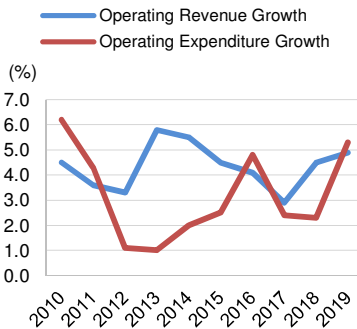


2019 Water and Sewer Medians

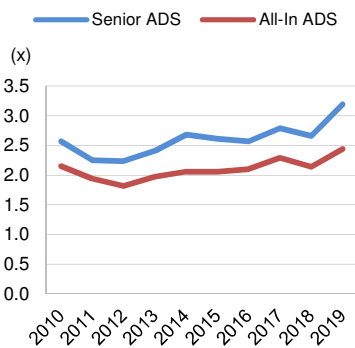
Special Report

Revenue and Expenditure Medians



Source: Fitch Ratings, Fitch Solutions.

Debt Service Coverage Medians



Source: Fitch Ratings, Fitch Solutions.

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Sector Strength Continues

This edition of water and sewer medians, for 2019, continues Fitch Ratings' effort to offer transparency to market participants through clear definitions of certain statistical ratios used in the review of sector credits and quantitative results, specifically as pertaining to retail systems. The medians continue to highlight the sector's overall financial strength in light of ongoing business and capital challenges.

Key Findings

National Medians

Revenue Growth Continues to Climb: Annual revenue growth continued to improve, increasing almost 5% in the current median cycle. Most of the growth was attributable to rate adjustments, consistent with past medians. However, revenues did get a slight bump from increased water sales, which were up about 2% compared to flat sales during the past several years. Sewer flows were also marginally higher, by almost 1%.

Expense Figures Mixed: Operating expenses jumped more than 5% with the 2019 medians, growing at more than double the pace of the past two median cycles and rising faster than operating revenues. However, debt carrying costs were held in check and even declined slightly, to just 18% of revenues, compared with 20% with the 2018 medians.

Strong Debt Service Coverage Continues: Continued revenue gains helped to lift median debt service coverage (DSC) on both a senior and all-in basis to a new high, marking the seventh straight year of total DSC above 2.0x. Utilities are forecasting continued favorable DSC based on planned rate adjustments and moderate future borrowing plans.

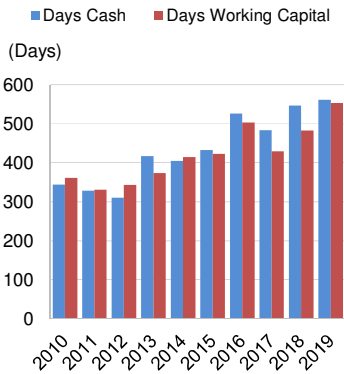
Positive Net Margins: Surplus cash flows benefitted from the stronger DSC and, for the third straight median cycle, fully covered annual depreciation expense (that is, annual renewal and replacement costs). Maintenance of such surplus revenues potentially allows utilities the capacity to maintain depreciating assets on a pay-as-you-go basis without having to borrow for rehabilitation efforts (that is, a steady state).

Liquidity Continues to Climb: Key liquidity metrics continued to grow, with days cash reaching a new high at a very robust 561 days of operating expenses. Liquidity metrics are now over 50% higher than those of a decade ago and are approximately double what they were relative to Fitch's 2007 medians. The level of liquidity provides a significant amount of flexibility for utilities in meeting their capital funding needs and managing fluctuations in operations.

Capital Spending Up, But More Needed: Capital investment approximated the 2018 medians (at 142% of annual depreciation) but was not enough to keep the age of facilities from rising to a new peak (16 years). While planned capital spending per customer is up from the prior year's median, additional spending may be necessary to maintain infrastructure performance.

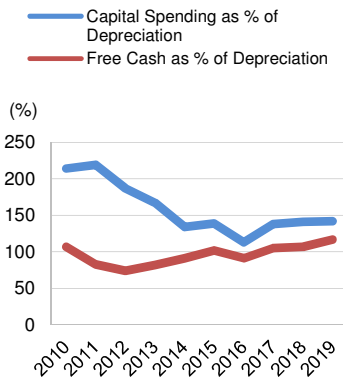
Declining Leverage: Key debt ratios were down over 5% for the year after rising 8% with the 2018 medians. Over the next five years, additional debt is expected to represent a manageable 36% of capital resources, which should limit growth in key debt metrics to 0%–3% annually.

Liquidity Medians



Source: Fitch Ratings, Fitch Solutions.

Cost Recovery and Capital Spending Medians



Source: Fitch Ratings, Fitch Solutions.

Related Criteria

[Rating Criteria for Public Sector Revenue-Supported Debt \(February 2018\)](#)

[U.S. Water and Sewer Rating Criteria \(November 2017\)](#)

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Regional Medians

Far West

The Far West's financial performance continued to be among the strongest of all the regions, posting DSC, liquidity and cash flows that were at or in excess of the national levels. The regional debt burden declined 1% from last year's numbers, and lower future planned issuances relative to the national level should temper escalation in debt levels over the next five years and keep debt metrics marginally below national norms.

Midwest

Financial results overall were marginally better than the 2018 medians, with DSC and free cash improving somewhat. Key debt metrics remained the highest of all the regions and even increased slightly from last year's figures. Borrowing sources relative to capital spending remain the highest in this region, which is expected to keep debt metrics elevated versus those of the other regions over the next several years.

Northeast

Financial results in the Northeast experienced solid gains in DSC, liquidity and cash flows from the prior medians. Key debt metrics remain higher than those of most regions, and planned borrowings of 50% of capital resources will add additional leverage, especially given the slow amortization rate of the region. But ongoing rate adjustments should help to limit erosion in financial metrics over the intermediate term.

Southeast

The Southeast continued to post the strongest financial results overall, outpacing all the other regions in virtually every metric. In addition, debt levels in the Southeast remained favorable relative to those of other systems nationwide. This should remain the case since this region's planned borrowings are among the lowest of all the regions. User charges for this region, which have historically been among the highest relative to income, continue to be slightly higher than the national median but may moderate over the next few years as planned annual rate adjustments are below national expectations.

Southwest

Financial margins within this region also experienced solid gains from the 2018 medians, with DSC, liquidity and cash flows all posting higher levels. Debt metrics have also improved since the 2018 medians and are now among the lowest in the nation. Leverage is expected to climb somewhat over the coming years, but planned rate adjustments, which are above the national norms, should help to preserve financial gains.

Medians Relative to System Size

Large Systems

Large systems (defined as utilities serving 500,000 or more persons), in general, continued to carry the greatest amount of debt and produce the lowest financial margins, although these systems experienced higher than normal growth in operating revenues with the 2019 medians, which helped to preserve DSC levels from the prior year. Facilities remain among the oldest in the nation, but significant spending to date has maintained asset life. Planned capital spending continues to climb, but this is not expected to significantly pressure existing leverage or financial metrics over the next five years.

Midsize Systems

Midsize systems (defined as utilities serving between 100,000 and 499,999 persons) continued to generate among the strongest financial metrics, while carrying debt burdens below the national medians. Financial and leverage metrics improved with the 2019 medians, but the age of facilities declined slightly, despite capital spending in excess of 150% of depreciation. Planned spending per customer is up from the 2018 medians, which could lead to some erosion in financial results over the next few years. However, financial performance should remain solid.

Small Systems

Small systems (defined as utilities serving fewer than 100,000 persons) saw sizable gains in financial results with the 2019 medians, even as capital spending was up 8% for the year. In addition, debt levels fell as most spending was done on a pay-go basis, which dropped leverage metrics to below the national medians. While planned rate adjustments are lower than those of other systems, lack of significant borrowing coupled with relatively low planned spending should preserve financial results and lead to further improvement in leverage metrics over the next couple of years.

Limitations of Medians Analysis in Rating Process

While the medians serve as a useful tool for market participants by allowing for broad assessments and comparisons of credit quality, Fitch Ratings maintains that the data complement the rating process rather than act as a substitute. Thus, when evaluating the medians in relation to the rating process, certain distinctions between them should be noted, as follows.

Point in Time

Medians largely provide a point-in-time snapshot of the rating category, region, class size or sector as a whole, whereas the rating process focuses more on trends at the issuer and specific rating level.

Exclusion of Rating Factors

Only a portion of the factors covered in Fitch’s rating process is reflected in the medians — in particular, qualitative aspects such as management, policies and legal provisions are excluded, although other quantitative ratios are also omitted.

Individual Credit Characteristics Excluded

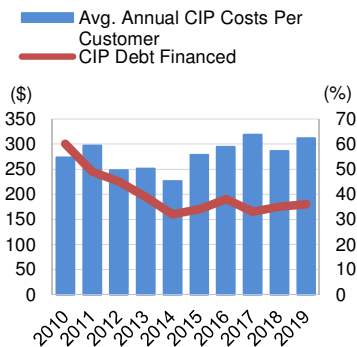
The medians present a composite of the range of credits and do not delineate offsetting strengths or weaknesses at the individual credit level that may affect a rating.

Methodology and Data

Fitch first published its water and sewer medians in 2004 to provide issuers, consultants, analysts, investors and others with a quantitative framework of ratios used in our water and sewer rating process. To this end, Fitch historically has grouped the medians according to their respective area within the criteria review process, and the 2019 medians continue this practice.

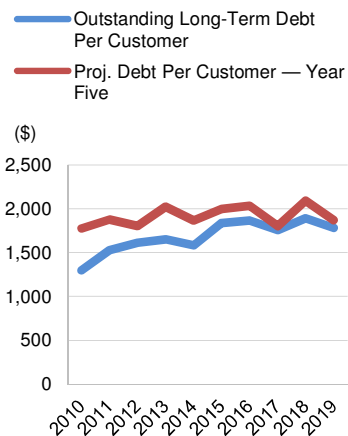
This report also continues Fitch’s presentation of key ratios used in the rating process to give the market a better understanding of the priority in weighting certain ratios. To allow a comparison with prior statistics, Fitch also has included historical information from the 2010–2018 medians

Capital Improvement Program Medians



Source: Fitch Ratings, Fitch Solutions.

Debt Medians



Source: Fitch Ratings, Fitch Solutions.

(see Appendix D, page 9). Fitch expects to add subsequent information annually to Appendix D as new medians are published to allow readers to follow long-term trends.

As with Fitch's prior medians, those for 2019 cover either wholly or predominantly retail systems for which Fitch has taken rating actions on senior lien debt or debt that effectively acts as senior lien obligations. The data include water and sewer revenue bond credits rated between September 2017 and August 2018. Certain credits have been excluded for various reasons, as outlined below. In cases where the same issuer was rated multiple times over the median selection period, only data from the most recent rating were incorporated into the medians.

In the 2019 medians, combined water and sewer utilities accounted for 85 credits (62% of the total), individual water systems numbered 29 (21%) and individual sewer systems totaled 24 (17%). Certain credits with ratings of 'BBB+' or below were excluded for median-reporting purposes from the 2019 data set because Fitch traditionally has viewed these issuers as outliers with extenuating circumstances. Also excluded were issuers for which a majority of system revenues were derived from other utility (such as electric power) revenues. In both cases, the data have a tendency to skew median results.

Appendix A: Water and Sewer Median Definitions

Median	Definition	Significance
Population	Estimated population of the service area.	Provides an overview of the scope of operations in the service area.
MHI (\$)	Median household income (MHI) for the primary municipal entity served by the utility based on the most recent year as reported by the U.S. Census Bureau.	Indicates the overall wealth of average residential customers and their ability to pay for services.
Total Water Customers	Most recent water customer accounts total, if applicable.	Provides an overview of the scope of operations in the service area.
Water Customer Annual Growth (%)	Percentage of historical average annual customer account growth rates over the prior five-year period.	Indicates the pressures a utility may be facing to meet customer demands.
Total Sewer Customers	Most recent sewer customer accounts total, if applicable.	Provides an overview of the scope of operations in the service area.
Sewer Customer Annual Growth (%)	Percentage of historical average annual customer account growth rates over the prior five-year period.	Indicates the pressures a utility may face to meet customer demands.
Top 10 Customers as % of Revenues	Total annual receipts from the 10 largest customers divided by total operating system revenues for the year.	Indicates revenue concentration levels.
Age of Plant (Years)	Total accumulated depreciation divided by annual depreciation.	Indicates age of facilities and potential deferred plant maintenance.
Water Treatment Capacity Remaining (%)	Percentage of average permitted treatment capacity remaining above most recent production level.	Indicates the pressures a utility may face to meet customer demands.
Sewer Treatment Capacity Remaining (%)	Percentage of average permitted treatment capacity remaining above most recent production level.	Indicates the pressures a utility may face to meet customer demands.
Average Annual CIP Costs per Customer (\$)	Total projected capital needs in the CIP divided by the number of years of the CIP, divided by total number of customers (for a combined utility, the aggregate number of water and sewer accounts is used).	Indicates effect of the CIP on ratepayers (principal only).
CIP Debt Financed (%)	Percentage of issuer's total CIP expected to be debt financed.	Indicates future debt leverage of capital assets.
Total Outstanding Debt to Net Plant Assets (%)	Total amount of utility long-term debt divided by the net asset value of the plant.	Indicates existing debt leverage of capital assets.
Debt to FADS (x)	Total amount of utility long-term debt divided by the total funds available for debt service.	Indicates existing debt leverage relative to existing funds available for debt service.
Debt to Equity (x)	Total amount of utility long-term debt divided by unrestricted net assets.	Indicates existing debt leverage relative to system equity.
Total Outstanding Long-Term Debt per Customer (\$) ^a	Total amount of utility long-term debt divided by the total number of utility customers (for a combined utility, the aggregate number of water and sewer accounts is used).	Indicates the existing debt burden attributable to ratepayers (principal only).
Total Outstanding Long-Term Debt per Capita (\$) ^a	Total amount of utility long-term debt divided by total population served by the utility.	Indicates the existing debt burden of a utility attributable to each person served by the utility (principal only).
10-Year Principal Payout (%)	Percentage of principal amortizing within 10 years.	Indicates longevity of system debt.
20-Year Principal Payout (%)	Percentage of principal amortizing within 20 years.	Indicates longevity of system debt.
Projected Debt per Customer — Year Five (\$) ^a	Total projected outstanding system debt (existing debt less scheduled amortization plus planned issuances) divided by total outstanding projected customers five years from the date of the rating (for a combined utility, the aggregate number of water and sewer accounts is used and is inflated by anticipated growth).	Indicates the total debt burden to ratepayers five years from the date of the rating (principal only).
Projected Debt per Capita — Year Five (\$) ^a	Total projected outstanding system debt (existing debt less scheduled amortization plus planned issuances) divided by total projected population served by the utility (population is inflated based on anticipated growth).	Indicates the total debt burden of a utility to each person served by the utility five years from the date of the rating (principal only).
Individual Water/Sewer Utility Avg. Monthly Residential Bill (\$)	Average monthly residential bill for individual utilities; when billing was not calculated on a monthly basis, it was converted to a monthly amount for standardization.	Indicates the monthly cost of service to residential customers.
Individual Water/Sewer Utility Avg. Annual Bill as % of MHI	Average monthly residential bill for individual utilities times 12, divided by the most recent yearly MHI as reported by the U.S. Census Bureau.	Indicates the annual burden for cost of service to ratepayers.
Combined Water/Sewer Utility Avg. Monthly Residential Bill (\$)	Average monthly residential bill for combined utilities; when billing was not calculated on a monthly basis, it was converted to a monthly amount for standardization.	Indicates the monthly cost of service to residential customers.
Combined Water/Sewer Utility Avg. Annual Bill as % of MHI	Average monthly residential bill for combined utilities times 12, divided by the most recent yearly MHI as reported by the U.S. Census Bureau.	Indicates the annual burden for cost of service to ratepayers.
Average Annual Projected Water Rate Increases (%)	Sum of planned annual rate increases divided by the number of years over which increases are forecast.	Indicates the future expected burden for cost of service to ratepayers.
Average Annual Projected Sewer Rate Increases (%)	Sum of planned annual rate increases divided by the number of years over which increases are forecast.	Indicates the future expected burden for cost of service to ratepayers.
Three-Year Historical Average Senior Lien ADS Coverage (x) ^a	Most recent three-year historical average of annual revenues available for debt service divided by respective senior lien debt service for the year.	Indicates the historical trend in senior lien ADS coverage.
Senior Lien ADS Coverage (x) ^a	Current-year revenues available for debt service divided by current-year senior lien debt service.	Indicates the financial margin to meet current senior lien ADS with current revenues available for debt service.

^aIndicates key ratio. CIP – Capital improvement program. FADS – Funds available for debt service. ADS – Annual debt service. MADS – Maximum annual debt service.

Source: Fitch Ratings. Continued on next page.

Appendix A: Water and Sewer Median Definitions (Continued)

Median	Definition	Significance
Senior Lien ADS Coverage Excluding Connection Fees (x)	Current-year revenues available for debt service, excluding one-time revenues such as connection fees, divided by current-year senior lien debt service.	Indicates the financial margin to meet current senior lien ADS with current revenues available for debt service, excluding one-time revenues such as connection fees.
Senior Lien ADS Coverage Net of Transfers Out (x)	Current-year revenues available for debt service, excluding operating transfers out, divided by current-year senior lien debt service.	Indicates the financial margin to meet current senior lien ADS with current revenues available for debt service, excluding transfers out.
Minimum Projected Senior Lien ADS Coverage (x) ^a	Minimum debt service coverage projected typically over the ensuing five-year period, based on revenues available for debt service in any given fiscal year, divided by the respective senior lien debt service amount for that fiscal year.	Indicates the financial margin during the year in which future senior lien ADS coverage is projected to be the lowest.
Senior Lien MADS Coverage (x)	Current-year revenues available for debt service divided by projected senior lien MADS.	Indicates the financial margin to meet projected senior lien MADS with current revenues available for debt service.
Senior Lien Debt Service as % of Gross Revenues	Current-year senior lien debt service divided by current-year gross revenues.	Indicates the level of annual senior lien debt service burden on system operations.
Three-Year Historical Average All-In ADS Coverage (x) ^a	Most recent three-year historical average of annual revenues available for debt service divided by respective total debt service for the year.	Indicates the historical trend in total ADS coverage.
All-In ADS Coverage (x) ^a	Current-year revenues available for debt service divided by current-year total debt service.	Indicates the financial margin to meet current total ADS with current revenues available for debt service.
All-In ADS Coverage Excluding Connection Fees (x)	Current-year revenues available for debt service, excluding one-time revenues such as connection fees, divided by current-year total debt service.	Indicates the financial margin to meet current total ADS with current revenues available for debt service, excluding one-time revenues such as connection fees.
All-In ADS Coverage Net of Transfers Out (x)	Current-year revenues available for debt service, excluding operating transfers out, divided by current-year total debt service.	Indicates the financial margin to meet current total ADS with current revenues available for debt service, excluding transfers out.
Minimum Projected All-In ADS Coverage (x) ^a	Minimum debt service coverage projected typically over the ensuing five-year period, based on revenues available for debt service in any given fiscal year, divided by the respective total debt service amount for that fiscal year.	Indicates the financial margin during the year in which future total ADS coverage is projected to be the lowest.
All-In MADS Coverage (x)	Current-year revenues available for debt service divided by projected total MADS.	Indicates the financial margin to meet projected total MADS with current revenues available for debt service.
All-In Debt Service as % of Gross Revenues	Current-year total debt service divided by current-year gross revenues.	Indicates the level of annual total debt service burden on system operations.
Operating Margin (%)	Operating revenues minus operating expenditures plus depreciation, divided by operating revenues.	Indicates financial margin to pay operating expenses.
Operating Cash Flow Ratio (x)	Cash flows from current operations divided by current liabilities.	Indicates the strength of existing cash flows to meet near-term obligations.
Operating Revenue Growth — Current Year (%)	Most recent audited operating revenues divided by the immediately prior year operating revenues minus one.	Indicates revenue gains.
Operating Revenue Growth — Three-Year Average (%)	Average of operating revenues divided by the immediately prior year operating revenues minus one for the three most recent audited fiscal years.	Indicates revenue gains.
Operating Expenditure Growth — Current Year (%)	Most recent audited operating expenses divided by the immediately prior year operating expenses minus one.	Indicates expenditure pressures.
Operating Expenditure Growth — Three-Year Average (%)	Average of operating expenses divided by the immediately prior year operating expenses minus one for the three most recent audited fiscal years.	Indicates expenditure pressures.
Days of Operating Revenues in Accounts Receivable	Current unrestricted accounts receivable divided by operating revenues, divided by 365.	Indicates rate at which customer revenues are received.
Days Cash on Hand ^a	Current unrestricted cash and investments plus any restricted cash and investments (if available for general system purposes), divided by operating expenditures minus depreciation, divided by 365.	Indicates financial flexibility to pay near-term obligations.
Days of Working Capital ^a	Current unrestricted assets plus any restricted cash and investments (if available for general system purposes), minus current liabilities payable from unrestricted assets, divided by operating expenditures minus depreciation, divided by 365.	Indicates financial flexibility to pay near-term obligations.
Quick Ratio	Current cash plus current receivables divided by current liabilities.	Indicates financial flexibility to pay near-term obligations.
Current Ratio	Current assets divided by current liabilities.	Indicates financial flexibility to pay near-term obligations.
Free Cash as % of Depreciation ^a	Current surplus revenues after payment of operating expenses, debt service and operating transfers out divided by current-year depreciation.	Indicates annual financial capacity to maintain facilities at current level of service from existing cash flows.
Capital Spending as % of Depreciation	Current-year additions to property, plant and equipment divided by current-year depreciation.	Indicates annual improvements made to system facilities relative to level of annual depreciation to effectively determine if facilities are being maintained.

^aIndicates key ratio. ADS – Annual debt service. MADS – Maximum annual debt service. Source: Fitch Ratings.

Appendix B: 2019 Regional Medians

	Far West	Midwest	Northeast	Southeast	Southwest	All Credits
Community Characteristics/Customer Growth and Concentration						
Population	151,613	734,436	378,000	195,840	201,051	193,824
MHI (\$)	59,205	44,868	67,689	47,287	53,564	53,461
Total Water Customers	26,617	32,496	148,639	61,830	63,153	45,705
Annual Growth (%)	0.5	—	0.4	1.7	1.2	1.0
Total Sewer Customers	57,163	245,000	35,681	52,960	62,492	57,909
Annual Growth (%)	0.8	0.9	0.5	1.4	0.8	0.9
Top 10 Customers as % of Revenues	8	6	9	8	6	8
Capacity						
Age of Plant (Years)	15	17	16	16	15	16
Water Treatment Capacity Remaining (%)	66	—	16	53	59	54
Sewer Treatment Capacity Remaining (%)	38	45	35	40	37	38
Capital Demands and Debt Burden						
Average Annual CIP Costs per Customer (\$)	367	222	271	280	313	311
CIP Debt Financed (%)	21	69	50	32	54	36
Total Outstanding Debt to Net Plant Assets (%)	41	58	74	50	36	43
Debt to FADS (x)	5.5	8.9	9.6	4.6	4.9	5.3
Debt to Equity (x)	2.2	7.2	5.6	2.7	2.4	2.7
Total Outstanding Long-Term Debt per Customer (\$) ^a	1,902	3,393	3,022	1,757	1,514	1,784
Total Outstanding Long-Term Debt per Capita (\$) ^a	463	1,194	750	476	463	482
10-Year Principal Payout (%)	45	49	29	44	61	48
20-Year Principal Payout (%)	87	98	65	91	100	92
Projected Debt per Customer — Year Five (\$) ^a	1,733	3,281	3,404	1,613	1,818	1,869
Projected Debt per Capita — Year Five (\$) ^a	526	1,277	622	545	486	543
Charges and Rate Affordability						
Individual Water/Sewer Utility Average Monthly Residential Bill (\$)	46	48	33	43	40	45
Individual Water/Sewer Utility Average Annual Bill as % of MHI	0.8	1.2	0.7	1.1	1.1	1.0
Combined Water/Sewer Utility Average Monthly Residential Bill (\$)	90	58	79	84	63	77
Combined Water/Sewer Utility Average Annual Bill as % of MHI	1.6	0.9	1.3	2.0	1.2	1.8
Average Annual Projected Water Rate Increases (%)	3.9	—	2.9	3.1	3.6	3.5
Average Annual Projected Sewer Rate Increases (%)	2.7	4.5	2.6	3.0	3.2	3.0
Coverage and Financial Performance/Cash and Balance Sheet Considerations						
Three-Year Historical Average Senior Lien ADS Coverage (x) ^a	3.8	2.9	2.6	3.0	3.1	3.1
Senior Lien ADS Coverage (x) ^a	3.5	2.4	2.9	3.1	3.5	3.2
Senior Lien ADS Coverage Excluding Connection Fees (x)	3.2	2.3	2.8	2.9	2.7	2.9
Senior Lien ADS Coverage Net of Transfers Out (x)	3.2	2.4	2.9	2.9	2.9	2.9
Minimum Projected Senior Lien ADS Coverage (x) ^a	2.6	2.6	2.4	2.2	2.8	2.3
Senior Lien MADS Coverage (x)	2.9	3.2	6.5	6.6	4.0	3.5
Senior Lien Debt Service as % of Gross Revenues	12	20	13	16	15	14
Three-Year Historical Average All-In ADS Coverage (x) ^a	2.8	1.8	2.3	2.4	2.1	2.4
All-In ADS Coverage (x) ^a	2.5	1.8	2.5	2.5	2.3	2.4
All-In ADS Coverage Excluding Connection Fees (x)	2.3	1.6	2.3	2.3	2.0	2.2
All-In ADS Coverage Net of Transfers Out (x)	2.4	1.7	2.5	2.5	2.1	2.3
Minimum Projected All-In ADS Coverage (x) ^a	2.1	1.6	1.6	1.9	1.8	1.9
All-In MADS Coverage (x)	1.6	2.6	6.5	2.0	2.2	2.0
All-In Debt Service as % of Gross Revenues	16	35	16	19	21	18
Operating Margin (%)	32	56	45	44	42	42
Operating Cash Flow Ratio (x)	1.4	1.4	1.5	1.6	1.4	1.5
Operating Revenue Growth — Current Year (%)	2.2	4.2	3.8	5.9	4.6	4.9
Operating Revenue Growth — Three-Year Average (%)	3.1	3.1	4.2	4.6	4.7	4.2
Operating Expenditure Growth — Current Year (%)	7.8	6.9	0.8	3.5	6.8	5.3
Operating Expenditure Growth — Three-Year Average (%)	2.7	5.2	0.5	3.4	4.9	3.4
Days of Operating Revenues in Accounts Receivable	48	88	52	43	45	46
Days Cash on Hand ^a	590	248	464	631	453	561
Days of Working Capital ^a	561	341	431	663	427	553
Quick Ratio (x)	5.6	3.5	3.4	5.8	3.9	5.3
Current Ratio (x)	5.7	3.8	3.5	6.1	4.2	5.4
Free Cash as % of Depreciation ^a	124	95	226	130	95	117
Capital Spending as % of Depreciation	123	323	177	125	153	142

^aIndicates key ratio. ADS – Annual debt service. CIP – Capital improvement program. FADS – Funds available for debt service. MADS – Maximum annual debt service. MHI – Median household income. Source: Fitch Ratings, Fitch Solutions.

Appendix C: 2019 Medians Relative to System Size

	System Size Classification			All Credits
	Large	Medium	Small	
Community Characteristics/Customer Growth and Concentration				
Population	939,020	211,120	43,946	193,824
MHI (\$)	51,845	54,268	51,767	53,461
Total Water Customers	257,338	61,993	15,167	45,705
Annual Growth (%)	1.0	1.1	0.8	1.0
Total Sewer Customers	250,529	69,844	12,018	57,909
Annual Growth (%)	1.0	0.7	0.9	0.9
Top 10 Customers as % of Revenues	6	6	9	8
Capacity				
Age of Plant (Years)	16	16	14	16
Water Treatment Capacity Remaining (%)	53	51	60	54
Sewer Treatment Capacity Remaining (%)	38	35	45	38
Capital Demands and Debt Burden				
Average Annual CIP Costs per Customer (\$)	413	321	254	311
CIP Debt Financed (%)	52	40	18	36
Total Outstanding Debt to Net Plant Assets (%)	53	41	36	43
Debt to FADS (x)	7.2	4.8	4.6	5.3
Debt to Equity (x)	5.6	2.4	2.2	2.7
Total Outstanding Long-Term Debt per Customer (\$) ^a	2,411	1,518	1,476	1,784
Total Outstanding Long-Term Debt per Capita (\$) ^a	580	443	479	482
10-Year Principal Payout (%)	38	50	51	48
20-Year Principal Payout (%)	82	91	100	92
Projected Debt per Customer — Year Five (\$) ^a	2,422	1,619	1,445	1,869
Projected Debt per Capita — Year Five (\$) ^a	676	519	535	543
Charges and Rate Affordability				
Individual Water/Sewer Utility Average Monthly Residential Bill (\$)	44	43	48	45
Individual Water/Sewer Utility Average Annual Bill as % of MHI	1.1	0.9	0.7	1.0
Combined Water/Sewer Utility Average Monthly Residential Bill (\$)	64	77	84	77
Combined Water/Sewer Utility Average Annual Bill as % of MHI	1.5	1.8	2.2	1.8
Average Annual Projected Water Rate Increases (%)	3.7	3.7	2.5	3.5
Average Annual Projected Sewer Rate Increases (%)	3.7	3.2	2.3	3.0
Coverage and Financial Performance/Cash and Balance Sheet Considerations				
Three-Year Historical Average Senior Lien ADS Coverage (x) ^a	2.8	3.8	3.1	3.1
Senior Lien ADS Coverage (x) ^a	2.8	3.6	3.2	3.2
Senior Lien ADS Coverage Excluding Connection Fees (x)	2.8	3.0	2.9	2.9
Senior Lien ADS Coverage Net of Transfers Out (x)	2.8	3.0	3.0	2.9
Minimum Projected Senior Lien ADS Coverage (x) ^a	2.3	2.7	2.3	2.3
Senior Lien MADS Coverage (x)	4.6	3.3	3.5	3.5
Senior Lien Debt Service as % of Gross Revenues	18	13	13	14
Three-Year Historical Average All-In ADS Coverage (x) ^a	2.0	2.6	2.4	2.4
All-In ADS Coverage (x) ^a	1.9	2.5	2.6	2.4
All-In ADS Coverage Excluding Connection Fees (x)	1.8	2.3	2.3	2.2
All-In ADS Coverage Net of Transfers Out (x)	1.9	2.4	2.4	2.3
Minimum Projected All-In ADS Coverage (x) ^a	1.8	1.9	2.0	1.9
All-In MADS Coverage (x)	1.8	2.4	3.4	2.0
All-In Debt Service as % of Gross Revenues	24	17	17	18
Operating Margin (%)	48	42	39	42
Operating Cash Flow Ratio (x)	1.3	1.5	1.7	1.5
Operating Revenue Growth — Current Year (%)	5.6	4.6	4.9	4.9
Operating Revenue Growth — Three-Year Average (%)	4.8	4.5	3.3	4.2
Operating Expenditure Growth — Current Year (%)	4.6	5.7	6.0	5.3
Operating Expenditure Growth — Three-Year Average (%)	2.9	3.7	2.5	3.4
Days of Operating Revenues in Accounts Receivable	46	43	47	46
Days Cash on Hand ^a	367	624	627	561
Days of Working Capital ^a	342	598	572	553
Quick Ratio (x)	3.5	5.8	5.8	5.3
Current Ratio (x)	3.9	6.0	6.0	5.4
Free Cash as % of Depreciation ^a	104	116	137	117
Capital Spending as % of Depreciation	184	151	109	142

^aIndicates key ratio. ADS – Annual debt service. CIP – Capital improvement program. FADS – Funds available for debt service. MADS – Maximum annual debt service.

MHI – Median household income.

Source: Fitch Ratings, Fitch Solutions.

Appendix D: Annual Sectorwide Medians

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Community Characteristics/Customer Growth and Concentration										
Population	144,162	150,142	153,272	172,778	149,025	190,713	161,967	188,100	170,000	193,824
MHI (\$)	47,179	50,146	50,294	51,518	49,655	50,610	51,683	52,585	53,286	53,461
Total Water Customers	37,264	40,755	39,441	48,169	40,431	47,982	47,643	51,168	46,551	45,705
Annual Growth (%)	1.7	1.4	0.5	0.4	0.6	0.6	0.7	0.9	0.6	1.0
Total Sewer Customers	40,306	48,949	34,984	50,296	35,210	52,802	53,657	56,711	44,592	57,909
Annual Growth (%)	1.5	1.7	0.6	0.8	0.6	0.6	0.9	0.9	0.8	0.9
Top 10 Customers as % of Revenues	7	7	8	8	8	7	8	8	7	8
Capacity										
Age of Plant (Years)	13	12	13	13	13	14	14	15	15	16
Water Treatment Capacity Remaining (%)	54	53	58	58	58	58	58	55	57	54
Sewer Treatment Capacity Remaining (%)	38	42	41	47	47	42	42	38	41	38
Capital Demands and Debt Burden										
Average Annual CIP Costs per Customer (\$)	273	297	248	251	226	278	294	318	286	311
CIP Debt Financed (%)	60	49	45	39	32	34	38	33	35	36
Total Outstanding Debt to Net Plant Assets (%)	43	44	45	47	43	48	46	45	41	43
Debt to FADS (x)	5.5	6.4	6.7	6.8	6.1	6.2	5.9	5.5	5.7	5.3
Debt to Equity (x)	—	3.2	3.5	3.8	3.3	3.4	3.1	2.8	2.7	2.7
Total Outstanding Long-Term Debt per Customer (\$) ^a	1,297	1,527	1,611	1,650	1,581	1,836	1,865	1,756	1,893	1,784
Total Outstanding Long-Term Debt per Capita (\$) ^a	375	425	458	460	459	491	521	487	527	482
10-Year Principal Payout (%)	39	38	39	38	39	40	42	44	43	48
20-Year Principal Payout (%)	80	79	80	78	80	82	86	86	88	92
Projected Debt per Customer — Year Five (\$) ^a	1,774	1,877	1,803	2,024	1,868	1,997	2,035	1,802	2,091	1,869
Projected Debt per Capita — Year Five (\$) ^a	446	531	532	566	519	522	526	558	517	543
Charges and Rate Affordability										
Individual Water/Sewer Utility Average Monthly Residential Bill (\$)	28	35	33	37	36	39	43	41	41	45
Individual Water/Sewer Utility Average Annual Bill as % of MHI	0.7	0.8	0.7	0.8	0.9	0.8	0.8	0.8	0.8	1.0
Combined Water/Sewer Utility Average Monthly Residential Bill (\$)	59	61	61	65	68	69	67	66	72	77
Combined Water/Sewer Utility Average Annual Bill as % of MHI	1.5	1.4	1.5	1.5	1.6	1.6	1.7	1.7	1.7	1.8
Average Annual Projected Water Rate Increases (%)	5.3	5.0	4.8	4.4	4.0	3.8	3.0	3.5	3.5	3.5
Average Annual Projected Sewer Rate Increases (%)	5.9	5.8	5.1	5.0	3.7	4.7	3.5	3.0	3.3	3.0
Coverage and Financial Performance/Cash and Balance Sheet Considerations										
Three-Year Historical Average Senior Lien ADS Coverage (x) ^a	2.9	2.7	2.5	2.4	2.5	2.6	2.5	3.0	2.7	3.1
Senior Lien ADS Coverage (x) ^a	2.6	2.3	2.2	2.4	2.7	2.6	2.6	2.8	2.7	3.2
Senior Lien ADS Coverage Excluding Connection Fees (x)	2.4	2.1	2.1	2.3	2.5	2.4	2.4	2.6	2.5	2.9
Senior Lien ADS Coverage Net of Transfers Out (x)	—	2.1	2.1	2.3	2.4	2.4	2.4	2.6	2.6	2.9
Minimum Projected Senior Lien ADS Coverage (x) ^a	1.9	1.8	1.9	1.8	2.1	2.0	2.1	2.4	2.2	2.3
Senior Lien MADS Coverage (x)	2.4	1.9	2.1	2.0	2.1	2.0	2.0	2.5	2.9	3.5
Senior Lien Debt Service as % of Gross Revenues	16	17	17	17	16	16	17	16	16	14
Three-Year Historical Average All-In ADS Coverage (x) ^a	2.4	2.3	2.1	2.0	2.0	2.1	2.1	2.2	2.2	2.4
All-In ADS Coverage (x) ^a	2.2	1.9	1.8	2.0	2.1	2.1	2.1	2.3	2.1	2.4
All-In ADS Coverage Excluding Connection Fees (x)	1.9	1.7	1.7	1.8	1.9	1.9	2.0	1.9	2.0	2.2
All-In ADS Coverage Net of Transfers Out (x)	—	1.8	1.7	1.8	1.9	2.0	1.9	2.1	2.1	2.3
Minimum Projected All-In ADS Coverage (x) ^a	1.6	1.5	1.6	1.5	1.7	1.6	1.7	1.7	1.8	1.9
All-In MADS Coverage (x)	2.0	1.7	1.6	1.6	1.7	1.8	1.8	1.9	1.7	2.0
All-In Debt Service as % of Gross Revenues	18	20	22	21	21	22	21	21	20	18
Operating Margin (%)	32	33	36	39	39	41	40	41	41	42
Operating Cash Flow Ratio (x)	1.0	1.0	1.1	1.3	1.3	1.4	1.5	1.4	1.3	1.5
Operating Revenue Growth — Current Year (%)	4.5	3.6	3.3	5.8	5.5	4.5	4.1	2.9	4.5	4.9
Operating Revenue Growth — Three-Year Average (%)	6.0	5.3	4.3	4.7	5.5	5.7	4.3	3.9	3.6	4.2
Operating Expenditure Growth — Current Year (%)	6.2	4.3	1.1	1.0	2.0	2.5	4.8	2.4	2.3	5.3
Operating Expenditure Growth — Three-Year Average (%)	7.7	8.1	4.1	2.7	1.9	2.8	3.5	3.4	3.6	3.4
Days of Operating Revenues in Accounts Receivable	48	46	47	46	46	45	48	45	46	46
Days Cash on Hand ^a	344	328	310	417	404	432	526	483	547	561
Days of Working Capital ^a	361	331	343	373	414	422	503	429	482	553
Quick Ratio (x)	3.3	2.9	2.9	3.1	3.4	3.2	4.2	4.1	3.8	5.3
Current Ratio (x)	3.8	3.3	3.9	3.8	4.1	3.7	5.0	4.3	4.2	5.4
Free Cash as % of Depreciation ^a	107	83	74	82	91	102	91	105	107	117
Capital Spending as % of Depreciation	214	219	187	167	134	139	113	138	141	142

^aIndicates key ratio. ADS – Annual debt service. CIP – Capital improvement program. FADS – Funds available for debt service. MADS – Maximum annual debt service. MHI – Median household income.
Source: Fitch Ratings, Fitch Solutions.

Appendix E: 2019 Medians Relative to Rating Category

	Rating Category			All Credits
	AAA	AA	A	
Community Characteristics/Customer Growth and Concentration				
Population	304,086	159,927	126,625	193,824
MHI (\$)	65,644	52,740	45,771	53,461
Total Water Customers	93,861	40,467	16,275	45,705
Annual Growth (%)	0.8	1.0	1.0	1.0
Total Sewer Customers	92,127	51,617	23,051	57,909
Annual Growth (%)	1.6	0.8	1.1	0.9
Top 10 Customers as % of Revenues	5	9	7	8
Capacity				
Age of Plant (Years)	15	16	11	16
Water Treatment Capacity Remaining (%)	37	58	56	54
Sewer Treatment Capacity Remaining (%)	35	39	41	38
Capital Demands and Debt Burden				
Average Annual CIP Costs per Customer (\$)	350	321	229	311
CIP Debt Financed (%)	29	37	44	36
Total Outstanding Debt to Net Plant Assets (%)	26	46	79	43
Debt to FADS (x)	4.0	5.2	8.0	5.3
Debt to Equity (x)	1.4	2.7	8.5	2.7
Total Outstanding Long-Term Debt per Customer (\$) ^a	1,037	1,731	2,994	1,784
Total Outstanding Long-Term Debt per Capita (\$) ^a	290	491	904	482
10-Year Principal Payout (%)	56	48	38	48
20-Year Principal Payout (%)	98	90	89	92
Projected Debt per Customer — Year Five (\$) ^a	1,345	1,673	2,709	1,869
Projected Debt per Capita — Year Five (\$) ^a	312	523	745	543
Charges and Rate Affordability				
Individual Water/Sewer Utility Average Monthly Residential Bill (\$)	44	44	47	45
Individual Water/Sewer Utility Average Annual Bill as % MHI	0.7	0.9	1.3	1.0
Combined Water/Sewer Utility Average Monthly Residential Bill (\$)	63	80	98	77
Combined Water/Sewer Utility Average Annual Bill as % of MHI	1.4	2.0	2.9	1.8
Average Annual Projected Water Rate Increases (%)	3.7	3.1	2.5	3.5
Average Annual Projected Sewer Rate Increases (%)	3.7	2.9	2.0	3.0
Coverage and Financial Performance/Cash and Balance Sheet Considerations				
Three-Year Historical Average Senior Lien ADS Coverage (x) ^a	4.3	3.1	2.1	3.1
Senior Lien ADS Coverage (x) ^a	4.6	3.2	2.0	3.2
Senior Lien ADS Coverage Excluding Connection Fees (x)	3.6	2.9	1.9	2.9
Senior Lien ADS Coverage Net of Transfers Out (x)	4.2	2.9	2.0	2.9
Minimum Projected Senior Lien ADS Coverage (x) ^a	2.9	2.4	1.8	2.3
Senior Lien MADS Coverage (x)	7.4	3.5	—	3.5
Senior Lien Debt Service as % of Gross Revenues	9	14	24	14
Three-Year Historical Average All-In ADS Coverage (x) ^a	3.3	2.4	1.6	2.4
All-In ADS Coverage (x) ^a	3.6	2.5	1.8	2.4
All-In ADS Coverage Excluding Connection Fees (x)	2.8	2.2	1.7	2.2
All-In ADS Coverage Net of Transfers Out (x)	2.9	2.3	1.8	2.3
Minimum Projected All-In ADS Coverage (x) ^a	2.4	1.9	1.5	1.9
All-In MADS Coverage (x)	2.9	2.0	1.7	2.0
All-In Debt Service as % of Gross Revenues	13	18	31	18
Operating Margin (%)	33	42	54	42
Operating Cash Flow Ratio (x)	1.3	1.5	1.4	1.5
Operating Revenue Growth — Current Year (%)	5.2	4.6	7.4	4.9
Operating Revenue Growth — Three-Year Average (%)	4.6	3.9	4.6	4.2
Operating Expenditure Growth — Current Year (%)	5.3	5.8	3.4	5.3
Operating Expenditure Growth — Three-Year Average (%)	3.1	3.4	3.3	3.4
Days of Operating Revenues in Accounts Receivable	51	43	47	46
Days Cash on Hand ^a	570	591	433	561
Days of Working Capital ^a	569	564	445	553
Quick Ratio (x)	6.0	5.3	3.9	5.3
Current Ratio (x)	6.1	5.4	4.1	5.4
Free Cash as % of Depreciation ^a	112	124	111	117
Capital Spending as % of Depreciation	131	157	88	142

^aIndicates key ratio. ADS – Annual debt service. CIP – Capital improvement program. FADS – Funds available for debt service. MADS – Maximum annual debt service.
MHI – Median household income.
Source: Fitch Ratings, Fitch Solutions.

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