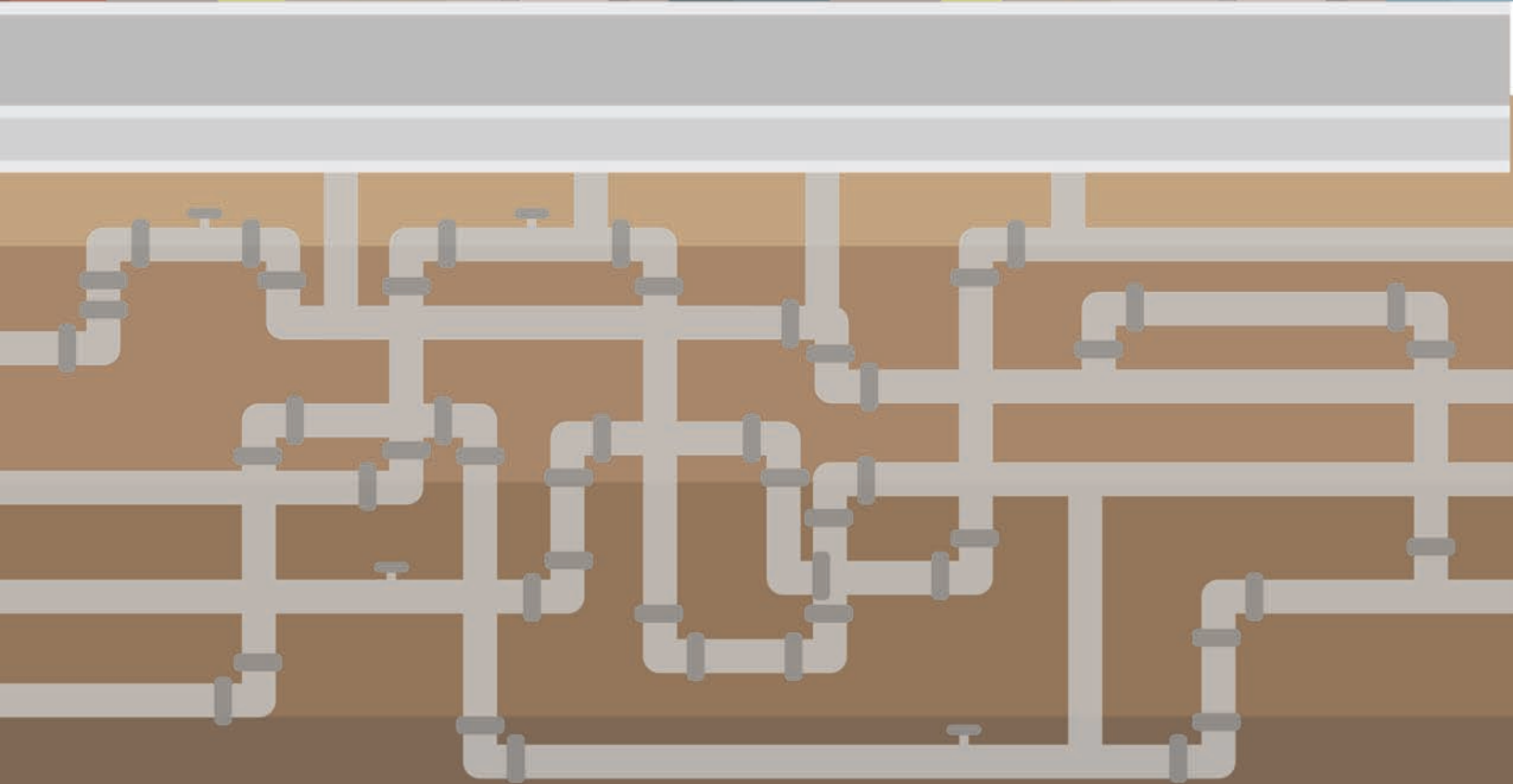




REPORT BRIEF

BENEATH THE STREETS:

THE OUTLOOK FOR METRO MILWAUKEE'S LARGEST
WATER AND SEWER INFRASTRUCTURE ASSETS



PUBLIC POLICY FORUM

The millions of miles of water mains and sewers that run beneath the country's cities, villages, and towns seldom receive much public scrutiny. That changed, however, in January 2016, when a water crisis erupted in Flint, Michigan. The crisis arose when improperly treated water from the Flint River caused lead from aging pipes to leach into the city's drinking water supply. To many, it was emblematic of an egregious indifference to aging roads, bridges, and pipes throughout the nation, which was now endangering the health and welfare of all U.S. citizens.

To what extent are the largest local governments in Greater Milwaukee effectively addressing their infrastructure needs, and do they have the financial capacity to meet their infrastructure challenges going forward? Those are questions the Public Policy Forum hopes to answer in a multi-part series of reports on local government infrastructure in metro Milwaukee.

In our first report (*A Fork in the Road?*¹), released in September 2016, we focused on transportation infrastructure owned by Milwaukee County and the City of Milwaukee. In this report – our second in the series – we explore water and wastewater treatment infrastructure owned by the Milwaukee Metropolitan Sewerage District (MMSD), the City of Milwaukee's Department of Public Works (DPW), and the City-owned Milwaukee Water Works (MWW), a self-financing water utility.

MILWAUKEE METROPOLITAN SEWERAGE DISTRICT

MMSD is a regional government that provides sewer and wastewater treatment services to about 1.1 million residents in Milwaukee County and parts of surrounding counties. MMSD serves 28 municipalities, including 18 of the 19 municipalities in Milwaukee County, which are considered district members (South Milwaukee is the exception). Another 10 communities outside Milwaukee County receive MMSD services but are not members.

INFRASTRUCTURE CONDITION

MMSD's capital assets portfolio consists of several different classes, categories, and types of infrastructure. For our analysis, we opted to focus on the condition of major assets that reflect the District's highest priorities: the conveyance system and water reclamation facilities.

The conveyance system is the system of large pipes that move wastewater from collector sewers owned by municipalities within the district to one of two reclamation facilities: the Jones Island facility in Milwaukee or the South Shore facility in Oak Creek. The main portion of the conveyance system is the Metropolitan Interceptor Sewer (MIS) system. The system also includes the Inline Storage System (ISS) – otherwise known as the Deep Tunnel – and the Northwest Side Relief Sewer (NWSRS), although these storage tunnels are treated as separate capital assets. The District's water reclamation facilities are where wastewater is treated for discharge back into Lake Michigan.

As shown in the snapshot, most of MMSD's capital assets, and particularly those associated with the District's conveyance system, are in good condition.

¹ The report can be accessed at <http://publicpolicyforum.org/research/fork-road-outlook-transportation-infrastructure-city-and-county-milwaukee>.



Snapshot: MMSD Infrastructure Condition

Sewers (MIS)



The majority of MIS conveyance pipes are in very good condition. We find that 178 miles (70%) of MIS pipes currently have a PACP score of 0-3, which means they have approximately 70 to 100 years of useful life remaining.

Sewers (ISS and NWSRS)



A 2012 inspection yielded no deficiencies or concerns that prompted recommendations for repair or rehabilitation of the ISS tunnel. While an inspection report for the NWSRS tunnel has not yet been completed, we believe the likelihood that it will need repair or rehabilitation within the five-year timeframe considered in this report is very low.

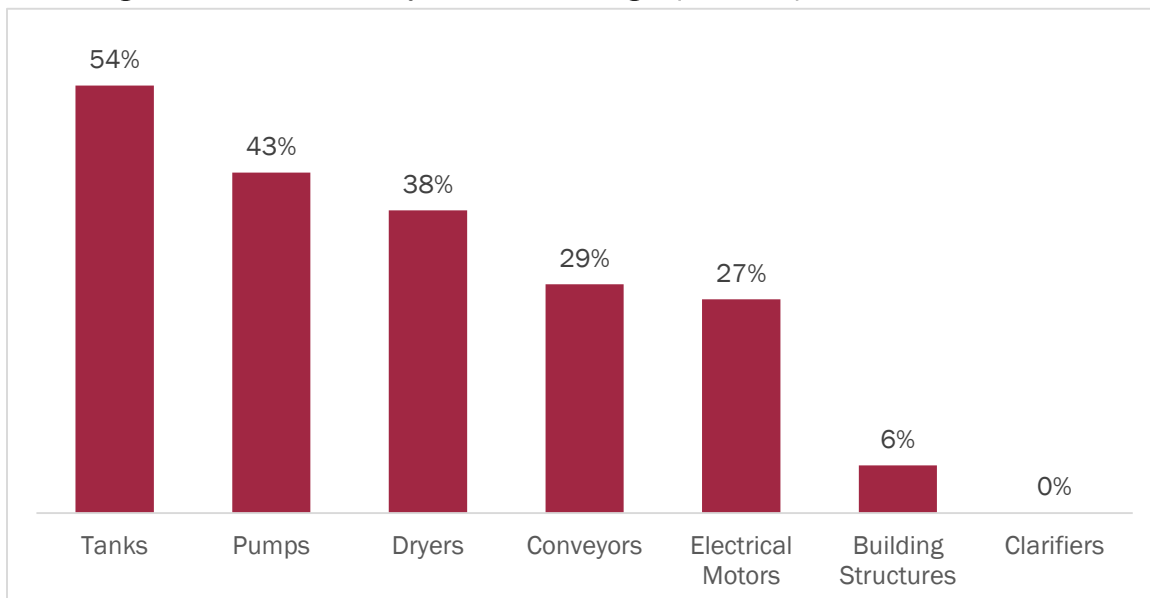
Reclamation Facilities



Two of the seven asset types we analyzed – building structures and clarifiers – are in very good condition. However, sizable percentages of the remaining assets either have exceeded their expected replacement year or will do so within the next five years.

MMSD's biggest potential challenge comes from its water reclamation facilities, where we found that a large number of assets have exceeded or will soon exceed their expected replacement dates, as shown in the chart below. While this is not a cause for alarm, MMSD will need to inspect these assets on a more detailed level to determine which should be overhauled or replaced, and which may only need maintenance.


Percentage of reclamation facility assets exceeding expected replacement now or within five years



CAPITAL FINANCE CAPACITY

In 2017, MMSD's adopted budget totals \$309.6 million, with Operations & Maintenance (O&M) at \$90.4 million and capital (including debt service) at \$219.2 million. The vast majority (79%) of revenues in the O&M budget come from user charges, which are billed to each of the 28 municipal members. MMSD's capital budget, on the other hand, receives a substantial share of its support from property tax levy and payments from non-member communities. Overall, as shown in the snapshot, we find that the District has a sound, yet ambitious, capital financing plan moving forward.

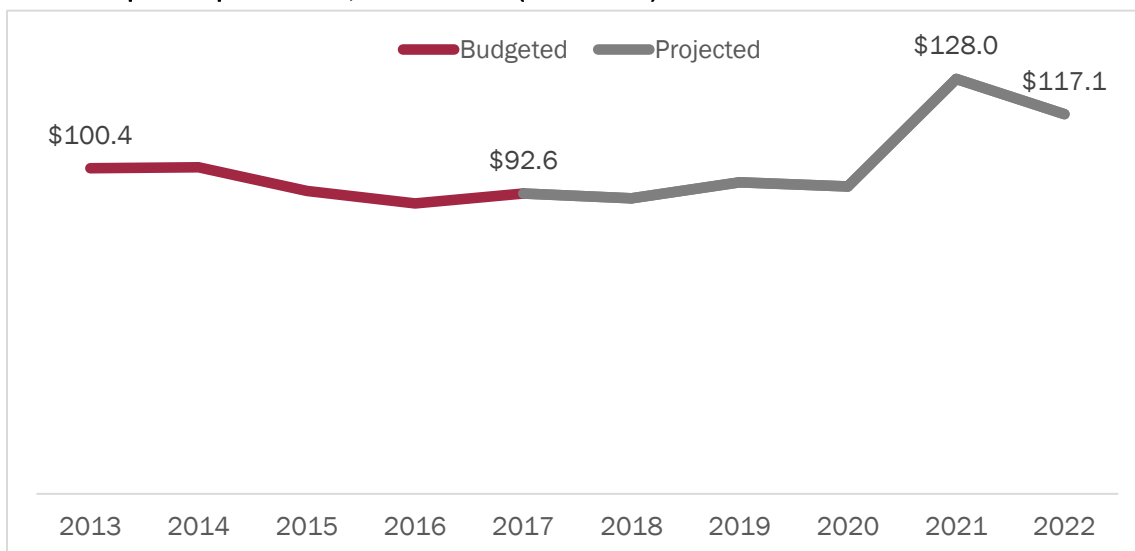
Snapshot: MMSD Fiscal Capacity



MMSD engages in detailed financial planning and has a realistic six-year plan in place to address its major infrastructure needs. That plan is built on an assumption that property taxes will increase by 4% annually. Such increases would substantially exceed the projected growth in inflation, thus casting some doubt on their political achievability.

After several years of diminishing or flat expenditures, MMSD's capital budget is anticipated to inch upward in 2019 and then grow substantially in 2021, as shown in the chart below. In fact, the \$35.4 million increase between the 2017 budgeted amount and the 2021 projected amount would constitute growth of 38%.

MMSD capital expenditures, 2013-2022 (in millions)



The District currently is preparing its 2050 facilities plan, which will provide an initial plan to address capital expenditure needs over a long-term horizon. Some impact might be seen in the 2018 budget, but it is more likely that new spending identified in the 2050 plan will begin to materialize in the 2019 budget. Because much of the equipment in the two water reclamation facilities is nearing or at the end of its planned useful life, it is anticipated that many new capital needs will be identified.



Given the potential projected boost in capital spending of nearly 40% by 2021, it is important to consider the impacts on debt and on property tax-supported debt service. With regard to the former, MMSD has seen its outstanding debt shrink by 8% since 2013 (from \$988 million to \$908 million), which positions it to be able to effectively absorb increased borrowing.

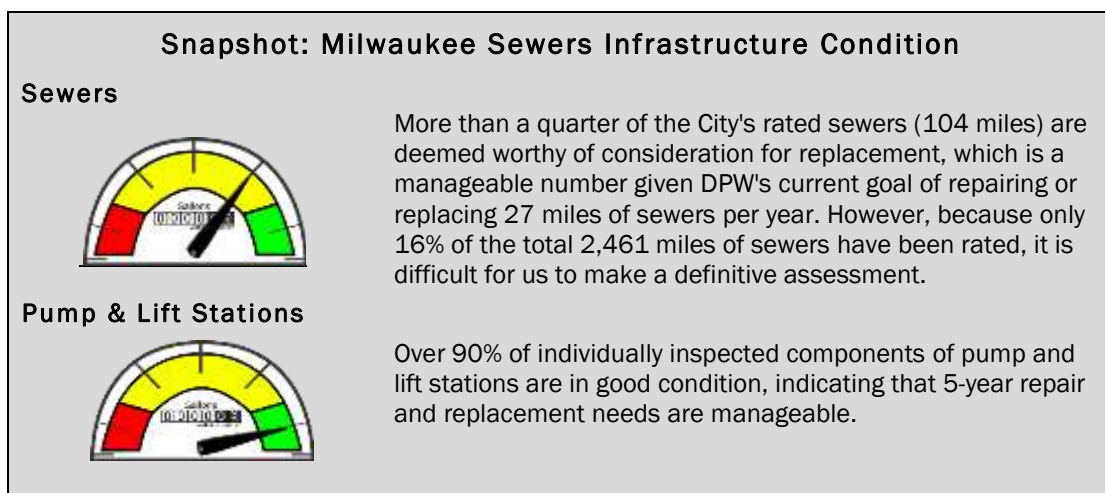
The impact on property taxpayers would be more severe, however. To accommodate projected debt service needs produced by anticipated borrowing amounts, the Long-Range Financing Plan projects annual 4% growth in the District's property tax levy between 2018 and 2022. That is not an outrageous demand on taxpayers, but it does exceed the typical ask of other local governments in the region, and it is likely to exceed the rate of inflation.

CITY OF MILWAUKEE SEWERS

The City of Milwaukee owns and maintains approximately 2,461 miles of sewers. Milwaukee's sewers play a vital role in the wastewater treatment process, collecting residential, commercial, and manufacturing wastewater and discharging it into MMSD's interceptor system. The City uses a Sewer Maintenance Fund – which operates as an enterprise fund and receives no property tax levy support – to pay for operations and capital improvement projects related to its sewers. Its Department of Public Works (DPW) maintains the Sewer Maintenance Fund, into which usage fees from residential and commercial users are deposited.

INFRASTRUCTURE CONDITION

The City's sewer infrastructure consists primarily of the sewers themselves and facilities that provide for conveyance. For our analysis, we focus mainly on sewers but also provide brief assessment of pump and lift stations given their critical role in preventing floods during heavy rainstorms. As shown in the snapshot below, we find Milwaukee sewers generally to be in a manageable state, and its pump and lift stations to be in good condition.

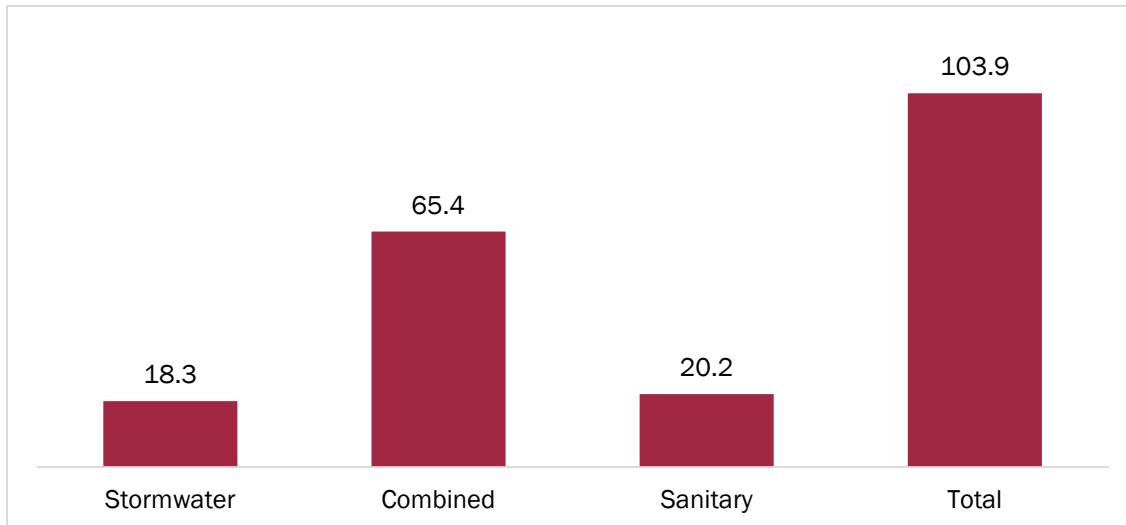


City engineers do not examine sewers that are less than 40 years of age unless a leak has been identified or a paving project will expose the sewer. As of late last year, 395 miles of City sewers had been inspected and rated (16% of the total). Sewers that receive an index rating of 65 or below are



placed on a list of those needing rehabilitation or replacement. Of all rated sewers, we find that 104 miles of the 395 miles that have been rated (26%) fall below that threshold. The chart below breaks down the total by type of sewer and shows that more than three fifths are combined sewers.

Miles of sewers with an index rating of 65 or below by type of sewer



Overall, this is a challenging situation for City leaders, but not one that is cause for panic. If DPW is able to live up to its goal of lining or replacing 27 miles of sewers per year, then it would be able to rehabilitate or replace all 104 miles in four years. Of course, additional sewers outside of those 104 miles that have not been rated already may be in need of attention or may fail during those four years, so it is difficult to make a definitive condition assessment.

CAPITAL FINANCE CAPACITY

The Sewer Maintenance Fund's operating expenditures are budgeted at \$70.2 million in 2017 and its capital projects at \$38.7 million. The two fees that support the Fund are sewer maintenance and stormwater management fees, both of which are charged directly to users. Combined, the two fees will capture \$62 million in 2017. As shown in the snapshot below, the City has ample capacity to support its sewer needs over the next five years, though steady fee increases will be required.

Snapshot: Milwaukee Sewer Maintenance Fund Fiscal Capacity

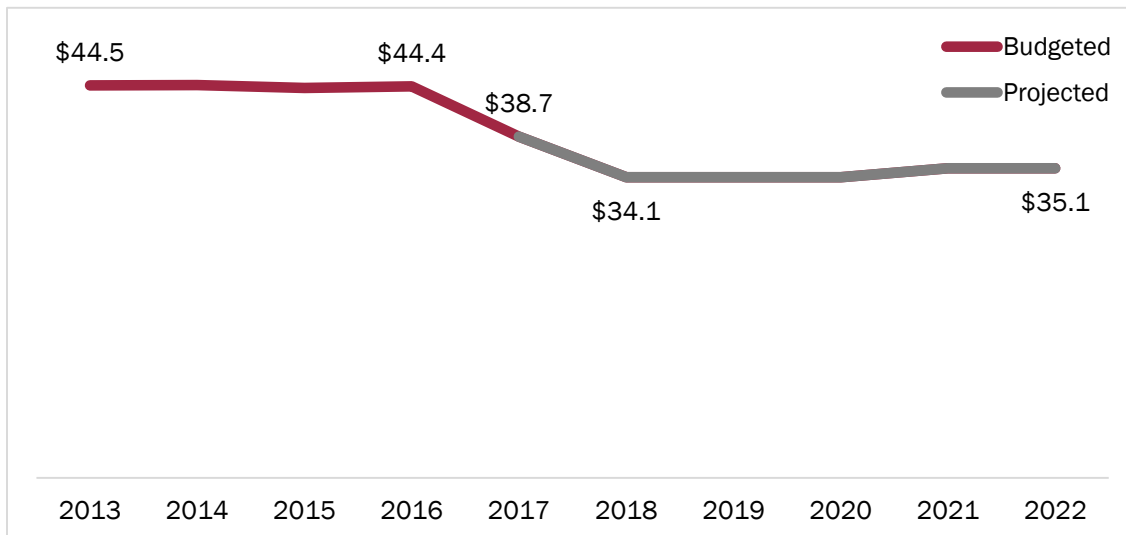


A recent surge in capital spending in response to flooding from historic rainfalls in 2008-10 has positioned DPW to ramp down capital spending for the next five years. Nevertheless, increasing debt service payments and the need to continue to line or replace at least 27 miles of sewers per year will continue to put pressure on stormwater and sewer fees, which already have increased steadily during the past five years.



The Sewer Maintenance Fund's capital expenditures exceeded \$44 million annually from 2013-2016 before declining by nearly \$6 million in 2017, as shown in the chart below. DPW's five-year capital plan shows that the Fund's capital spending is projected to decrease again in 2018 and remain relatively flat through 2022. According to DPW officials, historic rainstorms in 2008-2010 revealed significant capital needs that led to an aggressive push to conduct sewer lining and replacement over the next several years. With this initial surge of work taken care of, DPW now has the ability to lower capital spending from the Sewer Maintenance Fund over the next five years.

Sewer Maintenance Fund capital expenditures, 2013-2022 (in millions)



When spending surged after the severe storms of 2008-2010, the Sewer Maintenance Fund increased its borrowing. The increase in borrowing has produced an increase in debt service related to Clean Water Fund loans and revenue bonds. At the same time, the Fund gradually has been retiring its older General Obligation debt, which has tempered the increase in overall debt service payments. Nevertheless, the increases have placed pressure on the Fund's fee structure, and increased debt service payments will continue to exert such pressure for the foreseeable future.

The projected future impact on stormwater and sewer fees is difficult to gauge. Both fees have increased steadily during the past five years, including a 5% increase in the stormwater management fee and a 3% increase in the local sewer charge in 2017. DPW officials expect to request 3-5% annual increases in both fees going forward.

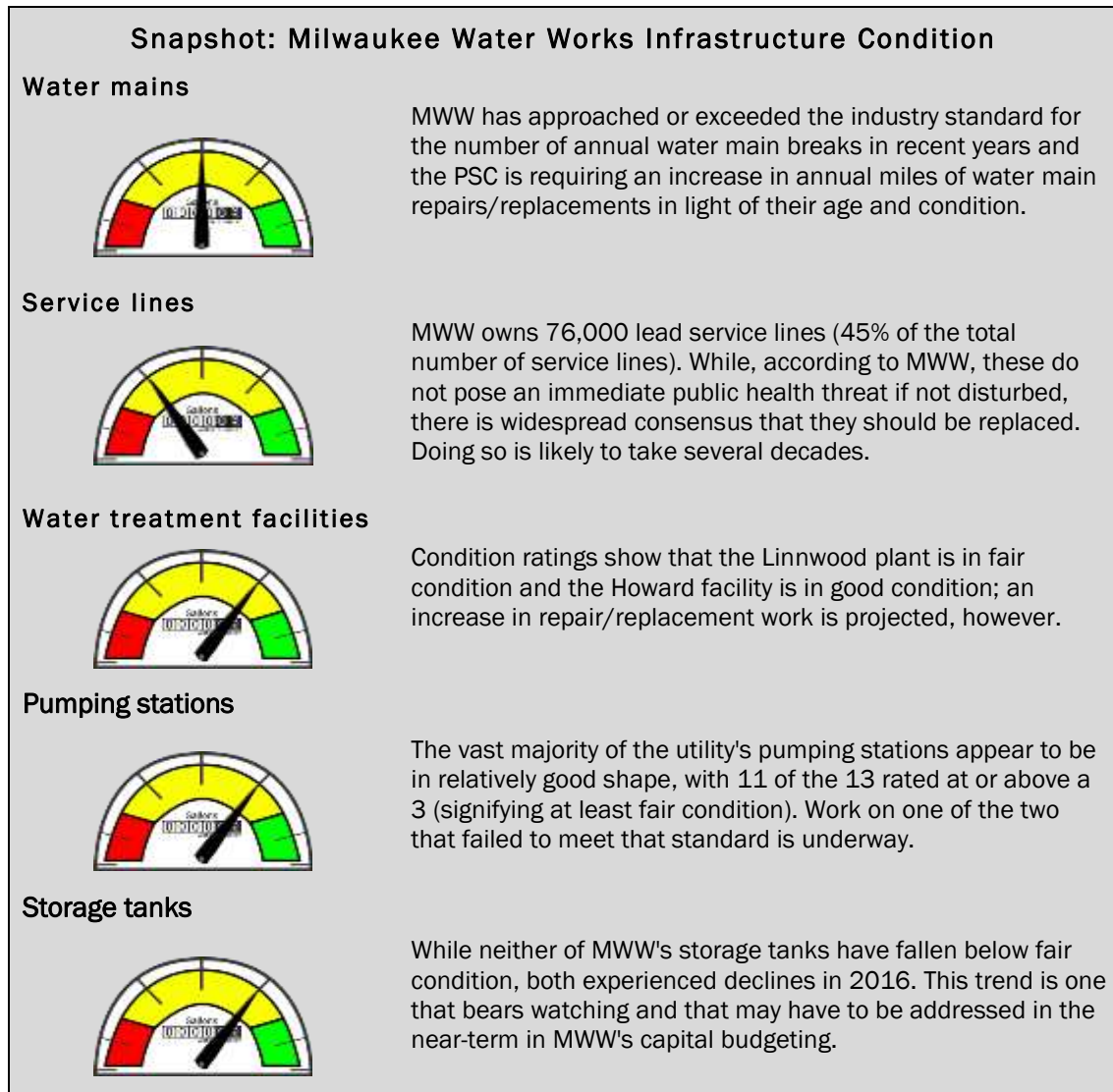
MILWAUKEE WATER WORKS

The Milwaukee Water Works (MWW) is a regional provider of drinking water that serves the City of Milwaukee and 15 suburban communities. MWW maintains 1,960 miles of water mains, 169,000 smaller service lines, 13 pumping stations, two elevated storage tanks, and two water treatment facilities. MWW is housed within the City of Milwaukee government, where it functions as an enterprise fund. MWW is regulated by the Public Service Commission (PSC), and its operations are financed mostly through fees charged to water users, which are subject to PSC review and approval.



INFRASTRUCTURE CONDITION

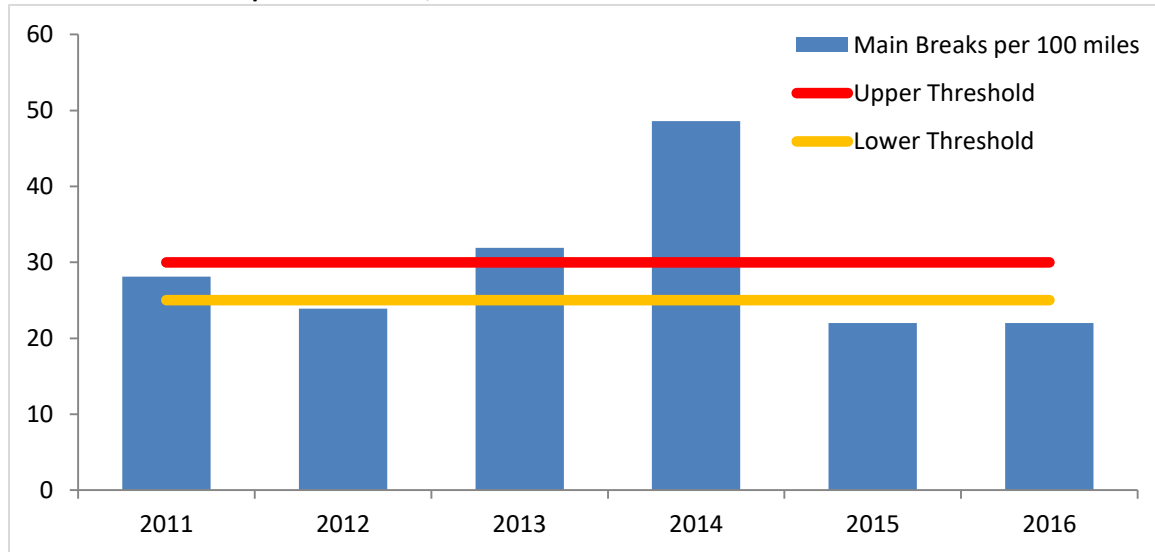
Our analysis of MWW's capital assets portfolio focuses on two types of pipes – water mains and service lines – as well as treatment facilities, pumping stations, and storage tanks. As shown in the snapshot below, MWW's service lines and water mains pose substantial replacement challenges, while its remaining infrastructure largely is in good or manageable condition going forward.



For water mains, the need for enhanced replacement activity is linked to the fact that breaks have hovered near or above the standard of no more than 25-30 breaks per 100 miles over the past five years, as shown in the chart below. In addition, the PSC recently directed MWW to increase its pace of replacements, which will grow from 15 miles per year in 2017 to 20 miles by 2020 (as recently as 2012, MWW replaced only 2.6 miles of water mains).



Water main breaks per 100 miles, 2011-2016




The need to commit significant capital resources to replacing service lines, meanwhile, is based on the fact that about 45% of the utility's 169,000 miles of service lines are composed of lead. Since 1996, MWW has added a corrosion-inhibiting chemical to its drinking water to prevent lead pipes from corroding to the point that lead particles would seep into the water. Consequently, it has not pursued an aggressive policy to replace lead lines.

Beginning in 2017, however, City officials are implementing a far more aggressive approach by mandating that lead service lines be replaced – as opposed only to being repaired – whenever a leak or break is discovered. In addition, MWW will replace lead service lines at 300 licensed child care facilities and eight private schools. MWW plans to increase its number of lead service line replacements until it reaches 1,250 annually by 2022. Despite this expensive and ambitious endeavor, replacement of all publicly-owned lead service lines still would take more than 50 years.

CAPITAL FINANCE CAPACITY

MWW's 2017 budget totals \$131.2 million, with \$102 million for operations and \$29.2 million for capital expenditures. Operating expenditures are financed primarily through fees charged to water users, while MWW typically has relied on cash financing to address its capital needs. As shown in the snapshot below, MWW plans to increase its annual capital spending by nearly 50% between now and 2020, which may require it to issue \$20-\$25 million of new debt annually for the foreseeable future.

Snapshot: Milwaukee Water Works Fiscal Capacity

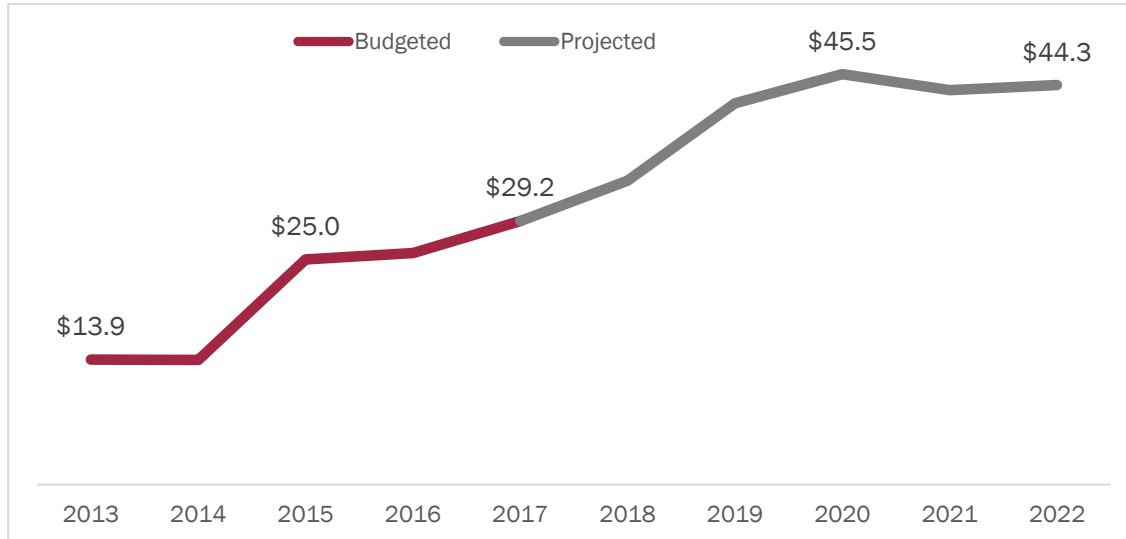


MWW's need to increase its annual capital spending by nearly 50% by 2020 is a daunting challenge. Fortunately, the utility currently enjoys a low level of debt, but a rapidly growing debt burden would require substantial rate increases that the PSC must approve. MWW is engaged in an intensive financial modeling exercise that will spell out these challenges and (presumably) lay out a recommended path forward by this Fall.



As shown in the chart below, MWW experienced a substantial increase in capital spending over the 2013-2017 timeframe, jumping from less than \$15 million in 2013 and 2014 to about \$25 million in the following two years. According to MWW's latest capital planning projections, the utility's capital expenditures are projected to skyrocket to more than \$40 million annually by 2019.

MWW capital expenditures, 2013-2022 (in millions)



The huge surge in capital spending in the coming years stems primarily from MWW's plans to substantially increase its repair and replacement of water mains and – at the same time – to initiate a concerted effort to replace lead service lines. Combined annual capital spending for replacement of water mains and utility-owned service lines is projected to increase from \$22.8 million this year to more than \$35 million by 2022. These figures do not include funds from MWW's operating budget that also will be devoted to replacing service lines.

It is possible that MWW will need to resort to significant annual borrowing to meet this challenge. Under a financial model being prepared by MWW and its financial consultants, the utility would issue \$20 million of revenue bonds in 2018 and 2019 and \$25 million from 2020-2022 to supplement cash and help finance capital needs. We estimate that such a scenario could cause annual debt service to grow from \$7 million in 2018 to \$14.5 million in 2022.

MWW's ability to implement this plan will depend on the willingness of elected officials and the PSC to approve necessary rate increases to accommodate the planned capital spending and borrowing. We cannot estimate the precise size of those increases at this time, though it is clear they would be sizable. It also is unknown whether MWW would seek one or two large increases during the next five years, or whether it would seek to "smooth" the impact through a series of smaller annual increases.

Another variable is the ability of the City's General Fund to accommodate assistance to property owners to replace the privately-owned portions of lead service lines. The City has committed to paying two-thirds of the cost of replacing those portions and to help property owners finance the other third with no-interest loans. If MWW reaches its goal of replacing 1,250 lead service lines per year, then the City could be required to issue nearly \$5 million of additional G.O. debt per year to assist homeowners with the portions of the lines that connect directly to their homes.



CONCLUSION

Our analysis of water, sewer, and wastewater treatment infrastructure owned by the City of Milwaukee and MMSD finds that the vast majority is being properly managed and that the financing of future repair and replacement needs is being properly planned. Unfortunately, while adherence to sound capital asset management practices is important, it will not soften the impact of those repairs and replacements on local property taxpayers and ratepayers, which will be substantial.

Specific key findings emanating from our review of water, sewer, and wastewater infrastructure owned by MMSD and the City of Milwaukee include the following:

- **MMSD's capital assets largely are in good condition, but keeping them that way demands a healthy commitment from property taxpayers.** MMSD conducts intensive capital planning and has a firm handle on how it should finance its infrastructure challenges. However, its annual capital expenditures are projected to surge to \$128 million in 2021 (up 38% from the \$92.6 million budgeted in 2017), and addressing the needs of its capital assets could require annual property tax levy increases of 4% in each of the next five years.
- **The age and condition of DPW's sewers demands an ambitious lining and replacement schedule that will continue to put pressure on sewer and stormwater fees.** We find that over a quarter of the City's rated sewer pipes (104 miles) should be considered for replacement. That is a manageable amount given the City's goal of lining or replacing 27 miles of sewers per year, but meeting that goal likely will require annual rate increases in sewer and stormwater fees of 3-5% going forward.
- **MWW must aggressively ramp up capital spending to address the condition of its aging water mains.** MWW needs to increase the annual miles of water main replacement from the current 15 to 20 three years from now. This will necessitate \$29 million in capital spending in 2020, which is an \$8.2 million (36%) increase from 2017 and more than triple the amount spent in 2013. Meeting that threshold may require MWW to substantially increase annual borrowing, which could necessitate sizable rate increases to cover required debt service.
- **Replacement of MWW's lead service lines may take decades to accomplish and will impose a significant and prolonged impact on ratepayers and taxpayers.** MWW intends to expedite its replacement of its 76,000 lead service lines in light of public health concerns, with current plans calling for an increase from the current 300-400 replacements per year to 1,250 by 2022. Such an effort – which could last more than 50 years – could cost ratepayers an additional \$7 million annually for the public portion of the service lines.

This report is the second in a series of reports on local government infrastructure. In future reports, we will conduct similar analyses of buildings, parks, and other infrastructure owned by our largest local governments. After we have a sense of the state of this collective set of local government infrastructure, we then will turn to the question of what new policies or strategies might be considered to address current needs and future challenges.





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