

STATE OF NORTH CAROLINA  
UTILITIES COMMISSION  
RALEIGH

DOCKET NO. W-218 SUB 573

IN THE MATTER OF APPLICATION BY AQUA NORTH CAROLINA, INC., FOR AUTHORITY TO ADJUST AND INCREASE RATES FOR WATER AND SEWER UTILITY SERVICE IN ALL SERVICE AREAS IN NORTH CAROLINA	DIRECT TESTIMONY OF DYLAN W. D'ASCENDIS ON BEHALF OF AQUA NORTH CAROLINA, INC.
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APPENDIX 3  
SCHEDULE 2



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UTILITIES COMMISSION  
RALEIGH**

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BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

IN THE MATTER OF  
APPLICATION BY AQUA NORTH CAROLINA, INC.  
FOR AUTHORITY TO ADJUST AND INCREASE RATES FOR WATER  
AND SEWER UTILITY SERVICE IN ALL SERVICE AREAS IN  
NORTH CAROLINA

PREFILED DIRECT TESTIMONY OF  
**DYLAN W. D'ASCENDIS, CRRA, CVA**  
PARTNER  
SCOTTMADDEN, INC.  
ON BEHALF OF  
AQUA NORTH CAROLINA , INC.

June 30, 2022

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1 **I. INTRODUCTION AND PURPOSE**

2 **Q. PLEASE STATE YOUR NAME, AFFILIATION, AND BUSINESS**  
3 **ADDRESS.**

4 A. My name is Dylan W. D'Ascendis. I am employed by ScottMadden, Inc. as  
5 a Partner. My business address is 3000 Atrium Way, Suite 200, Mount  
6 Laurel, NJ 08054.

7 **Q. ON WHOSE BEHALF ARE YOU SUBMITTING THIS TESTIMONY?**

8 A. I am submitting this direct testimony (referred to throughout as my "Direct  
9 Testimony") before the North Carolina Utilities Commission ("NCUC" or the  
10 "Commission") on behalf of the Aqua North Carolina, Inc. ("Aqua NC" or the  
11 "Company").

12 **Q. PLEASE SUMMARIZE YOUR PROFESSIONAL EXPERIENCE AND**  
13 **EDUCATIONAL BACKGROUND.**

14 A. I have offered expert testimony on behalf of investor-owned utilities in over  
15 30 state regulatory commissions in the United States, the Federal Energy  
16 Regulatory Commission, the Alberta Utility Commission, an American  
17 Arbitration Association panel, and the Superior Court of Rhode Island on  
18 issues including, but not limited to, common equity cost rate, rate of return,  
19 valuation, capital structure, class cost of service, and rate design.

20 On behalf of the American Gas Association ("AGA"), I calculate the AGA  
21 Gas Index, which serves as the benchmark against which the performance  
22 of the American Gas Index Fund ("AGIF") is measured on a monthly basis.  
23 The AGA Gas Index and AGIF are a market capitalization weighted index

1 and mutual fund, respectively, comprised of the common stocks of the  
2 publicly traded corporate members of the AGA.

3 I am a member of the Society of Utility and Regulatory Financial Analysts  
4 ("SURFA"). In 2011, I was awarded the professional designation "Certified  
5 Rate of Return Analyst" by SURFA, which is based on education,  
6 experience, and the successful completion of a comprehensive written  
7 examination.

8 I am also a member of the National Association of Certified Valuation  
9 Analysts ("NACVA") and was awarded the professional designation  
10 "Certified Valuation Analyst" by the NACVA in 2015.

11 I am a graduate of the University of Pennsylvania, where I received a  
12 Bachelor of Arts degree in Economic History. I have also received a Master  
13 of Business Administration with high honors and concentrations in Finance  
14 and International Business from Rutgers University.

15 The details of my educational background and expert witness appearances  
16 are included in Appendix A.

17 **Q. WHAT IS THE PURPOSE OF YOUR DIRECT TESTIMONY?**

18 A. The purpose of my Direct Testimony is to present evidence on behalf of  
19 Aqua NC and recommend a weighted average cost of capital ("WACC") to  
20 be used in setting rates in this proceeding. My testimony first provides a  
21 summary of financial theory and regulatory principles pertinent to the  
22 development of the recommended cost of capital. I then present evidence  
23 and analysis on: (1) the appropriate capital structure, (2) the appropriate

1 cost of long-term debt, and (3) the appropriate return on common equity  
2 (“ROE”) the Company should be given the opportunity to earn on its  
3 jurisdictional rate base, which will be applied for the duration of its Water  
4 and Sewer Investment Plan (“WSIP”). My testimony concludes with a  
5 discussion of the current capital market environment in North Carolina and  
6 how it influences cost of capital issues in this proceeding.

7 **Q. HAVE YOU PREPARED AN EXHIBIT IN SUPPORT OF YOUR**  
8 **RECOMMENDATION?**

9 A. Yes. I have prepared Exhibit No. 1, which contains Schedules DWD-1  
10 through DWD-9, and has been prepared by me or under my direct  
11 supervision.

12 **Q. WHAT IS YOUR RECOMMENDATION REGARDING THE WACC FOR**  
13 **AQUA NC?**

14 A. Since the WSIP is a four-year program consisting of the Base Year (“BY”),  
15 and three Forecasted Test Years (“FY1”, “FY2” and “FY3”, respectively), I  
16 have recommended four separate ranges of WACCs to be considered by  
17 the Commission in this proceeding. My recommended capital structure  
18 consists of 50.00% long-term debt and 50.00% common equity and is based  
19 on the Company’s target capital structure for the duration of the WSIP. The  
20 requested cost of long-term debt used in the WSIP is 4.01%, which is  
21 derived from the Company’s long-term borrowings as of May 2022. As for  
22 my recommended range of ROEs applicable to the Company, they vary  
23 slightly based on the changes in expected interest rates during the WSIP.

The overall rates of return for each period (the BY, FY1, FY2, and FY3) are summarized on page 1 of Schedule DWD-1 and in Tables 1a through 1d below:

**TABLE 1A: SUMMARY OF OVERALL RATE OF RETURN –  
BASE YEAR**

<u>Type of Capital</u>	<u>Ratios</u>	<u>Cost Rate</u>	<u>Weighted Cost Rate</u>
Long-Term Debt	50.00%	4.01%	2.01%
Common Equity	<u>50.00%</u>	9.90% - 10.90%	<u>4.95% - 5.45%</u>
Total	<u>100.00%</u>		<u>6.96% - 7.46%</u>

**TABLE 1B: SUMMARY OF OVERALL RATE OF RETURN –  
PROJECTED YEAR 1**

<u>Type of Capital</u>	<u>Ratios</u>	<u>Cost Rate</u>	<u>Weighted Cost Rate</u>
Long-Term Debt	50.00%	4.01%	2.01%
Common Equity	<u>50.00%</u>	10.12% - 11.12%	<u>5.06% - 5.56%</u>
Total	<u>100.00%</u>		<u>7.07% - 7.57%</u>

**TABLE 1C: SUMMARY OF OVERALL RATE OF RETURN –  
PROJECTED YEAR 2**

<u>Type of Capital</u>	<u>Ratios</u>	<u>Cost Rate</u>	<u>Weighted Cost Rate</u>
Long-Term Debt	50.00%	4.01%	2.01%
Common Equity	<u>50.00%</u>	10.08% - 11.08%	<u>5.04% - 5.54%</u>
Total	<u>100.00%</u>		<u>7.05% - 7.55%</u>

**TABLE 1D: SUMMARY OF OVERALL RATE OF RETURN –  
PROJECTED YEAR 3**

<u>Type of Capital</u>	<u>Ratios</u>	<u>Cost Rate</u>	<u>Weighted Cost Rate</u>
Long-Term Debt	50.00%	4.01%	2.01%
Common Equity	<u>50.00%</u>	10.19% - 11.19%	<u>5.09% - 5.59%</u>
Total	<u>100.00%</u>		<u>7.10% - 7.60%</u>

Given the ranges of ROEs, the Company is requesting an ROE of 10.40% for purposes of the WSIP.



1 **II. SUMMARY**

2 **Q. PLEASE SUMMARIZE YOUR RECOMMENDED RANGES OF COMMON**  
3 **EQUITY COST RATES.**

4 A. My recommended ranges of common equity cost rates are summarized on  
5 page 2 of Schedule DWD-1. In determining my recommended ranges, I  
6 have assessed the market-based common equity cost rates of companies  
7 of relatively similar, but not necessarily identical, risk to Aqua NC. Using  
8 companies of relatively comparable risk as proxies is consistent with the  
9 principles of fair rate of return established in the *Hope*<sup>1</sup> and *Bluefield*<sup>2</sup>  
10 cases. Of course, no proxy group can be identical in risk to any single  
11 company. Consequently, there must be an evaluation of relative risk  
12 between the Company and the proxy group to determine if it is appropriate  
13 to adjust the proxy group's indicated rate of return.

14 My recommendation results from the application of several cost of common  
15 equity models, specifically the Discounted Cash Flow ("DCF") model, the  
16 Risk Premium Model ("RPM"), and the Capital Asset Pricing Model  
17 ("CAPM"), to the market data of the Utility Proxy Group whose selection  
18 criteria will be discussed below. In addition, I also applied these same  
19 models to a Non-Price Regulated Proxy Group.

20 The results derived from these analyses are as follows:

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<sup>1</sup> *Federal Power Commission v. Hope Natural Gas Co.*, 320 U.S. 591 (1944). ("*Hope*")

<sup>2</sup> *Bluefield Water Works Improvement Co. v. Public Serv. Comm'n*, 262 U.S. 679 (1922). ("*Bluefield*")

**TABLE 2: SUMMARY OF COMMON EQUITY COST RATES**

	Using Current Interest Rates	Using Projected 2023 Interest Rates	Using Projected 2024 Interest Rates	Using Projected 2025 Interest Rates
Discounted Cash Flow Model	9.37%	9.37%	9.37%	9.37%
Risk Premium Model	11.12%	11.76%	11.69%	11.90%
Capital Asset Pricing Model	11.32%	11.68%	11.66%	11.79%
Market Models Applied to Comparable Risk, Non-Price Regulated Companies	<u>11.20%</u>	<u>11.54%</u>	<u>11.49%</u>	<u>11.49%</u>
Indicated Range of Common Equity Cost Rates Before Adjustments for Company-Specific Risk	9.85% - 10.85%	10.07% - 11.07%	10.03% - 11.03%	10.14% - 11.14%
Size Adjustment	0.00%	0.00%	0.00%	0.00%
Flotation Cost Adjustment	0.05%	0.05%	0.05%	0.05%
Indicated Range of Common Equity Cost Rates after Adjustment	<u>9.90% - 10.90%</u>	<u>10.12% - 11.12%</u>	<u>10.08% - 11.08%</u>	<u>10.19% - 11.19%</u>

The indicated ranges for each year are equal to 50-basis points above and below the midpoint of my four model results. Because, as mentioned previously, no individual company can be identical in risk to a proxy group, I conducted a relative risk analysis between the Company and the Utility Proxy Group. As a result of that analysis, the indicated range of common equity cost rates applicable to the Utility Proxy Group was adjusted upward by 0.05% to reflect flotation costs. This adjustment to the Utility Proxy Group-specific ROE ranges result in Company-specific ranges of common equity cost rates as shown on Table 2 above, which I recommend the Commission consider in its determination of the ROE for the Company in

1 this proceeding. As noted above, the Company is requesting a 10.40% for  
2 WSIP purposes.

3 **Q. PLEASE SUMMARIZE YOUR RECOMMENDATION WITH RESPECT TO**  
4 **THE COMPANY'S CAPITAL STRUCTURE.**

5 A. As briefly mentioned above, I recommend a capital structure including  
6 50.00% long-term debt and 50.00% common equity. This represents the  
7 Company's target capital structure throughout the duration of the WSIP.

8 **Q. PLEASE SUMMARIZE YOUR RECOMMENDATION WITH RESPECT TO**  
9 **THE COMPANY'S COST OF LONG-TERM DEBT.**

10 A. I recommend a cost of long-term debt of 4.01% for the duration of the WSIP.  
11 The Company's proposed cost of long-term debt is based on the Company's  
12 long-term debt borrowings as of May 2022.

13 **Q. HOW IS THE REMAINDER OF YOUR DIRECT TESTIMONY**  
14 **ORGANIZED?**

- 15 • Section III – Provides a summary of financial theory and regulatory  
16 principles pertinent to the development of the cost of capital;
- 17 • Section IV – Explains my selection of the Utility Proxy Group used to  
18 develop my ROE analytical results;
- 19 • Section V – Explains the proposed capital structure;
- 20 • Section VI – Describes the analyses on which my ROE  
21 recommendation is based;

- Section VII – Summarizes the ranges of ROEs applicable to the Utility Proxy Group before adjustments to reflect the Company-specific factors;
- Section VIII – Explains my relative risk analysis of the Company and the Utility Proxy Group;
- Section IX – Discusses the economic conditions in North Carolina; and
- Section X – Presents my conclusions.

**III. GENERAL PRINCIPLES**

**Q. WHAT GENERAL PRINCIPLES HAVE YOU CONSIDERED IN ARRIVING AT YOUR RECOMMENDED RANGES OF ROES?**

A. In unregulated industries, marketplace competition is the principal determinant of the price of products or services. For regulated public utilities, regulation must act as a substitute for marketplace competition. Assuring that the utility can fulfill its obligations to the public, while providing safe and reliable service at all times, requires a level of earnings sufficient to maintain the integrity of presently invested capital. Sufficient earnings also permit the attraction of needed new capital at a reasonable cost, for which the utility must compete with other firms of comparable risk, consistent with the fair rate of return standards established by the U.S. Supreme Court in the previously cited *Hope* and *Bluefield* cases.

1 The U.S. Supreme Court affirmed the fair rate of return standards in *Hope*  
2 when it stated:

3 *The rate-making process under the Act, i.e., the fixing of 'just*  
4 *and reasonable' rates, involves a balancing of the investor*  
5 *and the consumer interests. Thus we stated in the Natural*  
6 *Gas Pipeline Co. case that 'regulation does not insure that the*  
7 *business shall produce net revenues.'* 315 U.S. at page 590,  
8 *62 S.Ct. at page 745. But such considerations aside, the*  
9 *investor interest has a legitimate concern with the financial*  
10 *integrity of the company whose rates are being regulated.*  
11 *From the investor or company point of view it is important that*  
12 *there be enough revenue not only for operating expenses but*  
13 *also for the capital costs of the business. These include*  
14 *service on the debt and dividends on the stock. Cf. Chicago*  
15 *& Grand Trunk R. Co. v. Wellman, 143 U.S. 339, 345, 346 12*  
16 *S.Ct. 400,402. By that standard the return to the equity owner*  
17 *should be commensurate with returns on investments in other*  
18 *enterprises having corresponding risks. That return,*  
19 *moreover, should be sufficient to assure confidence in the*  
20 *financial integrity of the enterprise, so as to maintain its credit*  
21 *and to attract capital.*<sup>3</sup>

22  
23 In summary, the U.S. Supreme Court has found a return that is adequate to  
24 attract capital at reasonable terms enables the utility to provide service while  
25 maintaining its financial integrity. As discussed above, and in keeping with  
26 established regulatory standards, that return should be commensurate with  
27 the returns expected elsewhere for investments of equivalent risk. The  
28 Commission's decision in this proceeding, therefore, should provide the  
29 Company with the opportunity to earn a return that is: (1) adequate to attract  
30 capital at reasonable cost and terms; (2) sufficient to ensure their financial  
31 integrity; and (3) commensurate with returns on investments in enterprises  
32 having corresponding risks.

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<sup>3</sup> *Hope*, 320 U.S. 591 (1944), at 603.

1 Lastly, the required return for a regulated public utility is established on a  
2 stand-alone basis, i.e., for the utility operating company at issue in a rate  
3 case. Parent entities, like other investors, have capital constraints and must  
4 look at the attractiveness of the expected risk-adjusted return of each  
5 investment alternative in their capital budgeting process. That is, utility  
6 holding companies that own many utility operating companies have choices  
7 as to where they will invest their capital within the holding company family.  
8 Therefore, the opportunity cost concept applies regardless of the source of  
9 the funding, public funding or corporate funding.

10 When funding is provided by a parent entity, the return still must be sufficient  
11 to provide an incentive to allocate equity capital to the subsidiary or  
12 business unit rather than other internal or external investment opportunities.  
13 That is, the regulated subsidiary must compete for capital with all the parent  
14 company's affiliates, and with other, similarly situated utility companies. In  
15 that regard, investors value corporate entities on a sum-of-the-parts basis  
16 and expect each division within the parent company to provide an  
17 appropriate risk-adjusted return.

18 It therefore is important that the authorized ROE reflects the risks and  
19 prospects of the utility's operations and supports the utility's financial  
20 integrity from a stand-alone perspective as measured by their combined  
21 business and financial risks. Consequently, the ROE authorized in this  
22 proceeding should be sufficient to support the operational (i.e., business  
23 risk) and financing (i.e., financial risk) of the Company's utility operations on

1 a stand-alone basis. In unregulated industries, the competition of the  
2 marketplace is the principal determinant of the price of products or services.  
3 For regulated public utilities, regulation must act as a substitute for  
4 marketplace competition. Assuring that the utility can fulfill its obligations to  
5 the public, while providing safe and reliable service at all times, requires a  
6 level of earnings sufficient to maintain the integrity of presently invested  
7 capital. Sufficient earnings also permit the attraction of needed new capital  
8 at a reasonable cost, for which the utility must compete with other firms of  
9 comparable risk, consistent with the fair rate of return standards established  
10 by the U.S. Supreme Court in the previously cited *Hope* and *Bluefield*  
11 decisions. Consequently, marketplace data must be relied on in assessing  
12 a common equity cost rate appropriate for ratemaking purposes. Just as  
13 the use of the market data for the proxy group adds reliability to the informed  
14 expert's judgment used in arriving at a recommended common equity cost  
15 rate, the use of multiple, generally accepted common equity cost rate  
16 models also adds reliability and accuracy when arriving at a recommended  
17 common equity cost rate.

18 **Q. PLEASE DEFINE BUSINESS RISK AND EXPLAIN WHY IT IS**  
19 **IMPORTANT TO THE DETERMINATION OF A FAIR RATE OF RETURN.**

20 A. Regulated utilities primarily use common stock and long-term debt to  
21 finance their permanent property, plant, and equipment (i.e., rate base).  
22 The fair rate of return for a regulated utility is based on its WACC, in which,

1 as noted earlier, the costs of the individual sources of capital are weighted  
2 by their respective book values.

3 The cost of capital is the return investors require to make an investment in  
4 a firm. Investors will provide funds to a firm only if the return that they *expect*  
5 is equal to, or greater than, the return that they *require* to accept the risk of  
6 providing funds to the firm.

7 The cost of capital (that is, the combination of the costs of debt and equity)  
8 is based on the economic principle of “opportunity costs.” Investing in any  
9 asset (whether debt or equity securities) represents a forgone opportunity  
10 to invest in alternative assets. For any investment to be sensible, its  
11 expected return must be at least equal to the return expected on alternative,  
12 comparable risk investment opportunities. Because investments with like  
13 risks should offer similar returns, the opportunity cost of an investment  
14 should equal the return available on an investment of comparable risk.

15 Whereas the cost of debt is contractually defined and can be directly  
16 observed as the interest rate or yield on debt securities, the cost of equity  
17 must be estimated based on market data and various financial models.  
18 Because the cost of equity is premised on opportunity costs, the models  
19 used to determine it are typically applied to a group of “comparable” or  
20 “proxy” companies.

21 In the end, the estimated cost of capital should reflect the return that  
22 investors require in light of the subject company’s business and financial  
23 risks, and the returns available on comparable investments.



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1 company in relation to other similarly situated utility companies (i.e., the  
2 Utility Proxy Group). To the extent investors view a company as being  
3 exposed to higher risk, the required return will increase, and vice versa.

4 For regulated utilities, business risks are both long-term and near-term in  
5 nature. Whereas near-term business risks are reflected in year-to-year  
6 variability in earnings and cash flow brought about by economic or  
7 regulatory factors, long-term business risks reflect the prospect of an  
8 impaired ability of investors to obtain both a fair rate of return on, and return  
9 of, their capital. Moreover, because utilities accept the obligation to provide  
10 safe, adequate and reliable service at all times (in exchange for a  
11 reasonable opportunity to earn a fair return on their investment), they  
12 generally do not have the option to delay, defer, or reject capital  
13 investments. Because those investments are capital-intensive, utilities  
14 generally do not have the option to avoid raising external funds. The  
15 obligation to serve and the corresponding need to access capital is even  
16 more acute during periods of capital market distress.

17 Because utilities invest in long-lived assets, long-term business risks are of  
18 paramount concern to equity investors. That is, the risk of not recovering  
19 the return on their investment extends far into the future. The timing and  
20 nature of events that may lead to losses, however, also are uncertain and,  
21 consequently, those risks and their implications for the required return on  
22 equity tend to be difficult to quantify. Regulatory commissions (like  
23 investors who commit their capital) must review a variety of quantitative and

1 qualitative data and apply their reasoned judgment to determine how long-  
2 term risks weigh in their assessment of the market-required return on  
3 common equity.

4 **Q. WHAT BUSINESS RISKS DO THE WATER AND WASTEWATER**  
5 **INDUSTRIES FACE IN GENERAL?**

6 A. Water and wastewater utilities have an ever-increasing responsibility to be  
7 stewards of the environment from which water supplies are drawn in order  
8 to preserve and protect essential natural resources of the United States.  
9 This increased environmental stewardship is a direct result of compliance  
10 with the Safe Water Drinking Act, as well as a response to continuous  
11 monitoring by the Environmental Protection Agency ("EPA") and state and  
12 local governments, of the water supply for potential contaminants and their  
13 resultant regulations. This, plus aging infrastructure, necessitate additional  
14 capital investment in the distribution and treatment of water, exacerbating  
15 the pressure on free cash flows arising from increased capital expenditures  
16 for infrastructure repair and replacement. The significant amount of capital  
17 investment and, hence, high capital intensity, is a major risk factor for the  
18 water and wastewater utility industry.

19 *Value Line Investment Survey* ("*Value Line*") observes the following about  
20 the water utility industry:

21 Prices of goods and services have increased  
22 significantly over the past year. While this is not good  
23 news for many entities, it is particularly bad for utilities.  
24 Indeed, these companies have been allowed to  
25 operate as a monopoly in their service areas, but in  
26 return, they have agreed to let state regulators have

1 the final call on the prices customers are charged. For  
2 more then [sic] the past decade, this hasn't been a  
3 problem because inflation has been very tame. Since  
4 the pandemic has disrupted everything from the labor  
5 markets to the world's supply chains, (with a strong  
6 assist from easy monetary and fiscal policy), costs  
7 have spiked substantially. Thus, utilities are seeing  
8 their expenses rise without a similar increase in clients  
9 [sic] bills.

10 \* \* \*

11 Each state has its own authority that deals with  
12 requests for rate relief. In the recent past, regulators  
13 and water utilities have had a relatively good working  
14 relationship. With the nation's water infrastructure in  
15 poor condition, members of this group have been  
16 investing heavily in replacing pipelines that have been,  
17 over 70 years old, in many instances. Recall that this  
18 cooperation was achieved during an era of stable  
19 prices. So, the authorities have not met with much  
20 resistance from the general public, even though  
21 customer bills have been increased at levels well  
22 ahead of the inflation rate. This has been accepted  
23 without much blowback because there has been  
24 general agreement: For decades water rates were  
25 artificially kept too low, which meant that insufficient  
26 investment was made to modernize water  
27 infrastructure.<sup>4</sup>

28 The water and wastewater industry also experiences low depreciation rates.

29 Depreciation rates are one of the principal sources of internal cash flows for  
30 all utilities (through a utility's depreciation expense) and are vital for a  
31 company to fund ongoing replacements and repairs of water and  
32 wastewater systems. Water / wastewater utility assets have long lives, and  
33 therefore have long capital recovery periods. As such, they face greater

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<sup>4</sup> Value Line Investment Survey, April 8, 2022.

1 risk due to inflation, which results in a higher replacement cost per dollar of  
2 net plant.

3 Substantial capital expenditures, as noted by *Value Line*, will require  
4 significant financing. The three sources of financing typically used are debt,  
5 equity (common and preferred), and cash flow. All three are intricately  
6 linked to the opportunity to earn a sufficient rate of return as well as the  
7 ability to achieve that return. Consistent with *Hope* and *Bluefield*, the return  
8 must be sufficient to maintain credit quality as well as enable the attraction  
9 of necessary new capital, be it debt or equity capital. If unable to raise debt  
10 or equity capital, the utility must turn to either retained earnings or free cash  
11 flow,<sup>5</sup> both of which are directly linked to earning a sufficient rate of return.  
12 The level of free cash flow represents a utility's ability to meet the needs of  
13 its debt and equity holders. If either retained earnings or free cash flow is  
14 inadequate, it will be nearly impossible for the utility to attract the needed  
15 capital for new infrastructure investment necessary to ensure quality service  
16 to its customers. An insufficient rate of return can be financially devastating  
17 for utilities as well as a public safety issue for their customers.

18 The water and wastewater utility industry's high degree of capital intensity  
19 and low depreciation rates, coupled with the need for substantial  
20 infrastructure capital spending, require regulatory support in the form of  
21 adequate and timely rate relief, and in particular, a sufficient authorized

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<sup>5</sup> Free Cash Flow = Operating Cash Flow (Funds From Operations) minus Capital Expenditures.

1 return on common equity, so that the industry can successfully meet the  
2 challenges it faces.

3 **B. FINANCIAL RISK**

4 **Q. PLEASE DEFINE FINANCIAL RISK AND EXPLAIN WHY IT IS**  
5 **IMPORTANT IN DETERMINING A FAIR RATE OF RETURN.**

6 A. Financial risk is the additional risk created by the introduction of debt and  
7 preferred stock into the capital structure. The higher the proportion of debt  
8 and preferred stock in the capital structure, the higher the financial risk to  
9 common equity owners (i.e., failure to receive dividends due to default or  
10 other covenants). Therefore, consistent with the basic financial principle of  
11 risk and return, common equity investors require higher returns as  
12 compensation for bearing higher financial risk.

13 **Q. CAN BOND AND CREDIT RATINGS BE A PROXY FOR A FIRM'S**  
14 **COMBINED BUSINESS AND FINANCIAL RISKS TO EQUITY OWNERS**  
15 **(I.E., INVESTMENT RISK)?**

16 A. Yes, similar bond ratings/issuer credit ratings reflect, and are representative  
17 of, similar combined business and financial risks (i.e., total risk) faced by  
18 bond investors.<sup>6</sup> Although specific business or financial risks may differ  
19 between companies, the same bond/credit rating indicates that the  
20 combined risks are roughly similar from a debtholder perspective. The

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<sup>6</sup> Risk distinctions within S&P's bond rating categories are recognized by a plus or minus, i.e., within the A category, an S&P rating can be at A+, A, or A-. Similarly, risk distinctions for Moody's ratings are distinguished by numerical rating gradations, i.e., within the A category, a Moody's rating can be A1, A2 and A3.

1 caveat is that these debtholder risk measures do not translate directly to  
2 risks for common equity.

3 **IV. AQUA NC AND THE UTILITY PROXY GROUP**

4 **Q. WHY IS IT NECESSARY TO DEVELOP A PROXY GROUP WHEN**  
5 **ESTIMATING THE ROE FOR THE COMPANY?**

6 A. Because the Company is not publicly traded and does not have publicly  
7 traded equity securities, it is necessary to develop groups of publicly traded,  
8 comparable companies to serve as “proxies” for the Company. In addition  
9 to the analytical necessity of doing so, the use of proxy companies is  
10 consistent with the *Hope* and *Bluefield* comparable risk standards, as  
11 discussed above. I have selected two proxy groups that, in my view, are  
12 fundamentally risk-comparable to the Company: a Utility Proxy Group and  
13 a Non-Price Regulated Proxy Group, which is comparable in total risk to the  
14 Utility Proxy Group.<sup>7</sup>

15 Even when proxy groups are carefully selected, it is common for analytical  
16 results to vary from company to company. Despite the care taken to ensure  
17 comparability, because no two companies are identical, market  
18 expectations regarding future risks and prospects will vary within the proxy  
19 group. It therefore is common for analytical results to reflect a seemingly  
20 wide range, even for a group of similarly situated companies. At issue is  
21 how to estimate the ROE from within that range. That determination will be

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<sup>7</sup> The development of the Non-Price Regulated Proxy Group is explained in more detail in Section VII.

1 best informed by employing a variety of sound analyses and necessarily  
2 must consider the sort of quantitative and qualitative information discussed  
3 throughout my Direct Testimony. Additionally, a relative risk analysis  
4 between the Company and the Utility Proxy Group must be made to  
5 determine whether or not explicit Company-specific adjustments need to be  
6 made to the Utility Proxy Group's indicated results.

7 My analyses are based on the Utility Proxy Group, containing U.S. water  
8 utilities. As discussed earlier, utilities must compete for capital with other  
9 companies with commensurate risk (including non-utilities) and, to do so,  
10 must be provided the opportunity to earn a fair and reasonable return.  
11 Consequently, it is appropriate to consider the Utility Proxy Group's market  
12 data in determining the Company's ROE.

13 **Q. ARE YOU FAMILIAR WITH THE OPERATIONS OF AQUA NC?**

14 A. Yes. Aqua NC is a subsidiary of Essential Utilities, Inc. ("Essential"). Aqua  
15 NC's operations span the state of North Carolina and are broken into three  
16 regions: the Coast, Central, and the West. Aqua NC is headquartered in  
17 Cary, NC, and serves more than 321,000 residents in 52 counties and has  
18 approximately 85,000 water customers and 22,000 sewer customers.<sup>8</sup>  
19 Aqua NC's common stock is not publicly traded.

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<sup>8</sup> Source: <https://www.aquaamerica.com/our-states/north-carolina.aspx>



1 Q. PLEASE EXPLAIN HOW YOU CHOSE THE COMPANIES IN THE  
2 UTILITY PROXY GROUP.

3 A. Because the cost of equity is a comparative exercise, my objective in  
4 developing a proxy group was to select companies that are comparable to  
5 the Company. Because the Company is a 100% rate-regulated water utility,  
6 I applied the following criteria to select my Utility Proxy Group:

- 7 (i) They were included in the Water Utility Group of *Value Line's*  
8 Standard Edition (April 8, 2022);
- 9 (ii) They have 60% or greater of fiscal year 2021 total operating income  
10 derived from, or 60% or greater of fiscal year 2021 total assets  
11 attributable to, regulated water utility operations;
- 12 (iii) At the time of preparation of this testimony, they had not publicly  
13 announced that they were involved in any major merger or  
14 acquisition activity (i.e., one publicly-traded utility merging with or  
15 acquiring another) or any other major development;
- 16 (iv) They have not cut or omitted their common dividends during the five  
17 years ended 2021 or through the time of preparation of this  
18 testimony;
- 19 (v) They have *Value Line* and Bloomberg Professional Services  
20 ("Bloomberg") adjusted Beta coefficients ("beta");
- 21 (vi) They have positive *Value Line* five-year dividends per share ("DPS")  
22 growth rate projections; and

1 (vii) They have *Value Line*, Zacks, or Yahoo! Finance consensus five-  
2 year earnings per share (“EPS”) growth rate projections.

3 The following seven companies met these criteria: American States Water  
4 Co., American Water Works Co., Inc., California Water Service Group,  
5 Essential Utilities, Inc., Middlesex Water Co., SJW Corp., and The York  
6 Water Co.

7 **Q. PLEASE SUMMARIZE THE UTILITY PROXY GROUP’S HISTORICAL**  
8 **CAPITALIZATION AND FINANCIAL STATISTICS.**

9 A. Page 1 of Schedule DWD-2 contains comparative capitalization and  
10 financial statistics for the Utility Proxy Group identified above for the years  
11 2017 to 2021.

12 During the five-year period ending 2021, the historically achieved average  
13 earnings rate on book common equity for the group averaged 10.53%. The  
14 average common equity ratio based on total permanent capital (excluding  
15 short-term debt) was 52.31%, and the average dividend payout ratio was  
16 59.66%.

17 Total debt to earnings before interest, taxes, depreciation, and amortization  
18 for the years 2017 to 2021 ranges between 3.42 and 5.57 times, with an  
19 average of 4.70 times. Funds from operations to total debt range from  
20 11.66% to 22.87%, with an average of 16.51%.

1 **V. CAPITAL STRUCTURE**

2 **Q. HOW DOES THE CAPITAL STRUCTURE AFFECT THE RATE OF**  
3 **RETURN?**

4 A. As discussed above, there are two general categories of risk: business risk  
5 and financial risk. The capital structure relates to a company's financial risk,  
6 which represents the risk that a company may not have adequate cash  
7 flows to meet its financial obligations and is a function of the percentage of  
8 debt (or financial leverage) in its capital structure. In that regard, as the  
9 percentage of debt in the capital structure increases, so do the fixed  
10 obligations for the repayment of that debt. Consequently, as the degree of  
11 financial leverage increases, the risk of financial distress (i.e., financial risk)  
12 also increases.<sup>9</sup> In essence, even if two firms face the same business risks,  
13 a company with meaningfully higher levels of debt in its capital structure is  
14 likely to have a higher cost of both debt and equity. Since the capital  
15 structure can affect the subject company's overall level of risk, it is an  
16 important consideration in establishing a just and reasonable rate of return.

17 **Q. IS THERE SUPPORT FOR THE PROPOSITION THAT THE CAPITAL**  
18 **STRUCTURE IS A KEY CONSIDERATION IN ESTABLISHING AN**  
19 **APPROPRIATE RATE OF RETURN?**

20 A. Yes. The Supreme Court and various utility commissions have long  
21 recognized the role of capital structure in the development of a just and

---

<sup>9</sup> Roger A. Morin, Modern Regulatory Finance, Public Utility Reports, Inc., 2020, at 51-52. ("Morin")

1 reasonable rate of return for a regulated utility. In particular, a utility's  
2 leverage, or debt ratio, has been explicitly recognized as an important  
3 element in determining a just and reasonable rate of return:

4 *Although the determination of whether bonds or stocks should*  
5 *be issued is for management, the matter of debt ratio is not*  
6 *exclusively within its province. Debt ratio substantially affects*  
7 *the manner and cost of obtaining new capital. It is therefore*  
8 *an important factor in the rate of return and must necessarily*  
9 *be considered by and come within the authority of the body*  
10 *charged by law with the duty of fixing a just and reasonable*  
11 *rate of return.*<sup>10</sup>

12 Perhaps ultimate authority for balancing the issues of cost and financial  
13 integrity is found in the Supreme Court's statement in *Hope*:

14 *The rate-making process under the Act, i.e., the fixing of "just*  
15 *and reasonable' rates, involves a balancing of the investor*  
16 *and the consumer interests.*<sup>11</sup>

17 And as the U.S. Court of Appeals, District of Columbia Circuit found in  
18 *Communications Satellite Corp. et. al. v. FCC*:

19 *The equity investor's stake is made less secure as the*  
20 *company's debt rises, but the consumer rate-payer's burden*  
21 *is alleviated.*<sup>12</sup>

22 That is, the U.S. Court of Appeals, District of Columbia Circuit found  
23 that because there is a relationship between the capital structure and the  
24 cost of equity, investor and consumer interests must be balanced.  
25 Consequently, the principles of fairness and reasonableness with respect

---

<sup>10</sup> *New England Telephone & Telegraph Co. v. State*, 98 N.H. 211, 97 A.2d 213, (1953), citing  
*New England Tel. & Tel. Co. v. Department of Pub. Util.*, (Mass.) 327 Mass. 81, 97 N.E. 2d  
509, 514; *Petitions of New England Tel. & Tel. Co.* 116 Vt. 480, 80 A2d 671, at 6.

<sup>11</sup> *Federal Power Commission v. Hope Natural Gas Co.*, 320 U.S., at 603 (1944).

<sup>12</sup> *Communications Satellite Corp. et. al. v. FCC*, 198 U.S. App. D.C. 60, 63-64611 F.2d 883.

1 to the allowed rate of return and capital structure are considered at both the  
2 federal and state levels.

3 **Q. WHAT CAPITAL STRUCTURE RATIOS DO YOU RECOMMEND BE**  
4 **EMPLOYED IN DEVELOPING AN OVERALL FAIR RATE OF RETURN**  
5 **FOR THE COMPANY?**

6 A. I recommend the use of Aqua NC's expected capital structure for the  
7 duration of the WSIP, which consists of 50.00% long-term debt and 50.00%  
8 common equity as shown on page 1 of Schedule DWD-1.

9 **Q. HOW DOES AQUA NC'S TARGET RATEMAKING COMMON EQUITY**  
10 **RATIO OF 50.00% COMPARE WITH THE EQUITY RATIOS**  
11 **MAINTAINED BY THE COMPANIES IN YOUR UTILITY PROXY GROUP?**

12 A. Aqua NC's ratemaking common equity ratio of 50.00% is reasonable and  
13 consistent with the range of common equity ratios maintained, on average,  
14 by the companies in the Utility Proxy Group on which I base my  
15 recommended common equity cost rate. As shown on page 2 of Schedule  
16 DWD-2, the common equity ratios of the Utility Proxy Group range from  
17 40.31% to 62.44% in 2021. In my opinion, Aqua NC's ratemaking equity  
18 ratio of 50.00% falls within a reasonable range.

19 **Q. WHAT LONG-TERM DEBT COST RATE IS MOST APPROPRIATE FOR**  
20 **AQUA NC IN THIS PROCEEDING?**

21 A. Aqua NC's proposed long-term debt cost rate is 4.01% is derived from the  
22 long-term borrowings of the Company as of May 2022, and reasonable and  
23 appropriate as Aqua NC's cost of long-term debt in this proceeding.

1 **VI. COMMON EQUITY COST RATE MODELS**

2 **Q. IS IT IMPORTANT THAT COST OF COMMON EQUITY MODELS BE**  
3 **MARKET BASED?**

4 A. Yes. As discussed previously, regulated public utilities, like the Company,  
5 must compete for equity in capital markets along with all other companies  
6 with commensurate risk, including non-utilities. The cost of common equity  
7 is thus determined based on equity market expectations for the returns of  
8 those companies. If an individual investor is choosing to invest their capital  
9 among companies with comparable risk, they will choose the company  
10 providing a higher return over a company providing a lower return.

11 **Q. ARE THE COST OF COMMON EQUITY MODELS YOU USE MARKET-**  
12 **BASED MODELS?**

13 A. Yes. The DCF model is market-based in that market prices are used in  
14 developing the dividend yield component of the model. The RPM and  
15 CAPM are also market-based in that the bond/issuer ratings and expected  
16 bond yields/risk-free rate used in the application of the RPM and CAPM  
17 reflect the market's assessment of bond/credit risk. In addition, the use of  
18 the beta to determine the equity risk premium also reflects the market's  
19 assessment of market/systematic risk, as betas are derived from regression  
20 analyses of market prices. Moreover, market prices are used in the  
21 development of the monthly returns and equity risk premiums used in the  
22 Predictive Risk Premium Model ("PRPM"). Selection criteria for the Non-

1 Price Regulated Proxy Group are based on regression analyses of market  
2 prices and reflect the market's assessment of total risk.

3 **Q. WHAT ANALYTICAL APPROACHES DID YOU USE TO DETERMINE**  
4 **THE COMPANY'S ROE?**

5 A. As discussed earlier, I have relied on the DCF model, the RPM, and the  
6 CAPM, which I applied to the Utility Proxy Group described above. I also  
7 applied these same models to a Non-Price Regulated Proxy Group  
8 described later in this section.

9 I rely on these models because reasonable investors use a variety of tools  
10 and do not rely exclusively on a single source of information or single model.  
11 Moreover, the models on which I rely focus on different aspects of return  
12 requirements, and provide different insights to investors' views of risk and  
13 return. The DCF model, for example, estimates the investor-required return  
14 assuming a constant expected dividend yield and growth rate in perpetuity,  
15 while Risk Premium-based methods (i.e., the RPM and CAPM approaches)  
16 provide the ability to reflect investors' views of risk, future market returns,  
17 and the relationship between interest rates and the cost of equity. Just as  
18 the use of market data for the Utility Proxy Group adds the reliability  
19 necessary to inform expert judgment in arriving at a recommended common  
20 equity cost rate, the use of multiple generally accepted common equity cost  
21 rate models also adds reliability and accuracy when arriving at a  
22 recommended common equity cost rate.

1                                    **A.     DISCOUNTED CASH FLOW MODEL**

2     **Q.     PLEASE GIVE A GENERAL DESCRIPTION OF THE DCF MODEL.**

3     A.     The theory underlying the DCF model is that the present value of an  
4            expected future stream of net cash flows during the investment holding  
5            period can be determined by discounting those cash flows at the cost of  
6            capital, or the investors' capitalization rate. DCF theory indicates that an  
7            investor buys a stock for an expected total return rate, which is derived from  
8            the cash flows received from dividends and market price appreciation.  
9            Mathematically, the expected dividend yield on market price plus a growth  
10           rate equals the capitalization rate; i.e., the total common equity return rate  
11           expected by investors, as shown in Equation [1] below:

12                                    
$$K_e = (D_0 (1+g))/P + g$$

13                                    where:

14                                     $K_e$  = the required Return on Equity;  
15                                     $D_0$  = the annualized Dividend Per Share;  
16                                     $P$  = the current stock price; and  
17                                     $g$  = the growth rate.

18     **Q.     WHICH VERSION OF THE DCF MODEL DID YOU USE?**

19     A.     I used the single-stage constant growth DCF model.



1 **Q. PLEASE DESCRIBE THE DIVIDEND YIELD YOU USED IN YOUR**  
2 **APPLICATION OF THE DCF MODEL.**

3 A. The unadjusted dividend yields are based on the proxy companies'  
4 dividends as of May 13, 2022, divided by the average of closing market  
5 prices for the 60 trading days ending May 13, 2022.<sup>13</sup>

6 **Q. PLEASE EXPLAIN YOUR ADJUSTMENT TO THE DIVIDEND YIELD.**

7 A. Because dividends are paid periodically (e.g., quarterly), as opposed to  
8 continuously (daily), an adjustment must be made to the dividend yield.  
9 This is often referred to as the discrete, or the Gordon Periodic, version of  
10 the DCF model.

11 DCF theory calls for the use of the full growth rate, or  $D_1$ , in calculating the  
12 dividend yield component of the model. Since the various companies in the  
13 Utility Proxy Group increase their quarterly dividend at various times during  
14 the year, a reasonable assumption is to reflect one-half the annual dividend  
15 growth rate in the dividend yield component, or  $D_{1/2}$ . Because the dividend  
16 should be representative of the next 12-month period, my adjustment is a  
17 conservative approach that does not overstate the dividend yield.  
18 Therefore, the actual average dividend yields in Column 1 on page 1 of  
19 Schedule DWD-3 have been adjusted upward to reflect one-half the  
20 average projected growth rate shown in Column 5.

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<sup>13</sup> See, Schedule DWD-3, page 1, Column 1.

1 **Q. PLEASE EXPLAIN THE BASIS OF THE GROWTH RATES YOU**  
2 **APPLIED TO THE UTILITY PROXY GROUP IN YOUR DCF MODEL.**

3 A. Investors with more limited resources than institutional investors are likely  
4 to rely on widely available financial information services, such as *Value*  
5 *Line*, Zacks, and Yahoo! Finance. Investors realize that analysts have  
6 significant insight into the dynamics of the industries and individual  
7 companies they analyze, as well as companies' abilities to effectively  
8 manage the effects of changing laws and regulations, and ever-changing  
9 economic and market conditions. For these reasons, I used analysts' five-  
10 year forecasts of EPS growth in my DCF analysis.

11 Over the long run, there can be no growth in DPS without growth in EPS.  
12 Security analysts' earnings expectations have a more significant influence  
13 on market prices than dividend expectations. Thus, using projected  
14 earnings growth rates in a DCF analysis provides a better match between  
15 investors' market price appreciation expectations and the growth rate  
16 component of the DCF.

17 **Q. PLEASE SUMMARIZE THE CONSTANT GROWTH DCF MODEL**  
18 **RESULTS.**

19 A. As shown on page 1 of Schedule DWD-3, the mean result of the application  
20 of the single-stage DCF model is 9.03%, the median result is 9.71%, and  
21 the average of the two is 9.37% for the Utility Proxy Group. In arriving at a  
22 conclusion for the DCF-indicated common equity cost rate for the Utility  
23 Proxy Group, I relied on an average of the mean and the median results

1 (i.e., 9.37%) of the DCF. By doing so, I have considered the DCF results  
2 for each company without giving undue weight to outliers on either the high  
3 or low side.

4 **B. THE RISK PREMIUM MODEL**

5 **Q. PLEASE DESCRIBE THE THEORETICAL BASIS OF THE RPM.**

6 A. The RPM is based on the fundamental financial principle of risk and return,  
7 namely, that investors require greater returns for bearing greater risk. The  
8 RPM recognizes that common equity capital has greater investment risk  
9 than debt capital, as common equity shareholders are behind debt holders  
10 in any claim on a company's assets and earnings. As a result, investors  
11 require higher returns from common stocks than from investment in bonds,  
12 to compensate them for bearing the additional risk.

13 While it is possible to directly observe bond returns and yields, investors'  
14 required common equity return cannot be directly determined or observed.  
15 According to RPM theory, one can estimate a common equity risk premium  
16 over bonds (either historically or prospectively), and use that premium to  
17 derive a cost rate of common equity. The cost of common equity equals the  
18 expected cost rate for long-term debt capital, plus a risk premium over that  
19 cost rate, to compensate common shareholders for the added risk of being  
20 unsecured and last-in-line for any claim on the corporation's assets and  
21 earnings upon liquidation.

1 Q. PLEASE EXPLAIN HOW YOU DERIVED YOUR INDICATED COST OF  
2 COMMON EQUITY BASED ON THE RPM.

3 A. To derive my indicated cost of common equity under the RPM, I used two  
4 risk premium methods. The first method was the PRPM and the second  
5 method was a risk premium model using a total market approach. The  
6 PRPM estimates the risk-return relationship directly, while the total market  
7 approach indirectly derives a risk premium by using known metrics as a  
8 proxy for risk.

9 1. PREDICTIVE RISK PREMIUM MODEL

10 Q. PLEASE EXPLAIN THE PRPM.

11 A. The PRPM, published in the Journal of Regulatory Economics and The  
12 Electricity Journal<sup>14</sup>, was developed from the work of Robert F. Engle who  
13 shared the Nobel Prize in Economics in 2003 “for methods of analyzing  
14 economic time series with time-varying volatility (“ARCH”)”.<sup>15</sup> Engle found  
15 that volatility changes over time and is related from one period to the next,  
16 especially in financial markets. Engle discovered that the volatility in prices  
17 and returns clusters over time and is therefore highly predictable and can  
18 be used to predict future levels of risk and risk premiums. That is, historical

---

<sup>14</sup> Autoregressive conditional heteroscedasticity. See “A New Approach for Estimating the Equity Risk Premium for Public Utilities”, Pauline M. Ahern, Frank J. Hanley and Richard A. Michelfelder, Ph.D. The Journal of Regulatory Economics (December 2011), 40:261-278 and “Comparative Evaluation of the Predictive Risk Premium Model, the Discounted Cash Flow Model and the Capital Asset Pricing Model for Estimating the Cost of Common Equity”, Richard A. Michelfelder, Ph.D, Pauline M. Ahern, Dylan W. D’Ascendis, and Frank J. Hanley, The Electricity Journal (May 2013), 84-89.

<sup>15</sup> [www.nobelprize.org](http://www.nobelprize.org).

1 volatility can be used to predict future volatility, which then can be translated  
2 to a predicted equity risk premium.

3 The PRPM estimates the risk-return relationship directly, as the predicted  
4 equity risk premium is generated by the prediction of volatility or risk. The  
5 PRPM is not based on an estimate of investor behavior, but rather on the  
6 evaluation of the results of that behavior (i.e., the variance of historical  
7 equity risk premiums).

8 The inputs to the model are the historical returns on the common shares of  
9 each company in the Utility Proxy Group minus the historical monthly yield  
10 on long-term U.S. Treasury securities through April 2022. Using a  
11 generalized form of ARCH, known as GARCH, I calculated each Utility  
12 Proxy Group company's projected equity risk premium using Eviews®  
13 statistical software. When the GARCH Model is applied to the historical  
14 return data, it produces a predicted GARCH variance series<sup>16</sup> and a  
15 GARCH coefficient<sup>17</sup>. Multiplying the predicted monthly variance by the  
16 GARCH coefficient, then annualizing it<sup>18</sup>, produces the predicted annual  
17 equity risk premium for each company. I then added the representative risk-  
18 free rate<sup>19</sup> to each company's PRPM-derived equity risk premium to arrive  
19 at indicated costs of common equity.

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16 Illustrated on Columns 1 and 2 of pages 2, 3, 4, and 5 of Schedule DWD-4.

17 Illustrated on Column 4 of pages 2, 3, 4, and 5 of Schedule DWD-4.

18 Annualized Return =  $(1 + \text{Monthly Return})^{12} - 1$ .

19 See, Column 6 of pages 2, 3, 4, and 5 of Schedule DWD-4.

1 **Q. PLEASE DESCRIBE YOUR SELECTION OF RISK-FREE RATES OF**  
2 **RETURN.**

3 A. In order to reflect the time periods contemplated by the WSIP (i.e., BY, FY1,  
4 FY2, and FY3), I selected four risk-free rates consistent with projected risk-  
5 free rates during those years as shown in Table 3, below:

6 **TABLE 3: REPRESENTATIVE RISK-FREE RATES DURING WSIP**

Test Year	Time Frame	Source	Value
Base Year	YE 3/31/2022	Bloomberg	2.49%
Forecasted Year 1	YE 3/31/2023	<i>Blue Chip</i>	3.33%
Forecasted Year 2	YE 3/31/2024	<i>Blue Chip</i>	3.30%
Forecasted Year 3	YE 3/31/2025	<i>Blue Chip</i>	3.60%

7 For the BY, I used the three-month average<sup>20</sup> 30-year Treasury bond yield  
8 as reported by Bloomberg. For the prospective risk-free rates for FYs1  
9 through 3, I used the consensus forecast of 30-year Treasury bonds for  
10 each year (2023, 2024, and 2025) from *Blue Chip Financial Forecasts*  
11 (*"Blue Chip"*).

12 **Q. WHY DID YOU USE THE 30-YEAR TREASURY BOND YIELD AS YOUR**  
13 **RISK-FREE RATE?**

14 A. I used the 30-year Treasury bond yield as my proxy for the risk-free rate  
15 because the yield on long-term U.S. Treasury bonds is almost risk-free and  
16 its term is consistent with the long-term cost of capital to public utilities  
17 measured by the yields on Moody's Investor Service's ("Moody's") A2-rated  
18 public utility bonds; the long-term investment horizon inherent in utilities'

---

<sup>20</sup> February – April 2022.

1 common stocks; and the long-term life of the jurisdictional rate base to  
2 which the allowed fair rate of return (i.e., cost of capital) will be applied. In  
3 contrast, short-term U.S. Treasury yields are more volatile and largely a  
4 function of Federal Reserve monetary policy.

5 More specifically, the term of the risk-free rate used for cost of capital  
6 purposes should match the life (or duration) of the underlying investment  
7 (i.e., perpetuity). As noted by Morningstar:

8 The traditional thinking regarding the time horizon of  
9 the chosen Treasury security is that it should match the  
10 time horizon of whatever is being valued. When  
11 valuing a business that is being treated as a going  
12 concern, the appropriate Treasury yield should be that  
13 of a long-term Treasury bond. Note that the horizon is  
14 a function of the investment, not the investor. If an  
15 investor plans to hold stock in a company for only five  
16 years, the yield on a five-year Treasury note would not  
17 be appropriate since the company will continue to exist  
18 beyond those five years.<sup>21</sup>

19 Morin also confirms this when he states:

20 [b]ecause common stock is a long-term investment and  
21 because the cash flows to investors in the form of  
22 dividends last indefinitely, the yield on very long-term  
23 government bonds, namely, the yield on 30-year  
24 Treasury bonds, is the best measure of the risk-free  
25 rate for use in the CAPM (footnote omitted)... The  
26 expected common stock return is based on long-term  
27 cash flows, regardless of an individual's holding time  
28 period.<sup>22</sup>

29 Pratt and Grabowski recommend a similar approach to selecting the risk-  
30 free rate: "[i]n theory, when determining the risk-free rate and the matching

---

<sup>21</sup> Morningstar, Inc., 2013 Ibbotson Stocks, Bonds, Bills and Inflation Valuation Yearbook, at 44.

<sup>22</sup> Morin, at 169.

1 ERP you should be matching the risk-free security and the ERP with the  
2 period in which the investment cash flows are expected.”<sup>23</sup>

3 **2. TOTAL MARKET APPROACH RISK PREMIUM MODEL**

4 **Q. PLEASE EXPLAIN THE TOTAL MARKET APPROACH RPM.**

5 A. The total market approach RPM adds a representative public utility bond  
6 yield to an average of: (1) an equity risk premium that is derived from a beta-  
7 adjusted total market equity risk premium, and (2) an equity risk premium  
8 based on the S&P Utilities Index.

9 **Q. PLEASE EXPLAIN HOW YOU DETERMINED THE REPRESENTATIVE**  
10 **BOND YIELDS USED IN YOUR ANALYSIS.**

11 A. The first step in the total market approach RPM analysis is to determine the  
12 representative bond yield. Consistent with the selection of my risk-free rate,  
13 I relied on four different bond yields which reflect the four years the WSIP  
14 will be in effect. For the BY, I started with the three-month average yield on  
15 A2-rated public utility bonds.<sup>24</sup> Since the Utility Proxy Group’s average  
16 Moody’s long-term issuer rating is A3, another adjustment to the A2-rated  
17 public utility bond yield is needed to reflect the difference in bond ratings.  
18 An upward adjustment of 0.10%, which represents one-third of a recent  
19 spread between A2- and Baa2-rated public utility bond yields, is necessary

---

<sup>23</sup> Shannon Pratt and Roger Grabowski, Cost of Capital: Applications and Examples, 3rd Ed. (Hoboken, NJ: John Wiley & Sons, Inc., 2008), at 92. “ERP” is the Equity Risk Premium.

<sup>24</sup> From February – April 2022.



1 to make the A2-rated prospective bond yield applicable to an A3-rated  
2 public utility bond.<sup>25</sup>

3 For the prospective utility bond yields for FY1, FY2, and FY3, I used the  
4 consensus forecast of Aaa-rated corporate bonds for each year (i.e., 2023,  
5 2024, and 2025) from *Blue Chip*. I then adjusted that yield by the recent  
6 spread between Aaa-rated corporate bond yields and A2-rated public utility  
7 yields, or 0.51%, as shown on Schedule DWD-4, page 7, and by one-third  
8 of the recent spread between A2-rated and Baa2-rated public utility bonds,  
9 to reflect the average long-term bond rating of the Utility Proxy Group, as  
10 discussed previously. Representative bond yields for the Utility Proxy  
11 Group for the years encompassed by the WSIP are presented on page 6 of  
12 Schedule DWD-4 and Table 4, below:

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<sup>25</sup> As shown on line 5 and explained in note 4, page 6 of Schedule DWD-4. Moody's does not provide public utility bond yields for A3-rated bonds. As such, it was necessary to estimate the difference between A2-rated and A3-rated public utility bonds. Because there are two steps between Baa2 and A3 (Baa2 to Baa1 and Baa1 to A3) I assumed an adjustment of one-third of the difference between the A2-rated and Baa2-rated public utility bond yield was appropriate.

**TABLE 4: REPRESENTATIVE UTILITY PROXY GROUP BOND YIELDS  
DURING WSIP<sup>26</sup>**

Test Year	Time Frame	Source	Value
Base Year	YE 3/31/2022	Bloomberg	4.09%
Forecasted Year 1	YE 3/31/2023	<i>Blue Chip</i>	5.06%
Forecasted Year 2	YE 3/31/2024	<i>Blue Chip</i>	4.81%
Forecasted Year 3	YE 3/31/2025	<i>Blue Chip</i>	5.11%

To develop the total market approach RPM estimate of the appropriate return on equity, these prospective bond yields are then added to the average of two different equity risk premiums, which I discuss in turn.

**A. BETA-DERIVED EQUITY RISK PREMIUM**

**Q. PLEASE EXPLAIN HOW THE BETA-DERIVED EQUITY RISK PREMIUM IS DETERMINED.**

A. The components of the beta-derived risk premium model are: (1) an expected market equity risk premium over corporate bonds, and (2) the beta. The derivation of the beta-derived equity risk premium that I applied to the Utility Proxy Group is shown on lines 1 through 9 of page 11 of Schedule DWD-4. The total beta-derived equity risk premium I applied was based on an average of three historical market data-based equity risk premiums, two *Value Line*-based equity risk premiums, and a Bloomberg-based equity risk premium. Each of these is described below.

<sup>26</sup>

From page 6 of Schedule DWD-4.

1 **Q. HOW DID YOU DERIVE A MARKET EQUITY RISK PREMIUM BASED**  
2 **ON LONG-TERM HISTORICAL DATA?**

3 A. To derive a historical market equity risk premium, I used the most recent  
4 holding period returns for the large company common stocks from the  
5 Stocks, Bonds, Bills, and Inflation ("SBBI") 2022 Yearbook ("SBBI –  
6 2022")<sup>27</sup> less the average historical yield on Moody's Aaa/Aa-rated  
7 corporate bonds for the period 1928 to 2021. Using holding period returns  
8 over a very long period of time is appropriate because it is consistent with  
9 the long-term investment horizon presumed by investing in a going concern,  
10 i.e., a company expected to operate in perpetuity.

11 SBBI's long-term arithmetic mean monthly total return rate on large  
12 company common stocks was 12.11% and the long-term arithmetic mean  
13 monthly yield on Moody's Aaa/Aa-rated corporate bonds was 5.98% from  
14 1928 to 2021.<sup>28</sup> As shown on line 1 of page 11 of Schedule DWD-4,  
15 subtracting the mean monthly bond yield from the total return on large  
16 company stocks results in a long-term historical equity risk premium of  
17 6.13%.

18 I used the arithmetic mean monthly total return rates for the large company  
19 stocks, and yields (income returns) for the Moody's Aaa/Aa-rated corporate  
20 bonds, because they are appropriate for the purpose of estimating the cost

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<sup>27</sup> See, SBBI-2022 Appendix A Tables: Morningstar Stocks, Bonds, Bills, & Inflation 1926-2021.

<sup>28</sup> As explained in note 1 on page 11 of Schedule DWD-4.

1 of capital as noted in SBBI – 2022.<sup>29</sup> Using the arithmetic mean return rates  
2 and yields is appropriate because historical total returns and equity risk  
3 premiums provide insight into the variance and standard deviation of returns  
4 needed by investors in estimating future risk when making a current  
5 investment. If investors relied on the geometric mean of historical equity  
6 risk premiums, they would have no insight into the potential variance of  
7 future returns because the geometric mean relates the change over many  
8 periods to a constant rate of change, thereby obviating the year-to-year  
9 fluctuations, or variance, which is critical to risk analysis.

10 **Q. PLEASE EXPLAIN THE DERIVATION OF THE REGRESSION-BASED**  
11 **MARKET EQUITY RISK PREMIUM.**

12 A. To derive the regression analysis-derived market equity risk premium  
13 shown on line 2 of page 11 of Schedule DWD-4, I used the same monthly  
14 annualized total returns on large company common stocks relative to the  
15 monthly annualized yields on Moody's Aaa/Aa-rated corporate bonds as  
16 mentioned above. The relationship between interest rates and the market  
17 equity risk premium was modeled using the observed monthly market equity  
18 risk premium as the dependent variable, and the monthly yield on Moody's  
19 Aaa/Aa-rated corporate bonds as the independent variable. I used a linear  
20 Ordinary Least Squares ("OLS") regression, in which the market equity risk  
21 premium is expressed as a function of the Moody's Aaa/Aa-rated corporate  
22 bond yields:

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<sup>29</sup> SBBI – 2022, at 201.

$$RP = \alpha + \beta (R_{Aaa/Aa})$$

Using the representative Aaa/Aa-rated corporate bond for each year produced the applicable market equity risk premium as shown on line 2 of page 11 of Schedule DWD-4.

**Q. HOW DID YOU CALCULATE THE REPRESENTATIVE AAA/AA-RATED CORPORATE BOND YIELDS FOR YOUR ANALYSES?**

A. Similar to my determination for my risk-free rate and bond yields applicable to the Utility Proxy Group, I used four separate bond yields, which reflect the four years the WSIP will be in effect. For the BY, I started with the three-month average yield on Aaa- and Aa2-rated corporate bonds from Bloomberg.<sup>30</sup> For FY1, FY2, and FY3, I used the forecasted Aaa-rated corporate bond yields from *Blue Chip* for 2023, 2024, and 2025, respectively. The representative Aaa/Aa-rated corporate bond yields are presented in Table 5, below:

**TABLE 5: REPRESENTATIVE AAA- AND AA-RATED AVERAGE BOND YIELDS DURING WSIP**

Test Year	Time Frame	Source	Value
Base Year	YE 3/31/2022	Bloomberg	3.56%
Forecasted Year 1	YE 3/31/2023	<i>Blue Chip</i>	4.45%
Forecasted Year 2	YE 3/31/2024	<i>Blue Chip</i>	4.20%
Forecasted Year 3	YE 3/31/2025	<i>Blue Chip</i>	4.50%

<sup>30</sup> From February – April 2022.

1 Q. PLEASE EXPLAIN THE DERIVATION OF A PRPM EQUITY RISK  
2 PREMIUM.

3 A. I used the same PRPM approach described previously to develop another  
4 equity risk premium estimate. The inputs to the model are the historical  
5 monthly returns on large company common stocks minus the monthly yields  
6 on Aaa/Aa-rated corporate bonds during the period from January 1928  
7 through April 2022.<sup>31</sup> Using the previously discussed generalized form of  
8 ARCH, known as GARCH, the projected equity risk premium is determined  
9 using Eviews<sup>®</sup> statistical software. The resulting PRPM-predicted market  
10 equity risk premium is 8.35%.<sup>32</sup>

11 Q. PLEASE EXPLAIN THE DERIVATION OF A PROJECTED EQUITY RISK  
12 PREMIUM BASED ON *VALUE LINE* SUMMARY & INDEX.

13 A. The derivation of the *Value Line* Summary & Index market equity risk  
14 premium can be found in note 4 on page 12 of Schedule DWD-4.  
15 Consistent with the concept of total returns being broken down into income  
16 returns and capital appreciation returns, the prospective market equity risk  
17 premiums are derived from an average of the three- to five-year median  
18 market price appreciation potential by *Value Line* for the 13 weeks ending  
19 May 13, 2022, plus an average of the median estimated dividend yield for

---

<sup>31</sup> Data from January 1926 – December 2021 is from SBBI – 2022. Data from January 2022 – April 2022 is from Bloomberg Professional Services.

<sup>32</sup> Shown on Line No. 3 on page 11 of Schedule DWD-4.

1 the common stocks of the 1,700 firms covered in *Value Line's* Standard  
2 Edition.<sup>33</sup>

3 The average median expected price appreciation is 53%, which translates  
4 to an 11.22% annual appreciation, and when added to the average of *Value*  
5 *Line's* median expected dividend yields of 1.94%, equates to a forecasted  
6 annual total return rate on the market of 13.16%. Subtracting the relevant  
7 bond yield (Table 5) for each year results in an indicated market equity risk  
8 premium, as shown on page 11, line 4 of Schedule DWD-4.

9 **Q. PLEASE EXPLAIN THE DERIVATION OF AN EQUITY RISK PREMIUM**  
10 **BASED ON THE VALUE LINE DATA FOR S&P 500 COMPANIES.**

11 A. Using data from *Value Line*, I calculated an expected total return on the S&P  
12 500 using expected dividend yields as a proxy for income returns and long-  
13 term growth estimates as a proxy for capital appreciation. The expected  
14 total return for the S&P 500 is 16.42%. Subtracting the representative yield  
15 on Aaa-rated corporate bonds as described above results in equity risk  
16 premiums as shown on line 5 of page 11 of Schedule DWD-4.

17 **Q. PLEASE EXPLAIN THE DERIVATION OF AN EQUITY RISK PREMIUM**  
18 **BASED ON BLOOMBERG DATA.**

19 A. Using data from Bloomberg, I calculated an expected total return on the  
20 S&P 500 using expected dividend yields as a proxy for income returns, and  
21 long-term growth estimates as a proxy for capital appreciation, identical to  
22 the method described above. The expected total return for the S&P 500 is

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<sup>33</sup> As explained in detail in page 5, note 1 of Schedule DWD-5.

1 13.93%. Subtracting the representative yields on Aaa-rated corporate  
2 bonds as described above from the prospective market return results in a  
3 market equity risk premium as shown on line 6 of page 11 of Schedule  
4 DWD-4.

5 **Q. WHAT IS YOUR CONCLUSION OF A BETA-DERIVED EQUITY RISK**  
6 **PREMIUM FOR USE IN YOUR RPM ANALYSIS?**

7 A. I gave equal weight to the six equity risk premiums for each year in arriving  
8 at my indicated market equity risk premiums as shown on line 7 of page 11  
9 of Schedule DWD-4.

10 After calculating the average market equity risk premiums, I adjusted them  
11 by beta to account for the risk of the Utility Proxy Group. As discussed  
12 below, beta is a meaningful measure of prospective relative risk to the  
13 market as a whole and a logical way to allocate a company's, or proxy  
14 group's, share of the market's total equity risk premium relative to corporate  
15 bond yields. As shown on page 1 of Schedule DWD-5, the average of the  
16 mean and median beta for the Utility Proxy Group is 0.82. Multiplying the  
17 beta of the Utility Proxy Group of 0.82 by the market equity risk premiums  
18 shown on line 7 of page 11 of Schedule DWD-4 result in beta-adjusted  
19 equity risk premiums for the Utility Proxy Group on line 9 of page 11 of  
20 Schedule DWD-4 and in Table 6, below:



**TABLE 6: UTILITY PROXY GROUP EQUITY RISK PREMIUMS (BETA-ADJUSTED APPROACH)<sup>34</sup>**

Test Year	Value
Base Year	7.72%
Forecasted Year 1	7.20%
Forecasted Year 2	7.35%
Forecasted Year 3	7.17%

**B. S&P UTILITY INDEX-DERIVED EQUITY RISK PREMIUM**

**Q. HOW DID YOU DERIVE THE EQUITY RISK PREMIUM BASED ON THE S&P UTILITY INDEX AND MOODY'S A-RATED PUBLIC UTILITY BONDS?**

A. I estimated three equity risk premiums based on S&P Utility Index holding returns, and two equity risk premiums based on the expected returns of the S&P Utilities Index, using *Value Line* and Bloomberg data, respectively. Turning first to the S&P Utility Index holding period returns, I derived a long-term monthly arithmetic mean equity risk premium between the S&P Utility Index total returns of 10.74% and monthly Moody's A-rated public utility bond yields of 6.46% from 1928 to 2021, to arrive at an equity risk premium of 4.28%.<sup>35</sup> I then used the same historical data and the representative yields on A-rated utility bonds<sup>36</sup> to derive equity risk premiums shown on line 2 of page 15 of Schedule DWD-4 based on a regression of the monthly equity risk premiums. The final S&P Utility Index holding period equity risk

<sup>34</sup> From page 11 of Schedule DWD-4.

<sup>35</sup> As shown on Line No. 1 on page 15 of Schedule DWD-4.

<sup>36</sup> See lines 3 and 4 of page 6 of Schedule DWD-4 for applicable A2-rated public utility bond yields.

1 premium involved applying the PRPM using the historical monthly equity  
2 risk premiums from January 1928 to April 2022 to arrive at a PRPM-derived  
3 equity risk premium of 5.89% for the S&P Utility Index.

4 I then derived expected total returns on the S&P Utilities Index of 10.66%  
5 and 9.92% using data from *Value Line* and Bloomberg, respectively, and  
6 subtracted the representative A2-rated public utility bond yields<sup>37</sup> to  
7 determine two additional equity risk premiums as shown on lines 4 and 5 of  
8 page 15 of Schedule DWD-4.

9 **Q. WHAT IS YOUR CONCLUSION FOR THE UTILITY-SPECIFIC EQUITY**  
10 **RISK PREMIUM?**

11 A. As with the market equity risk premiums, I averaged each risk premium to  
12 calculate the indicated utility-specific equity risk premiums as shown on line  
13 6 of page 15 of Schedule DWD-4 and Table 7, below:

14 **TABLE 7: UTILITY PROXY GROUP EQUITY RISK PREMIUMS (S&P**  
15 **UTILITY APPROACH)**<sup>38</sup>

Test Year	Value
Base Year	5.83%
Forecasted Year 1	5.28%
Forecasted Year 2	5.42%
Forecasted Year 3	5.25%

<sup>37</sup> See lines 3 and 4 of page 6 of Schedule DWD-4 for applicable A2-rated public utility bond yields.

<sup>38</sup> From page 11 of Schedule DWD-4.

1 **Q. WHAT WAS YOUR CONCLUSION OF AN EQUITY RISK PREMIUM FOR**  
2 **USE IN YOUR TOTAL MARKET APPROACH RPM ANALYSIS?**

3 A. The equity risk premiums I applied to the Utility Proxy Group were 6.78%  
4 (BY), 6.24% (FY1), 6.39% (FY2), and 6.21% (FY3) which represent the  
5 average of the beta-derived and the S&P utility equity risk premiums.<sup>39</sup>

6 **Q. WHAT IS THE INDICATED RPM COMMON EQUITY COST RATE BASED**  
7 **ON THE TOTAL MARKET APPROACH?**

8 A. As shown on line 8 of Schedule DWD-4, page 6, I calculated common equity  
9 cost rates for the Utility Proxy Group of 10.87%, 11.30%, 11.20%, and  
10 11.32% applicable to the BY, FY1, FY2, and FY3, respectively, based on  
11 the total market approach of the RPM.

12 **Q. WHAT ARE THE RESULTS OF YOUR APPLICATION OF THE PRPM**  
13 **AND THE TOTAL MARKET APPROACH RPM?**

14 A. As shown on page 1 of Schedule DWD-4, the indicated RPM-derived  
15 common equity cost rates are 11.12% (BY), 11.76% (FY1), 11.69% (FY2),  
16 and 11.90% (FY3); each of which gives equal weight to the PRPM and the  
17 adjusted market approach results.

18 **C. THE CAPITAL ASSET PRICING MODEL**

19 **Q. PLEASE EXPLAIN THE THEORETICAL BASIS OF THE CAPM.**

20 A. CAPM theory defines risk as the co-variability of a security's returns with  
21 the market's returns as measured by beta ( $\beta$ ). A beta less than 1.0 indicates

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<sup>39</sup> As shown on page 10 of Schedule DWD-4.

1 lower variability than the market as a whole, while a beta greater than 1.0  
2 indicates greater variability than the market.

3 The CAPM assumes that all non-market or unsystematic risk can be  
4 eliminated through diversification. The risk that cannot be eliminated  
5 through diversification is called market, or systematic, risk. In addition, the  
6 CAPM presumes that investors require compensation only for systematic  
7 risk, which is the result of macroeconomic and other events that affect the  
8 returns on all assets. The model is applied by adding a risk-free rate of  
9 return to a market risk premium, which is adjusted proportionately to reflect  
10 the systematic risk of the individual security relative to the total market, as  
11 measured by beta. The traditional CAPM model is expressed as:

$$R_s = R_f + \beta(R_m - R_f)$$

12 Where:  $R_s$  = Return rate on the common stock;

13  $R_f$  = Risk-free rate of return;

14  $R_m$  = Return rate on the market as a whole; and

15  $\beta$  = Adjusted beta coefficient (volatility of the  
16 security relative to the market as a whole).  
17

18 Numerous tests of the CAPM have measured the extent to which security  
19 returns and betas are related as predicted by the CAPM, confirming its  
20 validity. The empirical CAPM ("ECAPM") reflects the reality that while the  
21 results of these tests support the notion that beta is related to security  
22 returns, the empirical Security Market Line ("SML") described by the CAPM

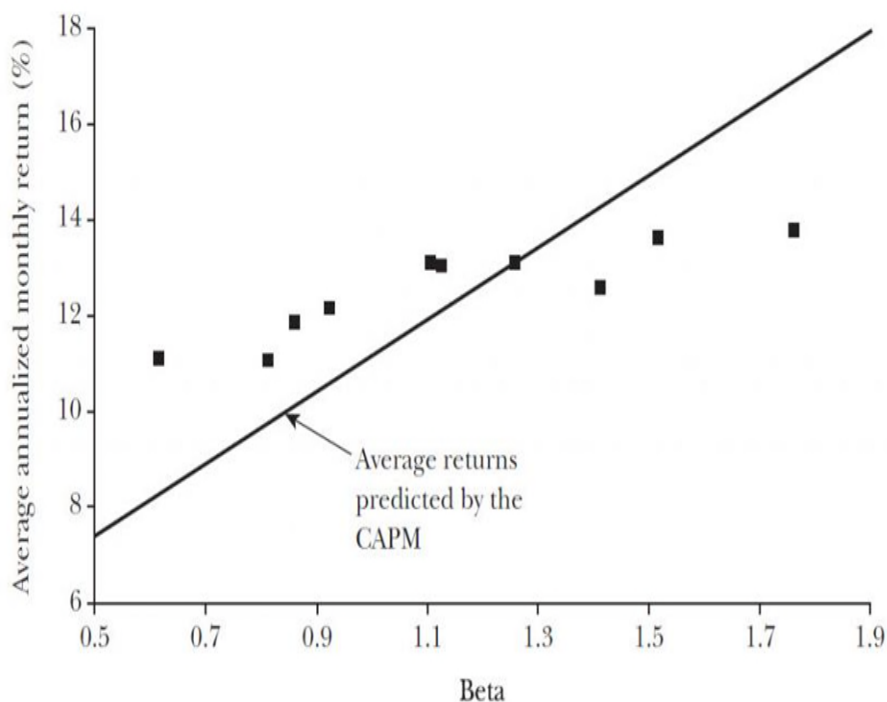
1 formula is not as steeply sloped as the predicted SML.<sup>40</sup> The ECAPM  
2 reflects this empirical reality.

3 In their work on the CAPM, Fama and French clearly state regarding Figure  
4 2, below, that "[t]he returns on the low beta portfolios are too high, and the  
5 returns on the high beta portfolios are too low."<sup>41</sup>

Figure 2

<http://pubs.aeaweb.org/doi/pdfplus/10.1257/0895330042162430>

Average Annualized Monthly Return versus Beta for Value Weight Portfolios  
Formed on Prior Beta, 1928–2003



6 In addition, Morin observes that while the results of these tests support the  
7 notion that beta is related to security returns, the empirical SML described  
8

<sup>40</sup> Morin at 205-209.

<sup>41</sup> Eugene F. Fama and Kenneth R. French, "The Capital Asset Pricing Model: Theory and Evidence", *Journal of Economic Perspectives*, Vol. 18, No. 3, Summer 2004 at 33 ("Fama & French"). <http://pubs.aeaweb.org/doi/pdfplus/10.1257/0895330042162430>.

1 by the CAPM formula is not as steeply sloped as the predicted SML. Morin  
2 states:

3 With few exceptions, the empirical studies agree that ... low-  
4 beta securities earn returns somewhat higher than the CAPM  
5 would predict, and high-beta securities earn less than  
6 predicted.<sup>42</sup>

7 \* \* \*

8 Therefore, the empirical evidence suggests that the expected  
9 return on a security is related to its risk by the following  
10 approximation:

$$11 \quad K = R_F + x (R_M - R_F) + (1-x) \beta (R_M - R_F)$$

12 where x is a fraction to be determined empirically. The value  
13 of x that best explains the observed relationship [is] Return =  
14 0.0829 + 0.0520  $\beta$  is between 0.25 and 0.30. If x = 0.25, the  
15 equation becomes:

$$16 \quad K = R_F + 0.25(R_M - R_F) + 0.75 \beta (R_M - R_F)^{43}$$

17 Fama and French provide similar support for the ECAPM when they state:

18 The early tests firmly reject the Sharpe-Lintner version of the  
19 CAPM. There is a positive relation between beta and average  
20 return, but it is too 'flat.'... The regressions consistently find  
21 that the intercept is greater than the average risk-free rate...  
22 and the coefficient on beta is less than the average excess  
23 market return... This is true in the early tests... as well as in  
24 more recent cross-section regressions tests, like Fama and  
25 French (1992).<sup>44</sup>

26 Finally, Fama and French further note:

27 Confirming earlier evidence, the relation between beta and  
28 average return for the ten portfolios is much flatter than the  
29 Sharpe-Linter CAPM predicts. The returns on low beta  
30 portfolios are too high, and the returns on the high beta  
31 portfolios are too low. For example, the predicted return on  
32 the portfolio with the lowest beta is 8.3 percent per year; the

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42 Morin, at 207.

43 Morin, at 221.

44 Fama & French, at 32.

1 actual return as 11.1 percent. The predicted return on the  
2 portfolio with the highest beta is 16.8 percent per year; the  
3 actual is 13.7 percent.<sup>45</sup>  
4

5 Clearly, the justification from Morin, Fama, and French, along with their  
6 reviews of other academic research on the CAPM, validate the use of the  
7 ECAPM. In view of theory and practical research, I have applied both the  
8 traditional CAPM and the ECAPM to the companies in the Utility Proxy  
9 Group and averaged the results.

10 **Q. WHAT BETAS DID YOU USE IN YOUR CAPM ANALYSIS?**

11 A. For the beta in my CAPM analysis, I considered two sources: *Value Line*  
12 and Bloomberg. While both of those services adjust their calculated (or  
13 “raw”) betas to reflect the tendency of beta to regress to the market mean  
14 of 1.00, *Value Line* calculates beta over a five-year period, while Bloomberg  
15 calculates it over a two-year period.

16 **Q. PLEASE DESCRIBE YOUR SELECTION OF A RISK-FREE RATE OF**  
17 **RETURN.**

18 A. As discussed previously, I present my CAPM analyses using four risk-free  
19 rates reflecting the four years the WSIP will be in effect.

20 **Q. PLEASE EXPLAIN THE ESTIMATION OF THE EXPECTED RISK**  
21 **PREMIUM FOR THE MARKET USED IN YOUR CAPM ANALYSES.**

22 A. The basis of the market risk premium is explained in detail in note 1 on page  
23 5 of Schedule DWD-5. As discussed previously, the market risk premium  
24 is derived from an average of three historical data-based market risk

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<sup>45</sup> Fama & French., at 33.

1 premiums, two *Value Line* data-based market risk premiums, and one  
2 Bloomberg data-based market risk premium.

3 The long-term income return on U.S. Government Securities of 5.02% was  
4 deducted from the SBBI - 2022 monthly historical total market return of  
5 12.37%, which results in an historical market equity risk premium of  
6 7.35%.<sup>46</sup> I applied a linear OLS regression to the monthly annualized  
7 historical returns on the S&P 500 relative to historical yields on long-term  
8 U.S. Government Securities from SBBI - 2022. That regression analysis  
9 yielded market equity risk premiums of 10.27% (BY), 9.34% (FY1), 9.38%  
10 (FY2), and 9.05% (FY3). The PRPM market equity risk premium is 9.35%  
11 and is derived using the PRPM relative to the yields on long-term U.S.  
12 Treasury securities from January 1926 through April 2022.

13 The *Value Line* Summary & Index-derived forecasted total market equity  
14 risk premiums are derived by subtracting the representative risk-free rates,  
15 discussed above, from the *Value Line* Summary & Index projected total  
16 annual market return of 13.16%, resulting in forecasted total market equity  
17 risk premiums of 10.67% (BY), 9.83% (FY1), 9.86% (FY2), and 9.56%  
18 (FY3). The S&P 500 projected market equity risk premium using *Value Line*  
19 data is derived by subtracting the representative risk-free rates from the  
20 projected total return of the S&P 500 of 16.42%. The resulting market equity  
21 risk premiums are 13.93% (BY), 13.09% (FY1), 13.12% (FY2), and 12.82%  
22 (FY3).

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<sup>46</sup> SBBI – 2022, at 256-258, 274-276.



1 The S&P 500 projected market equity risk premium using Bloomberg data  
2 is derived by subtracting the current and projected risk-free rates from the  
3 projected total return of the S&P 500 of 13.93%. The resulting market equity  
4 risk premiums are 11.44% (BY), 10.60% (FY1), 10.63% (FY2), and 10.33%  
5 (FY3).

6 These six market equity risk premiums, when averaged, result in an  
7 average total market equity risk premiums of 10.50% (BY), 9.93% (FY1),  
8 9.95% (FY2), and 9.74% (FY3).

9 **Q. WHAT ARE THE RESULTS OF YOUR APPLICATION OF THE**  
10 **TRADITIONAL AND EMPIRICAL CAPM TO THE UTILITY PROXY**  
11 **GROUP?**

12 A. As shown on pages 1 through 4 of Schedule DWD-5, the average of the  
13 mean and median results of my CAPM/ECAPM analyses are as follows:

14 **TABLE 8: INDICATED CAPM/ECAPM COST RATES<sup>47</sup>**

Test Year	CAPM/ECAPM ROE
Base Year	11.32%
Forecasted Year 1	11.68%
Forecasted Year 2	11.66%
Forecasted Year 3	11.79%

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<sup>47</sup> From pages 1 through 5 of Schedule DWD-5.

1           **D.     COMMON EQUITY COST RATES FOR A PROXY GROUP OF**  
2           **DOMESTIC, NON-PRICE REGULATED COMPANIES BASED ON**  
3           **THE DCF, RPM, AND CAPM**

4     **Q.     WHY DID YOU ALSO CONSIDER A PROXY GROUP OF DOMESTIC,**  
5     **NON-PRICE REGULATED COMPANIES?**

6     A.     Although I am not an attorney, my interpretation of the *Hope* and *Bluefield*  
7           cases is that they did not specify that comparable risk companies had to be  
8           utilities. Since the purpose of rate regulation is to be a substitute for the  
9           competition of the marketplace, non-price regulated firms operating in the  
10          competitive marketplace make an excellent proxy if they are comparable in  
11          total risk to the Utility Proxy Group being used to estimate the cost of  
12          common equity. The selection of such domestic, non-price regulated  
13          competitive firms theoretically and empirically results in a proxy group which  
14          is comparable in total risk to the Utility Proxy Group, since all of these  
15          companies compete for capital in the exact same markets.

16    **Q.     HOW DID YOU SELECT NON-PRICE REGULATED COMPANIES THAT**  
17    **ARE COMPARABLE IN TOTAL RISK TO THE UTILITY PROXY GROUP?**

18    A.     In order to select a proxy group of domestic, non-price regulated companies  
19           similar in total risk to the Utility Proxy Group, I relied on the betas and related  
20           statistics derived from *Value Line* regression analyses of weekly market  
21           prices over the most recent 260 weeks (i.e., five years). Using these  
22           selection criteria resulted in a proxy group of 24 domestic, non-price  
23           regulated firms comparable in total risk to the Utility Proxy Group. Total risk  
24           is the sum of non-diversifiable market risk and diversifiable company-

1 specific risks. The criteria used in the selection of the domestic, non-price  
2 regulated firms was:

- 3 (i) They must be covered by *Value Line* (Standard Edition);  
4 (ii) They must be domestic, non-price regulated companies, i.e., not  
5 utilities;  
6 (iii) Their betas must lie within plus or minus two standard deviations of  
7 the average unadjusted beta of the Utility Proxy Group; and  
8 (iv) The residual standard errors of the *Value Line* regressions which  
9 gave rise to the unadjusted betas must lie within plus or minus two  
10 standard deviations of the average residual standard error of the  
11 Utility Proxy Group.

12 Betas measure market, or systematic risk, which is not diversifiable. The  
13 residual standard errors of the regressions were used to measure each  
14 firm's company-specific, diversifiable risk. Companies that have similar  
15 betas and similar residual standard errors resulting from the same  
16 regression analyses have similar total investment risk.

17 **Q. HAVE YOU PREPARED A SCHEDULE WHICH SHOWS THE DATA**  
18 **FROM WHICH YOU SELECTED THE 24 DOMESTIC, NON-PRICE**  
19 **REGULATED COMPANIES THAT ARE COMPARABLE IN TOTAL RISK**  
20 **TO THE UTILITY PROXY GROUP?**

21 A. Yes. The basis of my selection, and both proxy groups' regression  
22 statistics, are shown in Schedule DWD-6.

1 Q. DID YOU CALCULATE COMMON EQUITY COST RATES USING THE  
2 DCF, RPM, AND CAPM FOR THE NON-PRICE REGULATED PROXY  
3 GROUP?

4 A. Yes. Because the DCF, RPM, and CAPM have been applied in an identical  
5 manner as described above, I will not repeat the details of the rationale and  
6 application of each model. One exception is in the application of the RPM,  
7 where I did not use public utility-specific equity risk premiums, nor did I apply  
8 the PRPM to the individual non-price regulated companies.

9 Page 2 of Schedule DWD-7 contains the derivation of the DCF cost rates.

10 As shown, the indicated common equity cost rate using the DCF for the  
11 Non-Price Regulated Proxy Group comparable in total risk to the Utility  
12 Proxy Group, is 10.68%.

13 Pages 3 through 5 of DWD-7 contain the data and calculations that support  
14 the indicated RPM cost rates shown in Table 9, below:

15 **TABLE 9: INDICATED ROES USING THE RPM FOR THE NON-PRICE**  
16 **REGULATED PROXY GROUP SIMILAR IN TOTAL RISK TO THE**  
17 **UTILITY PROXY GROUP** <sup>48</sup>

Test Year	Value
Base Year	11.79%
Forecasted Year 1	12.33%
Forecasted Year 2	12.13%
Forecasted Year 3	12.25%

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<sup>48</sup> From page 3 of Schedule DWD-7.

1 Pages 6 through 9 of Schedule DWD-7 contain the inputs and calculations  
2 that support my indicated CAPM/ECAPM cost rates as shown on Table 10,  
3 below:

4 **TABLE 10: INDICATED ROES USING THE CAPM FOR THE NON-**  
5 **PRICE REGULATED PROXY GROUP SIMILAR IN TOTAL RISK TO**  
6 **THE UTILITY PROXY GROUP** <sup>49</sup>

Test Year	Value
Base Year	11.18%
Forecasted Year 1	11.55%
Forecasted Year 2	11.53%
Forecasted Year 3	11.66%

7 **Q. WHAT ARE THE RESULTS OF THE COST OF COMMON EQUITY**  
8 **MODELS BASED ON THE NON-PRICE REGULATED PROXY GROUP**  
9 **COMPARABLE IN TOTAL RISK TO THE UTILITY PROXY GROUP?**

10 **A.** The results of the DCF, RPM, and CAPM applied to the Non-Price  
11 Regulated Proxy Group comparable in total risk to the Utility Proxy Group  
12 are shown on page 1 of Schedule DWD-7. The average of the mean and  
13 median of these models are 11.20% (BY), 11.54% (FY1), 11.49% (FY2),  
14 and 11.60% (FY3).

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<sup>49</sup> From page 11 of Schedule DWD-4.

VII. **CONCLUSION OF COMMON EQUITY COST RATE BEFORE  
ADJUSTMENT**

Q. **BASED ON YOUR ANALYSES WHAT IS THE RANGE OF INDICATED  
COMMON EQUITY COST RATES FOR THE UTILITY PROXY GROUP  
BEFORE ADJUSTMENTS?**

A. By applying multiple cost of common equity models to the Utility Proxy Group and the Non-Price Regulated Proxy Group, the indicated range of common equity cost rates attributable to the Utility Proxy Group before any relative risk adjustments are as follows:

**TABLE 11: INDICATED RANGES OF COMMON EQUITY COST RATES  
BEFORE ADJUSTMENT**

Test Year	Value
Base Year	9.85% - 10.85%
Forecasted Year 1	10.07% - 11.07%
Forecasted Year 2	10.03% - 11.03%
Forecasted Year 3	10.14% - 11.14%

The indicated ranges of ROEs shown on Table 11 are 50 basis points above and below the midpoint of my four model results for each time period as shown on page 2 of Schedule DWD-1.

I used multiple cost of common equity models as primary tools in arriving at my recommended common equity cost rate because each of these models is theoretically sound and available to investors, and because no single model is so inherently precise that it can be relied on to the exclusion of other theoretically sound models. As discussed previously, using multiple models adds reliability to the estimated common equity cost rate, with the

1 prudence of using multiple cost of common equity models supported in both  
2 the financial literature and regulatory precedent.

3 **VIII. ADJUSTMENTS TO THE COMMON EQUITY COST RATE**

4 **A. SIZE ADJUSTMENT**

5 **Q. DOES A COMPANY'S SIZE COMPARED WITH THE UTILITY PROXY**  
6 **GROUP IMPACT ITS BUSINESS RISK?**

7 A. Yes. A smaller size relative to the Utility Proxy Group companies indicates  
8 greater relative business risk for the Company because, all else being  
9 equal, size has a material bearing on risk.

10 Size affects business risk because smaller companies generally are less  
11 able to cope with significant events that affect sales, revenues and earnings.  
12 For example, smaller companies face more risk exposure to business  
13 cycles and economic conditions, both nationally and locally. Additionally,  
14 the loss of revenues from a few larger customers would have a greater  
15 effect on a small company than on a bigger company with a larger, more  
16 diverse, customer base. This is true for utilities, as well as for non-regulated  
17 companies.

18 As further evidence that smaller firms are riskier, investors generally  
19 demand greater returns from smaller firms to compensate for less  
20 marketability and liquidity of their securities. Kroll's Cost of Capital  
21 Navigator: U.S. Cost of Capital Module ("Kroll") discusses the nature of the  
22 small-size phenomenon, providing an indication of the magnitude of the size

1 premium based on several measures of size. In discussing “Size as a  
2 Predictor of Equity Returns,” Kroll states:

3 The size effect is based on the empirical observation that  
4 companies of smaller size are associated with greater risk  
5 and, therefore, have greater cost of capital [sic]. The “size”  
6 of a company is one of the most important risk elements  
7 to consider when developing cost of equity capital  
8 estimates for use in valuing a business simply because  
9 size has been shown to be a *predictor* of equity returns. In  
10 other words, there is a significant (negative) relationship  
11 between size and historical equity returns - as size  
12 decreases, returns tend to *increase*, and vice versa.  
13 (footnote omitted) (emphasis in original)<sup>50</sup>

14 Furthermore, in “The Capital Asset Pricing Model: Theory and Evidence,”  
15 Fama and French note size is indeed a risk factor which must be reflected  
16 when estimating the cost of common equity. On page 14, they note:

17 . . . the higher average returns on small stocks and high  
18 book-to-market stocks reflect unidentified state variables  
19 that produce undiversifiable risks (covariances) in returns  
20 not captured in the market return and are priced separately  
21 from market betas.<sup>51</sup>

22 Based on this evidence, Fama and French proposed their three-factor  
23 model which includes a size variable in recognition of the effect size has on  
24 the cost of common equity.

25 Also, it is a basic financial principle that the use of funds invested, and not  
26 the source of funds, is what gives rise to the risk of any investment.<sup>52</sup>

27 Eugene Brigham, a well-known authority, states:

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50 Kroll, Cost of Capital Navigator: U.S. Cost of Capital Module, Size as a Predictor of Equity Returns, at 1.

51 Fama & French, at 25-43.

52 Richard A. Brealey and Stewart C. Myers, Principles of Corporate Finance (McGraw-Hill Book Company, 1996), at 204-205, 229.



1 A number of researchers have observed that portfolios of  
2 small-firms (sic) have earned consistently higher average  
3 returns than those of large-firm stocks; this is called the  
4 "small-firm effect." On the surface, it would seem to be  
5 advantageous to the small firms to provide average  
6 returns in a stock market that are higher than those of  
7 larger firms. In reality, it is bad news for the small firm;  
8 **what the small-firm effect means is that the capital**  
9 **market demands higher returns on stocks of small**  
10 **firms than on otherwise similar stocks of the large**  
11 **firms.** (emphasis added)<sup>53</sup>

12 Consistent with the financial principle of risk and return discussed above,  
13 increased relative risk due to small size must be considered in the allowed  
14 rate of return on common equity.

15 **Q. EARLIER YOU EXPLAINED THAT CREDIT RATINGS CAN ACT AS A**  
16 **PROXY FOR A FIRM'S COMBINED BUSINESS AND FINANCIAL RISKS**  
17 **TO EQUITY OWNERS. DO RATINGS AGENCIES ACCOUNT FOR**  
18 **COMPANY SIZE IN THEIR BOND RATINGS?**

19 A. No. Neither S&P nor Moody's have minimum company size requirements  
20 for any given rating level. This means, all else equal, a relative size analysis  
21 must be conducted for equity investments in companies with similar bond  
22 ratings.

23 **Q. HAVE YOU APPLIED A RELATIVE RISK ADJUSTMENT DUE TO AQUA**  
24 **NC'S SMALL SIZE COMPARED TO THE UTILITY PROXY GROUP?**

25 A. No. While Aqua NC has greater relative risk than the median utility in the  
26 Utility Proxy Group as measured by its estimated market capitalization of

---

<sup>53</sup> Eugene F. Brigham, Fundamentals of Financial Management, Fifth Edition (The Dryden Press, 1989), at 623.

common equity, the difference is not large enough to merit a risk adjustment as shown on Table 12, below:

**TABLE 12: SIZE AS MEASURED BY MARKET CAPITALIZATION FOR THE COMPANY AND THE UTILITY PROXY GROUP<sup>54</sup>**

	Market Capitalization* (\$ Millions)	Times Greater Than the Company
Aqua NC	\$742.586	
Utility Proxy Group Median	\$2,849.097	3.8x

The Company's estimated market capitalization was at \$742.586 million as of May 13, 2022, compared with the median market capitalization of the Utility Proxy Group of \$2.8 billion as of May 13, 2022. The Utility Proxy Group's market capitalization is 3.8 times the size of Aqua NC's estimated market capitalization.

The average size premium for the Utility Proxy Group with a market capitalization of \$2.8 billion falls in the 6<sup>th</sup> decile, while Aqua NC's market capitalization of \$742.586 million places the Company in the 8<sup>th</sup> decile. The size premium spread between the 6<sup>th</sup> decile and the 8<sup>th</sup> decile is 0.03%.<sup>55</sup> Given the indicated size premium of 0.03%, the difference is not large enough to merit a risk adjustment at this time.

**B. FLOTATION COST ADJUSTMENT**

**Q. WHAT ARE FLOTATION COSTS?**

A. Flotation costs are those costs associated with the sale of new issuances of common stock. They include market pressure and the essential costs of

<sup>54</sup> From page 1 of Schedule DWD-8.

<sup>55</sup> Source: Kroll, Cost of Capital Navigator.

1 issuance, (e.g., underwriting fees and out-of-pocket costs for printing, legal,  
2 registration, etc.).

3 **Q. WHY IS IT IMPORTANT TO RECOGNIZE FLOTATION COSTS IN THE**  
4 **ALLOWED COMMON EQUITY COST RATE?**

5 A. It is important because there is no other mechanism in the ratemaking  
6 paradigm with which such costs can be recovered. Because these costs  
7 are real and legitimate, recovery of these costs should be permitted. As  
8 noted by Morin:

9 The costs of issuing these securities are just as real as  
10 operating and maintenance expenses or costs incurred  
11 to build utility plants, and fair regulatory treatment must  
12 permit recovery of these costs....

13 The simple fact of the matter is that common equity  
14 capital is not free....[Flotation costs] must be recovered  
15 through a rate of return adjustment<sup>56</sup>

16 **Q. SHOULD FLOTATION COSTS BE RECOGNIZED ONLY WHEN THERE**  
17 **WAS AN ISSUANCE DURING THE TEST YEAR OR THERE IS AN**  
18 **IMMINENT POST-TEST YEAR ISSUANCE OF ADDITIONAL COMMON**  
19 **STOCK?**

20 A. No. As noted above, there is no mechanism to recapture such costs in the  
21 ratemaking paradigm other than an adjustment to the allowed common  
22 equity cost rate. Flotation costs are charged to capital accounts and are not  
23 expensed on a utility's income statement. As such, flotation costs are  
24 analogous to capital investments reflected on the balance sheet. Recovery

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<sup>56</sup> Morin 321.

1 of capital investments relates to the expected useful lives of the investment.

2 Since common equity has a very long and indefinite life (assumed to be  
3 infinity in the standard regulatory DCF model), flotation costs should be  
4 recovered through an adjustment to common equity cost rate even when  
5 there has not been an issuance during the test year or in the absence of an  
6 expected imminent issuance of additional shares of common stock.

7 Historical flotation costs are a permanent loss of investment to the utility and  
8 should be accounted for. When any company, including a utility, issues  
9 common stock, flotation costs are incurred for legal, accounting, printing  
10 fees and the like. For each dollar of issuing market price, a small percentage  
11 is expensed and is permanently unavailable for investment in utility rate  
12 base. Since these expenses are charged to capital accounts and not  
13 expensed on the income statement, the only way to restore the full value of  
14 that dollar of issuing price with an assumed investor required return of 10%  
15 is for the net investment, \$0.95, to earn more than 10% to net back to the  
16 investor a fair return on that dollar. In other words, if a company issues  
17 stock at \$1.00 with 5% in flotation costs, it will net \$0.95 in investment.  
18 Assuming the investor in that stock requires a 10% return on his or her  
19 invested \$1.00 (*i.e.*, a return of \$0.10), the company needs to earn  
20 approximately 10.5% on its invested \$0.95 to receive a \$0.10 return.

1 **Q. DO THE COMMON EQUITY COST RATE MODELS YOU HAVE USED**  
2 **ALREADY REFLECT INVESTORS' ANTICIPATION OF FLOTATION**  
3 **COSTS?**

4 A. No. All of these models assume no transaction costs. The literature is quite  
5 clear that these costs are not reflected in market prices paid for common  
6 stocks. For example, Brigham and Daves confirm this and provide the  
7 methodology utilized to calculate the flotation adjustment.<sup>57</sup> In addition,  
8 Morin confirms the need for such an adjustment even when no new equity  
9 issuance is imminent.<sup>58</sup> Consequently, it is proper to include a flotation cost  
10 adjustment when using cost of common equity models to estimate the  
11 common equity cost rate.

12 **Q. HOW DID YOU CALCULATE THE FLOTATION COST ALLOWANCE?**

13 A. I modified the DCF calculation to provide a dividend yield that would  
14 reimburse investors for issuance costs in accordance with the method cited  
15 in literature by Brigham and Daves as well as Morin. The flotation cost  
16 adjustment recognizes the costs of issuing equity that were incurred by  
17 Essential since January 2019. Based upon the issuance costs shown on  
18 page 1 of Schedule DWD-9, an adjustment of 0.05% is required to reflect  
19 the flotation costs applicable to the Company.

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<sup>57</sup> Eugene F. Brigham and Phillip R. Daves, Intermediate Financial Management, 9th Edition, Thomson/Southwestern, at 342.

<sup>58</sup> Morin 327-30.

### C. OTHER CONSIDERATIONS

**Q. DID YOU CONSIDER THE WSIP IN YOUR DETERMINATION OF THE COMPANY'S ROE?**

A. Yes, I did. In reviewing Commission Rule R1-17A, which establishes the WSIP, I did not find that the mechanism lowered the Company's risk.

**Q. PLEASE EXPLAIN YOUR FINDINGS.**

A. Risk can be defined as volatility in revenues and earnings. The WSIP, as far as I can gather from current documents, has the effect of generating fully forecasted test years and associated revenue requirements, it better matches future revenues to future expenses, and does not affect the volatility of those revenues or resultant earnings.

**Q. DOES THE WSIP PROTECT THE CUSTOMER INTEREST OVER THE COMPANY INTEREST?**

A. Yes, it does. Commission Rule R1-17A, subsection g(3) a and b state that if a company earns a return in excess of 100 basis points over its authorized return, the company must refund those earnings to their customers. If the company earns less than 100 basis points under its authorized ROE, it does not have the ability to collect a surcharge from its customers but can file a base rate case. This section of the Commission Rule places a ceiling on company earnings, but no floor, which would create an imbalance.

1 Q. WHAT ARE YOUR CONCLUSIONS REGARDING WSIP'S EFFECT ON  
2 THE COMPANY'S RISK PROFILE?

3 A. While WSIP allows the Company to better match revenues and expenses,  
4 the WSIP does not mitigate the volatility of those revenues or earnings,  
5 which is a direct measure of risk. This, in addition to the WSIP introducing  
6 an earnings ceiling without a corresponding earnings floor, leads me to the  
7 conclusion that the WSIP does not reduce the Company's risk profile.

8 IX. ECONOMIC CONDITIONS IN NORTH CAROLINA

9 Q. DID YOU CONSIDER THE ECONOMIC CONDITIONS IN NORTH  
10 CAROLINA IN ARRIVING AT YOUR ROE RECOMMENDATION?

11 A. Yes, I did. As a preliminary matter, I understand and appreciate that the  
12 Commission must balance the interests of investors and customers in  
13 setting the return on common equity. As the Commission has stated, it "...is  
14 and must always be mindful of the North Carolina Supreme Court's  
15 command that the Commission's task is to set rates as low as possible  
16 consistent with the dictates of the United States and North Carolina  
17 Constitutions."<sup>59</sup> In that regard, the return should be neither excessive nor  
18 confiscatory; it should be the minimum amount needed to meet the *Hope*  
19 and *Bluefield* Comparable Risk, Capital Attraction, and Financial Integrity  
20 standards.

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<sup>59</sup> State of North Carolina Utilities Commission, Docket No. E-7, Sub 1026, Order Granting General Rate Increase, Sept. 24, 2013 at 25; see also, North Carolina Utilities Commission, Docket No. E-7, Sub 989, Order on Remand, at 31 ("the Commission in every case seeks to comply with the N.C. Supreme Court mandate that the Commission establish rates as low as reasonably possible within Constitutional limits.").

1 The Commission also has found the role of cost of capital experts is to  
2 determine the investor-required return, not to estimate increments or  
3 decrements of return in connection with consumers' economic environment:

4 *... adjusting investors' required costs based on factors upon*  
5 *which investors do not base their willingness to invest is an*  
6 *unsupportable theory or concept. The proper way to take into*  
7 *account customer ability to pay is in the Commission's*  
8 *exercise of fixing rates as low as reasonably possible without*  
9 *violating constitutional proscriptions against confiscation of*  
10 *property. This is in accord with the "end result" test of Hope.*  
11 *This the Commission has done.*<sup>60</sup>

12 The North Carolina Supreme Court agreed, and upheld the Commission's  
13 Order on Remand.<sup>61</sup> The North Carolina Supreme Court has also,  
14 however, made clear that the Commission "must make findings of fact  
15 regarding the impact of changing economic conditions on customers when  
16 determining the proper ROE for a public utility."<sup>62</sup> In *Cooper II*, the North  
17 Carolina Supreme Court directed the Commission on remand to "make  
18 additional findings of fact concerning the impact of changing economic  
19 conditions on customers",<sup>63</sup> which the Commission made in its Order on  
20 Remand.<sup>64</sup> In light of the *Cooper II* decision and the North Carolina  
21 Supreme Court precedent that preceded it,<sup>65</sup> I appreciate the Commission's

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<sup>60</sup> State of North Carolina Utilities Commission, Docket No. E-7, Sub 989, Order on Remand, October 23, 2013, at 34 - 35; see also, Dominion Remand Order, Docket No. E-22, Sub 479 at 26 (stating that the Commission is not required to "isolate and quantify the effect of changing economic conditions on consumers in order to determine the appropriate rate of return on equity").

<sup>61</sup> *State ex rel. Utils. Comm'n v. Cooper*, 366 N.C. 484, 739 S.E.2d 541 (2013) ("Cooper I").

<sup>62</sup> *State of North Carolina ex rel. Utilities Commission v. Cooper*, 758 S.E.2d 635, 642 (2014) ("Cooper II").

<sup>63</sup> *Cooper II*, 758 S.E.2d at 643.

<sup>64</sup> DNCP Remand Order, at 4-10.

<sup>65</sup> *Cooper I*, 366 N.C. 484, 739 S.E.2d 541 (2013).



1 need to consider economic conditions in the state. As such, I have  
2 undertaken several analyses to provide such a review.

3 **Q. PLEASE SUMMARIZE YOUR ANALYSES AND CONCLUSIONS.**

4 A. In its Order on Remand in Docket No. E-22, Sub 479, the Commission  
5 observed that economic conditions in North Carolina were highly correlated  
6 with national conditions, such that they were reflected in the analyses used  
7 to determine the cost of common equity.<sup>66</sup> As discussed below, those  
8 relationships still hold:

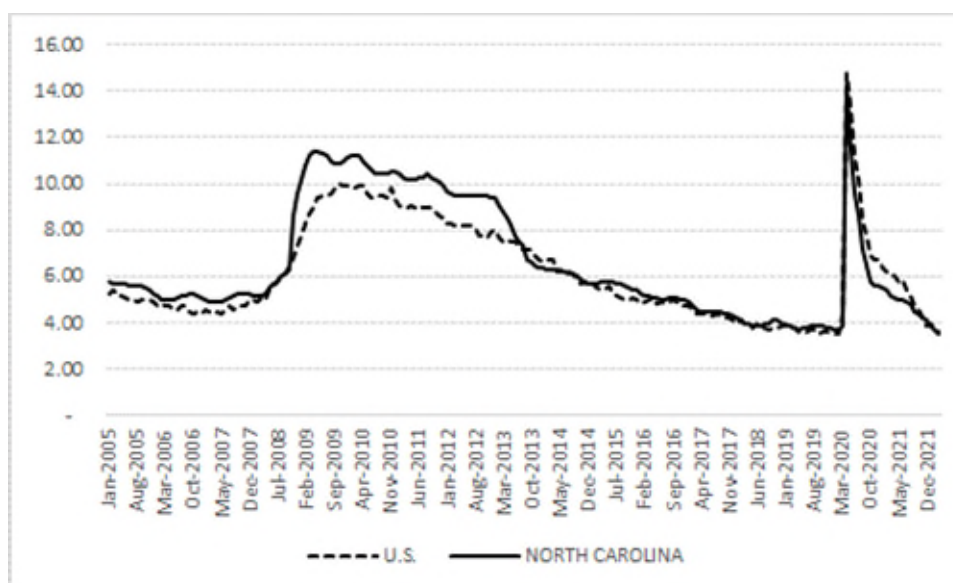
- 9 • Although economic conditions in North Carolina declined  
10 significantly in the second quarter of 2020 as a result of the COVID-  
11 19 pandemic, they have improved considerably since. Notably,  
12 economic conditions in North Carolina continue to be strongly  
13 correlated to the U.S. economy;
- 14 • Unemployment at both the state and county level remains highly  
15 correlated with national rates of unemployment;
- 16 • Real Gross Domestic Product ("GDP") in North Carolina also  
17 remains highly correlated with U.S. real GDP growth; and
- 18 • Median household income in North Carolina has grown at a rate  
19 consistent with the rest of the U.S. and remains strongly correlated  
20 with national levels.

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<sup>66</sup> See, State of North Carolina Utilities Commission, Docket No. E-22, Sub 479, Order on Remand, July 23, 2015, at 39.

1     **Q.     PLEASE NOW DESCRIBE THE SPECIFIC MEASURES OF ECONOMIC**  
2     **CONDITIONS THAT YOU REVIEWED.**

3     A.     Turning first to the seasonally adjusted unemployment rate, prior to April  
4           2020, the unemployment rate had fallen substantially in North Carolina and  
5           the U.S. since the 2008/2009 financial crisis. Although the unemployment  
6           rate in North Carolina exceeded the national rate during and after the  
7           2008/2009 financial crisis, by the latter portion of 2013, the two were largely  
8           consistent. As the COVID-19 pandemic hit the U.S., unemployment in  
9           North Carolina and across the U.S. spiked in April 2020 as many  
10          communities closed non-essential businesses to contain the spread of the  
11          COVID-19 virus. Notably, North Carolina's unemployment rate has fared  
12          better than the overall U.S., even as both fell considerably by the beginning  
13          of 2021 (see Chart 1, below).

**CHART 1: UNEMPLOYMENT RATE (SEASONALLY ADJUSTED)<sup>67</sup>**

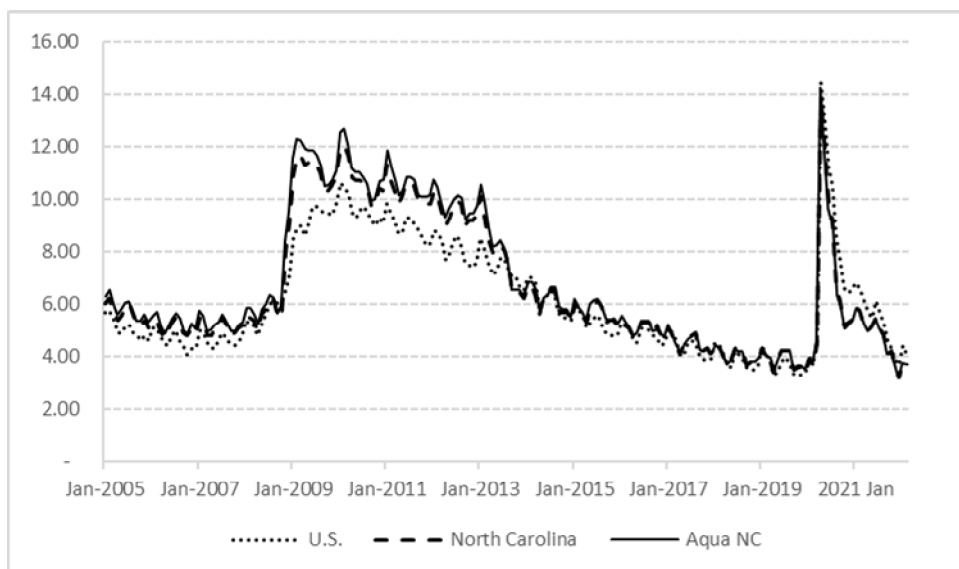
Between 2005 and March of 2022, the correlation between North Carolina's unemployment rate and the national rate was 95.91%, indicating the two are highly correlated.

Second, I reviewed (seasonally unadjusted) unemployment rates in the counties served by Aqua NC. As with the seasonally adjusted statistics described above, the unemployment rate in those counties spiked in April 2020 at 14.23% (0.33% above the state-wide average), but by February 2022 it had fallen substantially to 3.70%, equal to the rate statewide in North Carolina and below the overall rate in the U.S. (4.10%). From 2005 through February 2022, the correlations in unemployment rates between the counties served by Aqua NC and the U.S., as well as North Carolina, were approximately 94.92% and 99.89%, respectively. In summary, county-level

<sup>67</sup> Source: Bureau of Labor Statistics.

unemployment has fallen considerably since it recently spiked in April 2020, is similar to the U.S. and statewide unemployment rates, and is highly correlated to state and national unemployment rates.

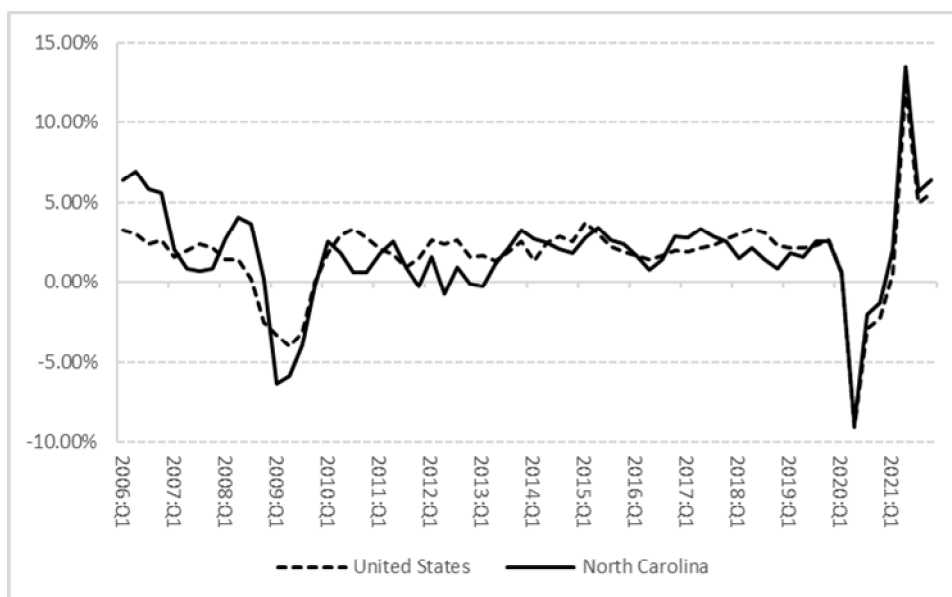
**CHART 2: SEASONALLY UNADJUSTED UNEMPLOYMENT RATES<sup>68</sup>**



Looking to real GDP growth, there also has been a relatively strong correlation between North Carolina and the national economy (approximately 86.29%). While the national rate of growth at times outpaced North Carolina between 2010 and 2014, since the first quarter of 2015, North Carolina's economic growth has been relatively consistent with U.S. economic growth. Moreover, North Carolina's real GDP grew faster than the overall U.S. in every quarter of 2021.

<sup>68</sup>

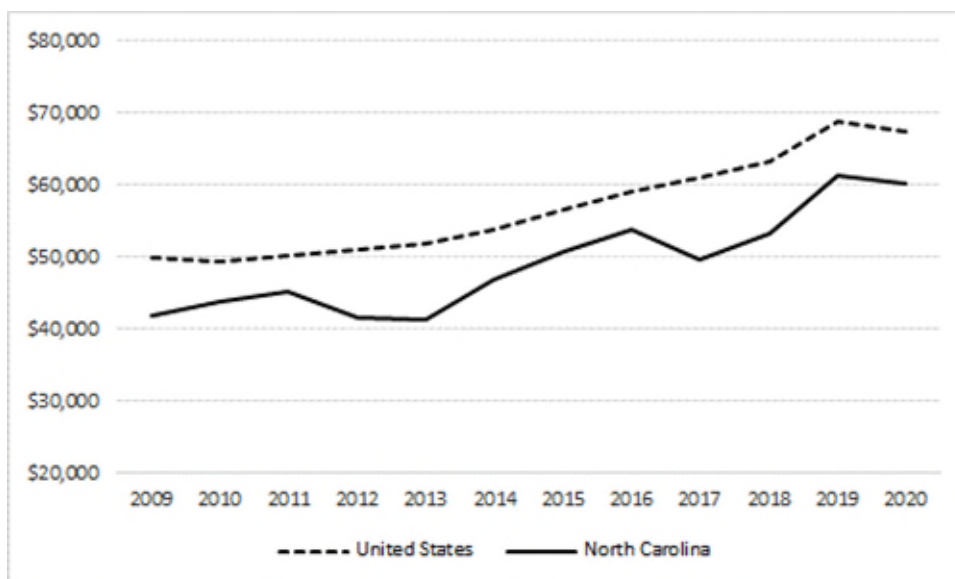
Source: Bureau of Labor Statistics, St. Louis Federal Reserve.

**CHART 3: REAL GDP GROWTH RATE (YEAR OVER YEAR)<sup>69</sup>**

As to median household income, the correlation between North Carolina and the U.S. is relatively strong (95.32% from 2005 through 2020). Since 2009 (that is, the years subsequent to the financial crisis), nominal median household income in North Carolina has grown at a slightly faster pace than the national median income (3.36% vs. 2.81%, respectively; see Chart 4, below). To put household income in perspective, the Missouri Economic Research and Information Center reports that in the first quarter of 2022, North Carolina had the 22<sup>nd</sup> lowest cost of living index among the 50 states, the District of Columbia, and Puerto Rico.<sup>70</sup>

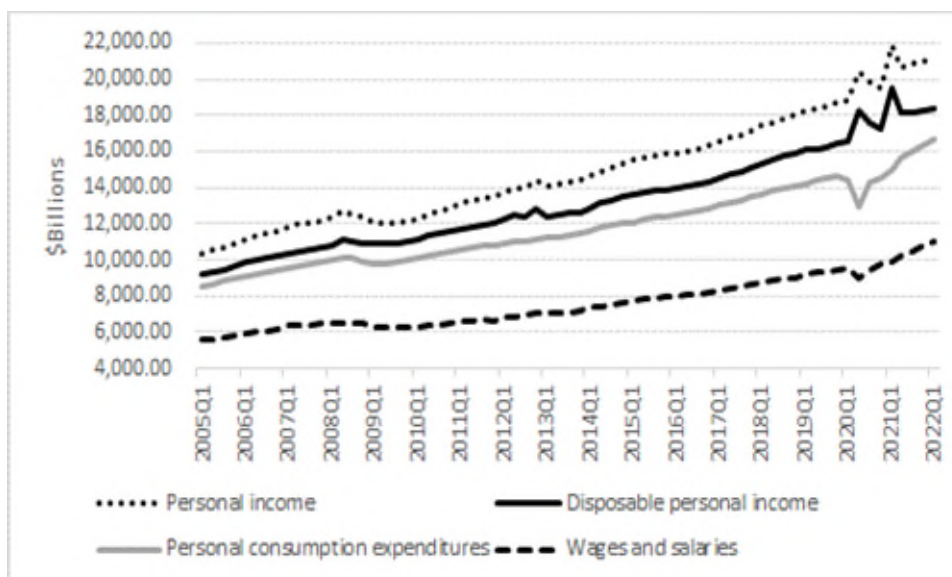
<sup>69</sup> Source: Bureau of Economic Analysis.

<sup>70</sup> Source: [meric.mo.gov/data/cost-living-data-series](https://meric.mo.gov/data/cost-living-data-series) accessed June 21, 2022.

**CHART 4: MEDIAN HOUSEHOLD INCOME<sup>71</sup>**

Similarly, as shown in Chart 5, below, since 2009 total personal income, disposable income, personal consumption, and wages and salaries have generally been on an increasing trend at the national level. Although wages and salaries dipped in the second quarter of 2020, they rebounded in late 2020 and 2021.

<sup>71</sup> Source: U.S. Census Bureau, Current Population Survey.

**CHART 5: UNITED STATES INCOME AND CONSUMPTION<sup>72</sup>**

**Q. HOW WOULD YOU SUMMARIZE THE ECONOMIC INDICATORS THAT YOU HAVE ANALYZED AND DISCUSSED IN YOUR DIRECT TESTIMONY?**

**A.** Based on the data presented above, I observed the following:

- Unemployment at both the state and county level remains highly correlated with national rates of unemployment. North Carolina's unemployment rate and the rate in the counties served by Aqua NC have fallen significantly since spiking in April 2020;
- The state's real GDP remains highly correlated with national GDP;

<sup>72</sup>

Source: Bureau of Economic Analysis.

- Similarly, since 2005, median household income has grown in North Carolina and has grown at a rate slightly faster than the national average.
- The overall cost of living in North Carolina also is below the national average; and
- At the national level, income has generally been increasing since the financial crisis.

The U.S. and North Carolina economies both experienced an historically difficult and challenging 2020 as a result of the COVID-19 pandemic; yet the data show that economic conditions have improved significantly since then. Moreover, although economic conditions remain uncertain, North Carolina and the counties contained within Aqua NC's service area have fared better than the rest of the U.S. during the COVID-19 pandemic.

**Q. IN YOUR OPINION, ARE YOUR RECOMMENDED RANGES OF ROE AND REQUESTED ROE OF 10.40% FAIR AND REASONABLE TO AQUA NC, ITS SHAREHOLDERS, AND ITS CUSTOMERS, AND NOT UNDULY BURDENSOME TO AQUA NC'S CUSTOMERS CONSIDERING THE CHANGING ECONOMIC CONDITIONS IN THE STATE?**

A. Yes. Based on the factors I have discussed here, I believe that my recommended ranges of ROE are fair and reasonable to Aqua NC, its shareholders, and its customers in light of the uncertainty surrounding current market conditions.



1 **X. CONCLUSION**

2 **Q. WHAT IS YOUR RECOMMENDED RETURN ON INVESTOR-SUPPLIED**  
3 **CAPITAL FOR AQUA NC?**

4 A. My recommended return on invested capital for the Company is 7.21%,  
5 which reflects the Company's proposed capital structure and cost rates as  
6 set forth below:

7 **TABLE 13: SUMMARY OF OVERALL RATE OF RETURN**  
8 **YEAR**

<u>Type of Capital</u>	<u>Ratios</u>	<u>Cost Rate</u>	<u>Weighted Cost Rate</u>
Long-Term Debt	50.00%	4.01%	2.01%
Common Equity	<u>50.00%</u>	10.40%	<u>5.20%</u>
Total	<u>100.00%</u>		<u>7.21%</u>

9  
10 Returns on invested capital as recommended above are consistent with the  
11 *Hope* and *Bluefield* standard of a just and reasonable return, which ensures  
12 the integrity of presently invested capital, and enables the attraction of  
13 needed new capital on reasonable terms. It also ensures that Aqua NC will  
14 be able to continue providing safe, adequate, and reliable service to the  
15 benefit of customers. Thus, it balances the interests of both customers and  
16 the Company.

17 **Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?**

18 A. Yes, it does.

Aqua North Carolina, Inc.  
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to Exhibit No. 1  
of Dylan W. D'Ascendis, CRRA, CVA

W-218 Sub 573

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Aqua North Carolina, Inc.  
Recommended Capital Structure and Cost Rates

Base Year

<u>Type Of Capital</u>	<u>Ratios (1)</u>	<u>Cost Rate</u>	<u>Weighted Cost Rate</u>
Long-Term Debt	50.00%	4.01% (1)	2.01%
Common Equity	50.00%	9.90% - 10.90% (2)	4.95% - 5.45%
Total	100.00%		6.96% - 7.46%

Projected Rate Year 1 (2023 Projected Interest Rates)

<u>Type Of Capital</u>	<u>Ratios (1)</u>	<u>Cost Rate</u>	<u>Weighted Cost Rate</u>
Long-Term Debt	50.00%	4.01% (1)	2.01%
Common Equity	50.00%	10.12% - 11.12% (2)	5.06% - 5.56%
Total	100.00%		7.07% - 7.57%

Projected Rate Year 2 (2024 Projected Interest Rates)

<u>Type Of Capital</u>	<u>Ratios (1)</u>	<u>Cost Rate</u>	<u>Weighted Cost Rate</u>
Long-Term Debt	50.00%	4.01% (1)	2.01%
Common Equity	50.00%	10.08% - 11.08% (2)	5.04% - 5.54%
Total	100.00%		7.05% - 7.55%

Projected Rate Year 3 (2025 Projected Interest Rates)

<u>Type Of Capital</u>	<u>Ratios (1)</u>	<u>Cost Rate</u>	<u>Weighted Cost Rate</u>
Long-Term Debt	50.00%	4.01% (1)	2.01%
Common Equity	50.00%	10.19% - 11.19% (2)	5.09% - 5.59%
Total	100.00%		7.10% - 7.60%

Notes:

- (1) Company-provided.  
(2) From page 2 of this Schedule.

Aqua North Carolina, Inc.  
Brief Summary of Common Equity Cost Rate

Line No.	Principal Methods	Base Year (Current Interest Rates)	Projected Year 1 (2023 Projected Int. Rates)	Projected Year 2 (2024 Projected Int. Rates)	Projected Year 3 (2025 Projected Int. Rates)
1.	Discounted Cash Flow Model (DCF) (1)	9.37%	9.37%	9.37%	9.37%
2.	Risk Premium Model (RPM) (2)	11.12%	11.76%	11.69%	11.90%
3.	Capital Asset Pricing Model (CAPM) (3)	11.32%	11.68%	11.66%	11.79%
4.	Market Models Applied to Comparable Risk, Non-Price Regulated Companies (4)	11.20%	11.54%	11.49%	11.49%
5.	Indicated Common Equity Cost Rate before Adjustment for Unique Risk	9.85% - 10.85%	10.07% - 11.07%	10.03% - 11.03%	10.14% - 11.14%
6.	Business Risk Adjustment (5)		0.00%		
7.	Flotation Cost Adjustment (6)		0.05%		
8.	Indicated Common Equity Cost Rate after Adjustment	9.90% - 10.90%	10.12% - 11.12%	10.08% - 11.08%	10.19% - 11.19%

Notes: (1) From page 1 of Schedule DWD-3.  
(2) From page 1 of Schedule DWD-4.  
(3) From pages 1-4 of Schedule DWD-5.  
(4) From page 1 of Schedule DWD-7.  
(5) As shown on Schedule DWD-8, no size adjustment is necessary at this time.  
(6) From page 1 of Schedule DWD-9.

Proxy Group of Seven Water Companies  
CAPITALIZATION AND FINANCIAL STATISTICS (1)  
2017 - 2021, Inclusive

	2021	2020	2019	2018	2017	
	(MILLIONS OF DOLLARS)					
<u>Capitalization Statistics</u>						
<u>Amount of Capital Employed</u>						
Total Permanent Capital	\$5,096.955	\$4,622.646	\$3,885.041	\$3,208.636	\$2,837.657	
Short-Term Debt	\$133.499	\$291.642	\$189.148	\$184.221	\$185.250	
Total Capital Employed	<u>\$5,230.454</u>	<u>\$4,914.288</u>	<u>\$4,074.189</u>	<u>\$3,392.857</u>	<u>\$3,022.907</u>	
<u>Indicated Average Capital Cost Rates (2)</u>						
Total Debt	3.55 %	3.84 %	4.18 %	4.75 %	4.83 %	
Preferred Stock	5.76 %	5.76 %	5.84 %	5.92 %	5.91 %	
<u>Capital Structure Ratios</u>						
Based on Total Permanent Capital:						5 YEAR AVERAGE
Long-Term Debt	50.00 %	50.26 %	47.11 %	45.15 %	45.58 %	47.62 %
Preferred Stock	0.05	0.05	0.06	0.09	0.10	0.07
Common Equity	49.95	49.69	52.83	54.76	54.32	52.31
Total	<u>100.00 %</u>	<u>100.00 %</u>	<u>100.00 %</u>	<u>100.00 %</u>	<u>100.00 %</u>	<u>100.00 %</u>
Based on Total Capital:						
Total Debt, Including Short-Term Debt	51.86 %	53.47 %	50.52 %	48.37 %	48.93 %	50.63 %
Preferred Stock	0.05	0.05	0.06	0.08	0.09	0.07
Common Equity	48.10	46.48	49.43	51.54	50.98	49.30
Total	<u>100.00 %</u>	<u>100.00 %</u>	<u>100.00 %</u>	<u>100.00 %</u>	<u>100.00 %</u>	<u>100.00 %</u>
<u>Financial Statistics</u>						
<u>Financial Ratios - Market Based</u>						
Earnings / Price Ratio	3.14 %	3.20 %	2.67 %	3.33 %	3.65 %	3.20 %
Market / Average Book Ratio	361.91	328.25	340.26	308.46	310.75	329.93
Dividend Yield	1.66	1.81	1.77	2.00	1.99	1.85
Dividend Payout Ratio	53.26	56.81	72.34	60.08	55.80	59.66
<u>Rate of Return on Average Book Common Equity</u>	11.26 %	10.49 %	9.48 %	10.12 %	11.31 %	10.53 %
<u>Total Debt / EBITDA (3)</u>	4.95 x	5.33 x	5.57 x	4.22 x	3.42 x	4.70 x
<u>Funds from Operations / Total Debt (4)</u>	11.66 %	12.11 %	14.55 %	21.37 %	22.87 %	16.51 %
<u>Total Debt / Total Capital</u>	51.86 %	53.47 %	50.52 %	48.37 %	48.93 %	50.63 %

Notes:

- (1) All capitalization and financial statistics for the group are the arithmetic average of the achieved results for each individual company in the group, and are based upon financial statements as originally reported in each year.
- (2) Computed by relating actual total debt interest or preferred stock dividends booked to average of beginning and ending total debt or preferred stock reported to be outstanding.
- (3) Total debt relative to EBITDA (Earnings before Interest, Income Taxes, Depreciation and Amortization).
- (4) Funds from operations (sum of net income, depreciation, amortization, net deferred income tax and investment tax credits, less total AFUDC) plus interest charges as a percentage of total debt.

Source of Information: Company Annual Forms 10-K

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Capital Structure Based upon Total Permanent Capital for the  
Proxy Group of Seven Water Companies  
2017 - 2021, Inclusive

	<u>2021</u>	<u>2020</u>	<u>2019</u>	<u>2018</u>	<u>2017</u>	<u>5 YEAR AVERAGE</u>
<u>American States Water Company</u>						
Long-Term Debt	37.56 %	40.72 %	31.87 %	36.54 %	37.75 %	36.89 %
Preferred Stock	0.00	0.00	0.00	0.00	0.00	0.00
Common Equity	62.44	59.28	68.13	63.46	62.25	63.11
Total Capital	<u>100.00 %</u>	<u>100.00 %</u>	<u>100.00 %</u>	<u>100.00 %</u>	<u>100.00 %</u>	<u>100.00 %</u>
<u>American Water Works Company, Inc.</u>						
Long-Term Debt	58.75 %	59.93 %	58.59 %	56.55 %	55.81 %	57.93 %
Preferred Stock	0.02	0.02	0.03	0.05	0.07	0.04
Common Equity	41.23	40.05	41.38	43.40	44.12	42.03
Total Capital	<u>100.00 %</u>	<u>100.00 %</u>	<u>100.00 %</u>	<u>100.00 %</u>	<u>100.00 %</u>	<u>100.00 %</u>
<u>California Water Service Group</u>						
Long-Term Debt	47.28 %	46.04 %	50.90 %	52.74 %	43.40 %	48.07 %
Preferred Stock	0.00	0.00	0.00	0.00	0.00	0.00
Common Equity	52.72	53.96	49.10	47.26	56.60	51.93
Total Capital	<u>100.00 %</u>	<u>100.00 %</u>	<u>100.00 %</u>	<u>100.00 %</u>	<u>100.00 %</u>	<u>100.00 %</u>
<u>Essential Utilities Inc.</u>						
Long-Term Debt	53.28 %	54.42 %	44.23 %	56.06 %	52.26 %	52.05 %
Preferred Stock	0.00	0.00	0.00	0.00	0.00	0.00
Common Equity	46.72	45.58	55.77	43.94	47.74	47.95
Total Capital	<u>100.00 %</u>	<u>100.00 %</u>	<u>100.00 %</u>	<u>100.00 %</u>	<u>100.00 %</u>	<u>100.00 %</u>
<u>Middlesex Water Company</u>						
Long-Term Debt	45.84 %	44.61 %	42.20 %	38.94 %	38.65 %	42.05 %
Preferred Stock	0.31	0.33	0.37	0.59	0.64	0.45
Common Equity	53.85	55.06	57.43	60.47	60.71	57.50
Total Capital	<u>100.00 %</u>	<u>100.00 %</u>	<u>100.00 %</u>	<u>100.00 %</u>	<u>100.00 %</u>	<u>100.00 %</u>
<u>SIW Group</u>						
Long-Term Debt	59.69 %	59.79 %	59.05 %	32.67 %	48.20 %	51.88 %
Preferred Stock	0.00	0.00	0.00	0.00	0.00	0.00
Common Equity	40.31	40.21	40.95	67.33	51.80	48.12
Total Capital	<u>100.00 %</u>	<u>100.00 %</u>	<u>100.00 %</u>	<u>100.00 %</u>	<u>100.00 %</u>	<u>100.00 %</u>
<u>The York Water Company</u>						
Long-Term Debt	47.64 %	46.31 %	42.95 %	42.52 %	43.02 %	44.49 %
Preferred Stock	0.00	0.00	0.00	0.00	0.00	0.00
Common Equity	52.36	53.69	57.05	57.48	56.98	55.51
Total Capital	<u>100.00 %</u>	<u>100.00 %</u>	<u>100.00 %</u>	<u>100.00 %</u>	<u>100.00 %</u>	<u>100.00 %</u>
<u>Proxy Group of Seven Water Companies</u>						
Long-Term Debt	50.01 %	50.26 %	47.11 %	45.15 %	45.59 %	47.62 %
Preferred Stock	0.05	0.05	0.06	0.09	0.10	0.07
Common Equity	49.94	49.69	52.83	54.76	54.31	52.31
Total Capital	<u>100.00 %</u>	<u>100.00 %</u>	<u>100.00 %</u>	<u>100.00 %</u>	<u>100.00 %</u>	<u>100.00 %</u>

Source of Information  
Annual Forms 10-K

Aqua North Carolina, Inc  
Indicated Common Equity Cost Rate Using the Discounted Cash Flow Model for t  
Proxy Group of Seven Water Companies

	[1]	[2]	[3]	[4]	[5]	[6]	[7]
Proxy Group of Seven Water Companies	Average Dividend Yield (1)	Value Line Projected Five Year Growth in EPS (2)	Zack's Five Year Projected Growth Rate in EPS	Yahoo! Finance Projected Five Year Growth in EPS	Average Projected Five Year Growth in EPS (3)	Adjusted Dividend Yield (4)	Indicated Common Equity Cost Rate (5)
American States Water Company	1.73 %	5.50 %	NA	4.40 %	4.95 %	1.77 %	6.72 %
American Water Works Company, Inc	1.67	7.50	8.10	8.30	7.97	1.74	9.71
California Water Service Group	1.77	6.50	NA	11.70	9.10	1.85	10.95
Essential Utilities Inc.	2.25	10.00	6.10	6.80	7.63	2.34	9.97
Middlesex Water Company	1.19	4.50	NA	2.70	3.60	1.21	4.81
SJW Group	2.22	14.00	NA	9.80	11.90	2.35	14.25
The York Water Company	1.83	5.00	NA	4.90	4.95	1.88	6.83
						Average	9.03 %
						Median	9.71 %
						Average of Mean and Median	9.37 %

NA= Not Available

Notes:

- (1) Indicated dividend at 05/13/2022 divided by the average closing price of the last 60 trading days ending 05/13/2022 for each company.
- (2) From pages 2 through 8 of this Schedule.
- (3) Average of columns 2 through 4 excluding negative growth rate
- (4) This reflects a growth rate component equal to one-half the conclusion of growth rate (from column 5) x column 1 to reflect the periodic payment of dividends (Gordon Model) as opposed to the continuous payment. Thus, for American States Water Company,  $1.73\% \times (1 + (1/2 \times 4.95\%)) = 1.77\%$ .
- (5) Column 5 + column 6.

Source of Information:

Value Line Investment Survey  
www.zacks.com Downloaded on 05/13/2022;  
www.yahoo.com Downloaded on 05/13/2022;

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<p>(A) Primary earnings. Excludes nonrecurring gains/(losses); '06, 3c; '08, (14c); '10, (23c); '11, 10c. Next earnings report due early May.</p> <p>(B) Dividends historically paid in early March.</p>	<p>June, September, and December. ■ Div'd reinvestment plan available.</p> <p>(C) In millions, adjusted for split.</p>	<p>(D) Includes intangibles. As of 12/31/21; \$1.1 million/\$0.03 a share.</p>	<p><b>Company's Financial Strength</b></p> <p>Stock's Price Stability 100</p> <p>Price Growth Persistence 90</p> <p>Earnings Predictability 95</p>	<p><b>A</b></p>
<p>© 2022 Value Line, Inc. All rights reserved. Material is obtained from sources believed to be reliable and is provided without warranties of any kind. THE PUBLISHER IS NOT RESPONSIBLE FOR ANY ERRORS OR OMISSIONS HEREIN. This publication is strictly for subscriber's own, non-commercial, internal use. No part of it may be reproduced, stored, sold, or transmitted in any printed, electronic or other form, or used for generation or reproduction, acquisition, or electronic publication, sales or product promotion without the prior written permission of Value Line Research Corporation.</p>				
<p><b>To subscribe call 1-800-VALUELINE</b></p>				

CALIFORNIA WATER NYSE-CWT										RECENT PRICE	58.80	P/E RATIO	31.4 (Trailing: 30.0 Median: 27.0)	RELATIVE P/E RATIO	1.75	DIV'D YLD	1.7%	VALUE LINE	
TIMELINESS 3 Lowered 10/29/21		SAFETY 3 Lowered 7/27/07		TECHNICAL 3 Lowered 3/25/22		BETA .65 (1.00 = Market)		18-Month Target Price Range		Low-High Midpoint (% to Mid)		\$50-\$91 \$71 (20%)		2025-27 PROJECTIONS		High Low		Institutional Decisions	
High: 19.4 19.3 23.4 26.4 26.0 36.8 46.2 49.1 57.5 57.4 72.1 72.0		Low: 16.7 16.8 18.4 20.3 19.5 22.5 32.4 35.3 44.6 39.7 51.0 52.8		LEGENDS 1.33 x Dividends p sh divided by Interest Rate --- Relative Price Strength 2-for-1 split 6/11 Options: Yes Shaded area indicates recession															

MIDDLESEX WATER NDQ-MSEX										RECENT PRICE	102.71	P/RATIO	48.7 (Trailing: 49.6 Median: 24.0)	RELATIVE P/E RATIO	2.72	DIV'D YLD	1.1%	VALUE LINE											
TIMELINESS 3 Lowered 6/4/21 SAFETY 2 New 10/21/11 TECHNICAL 3 Raised 4/8/22 BETA .70 (1.00 = Market) 18-Month Target Price Range Low-High Midpoint (% to Mid) \$63-\$117 \$90 (-10%) 2025-27 PROJECTIONS Price Gain Ann'l Total High Low 90 65 (-10%) (-35%) -2% -9% Institutional Decisions 202021 3Q2021 4Q2021 to Buy 71 101 93 to Sell 65 66 84 Hld's(000) 10852 12996 12685 Percent shares traded 12 8 4																				Target Price Range 2025 2026 2027 120 100 80 60 40 20 15 % TOT. RETURN 2/22 THIS STOCK VL ARITH. INDEX 1 yr. 54.3 6.9 3 yr. 85.0 49.8 5 yr. 201.8 71.1									
CAPITAL STRUCTURE as of 12/31/21 Total Debt \$313.2 mill. Due in 5 Yrs \$43.7 mill. LT Debt \$306.5 mill. LT Interest \$7.5 mill. (Total interest coverage: 6.0x) (45% of Cap'l) Pension Assets-12/21 \$100.8 mill. Oblig. \$113.7 mill. Pfd Stock \$2.4 mill. Pfd Div'd \$: 1 mill. Common Stock 17,520,000 shs. MARKET CAP: \$1.8 billion (Mid Cap)										© VALUE LINE PUB. LLC 25-27 Revenues per sh 9.15 "Cash Flow" per sh 3.85 Earnings per sh A 2.75 Div'd Decl'd per sh B= 1.40 Cap'l Spending per sh 6.00 Book Value per sh 22.20 Common Shs Outst'g C 18.00 Avg Ann'l P/E Ratio 28.0 Relative P/E Ratio 1.30 Avg Ann'l Div'd Yield 1.8% Revenues (\$mill) 165 Net Profit (\$mill) 49.5 Income Tax Rate 21.0% AFUDC % to Net Profit 2.5% Long-Term Debt Ratio 38.5% Common Equity Ratio 61.5% Total Capital (\$mill) 655 Net Plant (\$mill) 915 Return on Total Cap'l 8.0% Return on Shr. Equity 12.5% Return on Com Equity 12.5% Retained to Com Eq 6.0% All Div'ds to Net Prof 51%																			
CURRENT POSITION 2019 2020 12/31/21 (SMILL.) Cash Assets 2.2 4.5 3.5 Other 26.9 29.6 30.9 Current Assets 29.1 34.1 34.4 Accts Payable 23.3 30.4 21.1 Debt Due 27.2 9.3 6.7 Other 14.5 17.1 28.8 Current Liab. 65.0 56.8 56.6										BUSINESS: Middlesex Water Company engages in the ownership and operation of regulated water utility systems in New Jersey, Delaware, and Pennsylvania. It also operates water and wastewater systems under contract on behalf of municipal and private clients in NJ and DE. Its Middlesex System provides water services to 61,000 retail customers, primarily in Middlesex County, New Jersey. In 2021, the Middlesex System accounted for 59% of operating revenues. At 12/31/21, the company had 347 employees. Incorporated: NJ. President, CEO, and Chairman: Dennis W. Doll. Officers & directors own 2.0% of the com. stock: BlackRock Inst. Trust Co., 7.8% (4/21 proxy). Add.: 485 C Route 1 South, Suite 400, Iselin, NJ 08830. Tel.: 732-634-1500. Int.: www.middlesexwater.com.																			
ANNUAL RATES of change (per sh) Past 10 Yrs. 5 Yrs. Est'd '19-'21 to '25-'27 Revenues 2.0% 5% 2.5% "Cash Flow" 8.0% 9.5% 3.5% Earnings 9.5% 11.0% 4.5% Dividends 3.5% 6.0% 5.0% Book Value 6.0% 9.0% 2.0%										Middlesex Water reported lackluster share earnings in the December period. The New Jersey-based regulated water utility delivered fourth-quarter earnings of \$0.41 per share, down 13% from the previous year figure. Despite decent water consumption and customer base growth in its Delaware water system, headwinds, such as higher labor and transportation fuel costs, along with an uptick in operation and maintenance expense, were a drag on the bottom line. But a recently effected rate hike (January) should provide some relief amidst a relatively challenging operating backdrop. While burdensome fuel inputs are not likely to abate in the near term, higher revenues from the abovementioned rate increase ought to largely offset rising expenses. A notable recovery in economic activity levels post-pandemic augurs well, too. All things considered, based on our model, 2022 revenues and earnings are poised to expand 5% and 9% this year, to \$150 million and \$2.25 per share, respectively. The company ought to continue to execute on its capital investment strategy. On top of completing an ozone treatment facility late last year, several projects are on tap, including upgrades at its Wellfield treatment facility, water infrastructure improvements in Woodbridge Township, and a recently announced lead service line replacement program to extricate any lead-related materials from New Jersey service lines. On balance, we think periodic rate hikes are in the cards over the pull to mid-decade, as the majority of these project costs can be passed along to the consumer pending approval from state regulators. Middlesex stock has taken a breather since the start of the year. In our view, a combination of broader market turbulence and profit taking (MSEX shares etched an all-time high of \$120 in late December) likely weighed on share-price performance over the past three months. Even so, we are not recommending the stock at present. The equity, which is merely an Average (Timeliness: 3) selection for the year ahead, is currently trading beyond the upper end of our 3- to 5-year Target Price Range.																			
QUARTERLY REVENUES (\$ mill.) Cal- Mar.31 Jun.30 Sep.30 Dec.31 Full Year 2019 30.7 33.4 37.8 32.7 134.6 2020 31.8 35.3 39.9 34.6 141.6 2021 32.5 36.7 39.9 34.0 143.1 2022 34.0 38.0 41.0 37.0 150 2023 36.0 39.0 42.0 38.0 155										Earnings per share A Cal- Mar.31 Jun.30 Sep.30 Dec.31 Full Year 2019 .39 .49 .66 .46 2.01 2020 .44 .55 .72 .47 2.18 2021 .39 .62 .65 .41 2.07 2022 .39 .56 .75 .55 2.25 2023 .50 .60 .77 .58 2.45																			
QUARTERLY DIVIDENDS PAID B= \$ Cal- Mar.31 Jun.30 Sep.30 Dec.31 Full Year 2018 .22375 .22375 .22375 .24 .91 2019 .24 .24 .24 .2562 .98 2020 .2562 .2562 .2562 .2725 1.04 2021 .2725 .2725 .2725 .29 1.11 2022 .29										To subscribe call 1-800-VALUELINE																			

(A) Diluted earnings. Next earnings report due early May. (B) Dividends historically paid in mid-Feb., May, Aug., and November. Div'd reinvestment plan available. (C) In millions.

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*Nicholas P. Patrikis* April 8, 2022

ESSENTIAL UTIL. NYSE-WTRG										RECENT PRICE	50.04	P/RATIO	28.0	(Trailing: 30.0 Median: 25.0)	RELATIVE P/E RATIO	1.56	DIV'D YLD	2.2%	VALUE LINE			
TIMELINESS	4	Lowered 3/18/22	High: 19.0	21.5	28.1	31.1	35.8	39.6	39.4	47.3	54.5	53.9	53.7				Target Price Range					
SAFETY	3	Lowered 1/8/21	Low: 15.4	16.8	20.6	22.4	24.4	28.0	29.4	32.1	30.4	41.1	44.7				2025	2026	2027			
TECHNICAL	4	Lowered 4/8/22	LEGENDS																			
BETA	.95	(1.00 = Market)	1.60 x Dividends p sh divided by Interest Rate																			
18-Month Target Price Range			Relative Price Strength																			
Low-High Midpoint (% to Mid)			5-for-4 split 9/13																			
\$42-\$72 \$57 (15%)			Options: Yes																			
			Shaded area indicates recession																			
2025-27 PROJECTIONS																						
Price	Gain	Ann'l Total																				
High	70	(+40%)																				
Low	45	(-10%)																				
Institutional Decisions																						
			Percent shares traded																			

<p><b>(A)</b> Diluted earnings. Next earnings report due early May.</p> <p><b>(B)</b> Dividends historically paid in late February, June, September, and December.</p>	<p><b>(C)</b> In millions, adjusted for split.</p>		<p><b>Company's Financial Strength</b> B+</p> <p><b>Stock's Price Stability</b> 80</p> <p><b>Price Growth Persistence</b> 70</p> <p><b>Earnings Predictability</b> 100</p>	<p><b>To subscribe call 1-800-VALUELINE</b></p>
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Aqua North Carolina, Inc.  
Summary of Risk Premium Models for the  
Proxy Group of Seven Water Companies

	Base Year (Current Interest Rates)	Projected Rate Year 1 (2023 Proj Interest Rates)	Projected Rate Year 2 (2024 Proj Interest Rates)	Projected Rate Year 3 (2025 Proj Interest Rates)
Predictive Risk Premium Model (PRPM) (1)	11.37 %	12.21 %	12.18 %	12.48 %
Risk Premium Using an Adjusted Total Market Approach (2)	10.87 %	11.30 %	11.20 %	11.32 %
Average	11.12 %	11.76 %	11.69 %	11.90 %

Notes:

- (1) From pages 2 through 5 of this Schedule.  
(2) From page 6 of this Schedule.

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Aqua North Carolina, Inc.

Indicated ROE

Derived by the Predictive Risk Premium Model (1)

Using Current Interest Rates

	[1]	[2]	[3]	[4]	[5]	[6]	[7]
Proxy Group of Seven Water Companies	L.T Average Predicted Variance	Spot Predicted Variance	Recommended Variance (2)	GARCH Coefficient	Predicted Risk Premium (3)	Risk-Free Rate (4)	Indicated ROE (5)
American States Water Company	0.38%	0.42%	0.38%	1.8324	8.73%	2.49%	11.22%
American Water Works Company, Inc.	0.27%	0.38%	0.27%	4.7663	16.74%	2.49%	NMF
California Water Service Group	0.33%	0.53%	0.33%	1.8760	7.58%	2.49%	10.07%
Essential Utilities Inc.	0.44%	0.47%	0.44%	2.2107	12.41%	2.49%	14.90%
Middlesex Water Company	0.33%	0.82%	0.33%	2.0161	8.24%	2.49%	10.73%
SJW Group	0.41%	0.36%	0.41%	1.4808	7.60%	2.49%	10.09%
The York Water Company	0.47%	0.43%	0.47%	1.8732	11.04%	2.49%	13.53%
						Average	11.76%
						Median	10.98%
						Average of Mean and Median	11.37%

NMF = Not Meaningful Figure

Notes:

- (1) The Predictive Risk Premium Model uses historical data to generate a predicted variance and a GARCH coefficient. The historical data used are the equity risk premiums for the first available trading month as reported by Bloomberg Professional Services.
- (2) Based on the long-term average predicted variance.
- (3)  $(1 + (\text{Column [3]} * \text{Column [4]})^{12}) - 1$ .
- (4) From note 2 on page 5 of Schedule DWD-5.
- (5) Column [5] + Column [6].



Aqua North Carolina, Inc.

Indicated ROE

Derived by the Predictive Risk Premium Model (1)

Using Projected 2023 Interest Rates

	[1]	[2]	[3]	[4]	[5]	[6]	[7]
Proxy Group of Seven Water Companies	L.T Average Predicted Variance	Spot Predicted Variance	Recommended Variance (2)	GARCH Coefficient	Predicted Risk Premium (3)	Risk-Free Rate (4)	Indicated ROE (5)
American States Water Company	0.38%	0.42%	0.38%	1.8324	8.73%	3.33%	12.06%
American Water Works Company, Inc.	0.27%	0.38%	0.27%	4.7663	16.74%	3.33%	NMF
California Water Service Group	0.33%	0.53%	0.33%	1.8760	7.58%	3.33%	10.91%
Essential Utilities Inc.	0.44%	0.47%	0.44%	2.2107	12.41%	3.33%	15.74%
Middlesex Water Company	0.33%	0.82%	0.33%	2.0161	8.24%	3.33%	11.57%
SJW Group	0.41%	0.36%	0.41%	1.4808	7.60%	3.33%	10.93%
The York Water Company	0.47%	0.43%	0.47%	1.8732	11.04%	3.33%	14.37%
						Average	12.60%
						Median	11.82%
						Average of Mean and Median	12.21%

NMF = Not Meaningful Figure

Notes:

- (1) The Predictive Risk Premium Model uses historical data to generate a predicted variance and a GARCH coefficient. The historical data used are the equity risk premiums for the first available trading month as reported by Bloomberg Professional Services.
- (2) Based on the long-term average predicted variance.
- (3)  $(1 + (\text{Column [3]} * \text{Column [4]})^{12}) - 1$ .
- (4) From note 3 on page 5 of Schedule DWD-5.
- (5) Column [5] + Column [6].

Aqua North Carolina, Inc.

Indicated ROE

Derived by the Predictive Risk Premium Model (1)

Using Projected 2024 Interest Rates

	[1]	[2]	[3]	[4]	[5]	[6]	[7]
Proxy Group of Seven Water Companies	L.T Average Predicted Variance	Spot Predicted Variance	Recommended Variance (2)	GARCH Coefficient	Predicted Risk Premium (3)	Risk-Free Rate (4)	Indicated ROE (5)
American States Water Company	0.38%	0.42%	0.38%	1.8324	8.73%	3.30%	12.03%
American Water Works Company, Inc.	0.27%	0.38%	0.27%	4.7663	16.74%	3.30%	NMF
California Water Service Group	0.33%	0.53%	0.33%	1.8760	7.58%	3.30%	10.88%
Essential Utilities Inc.	0.44%	0.47%	0.44%	2.2107	12.41%	3.30%	15.71%
Middlesex Water Company	0.33%	0.82%	0.33%	2.0161	8.24%	3.30%	11.54%
SJW Group	0.41%	0.36%	0.41%	1.4808	7.60%	3.30%	10.90%
The York Water Company	0.47%	0.43%	0.47%	1.8732	11.04%	3.30%	14.34%
						Average	12.57%
						Median	11.79%
						Average of Mean and Median	12.18%

NMF = Not Meaningful Figure

Notes:

- (1) The Predictive Risk Premium Model uses historical data to generate a predicted variance and a GARCH coefficient. The historical data used are the equity risk premiums for the first available trading month as reported by Bloomberg Professional Services.
- (2) Based on the long-term average predicted variance.
- (3)  $(1 + (\text{Column [3]} * \text{Column [4]})^{12}) - 1$ .
- (4) From note 4 on page 5 of Schedule DWD-5.
- (5) Column [5] + Column [6].

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Aqua North Carolina, Inc.

Indicated ROE

Derived by the Predictive Risk Premium Model (1)

Using Projected 2025 Interest Rates

	[1]	[2]	[3]	[4]	[5]	[6]	[7]
Proxy Group of Seven Water Companies	L.T Average Predicted Variance	Spot Predicted Variance	Recommended Variance (2)	GARCH Coefficient	Predicted Risk Premium (3)	Risk-Free Rate (4)	Indicated ROE (5)
American States Water Company	0.38%	0.42%	0.38%	1.8324	8.73%	3.60%	12.33%
American Water Works Company, Inc.	0.27%	0.38%	0.27%	4.7663	16.74%	3.60%	NMF
California Water Service Group	0.33%	0.53%	0.33%	1.8760	7.58%	3.60%	11.18%
Essential Utilities Inc.	0.44%	0.47%	0.44%	2.2107	12.41%	3.60%	16.01%
Middlesex Water Company	0.33%	0.82%	0.33%	2.0161	8.24%	3.60%	11.84%
SJW Group	0.41%	0.36%	0.41%	1.4808	7.60%	3.60%	11.20%
The York Water Company	0.47%	0.43%	0.47%	1.8732	11.04%	3.60%	14.64%
						Average	12.87%
						Median	12.09%
						Average of Mean and Median	12.48%

NMF = Not Meaningful Figure

Notes:

- (1) The Predictive Risk Premium Model uses historical data to generate a predicted variance and a GARCH coefficient. The historical data used are the equity risk premiums for the first available trading month as reported by Bloomberg Professional Services.
- (2) Based on the long-term average predicted variance.
- (3)  $(1 + (\text{Column [3]} * \text{Column [4]})^{12}) - 1$ .
- (4) From note 5 on page 5 of Schedule DWD-5.
- (5) Column [5] + Column [6].

Aqua North Carolina, Inc.  
Indicated Common Equity Cost Rate  
Through Use of a Risk Premium Model  
Using an Adjusted Total Market Approach

<u>Line No.</u>		<u>Results using Current Interest Rates</u>	<u>Results using Projected 2023 Interest Rates</u>	<u>Results using Projected 2024 Interest Rates</u>	<u>Results using Projected 2025 Interest Rates</u>
1.	Prospective Yield on Aaa Rated Corporate Bonds (1)		4.45 %	4.20	4.50
2.	Adjustment to Reflect Yield Spread Between Aaa Rated Corporate Bonds and A2 Rated Public Utility Bonds		<u>0.51 (2)</u>	<u>0.51</u>	<u>0.51</u>
3.	Adjusted Prospective Yield on A2 Rated Public Utility Bonds		4.96 %	4.71 %	5.01 %
4.	Current Yield on A2 Rated Public Utility Bonds (3)	3.99 %			
5.	Adjustment to Reflect Bond Rating Difference of Proxy Group (4)	<u>0.10</u>	<u>0.10</u>	<u>0.10</u>	<u>0.10</u>
6.	Adjusted Prospective Bond Yield	4.09 %	5.06 %	4.81 %	5.11 %
7.	Equity Risk Premium (5)	<u>6.78</u>	<u>6.24</u>	<u>6.39</u>	<u>6.21</u>
8.	Risk Premium Derived Common Equity Cost Rate	<u>10.87 %</u>	<u>11.30 %</u>	<u>11.20 %</u>	<u>11.32 %</u>

- Notes: (1) Consensus forecast of Moody's Aaa Rated Corporate bonds from Blue Chip Financial Forecasts (see pages 13 and 14 of this Schedule).  
(2) The average yield spread of A2 rated public utility bonds over Aaa rated corporate bonds of 0.51% from page 7 of this Schedule.  
(3) Three-month average A2-rated utility bond yield ending April 2022 as shown on page 7 of this Schedule.  
(4) Adjustment to reflect the A3 Moody's long-term rating of the Utility Proxy Group as shown on page 8 of this Schedule. The 0.1% upward adjustment is derived by taking 1/3 of the spread between A2 and Baa2 Public Utility Bonds ( $1/3 * 0.29\% = 0.10\%$ ) as derived from page 7 of this Schedule.  
(5) From page 10 of this Schedule.

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Aqua North Carolina, Inc.  
Interest Rates and Bond Spreads for  
Moody's Corporate and Public Utility Bonds

Selected Bond Yields

	[1]	[2]	[3]
	<u>Aaa Rated Corporate Bond</u>	<u>A2 Rated Public Utility Bond</u>	<u>Baa2 Rated Public Utility Bond</u>
Apr-2022	3.75 %	4.30 %	4.60 %
Mar-2022	3.43	3.98	4.28
Feb-2022	<u>3.25</u>	<u>3.68</u>	<u>3.95</u>
Average	<u>3.48 %</u>	<u>3.99 %</u>	<u>4.28 %</u>

Selected Bond Spreads

A2 Rated Public Utility Bonds Over Aaa Rated Corporate Bonds:

0.51 % (1)

Baa2 Rated Public Utility Bonds Over A2 Rated Public Utility Bonds:

0.29 % (2)

Notes:

(1) Column [2] - Column [1].

(2) Column [3] - Column [2].

Source of Information:

Bloomberg Professional Services

Aqua North Carolina, Inc.  
Comparison of Long-Term Issuer Ratings for the  
Proxy Group of Seven Water Companies

	Moody's		Standard & Poor's	
	Long-Term Issuer Rating		Long-Term Issuer Rating	
	May 2022		May 2022	
Proxy Group of Seven Water Companies	Long-Term Issuer Rating	Numerical Weighting (1)	Long-Term Issuer Rating	Numerical Weighting (1)
American States Water Company (2)	A2	6.0	A+	5.0
American Water Works Company, Inc. (3)	A3	7.0	A	6.0
California Water Service Group	NR	--	A+	5.0
Essential Utilities Inc. (4)	Baa1	8.0	A	6.0
Middlesex Water Company	NR	--	A	6.0
SJW Group (5)	NR	--	A/A-	6.5
The York Water Company	NR	--	A-	7.0
Average	A3	7.0	A	5.9

Notes:

- (1) From page 9 of this Schedule.
- (2) Ratings that of Golden State Water Company.
- (3) Ratings that of New Jersey and Pennsylvania American Water Companies.
- (4) Ratings that of PNG Companies and Aqua Pennsylvania, Inc.
- (5) Ratings that of San Jose Water Company and Connecticut Water Inc.

Source Information: Moody's Investors Service  
Standard & Poor's Global Utilities Rating Service

# Numerical Assignment for Moody's and Standard & Poor's Bond Ratings

Moody's Bond Rating	Numerical Bond Weighting	Standard & Poor's Bond Rating
Aaa	1	AAA
Aa1	2	AA+
Aa2	3	AA
Aa3	4	AA-
A1	5	A+
A2	6	A
A3	7	A-
Baa1	8	BBB+
Baa2	9	BBB
Baa3	10	BBB-
Ba1	11	BB+
Ba2	12	BB
Ba3	13	BB-
B1	14	B+
B2	15	B
B3	16	B-

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Aqua North Carolina, Inc.  
Judgment of Equity Risk Premium for the  
Results using Current Interest Rates

Line No.		Results using Current Interest Rates	Results Using Projected 2023 Interest Rates	Results Using Projected 2024 Interest Rates	Results Using Projected 2025 Interest Rates
1.	Calculated equity risk premium based on the total market using the beta approach (1)	7.72 %	7.20 %	7.35 %	7.17 %
2.	Mean equity risk premium based on a study using the holding period returns of public utilities with A2 rated bonds (2)	5.83	5.28	5.42	5.25
3.	Average equity risk premium	6.78 %	6.24 %	6.39 %	6.21 %

Notes: (1) From page 11 of this Schedule.  
(2) From page 15 of this Schedule.

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Aqua North Carolina, Inc.  
Derivation of Equity Risk Premium Based on the Total Market Approach  
Using the Beta for the  
Proxy Group of Seven Water Companies

Line No.	Equity Risk Premium Measure	Results using Current Interest Rates	Results Using Projected 2023 Interest Rates	Results Using Projected 2024 Interest Rates	Results Using Projected 2025 Interest Rates
1.	Ibbotson Equity Risk Premium (1)	6.13 %	6.13 %	6.13 %	6.13 %
2.	Regression on Ibbotson Risk Premium Data (2)	9.16	8.02	8.34	7.96
3.	Ibbotson Equity Risk Premium based on PRPM (3)	8.35	8.35	8.35	8.35
4.	Equity Risk Premium Based on Value Line Summary and Index (4)	9.61	8.71	8.96	8.66
5.	Equity Risk Premium Based on Value Line S&P 500 Companies (5)	12.87	11.97	12.22	11.92
6.	Equity Risk Premium Based on Bloomberg S&P 500 Companies (6)	10.37	9.48	9.73	9.43
7.	Conclusion of Equity Risk Premium	9.41 %	8.78 %	8.96 %	8.74 %
8.	Adjusted Beta (7)	0.82	0.82	0.82	0.82
9.	Forecasted Equity Risk Premium	7.72 %	7.20 %	7.35 %	7.17 %

Notes provided on page 12 of this Schedule.

Aqua North Carolina, Inc.  
Derivation of Equity Risk Premium Based on the Total Market Approach  
Using the Beta for the  
Proxy Group of Seven Water Companies

Notes:

- (1) Based on the arithmetic mean historical monthly returns on large company common stocks from Kroll 2022 SBBI® 2022 YearbookMarket Report minus the arithmetic mean monthly yield of Moody's average Aaa and Aa2 corporate bonds from 1928-2021.
- (2) This equity risk premium is based on a regression of the monthly equity risk premiums of large company common stocks relative to Moody's average Aaa and Aa2 rated corporate bond yields from 1928-2021 referenced in Note 1 above. The equity risk premium is calculated using current and projected interest rates as indicated. The projected Aaa corporate bond yields for 2023 through 2025 are shown on line 1 of page 6 of this Schedule. The current interest rate is the three-month average Aaa and Aa2 corporate bond yields ending April 2022.
- (3) The Predictive Risk Premium Model (PRPM) is discussed in the accompanying direct testimony. The Ibbotson equity risk premium based on the PRPM is derived by applying the PRPM to the monthly risk premiums between Ibbotson large company common stock monthly returns and average Aaa and Aa2 corporate monthly bond yields, from January 1928 through April 2022.
- (4) The equity risk premium based on the Value Line Summary and Index is derived by subtracting the relevant bond yield from the projected 3-5 year total annual market return of 13.16% (described fully in note 1 on page 5 of Exhibit DWD-5).
- (5) The equity risk premium based on Value Line data for the S&P 500 companies subtracts the relevant bond yield from the expected market return of 16.42%, which was derived using expected dividend yields to represent the income return and expected earnings growth to represent the capital appreciation return.
- (6) The equity risk premium based on Bloomberg data for the S&P 500 companies subtracts the relevant bond yield from the expected market return of 13.93%, which was derived using expected dividend yields to represent the income return and expected earnings growth to represent the capital appreciation return.
- (7) Average of mean and median beta from Schedule DWD-5.

Sources of Information:

Kroll 2022  
Industrial Manual and Mergent Bond Record Monthly  
Value Line Summary and Index  
Blue Chip Financial Forecasts, December 1, 2021 and  
Bloomberg Professional Service

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2 ■ BLUE CHIP FINANCIAL FORECASTS ■ APRIL 29, 2022

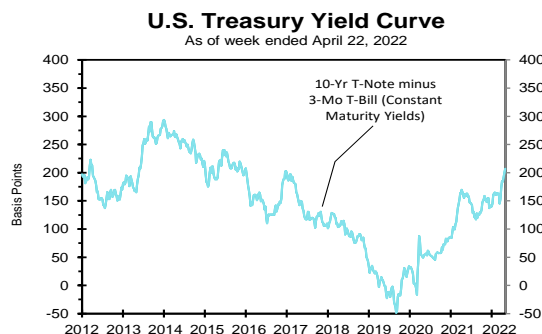
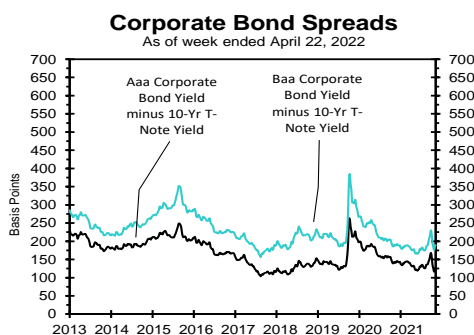
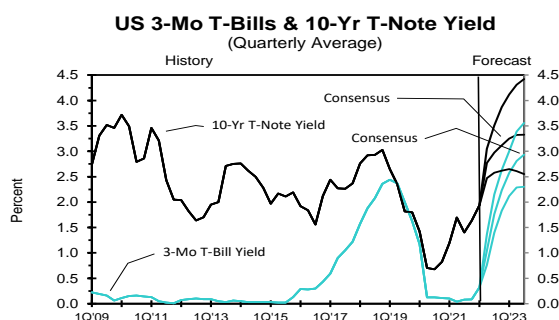
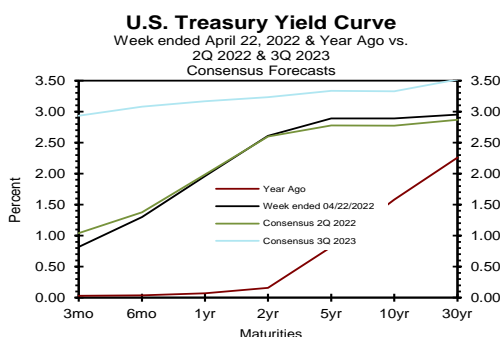
Consensus Forecasts of U.S. Interest Rates and Key Assumptions

Interest Rates	History				History				Consensus Forecasts-Quarterly Avg.						
	Average For Week Ending				Average For Month				2Q 2022	3Q 2022	4Q 2022	1Q 2023	2Q 2023	3Q 2023	2Q 2022
Federal Funds Rate	Apr 22	Apr 15	Apr 8	Apr 1	Mar	Feb	Jan	1Q 2022	1.0	1.7	2.2	2.6	2.9	3.0	1.0
Prime Rate	3.50	3.50	3.50	3.50	3.37	3.25	3.25	3.29	4.0	4.8	5.2	5.6	5.9	6.1	4.0
SOFR	0.27	0.29	0.30	0.28	0.16	0.05	0.05	0.09	0.8	1.6	2.1	2.5	2.7	2.9	0.8
Commercial Paper, 1-mo.	0.48	0.38	0.32	0.34	0.32	0.16	0.07	0.18	0.9	1.7	2.1	2.6	2.8	3.0	0.9
Treasury bill, 3-mo.	0.82	0.76	0.67	0.55	0.45	0.31	0.15	0.30	1.0	1.8	2.2	2.6	2.8	2.9	1.0
Treasury bill, 6-mo.	1.30	1.22	1.15	1.07	0.86	0.64	0.33	0.61	1.4	2.1	2.4	2.8	3.0	3.1	1.4
Treasury bill, 1 yr.	1.96	1.81	1.77	1.67	1.34	1.00	0.55	0.96	2.0	2.4	2.7	3.0	3.1	3.2	2.0
Treasury note, 2 yr.	2.61	2.43	2.49	2.35	1.91	1.44	0.98	1.44	2.6	2.9	3.0	3.2	3.2	3.2	2.6
Treasury note, 5 yr.	2.89	2.73	2.68	2.49	2.11	1.81	1.54	1.82	2.8	3.0	3.1	3.3	3.3	3.3	2.8
Treasury note, 10 yr.	2.89	2.76	2.59	2.39	2.13	1.93	1.76	1.94	2.8	3.0	3.1	3.3	3.3	3.3	2.8
Treasury note, 30 yr.	2.95	2.85	2.63	2.49	2.41	2.25	2.10	2.25	2.9	3.1	3.2	3.4	3.5	3.5	2.9
Corporate Aaa bond	4.16	4.02	3.75	3.64	3.63	3.36	3.06	3.35	4.0	4.2	4.4	4.6	4.7	4.8	4.0
Corporate Baa bond	4.78	4.63	4.35	4.23	4.23	3.92	3.54	3.90	4.8	5.1	5.3	5.5	5.6	5.7	4.8
State & Local bonds	3.79	3.67	3.55	3.51	3.30	3.01	2.74	3.02	3.4	3.7	3.8	4.0	4.1	4.1	3.4
Home mortgage rate	5.11	5.00	4.72	4.67	4.17	3.76	3.45	3.79	4.9	5.1	5.2	5.3	5.4	5.4	4.9

Key Assumptions	History				History				Consensus Forecasts-Quarterly						
	2Q 2020	3Q 2020	4Q 2020	1Q 2021	2Q 2021	3Q 2021	4Q 2021	1Q 2022	2Q 2022	3Q 2022	4Q 2022	1Q 2023	2Q 2023	3Q 2023	2Q 2022
Fed's AFE \$ Index	112.4	107.2	105.1	103.4	102.9	105.0	107.0	108.4	110.9	111.5	111.7	111.5	111.2	110.9	110.9
Real GDP	-31.2	33.8	4.5	6.3	6.7	2.3	6.9	-1.4	2.8	2.7	2.4	2.3	2.1	2.0	2.8
GDP Price Index	-1.5	3.6	2.2	4.3	6.1	6.0	7.1	8.0	5.6	4.0	3.4	3.0	2.8	2.6	5.6
Consumer Price Index	-3.4	4.8	2.2	4.1	8.2	6.7	7.9	9.2	6.9	4.3	3.4	3.0	2.7	2.6	6.9
PCE Price Index	-1.6	3.7	1.5	3.8	6.5	5.3	6.4	7.0	5.8	3.9	3.2	2.8	2.6	2.4	5.8

Forecasts for interest rates and the Federal Reserve's Advanced Foreign Economies Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index, CPI and PCE Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data: Treasury rates from the Federal Reserve Board's H.15; AAA-AA and A-BBB corporate bond yields from Bank of America-Merrill Lynch and are 15+ years, yield to maturity; State and local bond yields from Bank of America-Merrill Lynch, A-rated, yield to maturity; Mortgage rates from Freddie Mac, 30-year, fixed; SOFR from the New York Fed. All interest rate data are sourced from Haver Analytics. Historical data for Fed's Advanced Foreign Economies Index are from FRSR H.10. Historical data for Real GDP, GDP Price Index and PCE Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index history is from the Department of Labor's Bureau of Labor Statistics (BLS).



14 ■ BLUE CHIP FINANCIAL FORECASTS ■ DECEMBER 1, 2021

## Long-Range Survey:

The table below contains the results of our twice-annual long-range CONSENSUS survey. There are also Top 10 and Bottom 10 averages for each variable. Shown are consensus estimates for the years 2023 through 2027 and averages for the five-year periods 2023-2027 and 2028-2032. Apply these projections cautiously. Few if any economic, demographic and political forces can be evaluated accurately over such long time spans.

		Average For The Year					Five-Year Averages	
		2023	2024	2025	2026	2027	2023-2027	2028-2032
1. Federal Funds Rate	CONSENSUS	0.8	1.6	2.0	2.2	2.3	1.8	2.2
	Top 10 Average	1.2	2.2	2.7	2.7	2.8	2.3	2.9
	Bottom 10 Average	0.4	1.0	1.4	1.7	1.8	1.2	1.5
2. Prime Rate	CONSENSUS	4.0	4.7	5.1	5.3	5.4	4.9	5.3
	Top 10 Average	4.3	5.3	5.8	5.8	5.9	5.4	6.0
	Bottom 10 Average	3.6	4.1	4.5	4.9	5.0	4.4	4.6
3. LIBOR, 3-Mo.	CONSENSUS	1.0	1.7	2.2	2.4	2.5	1.9	2.4
	Top 10 Average	1.3	2.1	2.7	2.9	3.0	2.4	3.1
	Bottom 10 Average	0.7	1.2	1.6	1.9	2.0	1.5	1.8
4. Commercial Paper, 1-Mo	CONSENSUS	0.9	1.6	2.1	2.3	2.4	1.9	2.4
	Top 10 Average	1.2	2.0	2.6	2.8	2.9	2.3	2.9
	Bottom 10 Average	0.6	1.2	1.6	1.9	2.0	1.5	1.8
5. Treasury Bill Yield, 3-Mo	CONSENSUS	0.8	1.4	1.8	2.0	2.3	1.7	2.2
	Top 10 Average	1.2	1.9	2.5	2.6	2.8	2.2	2.9
	Bottom 10 Average	0.4	0.8	1.2	1.5	1.8	1.1	1.6
6. Treasury Bill Yield, 6-Mo	CONSENSUS	0.8	1.4	1.9	2.1	2.4	1.7	2.3
	Top 10 Average	1.2	2.0	2.6	2.7	2.9	2.3	3.0
	Bottom 10 Average	0.4	0.9	1.2	1.6	1.9	1.2	1.7
7. Treasury Bill Yield, 1-Yr	CONSENSUS	1.0	1.6	2.1	2.4	2.5	1.9	2.4
	Top 10 Average	1.4	2.1	2.7	2.8	3.0	2.4	3.1
	Bottom 10 Average	0.6	1.2	1.5	1.9	2.0	1.4	1.8
8. Treasury Note Yield, 2-Yr	CONSENSUS	1.3	1.9	2.4	2.6	2.6	2.2	2.6
	Top 10 Average	1.7	2.5	3.0	3.1	3.2	2.7	3.4
	Bottom 10 Average	0.8	1.4	1.8	2.0	2.1	1.6	1.9
9. Treasury Note Yield, 5-Yr	CONSENSUS	1.9	2.4	2.8	2.9	2.9	2.6	3.0
	Top 10 Average	2.3	3.0	3.4	3.5	3.6	3.1	3.8
	Bottom 10 Average	1.5	1.9	2.1	2.3	2.3	2.0	2.2
10. Treasury Note Yield, 10-Yr	CONSENSUS	2.4	2.8	3.1	3.2	3.2	2.9	3.3
	Top 10 Average	2.8	3.3	3.7	3.8	3.9	3.5	4.2
	Bottom 10 Average	2.0	2.3	2.4	2.5	2.5	2.3	2.4
11. Treasury Bond Yield, 30-Yr	CONSENSUS	2.9	3.3	3.6	3.7	3.7	3.4	3.8
	Top 10 Average	3.4	3.9	4.3	4.4	4.4	4.1	4.6
	Bottom 10 Average	2.4	2.8	2.9	3.0	3.0	2.8	3.0
12. Corporate Aaa Bond Yield	CONSENSUS	3.7	4.2	4.5	4.6	4.8	4.4	4.9
	Top 10 Average	4.3	4.7	5.1	5.2	5.4	4.9	5.6
	Bottom 10 Average	3.2	3.7	3.9	4.1	4.2	3.8	4.2
13. Corporate Baa Bond Yield	CONSENSUS	4.6	5.0	5.3	5.5	5.6	5.2	5.7
	Top 10 Average	5.1	5.5	5.9	6.1	6.2	5.7	6.5
	Bottom 10 Average	4.0	4.5	4.8	4.9	5.0	4.7	5.0
14. State & Local Bonds Yield	CONSENSUS	3.2	3.7	3.9	4.1	4.2	3.8	4.3
	Top 10 Average	3.8	4.3	4.5	4.7	4.8	4.4	5.0
	Bottom 10 Average	2.7	3.2	3.4	3.5	3.6	3.3	3.6
15. Home Mortgage Rate	CONSENSUS	4.0	4.4	4.7	4.8	4.8	4.5	4.9
	Top 10 Average	4.5	5.0	5.3	5.4	5.4	5.1	5.7
	Bottom 10 Average	3.6	3.9	4.1	4.1	4.2	4.0	4.1
A. Fed's AFE Nominal \$ Index	CONSENSUS	106.2	106.0	106.1	106.2	106.4	106.2	106.5
	Top 10 Average	108.1	108.4	108.9	109.0	109.2	108.7	110.1
	Bottom 10 Average	104.4	104.0	103.7	103.7	103.9	103.9	103.1
		Year-Over-Year, % Change					Five-Year Averages	
		2023	2024	2025	2026	2027	2023-2027	2028-2032
B. Real GDP	CONSENSUS	2.6	2.2	2.1	2.0	2.0	2.2	2.0
	Top 10 Average	3.1	2.6	2.5	2.4	2.3	2.6	2.4
	Bottom 10 Average	2.2	1.7	1.7	1.7	1.7	1.8	1.7
C. GDP Chained Price Index	CONSENSUS	2.5	2.2	2.2	2.1	2.1	2.2	2.1
	Top 10 Average	3.0	2.7	2.5	2.4	2.4	2.6	2.4
	Bottom 10 Average	2.0	1.9	1.9	1.9	1.9	1.9	1.8
D. Consumer Price Index	CONSENSUS	2.6	2.3	2.3	2.2	2.2	2.3	2.2
	Top 10 Average	3.2	2.8	2.6	2.5	2.5	2.7	2.5
	Bottom 10 Average	2.1	2.0	2.0	2.0	2.0	2.0	1.9
E. PCE Price Index	CONSENSUS	2.5	2.2	2.1	2.1	2.1	2.2	2.1
	Top 10 Average	3.0	2.6	2.4	2.4	2.3	2.6	2.4
	Bottom 10 Average	2.0	1.9	1.9	1.9	1.9	1.9	1.9

Aqua North Carolina, Inc.  
Derivation of Mean Equity Risk Premium Based Studies  
Using Holding Period Returns and  
Projected Market Appreciation of the S&P Utility Index

<u>Line No.</u>	<u>Equity Risk Premium based on S&amp;P Utility Index Holding Period Returns (1):</u>	<u>Results using Current Interest Rates</u>	<u>Results using Projected 2023 Interest Rates</u>	<u>Results using Projected 2024 Interest Rates</u>	<u>Results using Projected 2025 Interest Rates</u>
1.	Historical Equity Risk Premium	4.28 %	4.28 %	4.28 %	4.28 %
2.	Regression of Historical Equity Risk Premium (2)	6.36	5.56	5.77	5.52
3.	Forecasted Equity Risk Premium Based on PRPM (3)	5.89	5.89	5.89	5.89
4.	Forecasted Equity Risk Premium based on Projected Total Return on the S&P Utilities Index (Value Line Data) (4)	6.67	5.70	5.95	5.65
5.	Forecasted Equity Risk Premium based on Projected Total Return on the S&P Utilities Index (Bloomberg Data) (5)	5.93	4.96	5.21	4.91
6.	Average Equity Risk Premium (6)	5.83 %	5.28 %	5.42 %	5.25 %

Notes provided on page 16 of this Schedule.

Aqua North Carolina, Inc.  
Derivation of Mean Equity Risk Premium Based Studies  
Using Holding Period Returns and  
Projected Market Appreciation of the S&P Utility Index

Notes:

- (1) Based on S&P Public Utility Index monthly total returns and Moody's Public Utility Bond average monthly yields from 1928-2021. Holding period returns are calculated based upon income received (dividends and interest) plus the relative change in the market value of a security over a one-year holding period.
- (2) This equity risk premium is based on a regression of the monthly equity risk premiums of the S&P Utility Index relative to Moody's A2 rated public utility bond yields from 1928 - 2021 referenced in note 1 above. Using the equation generated from the regression, an expected equity risk premium is calculated using the relevant bond yield. The current and projected A2 rated utility bond yields are shown on lines 4 and 3 of page 6 of this Schedule, respectively.
- (3) The Predictive Risk Premium Model (PRPM) is applied to the risk premium of the monthly total returns of the S&P Utility Index and the monthly yields on Moody's A2 rated public utility bonds from January 1928 - April 2022.
- (4) The equity risk premium based on Value Line data for the S&P Utilities Index subtracts the relevant bond yield from the expected market return of 10.66%, which was derived using expected dividend yields to represent the income return and expected earnings growth to represent the capital appreciation return.
- (5) The equity risk premium based on Bloomberg data for the S&P Utilities Index subtracts the relevant bond yield from the expected market return of 9.92%, which was derived using expected dividend yields to represent the income return and expected earnings growth to represent the capital appreciation return.
- (6) Average of lines 1 through 5.

Aqua North Carolina, Inc.  
Indicated Common Equity Cost Rate Through Use  
of the Traditional Capital Asset Pricing Model (CAPM) and Empirical Capital Asset Pricing Model (ECAPM)  
Using Current Interest Rates

Proxy Group of Seven Water Companies	[1] Value Line Adjusted Beta	[2] Bloomberg Adjusted Beta	[3] Average Beta	[4] Market Risk Premium (1)	[5] Risk-Free Rate (2)	[6] Traditional CAPM Cost Rate	[7] ECAPM Cost Rate	[8] Indicated Common Equity Cost Rate (6)
American States Water Company	0.65	0.80	0.73	10.50 %	2.49 %	10.16 %	10.87 %	10.51 %
American Water Works Company, Inc.	0.85	0.79	0.82	10.50	2.49	11.10	11.57	11.34
California Water Service Group	0.65	0.91	0.78	10.50	2.49	10.68	11.26	10.97
Essential Utilities Inc.	0.95	0.91	0.93	10.50	2.49	12.26	12.44	12.35
Middlesex Water Company	0.70	0.88	0.79	10.50	2.49	10.79	11.34	11.06
SJW Group	0.80	0.86	0.83	10.50	2.49	11.21	11.65	11.43
The York Water Company	0.85	0.81	0.83	10.50	2.49	11.21	11.65	11.43
Mean			0.82			11.06 %	11.54 %	11.30 %
Median			0.82			11.10 %	11.57 %	11.34 %
Average of Mean and Median			0.82			11.08 %	11.56 %	11.32 %

Notes on page 5 of this Schedule.

Aqua North Carolina, Inc.  
Indicated Common Equity Cost Rate Through Use  
of the Traditional Capital Asset Pricing Model (CAPM) and Empirical Capital Asset Pricing Model (ECAPM)  
Using Projected 2023 Interest Rates

Proxy Group of Seven Water Companies	[1] Value Line Adjusted Beta	[2] Bloomberg Adjusted Beta	[3] Average Beta	[4] Market Risk Premium (1)	[5] Risk-Free Rate (3)	[6] Traditional CAPM Cost Rate	[7] ECAPM Cost Rate	[8] Indicated Common Equity Cost Rate (6)
American States Water Company	0.65	0.80	0.73	9.93 %	3.33 %	10.58 %	11.25 %	10.91 %
American Water Works Company, Inc.	0.85	0.79	0.82	9.93	3.33	11.47	11.92	11.69
California Water Service Group	0.65	0.91	0.78	9.93	3.33	11.07	11.62	11.35
Essential Utilities Inc.	0.95	0.91	0.93	9.93	3.33	12.56	12.74	12.65
Middlesex Water Company	0.70	0.88	0.79	9.93	3.33	11.17	11.69	11.43
SJW Group	0.80	0.86	0.83	9.93	3.33	11.57	11.99	11.78
The York Water Company	0.85	0.81	0.83	9.93	3.33	11.57	11.99	11.78
Mean			0.82			11.43 %	11.89 %	11.66 %
Median			0.82			11.47 %	11.92 %	11.69 %
Average of Mean and Median			0.82			11.45 %	11.91 %	11.68 %

Notes on page 5 of this Schedule.



Aqua North Carolina, Inc.  
Indicated Common Equity Cost Rate Through Use  
of the Traditional Capital Asset Pricing Model (CAPM) and Empirical Capital Asset Pricing Model (ECAPM)  
Using Projected 2024 Interest Rates

Proxy Group of Seven Water Companies	[1] Value Line Adjusted Beta	[2] Bloomberg Adjusted Beta	[3] Average Beta	[4] Market Risk Premium (1)	[5] Risk-Free Rate (4)	[6] Traditional CAPM Cost Rate	[7] ECAPM Cost Rate	[8] Indicated Common Equity Cost Rate (6)
American States Water Company	0.65	0.80	0.73	9.95 %	3.30 %	10.56 %	11.23 %	10.90 %
American Water Works Company, Inc.	0.85	0.79	0.82	9.95	3.30	11.46	11.91	11.68
California Water Service Group	0.65	0.91	0.78	9.95	3.30	11.06	11.61	11.33
Essential Utilities Inc.	0.95	0.91	0.93	9.95	3.30	12.55	12.73	12.64
Middlesex Water Company	0.70	0.88	0.79	9.95	3.30	11.16	11.68	11.42
SJW Group	0.80	0.86	0.83	9.95	3.30	11.56	11.98	11.77
The York Water Company	0.85	0.81	0.83	9.95	3.30	11.56	11.98	11.77
Mean			0.82			11.42 %	11.87 %	11.64 %
Median			0.82			11.46 %	11.91 %	11.68 %
Average of Mean and Median			0.82			11.44 %	11.89 %	11.66 %

Notes on page 5 of this Schedule.

Aqua North Carolina, Inc.  
Indicated Common Equity Cost Rate Through Use  
of the Traditional Capital Asset Pricing Model (CAPM) and Empirical Capital Asset Pricing Model (ECAPM)  
Using Projected 2025 Interest Rates

Proxy Group of Seven Water Companies	[1] Value Line Adjusted Beta	[2] Bloomberg Adjusted Beta	[3] Average Beta	[4] Market Risk Premium (1)	[5] Risk-Free Rate (5)	[6] Traditional CAPM Cost Rate	[7] ECAPM Cost Rate	[8] Indicated Common Equity Cost Rate (6)
American States Water Company	0.65	0.80	0.73	9.74 %	3.60 %	10.71 %	11.37 %	11.04 %
American Water Works Company, Inc.	0.85	0.79	0.82	9.74	3.60	11.59	12.03	11.81
California Water Service Group	0.65	0.91	0.78	9.74	3.60	11.20	11.74	11.47
Essential Utilities Inc.	0.95	0.91	0.93	9.74	3.60	12.66	12.83	12.75
Middlesex Water Company	0.70	0.88	0.79	9.74	3.60	11.30	11.81	11.55
SJW Group	0.80	0.86	0.83	9.74	3.60	11.69	12.10	11.89
The York Water Company	0.85	0.81	0.83	9.74	3.60	11.69	12.10	11.89
Mean			0.82			11.55 %	12.00 %	11.77 %
Median			0.82			11.59 %	12.03 %	11.81 %
Average of Mean and Median			0.82			11.57 %	12.02 %	11.79 %

Notes on page 5 of this Schedule.

Aqua North Carolina, Inc.  
Notes to Accompany the Application of the CAPM and ECAPM

Notes:

- (1) The market risk premium (MRP) is derived by using six different measures from three sources: Ibbotson, Value Line, and Bloomberg as illustrated below:

	Using Current Interest Rates	Using Projected 2023 Interest Rates	Using Projected 2024 Interest Rates	Using Projected 2025 Interest Rates
<u>Historical Data MRP Estimates:</u>				
Measure 1: Ibbotson Arithmetic Mean MRP (1926-2021)				
Arithmetic Mean Monthly Returns for Large Stocks 1926-2021	12.37 %	12.37 %	12.37 %	12.37 %
Arithmetic Mean Income Returns on Long-Term Government Bonds	5.02	5.02	5.02	5.02
MRP based on Ibbotson Historical Data:	<u>7.35 %</u>	<u>7.35 %</u>	<u>7.35 %</u>	<u>7.35 %</u>
Measure 2: Application of a Regression Analysis to Ibbotson Historical Data (1926-2021)				
	<u>10.27 %</u>	<u>9.34 %</u>	<u>9.38 %</u>	<u>9.05 %</u>
Measure 3: Application of the PRPM to Ibbotson Historical Data: (January 1926 - April 2022)				
	<u>9.35 %</u>	<u>9.35 %</u>	<u>9.35 %</u>	<u>9.35 %</u>
<u>Value Line MRP Estimates:</u>				
Measure 4: Value Line Projected MRP (Thirteen weeks ending May 13, 2022)				
Total projected return on the market 3-5 years hence*	13.16 %	13.16 %	13.16 %	13.16 %
Projected Risk-Free Rate (see note 2):	2.49	3.33	3.30	3.60
MRP based on Value Line Summary & Index:	<u>10.67 %</u>	<u>9.83 %</u>	<u>9.86 %</u>	<u>9.56 %</u>
*Forecasted 3-5 year capital appreciation plus expected dividend yield				
Measure 5: Value Line Projected Return on the Market based on the S&P 500				
Total return on the Market based on the S&P 500	16.42 %	16.42 %	16.42 %	16.42 %
Projected Risk-Free Rate (see note 2):	2.49	3.33	3.30	3.60
MRP based on Value Line data	<u>13.93 %</u>	<u>13.09 %</u>	<u>13.12 %</u>	<u>12.82 %</u>
Measure 6: Bloomberg Projected MRP				
Total return on the Market based on the S&P 500	13.93 %	13.93 %	13.93 %	13.93 %
Projected Risk-Free Rate (see note 2):	2.49	3.33	3.30	3.60
MRP based on Bloomberg data	<u>11.44 %</u>	<u>10.60 %</u>	<u>10.63 %</u>	<u>10.33 %</u>
Average of Value Line, Ibbotson, and Bloomberg MRP:	<u>10.50 %</u>	<u>9.93 %</u>	<u>9.95 %</u>	<u>9.74 %</u>

- (2) Three-month average on 30-year Treasury bond yield ended February, 2022 as shown below:

Feb-22	2.25 %
Mar-22	2.41
Apr-22	2.81
	<u>2.49 %</u>

- (3) For reasons explained in the Direct Testimony, the appropriate risk-free rate for cost of capital purposes is the average forecast of 30 year Treasury Bonds per the consensus of nearly 50 economists reported in Blue Chip Financial Forecasts. (See pages 13-14 of Schedule DWD-4.) The projection of the 2023 risk-free rate is illustrated below:

First Quarter 2023	3.40 %
Second Quarter 2023	3.50
Third Quarter 2023	3.50
2023 Consensus	<u>2.90</u>
	<u>3.33 %</u>

- (4) The projection of the 2024 risk-free rate is illustrated below:

2024 Consensus	<u>3.30 %</u>
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- (5) The projection of the 2025 risk-free rate is illustrated below:

2025 Consensus	<u>3.60 %</u>
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- (6) Average of Column 6 and Column 7.

Sources of Information:

Value Line Summary and Index  
Blue Chip Financial Forecasts, December 1, 2021 and April 29, 2022  
Kroll 2022 SBBi® Yearbook  
Bloomberg Professional Services

Aqua North Carolina, Inc.  
Basis of Selection of the Group of Non-Price Regulated Companies  
Comparable in Total Risk to the Utility Proxy Group

The criteria for selection of the proxy group of twenty-five non-price regulated companies was that the non-price regulated companies be domestic and reported in Value Line Investment Survey (Standard Edition).

The Non-Price Regulated Proxy Group were then selected based on the unadjusted beta range of 0.48 – 0.78 and residual standard error of the regression range of 2.8225 – 3.3665 of the Utility Proxy Group.

These ranges are based upon plus or minus two standard deviations of the unadjusted beta and standard error of the regression. Plus or minus two standard deviations captures 95.50% of the distribution of unadjusted betas and residual standard errors of the regression.

The standard deviation of the Utility Proxy Group's residual standard error of the regression is 0.1360. The standard deviation of the standard error of the regression is calculated as follows:

$$\text{Standard Deviation of the Std. Err. of the Regr.} = \frac{\text{Standard Error of the Regression}}{\sqrt{2N}}$$

where: N = number of observations. Since Value Line betas are derived from weekly price change observations over a period of five years, N = 259

$$\text{Thus, } 0.1360 = \frac{3.0945}{\sqrt{518}} = \frac{3.0945}{22.7596}$$

Source of Information: Value Line, Inc., March 2022  
Value Line Investment Survey (Standard Edition)

Aqua North Carolina, Inc.  
Basis of Selection of Comparable Risk  
Domestic Non-Price Regulated Companies

	[1]	[2]	[3]	[4]
Proxy Group of Seven Water Companies	Value Line Adjusted Beta	Unadjusted Beta	Residual Standard Error of the Regression	Standard Deviation of Beta
American States Water Company	0.65	0.40	2.4309	0.0601
American Water Works Company, Inc.	0.85	0.75	3.2139	0.0795
California Water Service Group	0.65	0.46	3.0606	0.0757
Essential Utilities Inc.	0.95	0.90	2.6745	0.0662
Middlesex Water Company	0.70	0.51	3.4876	0.0863
SJW Group	0.80	0.68	3.3451	0.0827
The York Water Company	0.85	0.71	3.4491	0.0853
Average	0.78	0.63	3.0945	0.0765
Beta Range (+/- 2 std. Devs. of Beta) 2 std. Devs. of Beta	0.48 0.15	0.78		
Residual Std. Err. Range (+/- 2 std. Devs. of the Residual Std. Err.)	2.8225	3.3665		
Std. dev. of the Res. Std. Err.	0.1360			
2 std. devs. of the Res. Std. Err.	0.2720			

Source of Information: Valueline Proprietary Database, March 2022

Aqua North Carolina, Inc.  
Proxy Group of Non-Price Regulated Companies  
Comparable in Total Risk to the  
Proxy Group of Seven Water Companies

	[1]	[2]	[3]	[4]
Proxy Group of Twenty-Four Non-Price Regulated Companies	Value Line Adjusted Beta	Unadjusted Beta	Residual Standard Error of the Regression	Standard Deviation of Beta
Smith (A.O.)	0.85	0.77	2.8592	0.0707
Balchem Corp.	0.70	0.51	3.3114	0.0819
Becton, Dickinson	0.75	0.60	2.8626	0.0708
Bristol-Myers Squibb	0.85	0.75	2.9154	0.0721
Chemed Corp.	0.85	0.70	2.8432	0.0703
C.H. Robinson	0.75	0.56	3.0412	0.0752
CSG Systems Int'l	0.75	0.57	3.0997	0.0767
Quest Diagnostics	0.80	0.65	3.1904	0.0789
Heartland Express	0.75	0.55	2.8513	0.0705
Henry (Jack) & Assoc	0.85	0.70	2.9159	0.0721
Lancaster Colony	0.70	0.49	2.9597	0.0732
Lilly (Eli)	0.75	0.62	3.2324	0.0800
ManTech Int'l 'A'	0.85	0.75	3.1083	0.0769
McCormick & Co.	0.80	0.65	2.8247	0.0699
Monster Beverage	0.85	0.75	2.9659	0.0734
Northrop Grumman	0.85	0.75	2.9830	0.0738
Oracle Corp.	0.75	0.61	2.8406	0.0703
Progressive Corp.	0.75	0.59	2.9344	0.0726
RLI Corp.	0.80	0.65	2.8568	0.0707
Rollins, Inc.	0.85	0.73	3.1605	0.0782
Tyler Technologies	0.75	0.59	3.2277	0.0798
United Parcel Serv.	0.80	0.65	3.3248	0.0822
Werner Enterprises	0.75	0.62	3.2786	0.0811
Western Union	0.80	0.64	2.8493	0.0705
Average	0.79	0.64	3.0182	0.0747
Proxy Group of Seven Water Companies	0.78	0.63	3.0945	0.0765

Source of Information:

Valueline Proprietary Database, March 2022

Aqua North Carolina, Inc.  
Summary of Cost of Equity Models Applied to  
Proxy Group of Twenty-Four Non-Price Regulated Companies  
Comparable in Total Risk to the  
Proxy Group of Seven Water Companies

Principal Methods	Results using Current Interest Rates	Results using Projected 2023 Interest Rates	Results using Projected 2024 Interest Rates	Results using Projected 2025 Interest Rates
Discounted Cash Flow Model (DCF) (1)	10.68 %	10.68 %	10.68 %	10.68 %
Risk Premium Model (RPM) (2)	11.79	12.33	12.13	12.25
Capital Asset Pricing Model (CAPM) (3)	11.18	11.55	11.53	11.66
	Mean 11.22 %	11.52 %	11.45 %	11.53 %
	Median 11.18 %	11.55 %	11.53 %	11.66 %
	Average of Mean and Median 11.20 %	11.54 %	11.49 %	11.60 %

Notes:

- (1) From page 2 of this Schedule.
- (2) From page 3 of this Schedule.
- (3) From pages 6 through 9 of this Schedule.

Aqua North Carolina, Inc.  
DCF Results for the Proxy Group of Non-Price-Regulated Companies Comparable in Total Risk to the  
Proxy Group of Seven Water Companies

	[1]	[2]	[3]	[4]	[6]	[7]	[8]
Proxy Group of Twenty-Four Non-Price Regulated Companies	Average Dividend Yield	Value Line Projected Five Year Growth in EPS	Zack's Five Year Projected Growth Rate in EPS	Yahoo! Finance Projected Five Year Growth in EPS	Average Projected Five Year Growth Rate in EPS	Adjusted Dividend Yield	Indicated Common Equity Cost Rate (1)
Smith (A.O.)	1.72 %	11.50 %	9.00 %	8.00 %	9.50 %	1.80 %	11.30 %
Batchem Corp.	0.48	14.00	NA	24.00	19.00	0.53	19.53
Becton, Dickinson	1.34	5.50	6.30	3.20	5.00	1.37	6.37
Bristol-Myers Squibb	2.96	NMF	6.20	4.43	5.32	3.04	8.36
Chemed Corp.	0.29	7.00	8.50	7.00	7.50	0.30	7.80
C.H. Robinson	2.13	8.50	9.00	7.24	8.25	2.22	10.47
CSG Systems Int'l	1.70	12.00	NA	(5.00)	12.00	1.80	13.80
Quest Diagnostics	1.93	7.00	NA	(13.70)	7.00	2.00	9.00
Heartland Express	0.57	8.50	NA	13.30	10.90	0.60	11.50
Henry (Jack) & Assoc	1.04	9.00	9.00	14.00	10.67	1.10	11.77
Lancaster Colony	2.08	5.50	NA	3.00	4.25	2.12	6.37
Lilly (Eli)	1.40	11.50	15.30	6.66	11.15	1.48	12.63
ManTech Int'l 'A'	1.95	7.50	NA	5.38	6.44	2.01	8.45
McCormick & Co.	1.49	6.00	6.10	6.95	6.35	1.54	7.89
Monster Beverage	-	11.50	15.70	14.58	13.93	-	NA
Northrop Grumman	1.41	7.50	6.10	6.10	6.57	1.46	8.03
Oracle Corp.	1.65	9.00	8.00	10.24	9.08	1.72	10.80
Progressive Corp.	0.36	4.50	17.60	NMF	11.05	0.38	11.43
RHI Corp.	0.95	12.00	NA	9.80	10.90	1.00	11.90
Rollins, Inc.	1.19	10.50	NA	8.20	9.35	1.25	10.60
Tyler Technologies	-	12.00	NA	10.00	11.00	-	NA
United Parcel Serv.	3.05	11.50	9.00	14.10	11.53	3.23	14.76
Werner Enterprises	1.26	9.00	4.10	9.40	7.50	1.31	8.81
Western Union	5.13	8.00	NA	6.84	7.42	5.32	12.74
						Mean	10.65 %
						Median	10.70 %
					Average of Mean and Median		10.68 %

NA= Not Available  
NMF= Not Meaningful Figure

Notes: (1) The application of the DCF model to the domestic, non-price regulated comparable risk companies is identical to the application of the DCF to the utility proxy group. The dividend yield is derived by using the 60 day average price and the spot indicated dividend as of May 13, 2022. The dividend yield is then adjusted by 1/2 the average projected growth rate in EPS, which is calculated by averaging the 5 year projected growth in EPS provided by Value Line, www.zacks.com, and www.yahoo.com (excluding any negative growth rates) and then adding that growth rate to the adjusted dividend yield.

Source of Information:

Value Line Investment Survey  
www.zacks.com Downloaded on 05/13/2022  
www.yahoo.com Downloaded on 05/13/2022



Aqua North Carolina, Inc.  
Indicated Common Equity Cost Rate  
Through Use of a Risk Premium Model  
Using an Adjusted Total Market Approach

Line No.		Proxy Group of Twenty-Four Non- Price Regulated Companies	Results using Projected 2023 Interest Rates	Results using Projected 2024 Interest Rates	Results using Projected 2025 Interest Rates
1.	Prospective Yield on Baa2 Rated Corporate Bonds	-	5.35 % (1)	5.00 % (2)	5.30 % (3)
2.	Current Yield on Baa2 Rated Corporate Bonds (4)	4.30 %	-	-	-
3.	Adjustment to Reflect Bond rating Difference of Non-Price Regulated Companies (5)	(0.13)	(0.13)	(0.13)	(0.13)
4.	Adjusted Prospective Bond Yield	4.17	5.22	4.87	5.17
5.	Equity Risk Premium (6)	7.62	7.11	7.26	7.08
6.	Risk Premium Derived Common Equity Cost Rate	11.79 %	12.33 %	12.13 %	12.25 %

(1) Average forecast of 2023 Baa2 corporate bonds based upon the consensus of nearly 50 economists reported in Blue Chip Financial Forecasts dated December 1, 2021 and April 29, 2022 (see pages 13 and 14 of Schedule DWD-4). The estimates are detailed below.

First Quarter 2023	5.50 %
Second Quarter 2023	5.60
Third Quarter 2023	5.70
2023 Consensus	4.60
Average	5.35 %

(2) The projection of the 2024 Baa2 corporate bond is illustrated below:

2024 Consensus	5.00 %
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(3) The projection of the 2025 Baa2 corporate bond is illustrated below:

2025 Consensus	5.30 %
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(4) Three-month average Baa2 corporate bond yield ended February, 2022 as reported by Bloomberg Professional Services shown below:

Feb-22	3.97 %
Mar-22	4.29
Apr-22	4.64
Average	4.30 %

(5) The average yield spread of Baa rated corporate bonds over A corporate bonds for the three months ending April 2022. To reflect the Baa1 average rating of the non-utility proxy group, the prospective yield on Baa corporate bonds must be adjusted by 1/3 of the spread between A and Baa corporate bond yields as shown below:

	A Corp. Bond Yield	Baa Corp. Bond Yield	Spread
Apr-22	4.21 %	4.64	0.43 %
Mar-22	3.88	4.29	0.41
Feb-22	3.60	3.97	0.37
	Average yield spread		0.40
	1/3 of spread		0.13

(6) From page 5 of this Schedule.

Aqua North Carolina, Inc.  
Comparison of Long-Term Issuer Ratings for the  
Proxy Group of Twenty-Four Non-Price Regulated Companies of Comparable risk to the  
Proxy Group of Seven Water Companies

Proxy Group of Twenty-Four Non-Price Regulated Companies	Moody's Long-Term Issuer Rating May 2022		Standard & Poor's Long-Term Issuer Rating May 2022	
	Long-Term Issuer Rating	Numerical Weighting (1)	Long-Term Issuer Rating	Numerical Weighting (1)
Smith (A.O.)	NA	--	NA	--
Balchem Corp.	NA	--	NA	--
Becton, Dickinson	Baa3	10.0	BBB	9.0
Bristol-Myers Squibb	A2	6.0	A+	5.0
Chemed Corp.	WR	--	NR	--
C.H. Robinson	Baa2	9.0	BBB+	8.0
CSG Systems Int'l	NA	--	BB+	11.0
Quest Diagnostics	Baa2	9.0	BBB+	8.0
Heartland Express	NA	--	NA	--
Henry (Jack) & Assoc	NA	--	NA	--
Lancaster Colony	NA	--	NA	--
Lilly (Eli)	A2	6.0	A+	5.0
ManTech Int'l 'A'	WR	--	BB+	11.0
McCormick & Co.	Baa2	9.0	BBB	9.0
Monster Beverage	NA	--	NA	--
Northrop Grumman	Baa1	8.0	BBB+	8.0
Oracle Corp.	Baa2	9.0	BBB+	8.0
Progressive Corp.	A2	6.0	A	6.0
RLI Corp.	Baa2	9.0	BBB	9.0
Rollins, Inc.	NA	--	NA	--
Tyler Technologies	NA	--	NA	--
United Parcel Serv.	A2	6.0	A	6.0
Werner Enterprises	NA	--	NA	--
Western Union	Baa2	9.0	BBB	9.0
Average	Baa1	8.0	BBB+	8.0

Notes:

(1) From page 9 of Schedule DWD-4.

Source of Information:

Bloomberg Professional Services

Aqua North Carolina, Inc.  
Derivation of Equity Risk Premium Based on the Total Market Approach  
Using the Beta for  
Proxy Group of Twenty-Four Non-Price Regulated Companies of Comparable risk to the  
Proxy Group of Seven Water Companies

Line No.	Equity Risk Premium Measure	Results using Current Interest Rates	Results using Projected 2023 Interest Rates	Results using Projected 2024 Interest Rates	Results using Projected 2025 Interest Rates
<u>Ibbotson-Based Equity Risk Premiums:</u>					
1.	Ibbotson Equity Risk Premium (1)	6.13 %	6.13 %	6.13 %	6.13 %
2.	Regression on Ibbotson Risk Premium Data (2)	9.16	8.02	8.34	7.96
3.	Ibbotson Equity Risk Premium based on PRPM (3)	8.35	8.35	8.35	8.35
4.	Equity Risk Premium Based on <u>Value Line</u> Summary and Index (4)	9.61	8.71	8.96	8.66
5	Equity Risk Premium Based on <u>Value Line</u> S&P 500 Companies (5)	12.87	11.97	12.22	11.92
6.	Equity Risk Premium Based on Bloomberg S&P 500 Companies (6)	10.37	9.48	9.73	9.43
7.	Conclusion of Equity Risk Premium	9.41 %	8.78 %	8.96 %	8.74 %
8.	Adjusted Beta (7)	0.81	0.81	0.81	0.81
9.	Forecasted Equity Risk Premium	7.62 %	7.11 %	7.26 %	7.08 %

Notes:

- (1) From note 1 of page 12 of Schedule DWD-4.
- (2) From note 2 of page 12 of Schedule DWD-4.
- (3) From note 3 of page 12 of Schedule DWD-4.
- (4) From note 4 of page 12 of Schedule DWD-4.
- (5) From note 5 of page 12 of Schedule DWD-4.
- (6) From note 6 of page 12 of Schedule DWD-4.
- (7) Average of mean and median beta from page 6 of this Schedule.

Sources of Information:

Kroll 2022 SBI® Yearbook  
Value Line Summary and Index  
Blue Chip Financial Forecasts, December 1, 2021 and April 29, 2022  
Bloomberg Professional Services

Aqua North Carolina, Inc.  
Traditional CAPM and ECAPM Results for the Proxy Group of Non-Price-Regulated Companies Comparable in Total Risk to the  
Proxy Group of Seven Water Companies  
Using Current Interest Rates

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Proxy Group of Twenty-Four Non-Price Regulated Companies	Value Line Adjusted Beta	Bloomberg Beta	Average Beta	Market Risk Premium (1)	Risk-Free Rate (2)	Traditional CAPM Cost Rate	ECAPM Cost Rate	Indicated Common Equity Cost Rate (3)
Smith (A.O.)	0.85	1.08	0.97	10.50 %	2.49 %	12.68 %	12.76 %	12.72 %
Balchem Corp.	0.70	0.96	0.83	10.50	2.49	11.21	11.65	11.43
Becton, Dickinson	0.75	0.53	0.64	10.50	2.49	9.21	10.16	9.68
Bristol-Myers Squibb	0.85	0.60	0.73	10.50	2.49	10.16	10.87	10.51
Chemed Corp.	0.85	0.80	0.82	10.50	2.49	11.10	11.57	11.34
C.H. Robinson	0.75	0.87	0.81	10.50	2.49	11.00	11.50	11.25
CSG Systems Int'l	0.75	0.88	0.81	10.50	2.49	11.00	11.50	11.25
Quest Diagnostics	0.80	0.55	0.68	10.50	2.49	9.63	10.47	10.05
Heartland Express	0.75	0.74	0.75	10.50	2.49	10.37	11.02	10.69
Henry (Jack) & Assoc	0.85	0.68	0.77	10.50	2.49	10.58	11.18	10.88
Lancaster Colony	0.70	0.70	0.70	10.50	2.49	9.84	10.63	10.24
Lilly (Eli)	0.75	0.67	0.71	10.50	2.49	9.95	10.71	10.33
ManTech Int'l 'A'	0.85	0.78	0.82	10.50	2.49	11.10	11.57	11.34
McCormick & Co.	0.80	0.58	0.69	10.50	2.49	9.74	10.55	10.14
Monster Beverage	0.85	0.96	0.91	10.50	2.49	12.05	12.28	12.16
Northrop Grumman	0.85	0.63	0.74	10.50	2.49	10.26	10.94	10.60
Oracle Corp.	0.75	0.86	0.81	10.50	2.49	11.00	11.50	11.25
Progressive Corp.	0.75	0.73	0.74	10.50	2.49	10.26	10.94	10.60
RLI Corp.	0.80	0.95	0.88	10.50	2.49	11.73	12.05	11.89
Rollins, Inc.	0.85	0.88	0.86	10.50	2.49	11.52	11.89	11.71
Tyler Technologies	0.75	0.93	0.84	10.50	2.49	11.31	11.73	11.52
United Parcel Serv.	0.80	1.09	0.94	10.50	2.49	12.36	12.52	12.44
Werner Enterprises	0.75	0.74	0.74	10.50	2.49	10.26	10.94	10.60
Western Union	0.80	1.01	0.90	10.50	2.49	11.94	12.20	12.07
Mean			0.80			10.84 %	11.38 %	11.11 %
Median			0.81			11.00 %	11.50 %	11.25 %
Average of Mean and Median			0.81			10.92 %	11.44 %	11.18 %

Notes:

- (1) From Schedule DWD-5, page 5, note 1.  
(2) From Schedule DWD-5, page 5, note 2.  
(3) Average of CAPM and ECAPM cost rates.

Aqua North Carolina, Inc.  
Traditional CAPM and ECAPM Results for the Proxy Group of Non-Price-Regulated Companies Comparable in Total Risk to the  
Proxy Group of Seven Water Companies  
Using 2023 Projected Interest Rates

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Proxy Group of Twenty-Four Non-Price Regulated Companies	Value Line Adjusted Beta	Bloomberg Beta	Average Beta	Market Risk Premium (1)	Risk-Free Rate (2)	Traditional CAPM Cost Rate	ECAPM Cost Rate	Indicated Common Equity Cost Rate (3)
Smith (A.O.)	0.85	1.08	0.97	9.93	3.33	12.96	13.03	13.00
Balchem Corp.	0.70	0.96	0.83	9.93	3.33	11.57	11.99	11.78
Becton, Dickinson	0.75	0.53	0.64	9.93	3.33	9.68	10.58	10.13
Bristol-Myers Squibb	0.85	0.60	0.73	9.93	3.33	10.58	11.25	10.91
Chemed Corp.	0.85	0.80	0.82	9.93	3.33	11.47	11.92	11.69
C.H. Robinson	0.75	0.87	0.81	9.93	3.33	11.37	11.84	11.61
CSG Systems Int'l	0.75	0.88	0.81	9.93	3.33	11.37	11.84	11.61
Quest Diagnostics	0.80	0.55	0.68	9.93	3.33	10.08	10.88	10.48
Heartland Express	0.75	0.74	0.75	9.93	3.33	10.78	11.40	11.09
Henry (Jack) & Assoc	0.85	0.68	0.77	9.93	3.33	10.97	11.55	11.26
Lancaster Colony	0.70	0.70	0.70	9.93	3.33	10.28	11.02	10.65
Lilly (Eli)	0.75	0.67	0.71	9.93	3.33	10.38	11.10	10.74
ManTech Int'l 'A'	0.85	0.78	0.82	9.93	3.33	11.47	11.92	11.69
McCormick & Co.	0.80	0.58	0.69	9.93	3.33	10.18	10.95	10.57
Monster Beverage	0.85	0.96	0.91	9.93	3.33	12.36	12.59	12.48
Northrop Grumman	0.85	0.63	0.74	9.93	3.33	10.68	11.32	11.00
Oracle Corp.	0.75	0.86	0.81	9.93	3.33	11.37	11.84	11.61
Progressive Corp.	0.75	0.73	0.74	9.93	3.33	10.68	11.32	11.00
RLI Corp.	0.80	0.95	0.88	9.93	3.33	12.07	12.36	12.22
Rollins, Inc.	0.85	0.88	0.86	9.93	3.33	11.87	12.22	12.04
Tyler Technologies	0.75	0.93	0.84	9.93	3.33	11.67	12.07	11.87
United Parcel Serv.	0.80	1.09	0.94	9.93	3.33	12.66	12.81	12.74
Werner Enterprises	0.75	0.74	0.74	9.93	3.33	10.68	11.32	11.00
Western Union	0.80	1.01	0.90	9.93	3.33	12.27	12.51	12.39
Mean			0.80			11.23	11.73	11.48
Median			0.81			11.37	11.84	11.61
Average of Mean and Median			0.81			11.30	11.79	11.55

Notes:  
(1) From Schedule DWD-5, page 5, note 1.  
(2) From Schedule DWD-5, page 5, note 3.  
(3) Average of CAPM and ECAPM cost rates.

Aqua North Carolina, Inc.  
Traditional CAPM and ECAPM Results for the Proxy Group of Non-Price-Regulated Companies Comparable in Total Risk to the  
Proxy Group of Seven Water Companies  
Using 2024 Projected Interest Rates

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Proxy Group of Twenty-Four Non-Price Regulated Companies	Value Line Adjusted Beta	Bloomberg Beta	Average Beta	Market Risk Premium (1)	Risk-Free Rate (2)	Traditional CAPM Cost Rate	ECAPM Cost Rate	Indicated Common Equity Cost Rate (3)
Smith (A.O.)	0.85	1.08	0.97	9.95 %	3.30 %	12.95 %	13.02 %	12.99 %
Balchem Corp.	0.70	0.96	0.83	9.95	3.30	11.56	11.98	11.77
Becton, Dickinson	0.75	0.53	0.64	9.95	3.30	9.67	10.56	10.11
Bristol-Myers Squibb	0.85	0.60	0.73	9.95	3.30	10.56	11.23	10.90
Chemed Corp.	0.85	0.80	0.82	9.95	3.30	11.46	11.91	11.68
C.H. Robinson	0.75	0.87	0.81	9.95	3.30	11.36	11.83	11.59
CSG Systems Int'l	0.75	0.88	0.81	9.95	3.30	11.36	11.83	11.59
Quest Diagnostics	0.80	0.55	0.68	9.95	3.30	10.06	10.86	10.46
Heartland Express	0.75	0.74	0.75	9.95	3.30	10.76	11.38	11.07
Henry (Jack) & Assoc	0.85	0.68	0.77	9.95	3.30	10.96	11.53	11.25
Lancaster Colony	0.70	0.70	0.70	9.95	3.30	10.26	11.01	10.64
Lilly (Eli)	0.75	0.67	0.71	9.95	3.30	10.36	11.08	10.72
ManTech Int'l 'A'	0.85	0.78	0.82	9.95	3.30	11.46	11.91	11.68
McCormick & Co.	0.80	0.58	0.69	9.95	3.30	10.16	10.94	10.55
Monster Beverage	0.85	0.96	0.91	9.95	3.30	12.35	12.58	12.47
Northrop Grumman	0.85	0.63	0.74	9.95	3.30	10.66	11.31	10.99
Oracle Corp.	0.75	0.86	0.81	9.95	3.30	11.36	11.83	11.59
Progressive Corp.	0.75	0.73	0.74	9.95	3.30	10.66	11.31	10.99
RLI Corp.	0.80	0.95	0.88	9.95	3.30	12.05	12.35	12.20
Rollins, Inc.	0.85	0.88	0.86	9.95	3.30	11.86	12.20	12.03
Tyler Technologies	0.75	0.93	0.84	9.95	3.30	11.66	12.05	11.86
United Parcel Serv.	0.80	1.09	0.94	9.95	3.30	12.65	12.80	12.73
Werner Enterprises	0.75	0.74	0.74	9.95	3.30	10.66	11.31	10.99
Western Union	0.80	1.01	0.90	9.95	3.30	12.25	12.50	12.38
Mean			0.80			11.21 %	11.72 %	11.47 %
Median			0.81			11.36 %	11.83 %	11.59 %
Average of Mean and Median			0.81			11.29 %	11.78 %	11.53 %

Notes:  
(1) From Schedule DWD-5, page 5, note 1.  
(2) From Schedule DWD-5, page 5, note 4.  
(3) Average of CAPM and ECAPM cost rates.

Aqua North Carolina, Inc.  
Traditional CAPM and ECAPM Results for the Proxy Group of Non-Price-Regulated Companies Comparable in Total Risk to the  
Proxy Group of Seven Water Companies  
Using 2025 Projected Interest Rates

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Proxy Group of Twenty-Four Non-Price Regulated Companies	Value Line Adjusted Beta	Bloomberg Beta	Average Beta	Market Risk Premium (1)	Risk-Free Rate (2)	Traditional CAPM Cost Rate	ECAPM Cost Rate	Indicated Common Equity Cost Rate (3)
Smith (A.O.)	0.85	1.08	0.97	9.74 %	3.60 %	13.05 %	13.12 %	13.09 %
Balchem Corp.	0.70	0.96	0.83	9.74	3.60	11.69	12.10	11.89
Becton, Dickinson	0.75	0.53	0.64	9.74	3.60	9.84	10.71	10.27
Bristol-Myers Squibb	0.85	0.60	0.73	9.74	3.60	10.71	11.37	11.04
Chemed Corp.	0.85	0.80	0.82	9.74	3.60	11.59	12.03	11.81
C.H. Robinson	0.75	0.87	0.81	9.74	3.60	11.49	11.96	11.72
CSG Systems Int'l	0.75	0.88	0.81	9.74	3.60	11.49	11.96	11.72
Quest Diagnostics	0.80	0.55	0.68	9.74	3.60	10.23	11.01	10.62
Heartland Express	0.75	0.74	0.75	9.74	3.60	10.91	11.52	11.21
Henry (Jack) & Assoc	0.85	0.68	0.77	9.74	3.60	11.10	11.66	11.38
Lancaster Colony	0.70	0.70	0.70	9.74	3.60	10.42	11.15	10.79
Lilly (Eli)	0.75	0.67	0.71	9.74	3.60	10.52	11.22	10.87
ManTech Int'l 'A'	0.85	0.78	0.82	9.74	3.60	11.59	12.03	11.81
McCormick & Co.	0.80	0.58	0.69	9.74	3.60	10.32	11.08	10.70
Monster Beverage	0.85	0.96	0.91	9.74	3.60	12.47	12.69	12.58
Northrop Grumman	0.85	0.63	0.74	9.74	3.60	10.81	11.44	11.13
Oracle Corp.	0.81	0.86	0.81	9.74	3.60	11.49	11.96	11.72
Progressive Corp.	0.75	0.73	0.74	9.74	3.60	10.81	11.44	11.13
RLI Corp.	0.80	0.95	0.88	9.74	3.60	12.17	12.47	12.32
Rollins, Inc.	0.85	0.88	0.86	9.74	3.60	11.98	12.32	12.15
Tyler Technologies	0.75	0.93	0.84	9.74	3.60	11.78	12.17	11.98
United Parcel Serv.	0.80	1.09	0.94	9.74	3.60	12.76	12.91	12.83
Werner Enterprises	0.75	0.74	0.74	9.74	3.60	10.81	11.44	11.13
Western Union	0.80	1.01	0.90	9.74	3.60	12.37	12.61	12.49
Mean			0.80			11.35 %	11.85 %	11.60 %
Median			0.81			11.49 %	11.96 %	11.72 %
Average of Mean and Median			0.81			11.42 %	11.91 %	11.66 %

Notes:  
(1) From Schedule DWD-5, page 5, note 1.  
(2) From Schedule DWD-5, page 5, note 5.  
(3) Average of CAPM and ECAPM cost rates.

Aqua North Carolina, Inc.  
Derivation of Investment Risk Adjustment Based upon  
Ibbotson Associates' Size Premia for the Decile Portfolios of the NYSE/AMEX/NASDAQ

Line No.		[1] Market Capitalization on May 13, 2022 (1) (millions)	[2] Applicable Decile of the NYSE/AMEX/ NASDAQ (2)	[3] Applicable Size Premium (3)	[4] Spread from Applicable Size Premium (4)
1.	Aqua North Carolina, Inc.	\$ 742,586	8	1.21%	
2.	Proxy Group of Seven Water Companies	\$ 2,849,097	3.8 x 6	1.18%	0.03%

Decile	Market Capitalization of Smallest Company (millions)	Market Capitalization of Largest Company (millions)	Size Premium (Return in Excess of CAPM)*
1	\$ 36,160,584	\$ 2,324,390,219	-0.22%
2	16,759,390	36,099,221	0.43%
3	8,216,356	16,738,364	0.55%
4	5,019,883	8,212,638	0.54%
5	3,281,009	5,003,747	0.89%
6	2,170,315	3,276,553	1.18%
7	1,306,402	2,164,524	1.34%
8	629,118	1,306,038	1.21%
9	290,002	627,803	2.10%
10	10,588	289,007	4.80%

\*From 2022 Duff & Phelps Cost of Capital Navigator

Notes:

- (1) From page 2 of this Schedule.
- (2) Gleaned from Columns [B] and [C] on the bottom of this page. The appropriate decile (Column [A]) corresponds to the market capitalization of the proxy group, which is found in Column [1].
- (3) Corresponding risk premium to the decile is provided in Column [D] on the bottom of this page.
- (4) Line No. 1 Column [3] - Line No. 2 Column [3]. For example, the 0.03% in Column [4], Line No. 2 is derived as follows 0.03% = 1.21% - 1.18%.



Aqua North Carolina, Inc.  
Market Capitalization of Aqua North Carolina, Inc. and the  
Proxy Group of Seven Water Companies

Company	Exchange	[1] Common Stock Shares Outstanding at Fiscal Year End 2021 ( millions )	[2] Book Value per Share at Fiscal Year End 2021 (1)	[3] Total Common Equity at Fiscal Year End 2021 ( millions )	[4] Closing Stock Market Price on May 13, 2022	[5] Market-to-Book Ratio on May 13, 2022 (2)	[6] Market Capitalization on May 13, 2022 (3) ( millions )
Aqua North Carolina, Inc.		NA	NA	\$ 217.831 (4)	NA		
Based upon Proxy Group of Seven Water Companies						340.9 (5)	\$ 742.586 (6)
Proxy Group of Seven Water Companies							
American States Water Company	NYSE	36.936	\$ 18.571	\$ 685.947	\$ 77.990	420.0 %	\$ 2,880.661
American Water Works Company, Inc.	NYSE	181.611	40.185	7,298.000	146.480	364.5	26,602.392
California Water Service Group	NYSE	53.716	22.023	1,182.980	53.040	240.8	2,849.097
Essential Utilities Inc.	NYSE	252.868	20.503	5,184.450	45.350	221.2	11,467.547
Middlesex Water Company	NASDAQ	17.522	20.987	367.726	91.180	434.5	1,597.656
SIW Group	NYSE	30.181	34.277	1,034.519	60.640	176.9	1,830.197
The York Water Company	NASDAQ	13.113	11.639	152.622	39.680	340.9	520.322
Median		36.936	\$ 20.987	\$ 1,034.519	\$ 60.640	340.9 %	\$ 2,849.097

NA= Not Available

- Notes: (1) Column 3 / Column 1.  
(2) Column 4 / Column 2.  
(3) Column 1 \* Column 4.  
(4) Combined book common equity from Company 2021 annual report filed with the Commission.  
(5) The market-to-book ratio of Aqua North Carolina, Inc. on May 13, 2022 is assumed to be equal to the market-to-book ratio of  
Proxy Group of Seven Water Companies on May 13, 2022 as appropriate.  
(6) Column [3] multiplied by Column [5].

Source of Information: 2021 Annual Forms 10K  
Bloomberg Financial Services

Aqua North Carolina, Inc.  
Derivation of the Flotation Cost Adjustment to the Cost of Common Equity

Equity Issuances and Flotation Costs of the Parent Since 2019

Date	Transaction	[Column 1] Shares Issued	[Column 2] Gross Equity Issue before Costs	[Column 3] Total Flotation Costs	[Column 4] Total Net Proceeds (1)	[Column 5] Flotation Cost Percentage (2)
08/09/21	Equity Offering	6,700,000	\$ 308,200,000	\$ 8,461,000	\$ 299,739,000	2.75%
03/16/20	Equity Offering	21,661,095	\$ 749,907,000	\$ 20,606,000	\$ 729,301,000	2.75%
04/23/19	Equity Offering	37,370,017	\$ 1,293,750,000	\$ 30,651,000	\$ 1,263,099,000	2.37%
			<u>\$ 2,351,857,000</u>	<u>\$ 59,718,000</u>	<u>\$ 2,292,139,000</u>	<u>2.54%</u>

Flotation Cost Adjustment

	[Column 6] Average Dividend Yield (3)	[Column 7] Average Projected EPS Growth Rate (3)	[Column 8] Adjusted Dividend Yield	[Column 9] Average DCF Cost Rate Unadjusted for Flotation (3)	[Column 10] DCF Cost Rate Adjusted for Flotation (4)	[Column 11] Flotation Cost Adjustment (5)
Proxy Group of Seven Water Companies	<u>1.81 %</u>	<u>7.16 %</u>	<u>1.87 %</u>	<u>9.03 %</u>	<u>9.08 %</u>	<u>0.05 %</u>

Notes:

- (1) Column 2 - Column 3.
- (2) (Column 2 - Column 4) / Column 2.
- (3) From page 1 of Schedule DWD-3.
- (4) Adjustment for flotation costs based on adjusting the average constant growth DCF cost rate in accordance with the following:

$$K = \frac{D(1 + 0.5g)}{P(1 - F)} + g$$

Where g is the growth factor and F is the percentage of flotation costs.

- (5) Column 10 - Column 9.

Source of Information: Company SEC filed documents



*Appendix A – Resume & Testimony Listing of:*  
**Dylan W. D’Ascendis, CRRA, CVA**  
**Partner**

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Jun 30 2022

### **Summary**

Dylan is an experienced consultant and a Certified Rate of Return Analyst (CRRA) and Certified Valuation Analyst (CVA). Dylan joined ScottMadden in 2016 and has become a leading expert witness with respect to cost of capital and capital structure. He has served as a consultant for investor-owned and municipal utilities and authorities for 13 years. Dylan has testified as an expert witness on over 100 occasions regarding rate of return, cost of service, rate design, and valuation before more than 30 regulatory jurisdictions in the United States and Canada, an American Arbitration Association panel, and the Superior Court of Rhode Island. He also maintains the benchmark index against which the Hennessy Gas Utility Mutual Fund performance is measured. Dylan holds a B.A. in economic history from the University of Pennsylvania and an M.B.A. with concentrations in finance and international business from Rutgers University.

### **Areas of Specialization**

- |                            |                       |
|----------------------------|-----------------------|
| ■ Regulation and Rates     | ■ Capital Market Risk |
| ■ Rate of Return           | ■ Regulatory Strategy |
| ■ Valuation                | ■ Cost of Service     |
| ■ Mutual Fund Benchmarking |                       |

### **Recent Expert Testimony Submission/Appearance**

- Regulatory Commission of Alaska – Capital Structure
- Federal Energy Regulatory Commission – Rate of Return
- Public Utility Commission of Texas – Return on Equity
- Hawaii Public Utilities Commission – Cost of Service / Rate Design
- Pennsylvania Public Utility Commission - Valuation

### **Recent Assignments**

- Provided expert testimony on the cost of capital for ratemaking purposes before numerous state utility regulatory agencies
- Sponsored valuation testimony for a large municipal water company in front of an American Arbitration Association Board to justify the reasonability of their lease payments to the City
- Co-authored a valuation report on behalf of a large investor-owned utility company in response to a new state regulation which allowed the appraised value of acquired assets into rate base

### **Recent Articles and Speeches**

- Co-Author of: “Decoupling, Risk Impacts and the Cost of Capital”, co-authored with Richard A. Michelfelder, Ph.D., Rutgers University and Pauline M. Ahern. The Electricity Journal, March, 2020
- Co-Author of: “Decoupling Impact and Public Utility Conservation Investment”, co-authored with Richard A. Michelfelder, Ph.D., Rutgers University and Pauline M. Ahern. Energy Policy Journal, 130 (2019), 311-319
- “Establishing Alternative Proxy Groups”, before the Society of Utility and Regulatory Financial Analysts: 51st Financial Forum, April 4, 2019, New Orleans, LA
- “Past is Prologue: Future Test Year”, Presentation before the National Association of Water Companies 2017 Southeast Water Infrastructure Summit, May 2, 2017, Savannah, GA.
- Co-author of: “Comparative Evaluation of the Predictive Risk Premium Model™, the Discounted Cash Flow Model and the Capital Asset Pricing Model”, co-authored with Richard A. Michelfelder, Ph.D., Rutgers University, Pauline M. Ahern, and Frank J. Hanley, The Electricity Journal, May, 2013
- “Decoupling: Impact on the Risk and Cost of Common Equity of Public Utility Stocks”, before the Society of Utility and Regulatory Financial Analysts: 45th Financial Forum, April 17-18, 2013, Indianapolis, IN

Sponsor	Date	Case/Applicant	Docket No.	Subject
<b>Regulatory Commission of Alaska</b>				
Cook Inlet Natural Gas Storage Alaska, LLC	07/21	Cook Inlet Natural Gas Storage Alaska, LLC	Docket No. TA45-733	Capital Structure
Alaska Power Company	09/20	Alaska Power Company; Goat Lake Hydro, Inc.; BBL Hydro, Inc.	Tariff Nos. TA886-2; TA6-521; TA4-573	Capital Structure
Alaska Power Company	07/16	Alaska Power Company	Docket No. TA857-2	Rate of Return
<b>Alberta Utilities Commission</b>				
AltaLink, L.P., and EPCOR Distribution & Transmission, Inc.	01/20	AltaLink, L.P., and EPCOR Distribution & Transmission, Inc.	2021 Generic Cost of Capital, Proceeding ID. 24110	Rate of Return
<b>Arizona Corporation Commission</b>				
EPCOR Water Arizona, Inc.	06/20	EPCOR Water Arizona, Inc.	Docket No. WS-01303A-20-0177	Rate of Return
Arizona Water Company	12/19	Arizona Water Company – Western Group	Docket No. W-01445A-19-0278	Rate of Return
Arizona Water Company	08/18	Arizona Water Company – Northern Group	Docket No. W-01445A-18-0164	Rate of Return
<b>Arkansas Public Service Commission</b>				
Southwestern Electric Power Co.	07/21	Southwestern Electric Power Co.	Docket No. 21-070-U	Return on Equity
CenterPoint Energy Resources Corp.	05/21	CenterPoint Arkansas Gas	Docket No. 21-004-U	Return on Equity
<b>Colorado Public Utilities Commission</b>				
Summit Utilities, Inc.	04/18	Colorado Natural Gas Company	Docket No. 18AL-0305G	Rate of Return
Atmos Energy Corporation	06/17	Atmos Energy Corporation	Docket No. 17AL-0429G	Rate of Return
<b>Delaware Public Service Commission</b>				
Delmarva Power & Light Co.	01/22	Delmarva Power & Light Co.	Docket No. 22-002 (Gas)	Return on Equity
Delmarva Power & Light Co.	11/20	Delmarva Power & Light Co.	Docket No. 20-0149 (Electric)	Return on Equity
Delmarva Power & Light Co.	10/20	Delmarva Power & Light Co.	Docket No. 20-0150 (Gas)	Return on Equity
Tidewater Utilities, Inc.	11/13	Tidewater Utilities, Inc.	Docket No. 13-466	Capital Structure
<b>Public Service Commission of the District of Columbia</b>				
Washington Gas Light Company	04/22	Washington Gas Light Company	Formal Case No. 1169	Rate of Return
Washington Gas Light Company	09/20	Washington Gas Light Company	Formal Case No. 1162	Rate of Return
<b>Federal Energy Regulatory Commission</b>				
LS Power Grid California, LLC	10/20	LS Power Grid California, LLC	Docket No. ER21-195-000	Rate of Return
<b>Florida Public Service Commission</b>				
Tampa Electric Company	04/21	Tampa Electric Company	Docket No. 20210034-EI	Return on Equity
Peoples Gas System	09/20	Peoples Gas System	Docket No. 20200051-GU	Rate of Return
Utilities, Inc. of Florida	06/20	Utilities, Inc. of Florida	Docket No. 20200139-WS	Rate of Return

Sponsor	Date	Case/Applicant	Docket No.	Subject
<b>Hawaii Public Utilities Commission</b>				
Launiupoko Irrigation Company, Inc.	12/20	Launiupoko Irrigation Company, Inc.	Docket No. 2020-0217 / Transferred to 2020-0089	Capital Structure
Lanai Water Company, Inc.	12/19	Lanai Water Company, Inc.	Docket No. 2019-0386	Cost of Service / Rate Design
Manele Water Resources, LLC	08/19	Manele Water Resources, LLC	Docket No. 2019-0311	Cost of Service / Rate Design
Kaupulehu Water Company	02/18	Kaupulehu Water Company	Docket No. 2016-0363	Rate of Return
Aqua Engineers, LLC	05/17	Puhi Sewer & Water Company	Docket No. 2017-0118	Cost of Service / Rate Design
Hawaii Resources, Inc.	09/16	Laie Water Company	Docket No. 2016-0229	Cost of Service / Rate Design
<b>Illinois Commerce Commission</b>				
Utility Services of Illinois, Inc.	02/21	Utility Services of Illinois, Inc.	Docket No. 21-0198	Rate of Return
Ameren Illinois Company d/b/a Ameren Illinois	07/20	Ameren Illinois Company d/b/a Ameren Illinois	Docket No. 20-0308	Return on Equity
Utility Services of Illinois, Inc.	11/17	Utility Services of Illinois, Inc.	Docket No. 17-1106	Cost of Service / Rate Design
Aqua Illinois, Inc.	04/17	Aqua Illinois, Inc.	Docket No. 17-0259	Rate of Return
Utility Services of Illinois, Inc.	04/15	Utility Services of Illinois, Inc.	Docket No. 14-0741	Rate of Return
<b>Indiana Utility Regulatory Commission</b>				
Aqua Indiana, Inc.	03/16	Aqua Indiana, Inc. Aboite Wastewater Division	Docket No. 44752	Rate of Return
Twin Lakes, Utilities, Inc.	08/13	Twin Lakes, Utilities, Inc.	Docket No. 44388	Rate of Return
<b>Kansas Corporation Commission</b>				
Atmos Energy	07/19	Atmos Energy	19-ATMG-525-RTS	Rate of Return
<b>Kentucky Public Service Commission</b>				
Atmos Energy Corporation	07/21	Atmos Energy Corporation	2021-00304	PRP Rider Rate
Atmos Energy Corporation	06/21	Atmos Energy Corporation	2021-00214	Rate of Return
Duke Energy Kentucky, Inc.	06/21	Duke Energy Kentucky, Inc.	2021-00190	Return on Equity
Bluegrass Water Utility Operating Company	10/20	Bluegrass Water Utility Operating Company	2020-00290	Return on Equity
<b>Louisiana Public Service Commission</b>				
Utilities, Inc. of Louisiana	05/21	Utilities, Inc. of Louisiana	Docket No. U-36003	Rate of Return
Southwestern Electric Power Company	12/20	Southwestern Electric Power Company	Docket No. U-35441	Return on Equity
Atmos Energy	04/20	Atmos Energy	Docket No. U-35535	Rate of Return
Louisiana Water Service, Inc.	06/13	Louisiana Water Service, Inc.	Docket No. U-32848	Rate of Return
<b>Maine Public Utilities Commission</b>				
Summit Natural Gas of Maine, Inc.	03/22	Summit Natural Gas of Maine, Inc.	Docket No. 2022-00025	Rate of Return
The Maine Water Company	09/21	The Maine Water Company	Docket No. 2021-00053	Rate of Return

Sponsor	Date	Case/Applicant	Docket No.	Subject
<b>Maryland Public Service Commission</b>				
Washington Gas Light Company	08/20	Washington Gas Light Company	Case No. 9651	Rate of Return
FirstEnergy, Inc.	08/18	Potomac Edison Company	Case No. 9490	Rate of Return
<b>Massachusetts Department of Public Utilities</b>				
Unitil Corporation	12/19	Fitchburg Gas & Electric Co. (Elec.)	D.P.U. 19-130	Rate of Return
Unitil Corporation	12/19	Fitchburg Gas & Electric Co. (Gas)	D.P.U. 19-131	Rate of Return
Liberty Utilities	07/15	Liberty Utilities d/b/a New England Natural Gas Company	Docket No. 15-75	Rate of Return
<b>Minnesota Public Utilities Commission</b>				
Northern States Power Company	11/01	Northern States Power Company	Docket No. G002/GR-21-678	Return on Equity
Northern States Power Company	10/21	Northern States Power Company	Docket No. E002/GR-21-630	Return on Equity
Northern States Power Company	11/20	Northern States Power Company	Docket No. E002/GR-20-723	Return on Equity
<b>Mississippi Public Service Commission</b>				
Atmos Energy	03/19	Atmos Energy	Docket No. 2015-UN-049	Capital Structure
Atmos Energy	07/18	Atmos Energy	Docket No. 2015-UN-049	Capital Structure
<b>Missouri Public Service Commission</b>				
Spire Missouri, Inc.	12/20	Spire Missouri, Inc.	Case No. GR-2021-0108	Return on Equity
Indian Hills Utility Operating Company, Inc.	10/17	Indian Hills Utility Operating Company, Inc.	Case No. SR-2017-0259	Rate of Return
Raccoon Creek Utility Operating Company, Inc.	09/16	Raccoon Creek Utility Operating Company, Inc.	Case No. SR-2016-0202	Rate of Return
<b>Public Utilities Commission of Nevada</b>				
Southwest Gas Corporation	09/21	Southwest Gas Corporation	Docket No. 21-09001	Return on Equity
Southwest Gas Corporation	08/20	Southwest Gas Corporation	Docket No. 20-02023	Return on Equity
<b>New Hampshire Public Utilities Commission</b>				
Aquarion Water Company of New Hampshire, Inc.	12/20	Aquarion Water Company of New Hampshire, Inc.	Docket No. DW 20-184	Rate of Return
<b>New Jersey Board of Public Utilities</b>				
Middlesex Water Company	05/21	Middlesex Water Company	Docket No. WR21050813	Rate of Return
Atlantic City Electric Company	12/20	Atlantic City Electric Company	Docket No. ER20120746	Return on Equity
FirstEnergy	02/20	Jersey Central Power & Light Co.	Docket No. ER20020146	Rate of Return
Aqua New Jersey, Inc.	12/18	Aqua New Jersey, Inc.	Docket No. WR18121351	Rate of Return
Middlesex Water Company	10/17	Middlesex Water Company	Docket No. WR17101049	Rate of Return
Middlesex Water Company	03/15	Middlesex Water Company	Docket No. WR15030391	Rate of Return

Sponsor	Date	Case/Applicant	Docket No.	Subject
The Atlantic City Sewerage Company	10/14	The Atlantic City Sewerage Company	Docket No. WR14101263	Cost of Service / Rate Design
Middlesex Water Company	11/13	Middlesex Water Company	Docket No. WR1311059	Capital Structure
<b>New Mexico Public Regulation Commission</b>				
Southwestern Public Service Co.	01/21	Southwestern Public Service Co.	Case No. 20-00238-UT	Return on Equity
<b>North Carolina Utilities Commission</b>				
Carolina Water Service, Inc.	07/21	Carolina Water Service, Inc.	Docket No. W-354 Sub 384	Rate of Return
Piedmont Natural Gas Co., Inc.	03/21	Piedmont Natural Gas Co., Inc.	Docket No. G-9, Sub 781	Return on Equity
Duke Energy Carolinas, LLC	07/20	Duke Energy Carolinas, LLC	Docket No. E-7, Sub 1214	Return on Equity
Duke Energy Progress, LLC	07/20	Duke Energy Progress, LLC	Docket No. E-2, Sub 1219	Return on Equity
Aqua North Carolina, Inc.	12/19	Aqua North Carolina, Inc.	Docket No. W-218 Sub 526	Rate of Return
Carolina Water Service, Inc.	06/19	Carolina Water Service, Inc.	Docket No. W-354 Sub 364	Rate of Return
Carolina Water Service, Inc.	09/18	Carolina Water Service, Inc.	Docket No. W-354 Sub 360	Rate of Return
Aqua North Carolina, Inc.	07/18	Aqua North Carolina, Inc.	Docket No. W-218 Sub 497	Rate of Return
<b>North Dakota Public Service Commission</b>				
Northern States Power Company	09/21	Northern States Power Company	Case No. PU-21-381	Rate of Return
Northern States Power Company	11/20	Northern States Power Company	Case No. PU-20-441	Rate of Return
<b>Public Utilities Commission of Ohio</b>				
Duke Energy Ohio, Inc.	10/21	Duke Energy Ohio, Inc.	Case No. 21-887-EL-AIR	Return on Equity
Aqua Ohio, Inc.	07/21	Aqua Ohio, Inc.	Case No. 21-0595-WW-AIR	Rate of Return
Aqua Ohio, Inc.	05/16	Aqua Ohio, Inc.	Case No. 16-0907-WW-AIR	Rate of Return
<b>Pennsylvania Public Utility Commission</b>				
Citizens' Electric Company of Lewisburg	05/22	C&T Enterprises	Docket No. R-2022-3032369	Rate of Return
Valley Energy Company	05/22	C&T Enterprises	Docket No. R-2022-3032300	Rate of Return
Community Utilities of Pennsylvania, Inc.	04/21	Community Utilities of Pennsylvania, Inc.	Docket No. R-2021-3025207	Rate of Return
Vicinity Energy Philadelphia, Inc.	04/21	Vicinity Energy Philadelphia, Inc.	Docket No. R-2021-3024060	Rate of Return
Delaware County Regional Water Control Authority	02/20	Delaware County Regional Water Control Authority	Docket No. A-2019-3015173	Valuation



Sponsor	Date	Case/Applicant	Docket No.	Subject
Valley Energy, Inc.	07/19	C&T Enterprises	Docket No. R-2019-3008209	Rate of Return
Wellsboro Electric Company	07/19	C&T Enterprises	Docket No. R-2019-3008208	Rate of Return
Citizens' Electric Company of Lewisburg	07/19	C&T Enterprises	Docket No. R-2019-3008212	Rate of Return
Steelton Borough Authority	01/19	Steelton Borough Authority	Docket No. A-2019-3006880	Valuation
Mahoning Township, PA	08/18	Mahoning Township, PA	Docket No. A-2018-3003519	Valuation
SUEZ Water Pennsylvania Inc.	04/18	SUEZ Water Pennsylvania Inc.	Docket No. R-2018-000834	Rate of Return
Columbia Water Company	09/17	Columbia Water Company	Docket No. R-2017-2598203	Rate of Return
Veolia Energy Philadelphia, Inc.	06/17	Veolia Energy Philadelphia, Inc.	Docket No. R-2017-2593142	Rate of Return
Emporium Water Company	07/14	Emporium Water Company	Docket No. R-2014-2402324	Rate of Return
Columbia Water Company	07/13	Columbia Water Company	Docket No. R-2013-2360798	Rate of Return
Penn Estates Utilities, Inc.	12/11	Penn Estates, Utilities, Inc.	Docket No. R-2011-2255159	Capital Structure / Long-Term Debt Cost Rate
<b>South Carolina Public Service Commission</b>				
Blue Granite Water Co.	12/19	Blue Granite Water Company	Docket No. 2019-292-WS	Rate of Return
Carolina Water Service, Inc.	02/18	Carolina Water Service, Inc.	Docket No. 2017-292-WS	Rate of Return
Carolina Water Service, Inc.	06/15	Carolina Water Service, Inc.	Docket No. 2015-199-WS	Rate of Return
Carolina Water Service, Inc.	11/13	Carolina Water Service, Inc.	Docket No. 2013-275-WS	Rate of Return
United Utility Companies, Inc.	09/13	United Utility Companies, Inc.	Docket No. 2013-199-WS	Rate of Return
Utility Services of South Carolina, Inc.	09/13	Utility Services of South Carolina, Inc.	Docket No. 2013-201-WS	Rate of Return
Tega Cay Water Services, Inc.	11/12	Tega Cay Water Services, Inc.	Docket No. 2012-177-WS	Capital Structure
<b>Tennessee Public Utility Commission</b>				
Piedmont Natural Gas Company	07/20	Piedmont Natural Gas Company	Docket No. 20-00086	Return on Equity
<b>Public Utility Commission of Texas</b>				
Oncor Electric Delivery Co. LLC	05/22	Oncor Electric Delivery Co. LLC	Docket No. 53601	Return on Equity
Southwestern Public Service Co.	02/21	Southwestern Public Service Co.	Docket No. 51802	Return on Equity
Southwestern Electric Power Co.	10/20	Southwestern Electric Power Co.	Docket No. 51415	Rate of Return
<b>Virginia State Corporation Commission</b>				



Sponsor	Date	Case/Applicant	Docket No.	Subject
Virginia Natural Gas, Inc.	04/21	Virginia Natural Gas, Inc.	PUR-2020-00095	Return on Equity
Massanutten Public Service Corporation	12/20	Massanutten Public Service Corporation	PUE-2020-00039	Return on Equity
Aqua Virginia, Inc.	07/20	Aqua Virginia, Inc.	PUR-2020-00106	Rate of Return
WGL Holdings, Inc.	07/18	Washington Gas Light Company	PUR-2018-00080	Rate of Return
Atmos Energy Corporation	05/18	Atmos Energy Corporation	PUR-2018-00014	Rate of Return
Aqua Virginia, Inc.	07/17	Aqua Virginia, Inc.	PUR-2017-00082	Rate of Return
Massanutten Public Service Corp.	08/14	Massanutten Public Service Corp.	PUE-2014-00035	Rate of Return / Rate Design
<b>Public Service Commission of West Virginia</b>				
Monongahela Power Company and The Potomac Edison Company	12/21	Monongahela Power Company and The Potomac Edison Company	Case No. 21-0857-E-CN (ELG)	Return on Equity
Monongahela Power Company and The Potomac Edison Company	11/21	Monongahela Power Company and The Potomac Edison Company	Case No. 21-0813-E-P (Solar)	Return on Equity