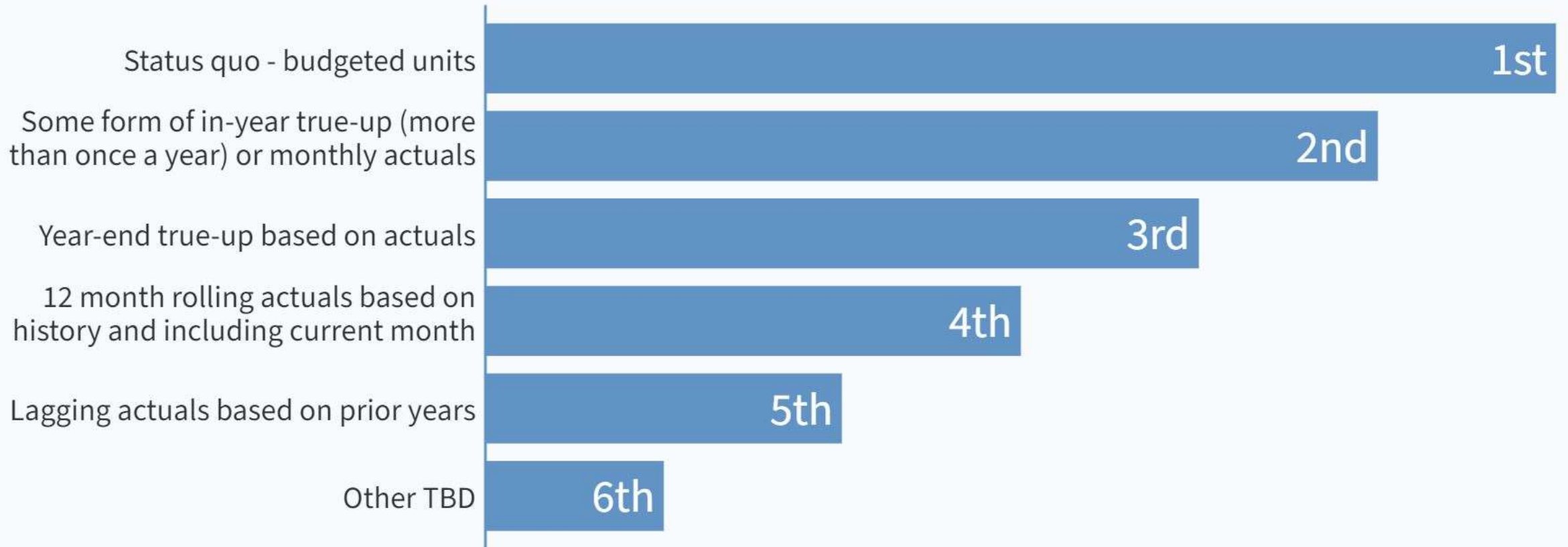
Achieve a balance...



What is most important to you regarding the capital charge? Please click each option in order of importance.



Which capital charge billing options would you most like to study further? Please rank the following.



Preliminary options

1. Status quo

- **Process:** Capital charge allocated to customers based on budgeted units, capital charge is billed at 1/12th per month.
- **Examples:** NEW Water (See prior slides)

2. Year-end true-up

- **Process:** Use budgeted units during the year, redistribute capital charge at end of the year using actual units settled with December invoice payment (or to-be-determined deadline).
- **Examples:** DC Water

3. In-year true-up (or actuals)

- **Process:** Capital charge allocated to each customer adjusted using actuals every six months, quarterly, or just-in-time (monthly).
- **Examples:** Williamsport, PA

4. Rolling actuals

- **Process:** Capital charge allocated to customers each month using a rolling average of 3, 6, or 12 months of actuals.
- **Examples:** Unknown

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- **Process:** Capital charge allocated to customers during the year based on the prior year or an average of 3 prior years of actuals.
- **Example:** Dayton Water (3-year average)

Additional feature

A. 65% to 100% capital charge

- **Process:** All capital costs would be billed on a capital charge basis.
- **Examples:** City of Wilmington, DE

Analysis Views

2019 Year-end True-up

Customer	\$ Change	% Change
Customer #1	(\$16,700)	-0.32%
Customer #2	(\$158,810)	-8.89%
Customer #3	\$89,845	14.89%
Customer #4	\$476	0.08%
Customer #5	\$37,178	2.48%
Customer #6	\$27,760	4.73%
Customer #7	\$15,312	6.99%
Customer #8	(\$51,908)	-5.75%
Customer #9	(\$15,157)	-20.38%
Customer #10	(\$4,436)	-5.67%
Customer #11	\$60,380	22.67%
Customer #12	(\$1,159)	-0.67%
Customer #13	\$38,501	20.13%
Customer #14	(\$1,416)	-9.85%
Customer #15	(\$17,624)	-12.21%
Customer #16	(\$2,242)	-6.89%
Total	Δ\$0	Δ0%

Max Received

Max Owed

2020 Year-end True-up

Customer	\$ Change	% Change
Customer #1	\$115,148	2.27%
Customer #2	(\$493,459)	-26.65%
Customer #3	(\$26,982)	-4.20%
Customer #4	\$46,193	7.89%
Customer #5	(\$69,358)	-4.37%
Customer #6	(\$15,091)	-2.60%
Customer #7	\$66,485	31.46%
Customer #8	\$350,079	41.06%
Customer #9	\$7,364	14.90%
Customer #10	(\$7,008)	-10.17%
Customer #11	(\$12,705)	-3.95%
Customer #12	\$24,487	14.87%
Customer #13	\$24,297	11.84%
Customer #14	(\$1,184)	-8.57%
Customer #15	(\$11,830)	-8.97%
Customer #16	\$3,567	11.56%
Total	Δ\$0	Δ0%

Max Received

Max Owed

2021 Year-end True-up

Customer	\$ Change	% Change
Customer #1	(\$3,472)	-0.06%
Customer #2	(\$445,379)	-22.62%
Customer #3	\$346,239	50.63%
Customer #4	(\$54,445)	-8.09%
Customer #5	(\$111,099)	-6.23%
Customer #6	(\$88,346)	-12.22%
Customer #7	\$27,231	10.77%
Customer #8	\$411,107	46.26%
Customer #9	\$5,239	8.26%
Customer #10	(\$5,939)	-7.13%
Customer #11	(\$35,284)	-9.18%
Customer #12	(\$10,855)	-5.68%
Customer #13	(\$10,956)	-4.49%
Customer #14	(\$709)	-4.51%
Customer #15	(\$21,218)	-14.51%
Customer #16	(\$2,113)	-5.11%
Total	Δ\$0	Δ0%

Max Received

Max Owed

2019-2021 Year-end True-up

Customer	\$ Change	% Change
Customer #1	\$94,975	0.6%
Customer #2	(\$1,097,649)	-19.6%
Customer #3	\$409,102	21.2%
Customer #4	(\$7,776)	-0.4%
Customer #5	(\$143,280)	-2.9%
Customer #6	(\$75,677)	-4.0%
Customer #7	\$109,027	16.0%
Customer #8	\$709,278	26.8%
Customer #9	(\$2,554)	-1.4%
Customer #10	(\$17,383)	-7.5%
Customer #11	\$12,390	1.3%
Customer #12	\$12,473	2.4%
Customer #13	\$51,842	8.1%
Customer #14	(\$3,308)	-7.5%
Customer #15	(\$50,672)	-12.0%
Customer #16	(\$788)	-0.8%
Total	Δ\$0	Δ0%

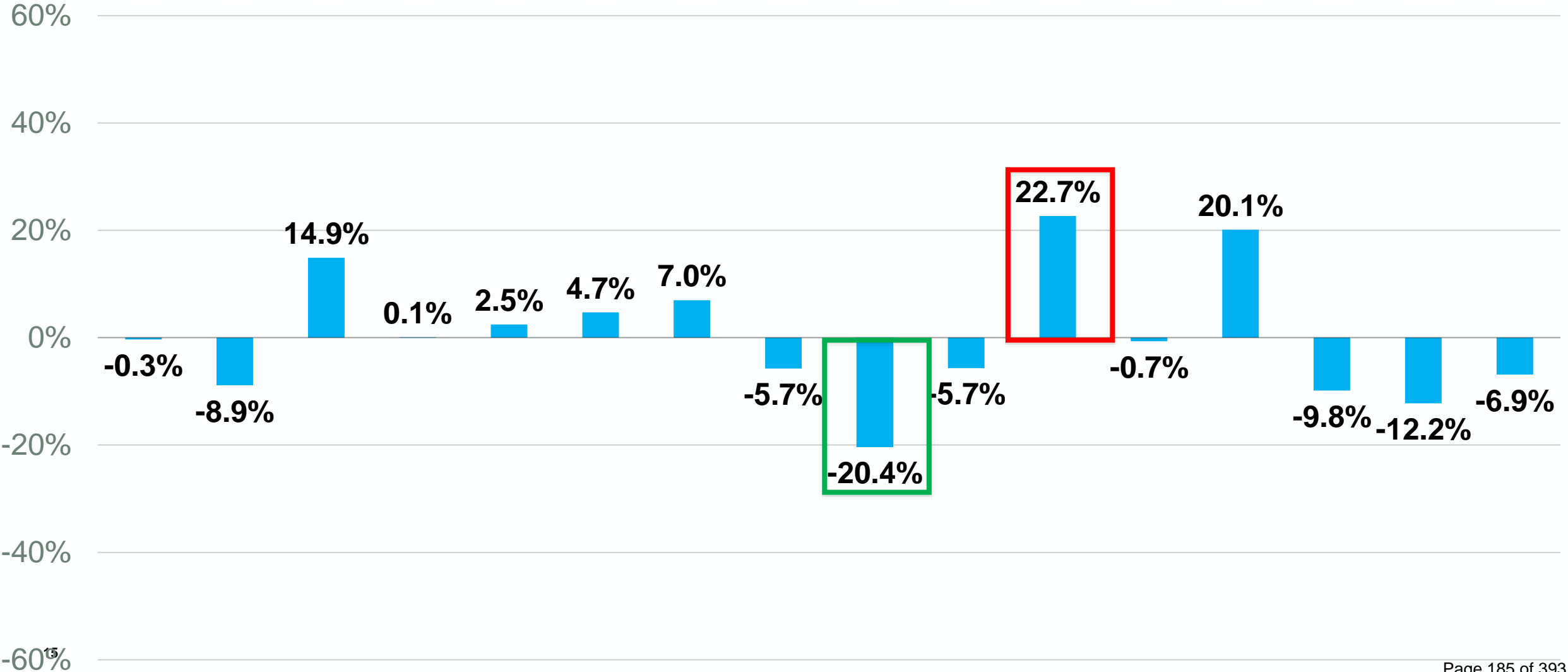
Max Received

Max Owed

2019 Year-end True-up

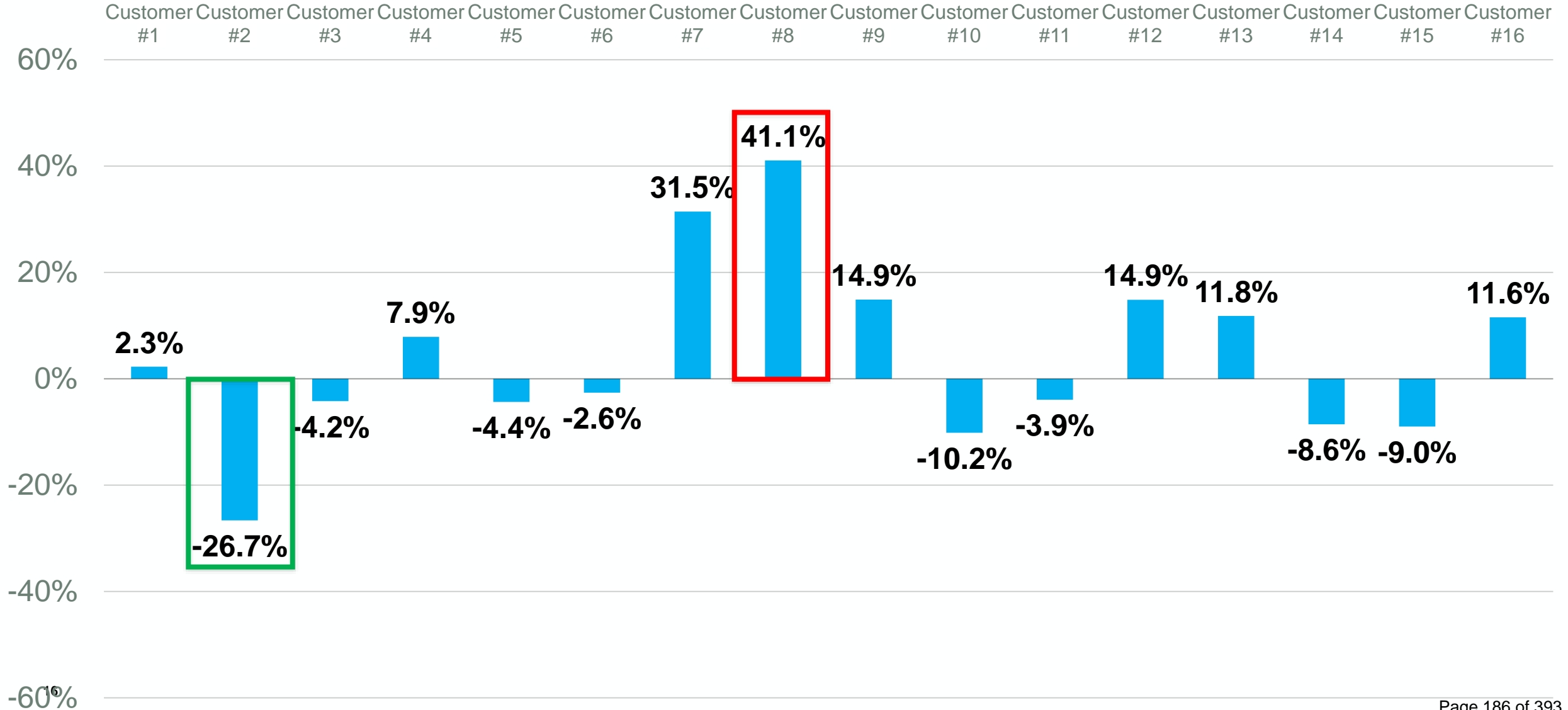
2019 % Change in Bills from Status Quo vs. Option 2

Customer #1 Customer #2 Customer #3 Customer #4 Customer #5 Customer #6 Customer #7 Customer #8 Customer #9 Customer #10 Customer #11 Customer #12 Customer #13 Customer #14 Customer #15 Customer #16



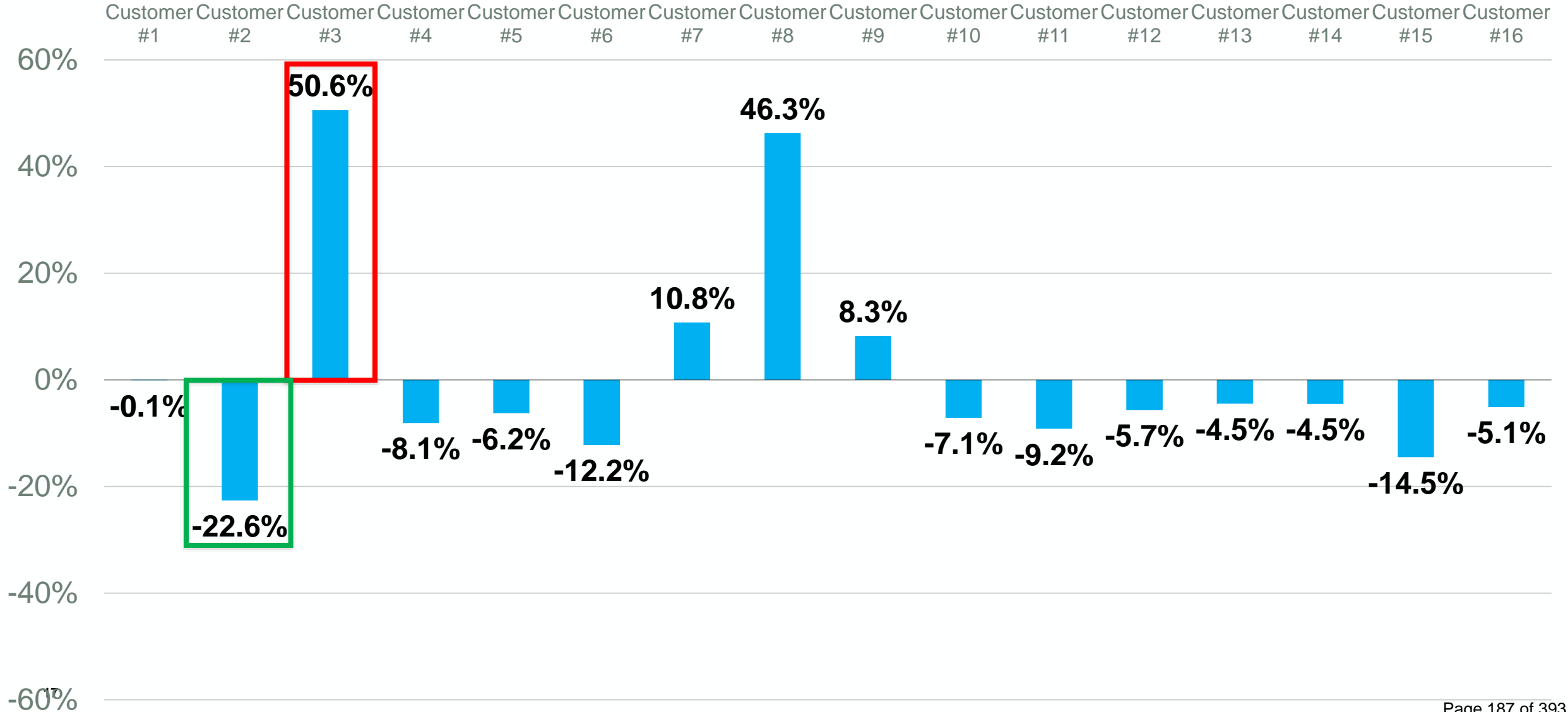
2020 Year-end True-up

2020 % Change in Bills from Status Quo vs. Option 2



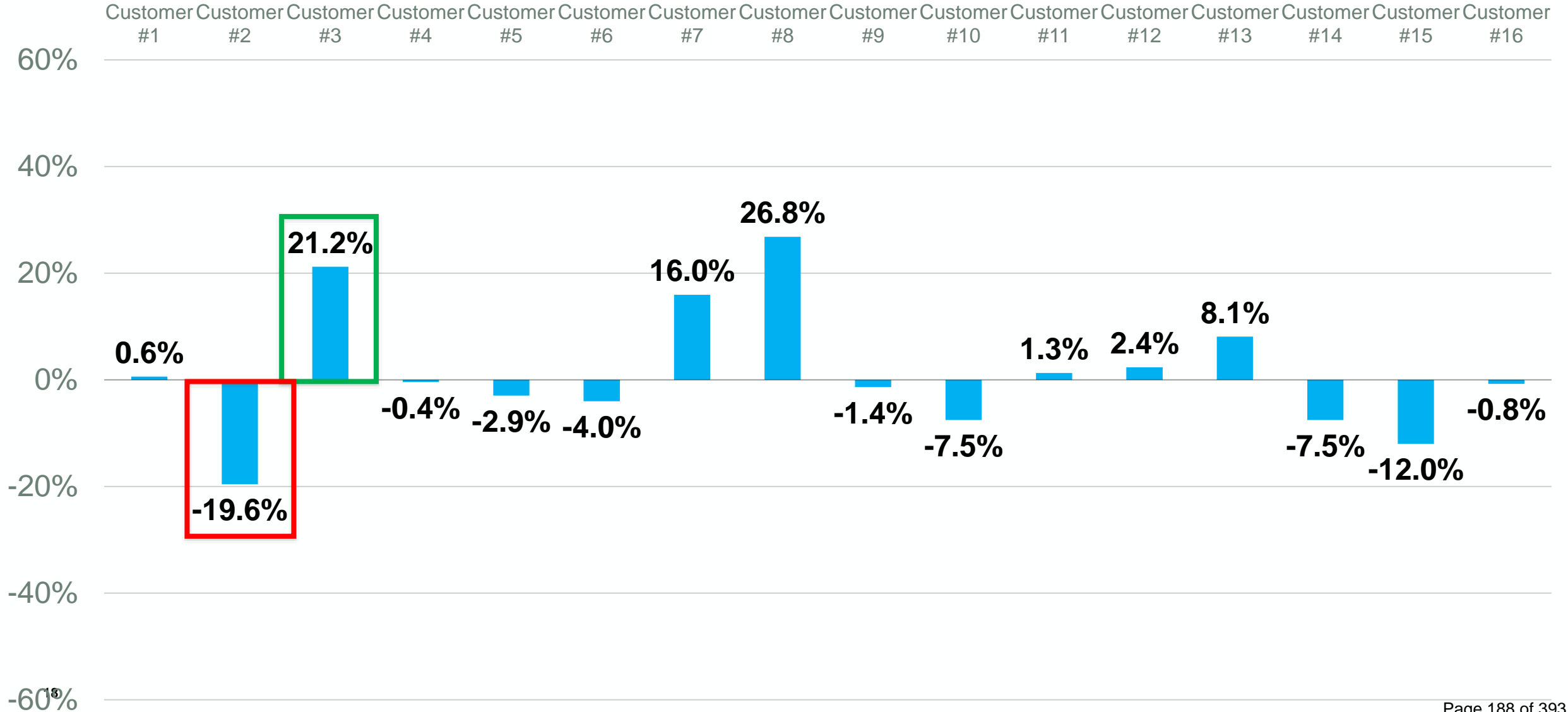
2021 Year-end True-up

2021 % Change in Bills from Status Quo vs. Option 2



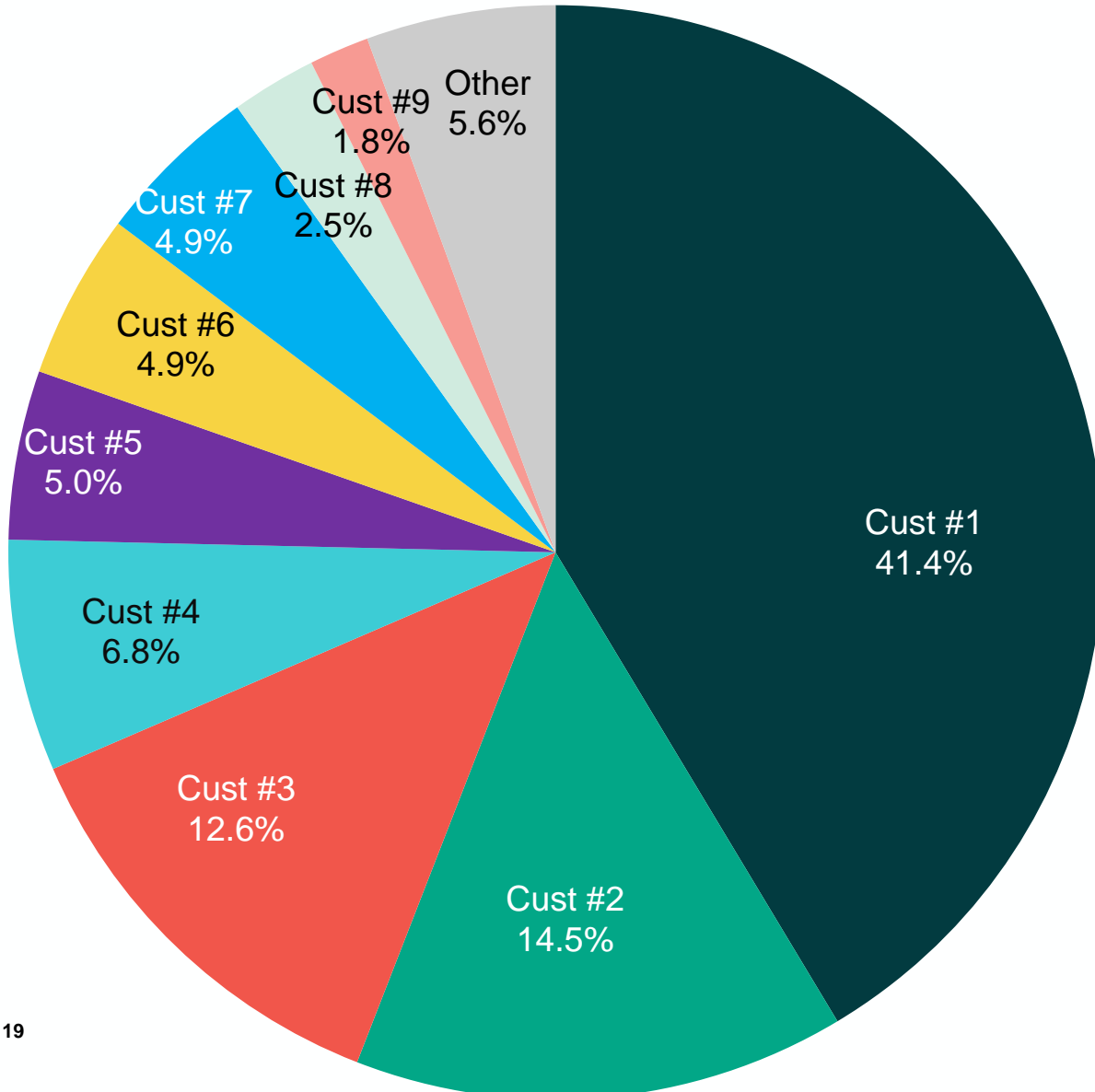
2019-2021 Year-end True-up

2021 % Change in Bills from Status Quo vs. Option 2

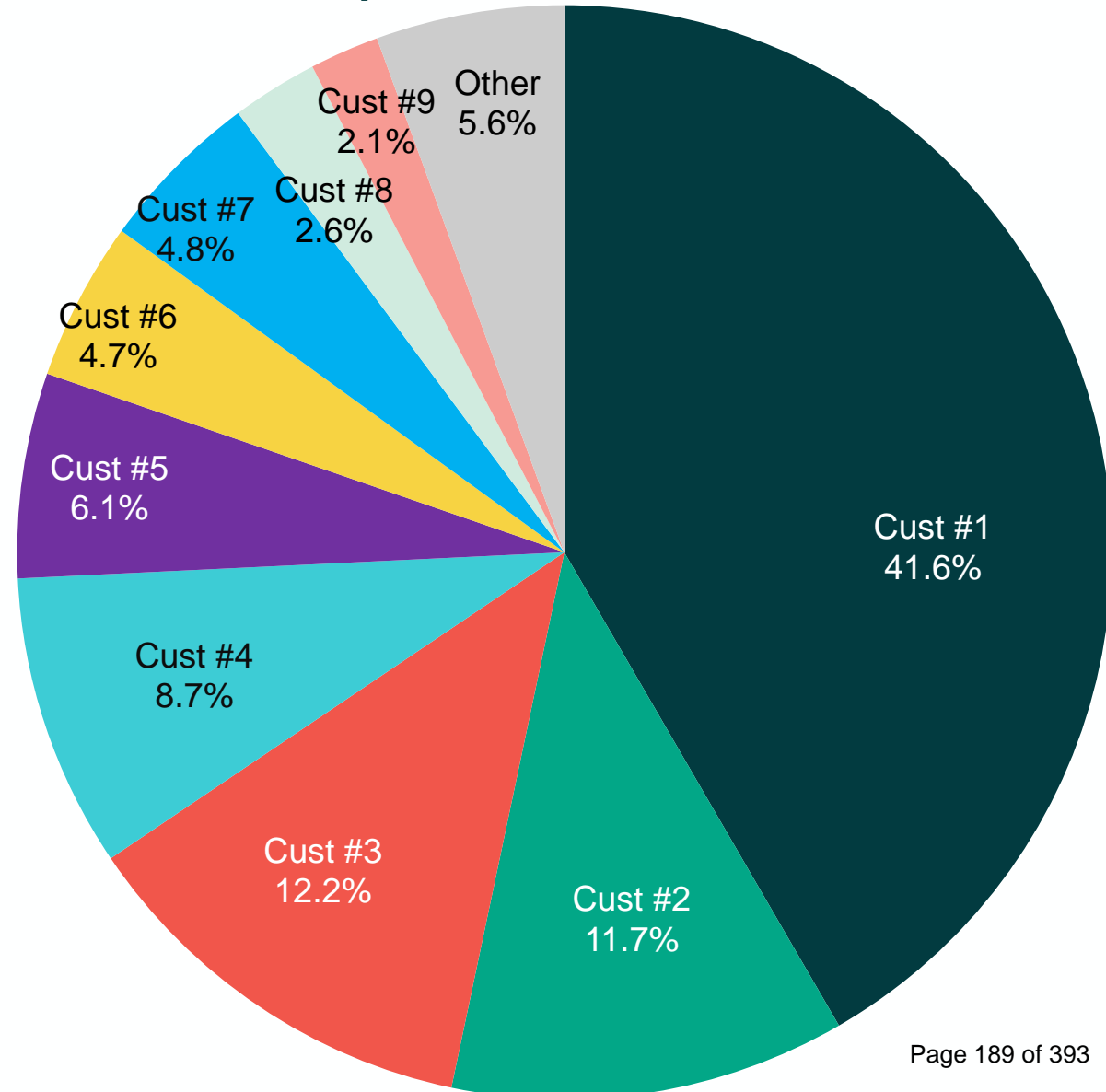


Year-end True-up Share of Costs

Status Quo



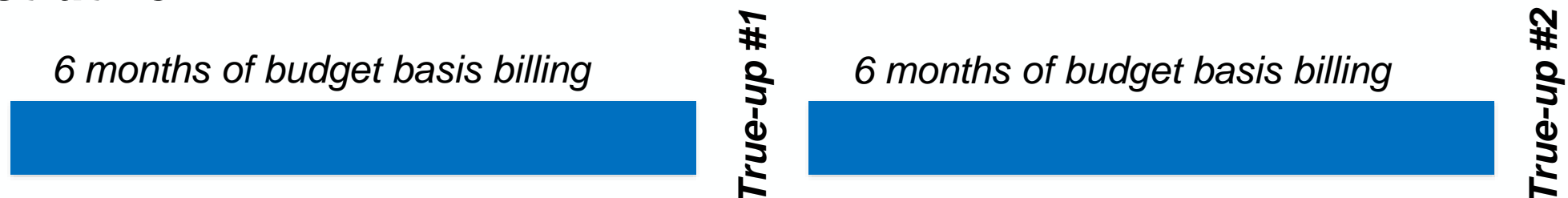
Option #2 2019-2021



Option #3 – In-Year True-Up

- **Results in same annual billings as Option #2 year-end true-up**
- Increases administrative costs
- Reduces surprises at the end of the year
- However, it's not necessarily the case that one period will correlate with the next, so could end up with net gain followed by a net loss or visa versa.
- Could be done monthly, quarterly, or every 6 months
 - › If considered recommend every 6 months to reduce administrative cost.

Illustrative



Which capital charge billing options are you most in favor of? Please rank the following.

Status quo - budgeted units

Year-end true-up based on actuals

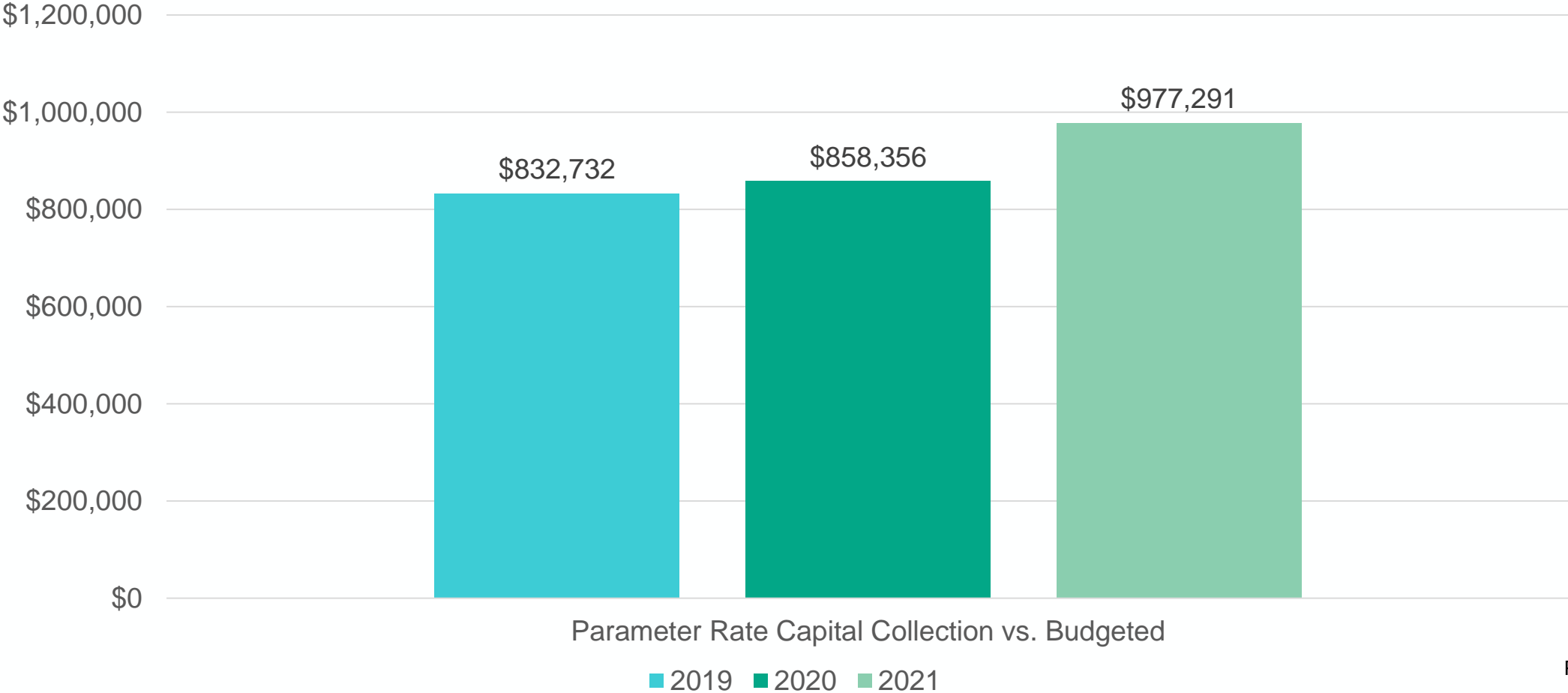
Some form of in-year true-up (more than once a year) or monthly actuals

Capital Charge at 65% and 100%

- If we take the 35% of capital that is currently recovered through unit rates out of those rates, as would occur with a 100% Capital Charge, then:
 - › ...in high flow and load years GBMSD would collect **less** they do currently (status quo accumulates reserves), but...
 - › ...at the same time in drier years GBMSD will still be able to meet debt obligations because they will collect **more** than they would have otherwise from budgeted capital costs allocated partially to unit rates (status quo can lead to under-collection).
- This is a more stable revenue source and would also increase confidence in estimated bills for customers.

2019 and 2020 were wet years where reserves grew, 2021 was impacted by additional loadings

2019 - 2021 Parameter Rate Capital Revenue Collected vs Budgeted

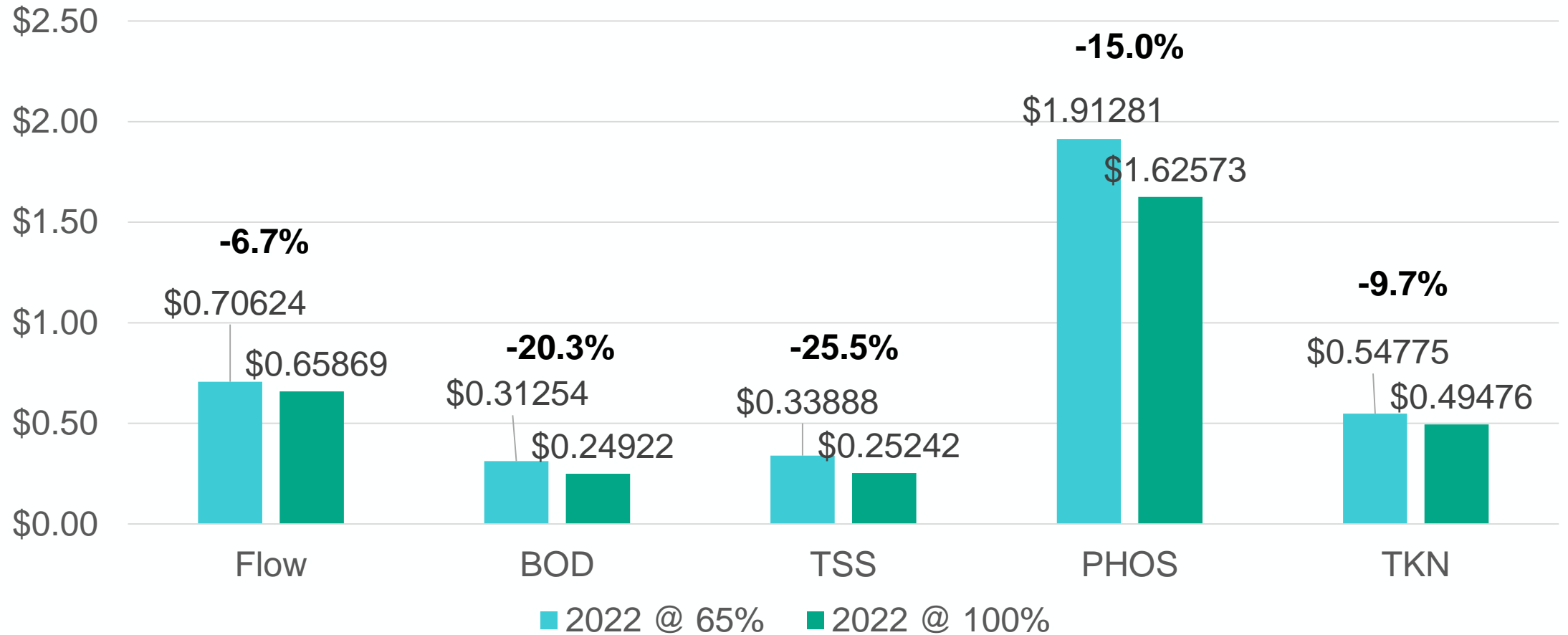


2022 Capital Charge at 65% and 100%

Customer	Current 65% Capital Charge	100% Capital Charge	\$ Change	% Change
#1	\$6,114,756	\$7,823,040	\$ 1,708,284	Same for All
#2	\$1,694,397	\$2,167,761	\$ 473,365	
#3	\$787,675	\$1,007,728	\$ 220,053	
#4	\$711,565	\$910,356	\$ 198,790	
#5	\$1,837,708	\$2,351,109	\$ 513,401	
#6	\$704,087	\$900,788	\$ 196,701	
#7	\$326,400	\$417,586	\$ 91,186	
#8	\$1,000,773	\$1,280,359	\$ 279,586	
#9	\$67,626	\$86,518	\$ 18,893	
#10	\$78,504	\$100,436	\$ 21,932	
#11	\$375,776	\$480,756	\$ 104,981	
#12	\$216,587	\$277,095	\$ 60,508	
#13	\$283,623	\$362,859	\$ 79,236	
#14	\$15,725	\$20,118	\$ 4,393	
#15	\$147,680	\$188,938	\$ 41,258	
#16	\$43,363	\$55,478	\$ 12,114	
Totals	\$14,406,244	\$18,430,925	\$ 4,024,682	Δ27.9%

100% Fixed Charge 2022 Rate Impacts

2022 Flow and Loadings Rates with 65% vs. 100% Capital Charge



Discussion

Next Steps

Next Steps



Task 1: Kickoff Meeting & Workshop #1



Task 2: Options Analysis & Workshop #2



Task 3: Path Forward Selection & Workshop #3



Task 4: Commission Meeting



Task 5: Summary Reporting



Task 6: OPTIONAL - Model Incorporation & User Guide Updates



Thank you!

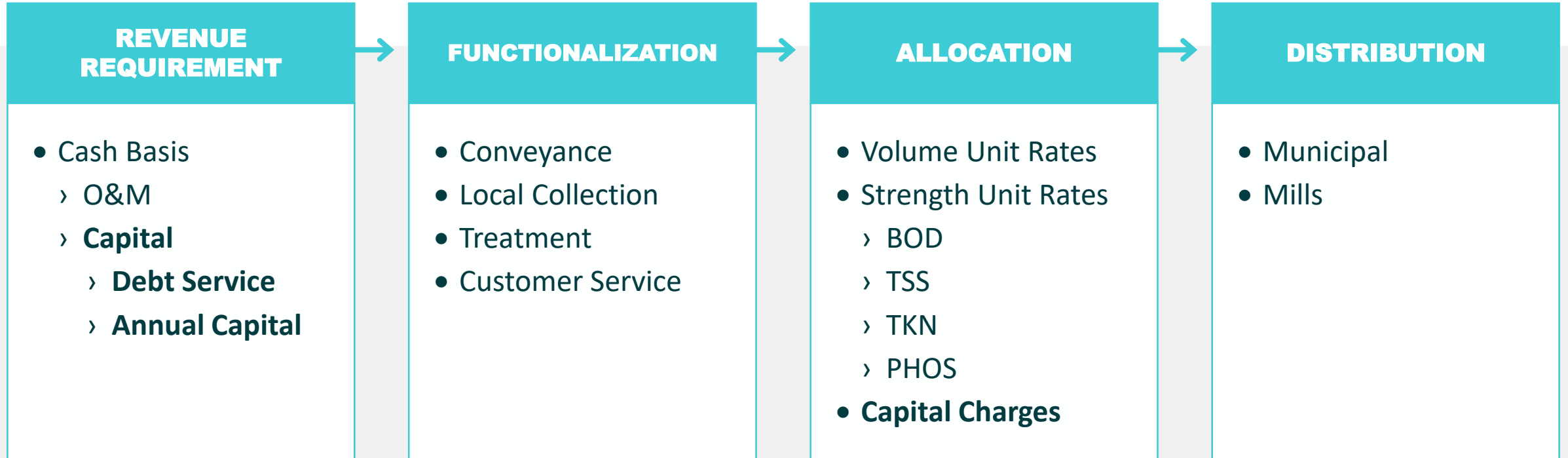
Contact: John Mastracchio
518 391 8944 / jmastracchio@raftelis.com

Contact: Zachary Green
518 316 2079 / zgreen@raftelis.com

Parking Lot

History

Wastewater Cost-of-Service Analysis Process



History of the Capital Charge

Concept: Implemented to stabilize a portion of annual cost and revenue.

Development: The capital charge was introduced in 2014 following completion of a prior Study “Rate Methodology for Cost of Service Allocation”.

Methodology: The capital charge is allocated to each customer based on proportion of customer’s budgeted flow and loads relative to total.

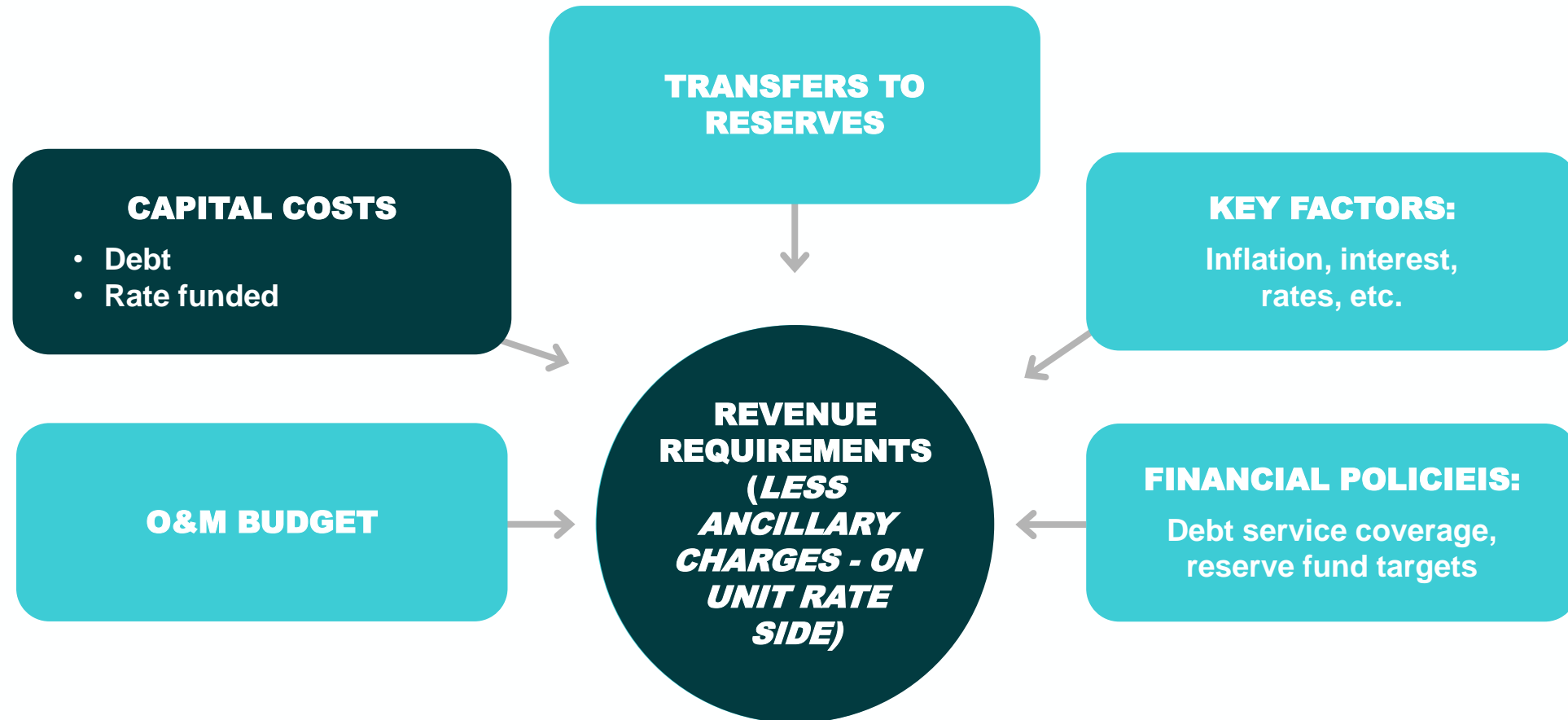
Note: *Not a new or additional charge*, but merely a different way to collect a portion of the Total Budget Requirement.

History of the Capital Charge

Budget Year	Amount of Capital Charge*	How Capital Charge Distributed/Collected
Pre 2014	No capital charge	All capital collected via parameter rates based on actual system use
2014	15% of total budget	Collected based on budgeted system use, equal across parameters
2015		
2016		
2017		
2018	45% of capital budget	Collected based on budgeted system use, across parameters consistent with our cost methodology
2019	65% of capital budget	
2020		
2021		
2022		

Current Approach

Identify Revenue Requirements



Wastewater Cost of Service Analysis

Allocation of Revenue Requirements

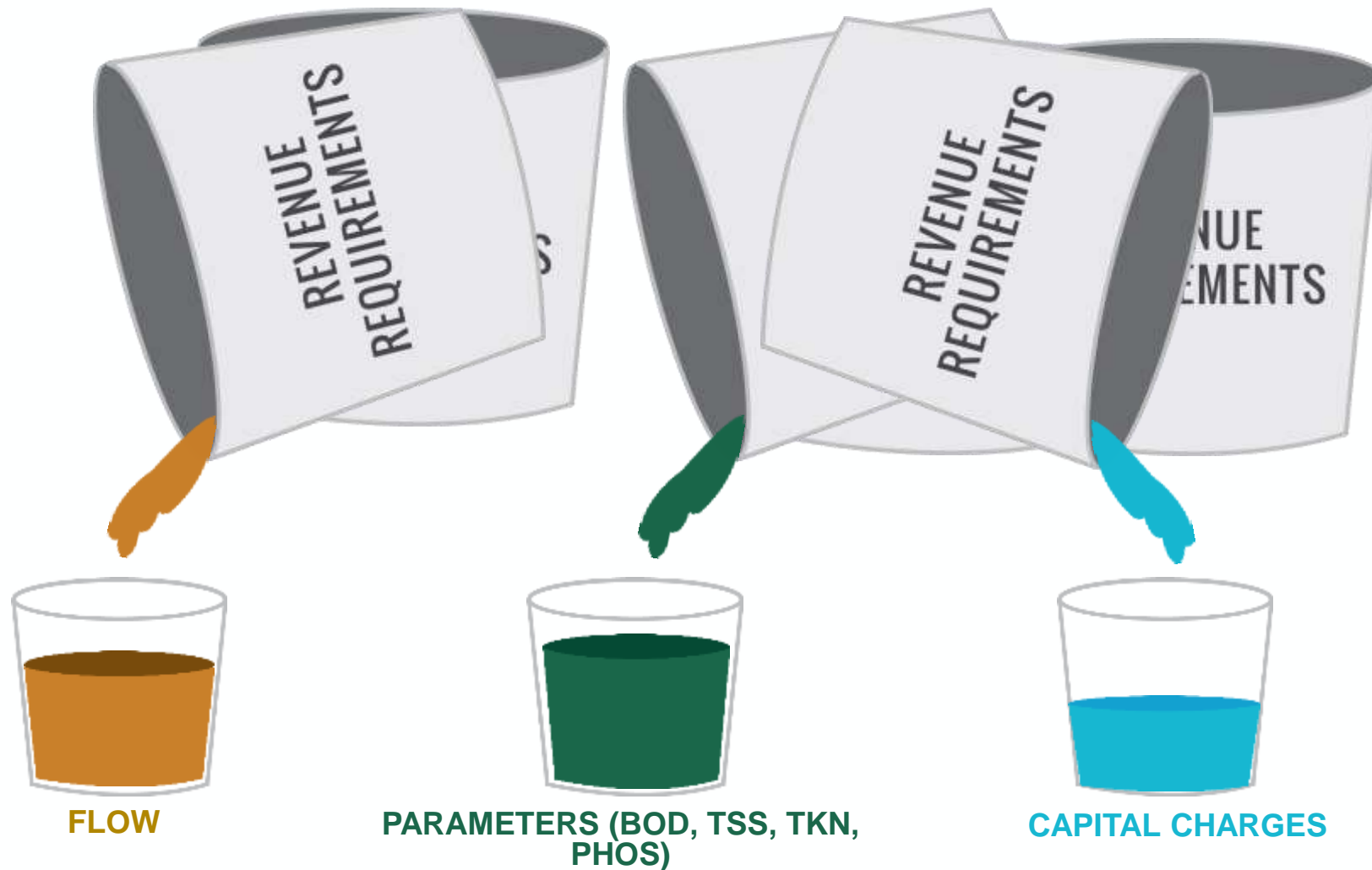


Illustration of Current Methodology

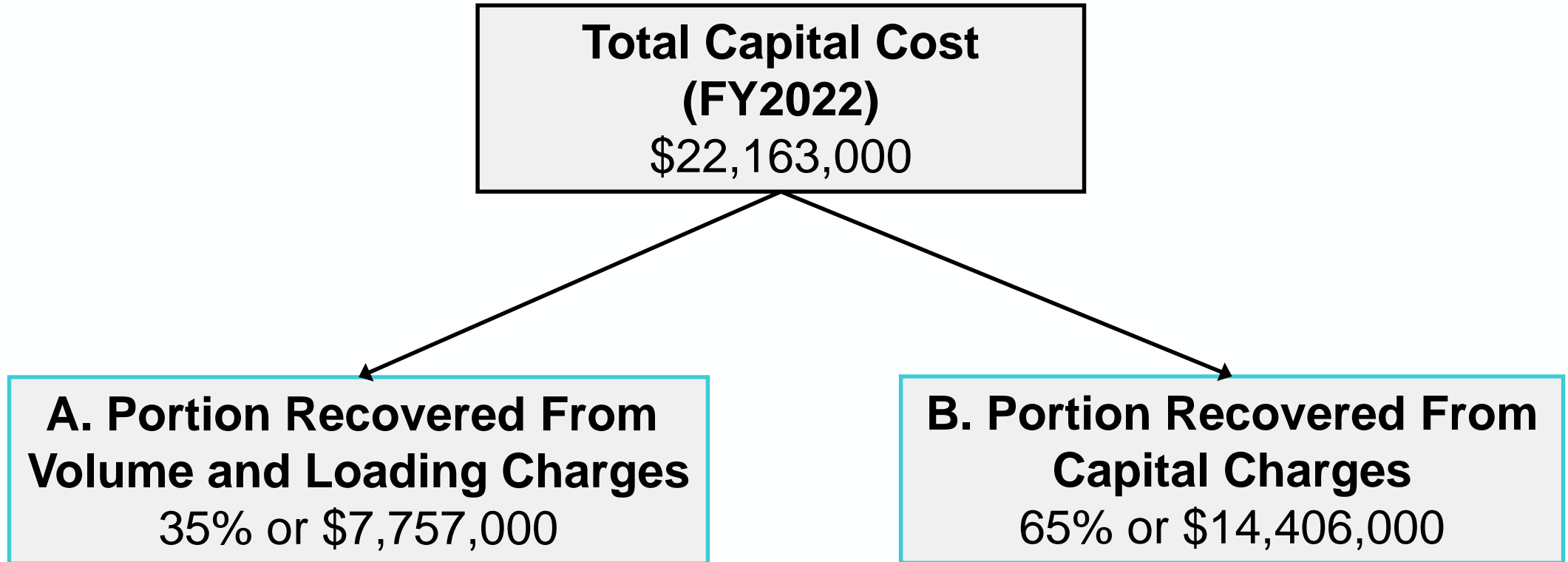


Illustration of cost distribution

Distribution of Budgeted Revenue Requirement

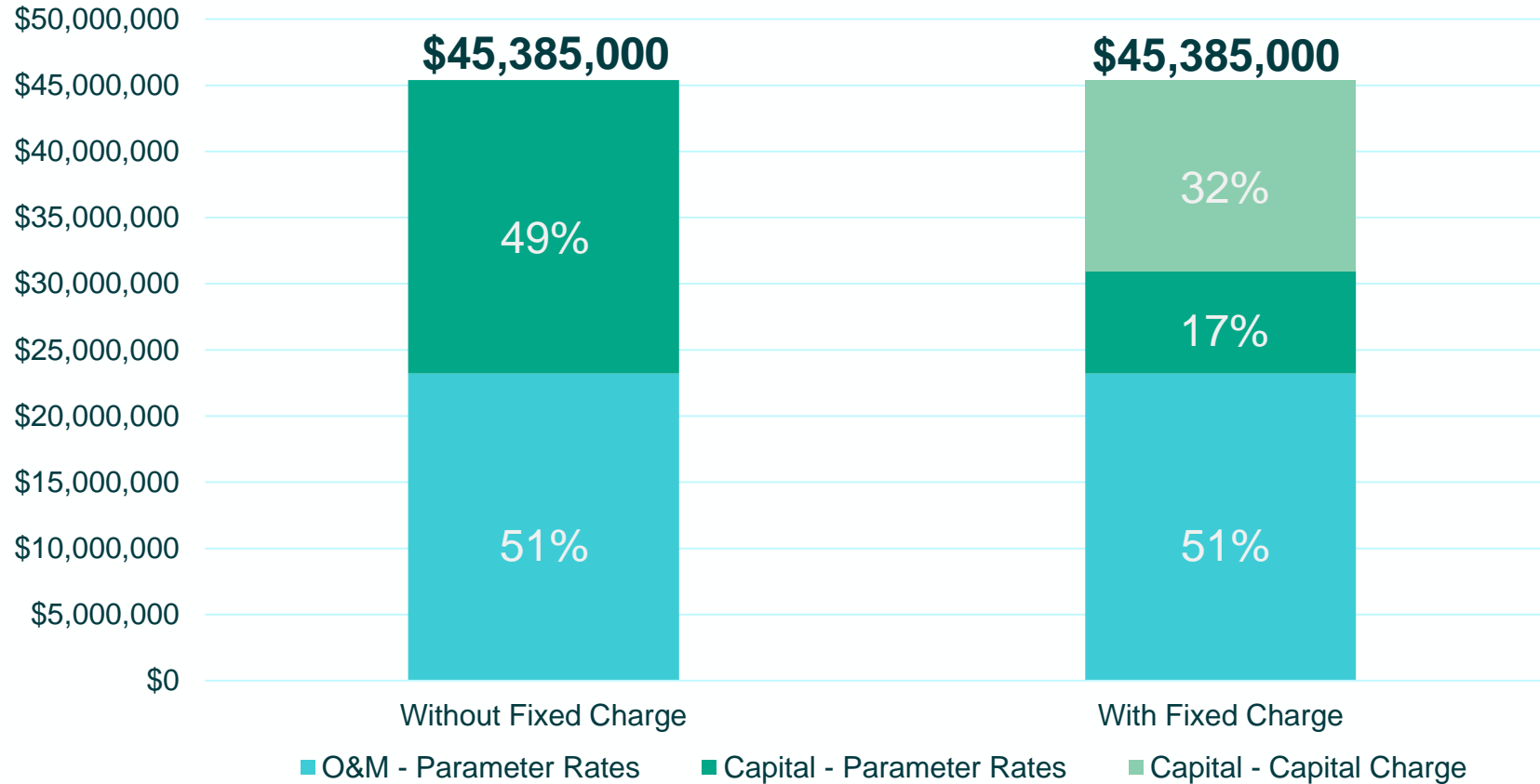


Illustration of Current Methodology

A. Portion From Volume & Loading Charges

35% or \$7,757,000

1. Adjust for GP, Mill Charges and Other Revenues
Remaining portion = \$4,025,000

2. Allocate costs to Parameters based on Fixed Asset Allocation

Customer	Flow	BOD	TSS	Phos	TKN
ALL	14.4%	33.2%	45.3%	3.1%	4.0%
ALL	\$0.58M	\$1.34M	\$1.82M	\$0.13M	\$0.16M

3. Divide by Flows and Loadings to Calculate Unit Rate and Bill Based on Actual Flows and Loadings

Customer	Flow	BOD	TSS	Phos	TKN
ALL	\$0.0500	\$0.0600	\$0.0900	\$0.3000	\$0.0500
Customer X	X MG	X LBS	X LBS	X LBS	X LBS

4. Customer X Portion = $(\$0.0500 \times X \text{ MG Flow}) + (\$0.0600 \times X \text{ LBS BOD...etc})$

Illustration of Current Methodology

B. Portion from Capital Charge

65% or \$14,406,000

1. Allocate Capital Charge to Parameters based on Fixed Asset Allocation

Customer	Flow	BOD	TSS	Phos	TKN
ALL	14.4%	33.2%	45.3%	3.1%	4.0%
ALL	\$2.07M	\$4.79M	\$6.52M	\$0.45M	\$0.58M

2. Distribute Capital Charge to Customers based on Budgeted Flow / Strength

Customer	Flow	BOD	TSS	Phos	TKN
Customer X	2.1%	8.2%	4.2%	6.0%	8.9%

3. Customer X Portion = $(2.1\% \times \$2.07M) + (8.2\% \times \$4.79M) + \text{etc...}$

* Method results in the **same customer allocation as if there was no capital charge**, and the costs were recovered through the variable rates (assuming actual usage mirrored budgeted usage).

How are budgeted units estimated?

Volume:

- Historical billing data is analyzed using a weighted average with less weight on outlier years
- A 30-year precipitation average is reviewed
- Estimates are vetted to ensure results are within range
- A growth percentage is then added to baseline flow based on trends
- Feedback from customers to gather information on expected changes and review results

Loading:

- Historical billing data average (1 to 5 years) is the basis (note there is a data lag)
- More industry driven, so new / lost industries, and customer process changes included
- A growth percentage is then added to baseline flow based on trends
- Manual adjustments based on industry knowledge, feedback from customers, and observed trends are employed as needed

Note: All figures shown here are illustrative.

Using budgeted or actual units won't impact NEW Water revenues

Customer	Budgeted Units	%	Actual Units	%
Customer 1	5,000,000	50%	2,000,000	25%
Customer 2	5,000,000	50%	6,000,000	75%
Total	10,000,000	100%	8,000,000	100%

Cost	%	Customer	Unit Rate Revenue	Budget Based Capital Charge	Actuals Based Capital Charge
O&M + 35% Capital	\$25,000,000	Customer 1	\$5,000,000	\$10,000,000	\$5,000,000
65% Capital Charge	\$20,000,000	Customer 2	\$15,000,000	\$10,000,000	\$15,000,000
Item	Value	Total	\$20,000,000	\$20,000,000	\$20,000,000

Item	Value
O&M + 35% Capital	\$25,000,000
Units	10,000,000
Unit Rate	\$2.5 / unit

**\$5M Rate
Revenue
Shortfall**

**\$0 Change in Total Capital
Charge Revenue Regardless
of Basis, Just Mix Changes**

Advantages vs. Disadvantages

Option #1: Status quo

Advantages

- Familiar process.
- Certainty to customers.
- Relatively less administratively burdensome than other options.
- Customers who deliver **more** flow/loads than budgeted may save on the capital charge portion of the bill.

Disadvantages

- Equity. Does not tie directly to actual usage, which is less equitable for customers.
- Customers who deliver **less** flow/loads than budgeted may pay more on the capital charge portion of the bill.

Option #2: Year-end true-up

Advantages

- More equitable than status quo.
- Relatively easy to administer compared to other options besides status quo.
- Similar to existing smoothing procedure.
- Common industry practice.

Disadvantages

- Could lead to surprises in customer year-end bills.
- Adds additional administrative effort (modest).
- Potential billing process changes.
- Reduces customer certainty about annual bill.
- Variation between budget and actuals may equalize over time, so annual efforts may not yield much net change for customers.

Option #3: In-year true-up (or actuals)

Advantages

- Improves equity compared to status quo option.
- Could result in lower magnitude changes than a year-end true-up.

Disadvantages

- Increases month to month customer variability.
- Adds administrative effort (modest).
- Requires billing process changes.
- Reduces customer certainty about annual bill.

Option 4: Rolling actuals

Advantages

- Potential for improved equity compared to status quo option.
- Reduces customer bill variability because units are smoothed.

Disadvantages

- Not as equitable as other options since units are from a different period than capital costs.
- Reduces customer certainty about annual bill.
- Could introduce seasonality issues (recommend rolling 12 months to avoid).
- Not a common industry practice.
- Adds administrative effort (modest).
- Requires billing process changes.

Option #5: Lagging actuals

Advantages

- Certainty to customers because units are known in advance.
- Relatively easy to administer compared to other options besides status quo.

Disadvantages

- Not as equitable as other options since units are from a different period than capital costs.
- Adds administrative effort (modest).
- Requires billing process changes.

Option A: 65% to 100% capital charge

Advantages

- Improves revenue stability for NEW Water.
- Improves bill predictability for customers (eliminate 35% variable capital cost recovery in unit rates).
- Could be paired with any prior option.
- Moves capital fixed costs to full capital charge basis.

Disadvantages

- End-users have less ability to impact their bill in a given year.
- May increase demand for some form of true-up because capital charges are higher.
- Sends less of a conservation signal for water and energy by reducing variable unit rates.



Milwaukee Metropolitan Sewerage District

Rate Methodology Development
and Review
Contract P-2655

Final Report / January 22, 2019



Ruekert • Mielke





January 22, 2019

Kevin Shafer
Executive Director
Milwaukee Metropolitan Sewerage District
260 W Seeboth St
Milwaukee, WI 53204

Subject: Rate Methodology Development and Review

Dear Mr. Shafer,

Raftelis Financial Consultants, Inc., in conjunction with our partners Ruekert & Mielke, Inc. and Stormwater Solutions Engineering, LLC, is pleased to submit this report presenting our findings and recommendations related to operating, maintenance, and capital costs associated with infiltration and inflow, wet weather projects, and green infrastructure for the Milwaukee Metropolitan Sewerage District.

This engagement focused on reviewing potential methodologies for the recovery of costs for projects related to infiltration, inflow, and wet weather as well as green infrastructure projects in the District's service area.

We appreciate this opportunity to be of service to the District, please do not hesitate to contact us at any time with any questions or comments concerning this report.

Sincerely,
RAFTELIS FINANCIAL CONSULTANTS, INC.

A handwritten signature in black ink that reads 'Thomas A. Beckley'.

Thomas A. Beckley
Senior Manager

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EXECUTIVE SUMMARY

Raftelis Financial Consultants, Inc. (Raftelis) and its subconsultants Ruckert & Mielke, Inc. (R/M) and Stormwater Solutions Engineering, LLC (SSE) were asked to review Milwaukee Metropolitan Sewerage District's (MMSD or District) existing cost recovery structure; identify costs associated with infiltration and inflow (I/I), wet weather, and green infrastructure; and determine how MMSD can adjust its cost recovery structure to more equitably recover these costs from its municipalities. MMSD sought to understand how it might recover the revenue requirement from municipalities in a way that provides a pricing incentive to individual municipalities that would benefit both MMSD and its municipalities with no impact on MMSD's total revenue requirement.

ALLOCATION OF COSTS TO INFILTRATION / INFLOW

MMSD assigns O&M unit process costs to four billing parameters:

1. Billable Flow (gallons of wastewater)
2. Biochemical Oxygen Demand (BOD)
3. Total Suspended Solids (TSS)
4. Sewer Connections

Currently, MMSD allocates O&M costs assigned to I/I to the billable flow (#1) and sewer connections (#4).

MMSD serves member and non-member municipalities. The revenue requirements for capital costs consisting of principal and interest on debt service and cash funded capital are recovered through a property tax levy for member municipalities and through an equalized value charge for non-member municipalities.

Capital expenditures that address I/I are funded either through debt proceeds or direct cash financing.

The total capital and O&M expenditures in 2017 that could be allocated to I/I are shown in Table ES-1. It is important to note that this does not change the District's total revenue requirement, this is the share of the existing revenue requirement that can be allocated to I/I.

Table ES-1 – Total Allocated Costs and Rate for I/I

Description	I/I Allocated Cost	Calculated Rate (per 1,000 gallons)
Operating & Maintenance	\$23,851,871	\$0.78732
Capital / Debt Service	\$47,653,487	\$1.57298
Total Allocated Cost	\$71,505,358	\$2.36030

IMPLEMENTATION OF I/I COST RECOVERY

A pilot analysis of data from MMSD's Flow Monitoring Program and water billing data from some municipalities demonstrated useful information on average and peak flows, including I/I. This information could allow MMSD to recover costs related to I/I specific to individual municipalities and provide an incentive to address system issues causing the municipality to generate higher levels of I/I. Our pilot program indicated that this approach is feasible, but additional metering of some areas may be necessary.

MMSD should consider phasing in such a change in cost recovery over time to allow municipalities to understand and mitigate the impact and allow MMSD to collect enough data for a multi-year period to minimize dramatic fluctuations in allocations among municipalities. MMSD should also consider how much of the identified I/I related costs should be recovered by the new methodology so impacts on municipalities are reasonable and that an appropriate pricing signal is provided to municipalities.

GREEN INFRASTRUCTURE

Green infrastructure is intended to support MMSD's 2035 Vision for zero basement backups and overflows and improving stormwater quality.

MMSD spends approximately \$4 million annually on green infrastructure, with approximately \$3 million for capital improvements collected from tax levies and equalized value charges to non-member municipalities and approximately \$1 million for operating and maintenance expenses collected from user charges.

MMSD is committed to a much greater investment in green infrastructure in the future and must have a fair and equitable approach to recover those costs.

Based on a yet-to-be-signed agreement between MMSD and Wisconsin Department of Natural Resources, MMSD green infrastructure projects located within the planning area can be used to comply with Total Maximum Daily Load (TMDL) goals set forth in each municipality's permit if the municipality contributes funds toward those projects.

The most common approach for recovering these types of costs in stormwater utilities is based on the impervious area of each property. Although some utilities measure each property's impervious area in square feet or acres, most utilities use an approach where residential properties are placed in specified tiers with ranges of square feet, and an equivalent residential unit (ERU) based approach is used for multi-family and commercial properties. Using tiers and ERU's is acceptable because data and processes used to measure impervious area have some inexactness that may make this method impractical.

If a similar charging mechanism were implemented, it would allow MMSD and its municipalities to implement the most cost-effective projects throughout the region, facilitating a collaborative path toward TMDL compliance and MMSD's goals. This concept could be further expanded to a watershed scale, regardless of political boundaries.

INTRODUCTION

BACKGROUND OF THE STUDY

In 2016 the Milwaukee Metropolitan Sewerage District (MMSD or District) engaged the Project Team consisting of Raftelis Financial Consultants, Inc. (Raftelis) along with its subconsultants Ruckert & Mielke, Inc. (R/M) and Stormwater Solutions Engineering, LLC (SSE) to undertake a study to review flow monitoring data, evaluate approaches to recover costs from the municipalities served by MMSD for inflow, infiltration, and wet weather projects as well as green infrastructure. In addition, the Project Team was to examine MMSD's Cost Recovery Procedures Manual (Manual) for any other recommended adjustments or changes to make the recovery of costs from the municipalities served by the District more equitable and fair, our findings for this review are contained in Appendix A.

Review of District Flow Monitoring Program

One of the key components of this engagement was a detailed review and evaluation of the data collected by the District's Flow Monitoring Program and how this data could be used to better allocate costs related to inflow, infiltration, and wet weather projects to the municipalities served by the District.

EXISTING COST RECOVERY APPROACH

The District recovers its revenue requirements through a system of ad valorem taxes, equalized value charges, and user charges. The District's revenue requirements consist of two primary pieces, capital costs and operating and maintenance expenses. The District uses a different approach to recover each portion of these costs.

The revenue requirements for capital costs, consisting of principal and interest on debt service as well as cash funded capital, are recovered in two different ways. Within the District's service area, there are member and non-member municipalities. Non-member municipalities may petition to become a member municipality at any time. The member municipalities pay through a property tax levy; the non-member municipalities pay through the equalized value charge. The difference in recovery of costs between the member and non-member municipalities is based on the District's authority to levy taxes within its boundaries. For non-member municipalities, the District has no authority to levy taxes so costs are recovered from the municipalities based on equalized value.

The revenue requirements for operating and maintenance expenses are recovered from user charges as documented annually in the District's Cost Recovery Procedures Manual¹ (Manual). The user charges are based on billable flow, number of connections, and contributed waste load strength by the retail customers within each municipalities' service area.

It is important to note that the focus of this study is to consider changes to how the District may recover its revenue requirements from the municipalities. The approaches discussed in this report do not fundamentally impact the revenue requirement, rather how the revenue requirement is recovered from the municipalities.

The District's existing methodology was reviewed as part of this project, in general the approach used by the District is reasonable and consistent with industry standards for setting wastewater rates, including those contained in the Water Environment Federation Manual of Practice Number 27, Financing and Charges for Wastewater Systems. We did provide some minor comments and suggestions to District staff, which are summarized in Appendix A of this report, some of which have already been implemented in more recent updates of the Manual.

¹ The 2017 Cost Recovery Procedures Manual, published in January 2017, which is the basis for the analysis in this report can be found at https://www.mmsd.com/application/files/4815/1301/9485/2017_CRPM.pdf

ALLOCATION OF COSTS TO INFILTRATION/INFLOW

BACKGROUND

An important component of this project was identifying the costs that may potentially be recovered based on a municipality's contribution of infiltration and inflow (I/I) to the District. Currently the operating costs for I/I are calculated as part of the District's annual user charge billings calculation. As part of the annual user charge billings calculation, I/I expenditures are allocated between the billable flow parameter (i.e., estimated wastewater volume) and the connections parameter (i.e., number of retail customer connections) in proportion to the amount of the operating and maintenance budget expenditures allocated to billable flow and connections. However, capital costs, which includes principal and interest on debt and cash funded capital, are recovered from municipalities within the District's member municipalities through a property tax levy and from those non-member municipalities of the District through the equalized value capital charge.

OPERATING AND MAINTENANCE EXPENSE

Operating and maintenance (O&M) expense allocable to I/I is determined annually by MMSD and documented in the Manual. In the 2017 update of the Manual these values are shown on page 2 of Table 3-2, which is also shown below.

Table 1 – Page 2 of Table 3-2 from Cost Recovery Procedures Manual

2017 BUDGETED UNIT PROCESS-PARAMETER RELATIONSHIPS					TABLE 3-2 Page 2 of 2
2017 CONNECTIONS & PROJECTED WASTELOADS:					
	<u>FLOW M.G.D.</u>	<u>BOD LBS./DAY</u>	<u>TSS LBS./DAY</u>	<u>CONNECTIONS</u>	
	<u>\$171.3</u>	<u>\$332,712</u>	<u>\$390,797</u>	<u>\$304,358</u>	
2017 UNIT COSTS (DOES NOT INCLUDE WATERCOURSE COSTS):					
	<u>FLOW CENTS/1000 GAL.</u>	<u>BOD CENTS/LBS.</u>	<u>TSS CENTS/LBS.</u>	<u>DOLLARS/CONN.</u>	
BILLABLE COSTS	\$0.43719	\$0.12572	\$0.16086	\$13.46	
I/I ALLOCATION	\$0.64343	\$0.00000	\$0.00000	\$10.22	
	\$1.08062	\$0.12572	\$0.16086	\$23.68	
PERMIT FEE SURCHARGE	\$0.01362	\$0.00158	\$0.00203	\$0.30	
	\$1.09424	\$0.12730	\$0.16289	\$23.98	
UNITS OF SERVICE BY CLASS OF USER:					
<u>CLASS OF USER</u>	<u>ESTIMATED BILLABLE FLOW (1000 GAL.)</u>	<u>ESTIMATED CONNECTIONS</u>	<u>ESTIMATED BOD LBS.</u>	<u>ESTIMATED TSS LBS.</u>	
RESIDENTIAL	16,472,945	264,500	42,582,561	50,835,509	
NON-CERTIFIED COMMERCIAL	10,336,270	37,193	26,723,392	31,895,662	
CERTIFIED COMMERCIAL	1,636,429	1,968	3,525,106	4,214,490	
CERTIFIED INDUSTRIAL	3,790,507	697	39,476,426	19,166,184	
TOTALS	<u>32,236,151</u>	<u>304,358</u>	<u>112,307,485</u>	<u>106,111,845</u>	
ESTIMATED BILLABLE WASTELOADS PER DAY	88,318,222		307,692	290,717	
ESTIMATED INFILTRATION/INFLOW PER DAY	83,000,000		25,020	100,080	
TOTAL DAILY WASTELOADS	<u>171,318,222</u>		<u>332,712</u>	<u>390,797</u>	TOTAL I/I COSTS
INFILTRATION/INFLOW COSTS (INCLUDES ISS)	<u>\$13,244,671</u>		<u>\$1,148,113</u>	<u>\$5,876,087</u>	<u>\$23,851,871</u>
PERMIT FEES SURCHARGE:					
PERMIT FEES	\$922,000				
TOTAL BUDGET W/O PERMIT FEES	<u>\$73,229,000</u>				
SURCHARGE	<u>1.26%</u>				

Based on these values, the O&M currently allocable to I/I is shown in the bottom right side as \$23,851,871. Under the existing methodology these costs are then allocated to the billable flow parameter and the connections parameter. In the 2017 Manual these allocations are 86.96% to flow and 13.04% to connections, as shown at the bottom of page 1 of Table 3-2 of the Manual. These costs are then included in MMSD's billable flow rate and connection charge and recovered from all customers based on those two billing parameters. Under this methodology all customers share equally in these costs proportional to their billable flow and number of connections.

This methodology for recovery of I/I related costs could be changed to reflect municipalities' contributions of I/I if reliable information is available on their share of contributed I/I. As discussed later in this report it appears that the data being collected under MMSD's flow monitoring program (with some additional improvements), when combined with other information, in particular, water billing data from the communities, would allow this to be reliably determined.

In 2017, the estimated total average daily flow of I/I was 83 million gallons per day, as shown on page 2 of Table 3-2 of the Manual. However, some portion of this I/I occurs in the MMSD owned and operated system and the existing methodology that allocates those flows to customers based on their contributed billable volumes and connections may still be reasonable for those flows, or the District should consider allocating those costs completely based on connections. The amount of flow originating in the District owned system can be estimated based on a comparison of inch diameter-miles of the District owned system relative to the communities' system. The remainder of the I/I flow, which originates in municipalities' collection systems, could then be recovered from those municipalities based on their estimated I/I volumes.

Assuming for analysis purposes that all of the I/I flow originates in the municipalities' collection systems, this approach would replace the current allocation of O&M related I/I costs of \$.64343 per 1,000 gallons of billable flow and \$10.22 per connection per year (as shown on page 2 of Table 3-2 of the 2017 Manual) with a volume rate of \$.78732 per 1,000 gallons of contributed I/I based on the 2017 estimate of 83 million gallons per day of I/I as shown below in Table 2.

Table 2 – O&M Volume Calculated Rate for I/I

	Description	Amount	Note
(1)	Total O&M allocated to I/I	\$23,851,871	Page 2 of Table 3-2 of 2017 Manual
(2)	Total Annual I/I flow (1,000's of gallons)	30,295,000	83 mgd of I/I, from Page 2 of Table 3-2 of 2017 Manual, times 365 days
	O&M Volume Calculated Rate (per 1,000 gallons)	\$.78732	(1)/(2)

CAPITAL COSTS

In addition to the O&M expense, there are also expenditures related to building and rehabilitating capital facilities to convey and treat the additional flows related to I/I. For purposes of this analysis, these costs consist of existing debt service, which is paying for facilities already constructed.

Debt Service

MMSD typically uses two types of debt, General Obligation (G.O.) bonds and notes and the Wisconsin Clean Water Fund (CWF), both are secured by a pledge of ad valorem taxes. Based on discussions with MMSD staff CWF debt and a portion of G.O. debt have been used to fund conveyance and treatment facilities, which would be allocable to I/I.

Currently debt service is paid for through a combination of the tax levy collected from member municipalities and equalized value charges based on assessed property values from non-member municipalities. If MMSD decides to change this approach those costs allocable to I/I could be collected on a flow based charge.

MMSD Staff provided a list of projects that have been funded with CWF loans and the portion of each project allocable to I/I. MMSD Staff assigned each project as either 0%, 50%, or 100% allocable to I/I. A total of 102 projects were identified as being funded by CWF loans, and of those, 21 were 100% allocable to I/I, 57 were 50% allocable to I/I, and 24% were 0% allocable to I/I. The 2017 debt service for each project was then multiplied by this percentage to determine the amount allocable to I/I. In addition to this allocation of CWF loans, MMSD Staff indicated that \$4,000,000 in G.O. debt service was allocable to I/I related projects. In total, \$47,653,487 of debt service is allocable to I/I as shown in Table 3 below.

Table 3 – Calculation of Debt Service Allocation

Clean Water Fund (CWF)	\$ 43,653,487
General Obligation (G.O.)	\$ 4,000,000
Total Debt Service Allocable to I/I	\$ 47,653,487

Based on this allocation of debt service to I/I, a debt service volume rate for I/I of \$1.57298 per 1,000 gallons can be calculated as shown below in Table 4.

Table 4 – Debt Service Volume Rate for I/I

	Description	Amount	Note
(1)	Total Debt Service allocated to I/I	\$47,653,487	Table 4
(2)	Total Annual I/I flow (1,000's of gallons)	30,295,000	83 mgd of I/I, from Page 2 of Table 3-2 of 2017 Manual, times 365 days
	Debt Service Volume Calculated Rate (per 1,000 gallons)	\$1.57298	(1)/(2)

TOTAL I/I COST ALLOCATION

In total, the possible allocation of O&M and debt service as discussed in the previous sections result in a total allocated cost for I/I of \$71,505,358, or a combined calculated rate of \$2.36030 per 1,000 gallons of I/I flow, as shown below in Table 5.

Table 5 – Total Allocated Costs and Rate for I/I

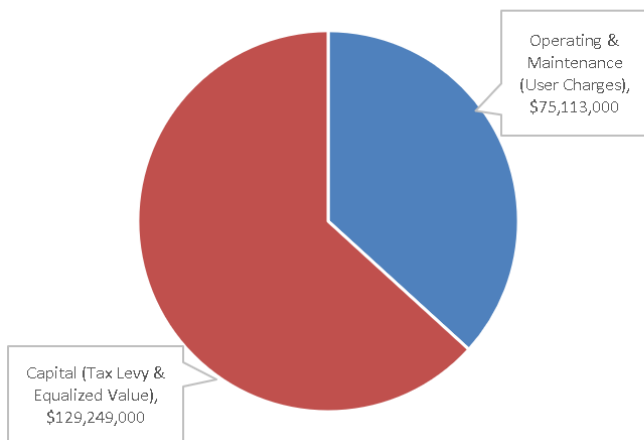
Description	I/I Allocated Cost	Rate (per 1,000 gallons)
Operating & Maintenance	\$23,851,871	\$0.78732
Debt Service	\$47,653,487	\$1.57298
Total Allocated Cost	\$71,505,358	\$2.36030
Total 2017 Tax Levy & User Charge Revenues	\$204,362,000	
I/I Costs as % of Tax Levy & User Charge Revenues	34.99%	

This amount represents approximately 34.99% of MMSD’s total user charges and tax levies for the year. Some portion of these costs may continue to be allocated based on the existing methodology or a revised methodology using the portion of I/I attributable to MMSD owned and operated facilities.

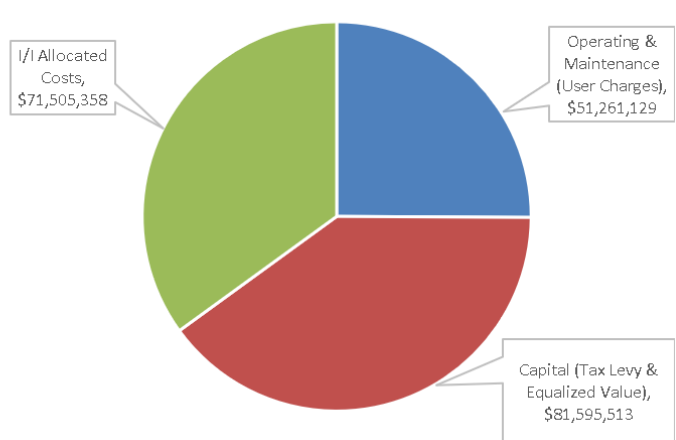
It is important to note that this allocation does not change the District’s total revenue requirement, rather it’s just an indication of what portion of the District’s existing revenue requirement can be allocated to I/I. As shown below in Chart 1 the total revenue requirement is the same \$204,362,000 in total before and after the allocation of costs to I/I.

Chart 1 – Comparison of District Revenue Requirement with I/I Allocation

Current Cost Recovery Methodology (\$204,362,000 total)



Allocation of Costs to I/I (\$204,362,000 total)



DISTRICT FLOW MONITORING DATA PILOT ANALYSIS

BACKGROUND

R/M completed a pilot analysis intended to determine the amount of clear water that is entering the separated sanitary sewer system on a consistent basis, commonly referred to as inflow and infiltration (I/I). Examples of typical sources of I/I in a separated sanitary sewer system include cracked sewer pipes or laterals that are located below the existing groundwater table, leaky manhole sections, foundation drains, pick or vent holes in manhole lids, and pipe joints that are separated. It is important to note that this pilot analysis was performed in the separated sewer service area of the system and that the combined sewer system was not studied.

R/M developed a process to compare MMSD's sanitary sewer meter data to local water meter records for the parcels that contribute to each respective sanitary sewer metershed. This water out vs. water in approach allows for a ratio comparison and indicates metersheds that may be experiencing higher levels of I/I. In a perfectly watertight sanitary sewer system devoid of any I/I and where all the water is returned as sanitary sewer waste the ratio of sanitary sewer flows to water meter data would be 1:1. Any value higher than 1:1 would indicate the amount of clear water source(s) entering the sanitary sewer system. By calculating the volume of sanitary sewer flows and subtracting the water use volume over a correspondingly dry season, like December through February (and adjusting for any high-volume water users that do not return all metered water to the system), the volume of I/I entering MMSD's sewer system can be calculated.

The pilot study analyzed ten metersheds in five different municipalities. The metersheds were selected based upon the following criteria:

- Availability of water use meter data
- Desire to work with water use data from multiple municipalities
- Availability and accuracy of sanitary sewer meter data
- Location of sanitary sewer meters, with preference given to direct correlation meters that were located on the downstream end of metersheds with no other areas flowing through the meters (this limited the need to add/subtract flow from other metersheds and ultimately improved the accuracy of the results presented herein)
- Desire to review data from both urban and suburban areas
- Desire to review data from both compliant and non-compliant sewersheds / metersheds

OVERVIEW OF METHODOLOGY

The data required to complete this analysis came from a variety of sources and arrived in a variety of formats. The text below summarizes the analysis methodology developed by R/M, Raftelis and MMSD staff.

1. Obtain water use records through the water utility serving each municipality.
 - a. Each utility was asked to provide billing records that broke down into the following categories: parcel tax key ID, meter start/end dates and total water usage.
 - b. Data was requested for a low water usage period so that the water loss due to things like lawn sprinkling, filling of backyard pools, etc. were at a minimum. To accomplish this, data was requested for the period from January through March of 2016.
2. Spatially assign the water meter data to parcel locations using Geographic Information Systems (GIS) software and the provided tax key identifier. Use the GIS search and view tools to determine any locations without meter data.
3. Overlay the local sanitary sewer data and metershed boundaries on the water use records using GIS to verify the boundaries and determine which parcels within the given metershed must be analyzed.
4. Review the land use and parcel ownership information within each metershed to determine if any industrial users were present that would consume large amounts of water as part of their process that would not be returned to the sanitary system. If so, investigate process water loss at these locations on a case-by-case basis.
5. Use the water meter data to calculate the total volume of water used within each metershed across the January-March quarter. Use proxy information to account for any parcels without water use records.
6. Multiply the first quarter water use volume by 4 to calculate the expected annual water use volume within each metershed during low-flow (winter) conditions.
7. Calculate theoretical water use within each metershed utilizing MMSD's municipal occupancy factors and water use data (53 gallons per capita per day for residential land uses; 1,500 gallons per acre per day for commercial/industrial/institutional land uses).
8. Obtain the sanitary sewer meter records through MMSD. This data was provided in a standardized format showing hourly meter readings at all meter locations.
9. Determine whether the sanitary sewer flow within each sewershed was represented by a single meter, multiple meters requiring addition of flow data, multiple meters requiring subtraction of flow data, or whether insufficient meter data existed.
10. If insufficient meter data existed, determine the preferred location of additional meters.
11. Use the January - December 2016 sewer meter data to calculate the volume of sanitary sewer flow within each metershed throughout 2016.
12. Subtract the water use volume from the sewer flow volume to estimate the volume of I/I entering the sewer system within each metershed.
13. Divide the sewer flow volume by the water use volume to get a sewer flow to water use factor for each metershed.
14. Extrapolate these numbers to the entire municipality to account for unmetered areas of the municipality while subtracting rates from other municipalities entering into the subject municipality.

GIS ANALYSIS

The process used to calculate the volume of I/I is heavily dependent on the use of geoprocessing tools in ArcGIS's desktop application, known as ArcMap. ArcMap gave the project team the ability to spatially analyze the water meter and sanitary sewer information that was provided by the pilot municipalities and MMSD.

The process for calculating I/I within a metershed started by linking the water meter records to their corresponding parcels. The water data records came in a wide variety of Excel spreadsheets from each municipality. These spreadsheets were used to join the water meter records to a tax parcel layer in ArcMap (based on the tax key ID), allowing the team to easily determine which parcels had water meter data and which parcels were missing data. The spatial water use data was also joined to the metershed boundaries to efficiently sort parcels and calculate water use volumes.

For the water meter data within one municipality that was part of the study area, a database query using Microsoft Access was created to filter extraneous readings and calculate a sum for water consumption in this case where variable monthly, and not quarterly, readings were performed. The initial development of a methodology for getting the data into a working format took some time but once the process was developed, the data manipulation was repetitive and very efficient. This task indicated that the timing and frequency of meter readings is not consistent. In a full study, a method for normalizing these differences will vary from municipality to municipality and should be collaboratively developed.

PROXY USAGE

For the metersheds that were part of this pilot analysis, an average of approximately 8% of parcels within each metershed were missing water meter data. The water meter data for various parcels could be missing for several different reasons - vacant parcel, property owner is away for an extended period (snow-bird), or the parcel is serviced by a private well. In these situations, a standardized unit of water usage, or proxy, was used based on land use type and applied to represent the missing parcel water meter data.

Milwaukee County's GIS parcel layer included land use classifications, meaning each parcel in the GIS database was assigned a corresponding land use (residential, commercial, industrial, etc.). The average water usage was calculated within each metershed for each land use class (by parcel for residential land uses and by acre for other land uses). This average water usage was applied for the appropriate land use and used as a proxy for any parcel that was missing water meter information.

The use of a proxy for missing parcel water usage introduces a theoretical or assumed value that may or may not be reflective of the actual amount used. The pros and cons must be weighed in these situations. The pros are that these parcels are represented with a value of water usage that is reflective of similar parcels in the immediate area. These parcels are known contributors of sanitary sewer flow and a water usage value, even if it is a proxy, this method allows for a better representation of actual conditions. The cons are that the used proxy values are not reflective of actual water usage values. The variance in water usage is greatest in commercial and industrial parcels as these values can vary widely from parcel to parcel. Typical commercial and industrial parcels that require water usage as part of their individual process will seek out a municipal water source and their water usage data will be readily available from the municipal utility. There were only

a handful of industrial and commercial parcels that had a proxy water usage value applied to them as part of this pilot analysis.

EFFICIENCIES GAINED

The sewer meter data received from MMSD staff was provided in a consistent Excel format, allowing the team to easily integrate it with GIS and seamlessly complete the required calculations. MMSD staff members were incredibly responsive with meter-related questions or data requests.

ArcMap GIS tools provided the ability to spatially distribute the water meter data to their corresponding properties through geoprocessing tools. The data from Milwaukee County included information such as addresses, names of property owners, land use classifications and tax key information which helped when cross checking water meter usage across land use classes and metersheds. ArcMap includes spatial representation of the datasets, making it easier to identify gaps in the information and create exhibits. ArcMap also allows the user to quickly run queries, calculate sums and averages, select features based on related attributes and export information into tables. The combination of ArcMap's statistics tools and the land use classification within the parcels dataset made calculating proxies within the metersheds an efficient and accurate process. We strongly recommend heavy GIS involvement if this methodology is expanded across the entire service area.

LESSONS LEARNED

The largest hurdle encountered during the trial area analysis was the format in which each municipality delivered their water meter data. Some data was provided with an extensive amount of records for each tax key which required review and parsing prior to joining the water records to the parcels. More importantly, the data itself varied widely, as each municipality generally reads their meters and bills their customers at different times throughout the year. Some are monthly readings, others are quarterly readings, and a few are biannual readings. Some readings were completed on the last day of the month, while others were done at variable days during the month. In many cases, this required a fair amount of time and statistical analysis to break the readings down and accurately determine the winter quarter (January - March) meter readings that were desired.

The measurement units for total water usage also varied widely, including gallons, thousand gallons and CCF (centum or hundred cubic feet). Often the units of measurement were not clear, requiring clarification with the municipality and then conversion of the data to a common unit of volume. There were also a number of parcels that exhibited zero or very little water usage. Given the massive amounts of data involved, it would require a significant investigation into the validity of these null readings. For the purposes of this trial area analysis, these parcels were assumed to be vacant or unoccupied, and the values were left as presented.

Going forward, it would be preferable to receive water use meter records from all municipalities during a consistent winter quarter (Dec-Feb or Jan-March). Additionally, consistent data formatting and use of the same unit of volume would also be helpful, although not as critical. That said, the project team understands that these changes would likely require a significant investment of municipal utility staff time, though hopefully the process would become more efficient over time. With that in mind, a collaborative approach

to obtaining the desired data should be developed by working with municipal representatives before making any additional data requests.

With regards to the sewer meters, MMSD should be commended for the data gathered over the past 5+ years, with meter coverage extending to approximately 85% of the system. After reviewing the trial area metersheds in detail, a few key points became apparent:

- There were gaps in the data for some of the meters where we found negative readings or no values. After talking with MMSD staff, this often was the result of a fouled meter, a meter using outdated technology or a general failure of the meter itself. Newer technology for metering and reporting should reduce these issues and provide reliable data.
- In some instances, there was a lack of physical sewer meters in key places, often making accumulation or subtraction of flows within a given metershed difficult. If this trial area methodology is applied to the entire service area, a recommended deliverable would be a list of locations where additional meters should be installed.
- Although the sewershed/metershed boundaries were generally correct, there were some minor discrepancies that our team discovered, leading to questions about which way certain parcels drain. At times, incorrect local municipality GIS sewer pipe data added to that confusion with flow direction arrows pointed in the wrong direction and/or lack of information such as pipe diameter or invert elevations. Again, if this study were expanded, these discrepancies could be corrected.
- With the introduction of laser flow meters, the District could achieve a flow accuracy of 96% +/- . With these levels of accuracy, the District would also have greater confidence with billings that are generated by metered data.

FINDINGS

The results of the trial area analysis are summarized in Table 6. These results indicate that there appears to be varying levels of I/I entering the system, with average sewer flow to water use factors ranging from 1.77 to 5.44. Through discussions with District staff, it was shared that a 2:1 ratio of average sewer flow to water usage is observed across the District as a whole, so the results from this pilot analysis fall in line with some values below the 2:1 and a few that are above the 2:1.

The metersheds that were close to surface waters such as rivers and streams generally saw higher ratios of sewer flow to water use. This phenomenon is familiar in southeastern Wisconsin, as the ground water table is generally higher in these locations, contributing to increased infiltration and inflow.

It is interesting to note that there was not a correlation in the analyzed trial areas between the age of the sewer and the level of clear water entering the system. In some cases, municipalities with sewers that are generally older performed better in some situations than municipalities that have a newer sewer system. The relatively small number of trial areas analyzed likely contributed to this finding, as other factors including local sewer rehabilitation efforts, geographic location, groundwater levels and seasonal variations all likely impacted the analysis.

It should be noted that the column “Sewer Flow Peak to Average Day” was added to Table 6 to demonstrate how each metershed performed during wet weather peak flow events during the duration of the analysis (calendar year 2016). This factor helps to distinguish metersheds that observe smaller levels of continuous base flow of clear water entering the system versus those metersheds that experience higher levels of peak sewer flows during wet weather. Based upon the results shown in Table 6, there were some metersheds that appear to experience higher ratios of sewer flow to water usage during dry weather periods compared to peak sewer flows to average sewer flows. These findings would suggest that these sewersheds are seeing a continuous base flow of I/I during dry weather periods but are performing adequately during wet weather events. Given these findings, the correlation that a sewershed that performs well during wet weather events is a sewershed that performs well during dry weather periods cannot be made.

It is recommended that the District’s current policies and procedures for those areas with excessive flow during peak periods, as outlined in Chapter 13 of the District’s Rules, would also remain to provide another mechanism of enforcement for those areas contributing excessive flow during peak periods.

Finally, the theoretical water usage, or proxy, was calculated based on land use and acreage within each metershed and applying MMSD’s district-wide occupancy factor of 2.64 people/unit and water usage of 53 gallons per capita per day for residential land uses and 1,500 gallons per acre per day for commercial / industrial / institutional land uses. These theoretical values were found in the District’s Cost Recovery Procedures Manual and are generally consistent with metered water use data, although a few statistical outliers exist that should be further investigated.

Table 6 – Summary of Pilot Area Analysis Results

Municipality	Parcels Within Metershed	Annual Water Usage (MG)	Annual Sanitary Flow (MG)	Sewer Flow to Water Use Factor	Sewer Flow Peak to Average Day	Annual Theoretical Water Usage (MG)
Municipality A	317	16.6	89.7	5.40	8.38	16.2
	1,578	83.2	183.2	2.20	7.15	121.1
	1,426	73.6	400.2	5.44	2.47	90.6
Municipality B	1,638	106.3	423.1	3.98	2.41	125.5
Municipality C	576	50.4	91.3	1.81	4.16	31.8
	815	62.8	113.6	1.81	4.40	55.1
Municipality D	396	15.6	53.5	3.43	4.44	24.3
	3,951	190.5	528.2	2.77	5.37	207.4
Municipality E	618	82.8	146.6	1.77	3.49	31.4
	842	81.6	164.8	2.02	2.50	86.4
Pilot Total	12,157	763.4	2194.2			789.8
Pilot Average	1,216	76.34	219.41	3.06	4.48	78.98

NEXT STEPS

The trial area analysis yielded promising results as a way to quickly calculate the volume of infiltration and inflow entering MMSD’s sewer system. If the Commission decides to pursue adoption of sewer rates based on infiltration and inflow volume, it is recommended to expand this analysis to cover the entire service area. Based on the methodologies developed herein, analysis of the complete service area can and should be completed in a manner that allows the consulting team to deliver a set of tools to MMSD which would allow MMSD staff to complete simple annual updates as new sewer flow meter and water use records are available.

It is recommended that the District consider expanding upon their flow meter site locations and install additional meters in locations that will maximize the effectiveness of metershed sewer data coverage. Critical locations, such as the very downstream end of a metershed and along the District’s MIS, should be identified throughout the entire District service area and meters should be installed to collect actual sewer flow data and limit the need for a proxy.

The introduction of more modern flow meters should allow the District to achieve more accurate readings and have a higher level of confidence in the data collected over time.

Implementation of I/I volume-based rates will also require a fairly lengthy technical lead-up time. In particular, the analysis across the service area can be expected to identify additional meters that need to be installed. Once installed, the meters will need at least one year to gather a statistically sufficient set of flow data. Given this, we advise caution when setting an implementation schedule.

IMPLEMENTATION OF I/I COST RECOVERY

The previous two sections of this report outline the total cost that can be attributed to I/I in the MMSD system and discuss the pilot analysis of MMSD's metering program information that could be used to determine how much I/I is attributable to each municipality MMSD serves. With this information, it would be possible to change from the District's current approach, where the operating costs are recovered in proportion to a municipality's billable flow while capital costs are recovered based on a municipality's equalized values.

The first consideration is whether there would be a benefit to this change in cost recovery methodology, and would it send a pricing signal to the municipalities contributing higher levels of I/I to address those concerns. The minimum amount necessary to send such a pricing signal cannot be determined exactly, and it would vary by municipality in practice, but based on our experience in rate setting with other utilities we believe that the total allocated cost of \$71.5 million would be sufficient, and likely some number significantly less than that. We do not believe MMSD's current approach to recovering these costs needs to change completely, so it is not necessary to shift all of the identified I/I costs to a new methodology. If MMSD makes the decision to move forward recovering these costs based on the volume of I/I it would be advisable to phase in the change over time to avoid dramatic changes in charges to municipalities in a short period of time.

MMSD may also wish to consider treating the recovery of O&M related costs differently than the capital related costs due to the different methods under which they are currently recovered. For example, MMSD may wish to recover all of the O&M costs based on both billable flow and connections, as they currently are, but only a portion of the capital costs from a newly implemented I/I rate, with the remaining portion recovered under the current approach. This approach would also dampen the impact on different customers based on how current revenues are recovered. The O&M allocated to I/I in this report represents 30% of the total recovered from user charges while the capital charges, including debt service, represent 59% of the revenue recovered from equalized value, so the impacts on different municipalities needs to be considered as well.

Another consideration is that while the pilot analysis contained in the previous section indicates that metering data can provide a reasonable estimate of I/I from the municipalities, it would be advisable to use several years of data on an ongoing basis to avoid dramatic changes in rates due to short-term differences in flow between municipalities. A multi-year rolling average of flows would be a reasonable approach that should be accurate and would minimize dramatic fluctuations on all customers, something on the order of four or five years. There is a trade-off between avoiding short-term fluctuations and dramatic impacts but also allowing municipalities to benefit from improvements they make to decrease their flows. A four or five year rolling average may be appropriate to consider given these factors.

The period of time to build up to that rolling average period would also give municipalities an opportunity to be aware of what the data is indicating the impact on them will be so they can begin taking steps to reduce the impact of these changes.

IMPACT OF I/I COST RECOVERY

The trial area analysis has provided a proof of concept that may be applied to the entire District, but the analysis does not indicate the impact on specific municipalities based on the existing data. However, for discussion purposes it is useful to understand what the potential impact on municipalities may be. Table 7 compares what the allocation of costs for an average single-family home, which is billed 51,000 gallons per year, if the total costs allocable to I/I of \$71.5 million were recovered from municipalities based on the example rates of municipality-wide I/I shown in the table.

What the table shows is that because so much cost would be shifted from being recovered on a tax levy basis that the properties with lower assessed values would see a greater impact than those with higher assessed values. In a municipality that had the existing average I/I of 94% of contributed flow², properties with lower tax levies would see an increase in their share of the District's costs while higher value properties would see a decrease in their share of the District's costs.

² Based on information from Page 2 of Table 3-2 from Cost Recovery Procedures Manual, as shown in Table 2 of this report, 83,000,000 gallons per day of I/I divided by 88,318,222 gallons per day of billable flow results in an average I/I rate of 94% of billable flow.

Table 7 – Summary of Pilot Area Analysis Results

2017 MMSD Charges (Existing)

	Taxable Value			
	\$ 100,000	\$200,000	\$300,000	\$400,000
Volume Charge	\$ 55.81	\$ 55.81	\$ 55.81	\$ 55.81
Connection Charge	\$ 23.98	\$ 23.98	\$ 23.98	\$ 23.98
Capital Charge	\$ 172.35	\$ 344.70	\$ 517.05	\$ 689.40
Total MMSD Charges per year	\$ 252.14	\$ 424.49	\$ 596.84	\$ 769.19

Average I/I (94% of Contributed Volume)

	Taxable Value			
	\$ 100,000	\$200,000	\$300,000	\$400,000
User Charge	\$ 36.75	\$ 36.75	\$ 36.75	\$ 36.75
I/I O&M Connection Charge	\$ 78.37	\$ 78.37	\$ 78.37	\$ 78.37
Capital Charge	\$ 108.81	\$ 217.62	\$ 326.43	\$ 435.24
I/I Capital Connection Charge	\$ 156.57	\$ 156.57	\$ 156.57	\$ 156.57
Total MMSD Charges per year	\$ 380.50	\$ 489.31	\$ 598.12	\$ 706.93
% Change from Current	51%	15%	0%	-8%

150% of Average I/I

	Taxable Value			
	\$ 100,000	\$200,000	\$300,000	\$400,000
User Charge	\$ 36.75	\$ 36.75	\$ 36.75	\$ 36.75
I/I O&M Connection Charge	\$ 117.55	\$ 117.55	\$ 117.55	\$ 117.55
Capital Charge	\$ 108.81	\$ 217.62	\$ 326.43	\$ 435.24
I/I Capital Connection Charge	\$ 234.86	\$ 234.86	\$ 234.86	\$ 234.86
Total MMSD Charges per year	\$ 497.97	\$ 606.78	\$ 715.59	\$ 824.40
% Change from Current	97%	43%	20%	7%

200% of Average I/I

	Taxable Value			
	\$ 100,000	\$200,000	\$300,000	\$400,000
User Charge	\$ 36.75	\$ 36.75	\$ 36.75	\$ 36.75
I/I O&M Connection Charge	\$ 156.74	\$ 156.74	\$ 156.74	\$ 156.74
Capital Charge	\$ 108.81	\$ 217.62	\$ 326.43	\$ 435.24
I/I Capital Connection Charge	\$ 313.14	\$ 313.14	\$ 313.14	\$ 313.14
Total MMSD Charges per year	\$ 615.44	\$ 724.25	\$ 833.06	\$ 941.87
% Change from Current	144%	71%	40%	22%

50% of Average I/I

	Taxable Value			
	\$ 100,000	\$200,000	\$300,000	\$400,000
User Charge	\$ 36.75	\$ 36.75	\$ 36.75	\$ 36.75
I/I O&M Connection Charge	\$ 39.18	\$ 39.18	\$ 39.18	\$ 39.18
Capital Charge	\$ 108.81	\$ 217.62	\$ 326.43	\$ 435.24
I/I Capital Connection Charge	\$ 78.29	\$ 78.29	\$ 78.29	\$ 78.29
Total MMSD Charges per year	\$ 263.03	\$ 371.84	\$ 480.65	\$ 589.46
% Change from Current	4%	-12%	-19%	-23%

GREEN INFRASTRUCTURE

BACKGROUND

In a conventional grey stormwater system, sewers are designed to move runoff away from its source as quickly as possible. When precipitation falls on streets, parking lots, roofs and other impervious surfaces, the runoff picks up trash, bacteria, sediment, phosphorus, heavy metals, and other pollutants from the urban/suburban landscape, conveying them to nearby waterbodies. The resultant “flashiness” of conventional urban drainage systems (high peak flows shortly after it begins to rain and reduced flows during dryer periods) also causes erosion and flooding in downstream waterways, potentially damaging habitat, property, and infrastructure.

Green infrastructure is intended to support the District’s 2035 Vision for zero basement backups, zero overflows, and improved water quality by capturing stormwater near its source and allowing it to soak into the ground, be filtered by plants or evaporate instead of entering sewers and contributing to sewer overflows or water in basements. Green infrastructure uses vegetation, soils, and other elements to mimic the natural processes found in undeveloped areas. Its goal is triple bottom line based – to provide environmental, social, and economic benefits to the region. It is not a replacement for grey infrastructure, but is intended to complement the system of storm sewers, storage tunnels and reclamation facilities that will continue to be the foundation of the region’s flood management and water quality goals.

The goal for the District’s Green Infrastructure, Fresh Coast 740, was identified in the 2035 Vision as, “Use green infrastructure to capture the first 0.5 inch of rainfall.” This goal equates to 740 million gallons of runoff storage to accommodate the first half an inch of rainfall on all impervious surfaces throughout the District’s service area.

The implementation of this plan was further detailed in the District’s Regional Green Infrastructure Plan dated June 2013. This plan calls for the construction of green infrastructure throughout the District to accomplish these goals. The plan estimated accomplishing these goals would cost approximately \$1.3 billion, although not all these costs are expected to be borne by the public sector and no economies of scale or other efficiencies were assumed.

The District currently spends approximately \$4 million annually on green infrastructure, with approximately \$3 million for capital improvements collected through tax levies and equalized value charges to non-member municipalities and approximately \$1 million for operating and maintenance expenses collected through user charges.

TOTAL MAXIMUM DAILY LOAD (TMDL) BACKGROUND

Section 303(d) of the Federal Clean Water Act requires each state to identify those waters within its boundaries that are not meeting their designated uses due to exceedance of water quality standards for any applicable pollutant. Essentially, the Clean Water Act requires Wisconsin to identify which waterways are too polluted to function as originally intended. Section 303(d) also requires the United States Environmental Protection Agency (USEPA) to develop TMDLs for all pollutants exceeding applicable water quality

standards. There are currently approximately 2,000 waterway impairments on Wisconsin's 303(d) list of impaired waters.

A TMDL determines the maximum amount of a pollutant that a water body is capable of accommodating while continuing to meet water quality standards. For all pollutant sources, such loads are established at levels necessary to meet the applicable standard, with consideration given to seasonal variations and margins of safety. TMDLs provide the framework that allow states to establish and implement pollution control and management plans with the ultimate goals, as defined by the Clean Water Act, of "water quality which provides for the protection and propagation of fish, shellfish and wildlife, and recreation in and on the water wherever attainable."

The Wisconsin Department of Natural Resources (WDNR), working in conjunction with the USEPA, is responsible to implement Wisconsin's TMDL process. Several major TMDLs have recently been completed by and for WDNR, including the Milwaukee River, the Rock River, and the Lower Fox River watersheds. Several more are currently under development, including the Wisconsin River and the Upper Fox/Wolf watersheds, along with the Northeast Lake Michigan shore.

The Milwaukee River watershed has been listed as an impaired water on the State's 303(d) list for many years. The primary pollutants of concern are excessive phosphorus, sediment and fecal coliform bacteria concentrations which lead to nuisance algae growth, oxygen depletion, reduced submerged aquatic vegetation, water clarity problems and degraded habitat. These impairments adversely impact fish and other aquatic life, water quality, recreation, and navigation.

As a third party on behalf of the WDNR, the District developed TMDLs within the Milwaukee River Basin (which includes the Menomonee River, Kinnickinnic River, and Milwaukee River watersheds, as well as the Milwaukee Harbor Estuary). WDNR and USEPA recently approved the Milwaukee River Basin TMDL, and specific water quality requirements are expected to appear on the next round of permits for municipalities, wastewater treatment facilities, industries, and large agricultural entities within the watershed.

The western and southern portions of the District are within the Fox River, Root River, and Oak Creek watersheds. Each of these waterways is also on the 303(d) list. Although TMDLs are not yet underway for these waterways, they can be expected in the future. For now, water quality targets are currently being developed for these watersheds as part of the Water Quality Improvement Plan (WQIP), which is also addressing next steps for the Milwaukee River Basin.

APPROACH FOR GREEN INFRASTRUCTURE COST RECOVERY

The District has a policy goal that will require a much greater investment in green infrastructure than what is currently undertaken, and with that greater investment it is important that a fair and equitable approach be used to recover those costs. The District's existing tax levy/equalized value and user charge approach has been established and refined over many years to provide an approach for recovering the cost of providing wastewater treatment services to the municipalities. National studies have shown that green infrastructure has been employed mainly in areas where the municipalities have combined sewer overflows (CSOs). With green infrastructure being primarily focused on addressing water quality issues due to precipitation, the District may wish to consider other approaches to finance it.

One alternative green infrastructure approach is similar to stormwater utilities in terms of the investment being used to mitigate the impact of flows resulting from precipitation. While there is not a single approach used by all stormwater utilities to recover costs, the use of impervious area is by far the most common approach used because it is generally recognized as being fair and equitable as a proxy to runoff volume and pollution, while not being overly burdensome to administer.

Impervious area is typically determined through measurement of aerial photography using a computerized Geographic Information System (GIS) such as ArcGIS. While the GIS can measure areas very precisely, it is important to note that the delineation of the impervious surfaces is not as precise. So, while the GIS will provide an exact number with many decimal places for the identified area, that identified area will likely not be exactly the impervious area of the property because of the inaccuracy of the delineation and the inaccuracy of the imagery. To mitigate this inaccuracy, tiers are often used for assessing impervious area. For residential properties (e.g., single-family homes or multi-family homes up to four units) it is common to use a single value for all properties or to use a handful of tiers. The use of a single value is more common in smaller more homogenous municipalities (i.e., where many or most homes are similar in size and nature). For a service area of the District's size and diversity, it would be appropriate to use multiple tiers to provide appropriate differentiation among properties. A common approach would be for the second tier to include the average or median residential property, then have one smaller tier for more modest properties and one or two higher tiers for larger properties that have greater amounts of runoff due to their higher impervious areas. The size of these tiers can be determined using standard statistical approaches once the impervious areas throughout the District have been identified.

For non-residential properties, a common approach is to use equivalent residential units, or ERUs. An ERU is defined as the impervious area of the average residential property which allows non-residential properties to be equated to an integer number of ERUs. As an example, a small business may be just one ERU, while the District's largest non-residential properties could have hundreds of ERUs because of their large impervious surface areas.

While other approaches are used for assessing such costs to customers, for a service area as large and diverse as the District's, other approaches such as a flat fee (for all customers or residential), residential equivalent factor (which assumes a ratio of impervious area for all customers of the same class), or gross area would be less appropriate to recover costs fairly and equitably.

The District could also consider providing credits (i.e., a reduction of their charges) for properties that pay for and construct green infrastructure that meets the goals and objectives of the District in part or in whole for their property. The District would establish policies that provides economic incentives for the use of green infrastructure that both meet the development requirements of the District while also meeting the goals of the Fresh Coast 740 program.

Table 8 below shows a comparison of each municipalities' share of the budgeted 2018 tax levy, user charges, and impervious area. Currently capital related to green infrastructure is recovered through the tax levy while the operating and maintenance expense of the green infrastructure program is recovered through the user charges. If the District recovered these costs based on impervious area instead of the existing tax levy and user charge methodology this illustrates the potential impact on these communities, though for most communities the share of impervious area is similar to their shares of tax levy and user charges. The exact impact would depend on the size of the green infrastructure program and the amount of each capital and operating and maintenance expenditures.

Table 8 – Comparison of Funding Methods

Municipality	2018 Tax Levy	% of Total Levy	2018 User Charges	% of User Charges	Impervious Area (acres)	% of Impervious Area
Bayside	\$1,129,221	0.88%	\$259,525	0.31%	314	0.48%
Brown Deer	\$1,527,859	1.18%	\$884,667	1.06%	931	1.42%
Cudahy	\$1,629,591	1.26%	\$2,175,045	2.60%	1,261	1.93%
Fox Point	\$1,948,874	1.51%	\$409,321	0.49%	469	0.72%
Franklin	\$6,519,552	5.05%	\$2,417,181	2.89%	2,769	4.23%
Glendale	\$3,048,574	2.36%	\$1,087,732	1.30%	1,318	2.01%
Greendale	\$2,256,517	1.75%	\$873,699	1.05%	892	1.36%
Greenfield	\$4,783,057	3.71%	\$2,319,261	2.78%	2,236	3.42%
Hales Corners	\$1,136,995	0.88%	\$515,145	0.62%	547	0.84%
Milwaukee	\$43,819,267	33.96%	\$47,740,615	57.12%	25,608	39.13%
Oak Creek	\$5,479,641	4.25%	\$2,620,744	3.14%	2,980	4.55%
River Hills	\$827,848	0.64%	\$97,629	0.12%	321	0.49%
Shorewood	\$2,588,399	2.01%	\$776,905	0.93%	475	0.73%
St. Francis	\$1,000,115	0.77%	\$633,507	0.76%	546	0.83%
Wauwatosa	\$10,134,874	7.85%	\$3,606,900	4.32%	3,302	5.04%
West Allis	\$6,265,580	4.86%	\$4,373,936	5.23%	3,488	5.33%
West Milwaukee	\$484,379	0.38%	\$1,042,639	1.25%	450	0.69%
Whitefish Bay	\$3,799,659	2.94%	\$795,698	0.95%	590	0.90%
Brookfield	\$3,966,335	3.07%	\$1,089,391	1.30%	1,763	2.69%
Butler	\$307,842	0.24%	\$440,381	0.53%	262	0.40%
Caledonia	\$47,157	0.04%	\$29,111	0.03%	53	0.08%
Elm Grove	\$1,620,953	1.26%	\$366,903	0.44%	551	0.84%
Germantown	\$3,042,082	2.36%	\$1,781,376	2.13%	2,057	3.14%
Menomonee Falls	\$5,371,739	4.16%	\$2,200,796	2.63%	3,120	4.77%
Mequon	\$5,699,750	4.42%	\$1,407,618	1.68%	2,606	3.98%
Muskego	\$3,744,349	2.90%	\$1,269,562	1.52%	1,784	2.73%
New Berlin	\$6,455,635	5.00%	\$2,144,655	2.57%	3,139	4.80%
Thiensville	\$413,816	0.32%	\$213,632	0.26%	217	0.33%
Milwaukee County					1,398	2.14%
Totals	\$129,049,660	100.00%	\$83,573,574	100.00%	65,447	100.00%

EXISTING REGIONAL WATER QUALITY COOPERATION WITHIN MMSD’S PLANNING AREA

There are numerous examples within the District’s planning area of entities coming together to more cost effectively meet water quality requirements in a collaborative manner. Some examples of this include:

- MMSD collaborating with WDNR to allow each municipality to show movement toward compliance with TMDL goals for any water quality improvements made by the District and financially supported by that municipality. While impaired waterways will only be delisted via in-stream monitoring, this collaborative approach to reducing loadings is anticipated to foster a sense of regional cooperation and allow the municipalities additional time to meet their individual requirements while showing progress.

- The Mid-Moraine Water Quality Collective (Collective), which is a group of 12 municipalities, 2 counties, nonprofits, and partner organizations within the Milwaukee River watershed (upstream of Milwaukee County) that have come together with the goal of meeting TMDL allocations in a cost-effective manner. The Collective includes engineering expertise, non-governmental organization partners for public outreach, regulatory experts, and funding partners helping lead municipalities to meet water quality goals, economic goals, and collaboration goals. The group has recognized the value of a collaborative approach to achieve pollutant reductions through cost-effective, coordinated planning of storm water and wastewater opportunities, grant funding, and creative approaches including examination of an extensive trading network, unified approaches to storm water management, and compilation of monitoring data to help determine strategies to implement the TMDL.
- The Menomonee River watershed permit group, which includes 10 municipalities and Milwaukee County that have come together to operate under the same WDNR water quality permit. These municipalities have collaborated on specific watershed improvement projects to jointly meet WDNR permit requirements.
- The North Shore permit group, which includes 7 municipalities that work together and operate under the same WDNR water quality permit.
- Numerous watershed-based organizations focused on improving water quality. A sampling of these include the Southeastern Wisconsin Watersheds Trust, Inc. (Sweet Water), the Root-Pike Watershed Initiative Network, Milwaukee Riverkeepers, the Harbor District, the 16th Street Health Center, the Water Council, and numerous other organizations.

DISTRICT-WIDE APPROACH FOR ADDRESSING GREEN INFRASTRUCTURE

The key drivers of the green infrastructure program are complying with the District's Wisconsin Pollutant Discharge Elimination System (WPDES) permit, reducing water in basements/overflows in the combined sewer service area (CSSA) and improving water quality to comply with existing and future TMDL requirements within the District's watersheds. Although each of the permitted entities within the District could attempt to meet their requirements independently, the District may be able to provide a cost-effective means of addressing the requirements for municipalities throughout the District through a comprehensive green infrastructure program.

Based on an understanding between the District and WDNR, District projects located anywhere within the planning area can be used to show progress toward compliance with TMDL goals set forth in each municipality's permit, provided that the municipality contributed funds toward the project. This mechanism allows the District and municipalities to identify the most cost-effective projects throughout the region, regardless of location, while providing benefit to municipalities throughout the District. In other words, participating municipalities may receive TMDL reduction credits even if there are not projects constructed in their municipality.

If such an approach were implemented, the District could seek proposals from municipalities in identifying potential green infrastructure investments and would also identify potential green infrastructure

investments through their own regulatory and engineering efforts, in particular, projects that may span multiple municipalities. All of the potential projects identified by both the municipalities and the District could then be prioritized based on their cost-effectiveness, or more specifically their water in basements/overflow reduction and/or TMDL benefits relative to their total cost. Through the benefit sharing methodology mentioned previously, all of the municipalities could receive TMDL benefits for projects funded by the District, regardless of where they are constructed.

FUTURE WATERSHED-BASED COOPERATION

If MMSD's approach to green infrastructure funding was modified to a methodology involving a District-wide impervious area charge, it would allow placement of cost effective projects in critical locations, regardless of local jurisdictional boundaries. If successful, this proposed approach may potentially be scaled up further to include other entities outside of the District's service area that would benefit from TMDL reductions. For example, only a small portion of the Milwaukee River watershed is within the District, so other government entities may wish to create a Watershed District that would be operated independently of MMSD but would feature water quality improvements and permit compliance implemented on a watershed basis. This approach would essentially allow the most cost-effective projects to be implemented in the watershed, regardless of political boundaries. Although there would need to be legislative changes in Wisconsin to allow for the development of Watershed Districts, the concept is an approach that has been successfully utilized in other nearby states such as Minnesota and could be considered an extension of Wisconsin's current Lake Districts.

CONCLUSIONS

Approximately \$71.5 million in O&M and debt service has been initially identified that can be attributed to I/I. MMSD should consider recovering some or all of these costs based on measured I/I flow using the information that will be available from the Flow Monitoring Program. The trial analysis successfully used information from MMSD's Flow Monitoring Program to quantify differences in inflow and infiltration between municipalities on a pilot basis. More work will need to be done to complete this analysis for all of the District's municipalities, but the trial analysis has demonstrated how this information could be used to identify problem areas and it could be used to recover costs from municipalities in relation to their contributions of I/I into MMSD's system.

Green infrastructure is intended to support the District's 2035 Vision and the cost of this program could be recovered through an impervious area charge assessed throughout the District. Although the green infrastructure projects may not be built in all municipalities, the District's agreements with the municipality would provide a mechanism for the WDNR to allow for offsets for TMDL reductions to municipalities throughout the District for projects it undertakes anywhere in the District. This allows the District and municipalities to undertake the most cost-effective green infrastructure solutions throughout the District, while providing all municipalities the benefit of these projects regardless of where they are constructed. The District could consider recovering these costs based on impervious area of properties throughout the District. This concept could be further expanded to a watershed scale, implementing the most cost-effective projects across the watershed, regardless of political boundaries.

APPENDIX A – COST RECOVERY PROCEDURES MANUAL REVIEW

The Project Team has reviewed the District’s most recent Cost Recovery Manual (Manual) for 2018. The following comments are organized by section of the Manual.

SECTION 1 – EQUIVALENT RESIDENTIAL UNIT

Even though the District updates the per capita flow annually based on winter flow data each year, they may consider undertaking a study to confirm the per capita strength loadings recognizing potential changes in residential pollutant strength as per capita water consumption has declined over the past 26 years.

It should be noted that page 1-1 of the current Manual states³:

The study yielded an ERU consisting of 64 gallons/capita/day (excluding Infiltration/Inflow), with BOD of 0.166 pounds per capita/day (310 mg/l) and TSS of 0.197 pounds/capita/day (370 mg/l).

In the body of the section and then at the end of the section states:

The resultant EQUIVALENT RESIDENTIAL UNIT, effective January 2018, is as follows: Domestic Flow, 52 gallons/capita/day (Excluding Infiltration/Inflow), B.O.D., 0.165 pounds capita/day (310 milligrams/liter), T.S.S., 0.197 pounds/capita/day (370 milligrams/liter).

In the second statement either the concentrations in milligrams per liter or the total loadings in pounds per capita per day must have changed as the per capita flow has decreased. We have discussed this discrepancy with District staff and based on plant flow and loading information they believe the concentrations are accurate and the total loadings have decreased. District staff has indicated this discrepancy will be corrected in the next revision of the Manual.

SECTION 2 – RESIDENTIAL OCCUPANCY FACTORS

The approach used by the District to calculate the number of residents per residential customer appears to be reasonable and we have no comments or recommended adjustments.

SECTION 3 – UNIT PROCESS PARAMETER RELATIONSHIPS

There was a notable change in this section in the latest Manual, non-member municipalities are now allowed to opt out of participating in the District’s Green Infrastructure program. To date, eight of the ten non-member municipalities have elected to opt out.

Given the scope of the current Green Infrastructure funding we believe the current methodology is reasonable and appropriate, but if the District were to increase the size significantly other approaches could be considered to ensure costs are being recovered fairly and equitably from the municipalities in the District.

³ ERU is equivalent residential unit. BOD is biochemical oxygen demand, which is a measure of the biological treatment requirements of wastewater flow. TSS is total suspended solids which is a measure of the organic and inorganic material removal requirements of wastewater flow.

The Project Team did review and consider other billing approaches and information on this is included in the SSE Report contained in Appendix E.

SECTION 4 – TYPICAL PROCESS WASTESTRENGTHS

We have no comments or recommended adjustments to this section of the Manual.

SECTION 5 – MUNICIPAL WHOLESALE BILLING

We have no comments or recommended adjustments to this section of the Manual.

SECTION 6 – TYPICAL WASTEWATER DISCHARGE RATE

We have no comments or recommended adjustments to this section of the Manual.

SECTION 7 – CERTIFICATION PROCEDURES

We have no comments or recommended adjustments to this section of the Manual.

SECTION 8 – DATA VERIFICATION PROCEDURES

We have no comments or recommended adjustments to this section of the Manual.

SECTION 9 – NOTICE IN CHANGE OF OCCUPANCY

We have no comments or recommended adjustments to this section of the Manual.

SECTION 10 – UNIT COSTS OF TREATMENT

The sentence on page 10-2 that starts “In making these projections, actual loadings for the first six months of 2018 were used”, we believe that the reference to 2018 in this context is incorrect, it should be 2017.

SECTION 11 – PRETREATMENT PROGRAM AND MONITORING CHARGE

We have no comments or recommended adjustments to this section of the Manual.

SECTION 12 – LATE PAYMENT PENALTY

We have no comments or recommended adjustments to this section of the Manual.

SECTION 13 – CHARGES FOR SPECIAL WASTES

We have no comments or recommended adjustments to this section of the Manual.

SECTION 14 – HOUSEHOLD HAZARDOUS WASTE PROGRAM COSTS

We have no comments or recommended adjustments to this section of the Manual.

APPENDIX B – SSE GREEN INFRASTRUCTURE RESEARCH MEMO

MILWAUKEE METROPOLITAN SEWERAGE DISTRICT RATE STUDY PROJECT GREEN INFRASTRUCTURE RESEARCH MEMO

CONTRACT NO. P-2655

UPDATED: FEBRUARY 2018

PREPARED FOR:



 Ruekert • Mielke



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1 EXECUTIVE SUMMARY

1.1 Introduction and Background

Stormwater Solutions Engineering, LLC (SSE) was contracted by the Milwaukee Metropolitan Sewerage District (MMSD) as a sub-consultant to Raftelis on the Rate Structure Project. The District currently recovers its operation and maintenance expenses primarily through its sewer user charge. The Rate Study Project team was tasked with reviewing the cost recovery methodology for all of MMSD's operation, maintenance, and capital costs, but more specific to SSE, the sewer charge parameters for TSS, inflow and infiltration (I/I), and how green infrastructure (GI) implementation and long-term maintenance fit into this cost recovery.

SSE and Ruekert and Mielke (R/M), another sub-consultant to Raftelis, were tasked on the review of green infrastructure, which included evaluating current methods of funding for the current Green Infrastructure Program, planned locations of GI from both the MMSD "Regional Green Infrastructure Plan" and when released, the MMSD 2050 Facilities Plan, and how the GI costs are allocated to each of the 28 communities served by MMSD. SSE and R/M were also tasked on the evaluation on the level and accuracy of any data relative to storm water flows and the amount of impervious surface in each municipality served by MMSD.

1.2 Summary of MMSD Billing and Budgets

The Milwaukee Metropolitan Sewerage District's (MMSD) billing and cost recovery methodology is unique and different from most agencies in the United States. MMSD offers sanitary sewer services to customers on a "wholesale" basis through a connection, collection and reclamation cost for its daily operation, and through an ad valorem tax that helps pay off debt financing for infrastructure improvements.

The District operates from two budgets, the Capital Budget, and the Operation and Maintenance (O&M) Budget. The Capital Budget covers capital projects, primarily being construction, and the other is for operation and maintenance expenses, which relates mainly to the collection, conveyance and treatment of wastewater. Capital expenditures include rehabilitation, replacement or improvement of existing District facilities and infrastructures, as well as planned watercourse and flood management improvements.

The District does not handle direct customer billing, but provides "wholesale" treatment services including collection, conveyance and treatment of wastewater to 28 municipalities. In this wholesale approach, the District sends bills to the 28 communities served, and the communities are the retailers handling the direct customer billing.

The *tax levy* is the main source of revenue for the capital program and is used to finance the acquisition, extension, planning, design, construction, adding to or improvement of land, waters, property, or facilities for sewerage purposes, and to pay principal and interest on bonds, notes, or loans as provided in the fiscal year capital budget. The tax is levied upon all taxable property in the District (as equalized for State purposes), pursuant to Sec. 200.55(6), Stats., a non-repealable, direct annual tax in an amount sufficient to pay the principal of and interest on the District-issues

bond or notes or low-interest loans for the Clean Water Fund Program for the following year. The District's tax levy is carried on to the tax roll of each city, town, or village wholly or partially within the boundaries of the District and collected in addition to all other taxes and in the same manner and at the same time, all as provided by law and in addition to all other State taxes. In any given year, the amount of any surplus fund in Debt Service Fund available to pay debt service is used to reduce the tax levy.

There are eighteen cities, town, or villages located within the boundaries of the District that are referred to as District Members. Each of these eighteen communities or municipalities are in Milwaukee County.

The following is a list of the eighteen District Members:

- | | |
|------------------|--------------------|
| 1. Bayside | 10. Milwaukee |
| 2. Brown Deer | 11. Oak Creek |
| 3. Cudahy | 12. River Hills |
| 4. Fox Point | 13. Shorewood |
| 5. Franklin | 14. St. Francis |
| 6. Glendale | 15. Wauwatosa |
| 7. Greendale | 16. West Allis |
| 8. Greenfield | 17. West Milwaukee |
| 9. Hales Corners | 18. Whitefish Bay |

Non-member billings come from ten communities outside the District's legal boundary but within the District's service areas. Non-member communities are billed a *capital charge* in place of levying a property tax. Non-member communities receive a billing rate credit for watercourse and flood management projects and some green infrastructure expenditures to which those communities are not tributary.

The following is a list of the ten Nonmember Communities:

- | | |
|---------------|--------------------|
| 1. Brookfield | 6. Menomonee Falls |
| 2. Butler | 7. Mequon |
| 3. Caledonia | 8. Muskego |
| 4. Elm Grove | 9. New Berlin |
| 5. Germantown | 10. Thiensville |

As an outcome to the Sewer Wars that occurred between 1984 and 1996, the District can bill non-members the same as members. If the works is flood management related, the District cannot bill the non-members unless it impacts their community. To incentivize communities to use the billing rate credits on green infrastructure projects, the District created a program called 'Green Solutions'. If the credits are used to fund green infrastructure projects, the District will reimburse partial design and construction costs, providing a financial incentive for communities to use that money on green infrastructure projects. In recent months, eight of the nonmember communities have opted out of the Green Solutions Program.

The research report is a collection of background information on other agencies around the United States billing methodology and trends. There is no direct comparison to the District

because of the way the District is structured, therefore the information on other agencies is not to be used as a recommendation to the District, but as a resource for other methodologies used. MMSD is committed to using green infrastructure innovation as an alternative and supplemental approach to typical grey infrastructure improvements. Similar to how the Private Property Inflow/Infiltration Program began, green infrastructure funding will likely increase.

1.3 Review on National Practices

Extensive research on national practices for funding green infrastructure projects and resulting user charges has been compiled. The national agencies and utilities researched include the District of Columbia Water and Sewer Authority, Philadelphia Water, Pittsburg Water and Sewer Authority, Allegheny County Sanitary Authority, City of Seattle, King County, Northeast Ohio Regional Sewer District, City of Chicago, New York City, San Francisco, and Onondaga County. Many agencies nationwide, have integrated GI funding for implementation, and maintenance into their sewer district budgets. A National Practices for Funding Green Infrastructure Table (Appendix B) was created to outline the agencies, their utilities, consent decrees, service areas, funding, charges, projects, long-term control plans, their removal goals or mandates, and the associated costs. Overall, the funding mechanisms vary, but the purpose for GI implementation does not. Green infrastructure is needed to provide volume control, improve water quality and to meet both state and federal water quality standards.

Green infrastructure can be funded through a variety of different mechanisms or utilities. Funding options for municipal stormwater programs are service fees (including stormwater utilities), property taxes/general fund, special assessment districts or regional funding mechanisms, system development charges (SDCs), and grants and low-interest loans. The methods stormwater utilities use to calculate service fees include equivalent residential unit (ERU), intensity of development (ID), and equivalent hydraulic area (EHA). These are further explained in the Environmental Protection Agency (EPA) document called “Funding Stormwater Programs” (Appendix A). Service fees and ERUs have been found to be common mechanisms amongst agencies, but each varies on exactly the parameters of these rates and charges are set and incorporated into billing.

The majority of organizations researched have added a green infrastructure funding component to address combined sewer overflows. There is little precedent of adding green infrastructure charges to reduce separate sewer overflows. All the mechanisms and utilities have advantages and disadvantages, and it is important to compare and evaluate these against the function and goals of the District.

1.4 Recommendations

After the entire project team has collected and reviewed all the necessary information, including what is listed in this report, rate structure recommendations for the District will be formed.

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Appendix D	Seattle, Washington and King County, Washington Settlement

2 INTRODUCTION & BACKGROUND

Stormwater Solutions Engineering, LLC (SSE) was contracted by the Milwaukee Metropolitan Sewerage District (District) as a sub-consultant to Raftelis on the Rate Structure Project. The District currently allocates costs to green infrastructure (GI) in its cost allocation process and then combines those costs with other Inflow and Infiltration (I/I) related costs (as shown in Section 10 of the Cost Recovery Procedures Manual) and recovers them through the I/I costs allocation methodology, described in Task 2 of the *Project Understanding*. However, the District may consider a different approach to recovering these costs; especially if the size of the program increases in the future (the 2015 Cost Recovery Procedures Manual shows \$890,000 of GI costs for the current fiscal year). SSE and Ruckert and Mielke (R/M), another sub-consultant to Raftelis, were assigned to focus on *Task 3 – Review of Green Infrastructure*. Specifically:

- Evaluation of the current method of funding the Green Infrastructure Program and how the costs are allocated to each of the 28 communities served by MMSD.
- Research on national practices for funding green infrastructure projects and the resulting user charges.
- Evaluation on the level and accuracy of any data relative to stormwater flows and the amount of impervious surface in each municipality served by MMSD.

3 GREEN INFRASTRUCTURE

3.1 WPDES Permit

MMSD's current Wisconsin Pollutant Discharge Elimination System (WPDES) Permit became effective January 8, 2013 and will expire on December 31, 2017. Modifications were made to the permit, and the modifications became effective January 1, 2015.

MMSD was the first Wisconsin Pollutant Discharge Elimination System (WPDES) Permit in the nation to add the green infrastructure regulatory requirement. The initial permit requires the additional storage of 1 million gallons of storage capacity per year. This requirement was in lieu of making other capital improvements on system upgrades to meet Wisconsin Department of Natural Resource (WDNR) requirements. In 2015, this permit was modified, and more green infrastructure requirements were added. These modifications and requirements are outlined in Section 3.1.2. Green infrastructure implementation is directly related to three main categories of the permit, Combined Sewer Overflow (CSO) Performance Standards, Green Infrastructure, and Phosphorus.

WPDES Permit No. WI-0036820-03-1

3.1.1 CSO Performance Standards

The permit outlines two combined sewer overflow (CSO) Performance Standards:

- There shall be no more than six combined sewer overflow events in any calendar year [OR]
- The capture, delivery and treatment at either the Jones Island or South Shore WRF of no less than 85% by volume of the combined sewage collected in the Combined Sewer System (CSS) as the result of precipitation events in a calendar year. Compliance with

this performance standard shall be determined on a system-wide annual average basis. 'The volume of the combined sewage collected in the CSS as the result of precipitation events on a system-wide calendar year basis' is defined:

- Volume of flow discharged at Jones Island
- + Volume of flow discharged at South Shore
- + Volume of flow discharged through CSOs
- Volume of average daily base flow

In calculating the percentage of wet weather flows captured and treated, annual average flows shall be used for flows discharged from Jones Island, South Shore, and the CSOs. Average daily base flow shall be used as calculated for MMSD's user charge system.

3.1.2 Green Infrastructure

As previously stated, the initial permit only required an additional storage of 1 million gallons of storage capacity per year. The permit was modified to require that the practices/control measures put in place between 2013 and 2014 must equal an annual design retention capacity of at least 1 million gallons. The initial retention capacity of 5 million gallons from 2013 to 2017 shall be increased to 12 million gallons. The total "retention capacity requirement" of this permit is 12 million gallons. If more than the annual design retention capacity is put in place in one year, the incremental amount over the design retention capacity may be counted toward the retention capacity requirement for subsequent years. The permit breaks down the types of green infrastructure and their allocations:

- The stormwater capture benefits of Greenseams acquisitions and improvement to Greenseams parcels can be counted toward the retention capacity requirement except that not more than 75% of green infrastructure retention capacity requirement can be met through capture at GreenSeams parcels;
- At least 25% of green infrastructure retention capacity requirement must be met through implementation of rain gardens, permeable pavement, removal of structures, first-flush combined sewer separation, and other green infrastructure management measures implemented in the MMSD service area;
- Greenseams shall account for no more than 75% of the total remaining Wet Weather Management requirement;
- Any green infrastructure control practices/control measures that are put in place to fulfill the retention capacity requirement must be maintained during the term of this permit.

3.2 Fresh Coast 740

The Milwaukee Metropolitan Sewerage District has created a systematic plan to implement widespread green infrastructure. The District has a 10-year history of partnering on green infrastructure projects, authored "Fresh Coast Green Solutions" to provide a foundation for a plan, and set 2035 goals for significantly more green infrastructure.

As a regional agency, the District is uniquely positioned to lead green infrastructure planning for the Milwaukee region, and has funding to undertake the work. This effort will help the District

make logical green infrastructure funding decisions. It will also help municipalities and non-governmental organizations prioritize their actions and will help inform municipalities and private funders where their green infrastructure money can do the greatest good. Technical analyses for the region's impervious surfaces, costs/benefits, and recommendations have all been completed. The Regional Green Infrastructure Plan (Phase 1) was approved by the MMSD Commission on June 22, 2013.

The Regional Green Infrastructure Plan (RGIP) documents how to meet the 2035 Vision goal of capturing the first 0.5 inch of rainfall on impervious surfaces, the equivalent of 740 million gallons of stormwater storage. Unlike many agencies and municipalities planning to implement this type of large-scale green infrastructure, MMSD is not under order by consent decree and is only required to meet the amounts set in their WPDES permit.

4 RESEARCH ON NATIONAL PRACTICES

Different agencies and municipalities have various stormwater funding mechanisms and types of stormwater utilities used for funding green infrastructure. There are common funding mechanisms and types of stormwater utilities that agencies and municipalities use to recover green infrastructure costs. The most common funding options for municipal stormwater programs are service fees (including stormwater utilities), property taxes/general fund, special assessment districts or regional funding mechanisms, system development charges (SDCs), and grants or low-interest loans. The three basic methods that stormwater utilities use to calculate service fees are equivalent residential unit (ERU), intensity of development (ID), and equivalent hydraulic area (EHA). The EPA document "Funding Stormwater Projects" (Appendix A) includes detailed information about the mechanisms and utilities listed above. It also describes how to create a stormwater utility and provides a list of resources.

Various agencies and municipalities' funding mechanisms were researched and information on their current methods and resulting user charges are compiled below and broken down by agency. In addition to this research, a table was created to give an overview of the agencies and municipalities researched. The table (Appendix B) includes the agency or municipality, if they hold a consent decree, if they have a storm sewer area, combined sewer area, or both, how they fund GI, if they have long term control plans, the amount of funding dedicated to GI and improvements, and removal goals.

These agencies and municipalities researched include MMSD, District of Columbia Water & Sewer Authority (DC Water), Philadelphia Water Department, Pittsburgh Water & Sewer Authority, Allegheny County Sanitary Authority (ALCOSAN), Northeast Ohio Regional Sewer District, City of Seattle, King County, City of Chicago, New York City Department of Environmental Protection, Baltimore Department of Public Works, San Francisco Public Utilities Commission, and Onondaga County Department of Water Environmental Protection.

Most of the entities researched have a delegated set of funding towards green infrastructure to achieve goals of either removing gallons from the combined sewer, improving water quality, or a combination of both. Most have been mandated by the Environmental Protection Agency (EPA),

after unauthorized discharges involving CSOs, to create long term control plans that detail their plan to mitigate and reduce CSOs by way of green infrastructure installations, improving gray infrastructure, or a mixture of both. Certain entities have reached Consent Decrees with the EPA after violating the Clean Water Act. The Consent Decree stipulations vary depending on the municipality or agency, but these decrees drive the implementation of green infrastructure, and therefore, increased funding.

The information provided by this report in Sections 5.1 - 5.12 was a compilation of research taken directly from municipal, government, and public websites and reports. The sources for each agency listed are provided in the “Sources” section. If any of the information provided in these sections is intended for publish, proper reference and citation should be used.

4.1 District of Columbia Water & Sewer Authority

The District of Columbia Water & Sewer Authority, also known as DC Water distributes drinking water and collects and treats wastewater from more than 672,000 residents and 17.8 million annual visitors in the District of Columbia. DC Water also provides wholesale wastewater treatment services for 1.9 million people in Montgomery and Prince George’s counties in Maryland, and Fairfax and Loudoun counties in Virginia. To collect wastewater, DC Water operates 1,900 miles of sanitary and combined sewers, 22 flow-metering stations, and nine off-site wastewater pumping stations.

Charges paid by the ratepayers cover the cost of capital projects, which include several projects designed to protect the environment and are required by the EPA. A small amount of the funding has come through the Clean Water Act and Safe Drinking Water Act, and other grants, but the majority of the capital costs are borne by the ratepayers. Water and sewer bills incorporate DC Water charges and District of Columbia charges together on the same bill. The District of Columbia charges are collected by DC Water, who in turn, forwards those fees to the District. The District fee includes PILOT (payment-in-lieu of taxes), ROW (right-of-way; structured as pass-through of the District of Columbia government’s right-of-way occupancy fee) and stormwater.

DC Water charges for water, sewer, customer metering, impervious area, and water system replacement fee. Water and sewer charges are billed volumetrically, that is, they are based on how much water a household or business consumes. The *Clean Rivers Impervious Area Charge* (CRIAC) is a sewer fee that takes into account the area on a property that is made of impermeable surface, which contributes to runoff and combined sewer overflows. The CRIAC generates funds to cover the cost of the Clean Rivers Project (also referred to as the Combined Sewer Overflow Long Term Control Plan), a \$2.6 billion capital project mandated by the federal government. Note that the CRIAC is different from the District’s stormwater fee. The Water System Replacement Fee is designed to recover the costs of 1 percent renewal and replacement of aging water service lines. The fee is based on meter size and average flow. The customer metering fee is a flat fee based on the meter size.

Table 1. DC Water 2016 Approved Rates outlines the water, sewer, PILOT, ROW, groundwater, CRIAC, customer meeting, and water system replacement fees and rates approved for 2016.

Table 2. DC Water 2016 Average Monthly Residential & Sewer Bill details the average 2016 residential rates for the fees and rates listed prior. The District of Columbia Water and Sewer Authority's complete Operating Budgets: Rates and Revenues can be found in Appendix C.

Table 1. DC Water 2016 Approved Rates

FY 2016 Approved Rates (in Ccf and equivalent gallons: 1 Ccf = 748 gallons)		
Approved FY 2016 (Effective 10/1/2015)		
Rate Class	Ccf (hundred cubic feet)	1,000 Gallons
Water Rate		
Residential 0 – 4 Ccf's	\$3.08	\$4.12
Residential Greater than 4 Ccf's	\$3.87	\$5.17
Multi-Family	\$3.45	\$4.61
Non-Residential	\$3.99	\$5.33
Sewer Rate		
Residential	\$5.44	\$7.27
Multi-Family	\$5.44	\$7.27
Non-Residential	\$5.44	\$7.27
PILOT (Payment In Lieu Of Taxes) Fee*		
Residential	\$0.47	\$0.63
Multi-Family	\$0.47	\$0.63
Non-Residential	\$0.47	\$0.63
The Right-of-Way (ROW) Fee*		
Residential	\$0.17	\$0.23
Multi-Family	\$0.17	\$0.23
Non-Residential	\$0.17	\$0.23
Groundwater Sewer Charge		
Residential	\$2.33	\$3.11
Multi-Family	\$2.33	\$3.11
Non-Residential	\$2.33	\$3.11
Clean Rivers Impervious Area Charge		
	per ERU (Equivalent Residential Unit)	
Residential		\$20.30
Multi-Family		\$20.30
Non-Residential		\$20.30
Customer Metering Fee		
	By Meter Size	
Residential**		\$3.86
Multi-Family		vary by meter size
Non-Residential		vary by meter size
Water System Replacement Fee		
	By Meter Size	
Residential**		\$6.30
Multi-Family		vary by meter size
Non-Residential		vary by meter size
Stormwater Fee***		
	Per ERU (Equivalent Residential Unit)	
Residential		\$2.67
Multi-Family		\$2.67

Non-Residential	\$2.67
*District of Columbia pass-through fees **for 5/8" meter size ***DC Water bills and collects Stormwater Fee on behalf of the District Government	

Table 2. DC Water 2016 Average Monthly Residential & Sewer Bill

Approved Average Monthly Residential Water and Sewer Bill for FY 2016*	
	FY 2016†
DC Water Retail Rates*	\$54.56
Clean Rivers Impervious Area Charge	\$20.30
DC Water Customer Metering Fee**	\$3.86
DC Water System Replacement Fee***	\$6.30
Subtotal: DC Water Rates & Charges	\$85.05
<i>Increase Over Prior Year</i>	<i>\$10.97</i>
District of Columbia PILOT Fee*	\$2.91
District of Columbia Right-of-Way Fee*	\$1.05
District of Columbia Stormwater Fee	\$2.67
Subtotal: District of Columbia Charges	\$6.63
Total Amount Appearing on DC Water Bill	\$91.65
<i>Increase Over Prior Year</i>	<i>\$11.03</i>
† FY 2016 is effective October 1, 2015 *Assumes average monthly consumption of 6.20 Ccf or 4,638 gallons. ** The DC Water Customer Metering Fee varies by meter size. The fee given here is the lowest fee and operates as a baseline. ***The DC Water System Replacement Fee varies by meter size. The fee given here is the lowest fee and operates as a baseline.	

4.1.1 District Stormwater Fee

The District Department of Energy and Environment (DOEE) is responsible for the District’s stormwater fee. Revenue generated from this fee is used to fund the implementation of the District’s municipal separate storm sewer system (MS4) permit. As part of this permit, the District must develop, implement, and enforce a stormwater management program that describes how the MS4 will reduce the discharge of pollutants from its storm sewer system. Also, as part of their permit, there are several requirements related to the implementation of green infrastructure.

Permit provisions related to green infrastructure primarily fall under the “Implementation of Stormwater Control Measures” category. One permit provision requires that the District develop an incentive program to encourage developers to utilize green technology practices such as permeable pavement and green roofs. Additionally, green infrastructure practice specifications are required to be incorporated into the Stormwater Guidebook and incorporated into training programs for builders, design professionals, regulators, resource agencies, and stakeholders. A separate provision requires the District to develop and implement a strategy to reduce the discharge of stormwater pollutants by expanding the tree canopy throughout the District. Finally, the permit contains a provision requiring the District to evaluate District owned properties to

determine the feasibility for green roof installation and requires the District to install a minimum of 350,000 square feet of green roofs on District properties over the course of the permit term.

Both the District stormwater charge and the CRIAC utilize similar rate structures based on impervious area. Both charges are based on an Equivalent Residential Unit (ERU). An ERU is a statistical median of the amount of impervious surface area in a single-family residential property, measured in square feet. Table 3. District Stormwater Charge outlines the residential ERU rates for the respective impervious areas and the associated monthly costs.

Table 3. District Stormwater Charge

Impervious Area (Square Feet)	ERU	Approved FY 2017 (Effective 11/1/2010)	
		ERU Rate	Monthly Cost
100-600	0.6	\$2.67	\$1.60
700-2,000	1.0	\$2.67	\$2.67
2,100-3,000	2.4	\$2.67	\$6.41
3,100-7,000	3.8	\$2.67	\$10.15
7,100-11,000	8.6	\$2.67	\$22.96
11,100 and more	13.5	\$2.67	\$36.05

All non-residential customers are assessed ERUs based on the total amount of impervious surface on each lot

4.1.2 Clean Rivers Impervious Area Charge

The Clean Rivers Project is DC Water’s ongoing program to reduce combined sewer overflows into the District’s waterways – the Anacostia and Potomac Rivers and Rock Creek. The Project is a massive infrastructure and support program designed to capture and clean water during heavy rainfalls before it ever reaches our rivers.

On May 20, 2015, DC Water, the District of Columbia, EPA, and United States Department of Justice (DOJ) announced an agreement to modify a 2005 legal settlement to allow for large-scale green infrastructure installations and other modifications to the Clean Rivers Project impacting the Potomac River and Rock Creek. Under the modified agreement, DC Water will eliminate the previously-planned underground tunnel for Rock Creek and will instead build green infrastructure and targeted sewer separation to manage the volume of runoff produced by 1.2" of rain falling on 365 impervious acres of land that currently does not absorb stormwater. This portion of work will be completed by 2030.

For the Potomac River, DC Water will build an underground tunnel capable of holding 30 million gallons of combined stormwater and sewage. The tunnel will use gravity to allow the collected combined sewage flow to DC Water’s Advanced Wastewater Treatment Plant at Blue Plains and will be completed by 2030. In addition, DC Water will construct green infrastructure and targeted sewer separation to manage the volume of runoff produced by 1.2" of rain falling on

133 impervious acres of land that currently does not absorb water. The green infrastructure in this area will be in place by 2027 and sewer separation will be complete by 2023.

The CRIAC is necessary to recover the costs of the \$2.6 billion federally mandated Clean Rivers Project. The 20-year plan will reduce the discharge of excess flows into local waterways from DC water combined sewer system. The DC Water Board of Directors determined that the CRIAC is a more equitable way to recover the costs of the Clean Rivers Project than the volumetric charge (for water used), because the CRIAC is based on a property’s contribution to rainwater runoff. Table 4. DC Water Residential ERU Rates outlines the residential ERU rates for the respective impervious areas and the associated monthly costs.

Table 4. DC Water Residential ERU Rates

Impervious Area (Square Feet)	ERU	Approved FY 2017 (Effective 10/1/2016)		Approved FY 2018 (Effective 10/1/2017)	
		ERU Rate	Monthly Cost	ERU Rate	Monthly Cost
100-600	0.6	\$22.24	\$13.34	\$25.18	\$15.11
700-2,000	1.0	\$22.24	\$22.24	\$25.18	\$25.18
2,100-3,000	2.4	\$22.24	\$53.38	\$25.18	\$60.43
3,100-7,000	3.8	\$22.24	\$84.54	\$25.18	\$95.68
7,100-11,000	8.6	\$22.24	\$191.26	\$25.18	\$216.55
11,100 and more	13.5	\$22.24	\$300.24	\$25.18	\$339.93
All non-residential customers are assed ERUs based on the total amount of impervious surface on each lot					

The information provided in this section was a compilation of research taken directly from municipal, government, and public websites and reports. The sources for each agency listed are provided in the “Sources” section. If any of the information provided in these sections is intended for publish, proper reference and citation should be used.

4.2 Philadelphia Water Department

The Philadelphia Water Department (PWD) supplies water to the City of Philadelphia and a portion of Bucks County. It provides wastewater service to the City and to 10 municipalities and authorities located in Montgomery, Delaware and Bucks counties. The water system serves approximately 1.7 million people and the wastewater system serves approximately 2.2 million people. Philadelphia Water predominately serves retail wastewater to the City of Philadelphia (1.6 Million People or 67%) but has 10 wholesale customers.

The primary mission of the Philadelphia Water Department is to plan for, operate, and maintain both the infrastructure and the organization necessary to purvey high quality drinking water, to provide an adequate and reliable water supply for all household, commercial, and community needs, and to sustain and enhance the region’s watersheds and quality of life by managing wastewater and stormwater effectively.

Water quality standards in Philadelphia are governed by a Consent Order and Agreement (COA) for Combined Sewer Overflows. In 2011, the Pennsylvania Department of Environmental Protection, the City of Philadelphia, and PWD signed a COA that allowed the Department to implement its Combined Sewer Overflow program, also known as the “Green City, Clean Waters” program. Under the program, the City will invest in green stormwater infrastructure and traditional infrastructure, including wastewater treatment facility enhancements, interceptor pipe lining and collection system improvements, to mitigate CSOs and enhance the quality of local waterways. Over the 25-year lifespan of the program, Green City, Clean Waters seeks to eliminate and remove the mass of pollutants that otherwise would be removed by the capture of 85% by volume, city-wide, of CSOs.

PWD anticipates that over the next twenty years, compliance with the COA will significantly increase capital and operating expenditures related to the Green City, Clean Waters program. The projected total cost of the program over its 25-year lifespan is approximately \$4.5 billion, of which approximately \$3.5 billion are capital related costs and \$1 billion are operation and maintenance costs. The program is anticipated to spend approximately 66% of its total costs on green infrastructure projects. Employing the green infrastructure approach instead of the traditional grey-only alternative, PWD estimates that it will save the city \$5.6 billion while still coming in compliance with the Clean Water Act.

The Green City, Clean Waters program is funded by both wastewater and stormwater fees. PWD’s wastewater fee can be broken into the monthly service charge and usage charges. The service charge varies based on the size of the customer’s meter. The usage charge is \$30.55 per MCF (1,000 cubic feet) of metered water consumption. In FY2016, the wastewater charges were expected to generate approximately \$206 million.

To generate funding for its stormwater-related activities, PWD has a dedicated stormwater utility. In FY2017, the stormwater user fees are projected to generate approximately \$159 million. PWD uses revenue generated through this Stormwater Management Service (SWMS) charge to fund maintenance of the City’s network of pipes and inlets that convey stormwater, which include both separate stormwater sewers and 50% of the city’s sewer system that is combined. PWD also uses these funds to implement stormwater management projects under Green City, Clean Waters and stream restoration projects.

The SWMS charge has three components: a fixed billing charge (\$2.88 per parcel), a gross area charge, and an impervious area charge. Residential customers are charged a flat rate based on the average gross and impervious areas on a single family residential property. In FY2016-17, that amount was \$14.12 per month, which includes the fixed billing charge. Non-residential customers are charged the monthly fixed charge plus gross and impervious area charges. If a non-residential lot is 5,000 square feet or greater, the IA is determined through the City’s Geographic Information System (GIS) software and aerial images of the property. The City has established a stormwater rate schedule for non-residential properties with a GA and IA Rate per 500 square feet. However, if the non-residential property is less than 5,000 square feet and undeveloped, then the impervious area is estimated as 25% of the total area. If the non-residential property is less than 5,000 square feet and developed, then the impervious area is

estimated as 85% of the total area of the property. The minimum charge for a non-residential parcel is \$14.79, which includes the fixed billing charge.

Beginning on July 1, 2016 the water, sewer and stormwater bills reflected new rates for water, wastewater, and stormwater services. The changes are outlined in Table 4. Philadelphia Water Residential Rate Changes.

Table 4. Philadelphia Water Residential Rate Changes

How the rate change affects a monthly bill for a typical residential customer			
Date	Increase of monthly bill	Additional monthly water & sewer charge	Average monthly bill total
Pre – July 1	n/a	n/a	\$67.43
July 1, 2016	5.1%	\$3.43	\$70.87
July 1, 2017	4.5%	\$3.19	\$74.05

4.3 Pittsburgh Water & Sewer Authority

The Pittsburgh Water and Sewer Authority (PWSA) is a municipal authority in Pittsburgh, Pennsylvania. It is responsible for water treatment and delivery water systems in the City of Pittsburgh, as well as the city’s sewer system. It was created in 1984 to oversee a \$200 million capital improvement program focused on Pittsburgh’s water treatment and distribution system. The City of Pittsburgh Water Department was absorbed by the PWSA in 1995, and in 1999, the PWSA also assumed the responsibility of operation and maintaining Pittsburgh’s sewer system. PWSA draws water from the Allegheny River. Anything that enters the storm sewer is ultimately released, untreated, into the rivers and streams. The PWSA system is made up of sanitary, dedicated stormwater and combined sewers. All new development is required to have separate storm sewers into Municipal Separate Storm Sewer Systems, known as MS4's.

PWSA bills on behalf of the Allegheny County Sanitary Authority (ALCOSAN) for sewage treatment. In 2013, ALCOSAN announced a four-year rate structure, to pay for \$70 million dollars in bonds used for various capital projects, including upgrading the main pump station at the plant to handle increased volume and complying with environmental mandates. The Pittsburgh Water and Sewer Authority (PWSA) will invest \$70 million dollars in 2016 for infrastructure improvements, including environmental mandates placed on sewer conveyance, to ensure continued delivery of clean, safe drinking water, and to expand our use of Green Infrastructure. In 2013, The PWSA Board of Directors authorized a four-year rate adjustment to fund identified water and sewer capital needs through 2017.

Beginning January 1, 2016, the average residential customer will see the PWSA rate for water and sewer conveyance increase by 4 cents per day, or \$1.26 per month. Effective, January 1, 2016, the sewage treatment rate will increase by 11 percent, increasing the average monthly bill by \$3.53 per month. The Distribution Infrastructure Charge (DISC) is a surcharge added to bills to fund system wide repair and replacement of aging water and sewer infrastructure, including emergency repairs. The 7% DISC surcharge is calculated based on water consumption and sewer conveyance. Effective January 1, 2016 and through December 31, 2016, charges for the supply

of metered water and the conveyance of sewage shall be determine and billed monthly as shown in Table 5. PWSA 2016 Metered Water & Sewage Conveyance Charges.

Table 5. PWSA 2016 Metered Water & Sewage Conveyance Charges

Meter Size	Minimum Gallons	Minimum Charge: Water	Minimum Charge: Sewer	Total Minimum Charge
5/8"	0 – 1,000	\$16.07	\$4.53	\$20.60
3/4"	0 – 2,000	\$27.30	\$9.05	\$36.35
1"	0 – 5,000	\$56.14	\$22.63	\$78.77
1 1/2"	0 – 10,000	\$112.29	\$45.26	\$157.55
2"	0 – 17,000	\$186.04	\$76.94	\$262.98
3"	0 – 40,000	\$400.70	\$181.03	\$581.73
4"	0 – 70,000	\$689.11	\$316.81	\$1,005.92
6"	0 – 175,000	\$1,601.63	\$792.02	\$2,393.65
8"	0 – 325,000	\$2,849.85	\$1,470.90	\$4,320.75
10" or larger	0 – 548,000	\$4,612.52	\$2,480.16	\$7,092.68

For every 1,000 gallons over the minimum, the rate is shown in Table 6. PWSA Charges for Every 1,000 Gallons over Minimum.

Table 6. PWSA Charges for Every 1,000 Gallons over Minimum

Account Classification	Water Allocation	Sewer Allocation	Total Combined Rate
Residential Property	\$5.66	\$3.99	\$9.65
Commercial Property	\$5.52	\$3.89	\$9.41
Industrial Property	\$5.05	\$3.56	\$8.61
Health or Education Property	\$8.18	\$5.76	\$13.94
Fire Systems (use other than reported fire – Rule 304.9)	\$5.27	\$3.71	\$8.98

The information provided in this section was a compilation of research taken directly from municipal, government, and public websites and reports. The sources for each agency listed are provided in the “Sources” section. If any of the information provided in these sections is intended for publish, proper reference and citation should be used.

4.4 City of Seattle, Washington

Seattle's drainage and wastewater collection system is a blend of combined, partially-separated and separated systems. About two-thirds of Seattle is served by a combined or partially-separated sewer system. Completely separated systems serve the other one-third. The city conveys its wastewater to King County facilities for treatment. Seattle's drainage system is a City-wide utility.

In 2013 King County and the City of Seattle have agreed to invest in major upgrades to local and combined stormwater collection, piping and treatment under settlements with the Department of Justice and the United States Environmental Protection Agency. Both Seattle and King County operate combined sewer systems. Seattle conveys the combined sewage it collects to King County's system for treatment prior to discharge.

Both King County and Seattle were in violation of the Clean Water Act (CWA), and the full settlement is provided in Appendix D. Between 2007, and 2010, the City of Seattle discharged approximately 200 million gallons of raw sewage to waters of the United States on an annual basis through unauthorized discharges involving combined sewer overflows (CSOs), including dry weather overflows, and sanitary sewer overflows (SSOs), in violation of CWA Section 301. During this time, the City also improperly operate and maintained its combined sanitary sewer (CSS), resulting in unauthorized discharges of raw sewage to public and private properties through overflow events, including basement backups.

The City was required to develop and implement a Long-Term Control Plan to control its CSO discharges by no later than December 31, 2025. The City must also develop and implement a Comprehensive System-Wide Operations and Maintenance Plan; A Fats, Oils, and Grease Control Program; and a Floatable Solids Observation Program. The City must further develop and implement a Joint Operations and System Optimization Plan with King County. The City's implementation of these injunctive relief measures will reduce its CSO discharges by approximately 99% at a cost of approximately \$600 million. These costs are recovered through the city's drainage fee, described below.

Through implementation of the Consent Decree, the City will eliminate 99%, or 198 million gallons, of the 200 million gallons of untreated sewage currently discharged on an annual basis as a result of CSOs and SSOs from the City's CSS and SSS into waters of the United States. The Consent Decree provides the City with the opportunity to propose the integration of water quality improvement projects with its Long Term Control Plan through Integrated Planning Proposal that the City would need to submit to the EPA for review and approval by June 30, 2018. The Consent Decree also allows the City to substitute green infrastructure projects for gray infrastructure projects at several CSO control projects. The City will implement early action CSO control projects in environmental justice communities, reducing discharges of over 13 million gallons of raw sewage in these areas on an annual basis.

In lieu of the mandated control, The City Council and the Mayor of Seattle directed city departments to work together to achieve Seattle's goal of managing 700 million gallons of polluted stormwater runoff with green stormwater infrastructure by 2025.

4.4.1 Drainage fees

All properties contribute to the problem of runoff and benefit from the drainage system through flood control and improvement of water quality. Drainage fees do not appear on the City of Seattle’s utility bill. The City of Seattle uses King County as its billing agent for the drainage fee. The drainage fee is shown on King County property tax statements as Surface Water Management (SWM) or Drainage. Drainage charges are assessed on an annual basis. The City charges a drainage fee on all properties in the City. However, methods for calculating bills depends on the type of property.

Single family and duplex properties smaller than 10,000 square feet are assigned to drainage rate categories based on the size of the parcel. All properties in each rate category pay the same flat rate. This rate is also equal to the total bill, or charge. For example, parcels between 3,000 and 4,999 square feet will be subject to an annual drainage charge of \$286.63 in 2016 while parcels between 5,000 and 6,999 square feet will all be subject to an annual drainage charge of \$390.03 in the same year. The annual rates for residential and other properties are shown in Table 7. Seattle Annual Residential and Table 8. Seattle Annual Non-Residential , respectively.

Table 7. Seattle Annual Residential Drainage Fees

Small Residential Annual rate per parcel ⁽¹⁾		
	2015	2016
Under 2000 sq. ft. ⁽²⁾	\$198.83	\$123.81
2000-2999 sq. ft. ⁽²⁾	\$198.83	\$206.93
3000-4999 sq. ft.	\$258.06	\$286.63
5000-6999 sq. ft.	\$350.40	\$390.03
7000-9999 sq. ft.	\$443.55	\$491.40

Table 8. Seattle Annual Non-Residential Drainage Fees

All Other Properties Annual rate per 1,000 square feet		
	2015	2016
Undeveloped (0-15% Impervious)		
Regular	\$28.25	\$31.24
Low Impact ⁽³⁾	\$16.54	\$18.57
Light (16-35% Impervious)		
Regular	\$43.69	\$48.52
Low Impact ⁽³⁾	\$34.36	\$38.31
Medium (36-65% Impervious)		
Regular	\$63.45	\$70.67
Low Impact ⁽³⁾	\$51.04	\$57.21
Heavy (66-85% Impervious)	\$85.12	\$93.56
Very Heavy (86-100% Impervious) ⁽⁴⁾	\$100.69	\$112.38
(1) Single Family Residential & Duplex parcels less than 10,000 square feet which are charged a flat rate per parcel rather than a fee based on the percent impervious. Rates for other properties are per 1,000 square feet based on the percent of impervious surface. (2) Beginning in 2016, the under 3,000 sq. ft. tier was split into two tiers to minimize the variance between properties in each group in terms of lot size and percent impervious. (3) A customer in the Undeveloped, Light or Medium rate category with a significant amount of highly pervious (absorbent) surface may qualify for the Low Impact rate. (4) "Very heavy" does not necessarily mean heavily developed. A parking lot would be classified as "very heavy" since it is 100% impervious		

All other properties, including single family/duplex properties 10,000 square feet and larger, are assigned to rate categories based on how much impervious surface is contained on the parcel. Each rate category is assigned a rate which is multiplied by the parcel area (in 1,000s of square feet) to calculate the total charge, or bill.

Drainage bill discounts are available for property owners that help reduce the impact of stormwater on the City’s system. Seattle Public Utilities (SPU) currently offers bill reductions to both natural areas whose characteristics enhance retention of stormwater runoff (Low Impact Rates), as well as to engineered systems that provide stormwater flow control and/or provide water quality treatment for run-off from impervious area (Stormwater Facility Credit Program, Rainwater Harvest Credit).

The information provided in this section was a compilation of research taken directly from municipal, government, and public websites and reports. The sources for each agency listed are provided in the “Sources” section. If any of the information provided in these sections is intended for publish, proper reference and citation should be used.

4.5 King County

As previously mentioned in the Section 5.5, King County and the City of Seattle have agreed to invest in major upgrades to local sewage and combined stormwater collection, piping, and treatment under settlements with the Department of Justice and the United States Environmental Protection Agency. The full settlement is shown in Appendix D.

Between 2006 and 2010, the County discharged approximately 900 million gallons of raw sewage to waters of the United States on an annual basis through unauthorized discharges involving combined sewer overflows (CSOs), in violation of CWA Section 301. During this time, the County also violated its National Pollutant Discharge Elimination System (NPDES) permit effluent limitations, including total suspended solids, fecal coliform, pH, and settleable solids, at one of its wastewater treatment plants, in violation of CWA Section 402. Furthermore, between 2006 and 2009, the County allowed wastewater to bypass secondary treatment at one of its wastewater treatment plants, in violation of its NPDES permit terms and CWA Section 402.

The County must implement its Long Term Control Plan to control its CSO discharges by no later than December 31, 2030. The County must also develop and implement a Comprehensive System-Wide Operations and Maintenance Plan. The County must further develop and implement a Joint Operations and System Optimization Plan with the City of Seattle, Washington. The County's implementation of these injunctive relief measures will reduce its CSO discharges by approximately 95% to 99% at a cost of approximately \$860 million.

In 2013 King County signed an agreement with the U.S. Department of Justice and the Environmental Protection Agency (EPA). This agreement or consent decree requires King County to complete its CSO control plan by 2030. Through implementation of the Consent Decree, the County will eliminate approximately 95% to 99%, or 855 to 891 million gallons, of the 900 million gallons of untreated sewage currently discharged on an annual basis as a result of CSOs from the County's wastewater collection system into waters of the United States. The elimination of these discharges will substantially reduce releases of microbial pathogens, suspended solids, toxins, and nutrients. The County's implementation of the Consent Decree will provide increased protection for several impaired water bodies, including Puget Sound, Lake Washington, and the Duwamish River.

The Consent Decree provides the County with the opportunity to propose the integration of water quality improvement projects with its Long Term Control Plan through an Integrated Planning Proposal that the County would need to submit to EPA for review and approval by June 30, 2018. The Consent Decree also allows the County to substitute green infrastructure projects for gray infrastructure projects at four of its approved CSO control projects. King County expects to complete 14 CSO control projects by 2030 to comply with the requirements of the Consent Decree.

The majority of permit compliance activities are funded by the revenues from the annual Surface Water Management (SWM) fee. Due to increasing permit requirements, the Metropolitan King County Council approved a 40% increase for the SWM fee for FY2017-2018, increasing the residential fee to \$240.44 from the previous \$171.50. Table 9 shows the rate schedule for the current SWM fee for King County.

Table 9. King County Surface Water Management Fee, FY2017-2018

Rate class	Description	% Imp. Surface	Fee
1	Residential	NA	\$240.44 per parcel
2	Very light	≤ 10%	\$240.44 per parcel
3	Light	> 10.1 ≤ 20%	\$647.96 per acre
4	Moderate	> 20.1 ≤ 45%	\$1,251.59 per acre
5	Moderate heavy	> 45.1 ≤ 65%	\$2,133.78 per acre
6	Heavy	> 65.1 ≤ 85%	\$2,955.98 per acre
7	Very heavy	> 85.1 ≤ 100%	\$3,669.84 per acre

The information provided in this section was a compilation of research taken directly from municipal, government, and public websites and reports. The sources for each agency listed are provided in the “Sources” section. If any of the information provided in these sections is intended for publish, proper reference and citation should be used.

4.6 Northeast Ohio Regional Sewer District

The Northeast Ohio Regional Sewer District (NEORSO or the District) coordinates wastewater and stormwater management for a large portion of the Cleveland metropolitan area, serving more than one million residents of Cleveland and its suburbs. Wastewater and stormwater in the District’s service area is managed by a vast system of sewers and treatment plants, consisting of more than 3,000 miles of local sewers, 300 miles of interceptor sewers, and three wastewater treatment plants. Within the Greater Cleveland area, there are a total of 126 permitted outfalls where combined sewer overflows release to the environment. The District has tracked and recorded these CSO events throughout Cleveland.

Cleveland is in the northeastern corner of Ohio on the shores of Lake Erie. The City of Cleveland is home to about 400,000 residents, and the greater metropolitan area is home to more than 2 million. The Cuyahoga River and Ohio Erie Canal flow through the city and were a catalyst for the city’s urbanization and industrialization for many decades. Since 1990, however, Cleveland has experienced a significant population decline, with the population falling from more than 500,000 to less than 450,000 in 2008 (representing a 15 percent decline in only 18 years). As the population decline continues, the number of vacant lots is growing. The city now has more than 20,000 vacant lots representing more than 3,300 acres of vacant urban land. The City of Cleveland has also experienced increasing poverty rates in the past few decades, with the poverty rate rising from 8.9 percent in 1970 to 10.8 percent in 2000.

In 2005, the District entered negotiations with the U.S. Department of Justice (DOJ), the EPA, and the Ohio Environmental Protection Agency to develop a plan for reducing its CSOs. The purpose of the negotiations was to develop a Long Term Control Plan (LTCP) that would provide an adequate level of CSO control within an acceptable time frame, while recognizing the region’s finite financial capability. In 2010, the District adopted the negotiated LTCP and signed a consent decree with the DOJ, EPA, and the Ohio EPA. Unlike the initial plan, the consent decree calls for a mix of both green and gray infrastructure to reduce CSOs by 44 million gallons

by 2018. The initial plan relied solely on large storage tunnels to capture the large amounts of runoff and sewage within the District's service area.

The inclusion of green infrastructure is intended not only to improve water quality in the Great Lakes, but also to revitalize the District's communities and to provide more cost-effective investments for rate payers. With the large flux of residents out of the city, the District is faced with fewer customers to pay the same bill and is compelled to collect higher fees from its customers. The green infrastructure component of the new LTCP will provide the District's customers with a wider range of more visible benefits in return for their utility fees.

Project Clean Lake is a \$3 billion, 25-year program that will reduce the total volume of raw sewage discharges from 4.5 billion gallons to 494 million gallons annually. Over 98% of wet weather flows in our combined sewer system will be receiving treatment in 25 years. Project Clean Lake is the primary vehicle through which the District is implementing green infrastructure. The project itself guarantees a minimum investment of \$42 million in green infrastructure practices that address the District's stormwater and CSO issues. These practices will increase the storage, infiltration, and evapotranspiration capacity of the landscape and retain the runoff that would otherwise flow into the combined system.

As a main source of revenue, customer fees will fund Project Clean Lake. In June 2011, Trustees approved a 2012-2016 rate schedule with an average increase of 13 percent each year, of which Project Clean Lake accounts for about 4 percent. However, Northeast Ohio Regional Sewer District (NEORS) is seeking additional funding and developing rate saving programs to help eligible customers defray the cost.

The 2016-2021 Rate Schedule implemented by the District is shown in Table 10. Northeast Ohio Regional Sewer District 2016-2021 Rate Schedule. The Water and Sewer Affordability Program offers discounts of 40% on water and or sewer for income-eligible homeowners serviced by the City of Cleveland's division of Water and/or NEORS.

Table 10. Northeast Ohio Regional Sewer District 2016-2021 Rate Schedule

2016-2021 rate schedule					
		Cleveland		Suburbs	
	Monthly base charge	Regular	Affordability/ Homestead	Regular	Affordability/ Homestead
2016	\$2.40	\$78.05	\$46.85	\$79.85	\$48.05
2017*	\$3.60 (\$2.15) †	\$83.10	\$49.85	\$84.60	\$50.85
2018	\$4.95 (\$2.95) †	\$88.40	\$53.05	\$89.60	\$53.85
2019	\$6.35 (\$3.80) †	\$94.15	\$56.50	\$95.05	\$57.10
2020	\$7.95 (\$4.75) †	\$100.15	\$60.10	\$100.75	\$60.50
2021	\$9.70 (\$5.80) †	\$106.50	\$63.90	\$106.80	\$64.10

The Northeast Ohio Regional Sewer District calculates your quarterly sewer charges by multiplying your actual water consumption (measured in MCF, or 7,480 gallons) by the appropriate sewer rate. The base charge (perhaps denoted on your bill as a Cost-Recovery Charge) is then added to that total.
 * In 2017, customers billed by Cleveland Water will begin being charged monthly rather than quarterly.
 † Homestead and Affordability Program eligible customers pay this reduced base charge

The District’ Regional Stormwater Management Program fees are shown in Table 11. Northeast Ohio Regional Sewer District Stormwater Management Program Fees. Revenues from the program fee help fund green infrastructure projects undertaken by the District. Additionally, it funds grants that the district distributes in its Combined Sewer Area to community and non-profit organizations to help fund green infrastructure projects on private land.

Table 11. Northeast Ohio Regional Sewer District Stormwater Management Program Fees

Type of property		Impervious surface area (sq-ft) *	2016	2017
Residential	Tier 1	Less than 2,000	\$3.09	\$3.09
	Tier 2 / Base	2,000 – 3,999	\$5.15	\$5.15
	Tier 3	4,000 or more	\$9.27	\$9.27
	Homestead	Any size	\$2.07	\$2.07
Non-residential		Per ERU, or 3,000 square feet	\$5.15	\$5.15

All fees above are per month
 *Impervious surface area (estimated) includes hard surfaces on your property such as rooftops, driveways, or decks/patios which contribute to increasing stormwater runoff.

In 2013, NEORS D faced a legal setback to its stormwater program when eight towns in its jurisdiction sued the District over its authority to implement a stormwater fee. Initially, the 8th Ohio Court of Appeals ruled that the District did not have the authority to implement the fee, and

all revenues collected up to that point were set aside in an escrow account. In September 2015, the Ohio Supreme Court overturned the lower court's decision,¹ however, and NEORS D re-implemented the program in July 2016. The Regional Stormwater Management Program budget for FY2016-17 was estimated at approximately \$44 million.

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4.7 New York City Department of Environmental Protection

New York City's Green Infrastructure Program is a multiagency effort led by the Department of Environmental Protection (DEP). DEP and agency partners design, construct and maintain a variety of sustainable green infrastructure practices such as green roofs, rain gardens, and Right-of-way Bioswales on City owned property such as streets, sidewalks, schools, and public housing. Green infrastructure promotes the natural movement of water by collecting and managing stormwater runoff from streets, sidewalks, parking lots and rooftops and directing it to engineered systems that typically feature soils, stones, and vegetation. This process prevents stormwater runoff from entering the City's sewer systems. In addition to the benefits to water quality, green infrastructure also beautifies City streets and neighborhoods while improving air quality.

The Order on Consent (the Order) that was developed between the New York City (NYC) Department of Environmental Protection (DEP) and the New York State Department of Environmental Conservation (DEC) outlines, among other things, a roadmap for the implementation of green infrastructure (GI) Citywide. The goal is to manage stormwater and reduce Combined Sewer Overflows (CSO), thereby improving water quality and promoting sustainability policies. The Order requires DEP to implement GI to manage the equivalent of stormwater generated by one inch of precipitation on impervious surfaces in combined sewer (CS) areas in the following five-year increments: 1.5% (December 31, 2015), 4% (December 31, 2020), 7% (December 31, 2025), and 10% (December 31, 2030).

To date, NYC DEP has begun implementation of right-of-way (ROW) green infrastructure throughout Brooklyn, Queens, and the Bronx. Projects are contracted out on Area-wide basis. Typical installations include ROW Greenstrips and ROW Infiltration Basins. DEP also provides design guidance for ROW Stormwater Greenstreets and On-Site Practices. In addition to ROW projects, DEP continues to work with its city agency partners to design and implement green infrastructure projects on 200 publicly owned properties throughout the City, including schools and public housing. Other major program elements include Integrated Watershed Planning and GI incentives for private property owners.

¹ *Northeast Ohio Regional Sewer Dist. v. Bath Twp.*, 144 Ohio St.3d 387, 2015-Ohio-3705, accessed 2/15/2017 at <https://www.supremecourt.ohio.gov/rod/docs/pdf/0/2015/2015-Ohio-3705.pdf>.

Capital funding for the program consists of \$140 million encumbered as of March 2017 and another \$1 billion budgeted through 2027. According to the NYC Green Infrastructure 2016 Annual Report, “this capital funding will support green infrastructure contracts undertaken by DEP and agency partners, including the Area-wide contracts, retrofit projects with other City agencies, Trust for Public Land partnership projects, and the Grant Program.”

In addition to capital funding, the GI program’s expense budget through for FY17-19 is \$39.6 million. This budget covers the operation costs for the program, such as GI maintenance, field and office program staff, equipment, materials, research and development, and other program elements not covered by capital funding.

Revenues generated from wastewater user charges help to fund stormwater management updates. These stormwater water updates include a combination of mechanical upgrades as well as green infrastructure. By updating the stormwater management system, the City can minimize CSOs and reduce floatable trash and debris that may enter waterways during CSO events. The City does not assess a separate stormwater fee, but they do assess a wastewater charge for stormwater to properties that are parking lots. The charge is based on impervious area and is assessed annually at a rate of \$0.0647 per square foot of impervious area. Exemptions are given to properties that implement stormwater management practices specified and approved by the NYC Water Board.

Current DEP water rates were not posted as of the writing of this report. In FY2015-2016, water was billed \$3.81 per CCF. There is also a minimum charge of \$0.49 per day per water meter within the bill period. The minimum charge is imposed for any bill period in which charges based on actual consumption are less than the minimum charge. DEP’s wastewater charges are calculated as 159% of water charges. Water charges are either metered, estimated based on frontage in unmetered buildings, or, in qualifying multifamily buildings, are billed a flat rate per dwelling unit. These rates went into effect on July 1, 2015. On June 22, 2016, the Manhattan Supreme Court invalidated the Water Board’s resolution approving a new Rate Schedule set to go into place July 1, 2016. The Water Board is appealing this decision because it believes it acted in the best interest of its customer and in accordance with the law.

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4.8 Baltimore Department of Public Works

In 2012, the Maryland State Legislature passed a law mandating that the 10 largest jurisdictions in the State create a Maryland Stormwater Fee by July 1, 2013. In response, the City of Baltimore created a stormwater utility in the Department of Public Works (DPW), which also houses the City’s water and wastewater utilities. Under this new utility, DPW is committed to protecting, enhancing and restoring watersheds by implementing stormwater best management practices (BMPs) throughout the City to improve water quality. Baltimore City covers an area of 87 square miles and has approximately 350 “major” storm sewer outfalls, which contribute to

pollution loads in Baltimore’s streams, harbor, and the Chesapeake Bay. The BMPs are required by the Environmental Protection Agency (EPA) through the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm System (MS4) permit for the City's public storm drain system, issued in 2012.

Annual stormwater management program costs will reach approximately \$45 million by 2020, as projected by the planned program developed prior to at the implementation of the utility. Most projects that the program funds are considered traditional “grey” infrastructure. They include much needed capital improvements to the City’s aging stormwater infrastructure, which consists largely of buried conveyance structures, as well as ongoing operations and maintenance costs. Nevertheless, the City’s current NPDES permit doubles impervious area restoration goals outlined by the previous permit and includes a requirement to control runoff from 20% of uncontrolled impervious area within the next five years, among other requirements.

Approximately one third of stormwater revenues fund operation and maintenance of the system and facilities. A similar amount funds capital improvement for stormwater management, including stream and wetland restoration projects that contribute to the meeting the impervious area restoration goals outlined by the NPDES MS4 permit. This figure has been increasing proportionally over the past few years. Much smaller portions fund stormwater management planning, public education, and grants to local organizations with well aligned strategies and goals. Roughly \$2 million in fees from stormwater management plan reviews and permit applications are put toward watershed protection and restoration. The City also has started a Growing Green Initiative, which includes stormwater planning efforts at a neighborhood level.

The Stormwater Management Program primarily relies on a separate stormwater fee for funding. The fee is charged to property owners within the City based on the amount of impervious surface area on their properties. For single family residential property owners, a simplified rate structure has been developed based on an equivalent residential unit (ERU), or the amount of impervious area on a typical developed residential lot in the City. Based on measured data, the ERU is 1,050 square feet of impervious area. For single family residential detached or attached properties, each property falls into one of three tiers based on impervious area on the property and is charged the flat rate for that tier. For all other properties, rates are \$5/month per ERU on the property. Table 12 shows the rate schedule for the Stormwater Management Program. In FY2016, the stormwater utility fee generated approximately \$28 million in revenues.

Table 12. Baltimore Stormwater Management Program rate schedule

Customer	Monthly Fee
Tier 1 Residential	\$3.33
Tier 2 Residential	\$5.00
Tier 3 Residential	\$10.00
All other properties	\$5.00 per ERU

4.9 San Francisco Public Utilities Commission

The San Francisco Public Utilities Commission (SFPUC) delivers high quality water, generates clean hydropower, and collects and treats wastewater for the residents and businesses of San Francisco. The services are offered 24 hours a day, while protecting the diverse Bay Area environment, community and economic interests of Bay Area residents. System operations and maintenance are 100 percent funded from the monthly ratepayer bills.

To continue delivering reliable, high quality service, SFPUC approved 4 years of water and wastewater (sewer) service rate increases beginning July 1 of 2014, 2015, 2016, and 2017. The wastewater rate schedules for both single-family residential and commercial/non-residential customers are shown in Table 13. SFPUC 2014-2017 Residential Wastewater Rate Schedules and Table 14. SFPUC 2014-2017 Commercial/Non-Residential Wastewater Rate Schedules, respectively.

Table 13. SFPUC 2014-2017 Residential Wastewater Rate Schedules

Wastewater Rate Schedules				
Schedule A-1: Single-Family Residential Customers				
Single-Family Residential	Effective 7/1/14	Effective 7/1/15	Effective 7/1/16	Effective 7/1/17
First 4 Discharge Units ¹ /DU ² /Month	\$9.06	\$9.82	\$10.84	\$12.40 ³
All Additional Ccf/DU/Month	\$11.23	\$11.34	\$11.66	\$12.40 ³
¹ 1 Discharge Unit = 1 Centum Cubic Feet (Ccf) of water = 748 gallons ² DU = Dwelling Unit; All Single-Family Residential customers have one dwelling unit per account ³ In FYE 2018, Tier 2 and Tier 2 will be a uniform rate for all wastewater discharge units				

Table 14. SFPUC 2014-2017 Commercial/Non-Residential Wastewater Rate Schedules

Wastewater Rate Schedules				
Schedule B: Commercial/Non-Residential Customers				
Non-Residential	Effective 7/1/14	Effective 7/1/15	Effective 7/1/16	Effective 7/1/17
Volumes per Discharge Unit ¹ /DU ² /Month	\$6.145	\$6.453	\$6.901	\$7.664
PLUS Chemical Oxygen Demand (COD) per lb	\$0.440	\$0.462	\$0.494	\$0.548
PLUS Total Suspended Solids (TSS) per lb	\$0.828	\$0.870	\$0.931	\$1.033
PLUS Oil and Grease (O/G) per lb (TSS) per lb	\$0.867	\$0.911	\$0.974	\$1.082
¹ 1 Unit = 1 Ccf of water = 748 gallons ² Applicable to the volume of wastewater discharged in accordance with the rules and regulations of the Wastewater Enterprise				

Similar to the Northeast Ohio Regional Sewer District, SFPUC also offers affordability assistance programs to eligible customers. SFPUC's Community Assistance Program (CAP)

service discount offers qualifying residential single-family customers a 15% discount on water and a 35% discount on sewer charges.

4.9.1 Sewer System Improvement Program

After eight years of public feedback along with expert third-party analysis, the SFPUC is moving forward with the Sewer System Improvement Program (SSIP) to upgrade aging infrastructure and ensure the reliability and performance of the combined sewer system, now and into the future.

San Francisco's 100-year-old sewer system was not built to withstand a major earthquake or impacts of climate change, such as intense rainstorms that overwhelm our sewer system, as we treat both sewage and stormwater runoff. Experts predict that there is an 80% chance that an earthquake of 6.0 magnitude or higher will impact the Bay Area within the next 20 years. The current sewer facilities, especially sewage plant that treats 80% of San Francisco's sewage and stormwater, have an increasing need for emergency repairs.

SSIP is a 20-year program, consisting of multiple phases. SSIP Goals and Levels of Service that are outlined below will guide project selection and help evaluate program implementation and success.

- Provide a Compliant, Reliable, Resilient, and Flexible System that can Respond to Catastrophic Events: The SSIP will ensure treatment of flows within 72 hours of a major earthquake.
- Integrate Green and Grey Infrastructure to Manage Stormwater and Minimize Flooding: The use of innovative green stormwater projects together with upgrades to sewer pipelines (grey) will minimize stormwater impacts on neighborhoods and the sewer system.
- Provide Benefits to Impacted Communities: SSIP projects will provide both economic and job benefits to the communities it serves.
- Modify the System to Adapt to Climate Change: New facilities will be built using a climate change design criterion so that the sewer system will be better able to respond to rising sea levels and other impacts.
- Achieve Economic and Environmental Sustainability: The SFPUC will beneficially reuse and conserve the by-products of our wastewater and stormwater treatment systems.
- Maintain Ratepayer Affordability: Through the multi-phased SSIP implementation approach, the SFPUC will keep customer bills less than 2.5% of an average household income for a single-family residence.

Phase I of the Sewer System Improvement Program (SSIP) has a budget of \$2.7 billion. As part of Phase I, SFPUC is currently in the process of constructing, monitoring and evaluating eight green infrastructure projects to manage stormwater before it enters the combined sewer system in each of San Francisco's eight urban watersheds.

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provided in the “Sources” section. If any of the information provided in these sections is intended for publish, proper reference and citation should be used.

4.10 Onondaga County Department of Water Environmental Protection

Onondaga County is an 800 square mile county near the Finger Lake region of central New York State. The county is home to about 465,000 residents, nearly one-third of whom live on the southern shore of Onondaga Lake in the city of Syracuse. The county, the City of Syracuse, and the Onondaga Nation comprise the community partners in EPA Region 2. Onondaga Lake has a long history of water quality issues and environmental degradation. Syracuse’s combined sewer system is designed to discharge excess flows during wet weather events into local waterways that are connected to Lake Onondaga. The frequency of combined sewer overflows (CSOs) along with increasing industrialization and associated wastewater discharges resulted in a swimming ban in Lake Onondaga in 1940, followed by a fishing ban in 1972. In 1994, Lake Onondaga was added to the Federal Superfund National Priorities List due to the combination of industrial contaminants and stormwater pollution.

In 1998, Onondaga County was placed under an Amended Consent Judgment (ACJ) order to reduce and eliminate the occurrences of CSOs. Onondaga County originally sought to solve its CSO issues with a single-purpose “gray infrastructure” approach. The initial solution developed by the City of Syracuse consisted of a sewer separation program, the addition of detention tanks, and the construction of four regional treatment facilities (RTFs) to store and treat increased flows during wet weather events. These RTFs were opposed by city residents due to their proposed locations in economically sensitive communities as well as the high costs of construction and maintenance. To date, the county has spent \$300 million on gray infrastructure improvements, \$79 million of which funded the construction of the first RTF. In response to the opposition in the community, Onondaga County Executive Joanne Mahoney and local stakeholder groups proposed that some of the gray infrastructure be replaced with green infrastructure to reduce the influx of stormwater into the combined sewer system. In 2009, the ACJ was amended to include a strategy that included both green and gray approaches. Instead of building more RTFs, the County will build two storage units to receive peak wet weather flows and invest in green infrastructure projects throughout the city to reduce runoff volumes and peak flows. The county plans to invest \$78 million in green infrastructure projects to manage stormwater from 470 acres of developed land and capture 6.3% of annual CSO volume (250 million gallons). Taken together, the county’s green and gray infrastructure investments are expected to capture 95% of rainfall volume by 2018.

Following the new amendment to the Consent Judgment in 2009, the Onondaga County Department of Water Environmental Protection (WEP) launched the “Save the Rain” initiative to coordinate the county’s green infrastructure investments. Through this initiative, the County has advanced more than 180 distinct green infrastructure projects on public and private property. “Save the Rain” has successfully established programs to distribute free rain barrels to homeowners and to foster urban forestry. The initiative also administers the Green Improvement Fund (GIF) that provides financial support for the development of green infrastructure on private property. The fund provides up to \$200,000 per applicant for a single green improvement project located in a district that is serviced by a combined sewer system. Grants are awarded based on factors such as the projected amount of captured precipitation. Since its inception, GIF has

provided nearly \$10 million in funding to local green infrastructure projects on private property. The 88 projects completed to date, including the installation of porous pavement, construction of green medians, and the construction of green roofs, capture more than 43 million gallons of stormwater runoff each year in the City of Syracuse. In addition to GIF, the Department also makes grants via its Suburban Green Infrastructure Program to smaller municipalities to help fund the development of publicly owned green infrastructure projects outside of the City of Syracuse.

Onondaga County WEP charges an annual sanitary unit charge to fund its wastewater- and stormwater-related activities. In 2016 and 2017, the sanitary unit charge for a single-family household was \$411.11 per year, which is charged on the annual County tax statement. Multifamily buildings are billed 0.75 unit charges per unit. Non-residential wastewater customers are billed based on the amount of water they use, with a minimum of 1 unit. In FY2015, Onondaga County WEP collected approximately \$89 million in revenues.

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5 STORMWATER FLOWS & IMPERVIOUS SURFACE

Stormwater Flows and the increase in these flows are a direct correlation to increased impervious areas (IA). Impervious areas are most commonly defined as roofs and pavements (driveways and roadways). As urbanization of Milwaukee and the surrounding areas have increased, so has IA and along with this, stormwater flows and volumes. Increase in stormwater flows has forced many municipalities to improve their stormwater conveyance systems.

Certain municipalities within the District fund their stormwater improvements and maintenance by implementing a stormwater utility. Approximately 19 of the 28 communities already have a stormwater utility in place to meet stormwater requirements within their borders.

The District, as a whole, also needs to meet water quality and quantity standards as urbanization increases, and as federal and state regulations ramp up their environmental standards. The MS4 permit and the WPDES permits both have water quality standards that are currently mandated, and future requirements are expected to become more stringent.

The District would like a unified structure that is passed along and implemented in all 28 contributing communities. Some of the remaining communities without utilities do not have them based on their lack of existing infrastructure, as they are predominately rural, with ditches as their primary stormwater conveyance system. Other communities do not have a separate stormwater utility because stormwater improvements are built into their annual capital budget. Going forward, MMSD will need to bill its customers for green infrastructure, in addition to the separate community stormwater utilities.

In addition to conveyance improvements, water quality improvements are also needed in the District's service area. Water quality improvements are especially needed within the separated sewer system areas (SSA), where untreated runoff is discharged directly to the receiving waters. Certain water bodies in the SSA have tested poorly in water quality. Total Suspended Solids (TSS), Bacteria, and Phosphorus levels are significantly higher in areas outside of the CSO areas. Ultimately the need for stormwater improvements, including green infrastructure, are needed in both the Combined Sewer and Separated Sanitary Sewer Areas.

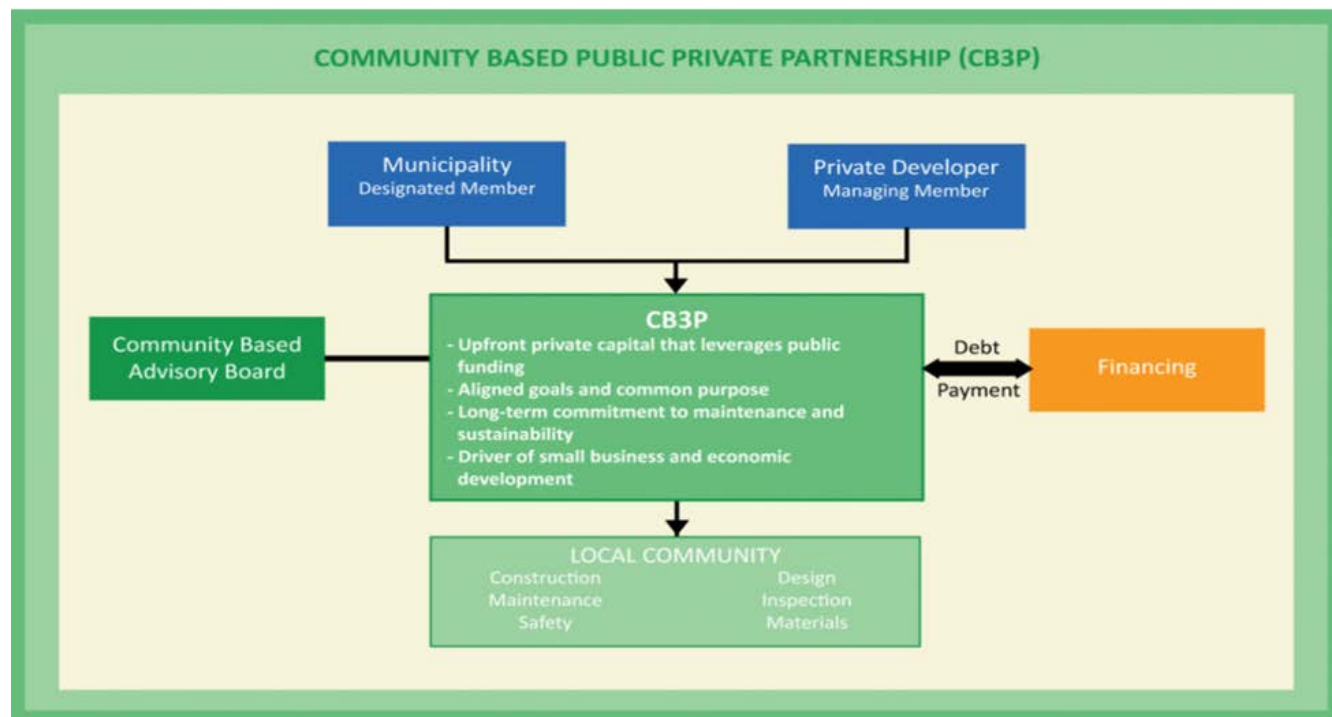
The goal of the District's future charging mechanism is to provide a method that not only helps achieve the goal of improved stormwater conveyance and quality, but is also defensible, as well as fair and equitable to all communities and users. These may be achieved through I/I monitoring, IA and density calculations, or a combination of these and potential others.

MMSD's Regional Green Infrastructure Plan also provides a watershed based breakdown of impervious area, and a water quality analysis of these watersheds. The watersheds with the highest portion of IA also tested highest for TSS and phosphorus. In addition to factors like high impervious area and pollutant loads, other factors like economic disadvantages and income/low tax bases should be considered in analysis. Certain contributing areas have less IA and a higher tax base than others, but also have few Low Impact Developments (LIDs) within their communities. These same communities tend to have greater area for green infrastructure implementations (GI) and should consider taking advantage of those areas for larger, more effective GI clusters.

6 PRIVATE PUBLIC PARTNERSHIP FUNDING

There are proven benefits and co-benefits of green infrastructure, but it is still difficult for communities to finance and implement green infrastructure (GI). Creative funding options will not only help with the initial investment dollars, but also the ongoing maintenance expenses. Community Based Public-Private Partnerships (CBP3) is an example of how communities can offset these costs with the assistance of public partnerships. Figure 1 outlines a typical CBP3 organizational chart.

Figure 1. Community Based Public Private Partnership Organizational Chart (CB3P)



The following two examples of CBP3 in Prince George’s County and Baltimore Maryland may assist communities with innovative funding approaches.

6.1 Prince George’s County, Maryland

To meet the Federal Chesapeake Bay Total Maximum Daily Load (TMDL) requirements, Prince George’s County (PG County) entered a 30 year CBP3 with Corvias Solutions in November 2014. The TMDL requirements will require PG County to retrofit 8,000 acres of impervious surface in a 10 year time frame. The partnership consists of an initial 3 year \$100 million dollar investment of PG County, with Corvias responsible for the long term maintenance and the design and construction oversight. The CP3 arrangement is the most successful in that it shares the performance and funding risk with both the private and public partners. The private partner intends for the installation and performance of each GI tool to have the best outcome, when the private entity is responsible for the long term maintenance of these GI tools. The government entity will repay the private partner when the devices are built and maintained according to the specifications and performance.

As a part of this Clean Water Partnership between the County and Corvias, local economic development will also be supported, by requiring that 30-40% of the total project scope be completed by small and minority-owned businesses. Corvias will focus on removing barriers to small businesses by actively assisting them to become qualified for Green Infrastructure (GI) best management practices. Corvias is also utilizing the existing county institutional resources for the GI educational and training programs. The trades that will be needed for the GI work will

be landscaping, concrete flatwork, earthwork, and suppliers. A majority of the GI work will be on public lands, but some private property projects may also be investigated.

The larger portion of PG County's initial investment will come from a stormwater utility fee that the county property owners will pay for. The fee is a fee, not a tax, so all non-profit entities (including churches) must pay. Corvias will also be able to provide funding as well.

The portfolio of Corvias is the military housing industry. They have successfully managed 15 Stormwater Management Pollution Prevention Programs (SWPPP) across 13 states. The current plan is to complete the entire Clean Water Partnership project by 2025, and the costs per acre treated are currently between \$40,000 and \$60,000.

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<https://www.supremecourt.ohio.gov/rod/docs/pdf/0/2015/2015-Ohio-3705.pdf>

City of Chicago

<https://www.cityofchicago.org/content/dam/city/progs/env/ChicagoGreenStormwaterInfrastructureStrategy.pdf>

New York City

http://www.nyc.gov/html/dep/html/stormwater/using_green_infra_to_manage_stormwater.shtml
http://www.nyc.gov/html/dep/pdf/green_infrastructure/gi_annual_report_2017.pdf
http://www.nyc.gov/html/dep/html/water_rates/index.shtml

Baltimore, MD

<http://publicworks.baltimorecity.gov/pw-bureaus/water-wastewater/stormwater>

San Francisco California

<http://sfwater.org/index.aspx?page=614>
<http://sfwater.org/Modules/ShowDocument.aspx?documentID=4220>

Onondaga County

<https://www.epa.gov/sites/production/files/2015-10/documents/region-2.pdf>
<http://savetherain.us/green-improvement-fund-gif/>
<http://www.ongov.net/wep/we1406.html>
<http://www.ongov.net/comptroller/documents/2015AuditedFinancialStatements.pdf>

Private Public Partnership Funding

<http://stormwater.wef.org/2015/01/stormwater-year-review-2014/>
<https://www.epa.gov/G3/financing-green-infrastructure-community-based-public-private-partnerships-cbp3-right-you>
<http://thecleanwaterpartnership.com/wp-content/uploads/2016/06/PGC-CBP3-Clean-Water-Partnership.pdf>
https://www.epa.gov/sites/production/files/2015-02/documents/gi_financing_options_12-2014_4.pdf
<http://stormwater.wef.org/2013/07/financing-urban-retrofits-via-a-public-private-partnership/>

APPENDIX A

Funding Stormwater Programs

APPENDIX B

National Practices for Funding Green Infrastructure Table

APPENDIX C

District of Columbia Water and Sewer Authority Operating Budgets: Rates and Revenues

APPENDIX D

Seattle, Washington and King County, Washington Settlement

Funding Stormwater Programs

EPA 901-F-09-004

April 2009

Executive Summary

This document is intended to assist local stormwater managers to alleviate the significant expense of construction, operation and maintenance of a municipal separate storm sewer system (MS4). The costs of stormwater programs, increased by regulatory requirements (stormwater Phase I or Phase II), flooding concerns, water quality issues (including total maximum daily loads, or TMDLs) and population growth, may be subsidized through a stormwater utility or various other methods detailed in this document.

Stormwater management can be costly, but it is a good investment. There are new stormwater management techniques, referred to as low impact development (LID), that infiltrate, evapotranspire and reuse stormwater, thereby, *preventing* polluted runoff from happening. This helps to reduce the high costs of cleaning up the water quality impairments from the polluted runoff. Additional benefits from these techniques include increased ground water recharge, flood control, and healthy aquatic ecosystems through maintenance of base flow for streams. LID techniques need to be sited and designed carefully, and used in conjunction with traditional stormwater management techniques.

This fact sheet includes information on various stormwater funding mechanisms and types of stormwater utilities; it also describes how to create a stormwater utility and provides a list of resources.

New England Case Studies

More than 800 communities or districts across the country have adopted a stormwater utility to help fund the costs of stormwater programs, including the costs of regulatory compliance, planning, maintenance, capital improvements, and repair or replacement of infrastructure. Examples of utilities from two New England cities are discussed below.

South Burlington, Vermont

<http://www.sburlstormwater.com>

The South Burlington Stormwater Utility is the first of its kind in Vermont. Six streams in and around South Burlington are impaired from stormwater, resulting in water pollution, erosion, flooding, and unstable streambanks. The utility was established in 2006 to help mitigate the increasingly complex issues associated with stormwater management, including failing septic systems in older developments and phosphorus runoff polluting Lake Champlain, which is the primary source of drinking water for the Burlington area.

The municipal Stormwater Services Division administers the utility, which pays for system maintenance, capital project construction, enforcement, and customer outreach and assistance.



An example of a capital project construction (a gravel wetland) that was paid for by the stormwater utility in South Burlington, Vermont.

User fees are based on the amount of impervious area on a property. The monthly fee per equivalent residential unit (ERU) was set using a scientific process. This process determined that a typical single-family home in South Burlington had 2,700 square feet of impervious surface. A single-family home is assessed a fee of \$4.50 per month, whereas duplexes and triplexes are assessed fees of \$2.25 and \$1.50 per month, respectively. All other properties are assessed a fee depending on the amount of impervious surface. The utility funds a comprehensive program bringing in more than \$1 million annually.

Cities in New England with Stormwater Utilities

- ◆ Chicopee, Massachusetts
- ◆ Lewiston, Maine
- ◆ Newton, Massachusetts
- ◆ Reading, Massachusetts
- ◆ South Burlington, Vermont

(as of December 2008)

Funding Stormwater Programs

Newton, Massachusetts

<http://www.ci.newton.ma.us/dpw/engin/stormwater.htm>

A Stormwater Drain Fee was established in 2006. The utility enables the city to manage and upgrade stormwater infrastructure, protect nearby natural waterbodies (e.g., Charles River and Crystal Lake), provide technical assistance with stormwater management issues, and provide educational programs for residents and schools.

User fees are based on a flat rate. Residential properties are assessed a fee of \$6.25 per quarter, and all other properties are assessed a fee of \$37.50 per quarter. The Board of Aldermen debated using a different fee structure but found that the program's operating costs would triple if the city had to determine the rates on the basis of individual lot sizes.



Two hydraulically connected bioretention cells paid for by the stormwater utility on Hammond Pond in Newton, Massachusetts

Stormwater Funding Mechanisms

The most common funding options for municipal stormwater programs are discussed below.

Service Fees (including stormwater utilities)

Some communities include stormwater management costs within their water or sanitary sewer system budgets, often basing fees on metered water flow. However, a property's metered water flow usually bears no relationship to the stormwater runoff it generates. For example, the stormwater runoff from the impervious area of a shopping center's buildings and parking lots is significant, but its use of metered water is relatively small.

Stormwater fees, which are typically based on property type or area, provide for regulatory compliance and operation and maintenance costs, and are charged to both tax-paying and tax-exempt properties. The average quarterly fee for a single-family home is \$11, though some communities charge as little as \$2 or as much as \$40 per quarter to a single-family home.

Property Taxes/General Fund

Many communities fund stormwater management through property taxes paid into their general funds, but in the competition for general fund dollars, stormwater management improvements are typically considered low priority unless the municipality is reacting to a recent major storm or regulatory action. This system is also not equitable, because the basis for determining property taxes, assessed property value, is irrelevant to the cost of stormwater management for that property. Additionally, tax-exempt properties, such as governmental properties, schools, colleges, and universities, do not support any of the cost of stormwater management, even though many of them are major contributors of stormwater runoff.

Special Assessment Districts or Regional Funding Mechanisms

If a stormwater construction project benefits only a portion of a municipality, it can be funded by fees assessed only to those properties within that area, which is called a *special assessment district*. Separate stormwater utility districts can also be formed within a town or by bringing several towns together to form a district.

There might be some cases where regional or multiple-jurisdictional funding mechanisms would be useful. For example, if an impaired stream has a fairly small watershed, spanning parts of several municipalities, costs of stormwater implementation could be shared among the municipalities and the funding could be managed by an existing regional authority such as a soil and water conservation district. Funding could involve fees, as well as credits, for existing best management practices (BMPs) or retrofits. The regulatory authority could choose to issue conditions or a general permit for discharges in the watershed, especially if a watershed stormwater management plan has been prepared (with specific nonstructural and structural BMPs). Parcel owners, developers or permittees could be required to fulfill their requirements by implementing the watershed plan.

System Development Charges (SDCs)

SDCs (also known as *connection fees* or *tie-in charges*) are one-time fees commonly charged to new customers connecting to a water or sanitary sewer system. In this way, new customers *buy into* the existing infrastructure, and/or the infrastructure expansion necessary to serve them. The amount of the new customer's SDC is typically based on an estimated water demand of the new customer. Municipalities could develop stormwater SDCs tied to the area of the customer's property.

Grants and Low-Interest Loans

Stormwater management grants might be available for various types of projects on a state-by-state basis. Clean Water or Drinking Water State Revolving Fund (SRF) dollars could be used to fund development of a utility or related capital projects. State environmental programs could consider working with the legislature to set up a pool of funds for towns to help set up districts, which could then be repaid

once the fees are established. Connecticut directed its Department of Environmental Protection to use \$1 million of state grant funds that the legislature provided for wastewater facility construction to be used by three communities to develop stormwater utilities as pilot programs. The Maine Department of Environmental Protection has provided a small amount of grant money, to be matched by the community, to help establish stormwater utility districts. Stormwater projects that are not required as part of a National Pollution Discharge elimination system (NPDES) permit can be funded through the Clean Water Act section 319 nonpoint source grant program administered by states.

Types of Stormwater Utilities

There are three basic methods that stormwater utilities use to calculate service fees. These are sometimes modified slightly to meet unique billing requirements. Impervious area is the most important factor influencing stormwater runoff and is therefore a major element in each method.

Equivalent Residential Unit (ERU)

The ERU method (also known as the Equivalent Service Unit (ESU) method) is used by more than 80 percent of all stormwater utilities. It bills an amount proportional to the impervious area on a parcel, regardless of the parcel's total area. It is therefore based on the effect of a typical single-family residential (SFR) home's impervious area footprint. A representative sample of SFR parcels is reviewed to determine the impervious area of a typical SFR parcel. This amount is called one *ERU*. In most cases, all SFRs up to a defined maximum total area are billed a flat rate for one ERU. In some cases, several *tiers* of SFR flat rates are established on the basis of an analysis of SFR parcels within defined total area groups. A tiered SFR flat rate approach improves the equitability of the bills sent to homeowners. The impervious areas of non-SFR parcels are usually individually measured. Each non-SFR impervious area is divided by the impervious area of a typical SFR parcel to determine the number of ERUs to be billed to the parcel.

Advantages

The relationship (or nexus) between impervious area and stormwater impact is relatively easy to explain to the public—you pave, you pay. The number of billable ERUs can be determined by limiting the parcel area review to impervious area only. Because pervious area analysis is not required, this approach requires the least amount of time to determine the total number of billing units.

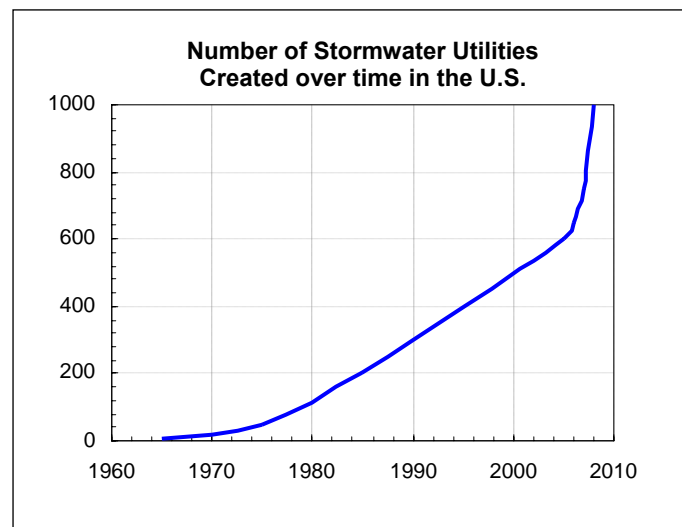
Disadvantages

Because the potential effect of stormwater runoff from the pervious area of a parcel is not reviewed, this method is sometimes considered to be less equitable than the Intensity of Development (ID) or Equivalent Hydraulic Area (EHA) methods (discussed below) because runoff-related expenses are recovered from a

smaller area base. This method could still be used to charge a fee to all parcels - pervious as well as impervious - to cover expenses, such as administration and regulatory compliance unrelated to impervious area.

What is a stormwater utility?

A stormwater utility, operating much like an electric or water utility, may collect fees related to the control and treatment of stormwater that can be used to fund a municipal stormwater management program.



Intensity of Development (ID)

This stormwater cost allocation system is based on the percentage of impervious area relative to an entire parcel's size. All parcels, including vacant/undeveloped parcels, are charged a fee. For developed parcels, fees are based on their *intensity of development*, which is defined as the percentage of impervious area of the parcel. Vacant or undeveloped parcels contribute to runoff and are assigned a lower fee. Rates are calculated for several ID categories and are billed at a sliding scale, as shown in the table below. For example, an SFR parcel, which is categorized as *moderate development*, would pay \$0.16/month/1,000 square foot (ft²) (or \$1.60 for a 10,000 ft² lot).

Category (impervious percentage range)	Rate per month per 1,000 square feet of total served area (impervious plus pervious)
Vacant/Undeveloped (0%)	\$0.08
Light development (1% to 20%)	\$0.12
Moderate development (21% to 40%)	\$0.16
Heavy development (41% to 70%)	\$0.24
Very heavy development (71% to 100%)	\$0.32

Funding Stormwater Programs

Advantages

The ID method accounts for stormwater from the pervious portion of parcels. Therefore, it can be more equitable than the ERU method. If a parcel's impervious area is increased slightly because of minor construction modification, it probably would not be bounced up into the next higher ID category. This reduces the time required for staff to maintain the billable unit master file.

Disadvantages

The ID categories are broad, and parcels are not billed in direct proportion to their relative stormwater discharges. This method can be more difficult to implement than the ERU method because parcel pervious and impervious areas need to be reviewed. It is also more complicated to explain to customers than the ERU method. This method might also discourage urban infill and inadvertently encourage sprawl.

Equivalent Hydraulic Area (EHA)

Parcels are billed on the basis of the stormwater runoff generated by their impervious and pervious areas, charging impervious area a much higher rate than the pervious area.

Advantages

The EHA method accounts for flow from the pervious portion of parcels. Therefore, it might be more equitable than the ERU method. Like the ID method, it accounts for undeveloped/vacant parcels and allows them to be billed, but it is fairer than the ID method because parcels are billed on the basis of individual measurements of pervious and impervious areas.

Disadvantages

Because pervious area analysis is required in addition to impervious area, this approach requires more time to determine the total number of billing units. It is also more complicated to explain to customers than the ERU method.

These are three basic methods that utilities can use to calculate fees, but it is becoming clear that municipalities will need to be creative to find what will work for their community. In San Mateo County in California vehicle registration fees were increased to address stormwater pollution issues associated with vehicles and transportation infrastructure.

Creating a Stormwater Utility

The following are the typical steps involved in creating a stormwater utility.

Develop a Feasibility Study

The first step is to develop a study that provides the community with enough information to decide if implementing the utility is sensible. The feasibility study will typically address preliminary revenue requirements (usually from

current stormwater budgets) and assess the billing area to determine the SFR billing rate, the service fee method to use and credits to provide, the preliminary rate charge for each ERU, and the responsible party for billing.

Create a Billing System

If the municipality decides after the feasibility study to develop a stormwater utility, it will then collect user and parcel area data (such as ownership and impervious area for each parcel) and develop a system to bill property owners. The two most common stormwater billing systems are (1) adding a stormwater utility fee onto an existing water/sewer fee bill, or, (2) non-ad valorem assessments. Approximately 80 percent of stormwater utilities use the first approach because it is inexpensive and simple to add on to the existing billing system.



An example of a public meeting.

Roll Out a Public Information Program

A strong public education program is critical throughout the stormwater utility development process. Many people are unaware of the increasing cost of stormwater management and the options to fund it. A well-funded stormwater program can help reduce flooding, improve drought conditions, create better fishing and recreation, and improve water quality. An organized public information and education effort, which typically involves the following components, is essential to the success of a stormwater utility:

- ◆ **Identify key users and groups.** Two potential groups to target include (1) properties that generate a significant amount of runoff and often receive high stormwater bills (i.e., shopping malls) and (2) tax-exempt properties (i.e., schools and churches) that do not contribute property taxes into the general fund (which has traditionally been the source of stormwater management funding).
- ◆ **Establish an advisory committee.** Include a cross-section of the community including representation from universities, businesses, non-profit organizations, churches, developers, and shopping center owners.
- ◆ **Create a stormwater utility website.** The website should post appropriate progress documents and develop a *frequently asked questions* page.

- ◆ **Prepare pamphlets and presentations.** Prepare a brochure and an electronic presentation describing the need for the stormwater utility, the rate method, and the projected rates.
- ◆ **Meet with key user groups and the media.** Give presentations to civic groups and the media, and schedule one-on-one meetings with customers projected to receive the highest bills.
- ◆ **Distribute information before the initial billing.** The stormwater utility brochure should be sent to all customers before billing. Include the customer's actual projected bill, if possible.

Adopt an Ordinance

An ordinance will provide legal authority for establishing the utility. An example stormwater utility ordinance from Maine is at <http://www.maine.gov/spo/landuse/docs/publications.htm>

Provide Credits/Exemptions

Credits or exemptions built into the ordinance can be used to provide incentives for certain practices or relief from utility fees to certain types of land uses. Credits should be clearly described and can include installation of approved BMPs such as retention/detention basins, rainspout disconnections or porous pavers, and educational programs for residents, businesses and municipal employees. Municipalities that calculate the utility using impervious area could offer an exemption to undeveloped (100 percent pervious) land.

Implement the Utility

The first utility bill is the most important because many customers do not focus on the new stormwater fee until they actually receive their first bill. The municipality should notify customers of their estimated fee several months before billing begins. It should create a telephone hot line, e-mail service and website to address questions and concerns. In addition, the municipality should be prepared to address legal challenges to its stormwater fee. The municipality should be prepared to develop a process to update the billing unit data for an existing customer or to enter the data for a new customer.

Barriers to Creating a Stormwater Utility

There are typically two barriers to creating a stormwater utility: legal and political.

Legal Barriers

In EPA Region 1, all states provide legal authority to establish stormwater utilities. A summary of the current or proposed legal authority within EPA Region 1 states is presented below:

◆ Connecticut

In 2007, the Connecticut General Assembly authorized three towns (New Haven, New London, and Norwalk) to conduct pilot studies to explore the feasibility and framework of stormwater utilities.

◆ Maine

Stormwater utilities are authorized in the Maine Constitution, Article VIII, and Title 30-A Maine Revised Statutes Annotated §3001.

◆ Massachusetts

MGL Chapter 83, Section 1 was amended in 2006 to include the ability to establish stormwater utilities.

◆ New Hampshire

Manchester was given special authority to form a utility in 2007. All municipalities were given the authority to establish a stormwater utility in 2008 under amendments to RSA 149-I.

◆ Rhode Island

Chapter 45-61 of the Rhode Island Stormwater Management and Utility District Act of 2002.

◆ Vermont

In 2003, 24 V.S.A. Section 3501(6) gave cities the ability to establish *sewage disposal charges* for treatment and disposal of stormwater. Also, 24 V.S.A. 1264 and 4407 have been amended to encourage the formation of utilities.

Political Barriers

It usually takes at least one *champion*, often the mayor or another senior local official, to create a stormwater utility, especially in the face of local political opposition. A public information program is needed to visually present the inadequacies of the community's current stormwater management program and the benefits from stormwater utilities in other communities to garner public support and offset opposition to the fee. It is important to explain the benefit of implementing a stormwater utility to the press, because opposition from local news outlets sometimes can turn public opinion against the utility, often by using inaccurate terms such as a *rain tax*. When clearly informed of the financial and environmental benefits (such as improved flood control, fishing, recreation, and enhancement of future drinking water supplies through increased recharge) of a stormwater utility, the community will be more likely to support its implementation.

Additional Resources

This fact sheet is one of a series of four prepared by EPA Region 1. The others are listed below and are available on the EPA Region 1 website. <http://www.epa.gov/region1/npdes/stormwater>

Funding Stormwater Programs

- ♦ *Managing Stormwater with Low Impact Development Practices: Addressing Barriers to LID*
- ♦ *Incorporating Low Impact Development Into Municipal Stormwater Programs*
- ♦ *Restoring Impaired Waters: Total Maximum Daily Loads (TMDLs) and Municipal Stormwater Programs*

Charles River Watershed Association. *Assessment of Stormwater Financing Mechanisms in New England*
<http://www.crrwa.org/projects/stormwater/swutility.html>

Connecticut Department of Environmental Protection. *The 2004 Connecticut Stormwater Quality Manual*
<http://www.ct.gov/dep/cwp/view.asp?a=2721&q=325704>

Connecticut Department of Environmental Protection, Stormwater Management.
<http://www.ct.gov/dep/stormwater>

Green Infrastructure Approaches to Managing Wet Weather with Clean Water State Revolving Funds
http://www.epa.gov/OWM/cwfinance/cwsrf/green_if.pdf

Indiana University-Purdue University Indianapolis. *An Internet Guide to Financing Stormwater Management*
<http://stormwaterfinance.urbancenter.iupui.edu>

Maine Department of Environmental Protection. *Bureau of Land and Water Quality*
<http://www.state.me.us/dep/blwq/docstand/stormwater/index.htm>

Massachusetts Department of Environmental Protection. *Water, Wastewater and Wetlands*
<http://www.mass.gov/dep/water/wastewater/stormwat.htm>

National Association of Flood and Stormwater Management Agencies. *Guidance for Municipal Stormwater Funding*
<http://www.nafsma.org>

Natural Resources Defense Council. *Funding and Gaining Support for Stormwater Programs*
<http://www.nrdc.org/water/pollution/storm/chap4.asp>

New England Environmental Finance Center. *Stormwater Utility Fees: Considerations and Options*
<http://efc.muskie.usm.maine.edu/docs/StormwaterUtilityFeeReport.pdf>

Pioneer Valley Commission. *How to Create a Stormwater Utility*
http://www.pvpc.org/resources/landuse/storm_util.pdf

Rhode Island Department of Environmental Management. *Office of Water Resources*
<http://www.dem.ri.gov/programs/benviron/water/permits/ripdes/stwater/index.htm>

University of Maryland, Environmental Finance Center.
<http://www.efc.umd.edu>

U.S. Environmental Protection Agency, Watershed Academy. *Catalog of Federal Funding Sources for Watershed Protection*
<http://cfpub.epa.gov/fedfund>

U.S. Environmental Protection Agency, Watershed Academy. *NPDES Permits in New England*
<http://www.epa.gov/region1/npdes/stormwater/administration.html>

U.S. Environmental Protection Agency, Watershed Academy. *NPDES Storm Water Program*
<http://www.epa.gov/region1/npdes/stormwater/index.html>

Vermont Agency of Natural Resources. *The Vermont Stormwater Management Manual*
http://www.anr.state.vt.us/dec/waterq/stormwater/docs/sw_manual-vol1.pdf

Vermont Agency of Natural Resources, *Water Quality Division*
<http://www.anr.state.vt.us/dec/waterq/stormwater.htm>

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NOTE: This document is not law or regulation; it provides recommendations and explanations that MS4s can consider in determining how to comply with requirements of the Clean Water Act and National Pollutant Discharge Elimination System permit requirements.

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DRAFT: National Practices for Funding Green Infrastructure

Municipality/Utility	Utility	Consent Decree	Sewer Drainage Areas	GI Funding	Charge	Project	Long Term Control Plan*	Gallons Removed Goal or Mandate	Cost	Notes
Milwaukee Metropolitan Sewerage District	MMSD	N	CSA/SSA	O&M Capital		Fresh Coast 740	--	740M	--	
District of Columbia Water & Sewer Authority (DC Water) (The District of Columbia charges are collected by DC Water, who in turn, passes those fee on to the District)	DC Water	Y	CSA	Impervious Area (ERU)	Clean Rivers Impervious Area Charge (CRIAC)	Clean River Project	Y	1.3B 11.9M GI	\$2.6B	DC Water will eliminate the previously-planned underground tunnel for Rock Creek and will instead build GI and targeted separation to manage the volume of runoff produced by 1.2" of rain falling on 365 acres of land that currently does not absorb water.
Philadelphia Water Department (PWD) (City of Philadelphia & portions of Bucks County)	Philadelphia Water Department	Y	CSA/SSA	Impervious Area	Stormwater Management Service (SWMS) Charge	Green City, Clean Waters	Y	See Notes	\$2.40B \$1.67B GI	Achieve the elimination of the mass of the pollutants that otherwise would be removed by the capture of 85% by volume of the combined sewage collected.
Pittsburgh Water & Sewer Authority (PWSA) (bills on behalf of the ALCOSAN)	ALCOSAN	Y	CSA/SSA	Meter	--	--	Y	--	\$70M GI	
Allegheny County Sanitary Authority (ALCOSAN) (83 communities)	ALCOSAN	Y	CSA/SSA	--	--	--	Y	--	\$2B	\$2B covers cost of reducing SSOs by 90% and CSOs by 79%
City of Seattle (Seattle convey the combined sewage it collects to King County)	King County	Y	CSA/SSA	Impervious Area	Surface Water Management (SWM)	700 Million Gallons	Y	198M	\$600M	Allows mix of green and gray infrastructure projects
King County	King County	Y	CSA/SSA	--	--	Protecting Our Waters	Y	855 to 891M	\$860M	Allows mix of green and gray infrastructure projects
Northeast Ohio Regional Sewer District (Cleveland and Suburbs)	Northeast Ohio Regional Sewer District	Y	CSA/SSA	Impervious Area	--	Project Clean Lake	Y	400B 44M GI	\$3B \$42M GI	Consent Decree calls for mix of both green and gray infrastructure. Project Clean Lake guarantees a minimum investment of \$42 million in GI practices
City of Chicago	Metropolitan Water Reclamation District of Greater Chicago (MWRD)	N*	CSA/SSA	--	--	--	--	10M	\$50M	*MWRD has Consent Decree
New York City	Department of Environmental Protection	Y	CSA / SSA	Impervious Area	--	Green Infrastructure Program	--	--	--	Implement GI to manage the equivalent of stormwater generated by 1-inch of precipitation in CSA in five-year increments
San Francisco, California	San Francisco Public Utilities Commission (SFPUC)	N	CSA	Volume	--	Sewer System Improvement Program (SSIP)	--	--	--	
Onondaga County (County, City of Syracuse, & Onondaga Nation)	Onondaga County	Y	CSA/SSA	--	--	Save the Rain	--	--	--	By 2018 green and grey infrastructure investments are expected to capture 95% of rainfall volume

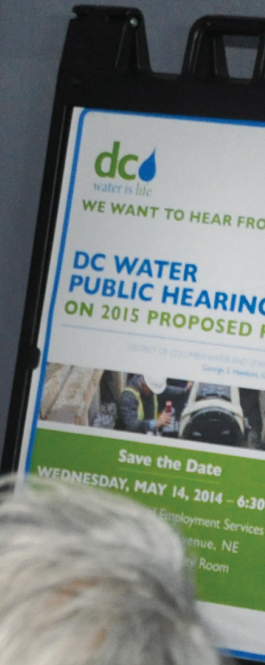
*Long Term Control Plans are submitted to the EPA and are documents that outline municipality's long-term plans to control combined sewer overflows.



OPERATING BUDGETS

DISTRICT OF COLUMBIA WATER AND SEWER AUTHORITY

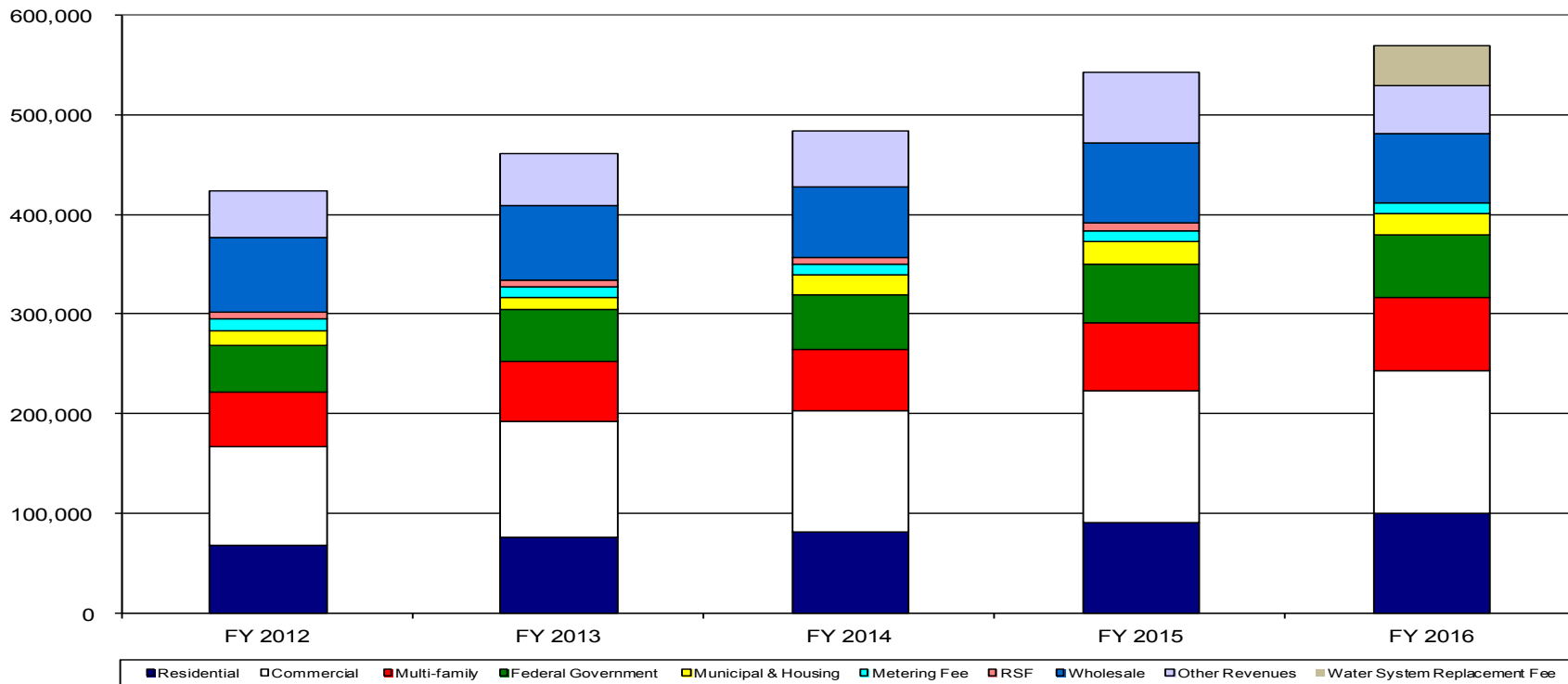
SECTION IV RATES AND REVENUES



DC WATER REVENUE RECEIPTS

In order to provide continuous delivery of water and wastewater services, DC Water must ensure a reliable and predictable revenue stream that cover operating and maintenance (O&M) costs and meet or exceed all Board and other financial requirements. DC Water has a diverse customer base and thus receives cash receipts from a variety of sources. This diversity mitigates reliance on any single customer and provides a level of revenue stability.

**Historical & Projected Cash Receipts
(\$000's)**



DC WATER REVENUE RECEIPTS, Cont.

Historical and Projected Operating Cash Receipts (\$ 000's)

	FY 2012 Actual	FY 2013 Actual	FY 2014 Actual	FY 2015 Revised	FY 2016 Approved
Residential	68,269	76,188	81,854	91,598	100,337
Commercial	98,612	116,693	120,965	132,017	143,325
Multi-family	55,369	59,646	61,563	67,732	73,133
Sub-Total Residential, Commercial and Multi-family	222,250	252,527	264,383	291,347	316,795
Federal Government (1)	46,508	52,564	55,725	58,695	63,278
District Government	8,419	7,042	12,734	15,735	13,208
D.C. Housing Authority	7,041	5,125	7,100	7,471	8,080
Transfer from Rate Stabilization Fund	6,500	6,500	6,500	7,500	-
Water System Replacement Fee	-	-	-	-	40,000
Metering Fee	11,029	11,103	11,207	10,776	10,776
Total Retail	301,747	334,861	357,648	391,524	452,137
IMA Wastewater Charges	66,790	67,469	63,822	73,652	62,495
Potomac Interceptor Wastewater Charges	8,450	7,540	6,941	7,713	6,847
Total Wholesale	75,240	75,009	70,763	81,365	69,342
District Stormwater Revenue (2)	763	898	930	1,000	1,000
Misc. Rev. (e.g. water tap installation, fire hydrant usage, etc.)	22,769	26,702	30,773	27,261	25,109
Washington Aqueduct Debt Service Revenue for Falls Church & Arlington	217	206	201	193	193
Interest Income (including interest on Bond Debt Service Reserve Fund)	711	766	560	631	1,680
Transfer from DC PILOT/ROW Fund	-	-	-	5,100	-
DC Contribution of 50% PILOT Fund to DCW	-	-	-	15,022	-
Right-of-Way Fee	5,100	5,100	-	5,100	5,100
PILOT Fee	17,576	17,416	23,618	15,447	15,644
Total Other	47,136	51,088	56,082	69,754	48,726
Total Operating Cash Receipts	424,123	460,958	484,493	542,643	570,205

(1) Historical actuals are presented on revenue basis. Projected amounts shown are billed revenues. Actual Federal receipts are a combination of current year projected revenues and prior year adjustments, which are presented as reserve items. See Section 3 for further explanation.

(2) Reflects District stormwater fee revenue that will fund DC Water's share of District stormwater permit compliance activities, and will not be funded through DC Water's retail rates or other DC Water revenue sources. See Section 3 for further explanation.

DC WATER REVENUE RECEIPTS, Cont.

CUSTOMER CATEGORIES AND ACCOUNTS

As of September 30, 2014, DC Water had 127,079 active, metered water and wastewater accounts. In addition, there are 8,993 separate accounts that are billed only for impervious surface. DC Water's customers are classified as retail (residential, multi-family and non-residential) and wholesale customers only. However, within the retail customer class, DC Water tracks receipts and associated consumption at a more detailed level in order to analyze trends and service characteristics. Retail customers' characteristics can be viewed in six groups: residential, multi-family, commercial, federal, DC Municipal and Housing Authority.

FY 2014 revenue receipts are actual as of September 30, 2014.

In FY 2011, a study of the demand characteristics of DC Water customers was undertaken to determine if additional customer classes should be defined for the purpose of cost allocation. Review of 12 months of data (May 2010 to April 2011) revealed, (among other things) that there is a difference in peaking characteristics between many of the customer groups. Generally, the federal customers have the highest peaking factor, with commercial customers having the next highest peaking factor and municipal, residential, multi-family and Housing Authority customers having the lowest peaking factor. Segmentation of water customers is typically done by class-based peak use characteristics with the higher peaking customers allocated more of the system costs (primarily driven by electricity and system capacity costs).

This information helped to inform an analysis of alternative rate structures within the FY 2012 Cost of Service Study (COS). Among the alternatives reviewed, the study reviewed different volumetric rates by customer class/category based on the different demands they place on the system. Differentiation could be based on water peaking characteristics or discharge strength contributions (wastewater). While it was recommended that additional analysis be undertaken in for any further consideration of discharge strength differentiation, management recommended that a new customer class, "Multi-Family", be created to acknowledge the similarity of peaking characteristics with other residential customers, yet provide transparency between single family and multi-family residential units. (Multi-Family residential facilities will continue to be defined as those facilities with 4 or more residential units.) The new Multi-family class has been effective from October 1, 2013. The three customer classes are defined as follows:

- Residential – a single-family dwelling used for domestic purposes; a condominium or apartment unit where each unit is served by a separate service line and is individually metered and the unit is used for domestic purposes; or a multi-family structure of less than four apartment units where all the units are served by a single service line that is master metered

DC WATER REVENUE RECEIPTS, Cont.

- Multi-Family – a multi-family structure (such as a condominium or apartment dwelling) used for domestic purposes, with four or more units
- Non-residential – all customers not within either the residential or multi-family class

In FY 2015, a COS was conducted by Independent Financial Consultants. Their recommendations were incorporated in the FY 2016 rate proposal, which are summarized below:

- New class-based rate structure including Lifeline rate
- Based on similar peaking ratios, District of Columbia Housing Authority (DCHA) category moved to Multi-family class

Residential, commercial and multi-family receipts are projected to increase in FY 2015 by approximately \$26.9 Million, or 10.2 percent, over the FY 2014 level due to:

- Board-approved volumetric retail rate increase of 7.5 percent, effective October 1, 2014
- Board-approved Clean Rivers Project CRIAC rate change from \$11.85 to \$16.75 per ERU per month
- 1 percent decrease in consumption due to conservation
- In FY 2014, DC Water's collections on its retail receivables was strong, with accounts receivable over 90 days at \$5.3 million as of September 30, 2014. DC Water will continue its aggressive collection efforts
- The customer assistance program reduces projected revenues by approximately \$2.6 million

Residential and multi-family customers:

- In FY 2015, residential customers include 104,965 accounts that comprise 16.9 percent of the total operating revenues. Given the large number of individual account holders who are in residential, it is unlikely that any one customer will have a major impact on the DC Water cash receipts.
- Multi-family customers house 4 or more units within one building with a master meter. In FY 2015, there are 7,343 accounts that comprise 12.5 percent of the total operating revenues.

The commercial group of customers includes a number of nationally-recognized universities and regional hospitals, national associations, lobbying firms, major law firms and hotels. This group has 12,083 accounts and will comprise 24.3 percent of the projected FY 2015 operating revenues. In FY 2016, they will comprise 25.1 percent of the fiscal year operating revenue.

FY 2016 projections for Residential, Multi-Family and Commercial customers reflect an increase of \$25.4 million, or 8.7 percent from FY 2015 revised due primarily to proposed retail rate increases of 6.5 percent (water and sewer volumetric rates), and \$3.55 monthly

DC WATER REVENUE RECEIPTS, Cont.

ERU fee for the Clean Rivers IAC. In FY 2015 and onwards, 1 percent decrease in consumption has been assumed due to conservation.

The Federal customers' revised FY 2015 receipts are projected to total \$58.7 million; an increase of \$3.0 million, or 5.3 percent over FY 2014. In FY 2016, federal revenues are projected to be \$63.3 million or 7.8 percent increase over FY 2015. The projected federal revenues will rise by \$4.6 million in FY 2016 due to estimated rate and consumption assumptions provided under the federal billing policies. Under existing federal billing legislation, federal billings are prepared on an estimated basis eighteen months in advance of the start of the fiscal year (e.g., the FY 2015 billing was prepared in April 2013), and are based on the current consumption estimates and projected rate increases as included in the current ten-year plan. These estimates are then reconciled with actual consumption and rate increases, and an adjustment is made in the subsequent year's billing (e.g., the reconciliation of FY 2015 estimated vs. actual consumption and rate increases will be included in the FY 2018 billing, to be prepared in April 2016.) Federal revenues in the ten-year plan are presented on a revenue basis, net of any adjustments for prior year reconciliations which are accounted for as reserve items. Consistent with this methodology, revised FY 2015 federal revenues reflect the final billing sent to the federal government in April 2013 net of the adjustment for the prior year (FY 2012) reconciliation. The Authority serves many facilities of the federal government as well as the District of Columbia. The largest federal accounts include General Services Administration, U.S. Congress, the Smithsonian Institution, Department of the Navy, National Park Service and the Department of Defense in both DC and VA.

Municipal & D.C. Housing Authority – FY 2015 receipts from the District of Columbia government and the District of Columbia Housing Authority are projected at \$23.2 million, an increase of \$3.4 million or 17.0 percent over FY 2014. In FY 2016, receipts from these organizations are projected to total \$21.3 million, a decrease of \$1.9 million, or 8.3 percent, mainly due to the decline in Municipal Clean Rivers Impervious Area Charge (CRIAC) revenue as compared to previous year.

- The municipal customer group includes 641 accounts under the authority of the District of Columbia government. This includes offices and facilities for various government agencies and activities such as education, regulatory affairs and general government operations. This group will comprise 2.9 percent of the FY 2015 operating budget and 2.3 percent of the FY 2016 approved budget.
- The D.C. Housing Authority has multiple accounts that include public housing at various facilities throughout the District of Columbia. They have 1,452 accounts. Their annual billings make up only 1.4 percent of the FY 2015 cash receipts and 1.4 percent of the FY 2016 approved cash receipts.

Wholesale customer revenue - FY 2015 revenues are projected at \$81.4 million, an increase of \$10.6 million over FY 2014. In FY 2016, wholesale revenues are projected to decrease by \$12.0 million to \$69.3 million due to a change in billing estimation methodology starting in FY 2016. DC Water provides wholesale wastewater treatment services to User Jurisdictions at the Blue

DC WATER REVENUE RECEIPTS, Cont.

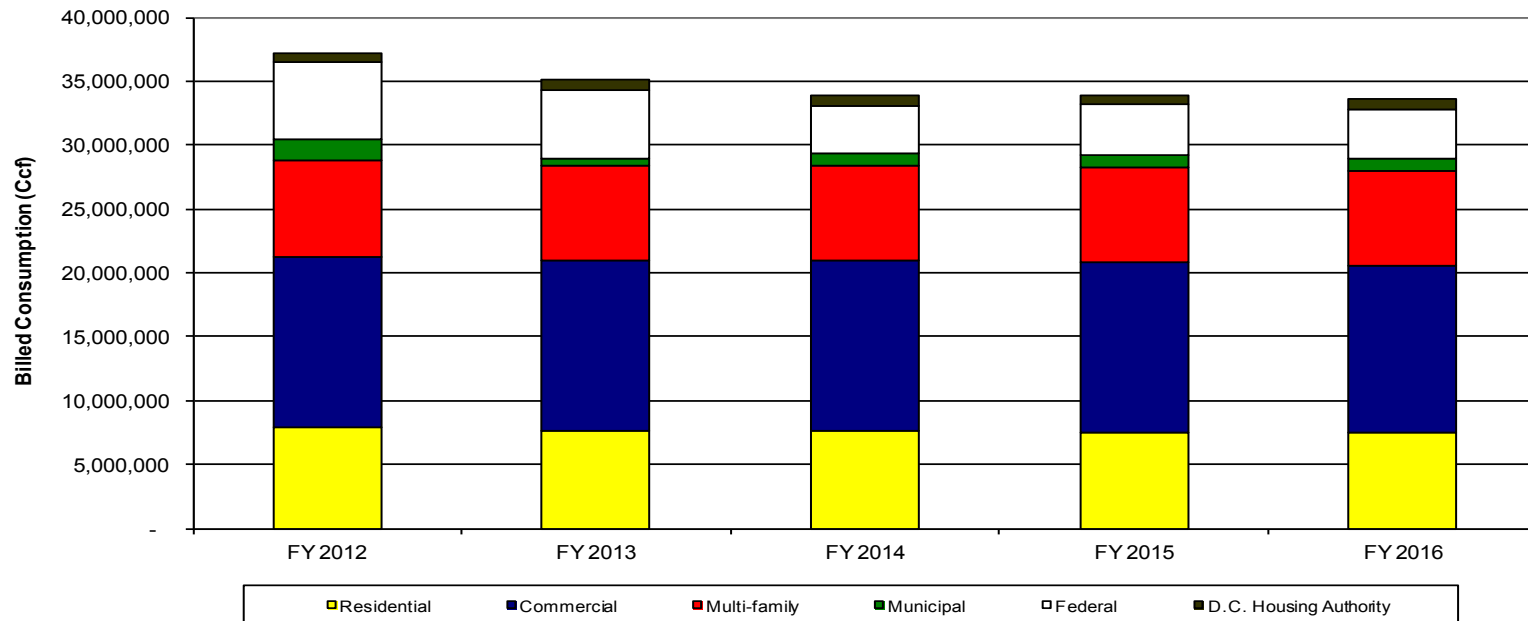
Plains Plant. The wholesale customers' share of operating costs at Blue Plains are recovered in accordance with the Blue Plains Intermunicipal Agreement of 1985 (replaced by Blue Plains Intermunicipal Agreement of 2012, effective April 3, 2013), the Potomac Interceptor Agreements and the Loudoun County Sanitation Authority Agreement (as discussed in more detail in "THE SYSTEM – The Wastewater System"), and are based on actual costs of operating and maintaining the plant and the collection facilities, prorated to each User Jurisdiction based on its respective actual share of wastewater flows. The User Jurisdiction's share of capital costs is based on each User Jurisdiction's share of capacity allocations in the Plant. Both operating and capital payments are made on a quarterly basis. Wholesale customers are billed based on the new estimation methodology starting from FY 2016. This new methodology incorporates a 3-year average of actuals for IMA estimated billing. Capital-related charges are billed quarterly with payments due on the 15th day of the second month following the end of the quarter. The operating and maintenance-related charges are billed annually by mid-October and payments are due on November, February, May and August. Receipts are projected to be 15 percent of total receipts in FY 2015. Following each fiscal year, the Authority prepares a reconciliation that determines the actual costs and each wholesale customer's appropriate share of such costs. Adjustments are then billed or credited to the wholesale customers in the first quarter of the subsequent fiscal year. The wholesale customers include: Washington Suburban Sanitary Commission (WSSC), Loudoun County, VA, Fairfax County, VA and a group of small customers of the Potomac Interceptor (PI). The PI customers are comprised of Dulles International Airport (MWAA), National Park Service, Department of Navy and the Town of Vienna.

DC WATER CASH RECEIPTS, Cont.

CONSUMPTION

While wholesale customers pay for their proportional share of wastewater services, retail customers are billed based upon metered consumption. Therefore, variations in consumption have a direct impact upon DC Water retail rates. The consumption for DC retail customers declined by 3.6 percent in FY 2014. Given the uncertainty of the current economy as well as the federal government's goal to close some neighboring federal facilities and implement a number of conservation best practices over the next few years, the revenue projections assume a 1 percent decline in FY 2015 over FY 2014 projection and 1 percent decline in FY 2016 and beyond.

Historical and Projected Billed Consumption (Ccf)



DC WATER CASH RECEIPTS, Cont.

Historical and Projected Billed Consumption (Ccf) ⁽³⁾

	FY 2012 Actual	FY 2013 Actual	FY 2014 Actual	FY 2015 Projected	FY 2016 Projected
Residential	7,878,216	7,638,824	7,566,045	7,541,000	7,466,000
Commercial (1)	13,406,380	13,295,119	13,336,392	13,279,000	13,146,000
Multi-family	7,569,320	7,464,328	7,439,742	7,450,000	7,376,000
Municipal (2)	1,546,942	565,671	1,035,424	907,000	898,000
Federal	6,067,764	5,383,567	3,706,631	4,000,000	3,960,000
D.C. Housing Authority	<u>775,733</u>	<u>763,155</u>	<u>776,944</u>	<u>753,000</u>	<u>745,000</u>
Total Retail	37,244,355	35,110,664	33,861,178	33,930,000	33,591,000

- (1) Reflects consumption at Commercial facilities and selected facilities at Howard University and Soldiers' Home. From October 1, 2011, Howard University accounts have been transferred to Commercial and are no longer exempt from paying water
- (2) Reflects consumption at District of Columbia Government facilities and DC Water facilities
- (3) Ccf - hundred cubic feet or 748 gallons

RECENT & PROPOSED RATE & FEE CHANGES

FY 2015 RATE & FEE CHANGES

Effective October 2014, the Board increased rates and fees as follows:

- Water and Sewer volumetric rate increased by \$0.60 per Ccf from \$8.02 to \$8.62 per Ccf, {\$0.80 per 1,000 gallons}
 - Water rate increase of \$0.27 per Ccf, {\$0.36 per 1,000 gallons} from \$3.61 per Ccf to \$3.88 per Ccf, {\$5.19 per 1,000 gallons}
 - Sewer rate increase of \$0.33 per Ccf, {\$0.44 per 1,000 gallons} from \$4.41 per Ccf to \$4.74 per Ccf, {\$6.33 per 1,000 gallons}
- Monthly Clean Rivers Impervious Area Surface Charge (CRIAC) increased by \$4.90 from \$11.85 per ERU to \$16.75 per ERU
- Clean Rivers Impervious Area Surface Charge (CRIAC) six-tier residential rate structure is shown in the table below

Tiers	Residential Impervious Area Range	ERU
Tier 1	100 – 600 sq ft	0.6 ERU
Tier 2	700 – 2,000 sq ft	1.0 ERU
Tier 3	2,100 – 3,000 sq ft	2.4 ERU
Tier 4	3,100 – 7,000 sq ft	3.8 ERU
Tier 5	7,100 – 11,000 sq ft	8.6 ERU
Tier 6	11,100 sq ft and more	13.5 ERU

- Right-of-Way fee – This fee recovers the full cost of the Right-of-Way fee charged to DC Water by the District of Columbia
 - There is no increase in Right-of-Way fee, which remains same at \$0.17 per Ccf, {\$0.22 per 1,000}
- Payment-in-Lieu of Taxes Fee – This fee recovers the cost for providing municipal services to DC Water by the District of Columbia. On September 4, 2014 the District and the Authority entered into a new Memorandum of Understanding (the “2014 PILOT MOU”) amending the 1998 PILOT MOU. According to the terms of the 2014 PILOT MOU, the Authority shall make a PILOT payment to the District in the amount of \$15.3 million in FY 2015 for the services provided by the District to the Authority. In fiscal years 2016 to 2024, the Authority shall increase the amount of the PILOT payment by two percent per annum based on the amount of the prior year’s annual PILOT payment
 - Decrease of \$0.07 per Ccf in the PILOT fee {\$0.09 per 1,000 gallons} to \$0.46 per Ccf, (\$0.62 per 1,000 gallons)
- These changes increased the typical residential customer’s total monthly bill by \$8.45 or 11.0 percent

RECENT & PROPOSED RATE & FEE CHANGES, Cont.

PROPOSED FY 2016 RATE & FEE CHANGES

The Board has proposed the following rates and fee increases for rate making, to be, effective October 2015:

- Water and Sewer volumetric rates are listed below:
 - Residential customers: “Consumption of 0 – 4 Ccf” water rate decrease of \$0.80 per Ccf, {\$1.07 per 1,000 gallons} from \$3.88 per Ccf to \$3.08 per Ccf, {\$4.12 per 1,000 gallons}
 - Residential customers: “Consumption greater than 4 Ccf” water rate decrease of \$0.01 per Ccf, {\$0.02 per 1,000 gallons} from \$3.88 per Ccf to \$3.87 per Ccf, {\$5.17 per 1,000 gallons}
 - Multi-family customers: water rate decrease of \$0.43 per Ccf, {\$0.57 per 1,000 gallons} from \$3.88 per Ccf to \$3.45 per Ccf, {\$4.61 per 1,000 gallons}
 - Non-Residential customers: water rate increase of \$0.11 per Ccf, {\$0.15 per 1,000 gallons} from \$3.88 per Ccf to \$3.99 per Ccf, {\$5.33 per 1,000 gallons}
- Sewer rate increase of \$0.70 per Ccf, {\$0.94 per 1,000 gallons} for all classes of customers from \$4.74 per Ccf to \$5.44 per Ccf, {\$7.27 per 1,000 gallons}
- Monthly Clean Rivers Impervious Area Charge (CRIAC) increase of \$3.55 from \$16.75 per ERU to \$20.30 per ERU
- Proposed a new fixed monthly fee, Water System Replacement Fee (WSRF) of \$6.30 for 5/8” meter size. This fee varies with meter size. The WSRF is to recover the costs of 1% renewal and replacement program for water services
- PILOT and Right-of-Way fee – These fees are proposed to increase to recover the full cost of the PILOT and Right-of-Way fees charged to DC Water by the District of Columbia
 - Increase of \$ 0.01 in the PILOT fee, {\$0.02 per 1,000 gallons} to \$0.47 per Ccf, {\$0.64 per 1,000 gallons}
 - There is no increase in Right-of-Way fee, which remains the same at \$0.17 per Ccf, {\$0.22 per 1,000 gallons}

RECENT & PROPOSED RATE & FEE CHANGES, Cont.

PROPOSED FY 2016 RATE & FEE CHANGES

COST OF SERVICE STUDIES:

In FY 2010, DC Water's Independent Financial Consultants performed a Cost of Service (COS) Study to include objectives from senior staff on prioritizing DC Water's pricing objectives. One of the objectives noted was the Class-Based Volumetric Differentiation.

In FY 2011, a Customer Segmentation Study was performed to identify classes of customers for the purpose of rate-setting, planning, supply management and cost analysis among others. Typically, this classification is based on: A. general service characteristics and B. demand patterns. Each class is assumed to have somewhat different needs and progressively higher demands than the previous class. Most water utilities typically have three principal classes of customers: A. Residential, B. Commercial and C. Industrial. DC Water has two customer classes: A. Residential and B. Non-Residential.

Furthermore, the FY 2012 Cost of Service Study identified several customer categories that demonstrated a reasonable level of differentiation in terms of peak usage. The customer classes identified included A. Residential, B. Multi-family and C. Non-residential. DC Water added a new class of customer, Multi-family effective October 1, 2014.

In FY 2015, DC Water successfully completed its Cost of Service Study (COS). This study is undertaken every three years to review and certify DC Water's water and wastewater volumetric rates, Clean Rivers Impervious Surface Area Charge (CRIAC) and other DC Water fees and charges to ensure that revenues are sufficient to recover projected revenue requirements, that Board rate setting policies are followed, and that rates are allocated equitably.

DC Water expanded the COS to include alternative rate structure analysis that would more effectively meet DC Water's highest priority pricing objectives:

- Lifeline Rates
- Classed-based Volumetric Rates
- Water System Replacement Fee (WSRF)

RECENT & PROPOSED RATE & FEE CHANGES, Cont.

Lifeline Rate

The lifeline rate allows for the first 4 Ccf of Single Family Residential (SFR) water use to reflect baseline usage by residential customers without peaking costs. The lifeline water rate provides an economic benefit to low-volume Residential customers, while spreading the cost of peaking to high-volume Residential customers.

Class-based Rate Structure

The Independent Financial Consultants analyzed rate differentiation based on the peaking demands of each customer class. They also analyzed consumption patterns to better understand how customers use water and how their use of water may inform selection of an optimized rate structure. Based upon the analysis of the peak demand of different customer classes as well as affordability considerations, management recommended establishing class-based water volumetric rates for Residential, Multi-family and Non-residential customers.

Water Volumetric	Class-Based (w/ lifeline)
Residential - 0-4 Ccf	\$ 3.08
Residential - >4 Ccf	\$ 3.87
Multi-Family / DC Housing	\$ 3.45
Non-Residential	\$ 3.99

Water System Replacement Fee (WSRF)

In FY 2016, DC Water will modify its existing rate structure and implement a new meter-based Water System Replacement Fee (WSRF) in order to recover the cost of the 1% renewal and replacement program for water service lines. It is anticipated that the new Water System Replacement Fee (WSRF) will generate \$40 million per year from fiscal years 2016 through 2024. The fee is

RECENT & PROPOSED RATE & FEE CHANGES, Cont.

based upon meter size and average flow. DC Water’s low income CAP customers will receive a 100% credit of \$6.30 for this fee.

Meter Size (inches)	Meter Register Type	Monthly Water System Replacement Fee
5/8"	Single Register	\$ 6.30
3/4"	Single Register	\$ 7.39
1"	Single Register	\$ 9.67
1"x1.25"	Single and Multiple Register	\$ 15.40
1.5"	Single Register	\$ 41.35
2"	Single and Multiple Register	\$ 83.75
3"	Single and Multiple Register	\$ 232.13
4"	Single and Multiple Register	\$ 561.02
6"	Single and Multiple Register	\$ 1,292.14
8"	Single Register	\$ 5,785.51
8"x2"	Multiple Register	\$ 1,899.60
8"x4"x1"	Multiple Register	\$ 2,438.35
10"	Single and Multiple Register	\$ 6,679.65
12"	Single and Multiple Register	\$ 6,679.65
16"	Single Register	\$ 6,679.65

Development Impact Fee

Many utilities have implemented a fee, assessed to new development (or redevelopment) to recover the investment in available system capacity. The DC Water management has recommended a new development impact fee to be effective from October 1, 2015. All Single Family Residential (SFR) Customers with meters 1" inch or smaller will use the same set of fees. All

RECENT & PROPOSED RATE & FEE CHANGES, Cont.

SRF Customers with meters larger than 1", and all Multi-Family and Non-Residential Customers will have development impact fees based on their meter size.

The proposed Development Impact Fee will be assessed for all new buildings, structures or properties under development and properties under redevelopment. For properties under redevelopment, DC Water will determine the net system impact fee by determining the property's proposed capacity requirements and applying a credit for the capacity of accounts being removed from the system. However, if the associated credit for capacity removed is equal to or greater than the future impact fee, the net impact fee shall be zero. Properties under redevelopment shall not receive a credit for accounts that are inactive for more than 12 months.

The following terms are defined:

Development – the construction of a building or structure that establishes a new water and/or sewer connection.

Redevelopment – the renovation or alteration of a building or structure, or reconstruction of a property that increases the water supply demand or drainage, waste, and vent (DWV) system load. Redevelopment shall not include the up-sizing of a water service or sewer lateral to comply with the current D.C. Plumbing Code, provided the water supply demand and DMV system load remain the same.

As a result of the 2015 Cost of Service Study, several revisions to the rate structure have been proposed for implementation in FY 2016 and other areas of opportunity will require additional analysis in FY 2016 before recommendation or implementation.

DC Water will determine whether to adopt and approve these objectives during its FY 2016 ratemaking process.

PROPOSED FY 2016 RATE & FEE CHANGES

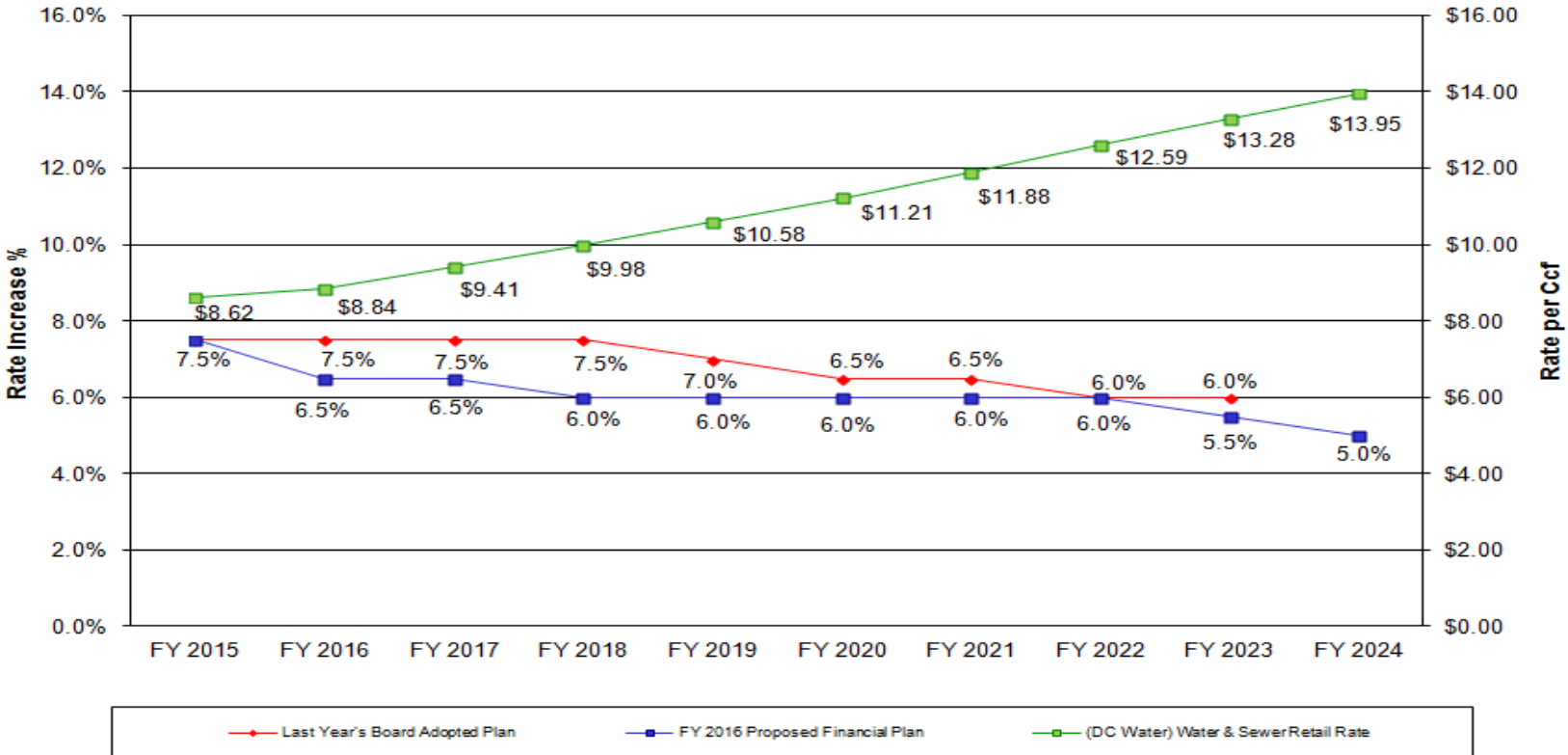
The ten-year projected water and sewer rate increases under this year's plan (FY 2015 – FY 2024) total 61.0 percent driven primarily by capital spending for DC Water's \$3.8 billion capital improvement program.

Primary spending in the ten-year capital plan includes: initial phases of the Clean Rivers Project (CSO LTCP), the Enhanced Nitrogen Removal Facilities (formerly called BTN), digesters, and various on-going water and sewer infrastructure improvements.

The public outreach and comment process for the FY 2016 rate proposal will occur between February and June 2015. If approved, these changes will increase the typical residential customer's monthly bill by \$11.36 or 13.3 percent as shown on page IV-20.

RECENT & PROPOSED RATE & FEE CHANGES, Cont.

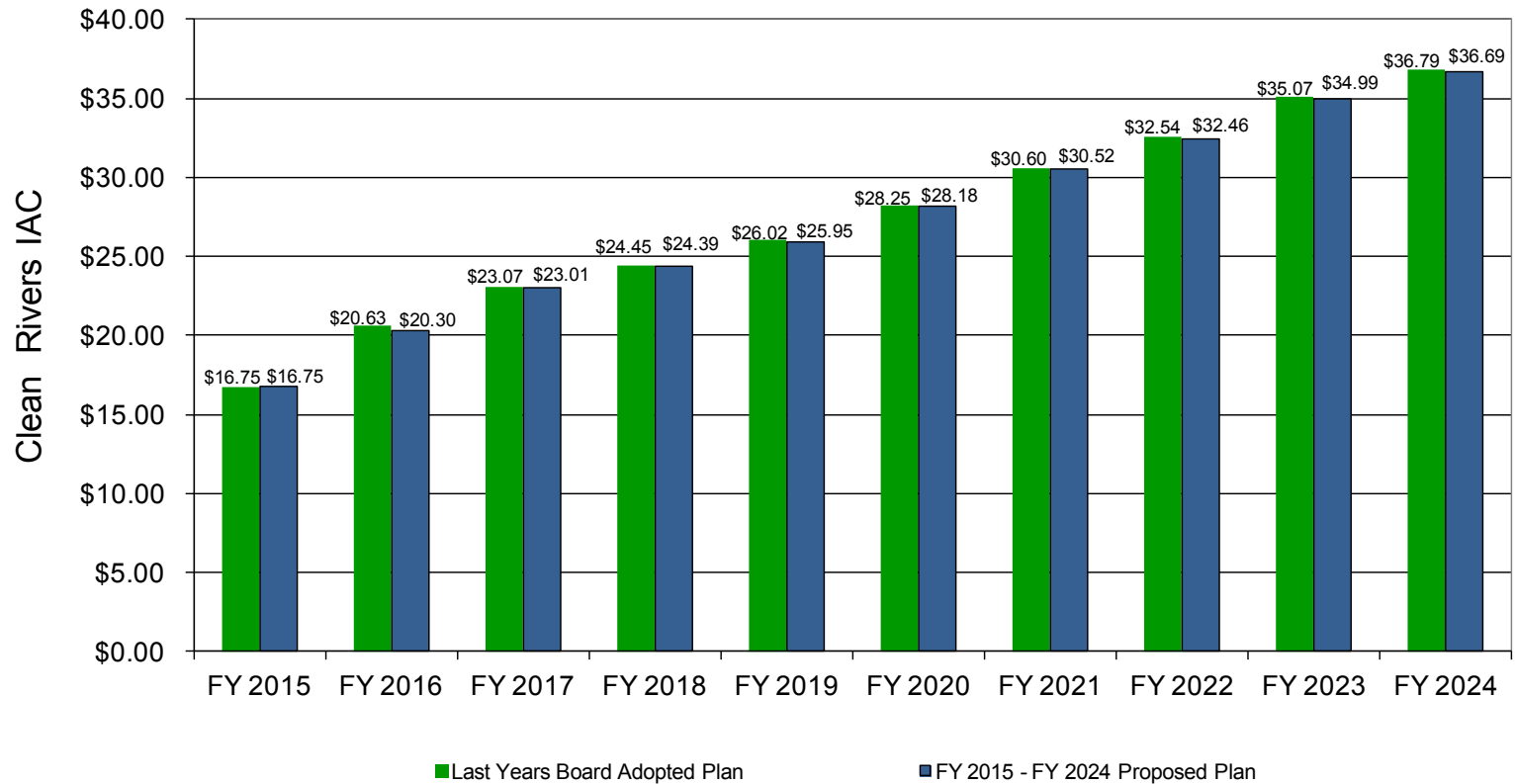
PROJECTED RETAIL WATER & SEWER RATE CHANGES
FY 2015 – FY 2024



- 1) Rates shown above reflect weighted water and sewer rates for Residential customer category
- 2) In FY 2016 proposed water and sewer rate increase of \$0.22 per Ccf, (\$0.29 per 1,000 gallons)
 - Combined water and sewer rate increases from \$8.62 to \$8.84 per Ccf
- 3) Rate increases ranging from 5.0 percent to 7.5 percent

RECENT & PROPOSED RATE & FEE CHANGES, Cont.

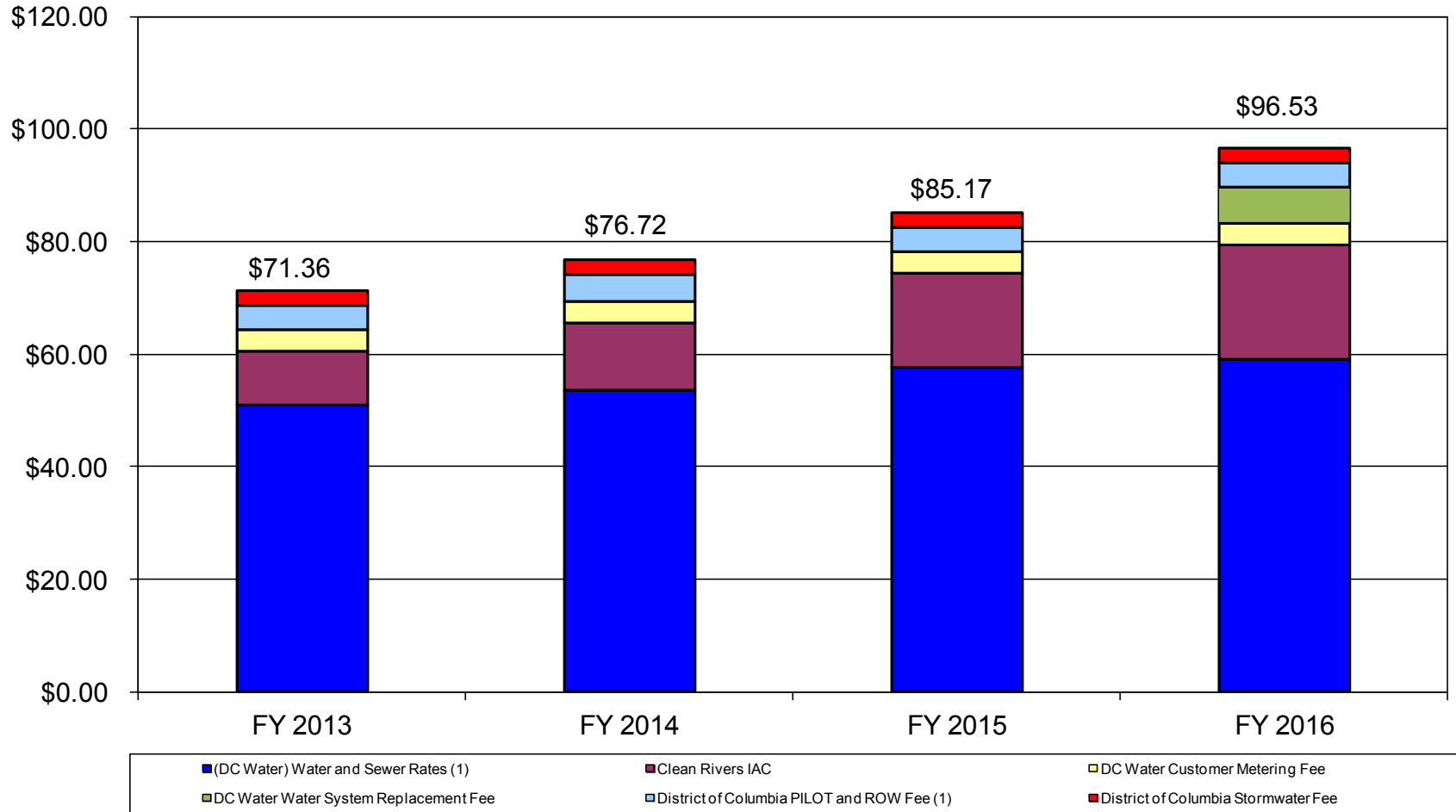
**PROJECTED MONTHLY CLEAN RIVERS IMPERVIOUS SURFACE AREA CHARGE (CRIAC) CHANGES
FY 2015 – FY 2024**



- The projected charges displayed in the chart above are primarily driven by anticipated debt service costs necessary to support the twenty year \$2.6 billion Clean Rivers Project, which includes the federally mandated CSO-LTCP and the nine-minimum controls program
- The annual Clean Rivers Project costs for the average Tier 2 residential customer (700 – 2,000 sq ft of impervious area) is projected to increase from \$243.60 in FY 2016 to \$440.28 in FY 2024

RECENT & PROPOSED RATE & FEE CHANGES, Cont.

*AVERAGE RESIDENTIAL CUSTOMER MONTHLY BILL
FY 2013 – FY 2016*



1) Assumes average monthly consumption of 6.69 Ccf, or 5,004 gallons
 – FY 2016 cost per gallon is \$0.01 (water and sewer rates only)

RECENT & PROPOSED RATE & FEE CHANGES, Cont.

AVERAGE RESIDENTIAL CUSTOMER MONTHLY BILL FY 2013 – FY 2016

	Units	FY 2013	FY 2014	FY 2015	Proposed FY 2016
DC Water and Sewer Retail Rates (1)	Ccf	\$ 50.84	\$ 53.65	\$ 57.67	\$ 59.12
DC Water Clean Rivers IAC	ERU	9.57	11.85	16.75	20.30
DC Water Customer Metering Fee	5/8"	3.86	3.86	3.86	3.86
DC Water Water System Replacement Fee (3)	5/8"	-	-	-	6.30
Subtotal DC Water Rates & Charges		\$ 64.27	\$ 69.36	\$ 78.28	\$ 89.58
Increase / Decrease		\$ 5.60	\$ 5.09	\$ 8.92	\$ 11.30
District of Columbia PILOT (1)	Ccf	\$ 3.35	\$ 3.55	\$ 3.08	\$ 3.14
District of Columbia Right-of-Way Fee (1)	Ccf	1.07	1.14	1.14	1.14
District of Columbia Stormwater Fee (2)	ERU	2.67	2.67	2.67	2.67
Subtotal District of Columbia Charges		\$ 7.09	\$ 7.36	\$ 6.89	\$ 6.95
Total Amount Appearing on DC Water Bill		\$ 71.36	\$ 76.72	\$ 85.17	\$ 96.53
Increase / Decrease Over Prior Year		\$ 5.74	\$ 5.36	\$ 8.45	\$ 11.36
Percent Increase in Total Bill		8.7%	7.5%	11.0%	13.3%

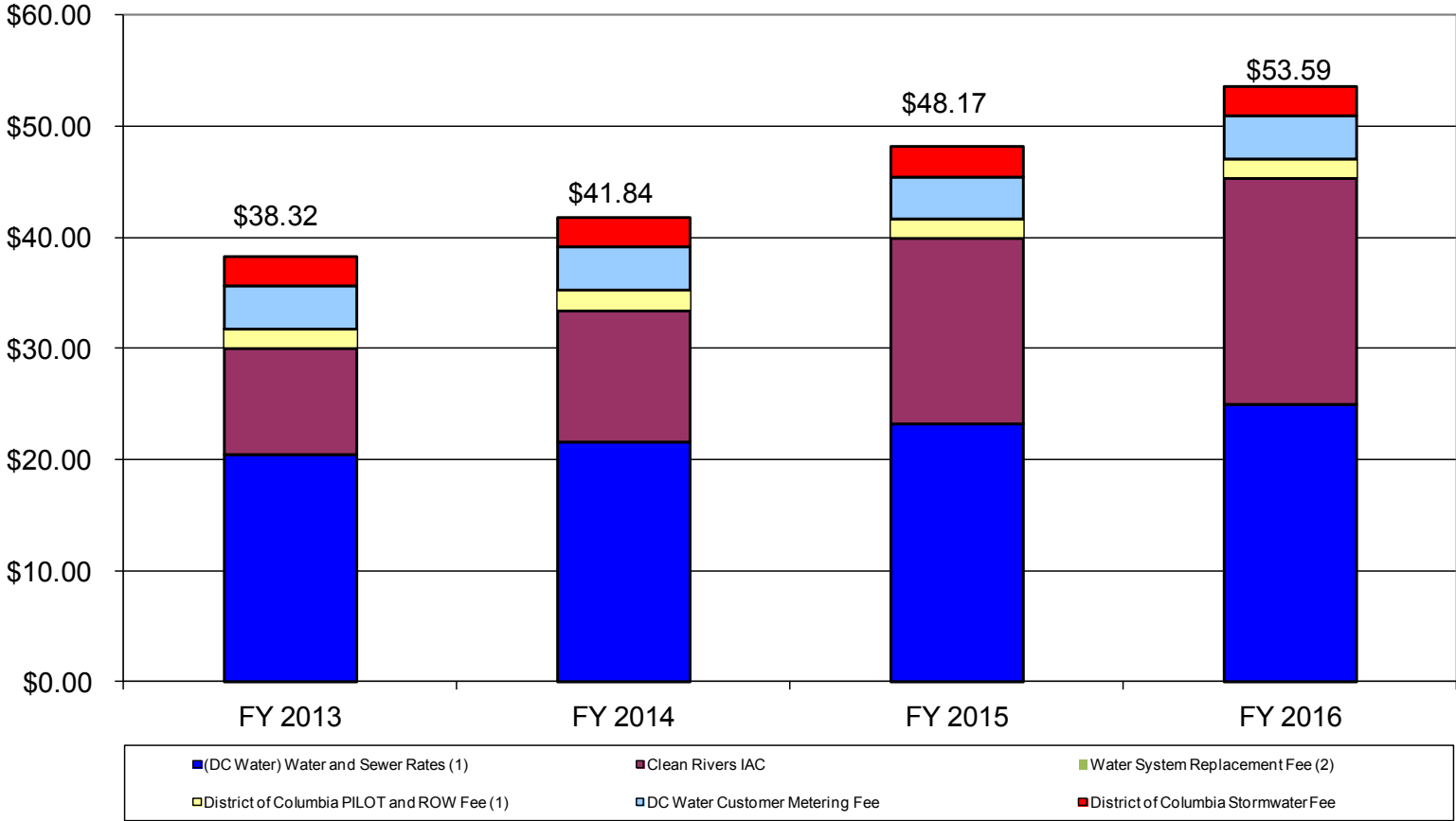
(1) Assumes average monthly consumption of 6.69 Ccf, or (5,004 gallons)

(2) District Department of the Environment stormwater fee of \$2.67 effective November 1, 2010

(3) DC Water "Water System Replacement Fee" of \$6.30 effective October 1, 2015

RECENT & PROPOSED RATE & FEE CHANGES, Cont.

AVERAGE CAP CUSTOMER MONTHLY BILL
FY 2013 – FY 2016



1. Assumes average monthly consumption of 6.69 Ccf, or 5,004 gallons
 - FY 2016 cost per gallon is \$0.01 (water and sewer rates only)
2. Assumes 100 percent discount for Water System Replacement Fee (WSRF) to Cap customers, therefore, WSRF is not shown in the above graph

RECENT & PROPOSED RATE & FEE CHANGES, Cont.

AVERAGE CAP CUSTOMER MONTHLY BILL FY 2013 – FY 2016

	Units	FY 2013	FY 2014	FY 2015	Proposed FY 2016
DC Water Retail Rates (1)	Ccf	\$ 50.84	\$ 53.65	\$ 57.67	\$ 59.12
DC Water Clean Rivers IAC	ERU	9.57	11.85	16.75	20.30
DC Water Customer Metering Fee	5/8"	3.86	3.86	3.86	3.86
DC Water Water System Replacement Fee	5/8"	-	-	-	6.30
Subtotal DC Water Rates & Charges		\$ 64.27	\$ 69.36	\$ 78.28	\$ 89.58
Increase / Decrease		\$ 5.60	\$ 5.09	\$ 8.92	\$ 11.30
District of Columbia PILOT (1)	Ccf	\$ 3.35	\$ 3.55	\$ 3.08	\$ 3.14
District of Columbia Right-of-Way Fee (1)	Ccf	1.07	1.14	1.14	1.14
District of Columbia Stormwater Fee (4)	ERU	2.67	2.67	2.67	2.67
Subtotal District of Columbia Charges		\$ 7.09	\$ 7.36	\$ 6.89	\$ 6.95
Total Amount		\$ 71.36	\$ 76.72	\$ 85.17	\$ 96.53
Less: CAP Discount (4 Ccf per month) (1), (2)		\$ (33.04)	\$ (34.88)	\$ (37.00)	\$ (36.64)
Water System Replacement Fee (WSRF) (3)		\$ -	\$ -	\$ -	\$ (6.30)
Total Amount Appearing on DC Water Bill		\$ 38.32	\$ 41.84	\$ 48.17	\$ 53.59
Increase / Decrease Over Prior Year		\$ 4.06	\$ 3.52	\$ 6.33	\$ 5.42
CAP Customer Discount as a Percent of Total Bill		-46.3%	-45.5%	-43.4%	-44.5%

(1) Assumes average monthly consumption of 6.69 Ccf, or (5,004 gallons)

(2) Extension of CAP program in FY 2011 to first 4 Ccf of PILOT and ROW

(3) Assumes 100 percent discount for Water System Replacement Fee (WSRF) to CAP customers

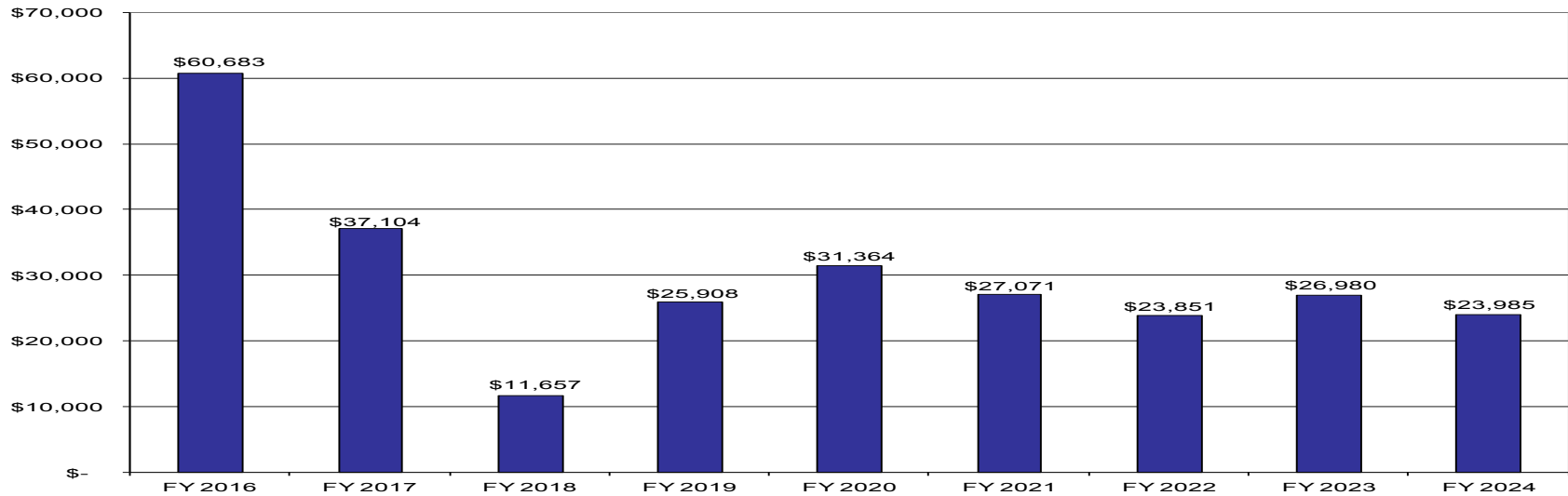
(4) District Department of the Environment stormwater fee of \$2.67 effective November 1, 2010

WHY RATE INCREASES ARE NEEDED

FY 2015 – FY 2024 FINANCIAL PLAN

- As shown in the chart below, incremental increases in retail revenues are projected to range from \$11.7 million to \$60.7 million in FY 2016 – FY 2024, due to:
 - Average annual debt service increase of 6.5 percent
 - Average annual O&M increase of 3.2 percent
 - Annual projected Payment-in-Lieu of Taxes (PILOT) increases of 2 percent per annum, as per the new PILOT agreement dated September 4, 2014, due to DC government’s increasing costs of providing services to DC Water
 - According to new Right-of-Way (ROW) agreement with the District signed on October 2, 2014, the ROW fee will remain same at \$5.1 million per annum
 - This year’s ten-year financial plan reflects anticipated operating cost savings at Blue Plains beginning in FY 2015 due to the implementation of the digester/cambi biosolids management project

INCREMENTAL INCREASE IN REVENUES
FY 2016 – FY 2024
 (\$000's)



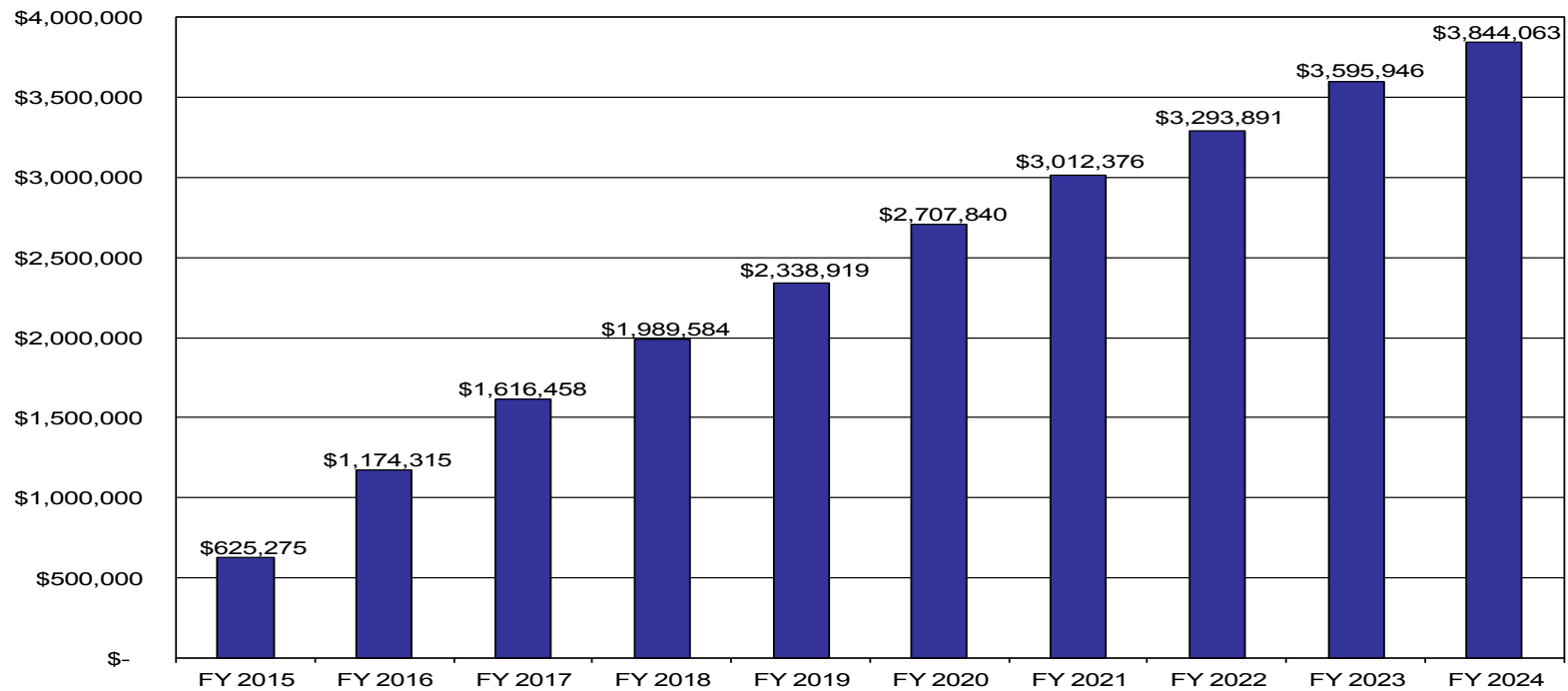
WHY RATE INCREASES ARE NEEDED, Cont.

- These costs would be recovered through:
 - Proposed water and sewer rate increases ranging from 5.0 percent to 7.5 percent
 - Proposed Clean Rivers Impervious Surface Area Charge (CRIAC) revenues ranging from \$20.30 to \$36.69 per ERU per month
 - Proposed DC PILOT fee increases of 2 percent in accordance with the current MOU dated September 4, 2014
 - The ROW fee will remain the same at \$5.1 million per annum in accordance with the current MOU signed on October 2, 2014
 - Utilization of the Board-authorized Rate Stabilization Fund (RSF) to offset retail rate increases

WHY RATE INCREASES ARE NEEDED, Cont.

DC Water's proposed rate increases are primarily required to fund increasing debt service costs from increased capital spending.

CUMULATIVE CAPITAL SPENDING
FY 2015 – FY 2024
(\$000's)



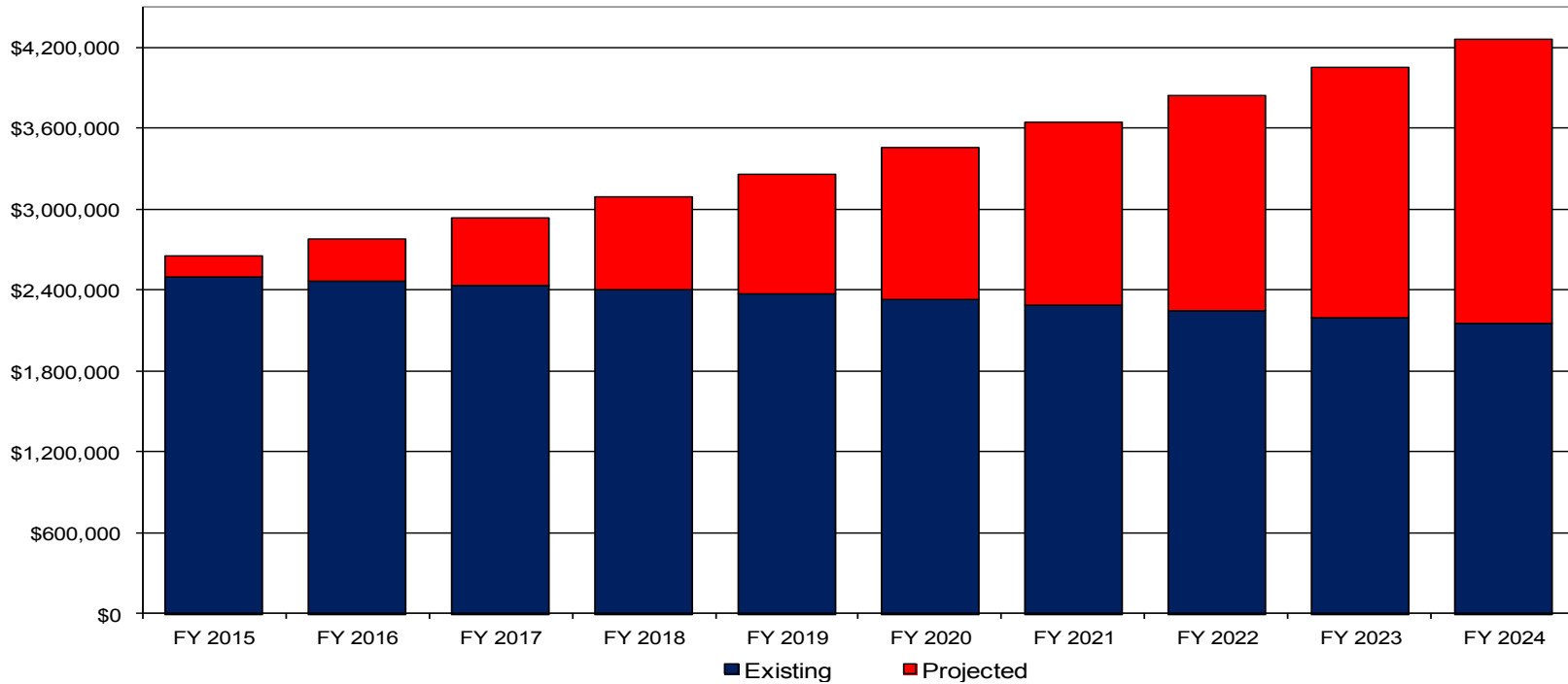
- DC Water's ten-year capital improvement program totals \$3.8 billion, with annual spending ranging from \$248.1 million to \$625.3 million

WHY RATE INCREASES ARE NEEDED, Cont.

- Once completed, the ten-year capital improvement project will double the book value of DC Water's infrastructure
- The ten-year plan includes disbursements of the Clean Rivers Project (CSO LTCP), totaling nearly \$1.4 billion exclusive of nine minimum controls
- Water and sewer infrastructure continues to drive the ten-year Capital Improvement Plan from FY 2015 through FY 2024

WHY RATE INCREASES ARE NEEDED, Cont.

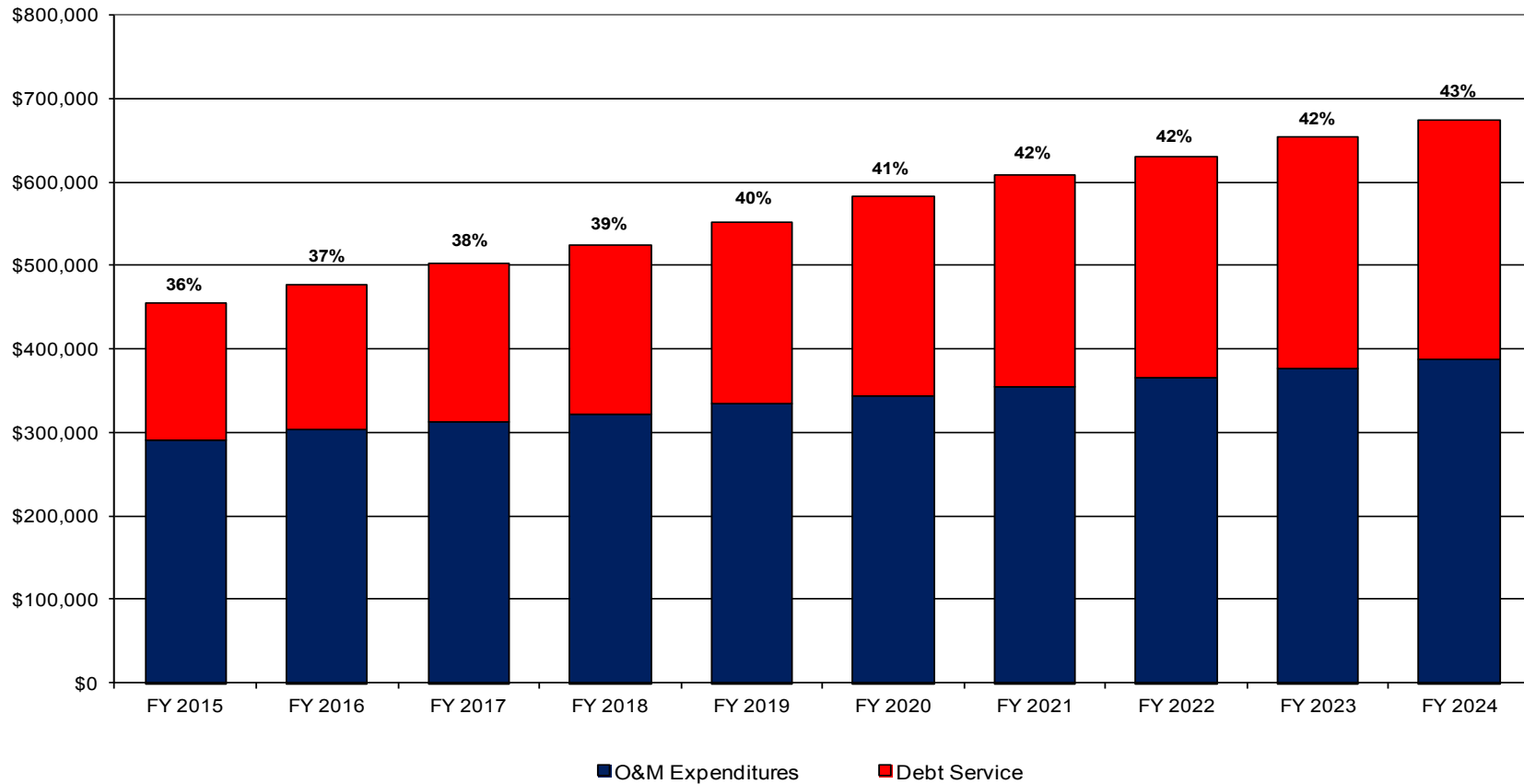
NEW & EXISTING DEBT OUTSTANDING
 FY 2015 – FY 2024
 (\$000's)



- The largest source of funding for DC Water’s capital program is debt
- Over the next ten years, DC Water will issue approximately \$1.9 billion in new debt (which includes the funding of reserves and costs of issuance), increasing total debt outstanding to \$4.2 billion at the end of FY 2024

WHY RATE INCREASES ARE NEEDED, Cont.

DEBT SERVICE AS PERCENT OF TOTAL OPERATING & MAINTENANCE EXPENDITURES
FY 2015 – FY 2024
(\$000's)



WHY RATE INCREASES ARE NEEDED, Cont.

OPERATING & DEBT SERVICE EXPENDITURES FY 2015 – FY 2024

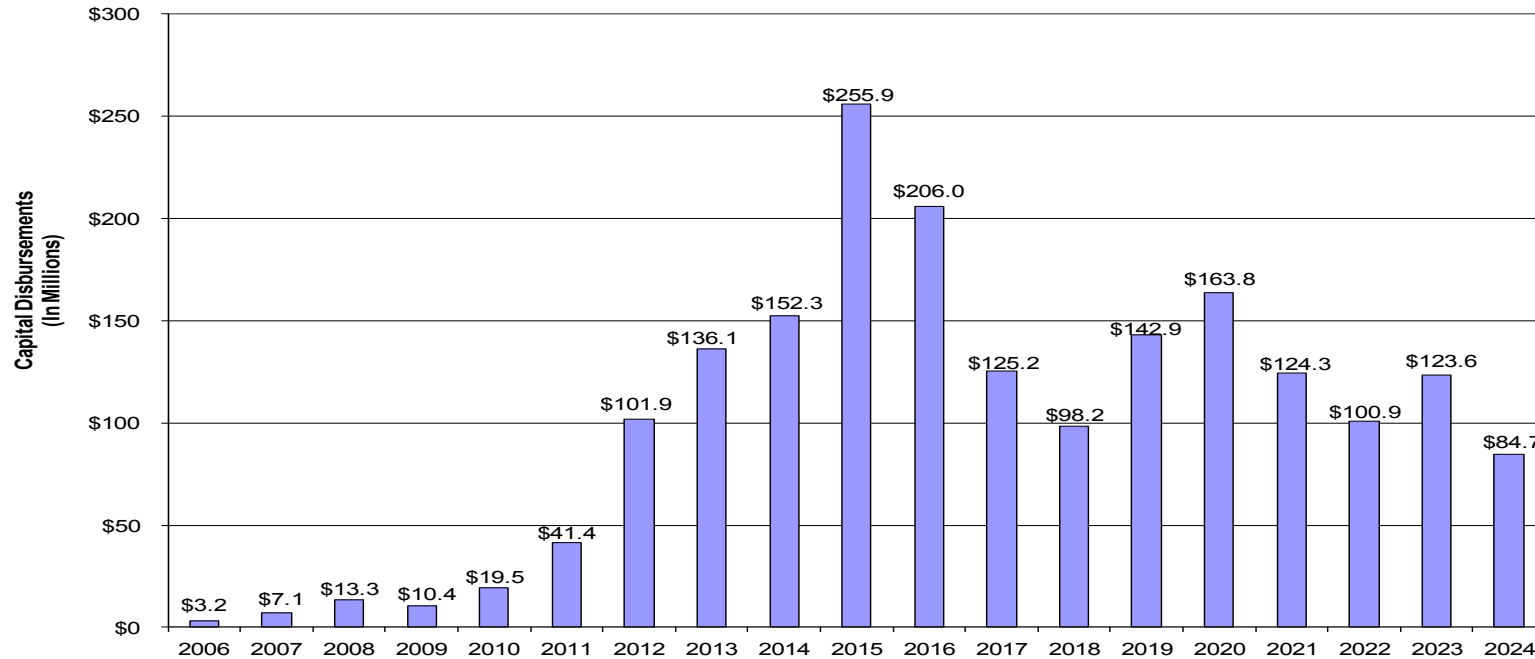
Over the ten-year period, total expenditures increase on average by 4.5 percent annually

DC Water's proposed rate increases are primarily required to fund increasing debt service costs

- Operations and maintenance expenditures (excluding the payment in lieu of taxes and right-of-way fee) increase on average by only 3.2 percent annually
- Debt service expenditures grow at an annual average rate of 6.5 percent
- This year's ten-year financial plan reflects anticipated operating cost savings at Blue Plains beginning in FY 2015 due to the implementation of the digester/cambi biosolids management project

WHY RATE INCREASES ARE NEEDED, Cont.

POTENTIAL IMPACT OF CSO LONG-TERM CONTROL PLAN ON RATES
Clean Rivers CSO LTCP Disbursements by Fiscal Year

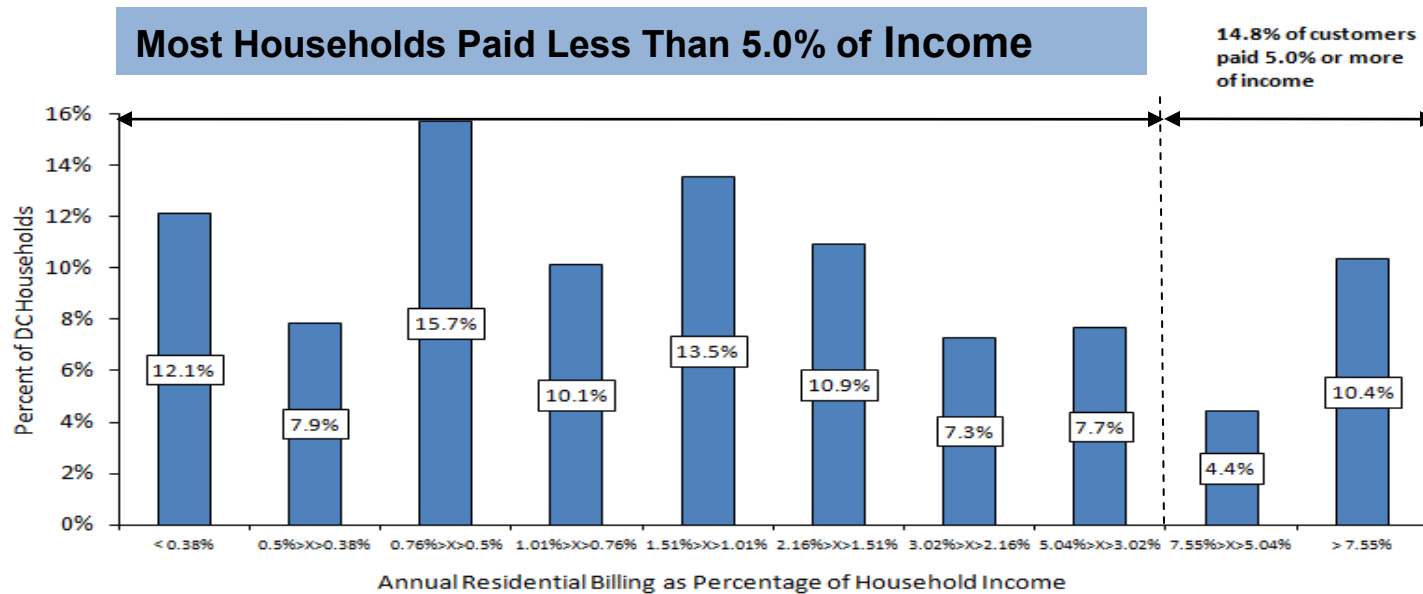


In December 2004, the Board reached an agreement with the federal government on the Clean Rivers Project (CSO-LTCP) and entered into a related consent decree. Actual and projected disbursements by fiscal year for the Clean Rivers Project are shown in the chart above and are the drivers for changes in the Clean Rivers Impervious Area Charge over the ten-year plan. Wholesale customers contribute 7.1 percent to the Clean Rivers Project. To mitigate impacts, DC Water continues to look for federal support for this program. As of September 30, 2014, \$196.8 million has been received through federal appropriations. Lifetime capital costs for the plan (exclusive of the nine – minimum controls program) total approximately \$2.3 billion, and this year’s proposed ten-year plan includes \$1.4 billion of projected Clean Rivers Project disbursements.

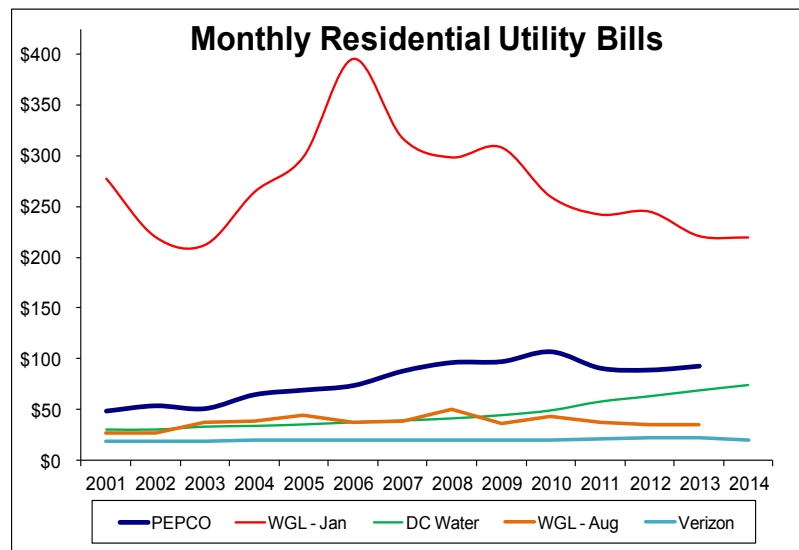
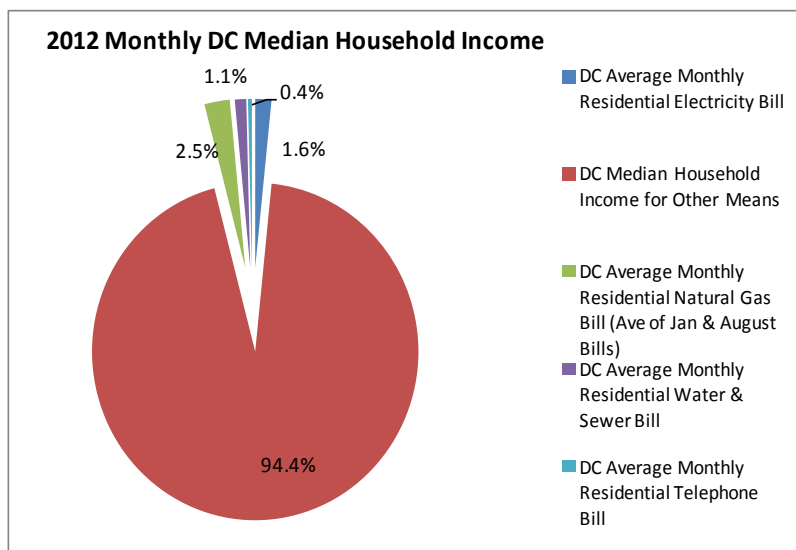
AFFORDABILITY OF RETAIL RATES

DC WATER CHARGES ARE STILL AFFORDABLE AND COMPETITIVE WITH OTHER MAJOR CITIES

- **Median household income:** The average DC Water charges are less than 5.0% of income for 85.2% of the households in the District of Columbia. US EPA guidelines suggest that charges greater than 4% of median household income are typically viewed as a strain on household budgets (2% water + 2% sewer)
- **Typical DC Water residential bill as a percentage of median household income is lower than average when compared to other utilities of similar size**
- **Customer Assistance Programs are in place to help eligible low income customers with their water/sewer bills**



AFFORDABILITY, Cont.



Observation:

- DC Water's average monthly residential water & sewer bill is about 1.1 percent of the total monthly household income for the median income family, which is lower, compared to the average monthly electricity and natural gas bill and at about the national average for urban populations

Observation:

- Average electricity and natural gas are higher than water & sewer bills

Assumption:

- Average DC customer is assumed to use 6.69 Ccf of water, 200 Therms of natural gas and almost 695 kWh of electricity per month in 2014

Sources:

Electricity and Gas: DC Public Service Commission

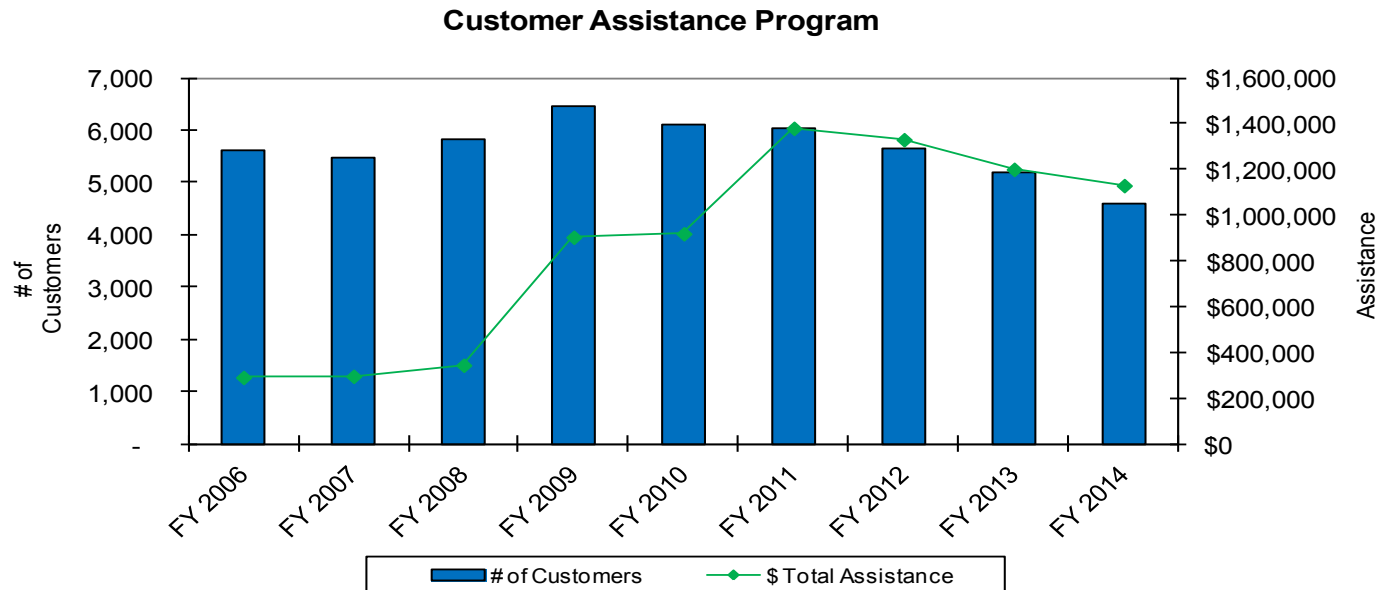
Water and Sewer: DC Water Assuming 6.69 Ccf, or 5,004 gallons consumption

Median HH Income: US Census Bureau

AFFORDABILITY, Cont.

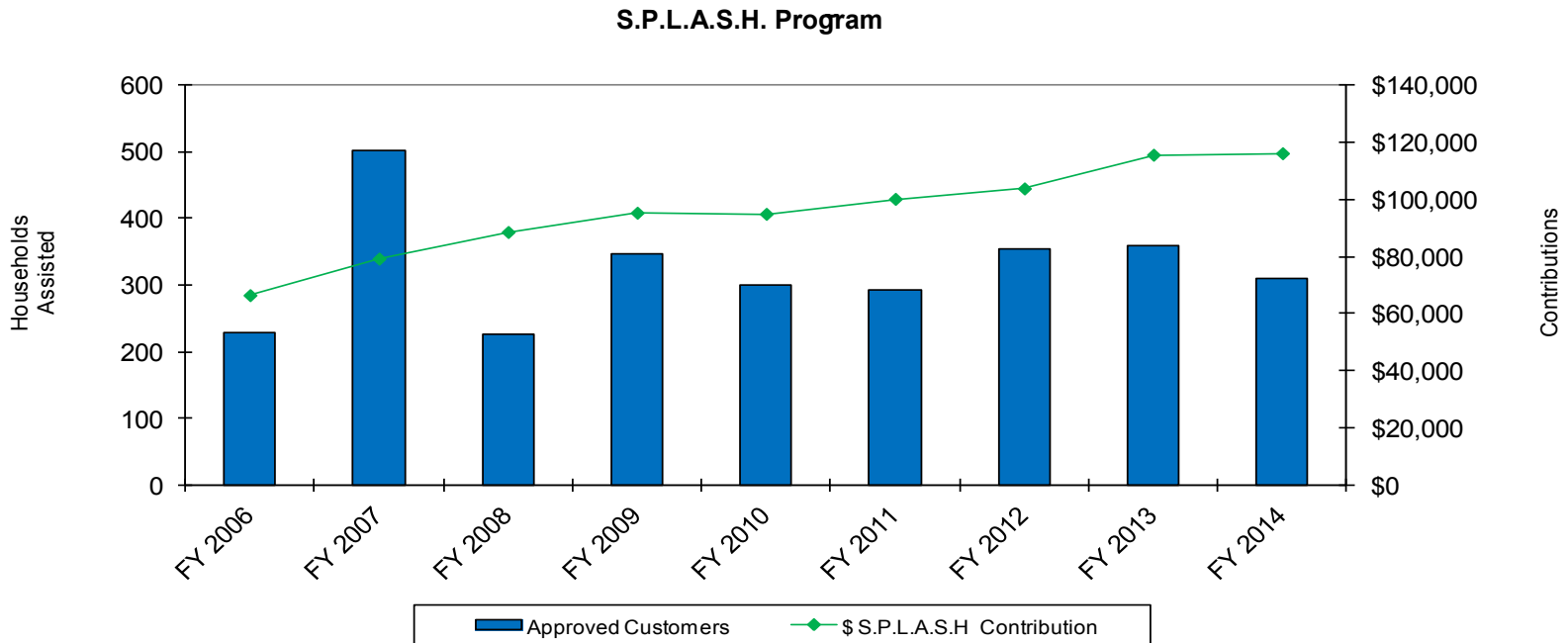
DC Water sponsors two programs to assist low income customers in paying their water bills:

- Customer Assistance Program (“CAP”):** The Authority implemented the CAP in 2001 providing a discount of 4 Ccf per months of water service for single family residential homeowners that meet income eligibility guidelines. In FY 2004, the Authority expanded the CAP to include tenants who meet the financial eligibility requirements and whose primary residence is separately metered by the Authority. In January 2009, the Authority further expanded the CAP to provide a discount of 4 Ccf per month of sewer services to eligible customers. In FY 2011, the discount was expanded to the first 4 Ccf associated with the PILOT/ROW fee in addition to the current discount provided on water and sewer services. In FY 2014, CAP assisted over 4,583 customers and provided \$1.1 million in discounts to low-income customers.



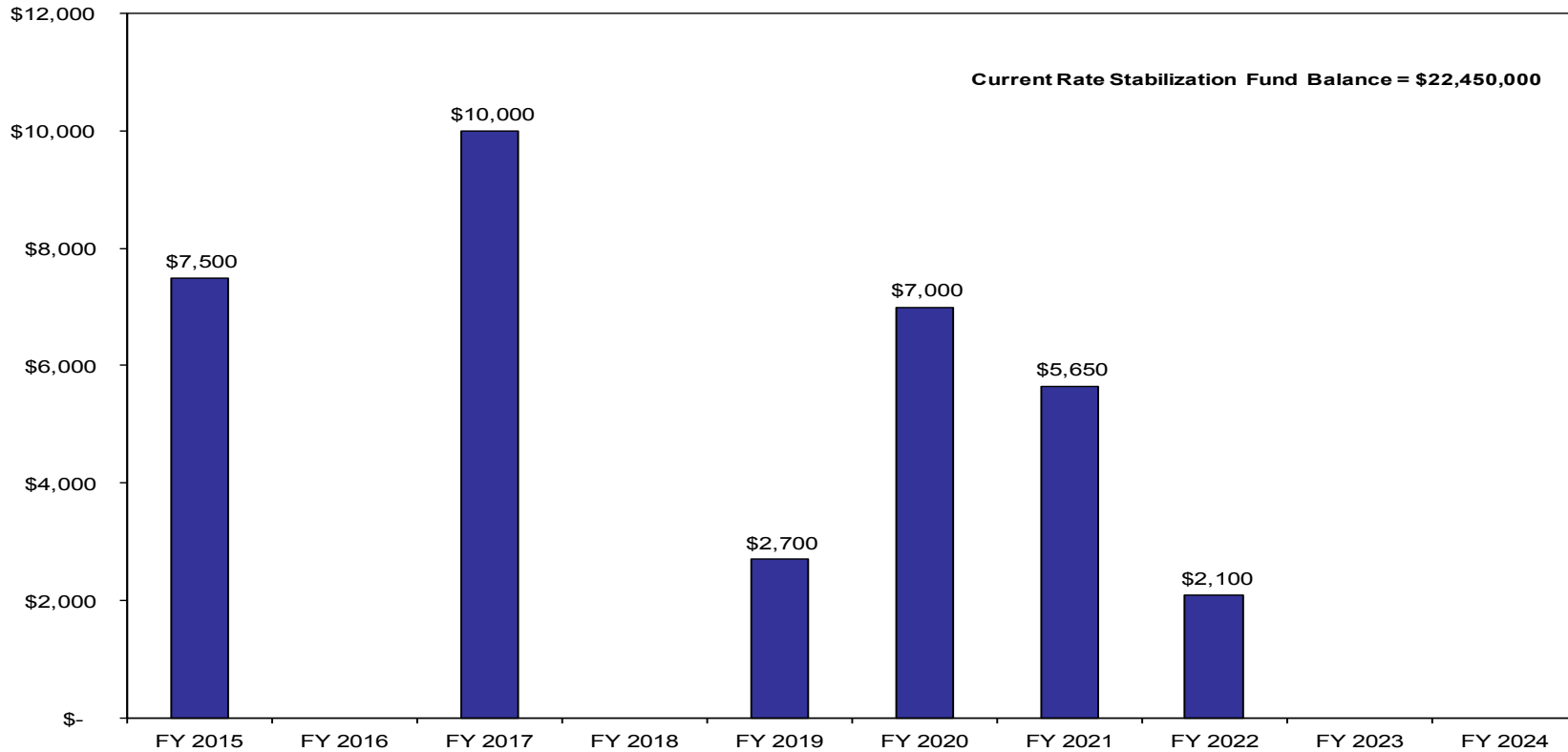
AFFORDABILITY, Cont.

- Serving People by Lending a Supporting Hand (“S.P.L.A.S.H.”):** The SPLASH program was implemented in FY 2001. Through the SPLASH program, DC Water offers assistance to families in need so that they can maintain critical water and sewer services until they get back on their feet. The program is administered by the Greater Washington Urban League. Every dollar received by DC Water is distributed to eligible customers. In FY 2014, SPLASH assisted 309 households and provided \$115,984 in contributions to low-income customers.



AFFORDABILITY, Cont.

RATE STABILIZATION FUND USAGE
FY 2015 – FY 2024
(\$000's)



- At the end of FY 2014, DC Water's rate stabilization fund (RSF) balance was \$22.45 million. The proposal calls for use of \$7.5 million in FY 2015. No RSF is proposed to be utilized in FY 2016. RSF will have a balance of \$6.0 million at the end of FY 2024.

AFFORDABILITY, Cont.

One method of assessing the affordability of residential rates is to calculate the portion of the Median Household Income that would be spent on typical water, wastewater, and stormwater bills and compare the results with the same calculation for other utilities. While no utilities are exactly alike, in the most recent rate survey conducted for DC Water in August 2014, DC Water's charges for a single family residential customer as a percentage of median income were below the average of other large and regional water and wastewater utilities.

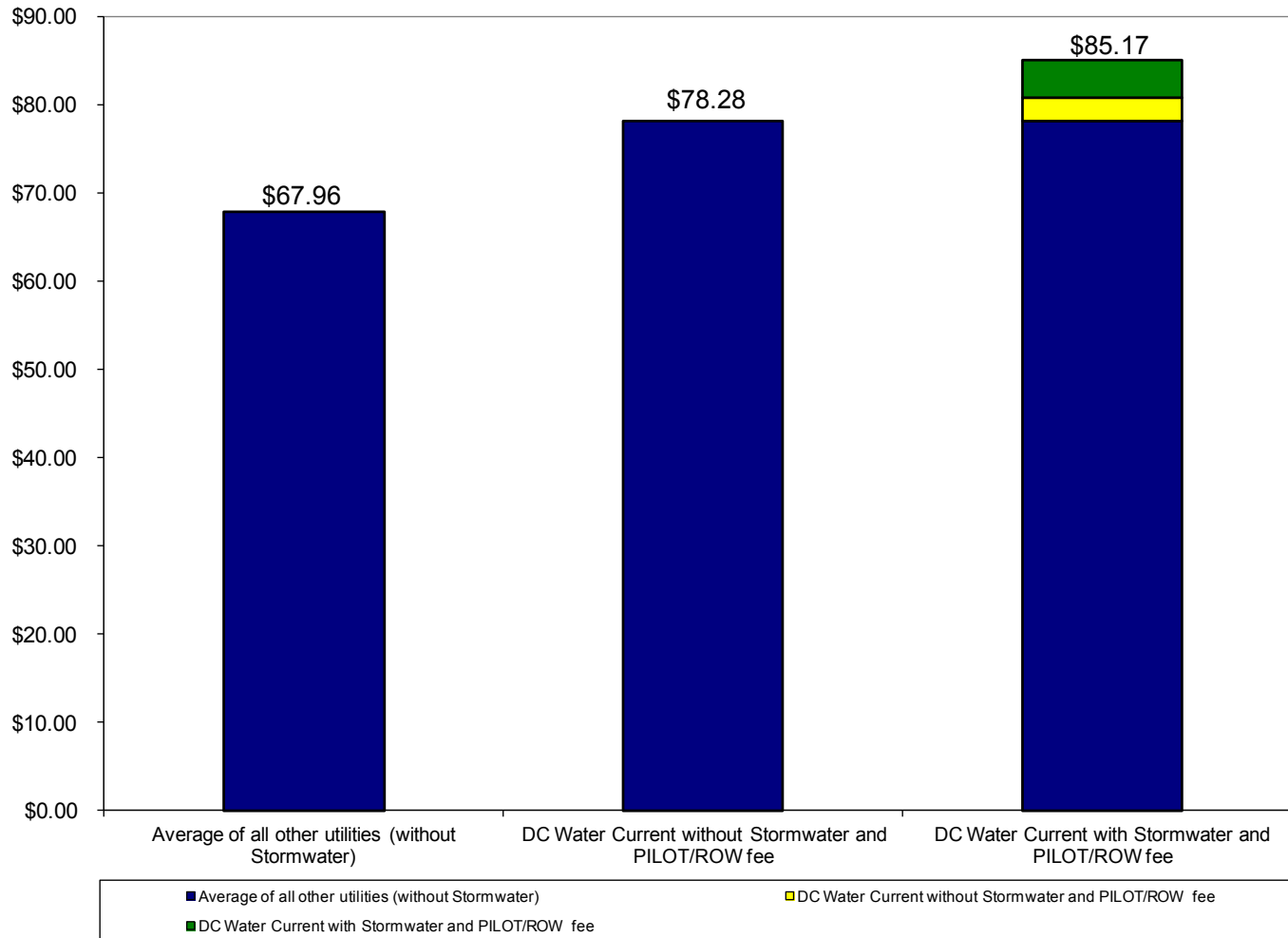
The following charts provide DC Water combined water, sewer and stormwater charges for single family residential customers compared to: large CSO communities, other similar large jurisdictions and other regional jurisdictions. There are distinct differences between DC Water and other large and regional utilities. Some differences include:

- Different patterns of water use (e.g., suburban jurisdictions can have different demands from urban centers)
- Revenues from taxes that reduce the revenues to be raised from water, sewer and stormwater rates (e.g., WSSC, Alexandria, Milwaukee, St. Louis, Atlanta, Chicago, etc.)
- Available undeveloped areas supporting high developer contributions for growth that can again reduce the revenues to be raised from water, sewer and stormwater rates (e.g., Fairfax County)
- Separate sewer systems in certain large jurisdictions and regional jurisdictions (e.g., Dallas, Charlotte)
- Differences in climate that may affect water supply or conservation needs (e.g., Seattle)
- Varying stages of completion of facilities to meet federal mandates (e.g., Atlanta and Boston have completed most of their major investments - the DC Clean Rivers Project is in progress at this time)

AFFORDABILITY, Cont.

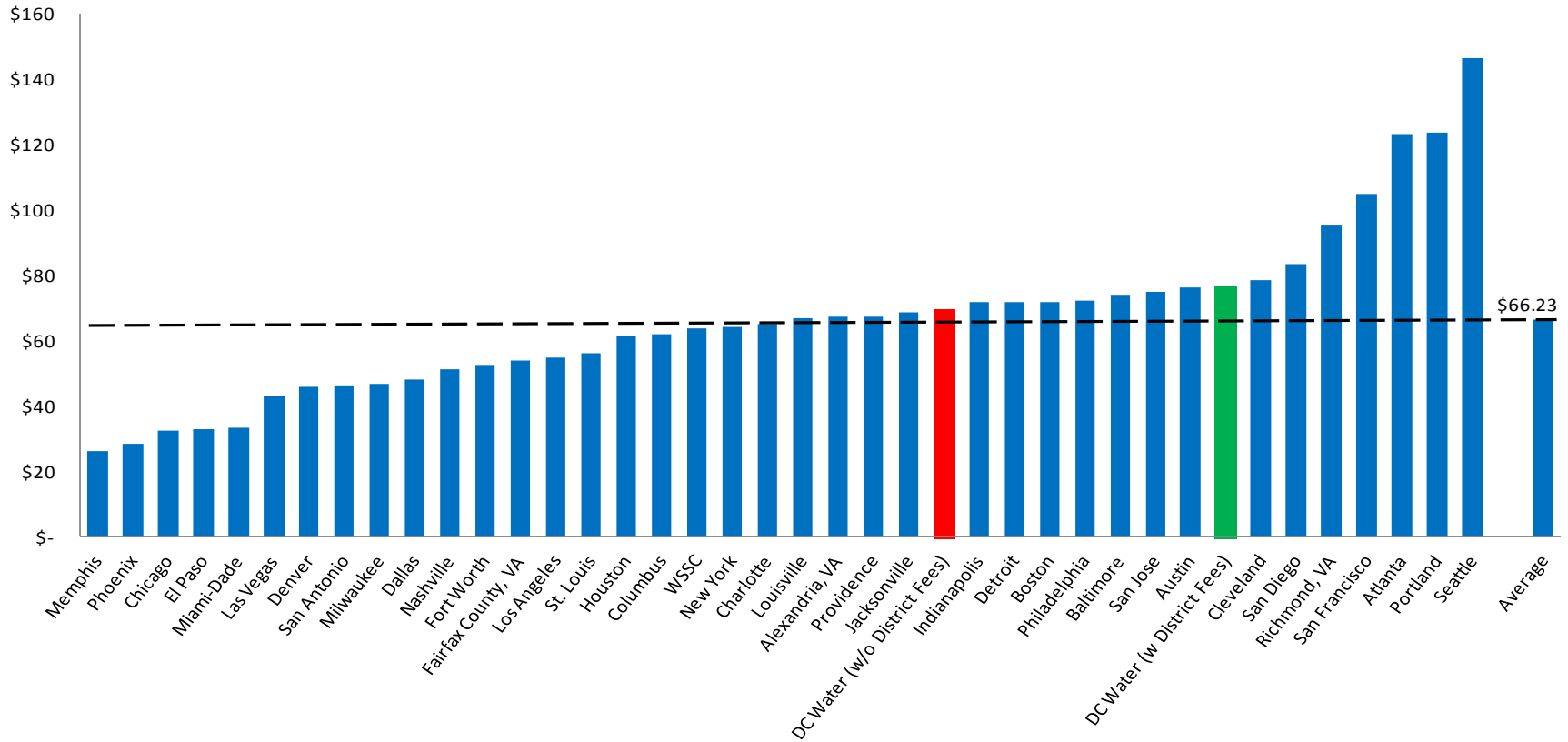
DC WATER'S RETAIL RATES ARE COMPARABLE TO OTHER UTILITIES

*DC Water's Current FY 2015 Monthly Residential Bill
vs.
Average Monthly Bill of Other Utilities in Effect Fall 2014*



AFFORDABILITY, Cont.

**DC Water Retail Rates Compared to Other Large Utilities
(Based on Rates in effect Fall 2014)**

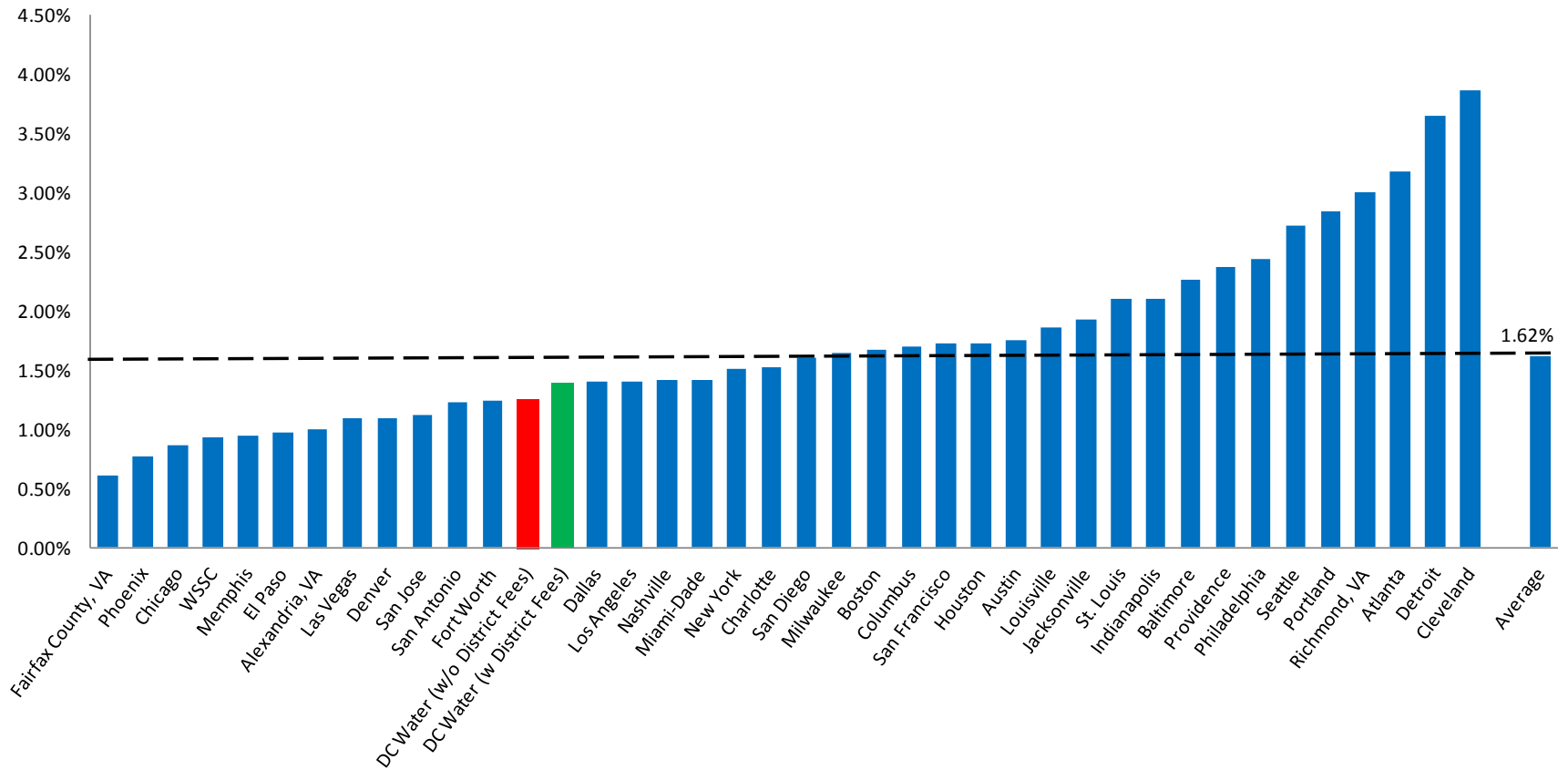


- (1) Assumes average residential consumption of 6.69 Ccf, or 5,004 gallons, per month. Ccf = hundred cubic feet, or 748 gallons
- (2) Reflects DC Water's rate and fee changes in FY 2014

AFFORDABILITY, Cont.

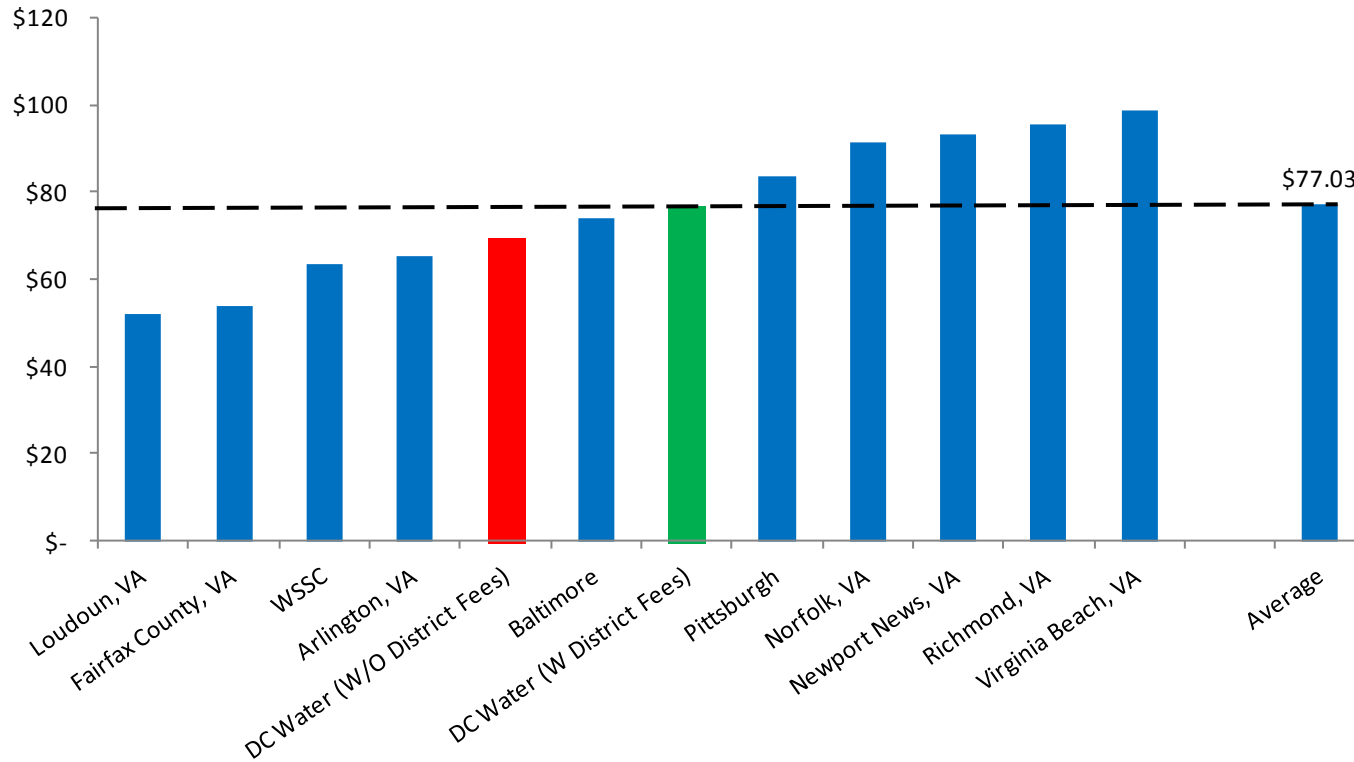
In the chart below, DC Water current charges rank at the median for bill comparison purposes for water and wastewater services compared to a select group of large, regional and CSO utilities, but well within US EPA guidance of 4 percent.

**Single Family Residential (SFR) Monthly Bill as %
of Median Household Income - Large National Utilities
(Based on Rates in effect Fall 2014)**



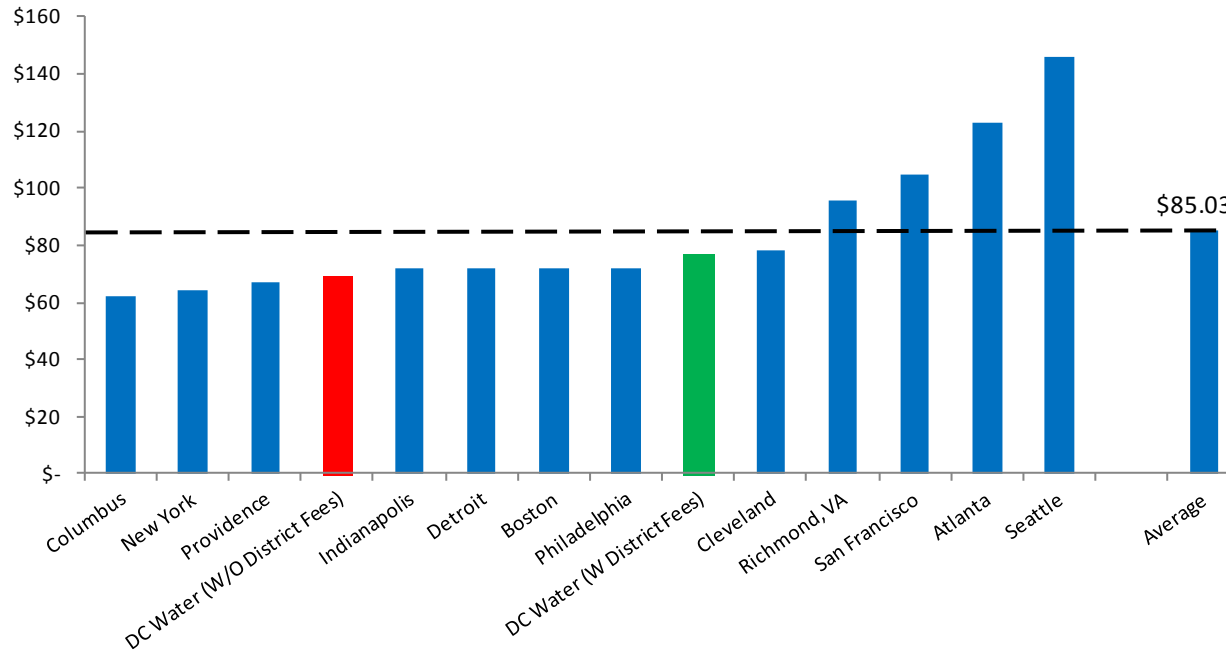
AFFORDABILITY, Cont.

*DC Water Retail Rates Compared to Regional Utilities
(Based on Rates in effect Fall 2014)*



AFFORDABILITY, Cont.

*DC Water Compared to CSO Communities
(Based on Rates in effect Fall 2014)*

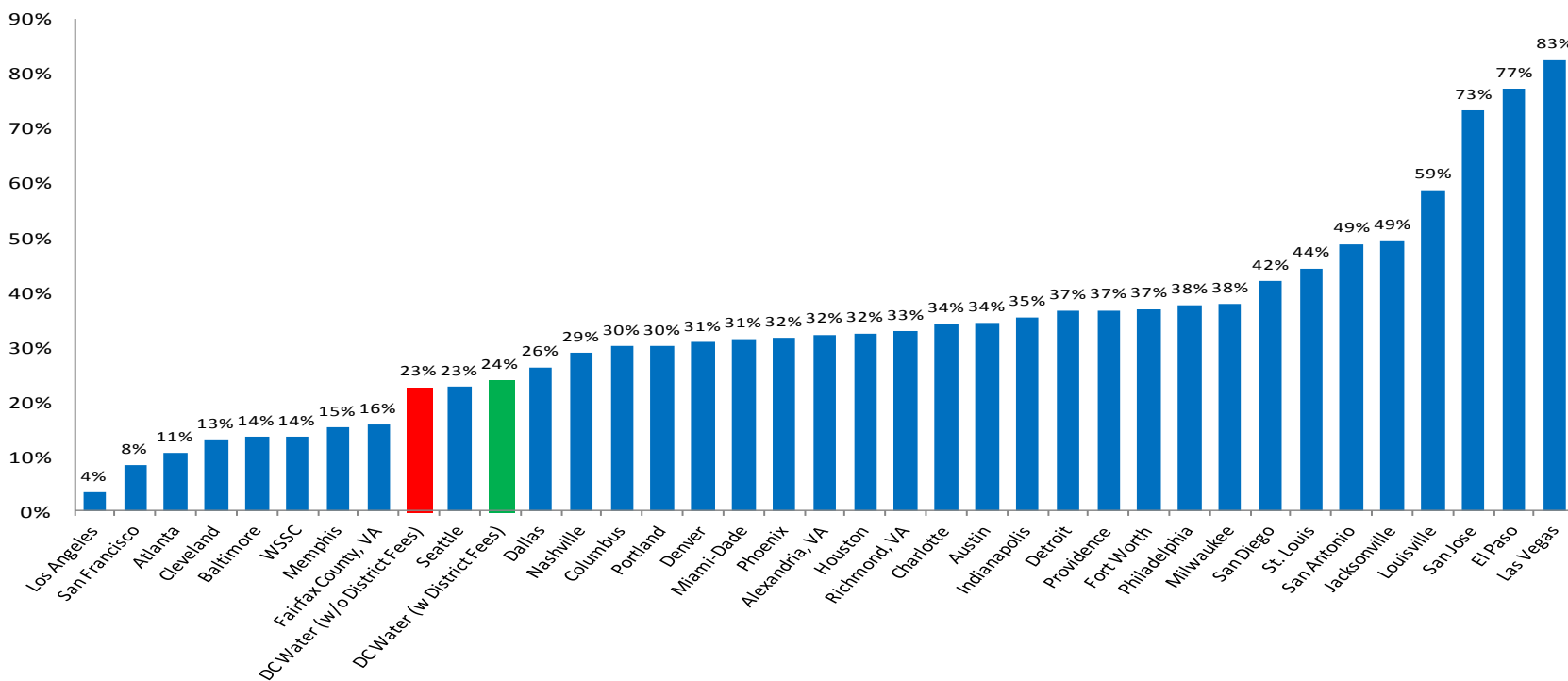


- Most CSO communities have implemented double digit rate increases to recover CSO-LTCP costs
- Increases do not reflect other available dedicated taxes or state funding potentially available to some agencies
- Chart reflects SFR monthly bill utilities with CSO programs without offsets to user charges

AFFORDABILITY, Cont.

Fixed charges are a small component of the DC Water monthly bill and is less than median for large utilities. This provides the customer more opportunities to impact monthly bills through water conservation.

**Fixed Charge as % of Total Single-Family Residential Bills in Large Cities
(Based on Rates in effect Fall 2014)**



- User Charges are based upon information provided by the identified cities and standardize assumptions regarding water consumption, wastewater discharge, stormwater drainage area and other factors. Sewer charges include stormwater charges in those cities where separate stormwater fees are assessed. Some cities use property tax revenue or other revenues to pay for the part of the cost of water, wastewater, or stormwater services
- DC Water rate schedule was effective October 1, 2013. Whereas, charges for all cities reflect rate schedules in effect Fall 2014
- DC Water PILOT and ROW fees are split between variable water charges and variable sewer charges
- DC Water charges include the stormwater charges of the District
- CSO/Stormwater charges may cover the cost of CSO abatement facilities in those cities with combined sewers; such charges can also cover the cost of stormwater-related facilities and services

Seattle, Washington and King County, Washington Settlement

(Washington, DC - April 16, 2013) King County and the City of Seattle have agreed to invest in a major upgrades of to local sewage and combined stormwater collection, piping and treatment under settlements with the Department of Justice and the U.S Environmental Protection Agency (EPA). The state of Washington was a co-plaintiff and partner in these settlements.

- [Overview of Municipality](#)
- [Violations](#)
- [Injunctive Relief](#)
- [Penalties Obtained](#)
- [Pollutant Reductions](#)
- [Integrated Planning and Green Infrastructure](#)
- [Environmental Justice](#)
- [State Involvement](#)
- [Comment Period](#)
- [Contact](#)

Settlement Resources

- [Press Release](#)
- [Consent Decree](#)

Overview of Municipality

Both Seattle and King County operate combined sewer systems. Seattle conveys the combined sewage it collects to King County's system for treatment prior to discharge.

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Violations

King County

Between 2006 and 2010, the County discharged approximately 900 million gallons of raw sewage to waters of the United States on an annual basis through unauthorized discharges involving combined sewer overflows (CSOs), in violation of CWA Section 301. During this time period, the County also violated its NPDES permit effluent limitations, including total suspended solids, fecal coliform, pH, and settleable solids, at one of its wastewater treatment plants, in violation of CWA Section 402. Furthermore, between 2006 and 2009, the County allowed wastewater to bypass secondary treatment at one of its wastewater treatment plants, in violation of its NPDES permit terms and CWA Section 402.

Seattle

Between 2007 and 2010, the City discharged approximately 200 million gallons of raw sewage to waters of the United States on an annual basis through unauthorized discharges involving combined sewer overflows (CSOs), including dry weather overflows, and sanitary sewer overflows (SSOs), in violation of CWA Section 301. During this time period, the City also improperly operated and maintained its combined sanitary sewer (CSS), resulting in unauthorized discharges of raw sewage to public and private properties through overflow events, including basement backups.

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Injunctive Relief

King County

The County must implement its Long Term Control Plan to control its CSO discharges by no later than December 31, 2030. The County must also develop and implement a Comprehensive System-Wide Operations and Maintenance Plan. The County must further develop and implement a Joint Operations and System Optimization Plan with the City of Seattle, Washington. The County's implementation of these injunctive relief measures will reduce its CSO discharges by approximately 95% to 99% at a cost of approximately \$860 million.

Seattle

The City must develop and implement a Long Term Control Plan to control its CSO discharges by no later than December 31, 2025. The City must also develop and implement a Comprehensive System-Wide Operations and Maintenance Plan; a Fats, Oils, and Grease Control Program; and a Floatable Solids Observation Program. The City must further develop and implement a Joint Operations and System Optimization Plan with King County. The City's implementation of these injunctive relief measures will reduce its CSO discharges by approximately 99% at a cost of approximately \$600 million.

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Penalties Obtained

King County will pay a civil penalty of \$400,000. The United States and the State of Washington will each receive \$200,000 of the total civil penalty.

The City of Seattle will pay a civil penalty of \$350,000. The United States and the State of Washington will each receive \$175,000 of the total civil penalty.

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Pollutant Reductions

King County

Through implementation of the Consent Decree, the County will eliminate approximately 95% to 99%, or 855 to 891 million gallons, of the 900 million gallons of untreated sewage currently discharged on an annual basis as a result of CSOs from the County's wastewater collection system into waters of the United States. The elimination of these discharges will substantially reduce releases of microbial pathogens, suspended solids, toxics, and nutrients. The County's implementation of the Consent Decree will provide increased protection for several impaired water bodies, including Puget Sound, Lake Washington, and the Duwamish River.

Seattle

Through implementation of the Consent Decree, the City will eliminate approximately 99%, or 198 million gallons, of the 200 million gallons of untreated sewage currently discharged on an annual basis as a result of CSOs and SSOs from the City's CSS and SSS into waters of the United States. The elimination of these discharges will substantially reduce releases of microbial pathogens, suspended solids, toxics, and nutrients. The City's implementation of the Consent Decree will provide increased

protection for several impaired water bodies, including Puget Sound, Lake Washington, and the Duwamish River.

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Integrated Planning and Green Infrastructure

King County

The Consent Decree provides the County with the opportunity to propose the integration of water quality improvement projects with its Long Term Control Plan through an Integrated Planning Proposal that the County would need to submit to EPA for review and approval by June 30, 2018. The Consent Decree also allows the County to substitute green infrastructure projects for gray infrastructure projects at four of its approved CSO control projects.

Seattle

The Consent Decree provides the City with the opportunity to propose the integration of water quality improvement projects with its Long Term Control Plan through an Integrated Planning Proposal that the City would need to submit to EPA for review and approval by June 30, 2018. The Consent Decree also allows the City to substitute green infrastructure projects for gray infrastructure projects at several CSO control projects.

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Environmental Justice

King County's implementation of its Long Term Control Plan will reduce discharges of approximately 433 million gallons of raw sewage currently impacting environmental justice communities on an annual basis.

The City will implement early action CSO control projects in environmental justice communities, reducing discharges of over 13 million gallons of raw sewage in these areas on an annual basis.

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State Involvement

Pursuant to Section 309(e) of the CWA, the State of Washington joins the United States as a Plaintiff to each of the Consent Decrees.

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Comment Period

The proposed settlement is subject to a 30-day public comment period and final court approval. Information on submitting comment is available at the [Department of Justice](#) website.

VILLAGE OF GERMANTOWN



2023 Sewer Utility Rate Study
June 5, 2023

June 5, 2023

Mr. Steven Kreklow
Village Administrator
Village of Germantown
N112 W171001 Mequon Rd.
Germantown, WI 53022

Re: Sewer Utility Rate Study

Dear Mr. Kreklow:

The Village of Germantown is looking for a qualified financial service firm to conduct a comprehensive wastewater rate study.

Ruekert & Mielke, Inc. (R/M) has decades of experience doing wastewater utility cost of service studies and ratemaking for municipalities throughout the state, as well as related work such as reserve capacity assessments and impact fees. We are among the few firms that understand both the financial and engineering aspects of sewer utilities.

We look forward to working with you and your staff on this project and would be pleased to discuss our proposal with you further.

Sincerely,

RUEKERT & MIELKE, INC.



Edward F. Maxwell, M.B.A.
Economic Consultant
emaxwell@ruekert-mielke.com

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4 FIRM INFORMATION

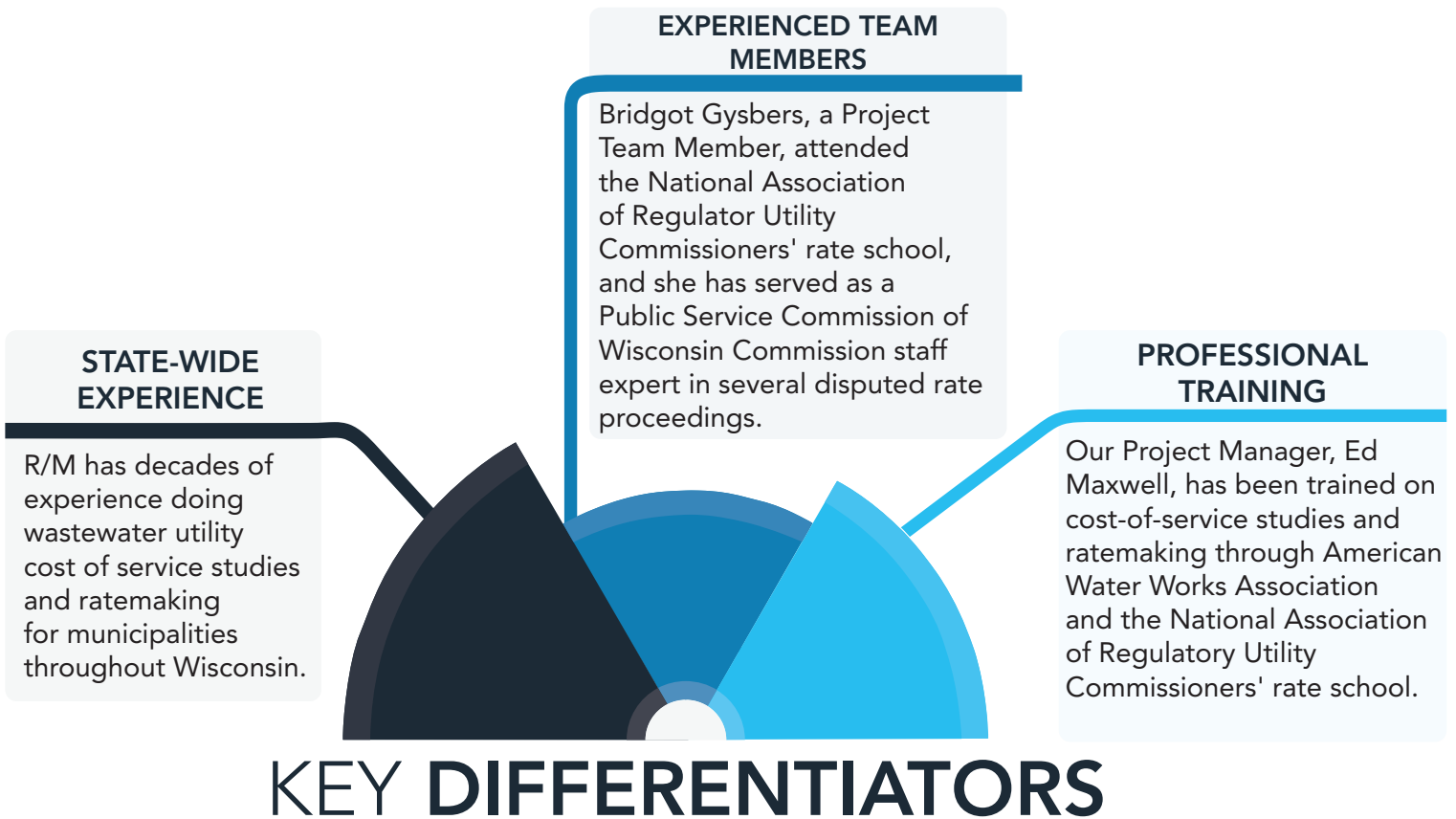
5 QUALIFICATIONS

7 REFERENCES

8 PROJECT TEAM

15 COMPENSATION & TIMELINE

EXAMPLE KENOSHA SEWER RATE STUDY





Ruekert • Mielke
YOUR INFRASTRUCTURE ALLY

Ruekert & Mielke, Inc. (R/M) is a 100% employee-owned civil engineering firm with more than 75 years of service to local communities and organizations. Our engineers, environmental scientists, agricultural experts, and technology consultants empower our clients to thrive by solving infrastructure challenges.

OUR LOCATIONS



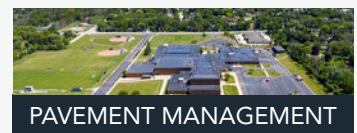
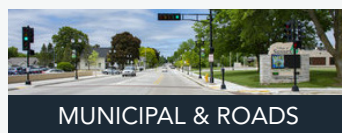
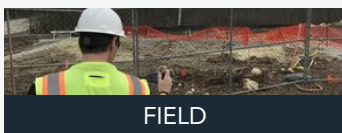
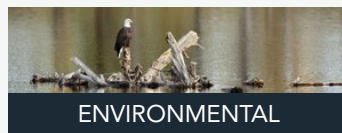
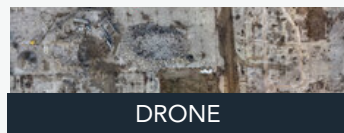
- WAUKESHA, WI
- MADISON, WI
- GREEN BAY, WI
- KENOSHA, WI
- MILWAUKEE, WI

100+
EMPLOYEE OWNERS

DEDICATION TO INNOVATION



OUR SERVICES



QUALIFICATIONS

Ruekert & Mielke, Inc. (R/M) has decades of experience doing wastewater utility cost of service studies and ratemaking for municipalities throughout the state, as well as related work such as reserve capacity assessments and impact fees. Municipalities served include City of Kenosha, City of Peshtigo, City of Menasha, City of Neenah, City of Oconomowoc, City of Hartford, Village of Ashwaubenon, City of Pewaukee, Village of Thiensville, City of Antigo, Village of Slinger, City of Lancaster, Village of Lannon, City of Cedarburg, Village of Sussex, City of Waukesha, Village of Dousman, Village of Lake Zurich, Shelby Sanitary District Number 2, City of Shawano, and Village of Menomonee Falls.

TEAM EXPERIENCE

Ed and Bridgot have worked on numerous wastewater rate studies, including for the City of Kenosha, the Village of Ashwaubenon, the City of Pewaukee, City of Shawano, and the Village of Thiensville. Ed performs cost-of-service studies on major capital projects for the Racine Wastewater Utility, a regional service provider. Additionally, Ed assists industrial users in their negotiations with municipal wastewater utilities, giving him unique insight into ratemaking issues.

Ed has been trained on cost-of-service studies and ratemaking specific through both the American Water Works Association's seminar and the National Association of Regulatory Utility Commissioners' rate school. He earned his MBA in finance and investment banking from the Wisconsin School of Business.

Bridgot attended the National Association of Regulatory Utility Commissioners' rate school as well, and she has served as a Public Service Commission of Wisconsin Commission staff expert in several disputed rate proceedings.

SCOPE

Study Objectives

1. Provide cost-of-services analyses that identify both the direct and indirect cost of providing Wastewater services.
2. Recommend rates necessary to adequately fund the Wastewater system through the minimum

5-year rate horizon, including consideration of annual inflationary/indexed adjustments.

3. Ensure that rate structures fairly distribute the cost of service among users.

Study Requirements

1. The recommended rates will be based on the cost of service and will be sufficient to meet the revenue requirements of the Utility.
2. The study will identify restructuring of user charges as appropriate to distribute costs fairly and accurately to customers.
3. The study will recommend rates and, if necessary, rate structures that consider and provide for the following factors:
 - a. Current and future cost of providing Wastewater services in accordance with established and anticipated standards, regulations, facility, and capital improvement plans.
 - b. Projected demands.
 - c. Age and condition of infrastructure and systems.
 - d. Funding requirements for all current long-term liabilities and debt obligations.
 - e. System reinvestment equal to annual depreciation expense.
 - f. Fair allocation of costs to appropriate customer categories.
4. The study will provide direct identification of revenues appropriated to major funded activities and infrastructure.
5. The recommended rate structure(s) will be planned for at least five years.
6. The Study will provide at least three rate alternatives for the utility. The consulting firm will recommend the alternative that best meets the Study Objectives defined above.

a. Alternative that considers decreasing current rates over a five-year period. The analysis will include the implications of a rate decrease including but not limited to Utility financial sustainability, system, reinvestment, operations, and maintenance program impacts, debt service, capital improvement and facility planning, growth planning, and regulatory compliance.

b. Alternative that considers no rate increases over a five-year period. The analysis will include the implications that a rate freeze would pose, including but not limited to Utility financial sustainability, system, reinvestment, operations, and maintenance program impacts, debt service, capital improvement and facility planning, growth planning, and regulatory compliance.

c. Alternative that considers rate increases over a five-year period (immediate and/or gradual implementation), annual inflationary/indexed adjustments, the approved Capital Improvement Plan, and the WWTP Facility Plan.

7. The recommended rate structure, if different from the current structure, will be easy to administer and understand.

Study Elements

1. Current Rate Structure: Assess the current rate structure's performance as a baseline for comparing recommended changes.

2. Equity: Assess the equity of recommended Water and Wastewater rates for all customer classifications.

3. Sensitivity Analysis: Assess the ability of the revenue stream generated by each alternative rate structure to fund Water and Wastewater system costs. This element shall include a sensitivity analysis where the long-term revenue generated under each alternative shall be considered against the impacts of future growth.

4. Neutrality: Prepare a Price Elasticity of Demand (PED) evaluation of rate structures based on historical data, including comparable municipalities, and regional factors. The PED element should be comprehensive enough to ensure that rates do not significantly affect revenues based on demand for utility services.

5. Annual operating income, rate of return, and cash flow targets.

6. Annual contingency account balances and level of liquidity.

7. Comprehensive Summary of Recommended Rate Structure(s): Assess performance of each alternative rate structure and provide recommendation of the optimal rate structure.

8. Supporting Data: Provide data supporting observations, conclusions, and recommendations.

9. Provide comparative rates for other wastewater utility providers.

Services

1. Conduct a review of existing Wastewater rates and the financial status of the Utility.

2. Conduct analyses as required to address the defined scope of work.

3. Present a Preliminary Report:

4. Prepare a preliminary study report that includes tentative rate structures.

5. Present preliminary report to staff for comments.

6. Present preliminary report to the Utility Advisory Committee and to the Public Works & Highways Committee at scheduled meetings.

7. Present a Final Report:

a. Incorporate changes pursuant to comments received.

b. Present the final report and recommended rate structures at a scheduled Village Board meeting.

The Scope for this project excludes the following:

- Any services not identified in the Scope.
- Attending meetings not identified in the Scope.
- Creating rates other than wastewater utility rates or fees such as wastewater impact fees.
- Creating or updating a capital improvement plan.



REFERENCES

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Project Manager



Ed Maxwell, M.B.A.

Project Advisor



Jerad Wegner, P.E.

Economic Consultant



Bridgot Gysbers



EDWARD F. MAXWELL

ECONOMIC CONSULTANT

Before joining R/M, he worked in private-sector finance, analyzing capital investments, forecasting expenses and revenue, and crafting department budgets. At R/M, he creates financial solutions for all clients, from municipalities to public utilities.

CONTACT

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EDUCATION

- Bachelor of Arts in English - Lawrence University, Appleton
- Master of Business Administration - Finance & Investment Banking - Wisconsin School of Business, Madison
- NARUC Utility Rate School
- AWWA Cost of Service Rate-Making Seminar



» MBA «
Finance & Investment Banking

EXPERIENCE

Wastewater Cost of Service & Rate Design

Edward has analyzed cost of service and designed rates for utilities for communities ranging from the Village of Thiensville, Wisconsin, to the City of Erie, Pennsylvania. For Erie’s sanitary sewer utility, Edward forecasted the cash flow and the rate increases needed to fund the increased debt service from all the infrastructure upgrades required in the next ten years.

Reserve Capacity Assessment Studies

Edward has conducted Reserve Capacity Assessment studies and offered recommendations for fee schedules. Based on the study he performed for the City of Hartford sanitary sewer utility, Edward proposed several alternatives that would ensure Hartford sewer’s capital expenditures for new development would be fully funded, and he provided a detailed list of advantages and disadvantages that informed decision makers.

Water Cost of Service, Rate Design, & Public Fire Protection Charges

Edward has created cost of service analysis and performed rate design for water utilities throughout Wisconsin. He has guided utilities through the process of submitting the applications with the Public Service Commission all the way to implementing the approved rates. He has assisted utilities such as the City of Racine Water Utility in changing their method of recovering costs for public fire protection to allow municipalities flexibility to meet their needs and to ensure utilities gain revenue that suffices to cover their expenses while complying with all relevant regulations.

Stormwater Cost of Service and Rate Design

Edward has analyzed cost of service and designed rates for stormwater utilities across the state, including communities such as the City of Fitchburg and the Village of Fox Point. Partnering with municipal employees and other stakeholders, he creates cogent narratives that explain these rate designs in an accessible manner. He has presented to finance committees, committees of the whole, and city councils to advance the proposed rate structures.

Utility Financial Best Practices Review

Edward has provided comprehensive reviews of stormwater utility financial best practices. Interviewing numerous utilities throughout the state and researching industry best practices, Edward has provided key insights to clients so that they can optimize their financial practices. Most recently, he offered counsel to the City of Watertown, focusing on improving their credit policy and approach to capital expenditures.



EDWARD F. MAXWELL

ECONOMIC CONSULTANT



Impact Fee Studies

Edward has created impact fee studies for utilities and municipalities. By partnering with utility and municipal staff to assess capital needs, Edward has developed impact fees to meet the demands placed on communities from new growth. Edward has drafted ordinances to codify the fees and ensure compliance with state statutory changes. These ordinances have been adopted by municipal clients as part of approving the new impact fees. Additionally, he has spoken at public hearings and before governing bodies to explain the fees in detail.

Presentations

Edward has presented actionable recommendations to executives at numerous corporations. He presented a comprehensive real-estate portfolio strategy regarding store locations in and near malls to Starbucks. He recommended specific courses of action to American Family Insurance regarding potential venture-capital investments. Edward presented multi-million-dollar manufacturing cost-saving measures for manufacturing at both Kimberly-Clark and Springs Window Fashions.

Stormwater Credit Application Reviews

Edward has reviewed stormwater credit applications on behalf of clients such as the City of Greenfield. The applications come from developers who had installed stormwater management features in hopes of earning credit. Edward has evaluated the applications and offered detailed feedback explaining the municipality's decision to the developers, including analysis and references to the credit policy.

Ordinance Revisions

Edward has revised ordinances for municipalities to ensure compliance with law changes and to reflect best practices. For the Village of Fox Point, he revised the storm water ordinances so that Fox Point was complying with NR 151 and had language that encouraged green infrastructure.

Valuation

Edward has valued utilities, companies, projects, and startups using several valuation methods, including discounted cash flow analysis. These valuations have informed negotiations so that clients can make smart financial decisions.

Expense Evaluation

Edward has analyzed expenses at several large corporations. At Lands' End, he performed ROI analysis on marketing vendor contracts to determine the most fiscally advantageous supplier. Edward also analyzed channel spend by geographic region to help management decide where to concentrate its marketing spend.

Capital Projects Evaluation

Edward has analyzed numerous capital projects, including equipment to revamp the largest product line at Springs Window Fashions. Using the capital asset pricing model, he determined the rate of return on these investments.

Forecasting

Edward has forecasted demand and expenses. Analyzing trends, he has forecasted demand for several products nationwide. He has forecasted expenses for departments at several corporations on line items including obsolescence, marketing, and selling.






BRIDGOT A. GYSBERS

ECONOMIC CONSULTANT

Bridgot joined Ruckert & Mielke, Inc. (R/M) in 2020 as a Economic Consultant. She has 16 years of experience which includes both municipal and investor-owned utility regulation in energy, gas, water, and sewer utilities. Bridgot has developed the revenue requirement for the majority of water rate cases that are regulated in Wisconsin along with a few where she analyzed the cost of service and designed rates. She was the lead auditor for several of the most complex investor-owned rate cases involving electric, gas, and water utilities. She comes to R/M with a wide range of experience in utility regulation. At R/M, she continues to use her background to find financial and management solutions for public utilities.

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EDUCATION

- Bachelor of Science, Business Administration, Accounting - Marian University, Fond du Lac, WI
- National Association of Regulatory Utility Commissioners (NARUC) Rate School, West Coast
- Wisconsin Public Utility Institute, Energy Utility Basics, Madison, WI

16+
» years «
experience

EXPERIENCE

Water Rate Case Applications

An application must be filed with the PSCW before a public utility can raise its rates. Bridgot managed the water rate case application request program. She sent out water rate case application requests and responded to application inquiries. In coordination with Information Technology at the PSCW, she made programming adjustments to the water rate case application on an as needed basis. This added additional efficiencies in the water rate case application process.

Initial Screening of Water Rate Case Applications

PSCW has an initial screening process for water rate case applications. This mechanism was implemented to ensure “clean” PSCW water rate case application filings from utilities which in turn expedites the rate case process. Bridgot has performed the initial screenings of these water rate case applications on an as needed basis.

Water and Electric Municipal Revenue Requirement

Bridgot has 16 years of experience in developing the revenue requirement for both municipal water and electric utilities in Wisconsin. Bridgot has been involved in some of the most highly complex municipal water revenue requirements, which included Milwaukee, Madison, and Waukesha. Each of these were disputed cases which appeared before the Public Service Commission of Wisconsin (PSCW) for Final Decision. In her role as Commission staff witness, her focus was on the revenue requirement, where she prepared testimony, drafted briefing memorandums, briefed Commissioners on issues in the case, and was involved in the preparation of the Final Order and Decision.

Investor-Owned Utilities Revenue Requirement

Bridgot developed the revenue requirement for the most highly complex investor-owned utilities in Wisconsin, which included Madison Gas and Electric Company (MG&E) and Northern States Power Company (NSP). She also reviewed water revenues and electric net investment rate base for several Superior Water, Light and Power Company (SWLP) rate cases. Each of these investor-owned utility cases was disputed and appeared before the PSCW for Final Decision. In her role as lead auditor, her focus was on the revenue requirement where she also developed the audit program, coordinated audit with Commission staff, summarized findings and conclusions,



BRIDGOT A. GYSBERS

ECONOMIC CONSULTANT



EXPERIENCE (CONT.)

and communicated those findings with the Company and Commission staff. In addition, as Commission staff witness, she also prepared the notice of proceeding, testimony, briefing memorandum, decision matrix, and Order and Final Decision.

Water, Electric, and Gas PSCW Commission Staff Expert Witness

Bridgot served as PSCW Commission staff expert witness in several disputed rate proceedings which included Milwaukee, Madison, and Waukesha along with Madison Gas and Electric Company (MG&E), Northern States Power Company (NSP), and Superior Water, Light and Power Company (SWLP). She filed testimony which focused on the revenue requirement. The revenue requirement included a review of net investment rate base, revenues, and expenses. For each of these areas she reviewed the reasonableness of the utility projections for the test year.

Impact Fees and Alternative Funding Mechanisms

The water rate application at the PSCW identifies those municipalities that have adopted and have implemented impact fees and other capital recovery mechanisms. In 2018, Bridgot developed a process at the PSCW for the review of impact fees to provide accounting guidance on the disclosure of those assets funded by impact fees for water rate case applications and PSCW annual reports.

Sewer Revenue Requirement

Bridgot developed the sewer revenue requirement for Plymouth Utilities prior to de-regulation which occurred in 2014.

Water Cost of Service Study and Rate Design

Bridgot has analyzed the cost of service and designed rates in several water municipalities in Wisconsin, which included facilitating discussions to explain the need for rate changes and impact it will have on customers.

Water Simplified Rate Case Filings

The simple rate case mechanism is to allow municipal water and sewer utilities to receive an inflationary level of rate increase with minimal effort and no rate hearing requirement. Bridgot reviewed and analyzed approximately 40 simplified water rate increases annually. She also presented to various groups in

the industry on this simple rate case mechanism and provided support on an as needed basis.

Electric and Gas Investor-Owned and Municipal Affiliated Interest Agreements

Bridgot was the lead auditor who managed and processed the majority of the electric and gas affiliated interest and/or intermunicipal agreements that were filed with the Public Service Commission (PSCW) from 2014 through 2017. In her role, she prepared the Notice of Investigation (NOI), analyzed the terms of the agreement along with other expert PSCW Commission staff and prepared Commission memo and Order and Final Decision. The majority of the agreements that she reviewed were filed by either WEC Energy Group (WEC) and Wisconsin Power and Light (WP&L) of varying complexities.

Investor-Owned Holding Company Audit

Bridgot was the lead auditor that managed the holding company program at the PSCW from 2014 through 2017. The holding companies that she audited included Alliant Energy Corporation and Madison Gas and Electric Company. For each of these audits, Bridgot developed the audit program, summarized findings and conclusions, communicated findings with Company personnel, and finalized PSCW Commission staff findings in a letter to the Company.

Draft Reports to the Legislature on Wisconsin Investor-Owned Utilities

Wis. Stats. § 196.795(7)(ar) and Wis. Stats. § 13.171(2) require that the PSCW submit to the Legislature a report that summarizes the impact that each holding company system has on our Wisconsin utilities. This report is due and filed with the Legislature every 2 years. Bridgot prepared the report in coordination with the feedback received from our Wisconsin utilities. She also presented the report to the PSCW and finalized the version of the report that was sent to the Legislature.

Water Utility and Investor-Owned Utility Acquisitions

Bridgot was involved in the acquisition of Integrys by Wisconsin Energy Corporation to form WEC Energy Group in 2014. In her role as PSCW Commission staff, she was involved in the development of the data requests along with developing an issues list for the Commission.

EXPERIENCE (CONT.)



BRIDGOT A. GYSBERS ECONOMIC CONSULTANT



PSCW WEGS and IOUS Annual Reporting Program

Pursuant to Wis. Stats. § 196.07, every utility shall file with the PSCW an annual report that is due on or before April 1 annually. Bridgot oversaw this program for approximately 12 years. She responded to utility accounting and PSCW program-related inquiries. In addition, she was involved in the annual report review process along with ensuring utilities file timely annual reports with the PSCW.

Regulatory Accounting Changes

PSCW receives inquiries on changes to generally accepted accounting principles (GAAP) and the impact that has had on PSCW utility accounting. Bridgot has responded to these utility inquiries by providing the proper accounting treatment from the PSCW perspective.

PSCW Uniform System of Accounts and Utility Reference Manual Update

The PSCW has established an accounting framework for utilities to use in reporting financial information. The accounting framework that is used for municipal and investor-owned utilities is the Uniform System of Accounts. In addition, the Water Utility Reference Manual is also used by water and sewer utilities as a supplement to the Uniform System of Accounts. Bridgot oversaw and provided accounting input that led to various updates of both the Uniform System of Accounts and Utility Reference Manual.

Renew Wisconsin. Some of the topics covered include PSC annual reports, rate case process, varying topics as part of the revenue requirement, funding mechanisms, construction authorization and continuing property records, conservation and record retention. Bridgot has participated in panel discussions related to distributed energy, which includes solar in particular.

- Attended the National Association of Regulatory Utility Commissioners (NARUC) Subcommittee on Accounting and Finance in 2015. Bridgot provided feedback from Wisconsin to this committee on a per request basis. Bridgot has also participated in panel discussions related to distributed energy, which includes solar.
- Presented at American Water Works Association annual conference in 2013 on the re-design of a compliance program that was being developed in Wisconsin. At this conference, Bridgot also was part of a panel discussion with others to discuss small systems and funding mechanisms available to water utilities.

SELECTED PUBLICATIONS

- Served as a member of American Water Works Association (AWWA) and Wisconsin American Water Works Association (WIAWWA). Bridgot has been involved with the IT & Security Committee, Small Systems Committee, Membership Committee, and Finance Committee of WIAWWA.
- Contributions made to Wisconsin American Water Works Association and Wisconsin Rural Water Association newsletters on an as needed basis.
- Presented and participated in panel discussion to various groups, which includes American Water Works Association, Wisconsin American Water Works Association, Wisconsin Rural Water Association, League of Wisconsin Municipalities, Municipal Electric Utilities of Wisconsin, and Municipal Clerk and Treasurer Institute and



JERAD J. WEGNER, P.E.

PROJECT ADVISOR

Jerad has been involved with a wide variety of projects, including street and highway design, intersection analysis, transportation facilities, storm sewer design, storm water management plan and review, sanitary sewer design, sanitary sewer capacity analysis, sanitary sewer rehabilitation, water main design, plan reviews, cost estimating, quantity take-offs, State and County permitting, and on-site construction review of sanitary and storm sewer, water main, pavement and curb and gutter.

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EDUCATION

- B.S. Civil Engineering - University of Wisconsin, Milwaukee

REGISTRATIONS & AFFILIATIONS

- Professional Engineer - WI
- American Council of Engineering Companies (ACEC)
- American Public Works Association (APWA)
- Collection System Committee for Wastewater Operators Association (WWOA) - Past Chairman
- Golden Manhole Society Award - CSWEA
- NASSCO - PACP, MACP, and LACP Certified



» professional engineer «

EXPERIENCE

Village of Sussex - Sanitary Sewer Rehabilitation

Completed analysis of sewer main and lateral televising records and developed rehabilitation/reconstruction recommendations. The Village's sewers downstream of two pumping stations showed signs of sulfuric acid and corrosion. The recommended rehabilitation/reconstruction balanced the project objectives to provide a cost-effective solution to extend the life of facilities by 50 years.

Sanitary Sewer Studies

- Village of Hartland: Update to existing sewer system plan for future expansion of Village and planned development within Village limits.
- City of Kenosha: Sewer study for west half of City for future expansion along I-94 and lands to the west.
- Village of Germantown: Pump Station needs assessment and capacity analysis for Village.
- City of Brookfield: Underwood Creek Interceptor capacity analysis and planning for future development

Private Property I/I

City of Franklin – 36th Street and 37th Place Lateral Rehabilitation: Design and construction administration of sanitary sewer lateral rehabilitation utilizing lining and open cut techniques, interior wastewater and clearwater plumbing improvements, and exterior sump line extensions. The repair areas were flow monitored pre- and post- construction and the area saw an 80-90% reduction in peak wet weather flows.

CMOM

Villages of Elm Grove and Germantown and Cities of Franklin and Muskego – Annual Reports and Audit Plan: Update the CMOM Programs for these MMSD communities on an annual basis dating back to 2009. Performed a self audit of each community to summarize the efforts and measures taken over the past five years to meet CMOM Program goals.

Municipal Engineer

- Village of Thiensville
- Village of Mukwonago

COMPENSATION & TIMELINE

COMPENSATION

Lump-sum price includes all reimbursables of \$31,900.

TIMELINE

This timeline depends on timely, complete responses from Village staff.

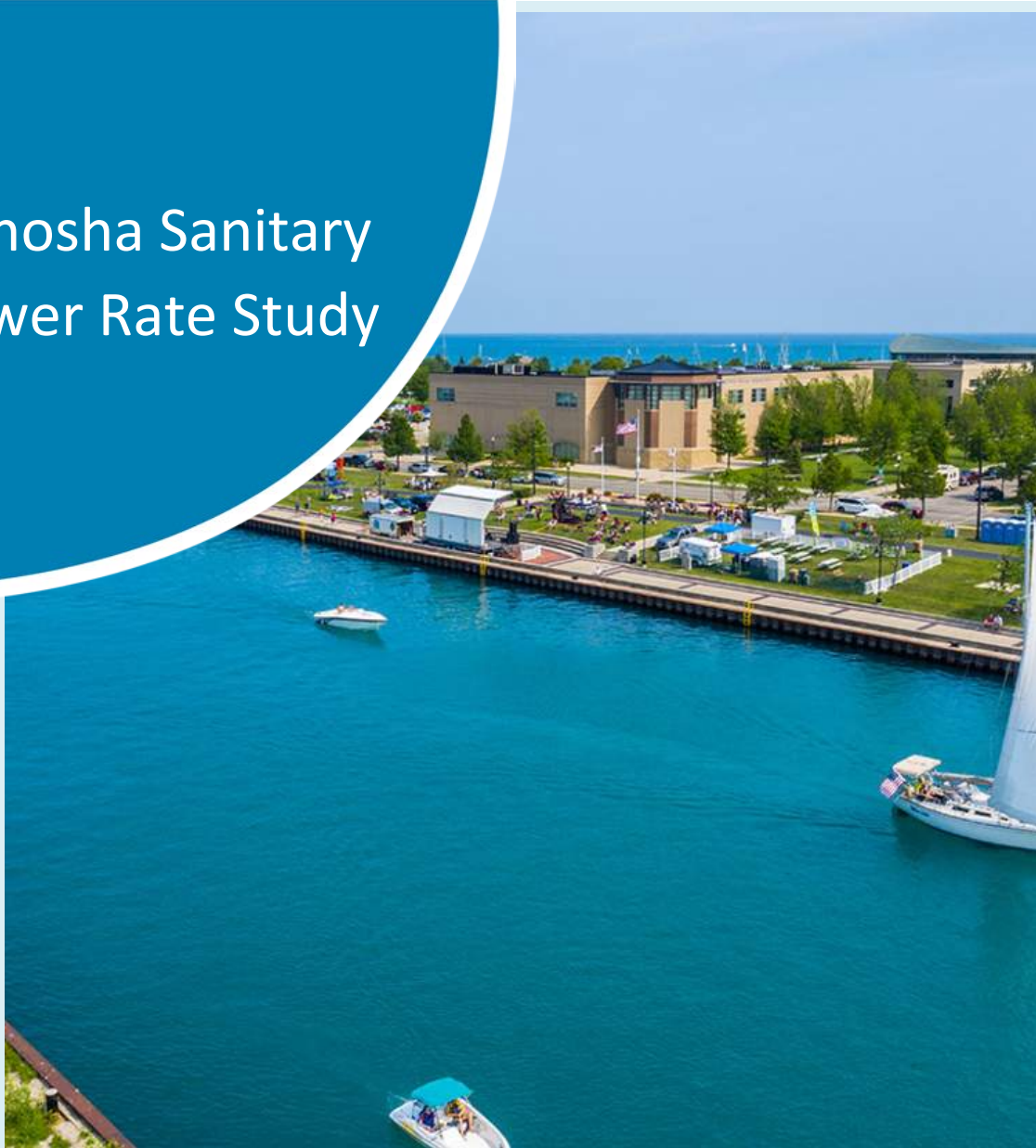
June/July – Gather data, perform analysis, write draft report

August – Present preliminary report to staff

September – Present preliminary report to Utility Advisory Committee and Public Works & Highways Committee, revise once based on feedback

October – Present final report to Village Board

Kenosha Sanitary Sewer Rate Study



Kenosha Sanitary Sewer Rate Study

September 2022

PREPARED FOR

City of Kenosha

4401 Green Bay Rd

Kenosha, WI 53144

PREPARED BY

Ruekert & Mielke, Inc.

6905 Green Bay Rd

Suite 204

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SANITARY SEWER RATE STUDY

EXECUTIVE SUMMARY

Background: The City of Kenosha Water Utility (Utility) furnishes sanitary sewer service to over 31,000 customers, operating both a sanitary sewer collection system and a treatment system. The Utility maintains over 350 miles of sewer main that ranges in diameter size from 2 to 99 inches, and it treated over 7 billion gallons of wastewater in 2021. In the same year, it processed over 10.5 million pounds of Biochemical Oxygen Demand (BOD), over 8 million pounds of suspended solids (SS), and over 100,000 pounds of Phosphorus (P). It has several large users, the most notable of which is Ocean Spray, which in 2021 sent over 200 million gallons to the treatment facility, along with 3.7 million pounds of BOD. In addition to serving the City of Kenosha, the Utility provides wholesale service to the Village of Pleasant Prairie, the Village of Bristol, and the Village of Somers. The Utility also receives and treats hauled landfill, septic, and holding wastes at the plant.

To provide safe, reliable service, the Utility is responsible for maintaining and replacing well over \$150 million worth of infrastructure. The Utility has not adopted new user rates since 2006. In the interval, expenses have risen significantly, and the Utility has not been able to invest in capital projects to match the need. The Utility needs to raise rates to be able to continue providing high-quality service.

Purpose: To recommend rates that will fully fund the Utility's financial needs. The Utility cannot function long-term without having user rates that recover the full cost to serve all its customers. This study and the accompanying tables describe the Utility's 2022 revenue requirement, the allocation of costs to the customer classes, and proposed new sewer rates. Overall revenue from sewer rates needs to increase by approximately \$4.1 million or an average of 37 percent of revenue at current rates. Although it seems like a steep increase, this represents an annual increase of only 2.2 percent per year since 2006 – the issue is that it has been so long since the last rate increase. Operation and Maintenance (O&M) expense drives the need for this rate increase. The utility will need to increase its capital expenditures as well to prevent falling behind in its infrastructure replacements.

KEY FINDINGS

Revenue Requirement and Projected Rates: This report proposes a range of rate changes based on revenue needs projected in the 2022 budget process and a cost of service that fairly recovers costs from customers and ensures the Utility's financial sustainability. This cost-of-service study (COSS) maintains historical rate practices and retains the Utility's traditional customer classes.

Costs Have Changed: In this study, different customer classes would receive different increases under the rates proposed due to changes in system usage and cost of operations. The overall

2022 budget for sanitary sewer operations is approximately \$9.5 million. This cost includes maintenance of mains, lift stations, and the treatment plant; electricity; replacement costs at the treatment plant; labor; and chemicals. Capital costs total close to \$6.4 million; these costs include depreciation and return on investment. Cash from capital-cost recovery is used to fund capital replacements and improvements. These costs are partially offset by approximately \$700,000 in income not from rates; this includes impact fees and penalties.

Sewer Rate Structure: The Utility has an established an equitable rate structure that assigns appropriate costs to customers based on their specific usage characteristics. No changes are being proposed to the rate structure format since the prior study. Domestic-strength concentrations for city customers for BOD = 200 milligrams per liter (mg/l); SS = 250 mg/l; and P = 5 mg/l. Discharges above domestic strength are billed at the calculated rate per pound per pollutant for the 2022 budget year. Wholesale customers are charged a volumetric rate that includes volume from infiltration and inflow (I/I) plus a per-pound charge for each pollutant. The hauled waste users' rates are based on an average pollutant-loading strength appropriate for each category plus a charge for costs specifically allocated to hauled waste as well, except landfill waste, whose volume is charged for domestic strength plus additional charges for discharges above domestic strength, like city users.

Impacts on Customer Bills: The overall rate increase is approximately 37 percent. Even though the rate structure is not changing, the rate levels are. The proposed rates will affect customer bills in several ways.

First, because loadings for SS and P have declined but the costs to treat them have risen, the rates for these pollutants have increased significantly (see Table 2).

Second, although the proposed flow rate increase to wholesale customers is much lower than the increase to city customers (see Table 2), these two rates are not apples to apples because the city rate includes the cost to treat domestic-strength waste while the wholesale rate does not. All charges for pollutant loadings to wholesale customers are recovered directly with charges per pound of each pollutant. When pollutant loading costs are included, the overall increase to wholesale customers is much closer to city customers (see Table 1, Subtotal City compared to Subtotal Wholesale).

Third, overall water sales per customer across the state have been declining in recent years. The city has followed the state trend with declining water sales and thus declining billable sewer consumption. This decline requires an increase in the volume and/or customer charges. Depending on a given customer's billing characteristics, this increase creates bill-impact diversity. However, each customer is paying a rate that reflects the cost the Utility incurs to serve that customer.

Recommendations:

- 1) Adopt the proposed rates.
- 2) Consider automatically adjusting rates each year based on inflation, with full rate reviews every 3 to 5 years.

RATE STUDY METHODOLOGY**A. COMPONENTS OF RATE STUDY METHODOLOGY**

A comprehensive utility rate study typically encompasses three major components: (1) preparing a financial plan or budget that identifies the net revenue requirements for the utility (2) analyzing the cost to serve each customer class (3) designing the rate structure. These three steps are shown in **Figure 1**.

Figure 1: Primary Components of a Rate Study



These three steps follow industry standards and reflect the fundamental principles of cost-of-service ratemaking as set forth in the American Water Works Association’s *Principles of Water Rates, Fees, and Charges*, also referred to as *Manual M1*. This manual addresses general requirements for equity and fairness so that rates will be proportionate and not exceed the cost of providing the service to all customers.

B. REVENUE REQUIRED

The 2022 sewer budget sets forth a revenue budget need of approximately \$15.2 million. This amount nets out the income from other sources such as penalties. This amount represents a 37

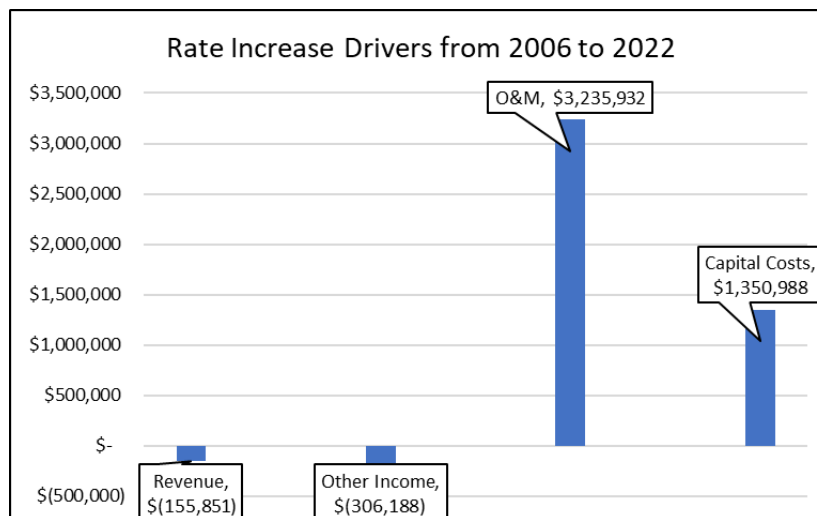
percent rate increase above currently authorized rates, which were based on a 2006 budget of approximately \$10.9 million. Net costs have risen for the Utility by an average of 2.2 percent per year since the last rate review, which parallels inflation during that time.

The rate increase is primarily driven by the increase in O&M expenses, which have risen by over \$3.2 million since 2006. This rise in O&M represents a 2.6 percent annual increase. Capital costs have risen by almost \$1.4 million during this time, representing a 1.5 percent annual increase. Meanwhile, revenue from rates has remained virtually flat. Although other income has risen, it is such a small amount that growing it has had a minimal impact on the revenue requirement.

Figure One

Rate Increase Drivers from 2006 to 2022				
Category	2006	2022	Difference	Share of Rate Increase
Revenue	\$10,904,377	\$11,060,229	\$ (155,851)	-3.4%
Other Income	\$ 370,917	\$ 677,105	\$ (306,188)	-6.7%
O&M	\$ 6,258,815	\$ 9,494,747	\$ 3,235,932	70.5%
Capital Costs	\$ 5,016,479	\$ 6,367,467	\$ 1,350,988	29.5%
Total Expenses	\$ 11,275,294	\$ 15,862,214	\$ 4,586,920	100.0%

Figure Two



C. COST OF SERVICE AND RATE DESIGN

Kenosha's costs are first allocated to several functions in Table 6 and then to various customer classes in Table 7. Tables 8, 9, 10, 15, and 16 provide supporting calculations and information.

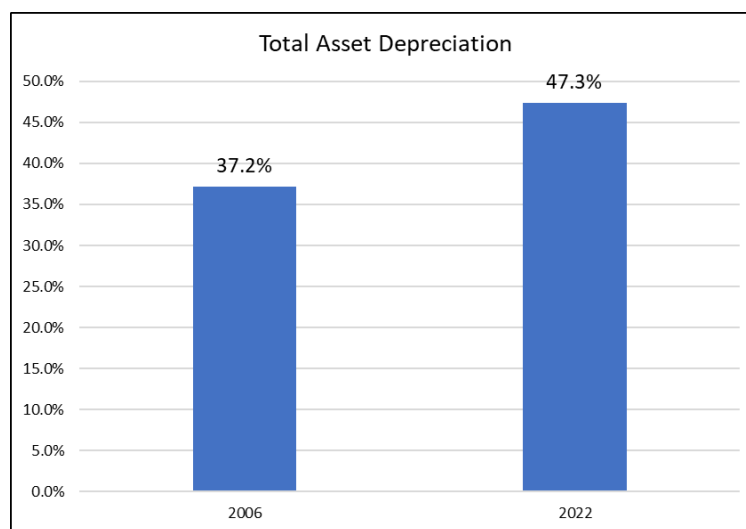
Tables 11 and 12 show the calculation of the rates. The proposed rates are designed to recover the cost to serve each customer class in an equitable manner – in other words, each customer class would pay the cost to serve it.

CASH FLOW PROJECTIONS

Table 19 shows a 10-year cash-flow forecast for the utility. This forecast assumes that the utility will spend \$10.5 million per year on capital expenditures. This is made up of a recent historical annual average of \$7.5 million for treatment plant and lift station work, plus \$1 million for manhole rehabilitation and another \$2 million for main replacements, linings, and/or rehabilitation.

The utility has underinvested in its capital needs and must spend more to avoid falling further behind. One useful measure to gauge a utility's progress or regression with capital investments is to look at how depreciated (worn out) the total assets are for the utility. The Average Percent Depreciated shown on Table 14 in the Total row at the bottom indicates the assets for the utility are on average 47 percent depreciated. The figure below compares that level to the level from the prior study.

Figure Three

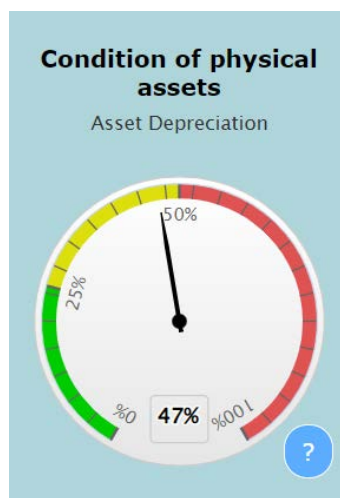


Accumulated depreciation on total assets has climbed by over 10 percent and is approaching 50 percent. Considering most utility assets last at least 20 years – and for mains it can be

substantially longer, up to 80 years – both the increase and current level of accumulated depreciation is concerning.

The Public Service Commission (PSC) offers a dashboard for water utilities to evaluate their financial wellbeing. One gauge measures the condition of physical assets in the same way as shown above – i.e., how depreciated the assets are. A result under 25 percent is coded green and indicates a good position, one between 25 and 50 percent is coded yellow and indicates an issue, and one over 50 percent is coded red and indicates a significant problem. Kenosha's sewer assets would be coded yellow and on the verge of becoming red.

Figure Four



Beginning to fund regular capital investments in manholes and main will help stop this asset deterioration.

More regular rate increases would help fund this crucial effort to maintain the utility's assets. Ruekert & Mielke (R/M) recommends considering automatic annual rate adjustments based on a measure of inflation. The most suitable measure is the Engineering News-Record's (ENR's) Construction Cost Index (CCI), which tracks changes in construction expenses. Adjusting rates based on the ENR's CCI every year would provide the utility with a better chance to sustain itself financially. R/M also recommends doing a full rate study every 3 to 5 years to ensure that those costs are equitably distributed among the customer classes.

SUMMARY AND CONCLUSIONS

The City of Kenosha retained Ruekert and Mielke to conduct a review and update of its water and sewer rates. While water rates are regulated at the state level by the PSC of Wisconsin, sanitary sewer rates are not so the City may implement new sewer rates following its local practice and procedures.

Because costs have increased in recent years, sewer rates need to be increased to sustain the Utility financially. It is recommended that the City adopt the rates proposed in Table 2. The City may want to consider automatically adjusting rates based on the ENR's CCI every year to maintain rate continuity and minimize customer rate shock. Frequent rate review takes on greater importance as the City incurs increased capital costs.

FINANCIAL TABLES

Kenosha Water Utility 2022 Sewer Rate Review T1 - Revenue Comparison Projected Flows and Loadings Billed at Existing Rates vs. Proposed Rates				
Customer Class	Revenues at Current Rates ⁽¹⁾	Revenues at Proposed Rates ⁽¹⁾	Change	% Change
Residential	\$ 5,476,162	\$ 7,666,890	\$ 2,190,729	40.0%
Commercial	1,227,211	1,713,713	486,502	39.6%
Industrial	129,916	181,268	51,352	39.5%
Industrial (Ocean Spray)	1,565,843	2,052,909	487,066	31.1%
Public	196,301	273,963	77,662	39.6%
Subtotal City	\$ 8,595,432	\$ 11,888,743	\$ 3,293,310	38.3%
Hauled Waste				
Landfills	\$ 37,668	\$ 69,397	\$ 31,730	84.2%
Hauled Septic Waste	3,122	5,278	2,156	69.0%
Hauled Holding Tank Waste	53,449	101,639	48,190	90.2%
Hauled Other Waste	17,884	17,644	(240)	-1.3%
Subtotal Hauled Waste	\$ 112,123	\$ 193,959	\$ 81,835	73.0%
Wholesale				
Town of Bristol - Volumetric & Loadings ⁽²⁾	\$ 15,550	\$ 20,393	\$ 4,842	31.1%
Town of Somers - Volumetric & Loadings ⁽²⁾	422,916	554,584	131,668	31.1%
Village of Pleasant Prairie - Volumetric & Loadings ⁽²⁾	1,914,207	2,527,431	613,225	32.0%
Subtotal Wholesale	\$ 2,352,673	\$ 3,102,408	\$ 749,735	31.9%
Total Revenues From Rates ⁽²⁾	<u>\$ 11,060,229</u>	<u>\$ 15,185,109</u>	<u>\$ 4,124,880</u>	<u>37.3%</u>
Notes:				
(1) projected flows and loadings.				
(2) Rates for the wholesale customers do not include direct service charges for costs associated with metering, monitoring and sampling at the wholesale stations.				

Kenosha Water Utility 2022 Sewer Rate Review Table 2 - Existing vs. Proposed Rates				
City	Existing Rates	Proposed Rates	\$ Change	% Change
Category "A"				
Monthly Fixed Charge	\$2.48	\$3.54	\$1.06	42.7%
Volume Charge/100 cf	\$1.99	\$2.78	\$0.79	39.7%
Volume Charge/1,000 gal	\$2.66	\$3.71	\$1.05	39.5%
City Unmetered				
Monthly Fixed Charge	\$2.48	\$3.54	\$1.06	42.7%
Residential Volume Charge/1,000 cf	\$19.90	\$27.80	\$7.90	39.7%
Commercial Volume Charge/2,000 cf	\$39.80	\$55.60	\$15.80	39.7%
Category "B"				
Monthly Fixed Charge	\$2.480	\$3.540	\$1.06	42.7%
Volume Charge/1,000 gal	\$2.660	\$3.710	\$1.05	39.5%
Rate BOD /lb (greater than 200 mg/l)	\$0.267	\$0.337	\$0.07	26.2%
Rate SS /lb (greater than 250 mg/l)	\$0.173	\$0.262	\$0.09	51.4%
Rate P /lb (greater than 5 mg/l)	\$4.400	\$7.764	\$3.36	76.5%
Hauled Waste				
Septic Tank Waste/1,000 gal	\$95.808	\$146.609	\$50.80	53.0%
Holding Tank Waste/1,000 gal	\$8.724	\$12.874	\$4.15	47.6%
Hauled Other/1,000 gal		\$8.060	-\$0.664	-7.6%
Wholesale				
Volume Charge/100 cf	\$0.570	\$0.672	\$0.10	17.9%
Volume Charge/1,000 gal	\$0.762	\$0.898	\$0.14	17.8%
Rate BOD /lb	\$0.267	\$0.337	\$0.07	26.2%
Rate SS /lb	\$0.173	\$0.262	\$0.09	51.4%
Rate P /lb	\$4.400	\$7.764	\$3.36	76.5%
Average Residential	\$189.36	\$265.08	\$75.720	40.0%

Kenosha Water Utility 2022 Sewer Rate Review Table 3 - Revenue Check				
City Customers		Units	Rate	Annual Total
Residential	Flow (mg)	1,736	\$3.710	\$6,441,398
Commercial	Flow (mg)	437	\$3.710	\$1,621,918
Industrial	Flow (mg)	48	\$3.710	\$177,738
Public	Flow (mg)	72	\$3.710	\$265,753
Industrial (Ocean Spray)	Flow (mg)	208	\$3.710	\$770,323
Industrial Excess BOD	lbs.	3,750,328	\$0.337	\$1,263,019
Industrial Excess SS	lbs.	43,216	\$0.262	\$11,332
Industrial Excess P	lbs.	1,055	\$7.764	\$8,191
Fixed Monthly Charge Residential	cust	28,810	\$3.545	\$1,225,493
Fixed Monthly Charge Commercial	cust	2,158	\$3.545	\$91,795
Fixed Monthly Charge Industrial	cust	83	\$3.545	\$3,531
Fixed Monthly Charge Industrial OS	cust	1	\$3.545	\$43
Fixed Monthly Charge Public	cust	193	\$3.545	\$8,210
Subtotal				\$11,888,743
Wholesale Customers				
Wholesale Flow Bristol	Flow (mg)	9	\$0.898	\$8,181
Wholesale Flow Somers	Flow (mg)	273	\$0.898	\$245,475
Wholesale Flow Pleasant Prairie	Flow (mg)	1,032	\$0.898	\$927,356
BOD Bristol	lbs.	17,684	\$0.337	\$5,956
BOD Somers	lbs.	384,568	\$0.337	\$129,513
BOD Pleasant Prairie	lbs.	2,192,656	\$0.337	\$738,433
SS Bristol	lbs.	14,117	\$0.262	\$3,702
SS Somers	lbs.	420,280	\$0.262	\$110,208
SS Pleasant Prairie	lbs.	2,209,860	\$0.262	\$579,483
P Bristol	lbs.	329	\$7.764	\$2,554
P Somers	lbs.	8,937	\$7.764	\$69,387
P Pleasant Prairie	lbs.	36,342	\$7.764	\$282,159
Subtotal				\$3,102,408
Other				
Landfills	Flow (mg)	12.6	\$4.989	\$62,687
Landfill Excess BOD	lbs.	4,545	\$0.337	\$1,531
Landfill Excess SS	lbs.	4,032	\$0.262	\$1,057
Landfill Excess P	lbs.	531	\$7.764	\$4,123
Subtotal				\$69,397
Hauled Septic Waste	mg	0.036	\$146.609	\$5,278
Hauled Holding Tank Waste	mg	7.895	\$12.874	\$101,639
Hauled Other Waste	mg	2.189	\$8.060	\$17,644
Subtotal Other				\$124,561
Total Revenue Generated				\$15,185,109
Total Revenue Requirements				\$15,185,109
Excess/(Shortage)				\$0

Kenosha Water Utility 2022 Sewer Rate Review Table 4 - Revenues at Old Rates				
City Customers		Units	Rate	Annual Total
Residential	Flow (mg)	1,736	\$2.66	\$4,618,776
Commercial	Flow (mg)	437	\$2.66	\$1,162,989
Industrial	Flow (mg)	48	\$2.66	\$127,446
Public	Flow (mg)	72	\$2.66	\$190,557
Industrial (Ocean Spray)	Flow (mg)	208	\$2.66	\$552,357
Industrial Excess BOD	lbs.	3,750,328	\$0.27	\$1,001,338
Industrial Excess SS	lbs.	43,216	\$0.17	\$7,476
Industrial Excess P	lbs.	1,055	\$4.40	\$4,642
Fixed Monthly Charge Residential	cust	28,810	\$2.48	\$857,386
Fixed Monthly Charge Commercial	cust	2,158	\$2.48	\$64,222
Fixed Monthly Charge Industrial	cust	83	\$2.48	\$2,470
Fixed Monthly Charge Industrial OS	cust	1	\$2.48	\$30
Fixed Monthly Charge Public	cust	193	\$2.48	\$5,744
Subtotal				\$8,595,432
Wholesale Customers				
Wholesale Flow Bristol	Flow (mg)	9	\$0.76	\$6,939
Wholesale Flow Somers	Flow (mg)	273	\$0.76	\$208,205
Wholesale Flow PP	Flow (mg)	1,032	\$0.76	\$786,557
BOD Bristol	lbs.	17,684	\$0.27	\$4,722
BOD Somers	lbs.	384,568	\$0.27	\$102,680
BOD PP	lbs.	2,192,656	\$0.27	\$585,439
SS Bristol	lbs.	14,117	\$0.17	\$2,442
SS Somers	lbs.	420,280	\$0.17	\$72,708
SS PP	lbs.	2,209,860	\$0.17	\$382,306
P Bristol	lbs.	329	\$4.40	\$1,448
P Somers	lbs.	8,937	\$4.40	\$39,323
P PP	lbs.	36,342	\$4.40	\$159,905
Subtotal				\$2,352,673
Other				
Landfills	Flow (mg)	12.6	\$2.66	\$33,420
Landfill Excess BOD	lbs.	4,545	\$0.27	\$1,214
Landfill Excess SS	lbs.	4,032	\$0.17	\$698
Landfill Excess P	lbs.	531	\$4.40	\$2,336
Subtotal				\$37,668
Hauled Septic Waste	Flow (mg)	0.04	\$86.73	\$3,122
Hauled Holding Tank Waste	Flow (mg)	7.90	\$6.770	\$53,449
Hauled Other Waste	Flow (mg)	2.19	\$8.170	\$17,884
Subtotal Other				\$74,456
Total Revenue				\$11,060,229

**Kenosha Water Utility
2022 Sewer Rate Review**

Table 5 - Proportionate Shares of Flows, Loadings and Revenues by Customer Class

Customer Class	Flow (mg/yr) ⁽¹⁾	%	BOD (lb/yr)	%	SS (lb/yr)	%	P (lb/yr)	%	Revenues (\$/yr)	%
Residential	4,044	56.5%	2,896,285	27.3%	3,620,356	45.0%	72,407	46.4%	\$7,666,890	50.5%
Commercial	1,018	14.2%	729,273	6.9%	911,591	11.3%	18,232	11.7%	\$1,713,713	11.3%
Industrial	595	8.3%	4,176,610	39.3%	576,069	7.2%	11,712	7.5%	\$2,234,177	14.7%
Public	167	2.3%	119,492	1.1%	149,365	1.9%	2,987	1.9%	\$273,963	1.8%
Hauled Waste	23	0.3%	105,375	1.0%	143,387	1.8%	5,175	3.3%	\$193,959	1.3%
Wholesale	1,315	18.4%	2,594,908	24.4%	2,644,257	32.9%	45,608	29.2%	\$3,102,408	20.4%
Total	7,161	100.0%	10,621,944	100.0%	8,045,025	100.0%	156,122	100.0%	\$15,185,109	100.0%

Notes:
(1) Includes I/I

Kenosha Water Utility
2022 Sewer Rate Review
Table 6 - Allocation of Costs to Function

	Total Budget	Fixed	City Flow	Wholesale	Waste Haulers	All User Charge	%	Flow	%	BOD	%	SS	%	P
Collector O & M						0.27								
Sewer Repairs	742,558	218,254	327,381			196,923	100%	196,923	100%	0	0%	0	0%	0
Sewer Cleaning and Inspection	601,511	176,797	266,196			159,518	100%	159,518	100%	0	0%	0	0%	0
Maintain Lift Station	258,002	51,600	77,491			129,901	100%	129,901	100%	0	0%	0	0%	0
Maint Sewage Monitoring Station	6,750	6,750	0			0	100%	0	100%	0	0%	0	0%	0
Subtotal	1,608,821	453,402	669,978	0	0	485,442		485,442		0		0		0
WTF Operations and Maintenance Costs														
Operations Labor	453,156					453,156	35%	158,605	35%	158,605	15%	67,973	15%	67,973
Natural Gas	143,000					143,000	10%	14,300	80%	114,400	5%	7,150	5%	7,150
Electric Power	54,000					54,000	10%	5,400	80%	43,200	5%	27,000	5%	27,000
Disinfection Chemicals	153,000					153,000	100%	0	0%	0	0%	0	0%	0
Phosphorous Removing Chemicals	270,000					270,000	0%	0	0%	0	0%	0	0%	0
Sludge Conditioning Chemicals	215,000					215,000	0%	0	0%	0	0%	0	0%	0
Landfill Expense	350,024					350,024	0%	0	0%	0	0%	0	0%	0
Maintenance Labor	137,640					137,640	10%	13,764	50%	175,012	40%	86,000	10%	21,500
Equipment maint.	516,716					516,716	10%	51,671	50%	68,820	25%	34,410	15%	35,002
Maintain Equalization Basin	174,511					174,511	50%	28,588	30%	155,015	15%	77,507	5%	24,836
Gen. Structure and Equipment maint.	689,728				14,500	675,228	35%	236,330	35%	236,330	20%	135,046	10%	67,525
Industrial Waste Monitoring	78,232					78,232	0%	0	0%	39,116	40%	31,293	10%	7,823
Subtotal	3,721,007	0	0	0	14,500	3,706,507	26%	975,612	40%	1,486,797	19%	693,644	15%	550,454
Other WTF O&M														
Other Chemicals	38,000					38,000	10%	3,800	40%	15,200	35%	13,300	15%	5,700
Lab Expenses	371,563	40,000				331,563	10%	33,156	40%	132,625	35%	116,047	15%	49,734
Subtotal Other WTF	409,563	40,000	0	0	0	369,563	10%	36,956	40%	147,825	35%	129,347	15%	55,434
Subtotal WTF Total O&M	4,130,570	40,000	0	0	14,500	4,076,070		1,012,568		1,634,622		822,991		605,888
Subtotal All O&M	5,739,391	493,402	669,978	0	14,500	4,561,512	33%	1,498,010	36%	1,634,622	18%	822,991	13%	605,888
Percent of Subtotal	100%	9%	12%	0%	0.25%	78.2%		26%		28%		14%		11%
Other O&M														
Fike River Monitoring	7,500					7,500	0%	0	0%	0	0%	0	0%	0
Transportation Expenses	153,116					153,116	33%	40,091	36%	43,747	18%	22,026	13%	16,215
Billing and collecting	305,756					305,756	0%	0	0%	0	0%	0	0%	0
Meter Reading	58,438					58,438	0%	0	0%	0	0%	0	0%	0
Meter Operations	403,948					403,948	0%	0	0%	0	0%	0	0%	0
Employee Pension/Benefits	1,136,961					1,136,961	35%	317,274	35%	317,274	15.0%	135,975	15.0%	135,975
Admin & General salaries	379,069					379,069	33%	99,253	36%	108,305	18%	54,529	13%	40,144
Administrative Expenses	61,500					61,500	33%	16,003	36%	17,571	18%	8,847	13%	6,513
Outside Services- City Services, Other	296,107					296,107	33%	77,331	36%	84,602	18%	42,596	13%	31,388
Outside Services- DNR Permit	119,183					119,183	33%	39,140	36%	42,709	18%	21,503	13%	15,831
Injuries and Damages	20,000					20,000	33%	5,714	36%	5,714	18%	2,877	13%	2,118
Insurance Expenses	238,778					238,778	33%	62,520	36%	68,222	18%	34,348	13%	25,287
Subtotal	3,180,356	972,124	2,667,977	0	0	1,941,435	21%	657,150	22%	688,145	10%	322,698	9%	273,441
Replacement Costs														
Replacement WTF	575,000					575,000	10%	57,500	40%	230,000	35%	201,250	15%	86,250
Subtotal	575,000	0	0	0	0	575,000		57,500		230,000		201,250		86,250
Total O & M and Replacement	9,494,747	1,465,525	936,775	0	14,500	7,077,946	31%	2,212,659	36%	2,552,767	19%	1,346,940	14%	965,579

Kenosha Water Utility 2022 Sewer Rate Review Table 6 - Allocation of Costs to Function														
Capital Costs														
Collector Depreciation and ROI (Local)	1,144,810													
Collector Interceptor Depreciation and ROI (Regional)	2,532,373													
WTF Depreciation and ROI (Regional)	2,675,755													
Hauler	14,529													
Total Capital Costs	6,307,467	0	1,144,810	0	14,529	5,208,128	58%	3,038,655	21%	1,085,555	16%	810,324	5%	273,595
Other Income														
Industrial Waste Mon	(85,000)					(85,000)	0%	0	40.0%	(34,000)	40.0%	(34,000)	20.0%	(17,000)
Wholesale Monitoring and Sampling	(41,455)					0	0%	0	0	0	0	0	0	0
Penalties	(75,000)					0	33%	0	36%	0	18%	0	13%	0
Misc. Operating	(73,000)					(73,000)	33%	(23,975)	36%	(26,160)	18%	(13,171)	13%	(9,696)
Engineering						0	33%	0	36%	0	18%	0	13%	0
Other	(2,650)					(2,650)	33%	(870)	36%	(950)	18%	(478)	13%	(352)
Wholesale Adjustment for ROI on New Interceptors	(40,000)					0	0%	0	36%	0	18%	0	13%	0
Impact Fees	(677,105)					(20,000)	0%	0	0	(160,650)	0%	(47,649)	0%	(27,048)
Subtotal						(677,105)		(136,455)		0		(160,650)		(27,048)
TOTAL NET REVENUE REQUIREMENTS	15,185,409	1,329,070	1,701,555	0	29,029	12,125,424		5,226,471		3,577,213		2,109,615		1,212,126
Summary														
Allocation of Costs to Function and Classification														
All Customers- Function	Total Budget	City Fixed	City Flow	City	Wholesale	Waste Haulers	All User Charge	Flow	ROD	SS	P			
WTF O&M	7,077,946						7,077,946	2,212,659	2,532,767	1,346,940	965,579			
WTF Depreciation and ROI	2,675,755						2,675,755	306,282	1,085,555	810,324	273,595			
Regional Collector Depreciation and ROI	2,532,373						2,532,373	2,532,373	0	0	0			
Other Income	(160,650)						(160,650)	(24,844)	(61,109)	(47,649)	(27,048)			
Total All Customers	12,125,424	0	0	0	0	0	12,125,424	5,226,471	3,577,213	2,109,615	1,212,126			
Wholesale City Adjustments	221,611						0	0	0	0	0			
Share of City IT	221,611						221,611	0	0	0	0			
Total Wholesale Only	221,611	0	0	0	221,611	0	221,611	0	0	0	0			
City Only	(221,611)						0	0	0	0	0			
Wholesale/City Adjustments	2,402,301						0	0	0	0	0			
O&M and Replacement	1,144,810						0	0	0	0	0			
Collector Capital (local)	(616,455)						0	0	0	0	0			
Other Income	2,809,044						0	0	0	0	0			
Total City Customers	2,809,044	1,329,070	1,479,974	0	0	29,029	12,125,424	5,226,471	3,577,213	2,109,615	1,212,126			
Hauler Only O&M and Capital	29,029						0	0	0	0	0			
TOTAL NET REVENUE REQUIREMENTS	15,185,409	1,329,070	1,479,974	221,611	29,029	12,125,424	5,226,471	3,577,213	2,109,615	1,212,126				

Kenosha Water Utility
2022 Sewer Rate Review
Table 7 - Allocation of Capital Costs

	Adjusted Costs	% Flow	\$ Flow	% BOD	\$ BOD	% SS	\$ SS	% P	\$ P
Collector System									
Local	55,331,169	100%	55,331,169	0%	0	0%	0	0%	0
Regional	52,034,524	100%	52,034,524	0%	0	0%	0	0%	0
Hauler	205,772	100%	205,772	0%	0	0%	0	0%	0
Subtotal	107,571,465	100%	107,571,465	0%	0	0%	0	0%	0
Treatment and Disposal									
Structures	13,168,328	40%	5,267,331	25%	3,292,082	25%	3,292,082	10%	1,316,833
Primary equipment	4,198,659	0%	0	25%	1,049,665	75%	3,148,994	0%	0
Secondary equipment	8,249,753	0%	0	75%	6,187,315	10%	824,975	15%	1,237,463
Advance treatment	219,279	0%	0	50%	109,640	25%	54,820	25%	54,820
Chlorination	1,297,166	100%	1,297,166	0%	0	0%	0	0%	0
Sludge treatment	13,657,997	0%	0	48%	6,487,549	40%	5,463,199	13%	1,707,250
Monitoring	243,100	100%	243,100	0%	0	0%	0	0%	0
Outfall sewer	1,179,759	100%	1,179,759	0%	0	0%	0	0%	0
Equalization basin land		100%	0	0%	0	0%	0	0%	0
Treatment and disposal land	932,950	19%	176,524	41%	378,498	30%	282,534	10%	95,394
Subtotal	43,146,991	19%	8,163,880	41%	17,504,748	30%	13,066,604	10%	4,411,759
General Equipment and Plant									
Land	713,790	19%	135,057	41%	289,585	30%	216,164	10%	72,985
Structures	2,673,798	19%	505,912	41%	1,084,761	30%	809,731	10%	273,395
Furniture	101,604	19%	19,225	41%	41,221	30%	30,770	10%	10,389
Computer equipment	128,634	19%	24,339	41%	52,187	30%	38,955	10%	13,153
Transportation equipment	2,980,626	19%	563,967	41%	1,209,241	30%	902,651	10%	304,768
Work equipment	554,181	19%	104,857	41%	224,831	30%	167,828	10%	56,665
Tool shop	418,314	19%	79,149	41%	169,710	30%	126,682	10%	42,772
Lab equipment	187,675	19%	35,510	41%	76,140	30%	56,835	10%	19,190
Communication equipment	2,228	19%	422	41%	904	30%	675	10%	228
Other	258,466	19%	48,904	41%	104,860	30%	78,274	10%	26,428
Subtotal	8,019,315	19%	1,517,342	41%	3,253,438	30%	2,428,563	10%	819,971
Subtotal Treatment Plant and General	51,166,305	19%	9,681,222	41%	20,758,186	30%	15,495,167	10%	5,231,730
Total	\$ 158,737,770	73.9%	\$ 117,252,687	13.1%	\$ 20,758,186	9.8%	\$ 15,495,167	3.3%	\$ 5,231,730

**Kenosha Water Utility
2022 Sewer Rate Review
Capital Cost Recovery
Table 8 - Depreciation, Rate Base, and ROI**

		Local		Regional		Haulers		Total
Average Net Plant⁽¹⁾								
Collection System		\$37,857,532		\$22,975,879		\$50,595		\$60,884,006
Collection System Pumping		\$266,501		\$3,660,980		-\$32,690		\$3,894,791
Treatment and Disposal		\$0		\$14,493,352		\$32,810		\$14,526,163
General Plant		\$0		\$4,533,937		\$0		\$4,533,937
Total Net Plant		<u>\$38,124,033</u>		<u>\$45,664,148</u>		<u>\$50,715</u>		<u>\$83,838,896</u>
Average Net CIAC⁽²⁾								
Collection System Assets		\$29,477,356		\$1,463,538		N/A		\$30,940,894
Collection System Pumping Assets		\$139,190		\$505,253		\$0		\$644,443
Treatment and Disposal		\$0		\$6,093,234		\$0		\$6,093,234
General Plant		\$0		\$0		\$0		\$0
Total Net CIAC		<u>\$29,616,546</u>		<u>\$8,062,026</u>		<u>\$0</u>		<u>\$37,678,571</u>
Net Rate Base								
Collector and Interceptor		\$8,507,487		\$24,668,068		\$17,904		\$33,193,460
Treatment, Disposal and General		\$0		\$12,934,054		\$32,810		\$12,966,865
Total Rate Base		<u>\$8,507,487</u>		<u>\$37,602,123</u>		<u>\$50,715</u>		<u>\$46,160,324</u>
ROI								
Collector and Interceptor	5.90%	\$501,942	5.9%	\$1,455,416	5.90%	\$1,056	5.90%	\$1,958,414
Treatment, Disposal and General	5.90%	\$0	5.9%	\$763,109	5.90%	\$1,936	5.90%	\$765,045
Total ROI		<u>\$501,942</u>		<u>\$2,218,525</u>		<u>\$2,992</u>		<u>\$2,723,459</u>
Depreciation Expense								
Collector and Interceptor		\$642,868		\$1,076,957		\$8,707		\$1,728,532
Treatment, Disposal and General		\$0		\$1,912,646		\$2,830		\$1,915,476
Total Depreciation		<u>\$642,868</u>		<u>\$2,989,603</u>		<u>\$11,537</u>		<u>\$3,644,008</u>
Capital Recovery From Rates								
Collector and Interceptor		\$1,144,810		\$2,532,373		\$9,763		\$3,686,946
Treatment, Disposal and General		\$0		\$2,675,755		\$4,766		\$2,680,521
Total Rate Recovery - ROI & Depreciation		<u>\$1,144,810</u>		<u>\$5,208,128</u>		<u>\$14,529</u>		<u>\$6,367,467</u>
Total Debt Service and Coverage Requirement								<u>\$4,963,927</u>
(1) Assets net of accumulated depreciation								
(2) Contributions in aid of Construction (CIAC) net of accumulated amortization								

Kenosha Water Utility 2022 Sewer Rate Review Table 9 - Inflow/Infiltration and Collector System Cost Adjustment Worksheet				
Collector/Interceptor I/I				
Components Contributing to City I/I			%	Share
Total System Sewer Mains	5,500	inch miles	100.00%	
Total Mains used by wholesale	1,459	inch miles	26.52%	
Total City I/I			3,323	mg
Portion of City I/I attributable to shared			881	mg
Rate/1,000 g for I/I			\$0.730	
I/I Cost for Shared Sewers			\$643,197.14	
Allocate I/I Costs to Communities	Flow MG	Share	I/I cost	Adj Amount
Wholesale	1,315	34.5%	\$221,610.76	\$221,610.76
City (excluding I/I)	2,501	65.5%	\$421,586.38	-\$221,610.76
Total	3,815	100.0%	\$643,197.14	\$0.00

Kenosha Water Utility 2022 Sewer Rate Review Table 10 - Projected Flows and Loadings					
Total	Equiv. Customers	Flow (mg)	BOD (lbs.)	SS (lbs.)	P (lbs.)
City	31,245	5,824	7,921,661	5,257,382	105,338
Wholesale		1,315	2,594,908	2,644,257	45,608
Other		23	105,375	143,387	5,175
Total	31,245	7,161	10,621,944	8,045,025	156,122
City	Equiv. Customers	Flow (mg)	BOD (lbs.)	SS (lbs.)	P (lbs.)
Residential	28,810	1,736	2,896,285	3,620,356	72,407
Commercial	2,158	437	729,273	911,591	18,232
Industrial	83	48	79,917	99,897	1,998
Ocean Spray	1	208	346,365	432,957	8,659
Industrial Excess Loadings			3,750,328	43,216	1,055
Public	193	72	119,492	149,365	2,987
City I/I		3,323			
Subtotal	31,245	5,824	7,921,661	5,257,382	105,338
Hauled Waste		Flow (mg)	BOD (lbs.)	SS (lbs.)	P (lbs.)
Landfills		12,564	20,957	26,196	524
Landfills Excess Loadings			4,545	4,032	531
Hauled Septic Waste		0.036	2,747	9,533	222
Hauled Holding Tank Waste		7,895	49,383	102,059	3,885
Hauled Other Waste		2,189	27,743	1,567	13
Subtotal		22.68	105,375	143,387	5,175
Wholesale		Flow (mg)	BOD (lbs.)	SS (lbs.)	P (lbs.)
Town of Bristol		9	17,684	14,117	329
Town of Somers		273	384,568	420,280	8,937
Village of Pleasant Prairie		1,032	2,192,656	2,209,860	36,342
Subtotal		1,315	2,594,908	2,644,257	45,608
Total		7,161	10,621,944	8,045,025	156,122

Kenosha Water Utility 2022 Sewer Rate Review Table 11 - Rate Computation Worksheet					
		Total	City Retail	Wholesale	Waste
All Customers					
Flow Cost	Cost	\$5,226,471	\$4,228,711	\$959,402	\$38,357
	Flow wholesale (mg)	7,161	5,824	1,315	23
	Wholesale rate/1,000 gal	\$0.730		\$0.730	
	Flow retail (mg)	2,523	2,501		23
	Retail rate/1,000 gal		\$1.691		\$1.691
BOD					
	Cost	\$3,577,213	\$2,667,823	\$873,902	\$35,488
	BOD lbs.	10,621,944	7,921,661	2,594,908	105,375
	Rate/lb.	\$0.337	\$0.337	\$0.337	\$0.337
	Domestic rate/1,000 gal		\$0.562		\$0.562
	Other rate/1,000 gal				\$4.268
SS					
	Cost	\$2,109,615	\$1,378,622	\$693,393	\$37,600
	SS lbs.	8,045,025	5,257,382	2,644,257	143,387
	Rate/lb.	\$0.262	\$0.262	\$0.262	\$0.262
	Domestic rate/1,000 gal		\$0.547		\$0.547
	Other rate/1,000 gal				\$0.188
P					
	Cost	\$1,212,126	\$817,845	\$354,100	\$40,180
	P lbs.	156,122	105,338	45,608	5,175
	Rate/lb.	\$7.764	\$7.764	\$7.764	\$7.764
	Domestic rate/1,000 gal		\$0.324		\$0.324
	Other rate/1,000 gal				\$0.047
Wholesale Adjustments					
Flow	Cost	\$221,611		\$221,611	
	Flow wholesale (mg)			1,315	
	Rate/1,000 gal			\$0.169	
City Only					
Flow Cost	Cost	\$1,479,974	\$1,479,974		
	Flow retail (mg)	2,523	2,501		23
	Domestic rate/1,000 gal		\$0.586		\$0.586
Customer Cost					
Customer Cost	Cost	\$1,329,070	\$1,329,070		
	Customers		31,245		
	Monthly fixed charge		\$3.545		
Hauled Waste Capital					
	Cost	\$29,029			\$29,029
	Hauler waste (mg)	22.68	-	-	22.68
	Rate/1,000 gal				\$1.280
Total Costs		\$15,185,109	\$11,902,047	\$3,102,408	\$180,655

**Kenosha Water Utility
2022 Sewer Rate Review
Table 11 - Rate Computation Worksheet**

Rate Summary	Retail	Wholesale	Other
Total Rates			
Monthly Fixed - City	\$3.545		
Monthly Fixed - Whole Metered			
Monthly Fixed - Whole Unmetered			
Total Volumetric Rate/1,000 gal.	\$3.710	\$0.898	
Industrial	\$3.710		
BOD rate/lb.	\$0.337	\$0.337	
SS rate/lb.	\$0.262	\$0.262	
P rate/lb.	\$7.764	\$7.764	
Hauled Septic rate/1,000 gal			\$146.609
Hauled Holding Tank rate/1,000 gal			\$12.874
Hauled Other rate/1,000 gal			\$8.060
Landfill rate/1,000 gal			\$4.989
BOD rate/lb.			\$0.337
SS rate/lb.			\$0.262
P rate/lb.			\$7.764

Kenosha Water Utility 2022 Sewer Rate Review Table 12 - Rates for Hauled Wastes			
		Waste Strength (mg/l)	Rate/1,000 gal
Septic	BOD mg/l	9,150	\$25.700
	SS mg/l	31,750	\$69.436
	P mg/l	740	\$47.916
	Hauler Capital		\$1.280
	Flow		\$2.277
			\$146.609
Holding	BOD mg/l	750	\$2.107
	SS mg/l	1,550	\$3.390
	P mg/l	59	\$3.820
	Hauler Capital		\$1.280
	Flow		\$2.277
			\$12.874
Other	BOD mg/l	1,520	\$4.268
	SS mg/l	86	\$0.188
	P mg/l	1	\$0.047
	Hauler Capital		\$1.280
	Flow		\$2.277
			\$8.060
Landfill	Flow		\$3.710
	Hauler Capital		\$1.280
	Total /1,000 gal		\$4.989
	BOD rate/lb.		\$0.337
	SS rate/lb.		\$0.262
	P rate/lb.		\$7.764

Kenosha Water Utility
2022 Sewer Rate Review
Table 13 - Wholesale Metering & Monitoring Charges

At the present time, the Utility takes samples at each of metering/monitoring station four times per week. Those results are used to bill for each individual day and the average of all samples for the month are used to calculate the remaining days that did not have samples taken.

In an effort to reduce the Utility's costs and therefore reduce charges for this direct service to our wholesale customers the following modification is being made available to each wholesale customer. Rather than take samples four days per week, the sampling frequency would be reduced to one day per week. The average calculated from these samples would then be used for billing for the month.

The proposed charges for each station are as follows:

- | | |
|---|---------------------|
| 1. If samples are taken once per week | \$90.18/day/station |
| 2. If samples are taken four times per week | \$66.84/day/station |

The rate model does not reflect any reduction in sampling days. If any of the municipalities choose to go to reduced sampling frequency, the Utility will realize an overall reduction in revenue.

**Kenosha Water Utility
2022 Sewer Rate Review**

Table 14 - Summary of Assets, Depreciation, and Contributions in Aid of Construction (CIAC)

	Average Plant Asset Balance	Average Accumulated Depreciation	Average Percent Depreciated	Average Net Plant	CIAC	Accumulated Amortization	Net CIAC	Annual Depreciation
Collection System (Local)	\$54,766,993	\$16,909,461	31%	\$37,857,532	\$42,643,724	\$13,166,368	\$29,477,356	\$629,787
Collection System (Regional)	31,003,682	8,027,803	25.9%	22,975,879	1,974,900	511,362	1,463,538	317,762
Collection System (Haulers)	50,595	-	N/A	50,595	-	N/A	N/A	-
Subtotal	85,821,270	24,937,264	29.1%	60,884,006	44,618,624	13,677,730	30,940,894	947,549
Collection Pumping (Local)	564,176	297,676	52.8%	266,501	294,661	155,472	139,190	13,081
Collection Pumping (Regional)	21,030,842	17,369,862	82.6%	3,660,980	2,902,475	2,397,221	505,253	759,194
Collection Pumping (Hauling)	155,177	187,868	121.1%	(32,690)	-	-	-	8,707
Subtotal	21,750,196	17,855,405	82.1%	3,894,791	3,197,136	2,552,693	644,443	780,982
Treatment and Disposal (Regional)	43,225,249	28,731,897	66.5%	14,493,352	18,172,578	12,079,344	6,093,234	1,296,405
Treatment and Disposal (Haulers)	36,334	3,524	9.7%	32,810	-	-	-	2,830
Subtotal	43,261,583	28,735,420	66.4%	14,526,163	18,172,578	12,079,344	6,093,234	1,299,235
General Plant (Regional)	8,389,610	3,855,673	46.0%	4,533,937	-	-	-	616,241
Total	\$159,222,657	\$75,383,762	47.3%	\$83,838,896	\$65,988,338	\$28,309,767	\$37,678,571	\$3,644,008

Kenosha Water Utility 2022 Sewer Rate Review Table 16 - Depreciation Expense											
Account	Average Cost Balance	Deprec Rate	Regional Assets			Local Assets			Depreciation Expense		
			Contrib	Utility	Total	Contrib	Utility	Total	Contrib	Utility	Total
Collection System											
13102 Collector Land	\$ 125,244	0.00%	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
13112 Collector Structures	-	3.20%	-	-	-	-	-	-	-	-	-
13122 Service Connections	1,904,641	2.00%	-	-	33,903	4,190	-	33,903	4,190	-	38,093
13132 Collecting Mains	50,989,793	1.00%	8,323	19,495	376,711	105,068	-	385,035	124,563	-	509,598
13142 Interceptor Mains	29,560,547	1.00%	6,715	271,207	3,586	14,098	-	10,301	285,305	-	295,605
13152 Force Mains	1,482,479	1.00%	-	12,023	1,241	1,561	-	1,241	13,584	-	14,825
13162 Collection Equipment	1,788,566	5.00%	-	-	-	89,428	-	-	89,428	-	89,428
Subtotal	85,821,270		15,038	302,725	415,441	214,346	-	430,479	517,071	-	947,549
Collection System Pumping											
13202 Sewage Collection Land	129,783	0.00%	-	-	-	-	-	-	-	-	-
13212 Pump Structures	6,061,769	3.20%	58,699	132,266	-	1,931	-	58,699	135,277	-	193,977
13222 Receiving Wells	5,974,214	3.33%	-	188,677	399	4,592	-	399	198,542	-	198,941
13232 Electric Pumping Equipment	9,115,702	4.00%	97,814	258,302	1,449	4,710	-	99,263	364,628	-	364,628
13242 Other Pumping Equipment	437,728	5.00%	-	21,886	-	-	-	-	21,886	-	21,886
13252 Misc Pumping Equipment	31,000	5.00%	-	1,550	-	-	-	-	1,550	-	1,550
Subtotal	21,750,196		156,513	602,681	1,848	11,233	-	158,362	622,621	-	780,982
Treatment & Disposal Plant											
13302 Treatment and Disposal Structure	11,705,559	0.00%	-	-	-	-	-	-	-	-	-
13322 Preliminary Equipment	1,462,769	4.00%	-	58,511	-	-	-	-	58,511	-	58,511
13332 Primary Equipment	4,198,659	3.33%	70,047	69,768	-	-	-	70,047	69,768	-	139,815
13342 Secondary Equipment	8,249,753	3.33%	129,117	145,600	-	-	-	129,117	145,600	-	274,717
13352 Advanced Equipment	219,279	4.00%	-	8,771	-	-	-	-	8,771	-	8,771
13362 Chlorination Equipment	1,297,166	6.67%	43,087	43,434	-	-	-	43,087	43,434	-	86,521
13372 Sludge Treatment	13,657,997	5.00%	355,108	327,792	-	-	-	355,108	327,792	-	682,900
Plant Site Piping	114,592	2.00%	-	1,895	-	-	-	-	397	-	2,292
13392 Monitoring Equipment	243,100	6.67%	-	13,817	-	-	-	-	2,398	-	16,215
13402 Outfall Sewer	1,179,759	2.50%	15,319	14,140	-	-	-	15,319	14,175	-	29,494
Treatment and Disposal Land	932,950	0.00%	-	-	-	-	-	-	-	-	-
Subtotal	43,261,583		612,678	683,727	-	2,830	-	612,678	686,557	-	1,299,235
General Plant											
13702 General Plant Land	713,790	0.00%	-	-	-	-	-	-	-	-	-
13712 General Structures & Improvements	2,673,798	2.00%	-	53,476	-	-	-	-	53,476	-	53,476
13721 Furniture & Improvements	101,604	5.80%	-	5,893	-	-	-	-	5,893	-	5,893
13722 Computer Equipment	128,634	26.70%	-	34,345	-	-	-	-	34,345	-	34,345
13731 Transportation Equipment	2,980,626	13.30%	-	396,423	-	-	-	-	396,423	-	396,423
13732 Work Equipment	554,181	7.50%	-	41,564	-	-	-	-	41,564	-	41,564
13751 Tools/Shop Equipment	418,314	5.80%	-	24,262	-	-	-	-	24,262	-	24,262
13761 Laboratory Equipment	187,675	5.80%	-	10,885	-	-	-	-	10,885	-	10,885
13771 Communication Equipment	2,228	15.00%	-	334	-	-	-	-	334	-	334
SCADA System Equipment	370,295	9.20%	-	34,067	-	-	-	-	34,067	-	34,067
13791 Other Equipment	258,466	5.80%	-	14,991	-	-	-	-	14,991	-	14,991
Subtotal	8,389,610		-	616,241	-	-	-	-	616,241	-	616,241
Total	\$ 159,222,657		\$ 784,229	\$ 2,205,373	\$ 417,290	\$ 225,578	\$ -	\$ 1,201,519	\$ 2,442,489	\$ -	\$ 3,644,008

**Kenosha Water Utility
2022 Sewer Rate Review
Table 17 - Average Accumulated Depreciation**

Account	Regional Assets		Local Assets		Waste Haulers		Total	
	Contrib	Utility	Contrib	Utility	Contrib	Utility	Contrib	Utility
Collection System								
13102 Collector Land	-	-	-	-	-	-	-	-
13112 Collector Structures	-	-	-	-	-	-	-	-
13122 Service Connections	-	-	925,631	114,404	-	-	925,631	114,404
13132 Collecting Mains	245,688	575,471	11,120,140	3,101,515	-	-	11,366,828	3,676,986
13142 Interceptor Mains	168,538	6,807,460	90,013	353,859	-	-	258,551	7,161,319
13152 Force Mains	-	230,646	23,810	29,948	-	-	23,810	284,403
13162 Collection Equipment	-	-	1,150,143	-	-	-	-	1,150,143
Subtotal	414,226	7,613,577	12,159,593	4,749,868	-	-	12,573,819	12,363,445
Collection System Pumping								
13202 Sewage Collection Land	-	-	-	-	-	-	-	-
13212 Pump Structures	-	-	-	-	-	-	-	-
13222 Receiving Wells	1,356,498	3,056,583	-	44,622	-	24,964	1,356,498	3,126,168
13232 Electric Pumping Equipment	-	3,710,888	7,854	90,318	-	103,714	7,854	3,904,920
13242 Other Pumping Equipment	2,459,883	6,495,913	36,443	118,439	-	59,190	2,496,326	6,673,542
13252 Misc Pumping Equipment	-	269,698	-	-	-	-	269,698	269,698
Subtotal	3,816,381	13,553,482	44,297	253,379	-	187,868	3,860,678	13,994,728
Treatment & Disposal Plant								
13302 Treatment and Disposal Land	-	-	-	-	-	-	-	-
13312 Treatment and Disposal Structures	-	-	-	-	-	-	-	-
13322 Preliminary Equipment	2,800,655	4,380,511	-	-	-	-	2,800,655	4,380,511
13332 Primary Equipment	-	263,553	-	-	-	-	-	263,553
13342 Secondary Equipment	2,098,262	2,089,886	-	-	-	-	2,098,262	4,188,148
13352 Advanced Equipment	3,419,774	3,856,341	-	-	-	-	3,419,774	3,856,341
13362 Chlorination Equipment	-	127,071	-	-	-	-	-	127,071
13372 Sludge Treatment	624,314	629,329	-	-	-	-	624,314	629,329
Plant Site Piping	3,739,722	3,452,052	-	-	-	-	3,739,722	3,452,052
13392 Monitoring Equipment	-	5730	-	-	-	1,202	-	6,931
13402 Outfall Sewer	-	229,855	-	-	-	-	-	230,976
Subtotal	527,720	487,127	-	-	-	1,202	527,720	488,328
General Plant	13,210,446	15,521,451	-	-	-	3,524	13,210,446	15,524,975
13702 General Plant Land	-	-	-	-	-	-	-	-
13712 General Structures & Improvements	-	-	-	-	-	-	-	-
13722 Furniture & Improvements	-	798,635	-	-	-	-	-	798,635
13732 Computer Equipment	-	83,179	-	-	-	-	-	83,179
13731 Transportation Equipment	-	100,528	-	-	-	-	-	100,528
13732 Work Equipment	-	1,966,706	-	-	-	-	-	1,966,706
13751 Tools/Shop Equipment	-	278,406	-	-	-	-	-	278,406
13761 Laboratory Equipment	-	255,191	-	-	-	-	-	255,191
13771 Communication Equipment	-	106,627	-	-	-	-	-	106,627
SCADA System Equipment	-	2,228	-	-	-	-	-	2,228
13791 Other Equipment	-	172,391	-	-	-	-	-	172,391
Subtotal	-	3,855,673	-	-	-	-	-	3,855,673
Total	\$ 17,441,052	\$ 40,544,182	\$ 12,203,890	\$ 5,003,247	\$ -	\$ 191,391	\$ 29,644,942	\$ 45,738,820
								\$ 75,383,762

Kenosha Water Utility
2022 Sewer Rate Review
Table 18 - Assets and Depreciation

Collector System	Plant		Average		Accumulated Depreciation		2022 Annual Depreciation
	12/31/2020	12/31/2021	12/31/2020	12/31/2021	12/31/2020	12/31/2021	
Collector Land	\$ 125,244	\$ 125,244	\$ -	\$ -	\$ -	\$ -	\$ -
Collector Structures	-	-	-	-	-	-	-
Service Connections	1,904,641	1,904,641	1,020,989	1,059,081	1,020,989	1,059,081	38,093
Collecting Mains	50,560,440	51,359,145	14,792,358	15,293,269	14,792,358	15,293,269	509,598
Collection equipment	1,788,566	1,788,566	1,105,428	1,194,858	1,105,428	1,194,858	89,428
Pump Structures	6,054,740	6,068,797	4,368,540	4,555,789	4,368,540	4,555,789	193,977
Receiving Wells	5,974,214	5,974,214	3,827,395	4,026,337	3,827,395	4,026,337	198,941
Electric Pumping Equipment	9,115,199	9,116,205	9,115,198	9,106,157	9,115,198	9,106,157	364,628
Other Pumping Equipment	437,728	437,728	258,755	280,641	258,755	280,641	21,886
Misc Pumping Equipment	31,000	31,000	19,625	21,175	19,625	21,175	1,550
Subtotal	75,991,772	76,805,540	34,508,288	35,537,307	34,508,288	35,088,397	1,418,101
Interceptor System							
Interceptor Mains	29,560,547	29,560,547	7,272,066	7,567,672	7,272,066	7,567,672	295,605
Force Mains	1,482,479	1,482,479	276,991	291,815	276,991	291,815	14,825
Subtotal	31,043,026	31,043,026	7,549,057	7,859,487	7,549,057	7,704,272	310,430
Treatment and Disposal							
Treatment and Disposal Structures	11,680,596	11,730,521	6,997,549	7,364,781	6,997,549	7,364,781	-
Preliminary Equipment	1,462,769	1,462,769	234,297	292,808	234,297	292,808	58,511
Primary equipment	4,198,659	4,198,659	4,177,636	4,198,659	4,177,636	4,198,659	139,815
Secondary equipment	8,221,652	8,277,854	7,138,756	7,413,473	7,138,756	7,413,473	274,717
Advanced Equipment	219,279	219,279	122,684	131,457	122,684	131,457	8,771
Chlorination Equipment	1,252,141	1,342,191	1,252,141	1,255,144	1,252,141	1,253,643	86,521
Sludge treatment	13,657,997	13,657,997	6,850,324	7,533,223	6,850,324	7,533,223	682,900
Plant Site Piping	114,592	114,592	4,584	6,875	4,584	6,875	2,292
Monitoring Equipment	243,100	243,100	224,070	240,284	224,070	240,284	16,215
Outfall Sewer	1,179,759	1,179,759	1,000,099	1,029,593	1,000,099	1,029,593	29,494
Sewage Collection Land	129,783	129,783	-	-	-	-	-
Treatment and Disposal Land	331,080	1,534,820	-	-	-	-	-
Subtotal	42,691,407	44,091,324	28,002,140	29,466,297	28,002,140	28,735,420	1,299,235
General Equipment and Plant							
General Plant Land	713,790	713,790	-	-	-	-	-
General Structures & Improvements	2,655,587	2,692,009	771,897	825,372	771,897	825,372	53,476
Furniture & Improvements	101,604	101,604	80,232	86,125	80,232	86,125	5,893
Computer Equipment	128,634	128,634	92,300	108,756	92,300	108,756	34,345
Transportation Equipment	2,759,879	3,201,372	1,946,836	1,986,576	1,946,836	1,986,576	396,423
Work Equipment	554,181	554,181	266,392	290,419	266,392	290,419	41,564
Tools/Shop Equipment	413,904	422,723	243,060	267,322	243,060	267,322	24,262
Laboratory Equipment	187,675	187,675	101,184	112,070	101,184	112,070	10,885
Communication Equipment	2,228	2,228	2,228	2,228	2,228	2,228	334
SCADA System Equipment	370,295	370,295	155,358	189,424	155,358	189,424	34,067
Other Equipment	253,483	263,448	84,288	99,279	84,288	99,279	14,991
Subtotal	8,141,260	8,637,959	3,743,775	3,967,571	3,743,775	3,855,673	616,241
Total Treatment Plant, Interceptor and General	81,875,693	83,772,309	39,294,972	41,293,355	39,294,972	40,295,365	2,225,906
Grand Total	\$ 157,867,465	\$ 160,577,849	\$ 73,803,260	\$ 76,830,662	\$ 73,803,260	\$ 75,383,762	\$ 3,644,008

		2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Kenosha Water Utility												
2022 Sewer Rate Review												
Table 19 - Cash Flow Projections												
Assumptions												
Inflation	2.5%											
Capital Expenses - % Debt Funded	80%											
Interest Rate	4%											
Loan Term (years)	20											
Annual Population Growth Rate (Kenosha) *	0.4%											
Annual Population Growth Rate (Pleasant P) *	1.2%											
Cash Sources												
Revenue												
City		\$ 8,595,432	\$ 11,888,743	\$ 11,936,298	\$ 11,984,043	\$ 12,031,979	\$ 12,080,107	\$ 12,128,428	\$ 12,176,941	\$ 12,225,649	\$ 12,274,552	\$ 12,323,650
Wholesale		2,352,673	3,102,408	3,139,636	3,177,312	3,215,440	3,254,025	3,293,073	3,332,590	3,372,581	3,413,052	3,454,009
Hauled		112,123	193,959	194,734	195,513	196,295	197,081	197,869	198,660	199,455	200,253	201,054
Miscellaneous		277,105	277,105	278,213	279,326	280,444	281,565	282,692	283,822	284,958	286,098	287,242
Impact Fees		400,000	400,000	400,000	400,000	400,000	400,000	400,000	400,000	400,000	400,000	400,000
Total Cash Sources		\$ 11,737,334	\$ 15,862,214	\$ 15,948,882	\$ 16,036,195	\$ 16,124,158	\$ 16,212,778	\$ 16,302,061	\$ 16,392,014	\$ 16,482,643	\$ 16,573,954	\$ 16,665,955
Capital Expenses **		\$ 8,299,000	\$ 10,300,000	\$ 10,762,500	\$ 11,031,563	\$ 11,307,352	\$ 11,590,035	\$ 11,879,786	\$ 12,176,781	\$ 12,481,200	\$ 12,793,230	\$ 13,113,061
New Debt		\$ 6,639,200	\$ 8,400,000	\$ 8,610,000	\$ 8,825,250	\$ 9,045,881	\$ 9,272,028	\$ 9,503,829	\$ 9,741,425	\$ 9,984,960	\$ 10,234,584	\$ 10,490,449
Debt Paydown†		-	331,960	751,960	1,182,460	1,623,723	2,076,017	2,539,618	3,014,809	3,501,881	4,001,129	4,512,858
Total Debt		\$ 6,639,200	\$ 14,707,240	\$ 22,565,280	\$ 30,208,070	\$ 37,630,229	\$ 44,826,240	\$ 51,790,451	\$ 58,517,067	\$ 65,000,146	\$ 71,233,602	\$ 77,211,193
Cash Uses												
Total O&M **		\$ 9,494,747	\$ 9,732,116	\$ 9,975,419	\$ 10,224,804	\$ 10,480,424	\$ 10,742,435	\$ 11,010,996	\$ 11,286,270	\$ 11,568,427	\$ 11,857,638	\$ 12,154,079
Debt Service		-	488,524	1,082,184	1,660,393	2,222,763	2,768,898	3,298,393	3,810,832	4,305,788	4,782,825	5,241,493
Cash-funded Capital Expenditures		1,659,800	2,100,000	2,152,500	2,206,513	2,261,470	2,318,007	2,375,957	2,435,356	2,496,240	2,558,646	2,622,612
Total Cash Uses		\$ 11,154,547	\$ 12,320,640	\$ 13,210,103	\$ 14,091,509	\$ 14,964,657	\$ 15,829,340	\$ 16,685,346	\$ 17,532,459	\$ 18,370,456	\$ 19,199,109	\$ 20,018,184
Net Cash Flow		\$ (7,716,213)	\$ 3,541,574	\$ 2,738,779	\$ 1,944,685	\$ 1,159,501	\$ 383,438	\$ (383,285)	\$ (1,140,444)	\$ (1,887,812)	\$ (2,625,154)	\$ (3,352,230)
Debt Coverage		N/A	1167%	464%	264%	171%	118%	85%	62%	46%	34%	26%
Cash Reserve		\$ 23,972,362	\$ 27,513,936	\$ 30,252,715	\$ 32,197,401	\$ 33,356,901	\$ 33,740,340	\$ 33,357,055	\$ 32,216,611	\$ 30,328,798	\$ 27,703,644	\$ 24,351,414
Cash Reserve as % O&M		252%	283%	303%	315%	318%	314%	303%	285%	262%	234%	200%

* From 20-year Department of Administration projections. Used to grow revenue annually.
 ** Capital expenditures are an average based on recent historical spending of \$7.5 million/year, plus \$1 million/year for manhole rehabilitation and \$2 million/year for main replacement/lining/rehabilitation
 Capital expenditures in 2022 are assumed to be cash funded. Capital expenditures beyond 2023 are grown annually by inflation.
 *** O&M grown by inflation

Definitions

BOD	Biochemical Oxygen Demand: a measure of pollutional strength of domestic and industrial wastes. It is defined as the amount of oxygen required to stabilize decomposable organic matter under aerobic conditions.
cf	Cubic Feet
CIAC	Contributions in aid of Construction: any amount of money or other property contributed to provide sewerage services to the extent that the purpose of the contribution is to provide for the expansion, improvement, or replacement of the utility's sewerage disposal facilities.
gal	Gallon
I/I	Inflow and Infiltration of ground and/or storm water that enters the sanitary sewer system
lb or lbs	Pound(s)
loadings	Amount of BOD, SS and P in the wastewater
mg or MG	Million Gallons
mg/l	milligrams per litre
O & M	Operations and Maintenance
P	Phosphorus: total phosphorus to be treated
ROI	Return on Investment: A source of money used for reinvestments in additions, replacements, and improvements to the wastewater collection and treatment facilities. According to the Wisconsin Public Service Commission methods, it is computed by taking a percentage of the Utility's rate base. Return on Investment is also used to finance debt service costs.
SS	Suspended Solids: Total suspended matter that either floats on the surface or is in suspension in water, wastewater, or other liquids and that is removable by laboratory filtering as prescribed in the standard methods
WTF	Wastewater Treatment Facility