

CITY OF LANCASTER
SEWER FUND
LANCASTER, PENNSYLVANIA

RATE OF RETURN

EXHIBIT

TO ACCOMPANY THE
DIRECT TESTIMONY

MAY 2019

Prepared by:
GANNETT FLEMING
VALUATION AND RATE CONSULTANTS, LLC



Valley Forge, Pennsylvania

City of Lancaster Sewer Fund
Recommended Fair Rate of Return
Recommended Rate Making Ratios at December 31, 2020

	<u>Recommended</u> <u>Ratios(1)</u>	<u>Cost</u> <u>Rates(2)</u>	<u>Weighted</u> <u>Cost</u>
Debt	45.0	4.34	1.95
Fund Equity	<u>55.0</u>	10.85	<u>5.97</u>
Overall	<u>100.0</u>		<u>7.92</u>

Notes: (1) As explained in the testimony.

(2) The debt cost rate is based on the weighted cost rate to maturity for all issues.

Capital Structure Ratios for
The Water Group Followed by Analysts
At 12/31/2018 and Estimated for 2023

	<u>12/31/2018</u>	Est.(1) <u>2023</u>
Water Group Followed by Analysts		
Long-term Debt	44.8 %	43.1 %
Preferred Stock	0.1	0.0
Common Equity	<u>55.1</u>	<u>56.9</u>
Total	<u>100.0</u> %	<u>100.0</u> %

Notes: (1) Project by Value Line for the period 2022 to 2024.

Source of Information: Value Line Investment Survey, 4/12/19
S&P Research Insight

Capital Structure Ratios for
The Water Group Followed by Analysts
At 12/31/2018 and Estimated for 2023

	Actual at 12/31/18		
	Long-term Debt	Preferred Stock	Common Equity
<u>Water Group Followed by Analysts</u>			
American States Water Co	40.3	0.0	59.7
American Water Works Co Inc	56.4	0.0	43.6
Aqua America Inc	54.4	0.0	45.6
California Water Service Gp	49.3	0.0	50.7
Middlesex Water Co	37.8	0.6	61.6
SJW Corp	32.7	0.0	67.3
York Water Co	<u>42.5</u>	<u>0.0</u>	<u>57.5</u>
Average	<u>44.8</u>	<u>0.1</u>	<u>55.1</u>

	Estimated at 2023		
	Long-term Debt	Preferred Stock	Common Equity
<u>Water Group Followed by Analysts</u>			
American States Water Co	46.0	0.0	54.0
American Water Works Co Inc	59.0	0.0	41.0
Aqua America Inc	56.0	0.0	44.0
California Water Service Gp	38.0	0.0	62.0
Middlesex Water Co	36.0	0.5	63.5
SJW Corp	32.5	0.0	67.5
York Water Co	<u>34.0</u>	<u>0.0</u>	<u>66.0</u>
Average	<u>43.1</u>	<u>0.0</u>	<u>56.9</u>

Source of Information: Value Line Investment Survey, 4/12/19
S&P Research Insight

City of Lancaster Sewer Fund
City of Lancaster
General Obligations Bonds and Notes
Bonds Attributable to Sewer Fund

Source of Funds	Total Sources and Uses of Funds			
	Entire Issue	Sewer Share General Obligation Bonds, Series of 2009	Sewer Share General Obligation Bonds, Series of 2011	Sewer Share PennVest - General Guaranteed Revenue Note of 2014
Par Amount of Bonds	\$43,990,000	\$38,860,000	\$42,490,000	\$5,500,000
Less: Net Original Issue Discount	(\$879,800.00)	(\$336,900.00)	(\$155,464.30)	\$0.00
Plus: Net Original Issue Premium	\$681,140.80	\$198,367.05	\$248,284.35	\$0.00
Total Source of Funds	\$43,791,340.80	\$22,321,467.05	\$7,507,820.05	\$5,500,000.00
Use of Funds - Not Construction Nor Contingency				
Deposit to Initial Sinking Fund	\$23,851.23	\$1,993,351.78	\$90,081.99	\$0.00
Costs of Issuance (1)	\$573,548.00	\$367,200.17	\$23,280.07	\$0.00
Termination of SWAP	\$3,902,500.00	\$0.00	\$0.00	\$0.00
Unrecovered Issuance Expense of Redeemed Issue	\$1,211,824.93	\$0.00	\$0.00	\$0.00
Issue Refinanced	1998			
Total Use of Funds - Not Construction Nor Contingency	\$5,713,722.16	\$2,360,551.95	\$113,362.06	\$0.00
Funds Available for Construction & Contingency				
	\$38,077,618.64	\$19,960,915.10	\$7,394,457.99	\$5,500,000.00
Net Expenses	\$5,912,381.36	\$2,499,084.90	\$20,542.01	\$0.00
Allocated to Sewer	31.89%	100.00%	100.00%	100.00%
Original Life At Issuance (in Months)	195	158	250	
Date of Issue	5/1/2009	11/1/2011	5/1/2014	
Date of Refinancing	2/26/2019			
Actual Life At Refinancing (in Months)	120			
Remianing Life	75			
Sewer Share of Expenses at Issuance	\$1,885,458.42	\$2,499,084.90	\$20,542.01	
Sewer Remianing Expense at Refinancing	\$725,176.31			

Series	Net Debt Service Schedule - Sewer Fund			
	2009	2011	2014	2014
Principal	\$14,030,000.00	\$22,460,000.00	\$7,415,000.00	\$5,500,000.00
Net Proceeds	86.56%	88.87%	99.72%	100.00%
Maturity	5/1/2025	5/1/2041	1/5/2034	2035
Effective Cost	5.93%	5.50%	3.59%	1.35%

Net Proceeds	2009	2011	2014	2014
	(\$12,144,328.02)	(\$19,960,915.10)	(\$7,394,457.99)	(\$4,858,292.96)
11/1/2009	255,118.75	5/1/2012 468,691.78	1/5/2014 90,081.99	2018 303,530.26
5/1/2010	1,095,118.75	11/1/2012 508,220.00	1/11/2014 134,006.26	2019 303,530.28
11/1/2010	244,618.75	5/1/2013 508,220.00	1/5/2015 134,006.26	2020 303,530.28
5/1/2011	1,104,618.75	11/1/2013 508,220.00	1/11/2015 134,006.26	2021 303,530.28
11/1/2011	233,868.75	5/1/2014 508,220.00	1/5/2016 314,006.26	2022 316,124.79
5/1/2012	1,053,868.75	11/1/2014 793,220.00	1/11/2016 130,406.26	2023 320,322.96
11/1/2012	223,618.75	5/1/2015 505,726.25	1/5/2017 360,406.26	2024 320,322.96
5/1/2013	1,063,618.75	11/1/2015 795,726.25	1/11/2017 125,806.26	2025 320,322.96
11/1/2013	211,018.75	5/1/2016 499,926.25	1/5/2018 325,806.26	2026 320,322.96
5/1/2014	1,081,018.75	11/1/2016 799,926.25	1/11/2018 121,806.26	2027 320,322.96
11/1/2014	197,968.75	5/1/2017 493,926.25	1/5/2019 326,806.26	2028 320,322.96
5/1/2015	1,092,968.75	11/1/2017 803,926.25	1/11/2019 117,706.26	2029 320,322.96
11/1/2015	183,425.00	5/1/2018 487,726.25	1/5/2020 332,706.26	2030 320,322.96
5/1/2016	593,425.00	11/1/2018 812,726.25	1/11/2020 114,481.26	2031 320,322.96
11/1/2016	176,762.50	5/1/2019 479,601.25	1/5/2021 334,481.26	2032 320,322.96
5/1/2017	606,762.50	11/1/2019 819,601.25	1/11/2021 111,181.26	2033 320,322.96
11/1/2017	166,012.50	5/1/2020 471,101.25	1/5/2022 341,181.26	2034 320,322.96
5/1/2018	616,012.50	11/1/2020 831,101.25	1/11/2022 105,431.26	2035 114,096.27
11/1/2018	157,012.50	5/1/2021 462,101.25	1/5/2023 345,431.26	
5/1/2019	622,012.50	11/1/2021 837,101.25	1/11/2023 99,431.26	
11/1/2019	148,293.75	5/1/2022 452,726.25	1/5/2024 349,431.26	
5/1/2020	633,293.75	11/1/2022 847,726.25	1/11/2024 95,681.26	
11/1/2020	138,593.75	5/1/2023 442,851.25	1/5/2025 565,681.26	
5/1/2021	643,593.75	11/1/2023 857,851.25	1/11/2025 88,631.26	
11/1/2021	128,493.75	5/1/2024 432,476.25	1/5/2026 573,631.26	
5/1/2022	1,308,493.75	11/1/2024 867,476.25	1/11/2026 81,356.26	
11/1/2022	104,893.75	5/1/2025 423,776.25	1/5/2027 581,356.26	
5/1/2023	2,229,893.75	11/1/2025 1,178,776.25	1/11/2027 73,856.26	
11/1/2023	61,065.63	5/1/2026 408,676.25	1/5/2028 588,856.26	
5/1/2024	2,281,065.63	11/1/2026 1,193,676.25	1/11/2028 65,809.38	
11/1/2024	13,890.63	5/1/2027 392,583.75	1/5/2029 595,809.38	
5/1/2025	648,890.63	11/1/2027 1,212,583.75	1/11/2029 57,196.88	
		5/1/2028 374,133.75	1/5/2030 602,196.88	
		11/1/2028 1,229,133.75	1/11/2030 48,000.00	
		5/1/2029 354,896.25	1/5/2031 613,000.00	
		11/1/2029 1,249,896.25	1/11/2031 36,700.00	
		5/1/2030 334,758.75	1/5/2032 626,700.00	
		11/1/2030 1,269,758.75	1/11/2032 24,900.00	
		5/1/2031 313,721.25	1/5/2033 634,900.00	
		11/1/2031 1,288,721.25	1/11/2033 12,700.00	
		5/1/2032 291,783.75	1/5/2034 647,700.00	
		11/1/2032 1,311,783.75		
		5/1/2033 268,323.75		
		11/1/2033 1,338,323.75		
		5/1/2034 243,713.75		
		11/1/2034 1,358,713.75		
		5/1/2035 218,068.75		
		11/1/2035 1,388,068.75		
		5/1/2036 191,158.75		
		11/1/2036 1,411,158.75		
		5/1/2037 163,098.75		
		11/1/2037 1,443,098.75		
		5/1/2038 133,338.75		
		11/1/2038 1,468,338.75		
		5/1/2039 102,300.00		
		11/1/2039 1,502,300.00		
		5/1/2040 69,750.00		
		11/1/2040 1,534,750.00		
		5/1/2041 35,688.75		
		11/1/2038 1,570,688.75		

Effective Cost 5.93% 5.50% 3.59% 1.35%

Note: (1) Includes legal, printing official statement, paying agent fee (initial), rating fee, Cusip fee, and miscellaneous expenses.

City of Lancaster Sewer Fund
City of Lancaster
General Obligations Bonds and Notes
Bonds Attributable to Sewer Fund

	Total Sources and Uses of Funds		
	Sewer Share	Sewer Share	Sewer Share
	\$118,820,000	\$113,325,000	\$22,140,000
	General	General	General
	Obligation	Obligation	Obligation
	Bonds, Series of 2016	Bonds, Series of 2018	Bonds, Series of 2019
Source of Funds			
Par Amount of Bonds	\$7,000,000.00	\$20,330,000.00	\$7,070,000.00
Less: Net Original Issue Discount	(\$90,852.44)	(\$78,337.53)	(\$31,796.53)
Plus: Net Original Issue Premium	\$911,067.45	\$465,194.95	\$799,115.85
Total Source of Funds	\$7,820,215.01	\$20,716,857.42	\$7,837,319.32
Use of Funds - Not Construction Nor Contingency			
Deposit to Initial Sinking Fund	\$3,094.73	\$980,714.44	\$4,601.43
Costs of Issuance (1)	\$39,370.28	\$110,196.61	\$60,705.39
Termination of SWAP	\$0.00	\$0.00	\$0.00
Unrecovered Issuance Expense of Redeemed Issue	(\$53,366.22)	\$0.00	\$725,176.31
Issue Refinanced	2007		2009
Total Use of Funds - Not Construction Nor Contingency	(\$8,894.21)	\$1,090,911.05	\$792,492.13
Funds Available for Construction & Contingency	\$7,829,109.22	\$19,625,946.37	\$7,044,827.19
Net Expenses	(\$829,109.22)	\$704,053.63	\$25,172.81
Allocated to Sewer	100.00%	100.00%	100.00%
Original Life At Issuance (in Months)	79	371	75
Date of Issue	5/1/2016	5/1/2018	2/26/2019
Date of Refinancing			
Actual Life At Refinancing (in Months)			
Remianing Life			
Sewer Share of Expenses at Issuance	(\$829,109.22)	\$704,053.63	\$25,172.81
Sewer Remianing Expense at Refinancing			

Net Debt Service Schedule - Sewer Fund			
Series	2016	2018	2019
Principal	\$7,000,000.00	\$20,330,000.00	\$7,070,000.00
Net Proceeds	111.84%	96.54%	99.64%
Maturity	1/11/2022	1/11/2048	1/5/2025
Effective Cost	1.82%	4.18%	4.69%

Net Proceeds	(\$7,829,109.22)	(\$19,625,946.37)	(\$7,044,827.19)
1/1/2016	193,545.00	1/11/2018	155,814.44
1/5/2017	170,775.00	1/5/2019	412,450.00
1/11/2017	1,045,775.00	1/11/2019	412,450.00
1/5/2018	148,900.00	1/5/2020	412,450.00
1/11/2018	1,373,900.00	1/11/2020	417,450.00
1/5/2019	118,275.00	1/5/2021	412,325.00
1/11/2019	1,408,275.00	1/11/2021	417,325.00
1/5/2020	86,025.00	1/5/2022	412,275.00
1/11/2020	1,436,025.00	1/11/2022	417,275.00
1/5/2021	52,275.00	1/5/2023	412,150.00
1/11/2021	1,467,275.00	1/11/2023	417,150.00
1/5/2022	16,900.00	1/5/2024	412,025.00
1/11/2022	861,900.00	1/11/2024	417,025.00
		1/5/2025	411,900.00
		1/11/2025	416,900.00
		1/5/2026	411,775.00
		1/11/2026	621,775.00
		1/5/2027	406,525.00
		1/11/2027	626,525.00
		1/5/2028	401,025.00
		1/11/2028	631,025.00
		1/5/2029	395,275.00
		1/11/2029	635,275.00
		1/5/2030	389,275.00
		1/11/2030	644,275.00
		1/5/2031	382,900.00
		1/11/2031	652,900.00
		1/5/2032	377,500.00
		1/11/2032	657,500.00
		1/5/2033	371,900.00
		1/11/2033	661,900.00
		1/5/2034	366,100.00
		1/11/2034	671,100.00
		1/5/2035	360,000.00
		1/11/2035	395,000.00
		1/5/2036	359,300.00
		1/11/2036	399,300.00
		1/5/2037	358,500.00
		1/11/2037	633,500.00
		1/5/2038	353,000.00
		1/11/2038	723,000.00
		1/5/2039	345,600.00
		1/11/2039	730,600.00
		1/5/2040	337,900.00
		1/11/2040	737,900.00
		1/5/2041	329,900.00
		1/11/2041	744,900.00
		1/5/2042	321,600.00
		1/11/2042	2,356,600.00
		1/5/2043	280,900.00
		1/11/2043	2,400,900.00
		1/5/2044	238,500.00
		1/11/2044	2,443,500.00
		1/5/2045	194,400.00
		1/11/2045	2,484,400.00
		1/5/2046	148,600.00
		1/11/2046	2,528,600.00
		1/5/2047	101,000.00
		1/11/2047	2,576,000.00
		1/5/2048	51,500.00
		1/11/2048	2,626,500.00
Effective Cost	1.82%	4.18%	4.69%

Note: (1) Includes legal, printing official statement, paying agent fee (initial), rating fee, Cusip fee, and miscellaneous expenses.

City of Lancaster Sewer Fund
City of Lancaster
General Obligations Bonds and Notes
Attributable to Sewer Fund
Effective Cost of Debt

	<u>Outstanding</u>	<u>Cost Rate (1)</u>	<u>Annual Cost</u>	<u>Effective Cost</u>
<u>At 12/31/18</u>				
General Obligation Notes, Series of 2009	\$7,615,000	5.93%	\$451,570	
General Obligation Bonds, Series of 2011	20,950,000	5.50%	1,152,250	
General Obligation Bonds, Series of 2014	6,805,000	3.59%	244,300	
PennVest - Guaranteed Revenue Note of 2014	4,601,802	1.35%	62,124	
General Obligation Bonds, Series of 2016	4,900,000	1.82%	89,180	
General Obligation Bonds, Series of 2018	<u>20,330,000</u>	4.18%	<u>849,794</u>	
Total	<u>\$65,201,802</u>		<u>\$2,849,218</u>	<u>4.37%</u>
<u>At 12/31/19</u>				
General Obligation Bonds, Series of 2011	\$20,610,000	5.50%	\$1,133,550	
General Obligation Bonds, Series of 2014	6,600,000	3.59%	236,940	
PennVest - Guaranteed Revenue Note of 2014	4,343,106	1.35%	58,632	
General Obligation Bonds, Series of 2016	3,610,000	1.82%	65,702	
General Obligation Bonds, Series of 2018	20,330,000	4.18%	849,794	
General Obligation Bonds, Series of 2019	<u>6,970,000</u>	4.69%	<u>326,893</u>	
Total	<u>\$62,463,106</u>		<u>\$2,671,511</u>	<u>4.28%</u>
<u>At 12/31/20</u>				
General Obligation Bonds, Series of 2011	\$20,250,000	5.50%	\$1,113,750	
General Obligation Bonds, Series of 2014	6,385,000	3.59%	229,222	
PennVest - Guaranteed Revenue Note of 2014	4,081,811	1.35%	55,104	
General Obligation Bonds, Series of 2016	2,260,000	1.82%	41,132	
General Obligation Bonds, Series of 2018	20,325,000	4.18%	849,585	
General Obligation Bonds, Series of 2019	<u>6,535,000</u>	4.69%	<u>306,492</u>	
Total	<u>\$59,836,811</u>		<u>\$2,595,285</u>	<u>4.34%</u>

Water Group Followed by Analysts
Five Year Analysis
2013 - 2017 (1)

<u>Ln #</u>	<u>2017</u>	<u>2016</u>	<u>2015</u>	<u>2014</u>	<u>2013</u>	<u>Average Ann. Chg(%)</u>	<u>Average Central Values(9)</u>	
	(Millions of \$)							
	Investor Provided Capital(\$)							
1	Permanent Capital	2,769.010	2,520.684	2,520.684	2,389.712	2,281.523	5.0	
2	Short-Term Debt	<u>253.900</u>	<u>121.388</u>	<u>121.388</u>	<u>101.836</u>	<u>126.480</u>		
3	Total Capital	3,022.910	2,642.072	2,642.072	2,491.548	2,408.003	6.0	
4	Total Revenue(\$)	834.658	785.487	785.487	762.461	737.254	3.2	
5	Construction(\$)	358.338	276.462	276.462	232.566	233.292	12.1	
6	Effective Income Tax Rate(%)	32.1	31.5	31.5	31.2	32.3	31.7	
	Book Capitalization Ratios(%)							
7	Long-Term Debt	44.9	46.2	46.2	45.3	45.6	45.6	
8	Preferred Stock	0.1	0.1	0.1	0.1	0.1	0.1	
9	Common Equity	<u>55.0</u>	<u>53.7</u>	<u>53.7</u>	<u>54.6</u>	<u>54.3</u>	54.3	
	Total	100.0	100.0	100.0	100.0	100.0	54.3	
10	Total Debt	48.9	47.8	47.8	47.2	47.9	47.9	
11	Preferred Stock	0.1	0.1	0.1	0.1	0.1	0.1	
12	Common Equity	<u>51.0</u>	<u>52.1</u>	<u>52.1</u>	<u>52.7</u>	<u>52.0</u>	52.0	
	Total	100.0	100.0	100.0	100.0	100.0	52.1	
	Rates on Average Capital(2)(%)							
13	Total Debt	5.0	5.2	5.2	5.4	5.5	5.3	
14	Long-Term Debt	NA	NA	NA	NA	NA	0.0	
15	Preferred Stock	5.9	5.9	5.9	5.7	4.2	5.5	
	Coverage - Including AFC(3)(x)							
16	PreTax Interest	4.8	4.4	4.4	4.5	3.9	4.4	
17	PreTax Interest + Pref. Div	4.7	4.4	4.4	4.5	3.9	4.4	
18	PostTax Interest + Pref. Div	3.5	3.3	3.3	3.4	3.0	3.3	
	Coverage - Excluding AFC(3)(x)							
19	PreTax Interest	4.6	4.3	4.3	4.5	3.9	4.3	
20	PreTax Interest + Pref. Div	4.6	4.3	4.3	4.5	3.9	4.3	
21	PostTax Interest + Pref. Div	3.4	3.2	3.2	3.4	2.9	3.2	
22	GCF / Interest Coverage(4)(x)	5.9	5.9	5.9	6.0	5.0	5.7	
23	Coverage of Common Dividends(5)(x)	3.7	3.9	3.9	4.3	3.7	3.9	
24	Construction / Avg. Tot. Capital(%)	13.7	10.7	10.7	9.7	9.8	10.9	
25	NCF / Construction(6)(%)	59.3	84.1	84.1	98.6	82.0	81.6	
26	AFC / Income for Common Stock	4.4	2.8	2.8	2.0	2.5	2.9	
27	GCF / Avg. Tot. Debt(7)(%)	23.4	24.9	24.9	27.0	21.8	24.4	
28	GCF / Permanent Capital(8)(%)	12.0	12.0	12.0	13.0	11.1	12.0	

See page 2 of this Schedule for notes.

Water Group Followed by Analysts
Five Year Analysis
2013-2017

Notes:

- (1) Average of the achieved results for each individual company based upon the financials as originally reported.
- (2) Computed by relating total debt interest, long-term debt interest and preferred dividend expense to average of beginning and ending balance of the respective capital outstanding.
- (3) The coverage calculations, both including and excluding AFC, represent the number of times available earnings cover the various fixed charges. It should be noted that the pretax coverage including preferred dividends has been grossed up for the income tax paid on the preferred dividends.
- (4) GCF or gross cash flow (sum of net income, depreciation, amortization, net deferred income taxes and investment tax credits, less AFC), plus interest charges, divided by interest charges.
- (5) GCF (see note 4) less all preferred dividends which cover common dividends.
- (6) The percent of GCF (see note 4) less all cash dividends which cover gross construction expenditures.
- (7) GCF (see note 4) as a percentage of Permanent Capital (long-term debt, current maturities and preferred, preference and common equity).
- (8) GCF (see note 4) as a percentage of average total debt.
- (9) Average of the second, third and fourth quintile values.

Source of Information: Standard & Poor's and Annual Reports

S&P Utilities
Five Year Analysis
2013 - 2017 (1)

<u>Ln #</u>	<u>2017</u>	<u>2016</u>	<u>2015</u>	<u>2014</u>	<u>2013</u>	<u>Average Ann. Chg(%)</u>	<u>Average Central Values(9)</u>	
	(Millions of \$)							
	Investor Provided Capital(\$)							
1	Permanent Capital	41,009.063	34,518.780	34,518.780	33,086.738	32,291.157	6.4	
2	Short-Term Debt	<u>3,053.085</u>	<u>2,492.003</u>	<u>2,492.003</u>	<u>2,673.805</u>	<u>2,094.635</u>		
3	Total Capital	44,062.148	37,010.783	37,010.783	35,760.543	34,385.791	6.7	
4	Total Revenue(\$)	14,573.444	13,896.573	13,896.573	14,567.195	13,924.574	1.2	
5	Construction(\$)	4,579.722	4,028.248	4,028.248	3,674.978	3,481.847	7.2	
6	Effective Income Tax Rate(%)	18.2	31.1	31.1	29.1	31.9	28.3	
	Book Capitalization Ratios(%)							
7	Long-Term Debt	56.5	53.7	53.7	52.8	52.4	53.8	
8	Preferred Stock	0.5	0.7	0.7	0.7	0.8	0.7	
9	Common Equity	<u>43.0</u>	<u>45.6</u>	<u>45.6</u>	<u>46.5</u>	<u>46.8</u>	45.5	
	Total	100.0	100.0	100.0	100.0	100.0	45.6	
10	Total Debt	59.6	56.6	56.6	56.2	55.4	56.9	
11	Preferred Stock	0.4	0.7	0.7	0.7	0.7	0.7	
12	Common Equity	<u>40.0</u>	<u>42.7</u>	<u>42.7</u>	<u>43.1</u>	<u>43.8</u>	42.4	
	Total	100.0	100.0	100.0	100.0	100.0	42.7	
	Rates on Average Capital(2)(%)							
13	Total Debt	4.3	4.4	4.4	4.7	4.8	4.5	
14	Long-Term Debt	5.0	5.0	5.0	4.9	5.1	5.0	
15	Preferred Stock	4.0	3.6	3.6	3.7	3.2	3.6	
	Coverage - Including AFC(3)(x)							
16	PreTax Interest	3.2	3.6	3.6	3.6	3.3	3.5	
17	PreTax Interest + Pref. Div	3.2	3.6	3.6	3.5	3.3	3.4	
18	PostTax Interest + Pref. Div	2.7	2.7	2.7	2.7	2.5	2.7	
	Coverage - Excluding AFC(3)(x)							
19	PreTax Interest	3.1	3.5	3.5	3.5	3.2	3.4	
20	PreTax Interest + Pref. Div	3.1	3.5	3.5	3.4	3.2	3.3	
21	PostTax Interest + Pref. Div	2.6	2.6	2.6	2.6	2.4	2.6	
22	GCF / Interest Coverage(4)(x)	5.0	5.5	5.5	5.3	5.0	5.2	
23	Coverage of Common Dividends(5)(x)	3.4	3.5	3.5	4.1	3.8	3.7	
24	Construction / Avg. Tot. Capital(%)	11.4	11.7	11.7	11.3	11.1	11.4	
25	NCF / Construction(6)(%)	60.4	65.2	65.2	75.5	68.1	66.9	
26	AFC / Income for Common Stock	8.6	4.8	4.8	6.3	7.4	6.4	
27	GCF / Avg. Tot. Debt(7)(%)	17.0	19.1	19.1	19.7	18.7	18.7	
28	GCF / Permanent Capital(8)(%)	10.4	11.1	11.1	11.5	10.8	11.0	

See page 2 of this Schedule for notes.

S&P Public Utilities
Five Year Analysis
2013-2017

Notes:

- (1) Market value weighted achieved results for each individual company based upon the financials as originally reported.
- (2) Computed by relating total debt interest, long-term debt interest and preferred dividend expense to average of beginning and ending balance of the respective capital outstanding.
- (3) The coverage calculations, both including and excluding AFC, represent the number of times available earnings cover the various fixed charges. It should be noted that the pretax coverage including preferred dividends has been grossed up for the income tax paid on the preferred dividends.
- (4) GCF or gross cash flow (sum of net income, depreciation, amortization, net deferred income taxes and investment tax credits, less AFC), plus interest charges, divided by interest charges.
- (5) GCF (see note 4) less all preferred dividends which cover common dividends.
- (6) The percent of GCF (see note 4) less all cash dividends which cover gross construction expenditures.
- (7) GCF (see note 4) as a percentage of Permanent Capital (long-term debt, current maturities and preferred, preference and common equity).
- (8) GCF (see note 4) as a percentage of average total debt.
- (9) Average of the second, third and fourth quintile values.

Source of Information: Standard & Poor's, Moody's and Annual Reports

Risk Measures for the Common Stock of
The Water Group Followed by Analysts and the S&P Utilities

	Recent S&P Issuer Credit Rating	Stock Exchange for Company	Recent S&P Common Stock Ranking	Value Line Beta	Recent Market Value (Mill \$)	Recent S&P Market Size Index	Market Quartile	Market Quartile Name
<u>Water Group Followed by Analysts</u>								
American States Water Co	A+	New York Stock Exchange	High (A)	0.70	2,618.700	S&P SmallCap 600	2	Mid-Cap
American Water Works Co Inc	A	New York Stock Exchange	Average (B+)	0.60	19,529.484	S&P 500	1	Large-Cap
Aqua America Inc	A+	New York Stock Exchange	Highest (A+)	0.70	9,179.970	S&P MidCap 400	2	Mid-Cap
California Water Service Gp	A+	New York Stock Exchange	Above Average (A-)	0.70	2,425.472	S&P SmallCap 600	2	Mid-Cap
Middlesex Water Co	A	NASDAQ/ NMS/ OTC Bul Brd	High (A)	0.75	953.994	NOT in a S&P Index	3	Low-Cap
SJW Corp	A	New York Stock Exchange	Above Average (A-)	0.65	1,764.676	NOT in a S&P Index	3	Low-Cap
York Water Co	A-	NASDAQ/ NMS/ OTC Bul Brd	High (A)	0.75	440.552	NOT in a S&P Index	4	Mico-Cap
Average	A		High (A)	0.69	2,425.472	S&P SmallCap 600	2	Mid-Cap
<u>S&P Public Utilities</u>								
AES Corporation	BB+	New York Stock Exchange	Below Average (B)	1.15	11,340.356	S&P 500	1	Large-Cap
Alliant Energy Corp	A-	NASDAQ/ NMS/ OTC Bul Brd	High (A)	0.70	11,160.401	S&P 500	1	Large-Cap
Ameren Corp	BBB+	New York Stock Exchange	Average (B+)	0.65	17,859.141	S&P 500	1	Large-Cap
American Electric Power Co Inc	A-	New York Stock Exchange	Average (B+)	0.65	42,213.449	S&P 500	1	Large-Cap
American Water Works Company Inc	A	New York Stock Exchange	Average (B+)	0.60	19,529.484	S&P 500	1	Large-Cap
CenterPoint Energy Inc.	A-	New York Stock Exchange	Below Average (B)	0.90	15,544.640	S&P 500	1	Large-Cap
CMS Energy Corp	BBB+	New York Stock Exchange	Above Average (A-)	0.65	15,762.535	S&P 500	1	Large-Cap
Consolidated Edison Inc.	A-	New York Stock Exchange	Average (B+)	0.50	28,169.754	S&P 500	1	Large-Cap
Dominion Resources Inc.	BBB+	New York Stock Exchange	Below Average (B)	0.65	62,249.121	S&P 500	1	Large-Cap
DTE Energy Co	BBB+	New York Stock Exchange	Above Average (A-)	0.65	23,031.580	S&P 500	1	Large-Cap
Duke Energy Corp	A-	New York Stock Exchange	Average (B+)	0.60	66,303.102	S&P 500	1	Large-Cap
Edison International	BBB	New York Stock Exchange	Below Average (B)	0.60	20,776.967	S&P 500	1	Large-Cap
Entergy Corp.	BBB+	New York Stock Exchange	Below Average (B)	0.65	18,456.543	S&P 500	1	Large-Cap
Eversource Energy	A+	New York Stock Exchange	High (A)	0.65	22,737.861	S&P 500	1	Large-Cap
Exelon Corp	BBB+	New York Stock Exchange	Below Average (B)	0.70	49,166.086	S&P 500	1	Large-Cap
FirstEnergy Corp.	BBB	New York Stock Exchange	In Reorganization (D)	0.65	22,336.508	S&P 500	1	Large-Cap
NextEra Energy Inc	A-	New York Stock Exchange	High (A)	0.65	93,124.125	S&P 500	1	Large-Cap
NiSource Inc.	BBB+	New York Stock Exchange	Below Average (B)	0.60	10,361.079	S&P 500	2	Mid-Cap
NRG Energy Inc	BB	New York Stock Exchange	Below Average (B)	1.25	11,485.442	S&P 500	1	Large-Cap
PG&E Corp	D	New York Stock Exchange	In Reorganization (D)	0.65	11,917.810	NOT in a S&P Index	1	Large-Cap
Pinnacle West Capital Corp	A-	New York Stock Exchange	High (A)	NMF	10,696.344	S&P 500	2	Mid-Cap
PPL Corp	A-	New York Stock Exchange	Average (B+)	0.75	22,501.973	S&P 500	1	Large-Cap
Public Service Enterprise Group Inc	BBB+	New York Stock Exchange	Average (B+)	0.70	30,123.250	S&P 500	1	Large-Cap
SCANA Corp	-	New York Stock Exchange						
Sempra Energy	BBB+	New York Stock Exchange	Average (B+)	0.75	35,078.133	S&P 500	1	Large-Cap
Southern Co	A-	New York Stock Exchange	Average (B+)	0.55	55,393.133	S&P 500	1	Large-Cap
WEC Energy Group Inc	A-	New York Stock Exchange	High (A)	0.60	24,740.744	S&P 500	1	Large-Cap
Xcel Energy Inc.	A-	NASDAQ/ NMS/ OTC Bul Brd	High (A)	0.60	29,079.025	S&P 500	1	Large-Cap
Average	BBB+		Average (B+)	0.69	28,931.059	S&P MidCap 400	1	Large-Cap

Comparative Ratios
The Water Group Followed by Analysts,
S&P Utilities, and S&P 500
For the Years 2013-2017(1)

	<u>2017</u>	<u>2016</u>	<u>2015</u>	<u>2014</u>	<u>2013</u>	<u>Five Year Average</u>
<u>Return on Common Equity(2)</u>						
Water Group Followed by Analysts	11.2	10.4	10.4	11.4	10.0	10.7
S&P Utilities	8.1	8.4	8.4	9.9	8.9	8.7
S&P 500	14.0	12.7	12.0	14.4	14.7	13.6
<u>Market/Book Multiple(3)</u>						
Water Group Followed by Analysts	3.1	2.3	2.3	2.2	2.1	2.4
S&P Utilities	2.2	1.9	1.9	1.9	1.7	1.9
S&P 500	3.1	2.7	2.7	2.7	2.3	2.6
<u>Earnings/Price Ratio(4)</u>						
Water Group Followed by Analysts	3.7	4.6	4.6	5.4	4.8	4.6
S&P Utilities	4.6	4.0	4.0	5.4	5.2	4.6
S&P 500	4.5	4.7	4.4	5.4	6.3	5.1
<u>Dividend Payout Ratio(5)</u>						
Water Group Followed by Analysts	56.4	57.7	57.7	53.2	60.8	57.2
S&P Utilities	84.2	56.9	56.9	77.1	76.1	70.2
S&P 500	43.9	47.7	49.4	38.0	34.5	42.7
<u>Dividend Yield(6)</u>						
Water Group Followed by Analysts	2.0	2.6	2.6	2.7	2.8	2.5
S&P Utilities	3.5	3.7	3.7	3.6	3.9	3.7
S&P 500	2.0	2.2	2.2	2.1	2.2	2.1

See next page for Notes.

Comparative Ratios For
The Water Group Followed by Analysts,
The S&P Utilities, and the S&P 500
For the Years 2013-2017 (1)

Notes:

- (1) The average of achieved results for the companies in each group. The information for the S&P Public Utilities is market weighted. The information for the S&P 500 is based upon per share information adjusted to price index level.
- (2) Rate of Return on Average Book Common Equity - income available for common equity divided by average beginning and ending year's balance of book common equity.
- (3) Market/Book Ratio - average of yearly high-low market price divided by the average of beginning and ending year's book value per share.
- (4) Earnings/Price Ratio - reported earnings per share yearly divided by the average of yearly high-low market price.
- (5) Dividend Payout Ratio is computed by dividing the yearly reported dividends paid by the yearly income available for common equity.
- (6) Dividend Yield - yearly dividend per share divided by the average yearly high-low market price.

Source of Information: Standard & Poor's and Annual Reports

Capital Intensity and Capital Recovery
City of Lancaster Sewer Fund
The Water Group Followed by Analysts, and S&P Utilities
For the Year 2017

	<u>Capital Intensity</u>	<u>Rate of Capital Recovery</u>	<u>Capital Recovery Years</u>
City of Lancaster Sewer Fund	<u>\$11.34</u>	<u>1.98%</u>	<u>50.4</u>
Water Group Followed by Analysts	<u>\$5.82</u>	<u>2.24%</u>	<u>45.5</u>
S&P Utilities	<u>\$4.17</u>	<u>3.20%</u>	<u>32.9</u>

Relative Size of
City of Lancaster Sewer Fund
Versus the Water Group Followed by Analysts
For the Year 2018

	<u>City of Lancaster Sewer Fund</u>	<u>Water Group Followed by Analysts</u>	<u>Water Group Followed by Analysts Vs. City of Lancaster Sewer Fund</u>
City of Lancaster Sewer Fund			
Total Capitalization (000's)	\$62,043	\$3,391,000	54.7 x
Total Operating Revenues (000's)	\$17,159	\$857,000	49.9 x
Number of Customers	20,204	802,885	39.7 x
City of Lancaster Sewer Fund - Total Outside City			
Total Capitalization (000's)*	\$7,682	\$3,391,000	441.4 x
Total Operating Revenues (000's)	\$1,374	\$857,000	623.6 x
Number of Customers	3,385	802,885	237.2 x
City of Lancaster Sewer Fund - Total Inside City			
Total Capitalization (000's)*	\$54,361	\$3,391,000	62.4 x
Total Operating Revenues (000's)	\$15,784	\$857,000	54.3 x
Number of Customers	16,819	802,885	47.7 x

* Capitalization is assumed to be equal to rate base apportioned based on revenues and customers.

Institutional Holdings, Insider Holdings and Percentage of Shares Traded Annually for
The Water Group Followed by Analysts, and the S&P Utilities

	Water Group Followed by <u>Analysts</u>	S&P <u>Public Utilities</u>
Percentage of common shares held by insiders (1)	2.9%	0.3%
Percentage of common shares held by institutions (2)	60.8%	77.9%
Percentage Of Common Shares Traded In 2016	127%	177%
Percentage Of Common Shares Traded In 2017	83%	156%
Average Number Of Months For All Common Shares To Turnover (3)	12.7	7.1

Notes: (1) An insider is a director or an officer who has a policy-making role or a person who is directly or indirectly the beneficial owner of more than 10% of a certain company's stock. An insider may be either an individual or a corporation. Insiders are required to disclose their purchase/sale transactions to the SEC in which a change in beneficial ownership has occurred. The filings must be submitted before the end of the second business day following the day on which the transaction had been executed.

(2) Institutional holders are those investment managers having a fair market value of equity assets under management of \$100 million or more. Certain banks, insurance companies, investment advisers, investment companies, foundations and pension funds are included in this category.

(3) Based on average turnover (shares traded) over the past five years.

Bond and Credit Ratings for
City of Lancaster and
The Water Group Followed by Analysts

	<u>S&P Credit Rating</u>	
City of Lancaster	<u>A3</u>	(Moody's rating)
City of Lancaster - (Insured Rating)	<u>AA</u>	
<u>Water Group Followed by Analysts</u>		
American States Water Co	A+	
American Water Works Co Inc	A	
Aqua America Inc *	A+	
California Water Service Gp **	A+	
Middlesex Water Co	A	
SJW Corp ***	A	
York Water Co	A-	
Average	<u>A</u>	

* - The A+ bond rating is that for Aqua Pennsylvania, Inc.

** - The A+ bond rating is that for California Water Service, Inc.

*** - The A bond rating is that for San Jose Water Co.

Comparison of Credit Market Financial Risk Metrics
For Lancaster Sewer Fund
And the Comparable Group
2015 - 2017 (1)

	Lancaster Sewer Fund			Comparable Group		
	2017	2016	2015	2017	2016	2015
Debt Service Coverage	0.9	0.8	0.6	2.9	3.4	3.1
Pre-Tax Interest Coverage - Including AFC(2)(x)	0.1	0.1	-0.4	4.8	4.6	4.4
Post-Tax Interest Coverage - Excluding AFC(2)(x)	0.1	0.1	-0.4	3.5	3.5	3.3
GCF / Interest Coverage(3)(x)	1.8	1.6	1.1	5.9	5.7	5.9
GCF / Tot. Debt(4)(%)	3.1	2.6	0.4	22.6	22.7	24.4
GCF / Construction(5)(%)	25.3	14.5	1.8	83.8	92.4	116.8

- Notes: (1) Average of the achieved results for each individual company based upon the financials as originally reported.
(2) Represents the number of times available earnings, including AFC, cover all interest charges.
(3) GCF or gross cash flow (sum of net income, depreciation, amortization, net deferred income taxes and investment tax credits, less AFC), plus interest charges, divided by interest charges.
(4) GCF (see note 3) as a percentage of total debt.
(5) The percent of GCF (see note 3) which cover gross construction expenditures.

Source: 2015-17 Annual Reports
S&P Research Insight

Distribution of Bond and Credit Ratings for
All Companies Contained in S&P's *Compustat* Database (1)

Number of Companies In Each Grouping	S&P Bond and Credit Ratings				Range of Reported Permanent Capital By Groupings (Million \$)		
	Average	Median	Maximum	Minimum	Smallest	Median	Largest
	100	B+	B	A	CCC-	-2,928.151	376.009
100	BB-	B+	AA-	CCC+	561.800	756.861	931.987
100	BB-	BB-	AA-	Default	932.000	1,094.997	1,273.900
100	BB	BB	A+	CCC+	1,283.351	1,512.788	1,669.359
100	BB+	BB+	A	CCC	1,674.200	1,895.810	2,127.131
100	BB+	BB+	AA	CCC-	2,143.009	2,421.839	2,756.083
100	BBB-	BBB-	A	CCC+	2,760.856	3,063.411	3,373.200
100	BB+	BBB-	A+	CCC-	3,376.416	3,661.564	4,062.805
100	BBB-	BBB-	A+	CCC+	4,074.267	4,604.100	5,251.000
100	BBB-	BBB-	AA-	B	5,253.000	5,873.850	6,402.000
100	BBB	BBB	AA	B-	6,402.700	7,189.141	8,397.630
100	BBB	BBB	AA-	CC	8,433.000	9,659.500	10,879.693
100	BBB	BBB+	A+	CCC	10,885.000	12,314.022	14,519.835
100	BBB	BBB	AA-	B	14,539.698	17,349.793	20,154.200
100	BBB+	BBB+	AAA	B+	20,226.000	24,400.500	31,082.000
100	BBB+	A-	AA	B	31,316.000	45,328.182	68,278.000
82	A	A	AAA	BB-	70,378.355	121,191.500	572,140.000
Total	1,682						

Number of Companies In Each Grouping	Range of Reported Permanent Capital By Groupings (Million \$)			Distribution of S&P Bond and Credit Ratings By Size Grouping								
	Smallest	Median	Largest	AAA	AA	A	BBB	BB	B	CCC	CC	Default
	100	-2,928.151	376.009	558.000	0%	0%	5%	3%	16%	62%	14%	0%
100	561.800	756.861	931.987	0%	1%	3%	11%	32%	50%	3%	0%	0%
100	932.000	1,094.997	1,273.900	0%	1%	5%	18%	36%	33%	6%	0%	1%
100	1,283.351	1,512.788	1,669.359	0%	0%	5%	21%	43%	29%	2%	0%	0%
100	1,674.200	1,895.810	2,127.131	0%	0%	8%	31%	42%	18%	1%	0%	0%
100	2,143.009	2,421.839	2,756.083	0%	1%	8%	41%	32%	16%	2%	0%	0%
100	2,760.856	3,063.411	3,373.200	0%	0%	16%	35%	41%	7%	1%	0%	0%
100	3,376.416	3,661.564	4,062.805	0%	0%	8%	53%	27%	10%	2%	0%	0%
100	4,074.267	4,604.100	5,251.000	0%	0%	14%	44%	26%	15%	1%	0%	0%
100	5,253.000	5,873.850	6,402.000	0%	1%	16%	43%	30%	10%	0%	0%	0%
100	6,402.700	7,189.141	8,397.630	0%	2%	20%	52%	21%	7%	0%	0%	0%
100	8,433.000	9,659.500	10,879.693	0%	1%	26%	50%	17%	5%	0%	1%	0%
100	10,885.000	12,314.022	14,519.835	0%	0%	36%	45%	13%	5%	1%	0%	0%
100	14,539.698	17,349.793	20,154.200	0%	1%	26%	56%	9%	8%	0%	0%	0%
100	20,226.000	24,400.500	31,082.000	1%	7%	30%	45%	14%	3%	0%	0%	0%
100	31,316.000	45,328.182	68,278.000	0%	9%	48%	31%	10%	2%	0%	0%	0%
82	70,378.355	121,191.500	572,140.000	2%	27%	40%	28%	2%	0%	0%	0%	0%
1,682												

Note: (1) Includes all companies contained in S&P's *Compustat* North American Database that have a S&P bond or credit ratings and reported permanent capital for the year 2016 (as of 7/12/17). Companies were sorted based on amount of reported permanent capital and then separated into groups of 100 companies from smallest to largest.

Debt Service Coverage Levels for the
The Water Group Followed by Analysts

Debt Service Coverage - As Reported						
	<u>2017</u>	<u>2016</u>	<u>2015</u>	<u>2014</u>	<u>2013</u>	<u>Average</u>
<u>Water Group Followed by Analysts</u>						
American States Water Co	5.7	5.4	5.6	2.9	4.8	4.9
American Water Works Co Inc	1.0	2.7	2.8	2.1	1.4	2.0
Aqua America Inc	1.0	1.0	0.8	1.3	1.1	1.0
California Water Service Gp	2.9	3.6	3.7	3.9	1.7	3.2
Middlesex Water Co	3.6	3.6	3.2	3.2	2.0	3.1
SJW Corp	4.7	3.0	4.2	5.0	2.9	4.0
York Water Co	1.1	4.4	1.4	1.1	3.9	2.4
Average	2.9	3.4	3.1	2.8	2.5	2.9

Municipal Water and Sewer Utility
 Median Debt Service Levels for 2011 and 2017 and
Median Size and Credits for 2017

2017 Water and Sewer Medians Debt Service Coverage

	AAA	AA	A	All Credits
3-Year Historical Average Coverage of Annual Debt Service	2.8	2.2	1.5	2.2
Current Year's Coverage of Annual Debt Service	2.6	2.3	1.6	2.3
Minimum Coverage Projected Next 5-Years	2.4	1.8	1.3	1.7
Maximum Annual Debt Service Coverage	2.3	1.8	1.4	1.9

2011 Water and Sewer Medians Debt Service Coverage

	AAA	AA	A	All Credits
3-Year Historical Average Coverage of Annual Debt Service	2.6	2.3	2.0	2.3
Current Year's Coverage of Annual Debt Service	2.1	1.9	1.8	1.9
Minimum Coverage Projected Next 5-Years	1.8	1.5	1.5	1.5
Maximum Annual Debt Service Coverage	3.1	1.7	1.8	1.7

SIZE & CREDIT: 2017 Water and Sewer Medians: Population and Number of Customers

	AAA	AA	A	All Credits
Population	330,421	188,100	69,117	188,100
Total Water Customers	90,783	51,844	12,975	51,168
Total Sewer Customers	86,744	54,757	20,437	56,711

Source of Information: Fitch, Inc., Fitch Ratings Ltd. "2017 Water and Sewer Medians", 12/16/16,
 Fitch, Inc., Fitch Ratings Ltd. "2011 Water and Wastewater Medians", 1/18/11.

Debt Service Coverage Levels for
Pennsylvania Water and Sewer Municipal Authorities *
For the Years 2013 to 2018

		2018	2017	2016	2015	2014	2013	Summary 2014-2018	Summary 2013-2017
Water Municipal Authorities									
Number of Municipal Authorities Reporting		11	175	197	212	212	224	807	1,020
Percentiles:	20%	1.8	1.6	1.5	1.4	1.4	1.3	1.4	1.4
	40%	3.4	2.2	2.0	2.0	1.9	1.7	2.0	1.9
	50%	3.8	2.6	2.4	2.4	2.3	2.0	2.4	2.4
	60%	4.1	3.2	3.0	3.1	3.0	2.6	3.1	2.9
	80%	11.9	5.4	4.9	6.6	5.4	5.4	5.4	5.4
Sewer Municipal Authorities									
Number of Municipal Authorities Reporting		5	84	92	94	108	107	383	485
Percentiles:	20%	0.7	1.4	1.9	1.5	1.0	1.3	1.4	1.4
	40%	1.5	2.8	3.3	2.8	2.2	2.3	2.6	2.5
	50%	2.0	3.5	4.0	3.4	2.6	3.1	3.3	3.3
	60%	4.3	4.3	5.3	4.5	3.5	4.0	4.5	4.3
	80%	20.5	9.6	10.4	8.2	7.3	6.6	8.9	8.1

* Includes all reported operating water/sewer municipal authorities with debt service payments that were greater than 2.99% of outstanding debt.

Source of Information: Statistics for Municipal Authorities in Pennsylvania, 2013 - 2018

City of Lancaster Sewer Fund
Debt Service Coverage Levels

	2017	2016	2015
Income (Loss)	(\$1,791,117)	(\$1,895,321)	(\$2,933,992)
Interest paid	2,007,589	2,014,351	2,116,895
Amortization	45,969	47,689	53,994
Depreciation	3,262,285	3,153,135	3,082,197
Total Source	\$3,524,726	\$3,319,854	\$2,319,094
Principal	\$2,036,577	\$2,005,000	\$1,768,000
Interest paid	2,007,589	2,014,351	2,116,895
Total Use	\$4,044,166	\$4,019,351	\$3,884,895
Debt Service Coverage	0.9	0.8	0.6

Sewer Fund - Existing Debt Service Requirements

2019	4,686,278
2020	5,952,608
2021	5,943,358
2022	6,606,177
2023	7,481,772
2024	7,490,144
2025	4,712,804
2026	3,618,488
2027	3,621,253
2028	3,618,353
2029	3,617,284
2030	3,617,784
2031	3,619,565
2032	3,622,290
2033	3,620,570
2034	3,620,350
2035	2,475,234
2036	2,360,918
2037	2,598,198
2038	2,677,678
2039	2,680,800
2040	2,680,300
2041	2,681,178
2042	2,678,200
2043	2,681,800
2044	2,682,000
2045	2,678,800
2046	2,677,200
2047	2,677,000
2048	2,678,000

Interest Rate Trends for
Investor-Owned Public Utility Bonds
Yearly for 2013-2017, Monthly for the Years 2018 and 2019

<u>Years</u>	<u>Aaa Rated</u>	<u>Aa Rated</u>	<u>A Rated</u>	<u>Baa Rated</u>
2013	NA	4.24	4.47	4.98
2014	NA	4.18	4.28	4.80
2015	NA	4.00	4.12	5.03
2016	NA	3.73	3.93	4.68
2017	NA	3.82	4.00	4.38
Average	NA	3.99	4.16	4.77
Jan 2018	NA	3.69	3.86	4.18
Feb 2018	NA	3.94	4.09	4.42
Mar 2018	NA	3.97	4.13	4.52
Apr 2018	NA	3.99	4.17	4.58
May 2018	NA	4.10	4.28	4.71
Jun 2018	NA	4.11	4.27	4.71
Jul 2018	NA	4.10	4.27	4.67
Aug 2018	NA	4.08	4.26	4.64
Sep 2018	NA	4.18	4.32	4.74
Oct 2018	NA	4.31	4.45	4.91
Nov 2018	NA	4.40	4.52	5.03
Dec 2018	NA	4.24	4.37	4.92
Avg 2018	NA	4.09	4.25	4.67
Jan 2019	NA	4.18	4.35	4.91
Feb 2019	NA	4.05	4.25	4.76
Mar 2019	NA	3.98	4.16	4.65
Apr 2019	NA	3.91	4.08	4.55

Source of Information: MERGENT BOND RECORD

Credit Risk Spreads of
Investor-Owned Public Utility Bonds
Yearly for 2013-2017, Monthly for the Years 2018 and 2019

	<u>Years</u>	Aa Over <u>Aaa</u>	A Over <u>Aa</u>	Baa Over <u>A</u>	Baa Over <u>Aaa</u>
	2013	NA	0.23	0.51	NA
	2014	NA	0.10	0.52	NA
	2015	NA	0.12	0.91	NA
	2016	NA	0.20	0.74	NA
	2017	NA	0.18	0.38	NA
	Average	NA	0.17	0.61	NA
Jan	2018	NA	0.17	0.32	NA
Feb	2018	NA	0.15	0.33	NA
Mar	2018	NA	0.16	0.39	NA
Apr	2018	NA	0.18	0.41	NA
May	2018	NA	0.18	0.43	NA
Jun	2018	NA	0.16	0.44	NA
Jul	2018	NA	0.17	0.40	NA
Aug	2018	NA	0.18	0.38	NA
Sep	2018	NA	0.14	0.42	NA
Oct	2018	NA	0.14	0.46	NA
Nov	2018	NA	0.12	0.51	NA
Dec	2018	NA	0.13	0.55	NA
Avg	2018	NA	0.16	0.42	NA
Jan	2019	NA	0.17	0.56	NA
Feb	2019	NA	0.20	0.51	NA
Mar	2019	NA	0.18	0.49	NA
Apr	2019	NA	0.17	0.47	NA

Source of Information: MERGENT BOND RECORD

Interest Rate Trends
Of Long-Term Treasury Constant
Yearly for 2013-2017, Monthly for the Years 2018 and 2019

<u>Years</u>	<u>10-Year T-Bond</u>	<u>20-Year T-Bond</u>	<u>30-Year T-Bond</u>	<u>Long-term T-Bond Yield</u>
2013	2.35	3.12	3.45	2.97
2014	2.54	3.07	3.34	2.98
2015	2.14	2.55	2.84	2.51
2016	1.84	2.23	2.60	2.22
2017	2.33	2.65	2.90	2.65
Average	2.24	2.72	3.03	2.67
Jan 2018	2.58	2.73	2.88	2.81
Feb 2018	2.86	3.02	3.13	3.08
Mar 2018	2.84	2.97	3.09	3.03
Apr 2018	2.87	2.96	3.07	3.02
May 2018	2.98	3.05	3.13	3.09
Jun 2018	2.91	2.98	3.05	3.02
Jul 2018	2.89	2.94	3.01	2.98
Aug 2018	2.89	2.97	3.04	3.01
Sep 2018	3.00	3.08	3.15	3.12
Oct 2018	3.15	3.27	3.34	3.31
Nov 2018	3.12	3.27	3.36	3.32
Dec 2018	2.83	2.98	3.10	3.04
Avg 2018	2.91	3.02	3.11	3.07
Jan 2019	2.71	2.89	3.04	2.97
Feb 2019	2.68	2.87	3.02	2.95
Mar 2019	2.57	2.80	2.98	2.89
Apr 2019	2.53	2.76	2.94	2.85

Source of Information: Federal Reserve Bulletin

Spread in Average Long-Term Bond Yields
Versus Public Utility Bond Yields
Yearly for 2013-2017, Monthly for the Years 2018 and 2019

Spread in Average Long-Term T-Bond Yields Versus Public Utility Bonds:

<u>Years</u>	<u>Aaa Rated</u>	<u>Aa Rated</u>	<u>A Rated</u>	<u>Baa Rated</u>
2013	NA	1.26	1.50	2.01
2014	NA	1.19	1.29	1.82
2015	NA	1.49	1.61	2.52
2016	NA	1.51	1.71	2.45
2017	NA	1.17	1.35	1.73
Average	NA	1.32	1.49	2.11
Jan 2018	NA	0.89	1.06	1.38
Feb 2018	NA	0.87	1.02	1.35
Mar 2018	NA	0.94	1.10	1.49
Apr 2018	NA	0.98	1.16	1.57
May 2018	NA	1.01	1.19	1.62
Jun 2018	NA	1.10	1.26	1.70
Jul 2018	NA	1.13	1.30	1.70
Aug 2018	NA	1.08	1.26	1.64
Sep 2018	NA	1.07	1.21	1.63
Oct 2018	NA	1.01	1.15	1.61
Nov 2018	NA	1.09	1.21	1.72
Dec 2018	NA	1.20	1.33	1.88
Avg 2018	NA	1.03	1.19	1.61
Jan 2019	NA	1.22	1.39	1.95
Feb 2019	NA	1.11	1.31	1.82
Mar 2019	NA	1.09	1.27	1.76
Apr 2019	NA	1.06	1.23	1.70

Comment: Derived from the information on pages 1 and 3 of this Schedule.

Interest Rate Trends for
Municipal Bonds
Yearly for 2013-2017, Monthly for the Years 2018 and 2019

<u>Years</u>	<u>Aaa Rated</u>	<u>Aa Rated</u>	<u>A Rated</u>	<u>Baa Rated</u>
2013	3.47	3.91	4.23	4.82
2014	3.41	3.66	4.11	4.61
2015	3.22	3.49	3.80	4.20
2016	2.76	3.01	3.31	3.61
2017	3.05	3.29	3.62	3.95
Average	3.18	3.47	3.81	4.24
Jan 2018	2.94	3.15	3.44	3.77
Feb 2018	3.09	3.32	3.61	3.91
Mar 2018	3.19	3.41	3.70	4.04
Apr 2018	3.25	3.47	3.76	4.10
May 2018	3.26	3.47	3.76	4.10
Jun 2018	3.22	3.43	3.72	4.06
Jul 2018	3.22	3.42	3.71	4.05
Aug 2018	3.26	3.46	3.75	4.09
Sep 2018	3.33	3.53	3.82	4.16
Oct 2018	3.60	3.81	4.10	4.46
Nov 2018	3.56	3.77	4.06	4.43
Dec 2018	3.42	3.62	3.92	4.29
Avg 2018	3.28	3.49	3.78	4.12
Jan 2019	3.23	3.43	3.73	4.09
Feb 2019	3.12	3.33	3.62	3.98
Mar 2019	3.06	3.27	3.53	3.89
Apr 2019	2.96	3.16	3.39	3.70

Source of Information: MERGENT BOND RECORD

Credit Risk Spreads of
Municipal Bonds
Yearly for 2013-2017, Monthly for the Years 2018 and 2019

<u>Years</u>	Aa Over <u>Aaa</u>	A Over <u>Aa</u>	Baa Over <u>A</u>	Baa Over <u>Aaa</u>
2013	0.45	0.32	0.60	1.36
2014	0.25	0.45	0.50	1.20
2015	0.27	0.32	0.40	0.98
2016	0.25	0.31	0.30	0.86
2017	0.23	0.33	0.34	0.90
Average	0.29	0.34	0.43	1.06
Jan 2018	0.21	0.29	0.33	0.83
Feb 2018	0.23	0.29	0.30	0.82
Mar 2018	0.22	0.29	0.34	0.85
Apr 2018	0.22	0.29	0.34	0.85
May 2018	0.21	0.29	0.34	0.84
Jun 2018	0.21	0.29	0.34	0.84
Jul 2018	0.20	0.29	0.34	0.83
Aug 2018	0.20	0.29	0.34	0.83
Sep 2018	0.20	0.29	0.34	0.83
Oct 2018	0.21	0.29	0.36	0.86
Nov 2018	0.21	0.29	0.37	0.87
Dec 2018	0.20	0.30	0.37	0.87
Avg 2018	0.21	0.29	0.34	0.84
Jan 2019	0.20	0.30	0.36	0.86
Feb 2019	0.21	0.29	0.36	0.86
Mar 2019	0.21	0.26	0.36	0.83
Apr 2019	0.20	0.23	0.31	0.74

Source of Information: MERGENT BOND RECORD

Spread in Average Long-Term Bond Yields
Versus Municipal Bond Yields
Yearly for 2013-2017, Monthly for the Years 2018 and 2019

<u>Spread in Average Long-Term T-Bond Yields Versus Municipal Bonds:</u>				
<u>Years</u>	<u>Aaa Rated</u>	<u>Aa Rated</u>	<u>A Rated</u>	<u>Baa Rated</u>
2013	(0.49)	(0.94)	(1.25)	(1.85)
2014	(0.43)	(0.67)	(1.12)	(1.62)
2015	(0.71)	(0.98)	(1.29)	(1.69)
2016	(0.53)	(0.78)	(1.09)	(1.39)
2017	(0.40)	(0.64)	(0.97)	(1.30)
Average	(0.51)	(0.80)	(1.15)	(1.57)
Jan 2018	(0.14)	(0.35)	(0.64)	(0.97)
Feb 2018	(0.01)	(0.25)	(0.54)	(0.84)
Mar 2018	(0.16)	(0.38)	(0.67)	(1.01)
Apr 2018	(0.24)	(0.46)	(0.75)	(1.09)
May 2018	(0.17)	(0.38)	(0.67)	(1.01)
Jun 2018	(0.21)	(0.42)	(0.71)	(1.05)
Jul 2018	(0.25)	(0.45)	(0.74)	(1.08)
Aug 2018	(0.26)	(0.46)	(0.75)	(1.09)
Sep 2018	(0.22)	(0.42)	(0.71)	(1.05)
Oct 2018	(0.30)	(0.51)	(0.80)	(1.16)
Nov 2018	(0.25)	(0.46)	(0.75)	(1.12)
Dec 2018	(0.38)	(0.58)	(0.88)	(1.25)
Avg 2018	(0.21)	(0.42)	(0.71)	(1.06)
Jan 2019	(0.27)	(0.47)	(0.77)	(1.13)
Feb 2019	(0.18)	(0.39)	(0.68)	(1.04)
Mar 2019	(0.17)	(0.38)	(0.64)	(1.00)
Apr 2019	(0.11)	(0.31)	(0.54)	(0.85)

Interest Rate Trends for
Federal Funds Rate and Prime Rate
Yearly for 2013-2017, Monthly for the Years 2018 and 2019

<u>Years</u>	<u>Fed Funds Rate</u>	<u>Prime Rate</u>
2013	0.11	3.25
2014	0.09	3.25
2015	0.13	3.26
2016	0.40	3.51
2017	1.00	4.10
Average	0.35	3.47
Jan 2018	1.41	4.50
Feb 2018	1.42	4.50
Mar 2018	1.51	4.58
Apr 2018	1.69	4.75
May 2018	1.70	4.75
Jun 2018	1.82	4.89
Jul 2018	1.91	5.00
Aug 2018	1.91	5.00
Sep 2018	1.95	5.03
Oct 2018	2.19	5.25
Nov 2018	2.20	5.25
Dec 2018	2.27	5.35
Avg 2018	1.83	4.90
Jan 2019	2.40	5.50
Feb 2019	2.40	5.50
Mar 2019	2.41	5.50
Apr 2019	2.42	5.50

Source of Information: Federal Reserve Bulletin

Blue Chip Financial Forecasts - May 1, 2019

	Fourth Quarter <u>2018</u>	First Quarter <u>2019</u>	Second Quarter <u>2019</u>	Third Quarter <u>2019</u>	Fourth Quarter <u>2019</u>	Five Quarter <u>Average</u>
<u>Prime Rate</u>						
Top Ten Average	5.5 %	5.6 %	5.6 %	5.8 %	5.9 %	5.7 %
Group Average	5.5	5.5	5.5	5.5	5.5	5.5
Bottom Ten Average	5.4	5.3	5.3	5.2	5.0	5.2
<u>Three-Month Treasury Bills</u>						
Top Ten Average	2.5	2.5	2.6	2.8	2.8	2.6
Group Average	2.4	2.4	2.4	2.4	2.4	2.4
Bottom Ten Average	2.4	2.3	2.3	2.3	2.0	2.3
<u>Ten Year Treasury Notes</u>						
Top Ten Average	2.7	2.9	3.0	3.1	3.2	3.0
Group Average	2.6	2.7	2.7	2.8	2.8	2.7
Bottom Ten Average	2.5	2.5	2.4	2.3	2.3	2.4
<u>Thirty Year Treasury Bonds</u>						
Top Ten Average	3.1	3.3	3.4	3.5	3.6	3.4
Group Average	3.0	3.0	3.1	3.1	3.1	3.1
Bottom Ten Average	2.8	2.8	2.8	2.8	2.7	2.8
<u>Aaa-Rated Corporate Bonds</u>						
Top Ten Average	4.1	4.2	4.2	4.4	4.5	4.3
Group Average	3.8	3.9	4.0	4.0	4.1	4.0
Bottom Ten Average	3.6	3.7	3.7	3.7	3.7	3.7
<u>Baa-Rated Corporate Bonds</u>						
Top Ten Average	5.1	5.1	5.3	5.4	5.5	5.3
Group Average	4.8	4.9	4.9	5.0	5.1	4.9
Bottom Ten Average	4.6	4.7	4.6	4.7	4.7	4.7

Derived Public Utility Bond Yield Forecasts Based on Aaa and Baa Corporate Yields

Aa-Rated Public Utility Bonds

Top Ten Average	4.3	4.4	4.5	4.6	4.7	4.5
Group Average	4.0	4.1	4.2	4.2	4.3	4.2
Bottom Ten Average	3.8	3.9	3.9	3.9	3.9	3.9

A-Rated Public Utility Bonds

Top Ten Average	4.5	4.5	4.6	4.8	4.9	4.7
Group Average	4.2	4.3	4.3	4.4	4.5	4.3
Bottom Ten Average	4.0	4.1	4.0	4.1	4.1	4.1

Baa-Rated Public Utility Bonds

Top Ten Average	4.9	5.0	5.1	5.2	5.3	5.1
Group Average	4.6	4.7	4.8	4.8	4.9	4.8
Bottom Ten Average	4.4	4.5	4.5	4.5	4.5	4.5

Settled Yields on Treasury Bond
Future Contracts
Traded on the Chicago Board of Trade
at the Close of May 08, 2019

<u>Delivery Date</u>	<u>Treasury Bonds (CBOT)</u>
Jun-19	3.399 %
Sep-19	3.425
Dec-19	<u>3.457</u>
Average	<u><u>3.427</u></u> %

Source of Information: Chicago Board of Trade

Market Value Discounted Cash Flow for
The Water Group Followed by Analysts

	Water Group Followed by <u>Analysts</u>
Dividend Yield(1)	2.0 %
Growth in Dividends(2)	<u>0.1</u>
Adjusted Dividend Yield	2.1
Stock Appreciation(3)	<u>7.6</u>
Market Value DCF Cost Rate	<u><u>9.7 %</u></u>

- Notes: (1) Developed on page 2 of this Schedule.
(2) Equal to one-half the assumed growth in value.
(3) As explained in the direct testimony, the growth in value is supported by the information shown on Schedules 13 and 14.

Market Value Dividend Yield for
the Water Group Followed by Analysts
For the Twelve Months Ended April 2019

	<u>Recent Dividend Yields(1)</u>	<u>Longer Term Dividend Yields(2)</u>	<u>Average Yields</u>
<u>Water Group Followed by Analysts</u>			
American States Water Co	1.6 %	1.7 %	
American Water Works Co Inc	1.7	2.0	
Aqua America Inc	2.4	2.4	
California Water Service Gp	1.5	1.7	
Middlesex Water Co	1.7	1.9	
SJW Corp	2.0	1.9	
York Water Co	<u>2.1</u>	<u>2.1</u>	
Average	<u>1.9 %</u>	<u>2.0 %</u>	<u>2.0 %</u>

- Notes: (1) Computed by annualizing the current quarterly dividend per share and relating it to the monthly high-low average price per share of common stock for April 2019.
- (2) Computed by annualizing the current quarterly dividend per share and relating it to the monthly high-low average price per share of common stock for the twelve months ended April 2019.

Source of Information: Standard & Poor's

Development of Long Term Projected Growth in Value
Based Upon Growth Over The Next Five Years
For the Water Group Followed by Analysts

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>	<u>F</u>	<u>G</u>	<u>H</u>
	Analysts' Projected Growth in EPS				Other Projected Growth			
	First Call EPS Growth	Reuters EPS Growth	ZACK's EPS Growth	Value Line EPS Growth	Value Line DPS Growth	Value Line Cash Flow Growth	Average EPS Growth	Average All Growth
<u>Water Group Followed by Analysts</u>								
American States Water Co	6.0 %	6.0 %	6.0 %	8.0 %	9.5 %	6.0 %	6.5 %	6.9 %
American Water Works Co Inc	8.2	10.6	8.1	9.5	9.0	7.0	9.1	8.7
Aqua America Inc	5.0	9.0	6.0	8.5	9.5	7.5	7.1	7.6
California Water Service Gp	9.8	NA	10.0	8.5	6.0	5.0	9.4	7.9
Middlesex Water Co	2.7	NA	NA	7.5	5.0	6.0	5.1	5.3
SJW Corp	14.0	NA	6.0	6.0	7.0	2.5	8.7	7.1
York Water Co	4.9	NA	NA	9.5	6.5	9.0	7.2	7.5
Average	<u>7.2 %</u>	<u>8.5 %</u>	<u>7.2 %</u>	<u>8.2 %</u>	<u>7.5 %</u>	<u>6.1 %</u>	<u>7.6 %</u>	<u>7.3 %</u>

	Historical 5-Year Growth in EPS			
	First Call EPS Growth	ZACK's EPS Growth	Value Line EPS Growth	Average EPS Growth
<u>Water Group Followed by Analysts</u>				
American States Water Co	4.8 %	2.4 %	4.5 %	3.9 %
American Water Works Co Inc	10.1	8.0	6.5	8.2
Aqua America Inc	5.1	4.4	5.5	5.0
California Water Service Gp	10.5	9.3	4.0	7.9
Middlesex Water Co	14.1	13.8	11.0	13.0
SJW Corp	12.0	9.2	18.5	13.2
York Water Co	5.5	5.7	6.5	5.9
Average	<u>8.9 %</u>	<u>7.5 %</u>	<u>8.1 %</u>	<u>8.2 %</u>

Source of Information: Value Line Investment Survey, 4/12/19; Reuters Market Guide 5/06/19; FirstCall 5/06/19; and Zacks Investment Research 5/06/19

Recent Payout Ratios,
ROEs, P-E Multiples, Market/Book Multiples, and Market Value
For the Water Group Followed by Analysts

	Current Dividend <u>Payout</u>	Current Return on <u>Equity</u>	PE <u>Mult</u>	Market to Book <u>Mult</u>	Current Market <u>Value</u> (Mill \$)
<u>Water Group Followed by Analysts</u>					
American States Water Co	61	11.8	41.1	4.69	2,618.700
American Water Works Co Inc	58	10.0	34.2	3.33	19,529.484
Aqua America Inc	79	9.6	36.2	4.57	9,179.970
California Water Service Gp	55	8.6	40.0	3.40	2,425.472
Middlesex Water Co	46	13.6	29.4	3.83	953.994
SJW Corp	60	6.9	31.2	1.99	1,764.676
York Water Co	<u>65</u>	<u>10.9</u>	<u>32.7</u>	<u>3.49</u>	<u>440.552</u>
Average	<u>60</u>	<u>10.2</u>	<u>35.0</u>	<u>3.61</u>	<u>5,273.264</u>

Source of Information: Quarterly Reports, Standard & Poor's and Value Line

Value Line Projected ROE Based on Year-End and Average,
Dividend Payout Ratio, and Common Equity Ratio for
The Water Group Followed by Analysts for 2022 - 2024

	Value Line Projected <u>ROE</u>	Projected Average ROE <u>(1)</u>	Value Line Projected Dividend <u>Payout</u>	Value Line Projected Common Equity <u>Ratio</u>
<u>Water Group Followed by Analysts</u>				
American States Water Co	14.0 %	14.4 %	61.8 %	54.0 %
American Water Works Co Inc	11.5	11.8	58.5	41.0
Aqua America Inc	13.5	14.0	65.9	44.0
California Water Service Gp	12.0	12.2	52.5	62.0
Middlesex Water Co	13.5	13.8	47.9	63.5
SJW Corp	9.5	9.7	43.5	67.5
York Water Co	<u>14.0</u>	<u>14.3</u>	<u>55.9</u>	<u>66.0</u>
Average	<u>12.6</u> %	<u>12.9</u> %	<u>55.1</u> %	<u>56.9</u> %

Notes: (1) Value Line ROE, which is a year-end ROE, is converted to average ROE by the factor derived from the following formula: $2((1+g)/(2+g))$, where "g" is the rate of growth in common equity.

Source of Information: Value Line Investment Survey, 4/12/19

Illustration of the
Effect of Market-To-Book Ratio on Market Return

<u>Ln #</u>	<u>Situation 1</u>	<u>Situation 2</u>	<u>Situation 3</u>
1 M/B Ratio	50%	100%	200%
2 Market Purchase Price	\$25.00	\$50.00	\$100.00
3 Book Value	\$50.00	\$50.00	\$50.00
4 DCF Return	10.0%	10.0%	10.0%
5 DCF Dollar Return	\$5.00	\$5.00	\$5.00
6 Dividend Yield	5.0%	5.0%	5.0%
7 DPS	\$1.25	\$2.50	\$5.00
8 Dollar Growth in Value	\$3.75	\$2.50	\$0.00
9 Market Sale Price	\$28.75	\$52.50	\$100.00
10 Total Market Return	20.0%	10.0%	5.0%

"The simple numerical illustration....demonstrates the impact of market-to-book ratios on the DCF market return....The DCF cost rate of 10%, made up of a 5% dividend yield and a 5% growth rate, is applied to the book value rate base of \$50 to produce \$5.00 of earnings. Of the \$5.00 of earnings, the full \$5.00 are required for dividends to produce a dividend yield of 5.0% on a stock price of \$100.00, and no dollars are available for growth. The investor's return is therefore only 5% versus his required return of 10%. A DCF cost rate of 10%, which implies \$10.00 of earnings, translates to only \$5.00 of earnings on book value, or a 5% return.....Therefore, the DCF cost rate understates the investor's required return when stock prices are well above book, as is the case presently."

The above illustration is taken from Roger A Morin, Regulatory Finance - Utilities' Cost of Capital, Public Utility Reports, Inc., 1994, pp. 236-237.

Differences in Book Value and Market Values for the
Water Group Followed by Analysts

	Recent Book Value Capitalization Ratios <u>(12/31/18)</u>	Recent Market Value Capitalization Ratios	Average Book Value of Common Equity <u>(Millions)</u>	Average Market Value of Common Equity <u>(Millions)</u>	Difference in Market Value and Book Value Common Equity
<u>Water Group Followed by Analysts:</u>					
Long Term Debt	44.8 %	19.3 %			
Preferred Stock	0.1	0.0			
Common Equity	<u>55.1</u>	<u>80.7</u>	<u>\$1,489.434</u>	<u>\$5,273.264</u>	<u>\$3,783.830</u>
Total	<u>100.0 %</u>	<u>100.0 %</u>			

Default Spread for
Aaa Rated Corporate Bonds and A Rated Investor-Owned Public Utility Bonds
Yearly for 2013-2017, Monthly for the Years 2018 and 2019

	<u>Years</u>	<u>Corporate Aaa Rated</u>	<u>Public Utility A Rated</u>	<u>A Over Aaa</u>
	2013	4.24	4.47	0.24
	2014	4.16	4.28	0.11
	2015	3.89	4.12	0.23
	2016	3.67	3.93	0.27
	2017	3.74	4.00	0.25
	Average	3.94	4.16	0.22
Jan	2018	3.55	3.86	0.31
Feb	2018	3.82	4.09	0.27
Mar	2018	3.87	4.13	0.26
Apr	2018	3.85	4.17	0.32
May	2018	4.00	4.28	0.28
Jun	2018	3.96	4.27	0.31
Jul	2018	3.87	4.27	0.40
Aug	2018	3.88	4.26	0.38
Sep	2018	3.98	4.32	0.34
Oct	2018	4.14	4.45	0.31
Nov	2018	4.22	4.52	0.30
Dec	2018	4.02	4.37	0.35
Avg	2018	0.00	4.25	4.25
Jan	2019	3.93	4.35	0.42
Feb	2019	3.79	4.25	0.46
Mar	2019	3.77	4.16	0.39
Apr	2019	3.69	4.08	0.39

Market Value CAPM for
The Water Group Followed by Analysts

Water Group
Followed by
Analysts

Estimation Based Upon Historical Information

Market Premium(1)	6.9 %
x Beta(2)	<u>0.69</u>
Risk Adjusted Market Premium	4.8
Size Adjustment Premium(2)	0.8
Plus Risk Free Rate(1)	<u>3.1</u>
Market Value CAPM Cost Rate	<u><u>8.7 %</u></u>

Estimation Based Upon Projected Information

Market Premium(1)	10.4 %
x Beta(2)	<u>0.69</u>
Risk Adjusted Market Premium	7.2
Size Adjustment Premium(2)	0.8
Plus Risk Free Rate(1)	<u>3.1</u>
Market Value CAPM Cost Rate	<u><u>11.1 %</u></u>

Market Value CAPM is: 9.9%

Notes: (1) Developed on page 2 of this Schedule.
(2) Developed on page 4 of this Schedule.

Development of Market Premiums for Use in a CAPM Model

<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>	<u>F</u>	<u>G</u>	<u>H</u>
Value Line Summary & Index Month End Edition	Forecasted Market Dividend Yield	Stock Price Appreciation Next 3-5 Years	Annual Price Appreciation(1)	Annual Total Return(1)	Midpoint Market Return(2)	Average Market Return(3)	CAPM Projected Market Return(6)
February-19	2.3 %	55 %	11.6 %	13.9 %			
March-19	2.3	55	11.6	13.9			
April-19	2.2	50	10.7	12.9			
					<u>13.4</u> %	<u>13.6</u> %	13.5 %
					Less Risk Free Rate(4)		<u>3.1</u>
							<u>10.4</u> %
							<u>6.9</u> %

See next page of this Schedule for Notes.

CAPM
The Water Group Followed by Analysts

- Notes: (1) A projected market premium is based upon the projected market return rate derived from the Value Line Summary and Index for the various dates shown. For example, Value Line projects (Apr-19) that the market will appreciate in price 50% over the next three to five years. Using a four-year midpoint estimate, Value Line's appreciation potential equates to 10.7% annually ($[1.50]^{.25}$). Additionally, Value Line estimates the market will have a dividend yield of 2.2%. Combining the market dividend yield of 2.2% with the market appreciation results in a projected market return rate of 12.9% (10.7% + 2.2%).
- (2) Mid point of the month-end total market returns in Column E.
- (3) Average total market return in Column E.
- (4) As discussed in the direct testimony, the risk-free rate is 3.1%.
- (5) The historical market premium is based upon studies conducted by Ibbotson Associates concerning asset returns. Ibbotson Associates' asset return studies are the most noted asset return rate studies available today. The results are widely disseminated throughout the investment public. Ibbotson Associates' long-term common stock total market return is 11.95% which, when reduced by the long-term historic risk-free rate of 5.02% results in a market premium of 6.9% (11.95% - 5.02%).

Recent Market Values and
Beta Adjusted Ibbotson Associates Size Premiums For
The Water Group Followed by Analysts

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>
	Recent Market Value (Mill \$)	Market Quartile Name	Market Quartile	Quartile Size Premium	Quartile Beta	Value Line Beta	Beta Ratio	Beta Adjusted Quartile Size Premium
<u>Water Group Followed by Analysts</u>								
American States Water Co	\$2,618.700	Mid-Cap	2	1.02	1.12	0.70	63%	0.6
American Water Works Co Inc	19,529.484	Large-Cap	1	0.00	1.00	0.60	60%	0.0
Aqua America Inc	9,179.970	Mid-Cap	2	1.02	1.12	0.70	63%	0.6
California Water Service Gp	2,425.472	Mid-Cap	2	1.02	1.12	0.70	63%	0.6
Middlesex Water Co	953.994	Low-Cap	3	1.75	1.22	0.75	61%	1.1
SJW Corp	1,764.676	Low-Cap	3	1.75	1.22	0.65	53%	0.9
York Water Co	440.552	<u>Mico-Cap</u>	<u>4</u>	<u>3.67</u>	<u>1.35</u>	<u>0.75</u>	<u>56%</u>	<u>2.1</u>
Average		<u>Mid-Cap</u>	<u>2</u>	<u>1.02</u>	<u>1.12</u>	<u>0.69</u>	<u>60%</u>	<u>0.8</u>

Source of Information: 2017 SBBI Yearbook, Stocks, Bonds, Bills, and Inflation, and Value Line

Market Value Risk Premium
For the Water Group Followed by Analysts

	Water Group Followed by <u>Analysts</u>
Prospective Public Utility Bond Yields(1)	4.3 %
Estimated Risk Premium(2)	<u>5.9</u>
Market Value Risk Premium Indicated Cost Rate	<u><u>10.2</u></u> %

- Notes: (1) Based upon the current and prospective long-term debt cost rates, it is reasonable to expect that if the comparable group (i.e., Water Group) issued new long-term bonds, it would both be priced to yield about 4.3% based upon credit profiles of A for the Water Group.
- (2) A 5.9% risk premium is concluded for the Group after reviewing the tabulation of risk spreads shown on pages 2, 3, 4 and 5 of this Schedule.

Development of the Projected Risk Premium

<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>	<u>F</u>	<u>G</u>	<u>H</u>	<u>I</u>
Value Line Summary & Index Month End Edition	Forecasted Market Dividend Yield	Stock Price Appreciation Next 3-5 Years	Annual Price Appreciation	Forecasted Annual Total Return	Less: Yield of Moody's A Rated Industrial Bonds	Forecasted Equity Premium	Estimated Risk Adjustment	Forecasted Risk Premium
February-19	2.3 %	55 %	11.6 %	13.9 %	4.21 %	9.7 %	90 %	8.7 %
March-19	2.3	55	11.6	13.9	4.17	9.7	90	8.8
April-19	2.2	50	10.7	12.9	4.08	8.8	90	7.9
		Midpoint of data		13.4		9.3		8.4 %
		Quarter's Average		13.6		9.4		8.5 %

Annual Total Returns and Risk Premiums of
S&P Public Utility Stocks and Bonds
for the Years 1998-2017, 1988-2017, 1978-2017, 1968-2017, 1958-2017, 1948-2017 and 1928-2017

Annual Total Returns							
Periods	Public Utility Stock	L-Term T-Bonds	Public Utility Bonds				
			AAA	AAA & AA	AA	A	BBB
Average Annual Rates of Return							
1998 to 2017	0.1103	0.0764	0.0612	0.0834	0.0836	0.0851	0.0901
1988 to 2017	0.1252	0.0912	0.1104	0.0987	0.0990	0.0978	0.1041
1978 to 2017	0.1362	0.0956	0.1079	0.1013	0.1023	0.1020	0.1080
1968 to 2017	0.1232	0.0853	0.0930	0.0926	0.0935	0.0944	0.1003
1958 to 2017	0.1232	0.0726	0.0747	0.0793	0.0801	0.0814	0.0870
1948 to 2017	0.1244	0.0636	0.0633	0.0699	0.0707	0.0716	0.0765
1928 to 2017	0.1108	0.0575	0.0594	0.0657	0.0668	0.0690	0.0758
Average Risk Premiums							
1998 to 2017		0.0339	0.0490	0.0268	0.0266	0.0252	0.0202
1988 to 2017		0.0340	0.0148	0.0265	0.0261	0.0274	0.0211
1978 to 2017		0.0406	0.0283	0.0349	0.0339	0.0342	0.0282
1968 to 2017		0.0505	0.0485	0.0438	0.0430	0.0418	0.0361
1958 to 2017		0.0505	0.0485	0.0438	0.0430	0.0418	0.0361
1948 to 2017		0.0608	0.0612	0.0545	0.0537	0.0528	0.0479
1928 to 2017		0.0533	0.0514	0.0451	0.0440	0.0418	0.0350

Annual Total Returns, Annual Income Returns and Risk Premiums of
S&P Public Utility Stocks and Bonds
for the Years 1998-2017, 1988-2017, 1978-2017, 1968-2017, 1958-2017, 1948-2017 and 1928-2017

<u>Periods</u>	<u>Annual Total Returns Public Utility Stock</u>	<u>Annual Income Returns</u>					
		<u>L-Term T-Bonds</u>	<u>Public Utility Bonds</u>				
			<u>AAA</u>	<u>AAA & AA</u>	<u>AA</u>	<u>A</u>	<u>BBB</u>
<u>Average Rates of Return</u>							
1998 to 2017	0.1103	0.0429	0.0732	0.0565	0.0566	0.0582	0.0629
1988 to 2017	0.1252	0.0541	0.0810	0.0661	0.0663	0.0681	0.0722
1978 to 2017	0.1362	0.0672	0.0950	0.0786	0.0791	0.0814	0.0859
1968 to 2017	0.1232	0.0676	0.0901	0.0788	0.0794	0.0817	0.0862
1958 to 2017	0.1232	0.0633	0.0800	0.0733	0.0738	0.0760	0.0800
1948 to 2017	0.1244	0.0581	0.0708	0.0672	0.0677	0.0698	0.0736
1928 to 2017	0.1108	0.0513	0.0609	0.0601	0.0608	0.0634	0.0682
<u>Average Risk Premiums</u>							
1998 to 2017		0.0674	0.0370	0.0537	0.0536	0.0521	0.0473
1988 to 2017		0.0711	0.0442	0.0591	0.0589	0.0571	0.0530
1978 to 2017		0.0690	0.0412	0.0576	0.0571	0.0548	0.0503
1968 to 2017		0.0598	0.0432	0.0499	0.0493	0.0472	0.0431
1958 to 2017		0.0598	0.0432	0.0499	0.0493	0.0472	0.0431
1948 to 2017		0.0663	0.0536	0.0572	0.0567	0.0546	0.0508
1928 to 2017		0.0595	0.0499	0.0507	0.0500	0.0474	0.0426

Annual Total Returns, Annual Income Returns and Risk Premiums of
S&P Public Utility Stocks and Bonds
For the 45 Years of the Lowest Interest Rate Environment and the 45 Years of the Highest Interest Rate Environment
For The Years 1928-2017

Current Interest Rate Environment: 3.1%

<u>Periods</u>	<u>Public Utility Stock</u>	<u>L-Term T-Bonds</u>	<u>Public Utility Bonds</u>				
			<u>AAA</u>	<u>AAA & AA</u>	<u>AA</u>	<u>A</u>	<u>BBB</u>

Annual Total Returns

Low Interest Rate Environment:

45 Years of the Lowest Interest Rates, Ranging from 2.0% to 4.1% with an Average Rate of 3.0%

Average Rates of Return

0.1115	0.0310	0.0361	0.0474	0.0486	0.0541	0.0659
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Average Risk Premiums

0.0805	0.0754	0.0640	0.0628	0.0574	0.0456
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High Interest Rate Environment:

45 Years of the Highest Interest Rates, Ranging from 4.2% to 13.5% with an Average Rate of 7.3%

Average Risk Premiums

0.1102	0.0841	0.0815	0.0840	0.0850	0.0839	0.0857
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Average Risk Premiums

0.0261	0.0286	0.0261	0.0252	0.0262	0.0245
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Annual Income Returns

Low Interest Rate Environment:

45 Years of the Lowest Interest Rates, Ranging from 2.0% to 4.1% with an Average Rate of 3.0%

Average Rates of Return

0.1115	0.0296	0.0346	0.0372	0.0379	0.0408	0.0467
--------	--------	--------	--------	--------	--------	--------

Average Risk Premiums

0.0818	0.0769	0.0742	0.0736	0.0706	0.0648
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High Interest Rate Environment:

45 Years of the Highest Interest Rates, Ranging from 4.2% to 13.5% with an Average Rate of 7.3%

Average Risk Premiums

0.1102	0.0730	0.0858	0.0831	0.0838	0.0860	0.0898
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Average Risk Premiums

0.0372	0.0244	0.0271	0.0264	0.0241	0.0203
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Annual Total Returns of
S&P Public Utility Stocks and Bonds
for the Years 1928-2017

Annual Total Returns							
Years	Public Utility Stocks	L-Term T-Bonds	Public Utility Bonds				
			AAA	AAA & AA	AA	A	BBB
1928	0.5431	-0.0030	0.0370	0.0388	0.0406	0.0372	0.0392
1929	0.1376	0.0410	0.0209	0.0193	0.0178	0.0163	-0.0076
1930	-0.2149	0.0509	0.0917	0.0892	0.0869	0.0820	0.0378
1931	-0.3193	-0.0782	0.0058	-0.0059	-0.0171	-0.0608	-0.1089
1932	-0.0724	0.1736	0.1073	0.1037	0.1003	0.0685	0.0570
1933	-0.2170	0.0090	0.0142	-0.0145	-0.0401	-0.0686	-0.0601
1934	-0.1743	0.0962	0.1712	0.2000	0.2272	0.3264	0.4593
1935	0.6914	0.0610	0.1053	0.1243	0.1427	0.1760	0.2885
1936	0.2357	0.0691	0.0783	0.0916	0.1046	0.1079	0.1078
1937	-0.3337	-0.0091	0.0290	0.0323	0.0357	0.0272	-0.0626
1938	0.1020	0.0662	0.0720	0.0773	0.0825	0.0884	0.1505
1939	0.1538	0.0692	0.0435	0.0473	0.0510	0.0851	0.0923
1940	-0.1643	0.0910	0.0480	0.0506	0.0532	0.0949	0.1359
1941	-0.3050	0.0234	0.0255	0.0291	0.0327	0.0428	0.0681
1942	0.1079	-0.0735	0.0261	0.0287	0.0313	0.0314	0.0590
1943	0.4750	0.0228	0.0312	0.0346	0.0380	0.0405	0.0564
1944	0.1879	0.0268	0.0343	0.0353	0.0362	0.0303	0.0459
1945	0.5665	0.1075	0.0298	0.0349	0.0383	0.0683	0.0805
1946	-0.0130	-0.0006	0.0233	0.0238	0.0242	0.0267	0.0377
1947	-0.1236	-0.0165	-0.0139	-0.0187	-0.0234	-0.0213	-0.0105
1948	0.0451	0.0202	0.0287	0.0317	0.0347	0.0225	0.0073
1949	0.3074	0.0760	0.0718	0.0746	0.0773	0.0892	0.0757
1950	0.0152	-0.0034	0.0126	0.0131	0.0135	0.0107	0.0233
1951	0.2075	-0.0541	-0.0393	-0.0393	-0.0393	-0.0468	-0.0268
1952	0.1947	0.0101	0.0373	0.0390	0.0407	0.0442	0.0399
1953	0.0918	0.0062	0.0078	0.0063	0.0048	0.0107	0.0037
1954	0.2269	0.0676	0.0668	0.0701	0.0733	0.0745	0.0909
1955	0.1357	-0.0264	-0.0107	-0.0127	-0.0147	-0.0100	0.0146
1956	0.0416	-0.0484	-0.0703	-0.0703	-0.0703	-0.0714	-0.0816
1957	0.0541	0.0472	0.0246	0.0229	0.0213	0.0054	-0.0131
1958	0.3827	-0.0439	-0.0081	-0.0032	0.0017	0.0123	0.0339
1959	0.0958	-0.0320	-0.0231	-0.0234	-0.0237	-0.0120	-0.0102
1960	0.1680	0.1106	0.0764	0.0735	0.0705	0.0791	0.0994
1961	0.3646	0.0135	0.0432	0.0448	0.0464	0.0502	0.0442
1962	-0.0519	0.0650	0.0831	0.0829	0.0828	0.0852	0.0891
1963	0.1261	-0.0022	0.0171	0.0202	0.0232	0.0294	0.0329
1964	0.1685	0.0439	0.0394	0.0391	0.0387	0.0409	0.0396
1965	0.0489	-0.0064	-0.0010	-0.0014	-0.0018	-0.0044	0.0050
1966	-0.0504	0.0085	-0.0501	-0.0509	-0.0518	-0.0602	-0.0990
1967	-0.0216	-0.0650	-0.0525	-0.0539	-0.0553	-0.0592	-0.0271
1968	0.1419	0.0149	0.0268	0.0224	0.0181	0.0286	0.0243
1969	-0.1769	-0.0640	-0.0792	-0.0839	-0.0885	-0.0960	-0.0892
1970	0.1494	0.1537	0.0970	0.0978	0.0987	0.0952	0.0761
1971	0.0050	0.0999	0.1168	0.1241	0.1313	0.1510	0.1681
1972	0.1464	0.0661	0.0912	0.0980	0.1047	0.1103	0.1387
1973	-0.2106	-0.0893	0.0158	0.0138	0.0118	0.0156	0.0150
1974	-0.2135	0.0092	-0.0315	-0.0360	-0.0405	-0.0683	-0.1033
1975	0.4364	0.0465	0.0915	0.0863	0.0813	0.0872	0.0940
1976	0.3245	0.1955	0.1976	0.2017	0.2058	0.2475	0.2806
1977	0.1076	0.0074	0.0459	0.0545	0.0629	0.0683	0.0903
1978	-0.0174	-0.0189	-0.0083	-0.0055	-0.0027	-0.0026	0.0000
1979	0.1221	-0.0289	-0.0424	-0.0509	-0.0590	-0.0655	-0.0823
1980	0.1275	-0.0804	-0.0782	-0.0778	-0.0773	-0.0702	-0.0649
1981	0.1464	0.0472	0.0616	0.0674	0.0730	0.0416	0.0674
1982	0.2292	0.4323	0.3294	0.3750	0.3942	0.3708	0.3808
1983	0.2372	-0.0049	0.0721	0.0691	0.0763	0.1406	0.1347
1984	0.2219	0.1611	0.1770	0.1796	0.1768	0.1783	0.2075
1985	0.3232	0.3143	0.3473	0.3276	0.3259	0.3143	0.3098
1986	0.3575	0.3692	0.2994	0.2720	0.2698	0.2835	0.2933
1987	-0.0544	-0.1013	-0.1132	-0.0637	-0.0566	-0.0435	-0.0505
1988	0.1849	0.1026	0.2027	0.1615	0.1594	0.1643	0.1919
1989	0.4351	0.2176	0.1770	0.1743	0.1715	0.1692	0.1781
1990	0.0069	0.0482	0.0685	0.0689	0.0722	0.0738	0.0728
1991	0.0931	0.1472	0.1813	0.1647	0.1624	0.1715	0.1878
1992	0.1183	0.1093	0.1264	0.1312	0.1324	0.1355	0.1315
1993	0.1661	0.2162	0.1926	0.2126	0.2190	0.1429	0.1590
1994	-0.0825	-0.1075	-0.0802	-0.0656	-0.0657	0.0065	-0.0351
1995	0.3772	0.3268	0.2860	0.3074	0.3089	0.2164	0.2442
1996	0.0550	0.0020	0.0279	0.0211	0.0214	0.0279	0.0415
1997	0.1959	0.1454	0.1181	0.1157	0.1169	0.1238	0.1496
1998	0.1896	0.1786	0.1431	0.0365	0.0289	0.1074	0.0981
1999	-0.0998	-0.1062	-0.0792	-0.0275	-0.0237	-0.0921	-0.0684
2000	0.5475	0.1922	0.1076	0.1150	0.1146	0.1101	0.1196
2001	-0.2877	0.0596	0.0734	0.0788	0.0873	0.0780	0.0534
2002	-0.2934	0.1362		0.1851	0.1851	0.2461	0.1746
2003	0.2509	0.0488		0.1678	0.1678	0.1529	0.2329
2004	0.2763	0.0861		0.1162	0.1162	0.0782	0.0919
2005	0.2151	0.0520		0.0869	0.0869	0.0732	0.0541
2006	0.2323	0.0421		0.0486	0.0486	0.0596	0.0759
2007	0.1434	0.0814		0.0043	0.0043	0.0143	0.0042
2008	-0.3160	0.2953		0.0733	0.0733	0.0132	-0.1109
2009	0.1801	-0.1460		0.1159	0.1159	0.1662	0.3279
2010	0.0795	0.0755		0.0809	0.0809	0.0871	0.0893
2011	0.2051	0.3271		0.2701	0.2701	0.2505	0.2019
2012	0.1272	0.0622		0.0801	0.0801	0.0955	0.1287
2013	0.1363	-0.1592		-0.0850	-0.0850	-0.0758	-0.0494
2014	0.3017	0.2419		0.1577	0.1577	0.1872	0.1333
2015	-0.0629	0.0115		-0.0031	-0.0031	-0.0227	-0.0682
2016	0.1834	-0.0224		0.0443	0.0443	0.0512	0.1625
2017	0.1966	0.0714		0.1224	0.1224	0.1211	0.1505

Annual Total Returns of S&P Public Utility Stocks
 And Annual Income Returns of Bonds
 for the Years 1928-2017

Years	Annual Total Returns		Income Returns				
	Public Utility Stocks	L-Term T-Bonds	Public Utility Bonds				
			AAA	AAA & AA	AA	A	BBB
1928	0.5431	0.0329	0.0451	0.0460	0.0470	0.0499	0.0541
1929	0.1376	0.0361	0.0468	0.0479	0.0490	0.0522	0.0578
1930	-0.2149	0.0332	0.0458	0.0470	0.0482	0.0514	0.0591
1931	-0.3193	0.0338	0.0434	0.0449	0.0463	0.0511	0.0635
1932	-0.0724	0.0350	0.0474	0.0504	0.0535	0.0640	0.0815
1933	-0.2170	0.0315	0.0436	0.0468	0.0499	0.0604	0.0833
1934	-0.1743	0.0306	0.0402	0.0436	0.0471	0.0559	0.0713
1935	0.6914	0.0278	0.0351	0.0376	0.0402	0.0466	0.0544
1936	0.2357	0.0273	0.0324	0.0343	0.0362	0.0415	0.0465
1937	-0.3337	0.0275	0.0320	0.0334	0.0347	0.0395	0.0486
1938	0.1020	0.0263	0.0303	0.0316	0.0329	0.0392	0.0510
1939	0.1538	0.0239	0.0286	0.0296	0.0305	0.0360	0.0448
1940	-0.1643	0.0224	0.0277	0.0285	0.0293	0.0331	0.0410
1941	-0.3050	0.0197	0.0269	0.0276	0.0283	0.0304	0.0366
1942	0.1079	0.0239	0.0272	0.0279	0.0287	0.0305	0.0358
1943	0.4750	0.0246	0.0264	0.0269	0.0273	0.0296	0.0338
1944	0.1879	0.0248	0.0265	0.0268	0.0272	0.0294	0.0333
1945	0.5665	0.0229	0.0256	0.0261	0.0266	0.0285	0.0318
1946	-0.0130	0.0208	0.0250	0.0254	0.0257	0.0268	0.0293
1947	-0.1236	0.0215	0.0257	0.0261	0.0264	0.0273	0.0297
1948	0.0451	0.0240	0.0282	0.0287	0.0292	0.0301	0.0327
1949	0.3074	0.0223	0.0270	0.0274	0.0277	0.0291	0.0324
1950	0.0152	0.0216	0.0262	0.0264	0.0267	0.0276	0.0312
1951	0.2075	0.0244	0.0285	0.0288	0.0291	0.0307	0.0334
1952	0.1947	0.0265	0.0300	0.0303	0.0305	0.0324	0.0351
1953	0.0918	0.0300	0.0325	0.0328	0.0331	0.0347	0.0371
1954	0.2269	0.0266	0.0296	0.0298	0.0301	0.0317	0.0348
1955	0.1357	0.0287	0.0307	0.0309	0.0311	0.0324	0.0341
1956	0.0416	0.0310	0.0335	0.0337	0.0340	0.0357	0.0374
1957	0.0541	0.0355	0.0397	0.0400	0.0403	0.0428	0.0452
1958	0.3827	0.0344	0.0384	0.0386	0.0389	0.0414	0.0447
1959	0.0958	0.0409	0.0445	0.0448	0.0451	0.0470	0.0494
1960	0.1680	0.0409	0.0450	0.0453	0.0455	0.0473	0.0489
1961	0.3646	0.0391	0.0442	0.0445	0.0449	0.0462	0.0476
1962	-0.0519	0.0401	0.0434	0.0437	0.0439	0.0450	0.0466
1963	0.1261	0.0403	0.0427	0.0429	0.0431	0.0437	0.0456
1964	0.1685	0.0419	0.0441	0.0442	0.0443	0.0450	0.0466
1965	0.0489	0.0424	0.0448	0.0450	0.0451	0.0458	0.0475
1966	-0.0504	0.0475	0.0513	0.0515	0.0518	0.0531	0.0552
1967	-0.0216	0.0494	0.0553	0.0556	0.0559	0.0576	0.0605
1968	0.1419	0.0543	0.0621	0.0627	0.0633	0.0651	0.0684
1969	-0.1769	0.0624	0.0706	0.0716	0.0725	0.0743	0.0778
1970	0.1494	0.0692	0.0822	0.0833	0.0844	0.0870	0.0913
1971	0.0050	0.0614	0.0766	0.0777	0.0789	0.0825	0.0868
1972	0.1464	0.0601	0.0744	0.0751	0.0758	0.0778	0.0815
1973	-0.2106	0.0701	0.0762	0.0767	0.0773	0.0789	0.0812
1974	-0.2135	0.0800	0.0849	0.0861	0.0873	0.0899	0.0929
1975	0.4364	0.0817	0.0894	0.0912	0.0929	0.0978	0.1057
1976	0.3245	0.0794	0.0864	0.0880	0.0895	0.0928	0.0987
1977	0.1076	0.0765	0.0814	0.0829	0.0845	0.0859	0.0896
1978	-0.0174	0.0840	0.0877	0.0888	0.0900	0.0917	0.0947
1979	0.1221	0.0921	0.0962	0.0978	0.0995	0.1017	0.1064
1980	0.1275	0.1115	0.1182	0.1211	0.1241	0.1271	0.1352
1981	0.1464	0.1349	0.1427	0.1458	0.1489	0.1529	0.1616
1982	0.2292	0.1309	0.1439	0.1448	0.1464	0.1532	0.1610
1983	0.2372	0.1115	0.1247	0.1229	0.1237	0.1298	0.1350
1984	0.2219	0.1247	0.1297	0.1339	0.1341	0.1374	0.1434
1985	0.3232	0.1104	0.1187	0.1179	0.1189	0.1228	0.1270
1986	0.3575	0.0802	0.0908	0.0930	0.0940	0.0973	0.1015
1987	-0.0544	0.0843	0.0934	0.0946	0.0953	0.0985	0.1027
1988	0.1849	0.0897	0.1013	0.1009	0.1014	0.1040	0.1083
1989	0.4351	0.0854	0.0938	0.0949	0.0955	0.0980	0.1001
1990	0.0069	0.0858	0.0943	0.0959	0.0964	0.0985	0.1009
1991	0.0931	0.0818	0.0891	0.0915	0.0921	0.0943	0.0961
1992	0.1183	0.0769	0.0822	0.0860	0.0869	0.0887	0.0897
1993	0.1661	0.0671	0.0737	0.0776	0.0780	0.0805	0.0816
1994	-0.0825	0.0730	0.0794	0.0799	0.0802	0.0826	0.0868
1995	0.3772	0.0708	0.0781	0.0774	0.0776	0.0813	0.0857
1996	0.0550	0.0672	0.0745	0.0742	0.0745	0.0762	0.0805
1997	0.1959	0.0670	0.0746	0.0743	0.0746	0.0747	0.0782
1998	0.1896	0.0572	0.0682	0.0674	0.0677	0.0687	0.0710
1999	-0.0998	0.0592	0.0710	0.0740	0.0748	0.0743	0.0766
2000	0.5475	0.0607	0.0790	0.0817	0.0821	0.0830	0.0839
2001	-0.2877	0.0557	0.0747	0.0777	0.0780	0.0787	0.0810
2002	-0.2934	0.0542		0.0730	0.0730	0.0754	0.0818
2003	0.2509	0.0496		0.0646	0.0646	0.0623	0.0673
2004	0.2763	0.0505		0.0608	0.0608	0.0617	0.0641
2005	0.2151	0.0465		0.0546	0.0546	0.0566	0.0592
2006	0.2323	0.0499		0.0583	0.0583	0.0607	0.0632
2007	0.1434	0.0493		0.0591	0.0591	0.0605	0.0629
2008	-0.3160	0.0448		0.0619	0.0619	0.0650	0.0711
2009	0.1801	0.0401		0.0579	0.0579	0.0610	0.0721
2010	0.0795	0.0405		0.0525	0.0525	0.0548	0.0598
2011	0.2051	0.0375		0.0489	0.0489	0.0514	0.0565
2012	0.1272	0.0256		0.0385	0.0385	0.0416	0.0490
2013	0.1363	0.0302		0.0417	0.0417	0.0441	0.0492
2014	0.3017	0.0316		0.0424	0.0424	0.0435	0.0485
2015	-0.0629	0.0254		0.0397	0.0397	0.0408	0.0496
2016	0.1834	0.0221		0.0373	0.0373	0.0394	0.0474
2017	0.1966	0.0267		0.0386	0.0386	0.0404	0.0443

City of Lancaster Sewer Fund
Common Equity Cost Rate Summary

	<u>Water Group Followed by Analysts</u>		
	<u>DCF(1)</u>	<u>CAPM(2)</u>	<u>RP(3)</u>
Common Equity Cost Rate Range	10.50 %	10.70 %	11.00 %
Investment Risk Adjustments (4)	<u>0.10</u>	<u>0.10</u>	<u>0.10</u>
City of Lancaster Sewer Fund Adjusted Common Equity Cost Rate Range:	<u>10.60</u>	<u>10.80</u>	<u>11.10</u>
City of Lancaster Sewer Fund Recommended Common Equity Cost Rate (5)	<u><u>10.85 %</u></u>		
LESS : Personal Income Tax Adjustment (4)	<u>1.30</u>		
Recommendation after personal income taxes for City of Lancaster Sewer Fund	<u><u>9.55 %</u></u>		
Check of Reasonableness of Common Equity Cost Rate (6)	9.7 % to 14.4 %		

- Notes: (1) From Schedule 12 and explained in the Direct Testimony.
(2) From Schedule 17 and explained in the Direct Testimony.
(3) From Schedule 18 and explained in the Direct Testimony.
(4) As explained in the Direct Testimony.
(5) As explained in the Direct Testimony, the recommendation is only applicable to a rate making common equity ratio of 55%. (~55.00%)
(6) See page 2 of Schedule 14.

Analysis of Tax Adjustment Factor
Based on Yield of G.O. Municipal Bonds and Investor-Owned Public Utility Bonds

<u>Years</u>	<u>1</u>		<u>2</u>		<u>3</u>		<u>4</u>		<u>5</u>		<u>6</u>	
	G.O. Municipal Bonds		Investor-Owned Public Utility Bonds						Calculated Tax Factor			
	<u>A Rated</u>	<u>Baa Rated</u>	<u>A Rated</u>	<u>Baa Rated</u>					Municipal A Over Public Utility A	Municipal Baa Over Public Utility Baa		
Apr 2017	3.69	4.02	4.12	4.51					0.10	0.11		
May 2017	3.74	4.06	4.12	4.50					0.09	0.10		
Jun 2017	3.50	3.82	3.94	4.32					0.11	0.12		
Jul 2017	3.57	3.89	3.99	4.36					0.11	0.11		
Aug 2017	3.52	3.85	3.86	4.23					0.09	0.09		
Sep 2017	3.44	3.77	3.87	4.24					0.11	0.11		
Oct 2017	3.40	3.73	3.91	4.26					0.13	0.12		
Nov 2017	3.42	3.75	3.83	4.16					0.11	0.10		
Dec 2017	3.41	3.74	3.79	4.14					0.10	0.10		
Jan 2018	3.44	3.77	3.86	4.18					0.11	0.10		
Feb 2018	3.61	3.91	4.09	4.42					0.12	0.12		
Mar 2018	3.70	4.04	4.13	4.52					0.10	0.11		
Apr 2018	3.76	4.10	4.17	4.58					0.10	0.10		
May 2018	3.76	4.10	4.28	4.71					0.12	0.13		
Jun 2018	3.72	4.06	4.27	4.71					0.13	0.14		
Jul 2018	3.71	4.05	4.27	4.67					0.13	0.13		
Aug 2018	3.75	4.09	4.26	4.64					0.12	0.12		
Sep 2018	3.82	4.16	4.32	4.74					0.12	0.12		
Oct 2018	4.10	4.46	4.45	4.91					0.08	0.09		
Nov 2018	4.06	4.43	4.52	5.03					0.10	0.12		
Dec 2018	3.92	4.29	4.37	4.92					0.10	0.13		
Jan 2019	3.73	4.09	4.35	4.91					0.14	0.17		
Feb 2019	3.62	3.98	4.25	4.76					0.15	0.16		
Mar 2019	3.53	3.89	4.16	4.65					0.15	0.16		
Apr 2019	3.39	3.70	4.08	4.55					0.17	0.19		
Average Per Credit Rating									0.12	0.12		

[Ratio is converted to a tax factor by
subtracting the ratio from 100%]

City of Lancaster Sewer Fund
 Recommended Fair Rate of Return and Summary of Alternative Overall Rates of Return
 With Tax Adjustment
Recommended Rate Making Ratios at December 31, 2020

	Recommended <u>Ratios</u>	Cost <u>Rates(1)</u>	Recommended Weighted <u>Cost</u>	12% Tax Adjusted Equity <u>Cost Rate (2)</u>	Tax-Adjusted Weighted <u>Cost</u>
Debt	45.0	4.34	1.95	--	1.95
Fund Equity	<u>55.0</u>	10.85	<u>5.97</u>	<u>9.55</u>	<u>5.25</u>
Overall	<u>100.0</u>		<u>7.92</u>		<u>7.20</u>

Notes: (1) Debt cost is from Schedule 3 and equity cost rates are from Schedule 19.

(2) See Schedule 20.