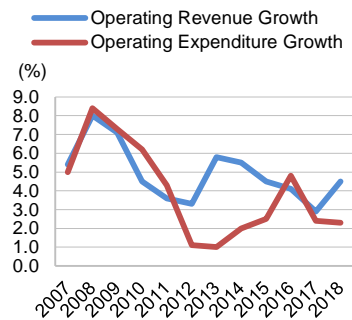


2018 Water and Sewer Medians

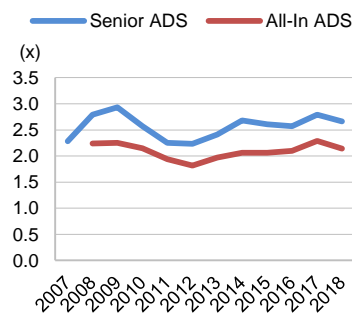
Special Report

Revenue and Expenditure Medians



Source: Fitch.

Debt Service Coverage Medians



Source: Fitch.

Related Research

[Fitch 2018 Outlook: Water and Sewer Sector \(December 2017\)](#)

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Sector Strength Continues

This edition of 2018 water and sewer medians continues our 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 Ticks Up: Annual revenue growth, which steadily slowed over the past four median cycles, saw a solid uptick of 4.5% with the 2018 medians. The gain was attributable almost entirely to rate adjustments, as water production was flat from the previous year and sewer flows were up less than 1%.

Expenses Remain in Check: Escalation in annual operating expenses, which had been on an upward trajectory in recent years, increased just 2.3% from the prior year, similar to the 2017 median. Debt carrying costs also remained in check and equaled 20% of gross revenues with the latest median cycle, down slightly from last year.

Strong Debt Service Coverage Continues: Steady revenue gains and limited cost increases allowed utilities to post median debt service coverage (DSC) on both a senior and all-in basis above **2.0x** for the fifth year in a row. Utilities are forecasting continued favorable DSC based on planned rate adjustments and moderate future borrowing plans.

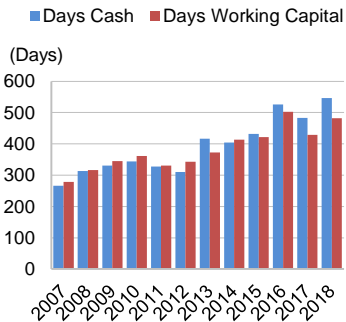
Improved Net Margins: Surplus cash flows were up slightly for the year and fully covered annual depreciation expense (that is, annual renewal and replacement costs), marking only the third time since the 2010 medians that this has occurred and for the second year in a row. Maintenance of such surplus revenues 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 Resumes Climb: Key liquidity metrics were up for the year after a slight drop in the 2017 medians, with days cash reaching a new high at a very robust 547 days of operating expenses. 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 was up slightly from the 2017 medians (to 141% of annual depreciation) but was not enough to reduce the age of facilities from last year's peak median level (15 years). Planned capital spending per customer is down from the prior year's median, which could lead to further aging of facilities in the future.

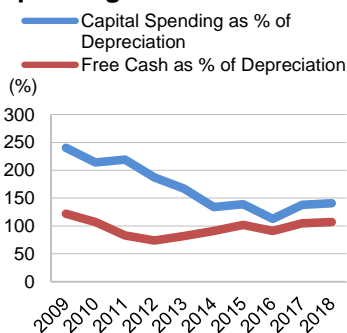
Increased But Manageable Debt: Key debt ratios were up 8% for the year after dropping with the 2017 medians. Over the next five years, additional debt is expected to represent a manageable 35% of capital resources, which should limit growth in key debt metrics to 0%–3% annually.

Liquidity Medians



Source: Fitch.

Cost Recovery and Capital Spending Medians



Source: Fitch.

Related Criteria

[Rating Criteria for Public Sector Revenue-Supported Debt \(June 2017\)](#)

[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, despite the challenges associated with the severe drought in California. The regional debt burden increased from last year's numbers, although lower future planned issuances relative to the national level should temper escalation in debt levels over the next five years and keep debt metrics in line with national norms.

Midwest

Financial results overall were relatively flat relative to the 2017 medians, although liquidity did improve somewhat. Key debt metrics remained the highest of all the regions but were down slightly from last year's figures. Nevertheless, borrowing sources relative to capital spending remain the highest in this region, which is expected to keep debt metrics higher versus the other regions over the next several years.

Northeast

Financial results in the Northeast fell somewhat from the 2017 medians. Relatively higher leverage amounts in the region traditionally have translated into more modest financial margins relative to credits across the U.S. Future borrowing plans continue to comprise the majority of planned capital resources (69%), which should continue to result in leverage metrics that are above most of the other regions' over the intermediate term.

Southeast

The Southeast's financial results continued to outpace all the other regions in virtually every metric. In addition, debt levels in the Southeast remained favorable relative to those of the 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, are now on par with the national median and may moderate further over the next few years, as its annual planned rate adjustments are the lowest of all the regions.

Southwest

DSC within this region improved slightly from the 2017 median, although liquidity fell as growth in operating expenses outpaced surplus revenue being added to reserves. Debt metrics also weakened slightly for the year but have remained below the national norms. Additionally, the metrics are expected to remain below the national norms over the next five years.

Medians Relative to System Size

Large Systems

Large systems (defined as utilities serving 500,000 or more persons) in general continued to have the greatest amount of debt and produce the lowest financial margins, although these systems experienced higher than normal growth in operating revenues and surplus revenues with the 2018 medians, which translated to a solid increase in liquidity over the prior medians. Facilities remain among the oldest in the nation, but significant spending to date has improved asset life. Planned capital spending continues to climb, but this is not expected to significantly pressure existing debt 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 stronger financial performance on balance than other utilities, while having the lowest debt burdens. Despite increases in debt levels from the prior year’s medians, revenues were increased sufficiently to keep financial metrics largely unchanged.

Small Systems

Small systems (defined as utilities serving fewer than 100,000 persons) continued to produce financial and debt metrics in the midrange relative to other utilities. As with midsized systems, debt metrics for small systems increased for the year, but revenue growth helped to keep financial performance mostly intact. With the least amount of planned borrowing for capital relative to other utilities, debt metrics are forecast to show some improvement over the next few years, which should also help to preserve existing financial results.

Limitations of Medians Analysis in the 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

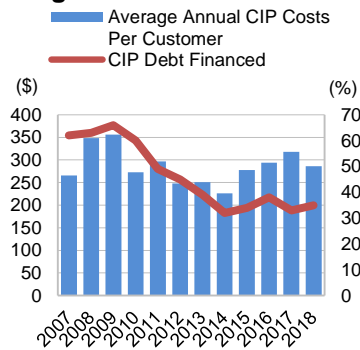
The medians present a composite of the range of credits and do not delineate offsetting strengths or weaknesses at the individual credit level that may affect a rating.

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 Fitch’s 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 2018 medians continue this practice.

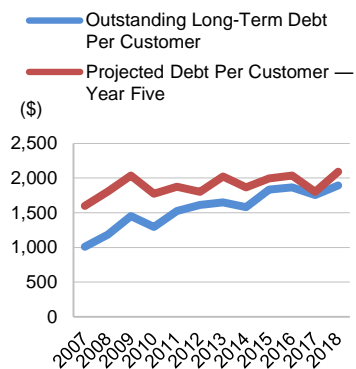
This report also continues Fitch’s presentation of key ratios used in the rating process to give the market a better understanding of the priority in weighting certain ratios. To allow a comparison with prior statistics, Fitch also has included historical information from the 2009–2017 medians (see Appendix 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.

Capital Improvement Program Medians



Source: Fitch.

Debt Medians



Source: Fitch.

As with Fitch's prior medians, those for 2018 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 2016 and August 2017. 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 2018 medians, combined water and sewer utilities accounted for 78 credits (48% of the total), individual water systems numbered 51 (31%) and individual sewer systems totaled 34 (21%). Certain credits with ratings of 'BBB+' or below were excluded for median-reporting purposes from the 2018 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 be facing 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 be facing 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 be facing 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. *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.

Appendix B: 2018 Regional Medians

	Far West	Midwest	Northeast	Southeast	Southwest	All Credits
Community Characteristics/Customer Growth and Concentration						
Population	115,827	933,736	1,061,597	181,320	174,492	170,000
MHI (\$)	62,884	48,522	56,524	50,019	49,694	53,286
Total Water Customers	27,850	93,100	281,440	46,865	65,808	46,551
Annual Growth (%)	0.4	0.5	0.3	0.9	1.5	0.6
Total Sewer Customers	21,380	288,376	822,273	39,113	52,636	44,592
Annual Growth (%)	0.6	(0.3)	0.6	1.0	1.2	0.8
Top 10 Customers as % of Revenues	9	10	8	6	5	7
Capacity						
Age of Plant (Years)	15	15	16	15	15	15
Water Treatment Capacity Remaining (%)	68	68	16	52	57	57
Sewer Treatment Capacity Remaining (%)	43	54	49	39	48	41
Capital Demands and Debt Burden						
Average Annual CIP Costs Per Customer (\$)	287	339	311	298	273	286
CIP Debt Financed (%)	20	73	69	30	55	35
Total Outstanding Debt to Net Plant Assets (%)	38	51	83	43	42	41
Debt to FADS (x)	5.6	8.3	9.4	4.7	6.1	5.7
Debt to Equity (x)	2.1	2.1	(1.1)	2.8	4.4	2.7
Total Outstanding Long-Term Debt Per Customer (\$) ^a	1,928	3,113	2,617	1,633	1,790	1,893
Total Outstanding Long-Term Debt Per Capita (\$) ^a	513	676	514	473	581	527
10-Year Principal Payout (%)	41	36	35	46	61	43
20-Year Principal Payout (%)	87	77	72	92	95	88
Projected Debt Per Customer — Year Five (\$) ^a	2,082	3,898	2,850	1,700	1,952	2,091
Projected Debt Per Capita — Year Five (\$) ^a	491	1,046	693	546	497	517
Charges and Rate Affordability						
Individual Water/Sewer Utility Average Monthly Residential Bill (\$)	45	29	34	40	33	41
Individual Water/Sewer Utility Average Annual Bill as % of MHI	0.8	0.8	N.A.	0.8	0.7	0.8
Combined Water/Sewer Utility Average Monthly Residential Bill (\$)	81	100	79	75	64	72
Combined Water/Sewer Utility Average Annual Bill as % of MHI	1.5	1.5	1.9	1.7	1.5	1.7
Average Annual Projected Water Rate Increases (%)	4.8	3.0	3.3	2.6	3.0	3.5
Average Annual Projected Sewer Rate Increases (%)	3.8	4.4	3.6	2.7	3.6	3.3
Coverage and Financial Performance/Cash and Balance Sheet Considerations						
Three-Year Historical Average Senior Lien ADS Coverage (x) ^a	2.9	3.7	2.0	2.7	2.1	2.7
Senior Lien ADS Coverage (x) ^a	2.9	3.3	2.1	2.8	2.5	2.7
Senior Lien ADS Coverage Excluding Connection Fees (x)	2.5	3.3	2.1	2.7	2.1	2.5
Senior Lien ADS Coverage Net of Transfers Out (x)	2.9	3.3	2.1	2.7	2.0	2.6
Minimum Projected Senior Lien ADS Coverage (x) ^a	2.2	4.2	1.7	2.2	2.1	2.2
Senior Lien MADS Coverage (x)	2.9	1.5	1.5	3.3	4.7	2.9
Senior Lien Debt Service as % of Gross Revenues	13	11	18	17	17	16
Three-Year Historical Average All-In ADS Coverage (x) ^a	2.5	1.8	1.8	2.5	1.7	2.2
All-In ADS Coverage (x) ^a	2.2	1.5	1.9	2.5	1.8	2.1
All-In ADS Coverage Excluding Connection Fees (x)	2.0	1.5	1.9	2.4	1.7	2.0
All-In ADS Coverage Net of Transfers Out (x)	2.3	1.5	1.9	2.4	1.6	2.1
Minimum Projected All-In ADS Coverage (x) ^a	2.0	1.4	1.6	1.9	1.7	1.8
All-In MADS Coverage (x)	1.9	1.5	1.5	2.3	1.5	1.7
All-In Debt Service as % of Gross Revenues	19	23	18	19	25	20
Operating Margin (%)	34	44	37	47	40	41
Operating Cash Flow Ratio (x)	1.0	0.9	1.4	1.6	1.3	1.3
Operating Revenue Growth — Current Year (%)	2.3	6.7	4.4	4.5	5.9	4.5
Operating Revenue Growth — Three-Year Average (%)	3.2	3.3	3.9	4.4	3.3	3.6
Operating Expenditure Growth — Current Year (%)	1.5	0.7	0.1	3.4	5.2	2.3
Operating Expenditure Growth — Three-Year Average (%)	3.9	2.8	3.0	2.5	4.4	3.6
Days of Operating Revenues in Accounts Receivable	47	82	57	43	42	46
Days Cash on Hand ^a	571	309	249	670	348	547
Days of Working Capital ^a	491	230	191	644	312	482
Quick Ratio	3.8	3.1	1.9	6.0	2.8	3.8
Current Ratio	4.2	3.3	1.9	6.1	3.0	4.2
Free Cash as % of Depreciation ^a	107	37	140	117	70	107
Capital Spending as % of Depreciation	148	167	161	130	124	141

^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. N.A. – Not available.

Appendix C: 2018 Medians Relative to System Size

	System Size Classification			All Credits
	Large	Medium	Small	
Community Characteristics/Customer Growth and Concentration				
Population	1,043,915	187,809	55,657	170,000
MHI (\$)	54,880	51,622	57,609	53,286
Total Water Customers	255,106	56,482	21,000	46,551
Annual Growth (%)	0.6	0.7	0.9	0.6
Total Sewer Customers	273,717	53,204	18,361	44,592
Annual Growth (%)	0.6	1.0	0.9	0.8
Top 10 Customers as % of Revenues	6	7	11	7
Capacity				
Age of Plant (Years)	16	15	13	15
Water Treatment Capacity Remaining (%)	59	57	60	57
Sewer Treatment Capacity Remaining (%)	41	37	49	41
Capital Demands and Debt Burden				
Average Annual CIP Costs Per Customer (\$)	391	283	256	286
CIP Debt Financed (%)	48	34	22	35
Total Outstanding Debt to Net Plant Assets (%)	47	41	37	41
Debt to FADS (x)	6.7	5.1	5.6	5.7
Debt to Equity (x)	2.5	2.2	3.1	2.7
Total Outstanding Long-Term Debt Per Customer (\$) ^a	2,177	1,817	1,877	1,893
Total Outstanding Long-Term Debt Per Capita (\$) ^a	468	464	624	527
10-Year Principal Payout (%)	40	44	47	43
20-Year Principal Payout (%)	82	88	96	88
Projected Debt Per Customer Capita — Year Five (\$) ^a	2,326	2,144	1,746	2,091
Projected Debt Per Capita — Year Five (\$) ^a	492	494	643	517
Charges and Rate Affordability				
Individual Water/Sewer Utility Average Monthly Residential Bill (\$)	33	41	47	41
Individual Water/Sewer Utility Average Annual Bill as % of MHI	0.8	0.8	0.9	0.8
Combined Water/Sewer Utility Average Monthly Residential Bill (\$)	71	73	72	72
Combined Water/Sewer Utility Average Annual Bill as % of MHI	1.5	1.7	1.8	1.7
Average Annual Projected Water Rate Increases (%)	3.7	3.5	2.7	3.5
Average Annual Projected Sewer Rate Increases (%)	3.7	3.5	3.0	3.3
Coverage and Financial Performance/Cash and Balance Sheet Considerations				
Three-Year Historical Average Senior Lien ADS Coverage (x) ^a	3.2	2.8	2.5	2.7
Senior Lien ADS Coverage (x) ^a	3.3	2.8	2.4	2.7
Senior Lien ADS Coverage Excluding Connection Fees (x)	3.0	2.7	2.1	2.5
Senior Lien ADS Coverage Net of Transfers Out (x)	3.1	2.7	2.1	2.6
Minimum Projected Senior Lien ADS Coverage (x) ^a	2.4	2.2	2.0	2.2
Senior Lien MADS Coverage (x)	3.7	2.6	1.5	2.9
Senior Lien Debt Service as % of Gross Revenues	17	14	16	16
Three-Year Historical Average All-In ADS Coverage (x) ^a	2.0	2.4	2.3	2.2
All-In ADS Coverage (x) ^a	1.9	2.3	2.1	2.1
All-In ADS Coverage Excluding Connection Fees (x)	1.8	2.1	2.0	2.0
All-In ADS Coverage Net of Transfers Out (x)	1.9	2.3	2.1	2.1
Minimum Projected All-In ADS Coverage (x) ^a	1.7	1.9	1.8	1.8
All-In MADS Coverage (x)	1.4	2.1	1.5	1.7
All-In Debt Service as % of Gross Revenues	23	19	19	20
Operating Margin (%)	41	42	39	41
Operating Cash Flow Ratio (x)	1.3	1.4	1.3	1.3
Operating Revenue Growth — Current Year (%)	4.5	4.1	5.0	4.5
Operating Revenue Growth — Three-Year Average (%)	3.7	3.3	3.9	3.6
Operating Expenditure Growth — Current Year (%)	2.9	3.3	1.1	2.3
Operating Expenditure Growth — Three-Year Average (%)	3.4	3.8	3.2	3.6
Days of Operating Revenues in Accounts Receivable	46	44	47	46
Days Cash on Hand ^a	494	624	525	547
Days of Working Capital ^a	377	560	500	482
Quick Ratio	2.9	4.4	4.2	3.8
Current Ratio	3.2	5.0	4.3	4.2
Free Cash as % of Depreciation ^a	109	105	102	107
Capital Spending as % of Depreciation	163	154	101	141

^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.

Appendix D: Annual Sectorwide Medians

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Community Characteristics/Customer Growth and Concentration										
Population	162,338	144,162	150,142	153,272	172,778	149,025	190,713	161,967	188,100	170,000
MHI (\$)	45,820	47,179	50,146	50,294	51,518	49,655	50,610	51,683	52,585	53,286
Total Water Customers	50,410	37,264	40,755	39,441	48,169	40,431	47,982	47,643	51,168	46,551
Annual Growth (%)	1.6	1.7	1.4	0.5	0.4	0.6	0.6	0.7	0.9	0.6
Total Sewer Customers	48,000	40,306	48,949	34,984	50,296	35,210	52,802	53,657	56,711	44,592
Annual Growth (%)	1.9	1.5	1.7	0.6	0.8	0.6	0.6	0.9	0.9	0.8
Top 10 Customers as % of Revenues	8	7	7	8	8	8	7	8	8	7
Capacity										
Age of Plant (Years)	12	13	12	13	13	13	14	14	15	15
Water Treatment Capacity Remaining (%)	50	54	53	58	58	58	58	58	55	57
Sewer Treatment Capacity Remaining (%)	35	38	42	41	47	47	42	42	38	41
Capital Demands and Debt Burden										
Average Annual CIP Costs Per Customer (\$)	356	273	297	248	251	226	278	294	318	286
CIP Debt Financed (%)	66	60	49	45	39	32	34	38	33	35
Total Outstanding Debt to Net Plant Assets (%)	39	43	44	45	47	43	48	46	45	41
Debt to FADS (x)	4.9	5.5	6.4	6.7	6.8	6.1	6.2	5.9	5.5	5.7
Debt to Equity (x)	—	—	3.2	3.5	3.8	3.3	3.4	3.1	2.8	2.7
Total Outstanding Long-Term Debt Per Customer (\$) ^a	1,454	1,297	1,527	1,611	1,650	1,581	1,836	1,865	1,756	1,893
Total Outstanding Long-Term Debt Per Capita (\$) ^a	379	375	425	458	460	459	491	521	487	527
10-Year Principal Payout (%)	40	39	38	39	38	39	40	42	44	43
20-Year Principal Payout (%)	82	80	79	80	78	80	82	86	86	88
Projected Debt Per Customer — Year Five (\$) ^a	2,036	1,774	1,877	1,803	2,024	1,868	1,997	2,035	1,802	2,091
Projected Debt Per Capita — Year Five (\$) ^a	607	446	531	532	566	519	522	526	558	517
Charges and Rate Affordability										
Individual Water/Sewer Utility Average Monthly Residential Bill (\$)	28	28	35	33	37	36	39	43	41	41
Individual Water/Sewer Utility Average Annual Bill as % of MHI	0.8	0.7	0.8	0.7	0.8	0.9	0.8	0.8	0.8	0.8
Combined Water/Sewer Utility Average Monthly Residential Bill (\$)	56	59	61	61	65	68	69	67	66	72
Combined Water/Sewer Utility Average Annual Bill as % of MHI	1.3	1.5	1.4	1.5	1.5	1.6	1.6	1.7	1.7	1.7
Average Annual Projected Water Rate Increases (%)	4.9	5.3	5.0	4.8	4.4	4.0	3.8	3.0	3.5	3.5
Average Annual Projected Sewer Rate Increases (%)	5.9	5.9	5.8	5.1	5.0	3.7	4.7	3.5	3.0	3.3
Coverage and Financial Performance/Cash and Balance Sheet Considerations										
Three-Year Historical Average Senior Lien ADS Coverage (x) ^a	3.0	2.9	2.7	2.5	2.4	2.5	2.6	2.5	3.0	2.7
Senior Lien ADS Coverage (x) ^a	2.9	2.6	2.3	2.2	2.4	2.7	2.6	2.6	2.8	2.7
Senior Lien ADS Coverage Excluding Connection Fees (x)	2.3	2.4	2.1	2.1	2.3	2.5	2.4	2.4	2.6	2.5
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
Minimum Projected Senior Lien ADS Coverage (x) ^a	1.9	1.9	1.8	1.9	1.8	2.1	2.0	2.1	2.4	2.2
Senior Lien MADS Coverage (x)	2.1	2.4	1.9	2.1	2.0	2.1	2.0	2.0	2.5	2.9
Senior Lien Debt Service as % of Gross Revenues	15	16	17	17	17	16	16	17	16	16
Three-Year Historical Average All-In ADS Coverage (x) ^a	2.1	2.4	2.3	2.1	2.0	2.0	2.1	2.1	2.2	2.2
All-In ADS Coverage (x) ^a	2.3	2.2	1.9	1.8	2.0	2.1	2.1	2.1	2.3	2.1
All-In ADS Coverage Excluding Connection Fees (x)	1.8	1.9	1.7	1.7	1.8	1.9	1.9	2.0	1.9	2.0
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
Minimum Projected All-In ADS Coverage (x) ^a	1.7	1.6	1.5	1.6	1.5	1.7	1.6	1.7	1.7	1.8
All-In MADS Coverage (x)	1.8	2.0	1.7	1.6	1.6	1.7	1.8	1.8	1.9	1.7
All-In Debt Service as % of Gross Revenues	21	18	20	22	21	21	22	21	21	20
Operating Margin (%)	33	32	33	36	39	39	41	40	41	41
Operating Cash Flow Ratio (x)	1.1	1.0	1.0	1.1	1.3	1.3	1.4	1.5	1.4	1.3
Operating Revenue Growth — Current Year (%)	7.1	4.5	3.6	3.3	5.8	5.5	4.5	4.1	2.9	4.5
Operating Revenue Growth — Three-Year Average (%)	6.5	6.0	5.3	4.3	4.7	5.5	5.7	4.3	3.9	3.6
Operating Expenditure Growth — Current Year (%)	7.3	6.2	4.3	1.1	1.0	2.0	2.5	4.8	2.4	2.3
Operating Expenditure Growth — Three-Year Average (%)	7.5	7.7	8.1	4.1	2.7	1.9	2.8	3.5	3.4	3.6
Days of Operating Revenues in Accounts Receivable	47	48	46	47	46	46	45	48	45	46
Days Cash on Hand ^a	331	344	328	310	417	404	432	526	483	547
Days of Working Capital ^a	345	361	331	343	373	414	422	503	429	482
Quick Ratio	2.9	3.3	2.9	2.9	3.1	3.4	3.2	4.2	4.1	3.8
Current Ratio	3.3	3.8	3.3	3.9	3.8	4.1	3.7	5.0	4.3	4.2
Free Cash as % of Depreciation ^a	122	107	83	74	82	91	102	91	105	107
Capital Spending as % of Depreciation	240	214	219	187	167	134	139	113	138	141

^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.

Appendix E: 2018 Medians Relative to Rating Category

	Rating Category			All Credits
	AAA	AA	A	
Community Characteristics/Customer Growth and Concentration				
Population	377,165	156,949	90,400	170,000
MHI (\$)	65,943	51,818	50,418	53,286
Total Water Customers	69,999	41,633	33,690	46,551
Annual Growth (%)	0.7	0.6	0.8	0.6
Total Sewer Customers	99,676	35,233	33,125	44,592
Annual Growth (%)	0.7	0.9	0.9	0.8
Top 10 Customers as % of Revenues	6	7	8	7
Capacity				
Age of Plant (Years)	15	15	12	15
Water Treatment Capacity Remaining (%)	59	61	40	57
Sewer Treatment Capacity Remaining (%)	45	40	41	41
Capital Demands and Debt Burden				
Average Annual CIP Costs Per Customer (\$)	283	312	272	286
CIP Debt Financed (%)	26	37	47	35
Total Outstanding Debt to Net Plant Assets (%)	24	46	55	41
Debt to FADS (x)	3.5	5.5	7.6	5.7
Debt to Equity (x)	1.4	3.0	4.8	2.7
Total Outstanding Long-Term Debt Per Customer (\$) ^a	1,078	2,000	2,331	1,893
Total Outstanding Long-Term Debt Per Capita (\$) ^a	293	557	682	527
10-Year Principal Payout (%)	55	43	39	43
20-Year Principal Payout (%)	95	90	75	88
Projected Debt Per Customer Year Five (\$) ^a	1,350	2,187	2,697	2,091
Projected Debt Per Capita Year Five (\$) ^a	338	498	853	517
Charges and Rate Affordability				
Individual Water/Sewer Utility Average Monthly Residential Bill (\$)	33	41	45	41
Individual Water/Sewer Utility Average Annual Bill as % MHI	0.6	0.8	1.0	0.8
Combined Water/Sewer Utility Average Monthly Residential Bill (\$)	62	77	69	72
Combined Water/Sewer Utility Average Annual Bill as % of MHI	1.3	1.7	2.2	1.7
Average Annual Projected Water Rate Increases (%)	3.3	3.2	4.2	3.5
Average Annual Projected Sewer Rate Increases (%)	3.6	3.0	3.5	3.3
Coverage and Financial Performance/Cash and Balance Sheet Considerations				
Three-Year Historical Average Senior Lien ADS Coverage (x) ^a	3.7	2.6	2.1	2.7
Senior Lien ADS Coverage (x) ^a	3.3	2.8	2.0	2.7
Senior Lien ADS Coverage Excluding Connection Fees (x)	2.7	2.6	2.0	2.5
Senior Lien ADS Coverage Net of Transfers Out (x)	3.3	2.6	1.9	2.6
Minimum Projected Senior Lien ADS Coverage (x) ^a	2.8	2.2	1.5	2.2
Senior Lien MADS Coverage (x)	2.5	3.8	1.5	2.9
Senior Lien Debt Service as % of Gross Revenues	11	16	22	16
Three-Year Historical Average All-In ADS Coverage (x) ^a	2.8	2.2	1.5	2.2
All-In ADS Coverage (x) ^a	2.8	2.1	1.7	2.1
All-In ADS Coverage Excluding Connection Fees (x)	2.4	2.0	1.5	2.0
All-In ADS Coverage Net of Transfers Out (x)	2.7	2.1	1.5	2.1
Minimum Projected All-In ADS Coverage (x) ^a	2.2	1.8	1.3	1.8
All-In MADS Coverage (x)	2.4	1.7	1.5	1.7
All-In Debt Service as % of Gross Revenues	14	21	27	20
Operating Margin (%)	39	43	36	41
Operating Cash Flow Ratio (x)	1.5	1.4	1.0	1.3
Operating Revenue Growth Current Year (%)	4.2	4.5	5.0	4.5
Operating Revenue Growth Three-Year Average (%)	3.3	3.9	2.9	3.6
Operating Expenditure Growth Current Year (%)	0.8	2.1	3.4	2.3
Operating Expenditure Growth Three-Year Average (%)	3.8	3.4	4.1	3.6
Days of Operating Revenues in Accounts Receivable	40	46	53	46
Days Cash on Hand ^a	692	572	311	547
Days of Working Capital ^a	614	498	280	482
Quick Ratio	5.3	4.1	2.2	3.8
Current Ratio	5.5	4.3	2.6	4.2
Free Cash as % of Depreciation ^a	122	105	59	107
Capital Spending as % of Depreciation	132	146	143	141

^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.

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