

**COMMONWEALTH OF KENTUCKY
BEFORE THE PUBLIC SERVICE COMMISSION**

In the Matter of:

**ELECTRONIC APPLICATION OF)
BLUEGRASS WATER UTILITY)
OPERATING COMPANY, LLC FOR AN) Case No. 2022-00432
ADJUSTMENT OF SEWAGE RATES)**

DIRECT TESTIMONY

OF

DYLAN W. D'ASCENDIS

ON BEHALF OF

BLUEGRASS WATER UTILITY OPERATING COMPANY, LLC

FILED: February 27, 2023

**DIRECT TESTIMONY
OF
DYLAN W. D'ASCENDIS**

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1 **DIRECT TESTIMONY**
2 **OF**
3 **DYLAN W. D'ASCENDIS**
4

5 **I. INTRODUCTION**

6 **A. WITNESS IDENTIFICATION**

7 **Q. Please state your name and business address.**

8 A. My name is Dylan W. D'Ascendis. My business address is 3000 Atrium Way, Suite 200,
9 Mount Laurel, NJ 08054.

10 **Q. By whom are you employed and in what capacity?**

11 A. I am a Partner at ScottMadden, Inc.

12 **B. BACKGROUND AND QUALIFICATIONS**

13 **Q. Please summarize your professional experience and educational background.**

14 A. I have offered expert testimony on behalf of investor-owned utilities in 35 state regulatory
15 commissions in the United States, the Federal Energy Regulatory Commission, the Alberta
16 Utility Commission, one American Arbitration Association panel, and the Superior Court
17 of Rhode Island on issues including, but not limited to, common equity cost rate, rate of
18 return, valuation, capital structure, class cost of service, and rate design.

19 On behalf of the American Gas Association ("AGA"), I calculate the AGA Gas
20 Index, which serves as the benchmark against which the performance of the American Gas
21 Index Fund ("AGIF") is measured on a monthly basis. The AGA Gas Index and AGIF are
22 a market capitalization-weighted index and mutual fund, respectively, comprised of the
23 common stocks of the publicly traded corporate members of the AGA.

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

5 I am also a member of the National Association of Certified Valuation Analysts
6 (“NACVA”) and was awarded the professional designation “Certified Valuation Analyst”
7 by the NACVA in 2015.

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

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

14 **II. PURPOSE OF TESTIMONY**

15 **Q. What is the purpose of your Direct Testimony in this proceeding?**

16 A. The purpose of my Direct Testimony is to present evidence on behalf of Bluegrass Water
17 Utility Operating Company, LLC (“Bluegrass Water” or the “Company”) about the
18 appropriate capital structure and corresponding cost rates the Company should be given
19 the opportunity to earn on its jurisdictional rate base.

20 **Q. Have you prepared any Exhibits in support of your recommendation?**

21 A. Yes. I have prepared Exhibits DWD-1 through DWD-9, which have been prepared by me
22 or under my direct supervision.

1 **Q. What is your recommended cost of capital for Bluegrass Water?**

2 A. I recommend the Kentucky Public Service Commission (“KPSC” or the “Commission”)
3 authorize the Company the opportunity to earn an overall rate of return of 9.77% based on
4 the actual capital structure of Bluegrass Water, consisting of 38.84% long-term debt at an
5 embedded cost rate of 6.80%, and 61.16% common equity at my recommended return on
6 common equity (“ROE”) of 11.65%. The overall rate of return is summarized on page 1
7 of Exhibit DWD-1 and in Table 1 below:

8 **Table 1: Summary of Overall Rate of Return**

<u>Type of Capital</u>	<u>Ratios</u>	<u>Cost Rate</u>	<u>Weighted Cost Rate</u>
Long-Term Debt	38.84%	6.80%	2.64%
Common Equity	<u>61.16%</u>	11.65%	<u>7.13%</u>
Total	<u>100.00%</u>		<u>9.77%</u>

9 **III. SUMMARY**

10 **Q. Please summarize your recommended common equity cost rate.**

11 A. My recommended common equity cost rate of 11.65% is summarized on page 2 of Exhibit
12 DWD-1. I have assessed the market-based common equity cost rates of companies of
13 relatively similar, but not necessarily identical, risk to Bluegrass Water’s. Using
14 companies of relatively comparable risk as proxies is consistent with the principles of fair
15 rate of return established in the *Hope*¹ and *Bluefield*² Supreme Court cases. No proxy
16 group can be identical in risk to any single company, so there must be an evaluation of

¹ *Federal Power Commission v. Hope Natural Gas Co.*, 320 U.S. 591 (1944). (“*Hope*”)

² *Bluefield Water Works Improvement Co. v. Public Serv. Comm’n*, 262 U.S. 679 (1922). (“*Bluefield*”)

1 relative risk between the company and the proxy group to see if it is appropriate to make
2 adjustments to the proxy group’s indicated rate of return.

3 My recommendation results from the application of several cost of common equity
4 models, specifically the Discounted Cash Flow (“DCF”) model, the Risk Premium Model
5 (“RPM”), and the Capital Asset Pricing Model (“CAPM”), to the market data of a proxy
6 group of six water companies (“Utility Proxy Group”) whose selection criteria will be
7 discussed below. In addition, I also applied the DCF, RPM, and CAPM to a proxy group
8 of domestic, non-price regulated companies comparable in total risk to the Utility Proxy
9 Group (“Non-Price Regulated Proxy Group”).

10 The results derived from each are as follows:

11 **Table 2: Summary of Common Equity Cost Rate**

Discounted Cash Flow Model	9.16%
Risk Premium Model	12.09%
Capital Asset Pricing Model	11.58%
Market Models Applied to Comparable Risk, Non-Price Regulated Companies	<u>11.40%</u>
Indicated Range of Common Equity Cost Rates Before Adjustments for Company-Specific Risk	10.13% - 11.13%
Business Risk Adjustment	1.00%
Indicated Range of Common Equity Cost Rates after Adjustment	<u>11.13% – 12.13%</u>
Recommended Cost of Common Equity	<u>11.65%</u>

1 After analyzing the indicated common equity cost rates derived through these
2 models, the indicated range of common equity cost rates applicable to the Utility Proxy
3 Group is between 10.13% and 11.13%.³

4 The indicated range of common equity cost rates applicable to the Utility Proxy
5 Group was then adjusted upward by 1.00% to reflect Bluegrass Water’s greater business
6 risk relative to the Utility Proxy Group. These adjustments result in a Company-specific
7 range of common equity cost rates between 11.13% and 12.13%. From this range of
8 results, I recommend the Commission consider a common equity cost rate of 11.65%, or
9 the approximate midpoint, for use in setting rates for the Company.

10 **IV. GENERAL PRINCIPLES**

11 **Q. What general principles have you considered in arriving at your recommended**
12 **common equity cost rate of 11.65%?**

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

³ The indicated range of ROEs applicable to the Utility Proxy Group excluding the Predictive Risk Premium Model (“PRPM”) is 9.74% to 10.74%.

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

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

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

⁴ *Hope*, 320 U.S. 591 (1944), at 603.

1 In addition, 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 case. Parent
3 entities, like other investors, have capital constraints and must look at the attractiveness of
4 the expected risk-adjusted return of each investment alternative in their capital budgeting
5 process. That is, utility holding companies that own many utility operating companies have
6 choices as to where they will invest their limited capital within the holding company
7 family. Therefore, the opportunity cost concept applies regardless of whether the funding
8 source is public or corporate.

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

16 It, therefore, is important that the authorized ROE for the Company reflects the
17 risks and prospects of its operations and supports its financial integrity from a stand-alone
18 perspective.

19 **Q. Within that broad framework, how is the cost of capital estimated in regulatory**
20 **proceedings?**

21 A. Regulated utilities primarily use common stock and long-term debt to finance their
22 permanent property, plant, and equipment (i.e., rate base). The fair rate of return for a

1 regulated utility is based on its weighted average cost of capital, in which, as noted earlier,
2 the costs of the individual sources of capital are weighted by their respective book values.

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

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

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

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

1 **A. BUSINESS RISK**

2 **Q. Please define business risk and explain why it is important to the determination of a**
3 **fair rate of return.**

4 A. Business risk is the riskiness of a company's common stock without the use of debt and/or
5 preferred capital. Examples of such general business risks faced by all utilities (i.e.,
6 electric, natural gas distribution, and water) include size, the quality of management, the
7 regulatory environment in which utilities operate, customer mix and concentration of
8 customers, service territory growth, and capital intensity. All of these have a direct bearing
9 on earnings.

10 Consistent with the basic financial principle of risk and return, business risk is
11 important to the determination of a fair rate of return, because the higher the level of risk,
12 the higher the rate of return investors demand.

13 **Q. What business risks do the water and wastewater industries face in general?**

14 A. Water and wastewater utilities have an ever-increasing responsibility to be stewards of the
15 environment from which water supplies are drawn in order to preserve and protect essential
16 natural resources of the United States. This increased environmental stewardship is a direct
17 result of compliance with the Safe Drinking Water Act, as well as a response to continuous
18 monitoring by the Environmental Protection Agency and state and local governments, of
19 the water supply for potential contaminants and their resultant regulations. This, plus aging
20 infrastructure, necessitate additional capital investment in the distribution and treatment of
21 water, exacerbating the pressure on free cash flows arising from increased capital
22 expenditures for infrastructure repair and replacement. The significant amount of capital

1 investment and, hence, high capital intensity, is a major risk factor for the water and
2 wastewater utility industry.

3 *Value Line Investment Survey* (“*Value Line*”) observes the following about the
4 water utility industry:

5 Members of this group are all in the midst of large ongoing
6 construction programs that ought to take decades to complete. For
7 years, insufficient capital was allocated to upgrading and
8 modernizing the country’s water infrastructure. Indeed, the average
9 age of many pipelines is now between 60 and 75 years. As a result,
10 in an era in which water has become scarcer, a large volume of it
11 was leaking and being wasted due to a shoddy transmission system.

12 ***

13 To fund the building projects, most utilities have to depend, in part,
14 on external financing. Over the past 15 years, we have been in a low
15 interest rate environment and debt was the preferred source of
16 financing. With interest rates for long-maturity corporate bonds
17 spiking higher, there is a chance that this could change.

18 ***

19 While this sector has several positive attributes, it also has a severe
20 limitations [sic]. For one, the returns on equity are determined by
21 an outside entity. Thus, there is a ceiling to each company’s profit
22 potential. Furthermore, regulators can be fickle. The water industry
23 has enjoyed positive relations with regulators over the past decade
24 or so, but that was during a time of very low inflation. Passing along
25 the rate hikes needed to finance the replacement of old pipes will
26 likely remain above the level of inflation, which is currently over
27 6%.⁵

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 all utilities
30 (through a utility’s depreciation expense) and are vital for a company to fund ongoing

⁵ *Value Line Investment Survey*, January 6, 2023.

1 replacements and repairs of water and wastewater systems. Water/wastewater utility assets
2 have long lives, and therefore have long capital recovery periods. As such, they face
3 greater risk due to inflation, which results in a higher replacement cost per dollar of net
4 plant. Simply, capital that is retiring today will need to be replaced with capital which is
5 significantly more expensive.

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

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

⁶ Free Cash Flow = Operating Cash Flow (Funds From Operations) minus Capital Expenditures.

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

3 **B. FINANCIAL RISK**

4 **Q. Please define financial risk and explain why it is important to the determination of a**
5 **fair rate of return.**

6 A. Financial risk is the additional risk created by the introduction of debt and preferred stock
7 into the capital structure. The higher the proportion of debt and preferred stock in the
8 capital structure, the higher the financial risk (i.e., likelihood of default). Therefore,
9 consistent with the basic financial principle of risk and return, investors demand a higher
10 common equity return as compensation for bearing higher default risk.

11 **Q. Can bond and credit ratings be a proxy for the combined business and financial risk**
12 **(i.e., investment risk of an enterprise)?**

13 A. Yes, similar bond ratings/issuer credit ratings reflect, and are representative of, similar
14 combined business and financial risks (i.e., total risk) faced by bond investors.⁷ Although
15 specific business or financial risks may differ between companies, the same bond/credit
16 rating indicates that the combined risks are roughly similar, albeit not necessarily equal, as
17 the purpose of the bond/credit rating process is to assess credit quality or credit risk (i.e.,
18 the risk of the company not paying its outstanding debt), and not common equity risk (i.e.,
19 the risk of the company not paying its outstanding debt, nor compensating its equity
20 investors).

⁷ 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 **Q. That being said, do rating agencies reflect company size in their bond ratings?**

2 A. No. Neither S&P nor Moody's have minimum company size requirements for any given
3 rating level. This means, all else equal, a relative size analysis needs to be conducted for
4 companies with similar bond ratings.

5 **V. BLUEGRASS WATER AND THE UTILITY PROXY GROUP**

6 **Q. Are you familiar with the operations of Bluegrass Water?**

7 A. Yes. Bluegrass Water is headquartered in St. Louis, Missouri, and provides service to 20
8 water and sewer service areas in Kentucky, representing 2,488 wastewater connections.⁸

9 **Q. Why is it necessary to develop a proxy group when estimating the ROE for the**
10 **Company?**

11 A. Because the Company is not publicly traded and does not have publicly traded equity
12 securities, it is necessary to develop groups of publicly traded, comparable companies to
13 serve as "proxies" for the Company. In addition to the analytical necessity of doing so, the
14 use of proxy companies is consistent with the *Hope* and *Bluefield* comparable risk
15 standards, as discussed above. I have selected a proxy group that, in my view, is
16 fundamentally risk-comparable to the Company.

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

⁸ Source: See Direct Testimony of Brent Thies.

1 to estimate the ROE for the target company from within that range. That determination
2 will be best informed by employing a variety of sound analyses and necessarily must
3 consider the sort of quantitative and qualitative information discussed throughout my
4 Direct Testimony. Additionally, a relative risk analysis between the Company and the
5 Utility Proxy Group must be made to determine whether explicit Company-specific
6 adjustments need to be made to the Utility Proxy Group's indicated results.

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

13 **Q. Please explain how you chose your Utility Proxy Group.**

14 A. The basis of selection for the Utility Proxy Group was to select those companies which
15 meet the following criteria:

- 16 (i) They are included in the Water Utility Group of *Value Line's Standard Edition*
17 (January 6, 2023);
- 18 (ii) They have 60% or greater of 2021 total operating income or 60% or greater of 2021
19 total assets attributable to regulated water operations;
- 20 (iii) At the time of preparation of this testimony, they had not publicly announced that
21 they were involved in any major merger or acquisition activity (i.e., one publicly
22 traded utility merging with or acquiring another);

- 1 (iv) They have not cut or omitted their common dividends during the five years ending
2 2021 or through the time of the preparation of this testimony;
- 3 (v) They have *Value Line* and Bloomberg Professional Services (“Bloomberg”)
4 adjusted Beta coefficients (“beta”);
- 5 (vi) They have a positive *Value Line* five-year dividends per share (“DPS”) growth rate
6 projection; and
- 7 (vii) They have *Value Line*, Zacks or Yahoo! Finance five-year earnings per share
8 (“EPS”) growth rate projections.

9 The following six companies met these criteria: American States Water Company,
10 American Water Works Company, Inc., California Water Service Group, Essential Utilities
11 Inc., Middlesex Water Company, and SJW Group.

12 **Q. Please describe Exhibit DWD-2, page 1.**

13 A. Page 1 of Exhibit DWD-2 contains comparative capitalization and financial statistics for
14 the Utility Proxy Group identified above for the years 2017 to 2021. During the five-year
15 period ending 2021, the historically achieved earnings rate on book common equity for the
16 group averaged 10.40%. The average common equity ratio based on total permanent
17 capital (excluding short-term debt) was 51.78%, and the average dividend payout ratio was
18 59.46%.

19 Total debt to earnings before interest, taxes, depreciation, and amortization for the
20 years 2017 to 2021 ranges between 3.48x and 5.92x, with an average of 4.88x. Funds from
21 operations to total debt range from 11.39% to 23.56%, with an average of 16.75%.

1 **VI. CAPITAL STRUCTURE AND LONG-TERM DEBT COST RATE**

2 **A. CAPITAL STRUCTURE**

3 **Q. What capital structure ratio do you recommend be employed in developing an overall**
4 **fair rate of return appropriate for the Company in this proceeding?**

5 A. I recommend the use of Bluegrass Water’s actual capital structure, which consists of
6 38.84% long-term debt and 61.16% common equity as shown on page 1 of Exhibit DWD-
7 1.⁹

8 **Q. How does Bluegrass Water’s proposed ratemaking common equity ratio of 61.16%**
9 **compare with the equity ratios maintained by the companies in your Utility Proxy**
10 **Group?**

11 A. Bluegrass Water’s proposed ratemaking common equity ratio of 61.16% is consistent with
12 the range of common equity ratios maintained, on average, by the companies in the Utility
13 Proxy Group on which I base my recommended common equity cost rate. As shown on
14 page 2 of Exhibit DWD-2, the common equity ratios of the Utility Proxy Group range from
15 40.31% to 62.44%, averaging 49.38% in fiscal year 2021.

16 Bluegrass Water’s proposed ratemaking equity ratio is also consistent with the
17 equity ratios expected to be maintained by the Utility Proxy Group in the years 2025 to
18 2027 as published by *Value Line*. In the years 2025 to 2027, the members of the Utility
19 Proxy Group are expected to maintain equity ratios between 40.00% and 62.50%.¹⁰

⁹ See, Kentucky Public Service Commission, Case No. 2020-00290, Order (August 2, 2021), at 101.

¹⁰ *Value Line Investment Survey*, January 6, 2023.

1 **B. LONG-TERM DEBT COST RATE**

2 **Q. What is your recommendation regarding the appropriate cost of long-term debt for**
3 **Bluegrass Water in this proceeding?**

4 A. In this proceeding, I recommend a cost of long-term debt of 6.80%, which reflects the
5 actual effective cost of debt for the Company. The calculation of the effective debt cost
6 rate is set forth in page 1 of Exhibit DWD-3.

7 **VII. COMMON EQUITY COST RATE MODELS**

8 **Q. Is it important that cost of common equity models be market-based?**

9 A. Yes. A public utility must compete for equity in capital markets along with all other
10 companies of comparable risk, which includes non-utilities. The cost of common equity is
11 thus determined based on equity market expectations for the returns of those comparable
12 risk companies. If individual investors are choosing to invest their capital among
13 companies of comparable risk, they will choose a company providing a higher return over
14 a company providing a lower return.

15 **Q. Are your cost of common equity models market-based models?**

16 A. Yes. The DCF model is market-based because market prices are used in developing the
17 dividend yield component of the model. The RPM is market-based because the bond
18 ratings and expected bond yields used in the application of the RPM reflect the market's
19 assessment of bond/credit risk. In addition, the use of beta (β) to determine the equity risk
20 premium reflects the market's assessment of market/systematic risk, since betas are derived
21 from regression analyses of market prices. The Predictive Risk Premium Model ("PRPM")
22 uses monthly market returns in addition to expectations of the risk-free rate. The CAPM

1 is market-based for many of the same reasons that the RPM is market-based (i.e., the use
2 of expected bond yields and beta). Selection of the comparable risk non-price regulated
3 companies is market-based because it is based on statistics which result from regression
4 analyses of market prices and reflect the market's assessment of total risk.

5 **Q. What analytical approaches did you use to determine the Company's ROE?**

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

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

1 Under the model's strict assumptions, the growth rate equals the rate of capital
2 appreciation (that is, the growth in the stock price). Given that assumption, it does not
3 matter whether the investor holds the stock in perpetuity, or whether they hold the stock
4 for some period of time, collect the dividends, then sell at the prevailing market price.

5 **Q. Which version of the DCF model did you use?**

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

7 **Q. Please describe the dividend yield you used in your application of the DCF model.**

8 A. The unadjusted dividend yields are based on the proxy companies' dividends as of January
9 13, 2023, divided by the average of closing market prices for the 60 trading days ending
10 January 13, 2023.¹¹

11 **Q. Please explain your adjustment to the dividend yield.**

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

15 DCF theory calls for the use of the full growth rate, or D_1 , in calculating the
16 dividend yield component of the model. Since the various companies in the Utility Proxy
17 Group increase their quarterly dividend at various times during the year, a reasonable
18 assumption is to reflect one-half the annual dividend growth rate in the dividend yield
19 component, or $D_{1/2}$. Because the dividend should be representative of the next 12-month
20 period, my adjustment is a conservative approach that does not overstate the dividend yield.
21 Therefore, the actual average dividend yields in Column 1 on page 1 of Exhibit DWD-4

¹¹ See Exhibit DWD-4, page 1, Column 1.

1 have been adjusted upward to reflect one-half the average projected growth rate shown in
2 Column 5.

3 **Q. Please explain the basis of the growth rates you applied to the Utility Proxy Group in**
4 **your DCF model.**

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

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

17 **Q. Please summarize the DCF model results.**

18 A. As shown on page 1 of Exhibit DWD-4, the application of the constant growth DCF model
19 to the Utility Proxy Group results in a wide range of indicated ROEs from 5.81% to
20 12.92%. The mean result is 9.11%, the median result is 9.21%, and the average of the
21 mean and median results is 9.16% for the Utility Proxy Group.

1 **B. THE RISK PREMIUM MODEL**

2 **Q. Please describe the theoretical basis of the RPM.**

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

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

17 **Q. Please explain how you derived your indicated cost of common equity based on the**
18 **RPM.**

19 A. I relied on the results of the application of two risk premium methods. The first method is
20 the PRPM, while the second method is a risk premium model using a total market approach.

1 **1. The Predictive Risk Premium Model**

2 **Q. Please explain the PRPM.**

3 A. The PRPM, published in the *Journal of Regulatory Economics* and *The Electricity*
4 *Journal*¹², was developed from the work of Robert F. Engle, who shared the Nobel Prize
5 in Economics in 2003 “for methods of analyzing economic time series with time-varying
6 volatility (“ARCH”).¹³ Engle found that volatility changes over time and is related from
7 one period to the next, especially in financial markets. Engle discovered that the volatility
8 in prices and returns clusters over time and is therefore highly predictable and can be used
9 to predict future levels of risk and risk premiums.

10 The PRPM estimates the risk / return relationship directly, as the predicted equity
11 risk premium is generated by the prediction of volatility or risk. The PRPM is not based
12 on an estimate of investor behavior, but rather on the evaluation of the results of that
13 behavior (i.e., the variance of historical equity risk premiums).

14 **Q. Please explain your application of the PRPM.**

15 A. The inputs to the model are the historical returns on the common shares of each company
16 in the Utility Proxy Group minus the historical monthly yield on long-term U.S. Treasury
17 securities through December 2022. Using a generalized form of ARCH, known as
18 GARCH, I calculated each Utility Proxy Group company’s projected equity risk premium

¹² 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, *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, Pauline M. Ahern, Dylan W. D’Ascendis, and Frank J. Hanley, *The Electricity Journal* (May 2013), 84-89.

¹³ www.nobelprize.org.

1 using Eviews[®] statistical software. When the GARCH Model is applied to the historical
2 return data, it produces a predicted GARCH variance series¹⁴ and a GARCH coefficient¹⁵.
3 Multiplying the predicted monthly variance by the GARCH coefficient, then annualizing
4 it¹⁶, produces the predicted annual equity risk premium. I then added the forecasted 30-
5 year U.S. Treasury Bond yield, 3.91%¹⁷, to each company's PRPM-derived equity risk
6 premium to arrive at an indicated cost of common equity. The 30-year Treasury yield is a
7 consensus forecast derived from the *Blue Chip Financial Forecasts ("Blue Chip")*¹⁸.

8 **Q. What are the results of the PRPM?**

9 A. As shown on page 2 of Exhibit DWD-5, the mean PRPM indicated common equity cost
10 rate for the Utility Proxy Group is 13.05%, the median is 12.23%, and the average of the
11 two is 12.64%. Consistent with my reliance on the average of the median and mean results
12 of the DCF, I relied on the average of the mean and median results of the Utility Proxy
13 Group PRPM to calculate a cost of common equity rate of 12.64%.

14 **Q. Is the PRPM supported by academic literature?**

15 Yes, it is. As is explained above, the PRPM is based on the research of Dr. Robert F. Engle,
16 dating back to the early 1980s. In addition, the GARCH methodology has been well tested
17 by academia since Engle's, *et al.* research was originally published in 1982, 40 years ago.

18 I use the well-established GARCH methodology to estimate the PRPM model using a

14 Illustrated on Columns 1 and 2 of page 2 of Exhibit DWD-5.

15 Illustrated on Column 4 of page 2 of Exhibit DWD-5.

16 Annualized Return = (1+Monthly Return)¹² - 1.

17 See Column 6 of page 2 of Exhibit DWD-5.

18 *Blue Chip Financial Forecasts*, December 2, 2022, at p. 14 and January 1, 2023 at p. 2.

1 standard commercial and relatively inexpensive statistical package, Eviews,^{©19} to develop
2 a means by which to estimate a predicted equity risk premium which, when added to a
3 bond yield, results in a cost of common equity.

4 Also, the PRPM is in the public domain, having been published six times in
5 academically peer-reviewed journals: *Journal of Economics and Business* (June 2011 and
6 April 2015),²⁰ *The Journal of Regulatory Economics* (December 2011),²¹ *The Electricity*
7 *Journal* (May 2013 and March 2020),²² and *Energy Policy* (April 2019).²³ Notably, none
8 of these articles have been rebutted in the academic literature.

9 Finally, the PRPM has also been presented to a number of utility
10 industry/regulatory/academic groups including the following: The Edison Electric Institute
11 Cost of Capital Working Group; The NARUC Staff Subcommittee on Accounting and
12 Finance; The National Association of Electric Companies Finance/Accounting/Taxation
13 and Rates and Regulations Committees; the NARUC Electric Committee; The Wall Street
14 Utility Group; the Indiana Utility Regulatory Commission Cost of Capital Task Force; the

¹⁹ In addition to Eviews,[®] the GARCH methodology can be applied and the PRPM derived using other standard statistical software packages such as SAS, RATS, S-Plus and JMulti, which are not cost-prohibitive. The software that I used in this proceeding, Eviews,[®] currently costs \$600 - \$700 for a single user commercial license. In addition, JMulti is a free downloadable software with GARCH estimation applications.

²⁰ Eugene A. Pilotte and Richard A. Michelfelder, “Treasury Bond Risk and Return, the Implications for the Hedging of Consumption and Lessons for Asset Pricing”, *Journal of Economics and Business*, June 2011, 582-604. and Richard A. Michelfelder, “Empirical Analysis of the Generalized Consumption Asset Pricing Model: Estimating the Cost of Capital”, *Journal of Economics and Business*, April 2015, 37-50.

²¹ Pauline M. Ahern, Frank J. Hanley, and Richard A. Michelfelder, “New Approach to Estimating the Equity Risk Premium for Public Utilities”, *The Journal of Regulatory Economics*, December 2011, at 40:261-278.

²² Richard A. Michelfelder, Pauline M. Ahern, Dylan W. D’Ascendis, and Frank J. Hanley, “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”, *The Electricity Journal*, April 2013, at 84-89; and Richard A. Michelfelder, Pauline M. Ahern, and Dylan W. D’Ascendis, “Decoupling, Risk Impacts and the Cost of Capital”, *The Electricity Journal*, January 2020.

²³ Richard A. Michelfelder, Pauline M. Ahern, and Dylan W. D’Ascendis, “Decoupling Impact and Public Utility Conservation Investment”, *Energy Policy*, April 2019, 311-319.

1 Financial Research Institute of the University of Missouri Hot Topic Hotline Webinar; and
2 the Center for Research and Regulated Industries Annual Eastern Conference on two
3 occasions.

4 **Q. Has the PRPM been implicitly accepted by other regulatory commissions?**

5 A. Yes. In Docket No. 2017-292-WS, the Public Service Commission of South Carolina
6 (“PSC SC”) accepted Blue Granite Water Company’s entire requested ROE, which
7 included the PRPM. The relevant portion states:

8 The Commission finds Mr. D’Ascendis’ arguments persuasive. He
9 provided more indicia of market returns, by using more analytical
10 methods and proxy group calculations. Mr. D’Ascendis’ use of
11 analysts’ estimates for his DCF analysis is supported by consensus,
12 as is his use of the arithmetic mean. The Commission also finds that
13 Mr. D’Ascendis’ non-price regulated proxy group more accurately
14 reflects the total risk faced [by] price regulated utilities and CWS.
15 Furthermore, there is no dispute that CWS is significantly smaller
16 than its proxy group counterparts, and, therefore, it may present a
17 higher risk. An appropriate ROE for CWS is 10.45% to 10.95%. The
18 Company used an ROE of 10.5% in computing its Application, a
19 return on the low end of Mr. D’Ascendis’ range, and the
20 Commission finds that ROE is supported by the evidence.²⁴

21 In addition, in Docket No. W-354, Subs 363, 364 and 365, the State of North
22 Carolina Utilities Commission (“NCUC”) approved my RPM and CAPM analyses, which
23 used PRPM analyses as presented in this proceeding. The relevant portion of the order
24 states:

25 In doing so the Commission finds that the DCF (8.81%), Risk
26 Premium (10.00%) and CAPM (9.29%) model results provided by
27 witness D’Ascendis, as updated to use current rates in D’Ascendis
28 Late-Filed Exhibit No. 1, as well as the risk premium (9.57%)

²⁴ PSC SC Docket No. 2017-292-WS - Order No. 2018-345, at 14. (May 17, 2018)

1 analysis of witness Hinton, are credible, probative, and are entitled
2 to substantial weight as set forth below.²⁵

3 **Q. Did the Commission reject the PRPM in Case No. 2021-00214 concerning Atmos**
4 **Energy Corporation?**

5 A. Yes, it did. The Commission stated:

6 Even though the Commission supports the use and presentation of
7 multiple modelling approaches, the Commission finds that Atmos
8 Kentucky's use of the Predictive Risk Premium Model (PRPM)
9 should be rejected. Though the PRPM model has been published
10 and presented in multiple forums, it has been rejected by this
11 Commission and only been addressed by three other regulatory
12 jurisdictions thus far and is not universally accepted.

13 **Q. Do you have a response to the Commission's statement?**

14 A. Yes, I do. I appreciate the Commission's openness to considering multiple models in its
15 determination of ROEs for the utilities they regulate, but I respectfully disagree with their
16 exclusion of the PRPM in Case No. 2021-00214. As noted above, the theory supporting
17 the model is based on the Nobel Prize winning work of Engle, and the model itself has
18 been published six times in four separate peer-reviewed academic journals, which indicates
19 that it has been thoroughly vetted by the academic community. This, in addition to the fact
20 that the model has not been rebutted in the academic literature in the approximately twenty
21 years since it was presented in 2003 should speak to the model's soundness.

22 Regarding the amount of times the model has been addressed in final orders; while
23 it is true that only three (now four) regulatory commissions have addressed the PRPM in
24 their final orders, the model has been presented in over 100 regulatory proceedings in over

²⁵ NCUC Docket No. W-354, Sub 363, 364, 365, *Order Granting Partial Rate Increase and Requiring Customer Notice*, at PDF 72 (March 31, 2020).

1 thirty U.S. regulatory jurisdictions and the Alberta Utilities Commission in Canada. This
2 would indicate that while maybe not universally accepted, the model is widely
3 disseminated across the U.S. regulatory landscape.

4 In view of the above, the soundness of the model, as evidenced in the underlying
5 theory and the academic vetting of the PRPM, and the wide dissemination of the model in
6 the U.S. regulatory landscape should lead the Commission to reconsider use of the PRPM
7 as a modeling methodology.

8 **Q. Have you presented your ROE model results excluding the PRPM?**

9 A. Yes. While I respectfully disagree with the Commission's finding in Case No. 2021-
10 00214, I have presented my ROE model results including and excluding the PRPM for the
11 Commission's convenience. As can be gleaned from page 2 of Exhibit DWD-1, my
12 recommended ROE of 11.65% is still within the range of ROEs produced by my models
13 without the PRPM,²⁶ albeit at the high end of that range.

14 **2. The Total Market Approach Risk Premium Model**

15 **Q. Please explain the total market approach RPM.**

16 A. The total market approach RPM adds a prospective public utility bond yield to an average
17 of: 1) an equity risk premium that is derived from a beta-adjusted total market equity risk
18 premium; and 2) an equity risk premium based on the S&P Utilities Index.

²⁶ The range of ROEs attributable to the Company excluding the PRPM is from 10.74% to 11.74%.

1 **Q. Please explain the basis of the expected bond yield of 5.98% applicable to the Utility**
2 **Proxy Group.**

3 A. The first step in the total market approach RPM analysis is to determine the expected bond
4 yield. Because both ratemaking and the cost of capital, including common equity cost rate,
5 are prospective in nature, a prospective yield on similarly-rated long-term debt is essential.
6 I rely on a consensus forecast of about 50 economists of the expected yield on Aaa-rated
7 corporate bonds for the six calendar quarters ending with the second calendar quarter of
8 2024, and the long-term projections for 2024 to 2028, and 2029 to 2033 from *Blue Chip*.
9 As shown on line 1 of page 3 of Exhibit DWD-5, the average expected yield on Moody's
10 Aaa-rated corporate bonds is 5.05%. In order to derive an expected yield on A2-rated
11 public utility bonds, I make an upward adjustment of 0.83%, which represents a recent
12 spread between Aaa-rated corporate bonds and A2-rated public utility bonds, in order to
13 adjust the expected Aaa-rated corporate bond yield to an equivalent Moody's A2-rated
14 public utility bond.²⁷ Adding that recent 0.83% spread to the expected Aaa-rated corporate
15 bond yield of 5.05% results in an expected A2-rated public utility bond of 5.88%.

16 Since the Utility Proxy Group's average Moody's long-term issuer rating is A3,
17 another adjustment to the expected A2-rated public utility bond yield is needed to reflect
18 the difference in bond ratings. An upward adjustment of 0.10%, which represents one-
19 third of a recent spread between A2- and Baa2-rated public utility bond yields, is necessary
20 to make the A2-rated prospective bond yield applicable to an A3-rated public utility bond.²⁸

²⁷ As shown on line 2 and explained in note 2 of page 3 of Exhibit DWD-5.

²⁸ As shown on line 5 and explained in note 4, page 3 of Exhibit DWD-5. 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 three steps between Baa2 and A2 (Baa2 to Baa1, Baa1

1 Adding the 0.10% to the 5.88% prospective A2-rated public utility bond yield results in a
2 5.98% expected bond yield for the Utility Proxy Group.

3 **Table 3: Summary of the Calculation of the Utility Proxy Group Projected Bond**
4 **Yield**²⁹

Prospective Yield on Moody's Aaa Rated Corporate Bonds (<i>Blue Chip</i>)	5.05%
Adjustment to Reflect Yield Spread Between Moody's Aaa Rated Corporate Bonds and Moody's A2 Rated Utility Bonds	0.83%
Adjustment to Reflect the Utility Proxy Group's Average Moody's Bond Rating of A3	<u>0.10%</u>
Prospective Bond Yield Applicable to the Utility Proxy Group	<u>5.98%</u>

5 To develop the indicated ROE using the total market approach RPM, this
6 prospective bond yield is then added to the average of the three different equity risk
7 premiums described below.

8 **Q. Please explain how the beta-derived equity risk premium is determined.**

9 A. The components of the beta-derived risk premium model are: 1) an expected market equity
10 risk premium over corporate bonds, and 2) beta. The derivation of the beta-derived equity
11 risk premium that I applied to the Utility Proxy Group is shown on lines 1 through 9 of
12 page 8 of Exhibit DWD-5. The total beta-derived equity risk premium I applied was based
13 on an average of: 1) Kroll-based equity risk premiums; 2) *Value Line*-based equity risk
14 premiums; and 3) Bloomberg-based equity risk premiums. Each of these is described in
15 turn.

29

to A3, and A3 to A2) I assumed an adjustment of one-third of the difference between the A2 rated and Baa2 rated public utility bond yield was appropriate. As shown on page 3 of Exhibit DWD-5.

1 **Q. How did you derive a market equity risk premium based on long-term historical**
2 **data?**

3 A. To derive a historical market equity risk premium, I used the most recent holding period
4 returns for the large company common stocks from the Kroll Stocks, Bonds, Bills, and
5 Inflation (“SBBI”) 2022 Yearbook (“SBBI – 2022”)³⁰ less the average historical yield on
6 Moody’s Aaa/Aa rated corporate bonds for the period 1928 to 2021. The use of holding
7 period returns over a very long period of time is appropriate because it is consistent with
8 the long-term investment horizon presumed by investing in a going concern, i.e., a
9 company expected to operate in perpetuity.

10 SBBI’s long-term arithmetic mean monthly total return rate on large company
11 common stocks was 12.11% and the long-term arithmetic mean monthly yield on Moody’s
12 Aaa/Aa-rated corporate bonds was 5.98% from 1928 to 2021.³¹ As shown on line 1 of
13 page 8 of Exhibit DWD-5, subtracting the mean monthly bond yield from the total return
14 on large company stocks results in a long-term historical equity risk premium of 6.13%.

15 I used the arithmetic mean monthly total return rates for the large company stocks
16 and yields (income returns) for the Moody’s Aaa/Aa-rated corporate bonds, because they
17 are appropriate for the purpose of estimating the cost of capital as noted in SBBI – 2022.³²
18 The use of the arithmetic mean return rates and yields is appropriate because historical total
19 returns and equity risk premiums provide insight into the variance and standard deviation
20 of returns needed by investors in estimating future risk when making a current investment.

³⁰ SBBI-2022 Appendix A Tables: Morningstar Stocks, Bonds, Bills, & Inflation 1926-2021.

³¹ As explained in note 1 on page 8 of Exhibit DWD-5.

³² SBBI – 2022, at 200-201.

1 If investors relied on the geometric mean of historical equity risk premiums, they would
2 have no insight into the potential variance of future returns because the geometric mean
3 relates to the change over many periods to a constant rate of change, thereby obviating the
4 year-to-year fluctuations, or variance, which is critical to risk analysis.

5 **Q. Please explain the derivation of the regression-based market equity risk premium.**

6 A. To derive the regression analysis-derived market equity risk premium of 7.26%, shown on
7 line 2 of page 8 of Exhibit DWD-5, I used the same monthly annualized total returns on
8 large company common stocks relative to the monthly annualized yields on Moody's
9 Aaa/Aa-rated corporate bonds as mentioned above. The relationship between interest rates
10 and the market equity risk premium was modeled using the observed monthly market
11 equity risk premium as the dependent variable, and the monthly yield on Moody's Aaa/Aa-
12 rated corporate bonds as the independent variable. I used a linear Ordinary Least Squares
13 ("OLS") regression, in which the market equity risk premium is expressed as a function of
14 the Moody's Aaa/Aa-rated corporate bond yield:

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

16 where:

17 RP = the market equity risk premium;

18 α = the regression intercept coefficient;

19 β = the regression slope coefficient; and

20 $R_{Aaa/Aa}$ = the Moody's Aaa/Aa rated corporate bond yield.

21 Using the equation generated by the regression, an expected equity risk premium
22 of 7.26% is calculated using the average forecast of Aaa-rated corporate bond yield of
23 5.05%, as discussed above.

1 **Q. Please explain the derivation of a PRPM equity risk premium.**

2 A. I used the same PRPM approach described previously to develop another equity risk
3 premium estimate. The inputs to the model are the historical monthly returns on large
4 company common stocks minus the monthly yields on Aaa/Aa-rated corporate bonds
5 during the period from January 1928 through December 2022.³³ Using the previously
6 discussed generalized form of ARCH, known as GARCH, the projected equity risk
7 premium is determined using Eviews[®] statistical software. The resulting PRPM predicted
8 market equity risk premium is 9.76%.³⁴

9 **Q. Please explain the derivation of a projected equity risk premium based on *Value Line***
10 **Summary and Index data for your RPM analysis.**

11 A. As noted previously, because both ratemaking and the cost of capital are prospective, a
12 prospective market equity risk premium is needed. The derivation of the forecasted or
13 prospective market equity risk premium can be found in note 4 on page 8 of Exhibit DWD-
14 5. Consistent with the premise that total returns are the sum of capital appreciation and
15 income returns, this prospective market return is derived from an average of the three to
16 five-year median market price appreciation potential by *Value Line* Summary and Index
17 for the 13 weeks ending January 13, 2023, plus an average of the median estimated
18 dividend yield for the common stocks of the 1,700 firms covered in *Value Line*'s Standard
19 Edition.³⁵

³³ Data from January 1928-December 2021 is from SBBI – 2022. Data from January 2022 – December 2022 is from Bloomberg Professional Services.

³⁴ Shown on line 3 on page 8 of Exhibit DWD-5.

³⁵ As explained in detail in page 2, note 1 of Exhibit DWD-6.

1 The average median expected price appreciation is 68%, which translates to a
2 13.85% annual appreciation, and when added to the average of *Value Line's* median
3 expected dividend yields of 2.21%, equates to a forecasted annual total return rate on the
4 market of 16.06%. The forecasted Aaa-rated bond yield of 5.05% is deducted from the
5 total market return of 16.06%, resulting in an equity risk premium of 11.01%, shown on
6 page 8, line 4 of Exhibit DWD-5.

7 **Q. Please explain the derivation of an equity risk premium based on *Value Line* data for**
8 **the S&P 500 companies.**

9 A. Using data from *Value Line*, I calculated an expected total return on the S&P 500 using
10 expected dividend yields as a proxy for income return and long-term growth estimates as
11 a proxy for capital appreciation. The expected total return for the S&P 500 is 15.52%.
12 Subtracting the prospective yield on Aaa-rated corporate bonds of 5.05% results in a
13 10.47% projected equity risk premium.

14 **Q. Please explain the derivation of an equity risk premium based on Bloomberg data.**

15 A. Using data from Bloomberg, I calculated an expected total return on the S&P 500 using
16 expected dividend yields as a proxy for income return and long-term growth estimates as
17 a proxy for capital appreciation, identical to the method described above. The expected
18 total return for the S&P 500 is 11.23%. Subtracting the prospective yield on Aaa-rated
19 corporate bonds of 5.05% resulted in a 6.18% projected equity risk premium.

1 Q. What is your conclusion of a beta-derived equity risk premium for use in your RPM
2 analysis?

3 A. I gave equal weight to the six equity risk premiums in arriving at my conclusion of 8.47%.³⁶

4 **Table 4: Summary of the Calculation of the Equity Risk Premium Using Total**
5 **Market Returns**³⁷

Historical Spread Between Total Returns of Large Stocks and Aaa and Aa2 Rated Corporate Bond Yields (1928 – 2021)	6.13%
Regression Analysis on Historical Data	7.26%
PRPM Analysis on Historical Data	9.76%
Prospective Equity Risk Premium using Total Market Returns from <i>Value Line</i> Summary & Index less Projected Aaa Corporate Bond Yields	11.01%
Prospective Equity Risk Premium using Measures of Capital Appreciation and Income Returns from <i>Value Line</i> for the S&P 500 less Projected Aaa Corporate Bond Yields	10.47%
Prospective Equity Risk Premium using Measures of Capital Appreciation and Income Returns from Bloomberg Professional Services for the S&P 500 less Projected Aaa Corporate Bond Yields	<u>6.18%</u>
Average	<u>8.47%</u>

6 After calculating the average market equity risk premium of 8.47%, I adjusted it by
7 beta to account for the risk of the Utility Proxy Group. As discussed below, the beta is a
8 meaningful measure of prospective relative risk to the market as a whole and is a logical
9 means by which to allocate a company's, or proxy group's, share of the market's total
10 equity risk premium relative to corporate bond yields. As shown on page 1 of Exhibit
11 DWD-6, the average of the mean and median beta for the Utility Proxy Group is 0.77.
12 Multiplying the beta of the Utility Proxy Group of 0.77 by the market equity risk premium
13 of 8.47% resulted in a beta-adjusted equity risk premium of 6.52% for the Utility Proxy
14 Group.

³⁶ See line 7 on page 8 of Exhibit DWD-5.

³⁷ As shown on page 8 of Exhibit DWD-5.

1 **Q. How did you derive the equity risk premium based on the S&P Utility Index and**
2 **Moody's A2-rated public utility bonds?**

3 A. I estimated three equity risk premiums based on S&P Utility Index holding returns, and
4 two equity risk premiums based on the expected returns of the S&P Utilities Index, using
5 *Value Line* and Bloomberg data, respectively. Turning first to the S&P Utility Index
6 holding period returns, I derived a long-term monthly arithmetic mean equity risk premium
7 between the S&P Utility Index total returns of 10.74% and monthly A2-rated public utility
8 bond yields of 6.46% from 1928 to 2021, to arrive at an equity risk premium of 4.28%.³⁸
9 I then used the same historical data to derive an equity risk premium of 4.80% based on a
10 regression of the monthly equity risk premiums. The final S&P Utility Index holding
11 period equity risk premium involved applying the PRPM using the historical monthly
12 equity risk premiums from January 1928 to December 2022 to arrive at a PRPM-derived
13 equity risk premium of 5.56% for the S&P Utility Index.

14 I then derived expected total returns on the S&P Utilities Index of 9.45% and
15 10.57% using data from *Value Line* and Bloomberg, respectively, and subtracted the
16 prospective A2-rated public utility bond yield (5.88%)³⁹, which results in risk premiums
17 of 3.57% and 4.69%, respectively. As with the market equity risk premiums, I averaged
18 each risk premium to arrive at my utility-specific equity risk premium of 4.58%.

³⁸ As shown on line 1 on page 11 of Exhibit DWD-5.

³⁹ Derived on line 3 of page 3 of Exhibit DWD-5.

1
2

**Table 5: Summary of the Calculation of the Equity Risk Premium Using S&P
Utility Index Holding Returns⁴⁰**

Historical Spread Between Total Returns of the S&P Utilities Index and A2 Rated Utility Bond Yields (1928 – 2021)	4.28%
Regression Analysis on Historical Data	4.80%
PRPM Analysis on Historical Data	5.56%
Prospective Equity Risk Premium using Measures of Capital Appreciation and Income Returns from <i>Value Line</i> for the S&P Utilities Index less Projected A2 Utility Bond Yields	3.57%
Prospective Equity Risk Premium using Measures of Capital Appreciation and Income Returns from Bloomberg Professional Services for the S&P Utilities Index less Projected A2 Utility Bond Yields	<u>4.69%</u>
Average	<u>4.58%</u>

3

4 **Q. What is your conclusion of an equity risk premium for use in your total market**
5 **approach RPM analysis?**

6 A. The equity risk premium I applied to the Utility Proxy Group is 5.55%, which is the average
7 of the beta-derived and the S&P utility equity risk premiums of 6.52% and 4.58%,
8 respectively.⁴¹

9 **Q. What is the indicated RPM common equity cost rate based on the total market**
10 **approach?**

11 A. As shown on line 7 of Exhibit DWD-5, page 3, I calculated a common equity cost rate of
12 11.53% for the Utility Proxy Group based on the total market approach of the RPM.

⁴⁰ As shown on page 11 of Exhibit DWD-5.

⁴¹ As shown on page 7 of Exhibit DWD-5.

1 **Table 6: Summary of the Total Market Return Risk Premium Model⁴²**

Prospective Moody's A3-Rated Utility Bond Applicable to the Utility Proxy Group	5.98%
Prospective Equity Risk Premium	5.55%
Indicated Cost of Common Equity	11.53%

2 **Q. What are the results of your application of the PRPM and the total market approach**
3 **RPM?**

4 A. As shown on page 1 of Exhibit DWD-5, the indicated RPM-derived common equity cost
5 rate is 12.09%, which gives equal weight to the PRPM (12.64%) and the adjusted market
6 approach results (11.53%).

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

8 **Q. Please explain the theoretical basis of the CAPM.**

9 A. CAPM theory defines risk as the co-variability of a security's returns with the market's
10 returns as measured by beta (β). A beta of less than 1.0 indicates lower variability than the
11 market as a whole, while a beta greater than 1.0 indicates greater variability than the
12 market.

13 The CAPM assumes that all other risk (i.e., all non-market or unsystematic risk)
14 can be eliminated through diversification. The risk that cannot be eliminated through
15 diversification is called market, or systematic, risk. In addition, the CAPM presumes that
16 investors require compensation only for systematic risk, which is the result of
17 macroeconomic and other events that affect the returns on all assets. The model is applied
18 by adding a risk-free rate of return to a market risk premium, which is adjusted

⁴² As shown on page 3 of Exhibit DWD-5.

1 proportionately to reflect the systematic risk of the individual security relative to the total
2 market, as measured by beta. The traditional CAPM model is expressed as:

$$3 \quad R_s = R_f + \beta(R_m - R_f)$$

4 Where: R_s = Return rate on the common stock;

5 R_f = Risk-free rate of return;

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

7 β = Adjusted beta (volatility of the
8 security relative to the market as a whole).

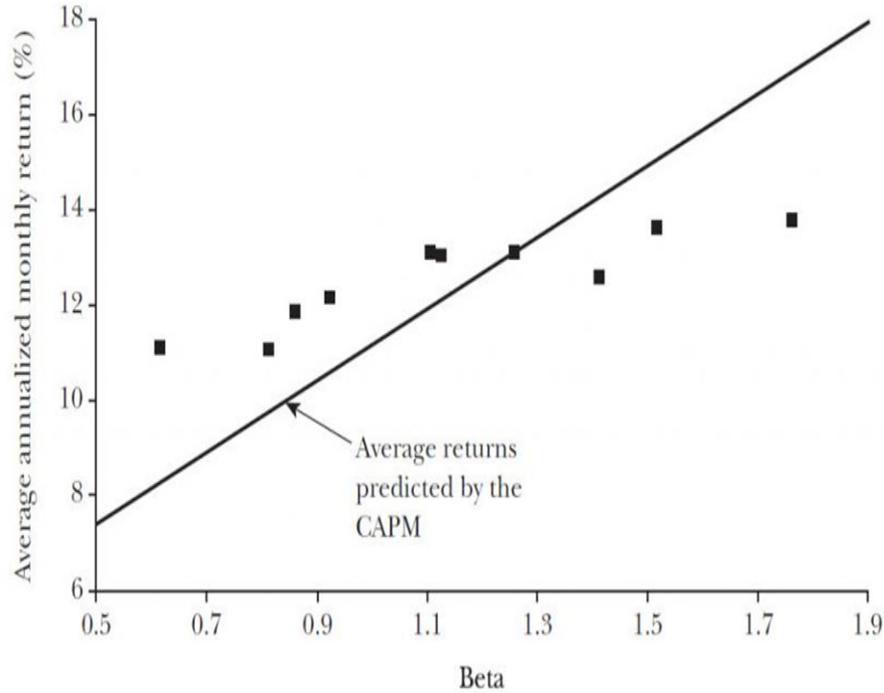
9 Numerous tests of the CAPM have measured the extent to which security returns
10 and beta are related as predicted by the CAPM, confirming its validity. The empirical
11 CAPM ("ECAPM") reflects the reality that while the results of these tests support the
12 notion that beta is related to security returns, the empirical Security Market Line ("SML")
13 described by the CAPM formula is not as steeply sloped as the predicted SML.⁴³ The
14 ECAPM reflects this empirical reality. Fama and French clearly state regarding Figure 2,
15 below, that "[t]he returns on the low beta portfolios are too high, and the returns on the
16 high beta portfolios are too low."⁴⁴

⁴³ Roger A. Morin, Modern Regulatory Finance, (PUR Books, 2021) at 221. ("Morin")

⁴⁴ 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>.

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



1
2 In addition, Morin observes that while the results of these tests support the notion
3 that beta is related to security returns, the empirical SML described by the CAPM formula
4 is not as steeply sloped as the predicted SML. Morin states:

5 With few exceptions, the empirical studies agree that ... low-beta securities
6 earn returns somewhat higher than the CAPM would predict, and high-beta
7 securities earn less than predicted.⁴⁵

8 * * *

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

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

⁴⁵ Morin, at 207.

1 where x is a fraction to be determined empirically. The value of x that best
2 explains the observed relationship [is] $\text{Return} = 0.0829 + 0.0520 \beta$ is
3 between 0.25 and 0.30. If $x = 0.25$, the equation becomes:

$$4 \quad K = R_F + 0.25(R_M - R_F) + 0.75 \beta(R_M - R_F)^{46}$$

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

6 The early tests firmly reject the Sharpe-Lintner version of the CAPM. There
7 is a positive relation between beta and average return, but it is too 'flat'...
8 The regressions consistently find that the intercept is greater than the
9 average risk-free rate... and the coefficient on beta is less than the average
10 excess market return... This is true in the early tests... as well as in more
11 recent cross-section regressions tests, like Fama and French (1992).⁴⁷

12 Finally, Fama and French further note:

13 Confirming earlier evidence, the relation between beta and average return
14 for the ten portfolios is much flatter than the Sharpe-Linter CAPM predicts.
15 The returns on low beta portfolios are too high, and the returns on the high
16 beta portfolios are too low. For example, the predicted return on the
17 portfolio with the lowest beta is 8.3 percent per year; the actual return as
18 11.1 percent. The predicted return on the portfolio with the highest beta is
19 16.8 percent per year; the actual is 13.7 percent.⁴⁸

20
21 Clearly, the justification from Morin, Fama, and French along with their reviews of
22 other academic research on the CAPM, validate the use of the ECAPM. In view of theory
23 and practical research, I have applied both the traditional CAPM and the ECAPM to the
24 companies in the Utility Proxy Group and averaged the results.

25 **Q. What beta did you use in your CAPM analysis?**

26 A. With respect to beta, I considered two methods of calculation: 1) the average beta of the
27 Utility Proxy Group companies reported by Bloomberg Professional Services; and 2) the
28 average beta of the Utility Proxy Group companies as reported by *Value Line*. While both

⁴⁶ Morin, at 221.

⁴⁷ Fama & French, at 32.

⁴⁸ Fama & French, at 33.

1 of those services adjust their calculated (or “raw”) betas to reflect the tendency of beta to
2 regress to the market mean of 1.00, *Value Line* calculates beta over a five-year period,
3 while Bloomberg’s calculation is based on two years of data.

4 **Q. Please describe your selection of a risk-free rate of return.**

5 A. As shown in Exhibits DWD-5 and DWD-6, the risk-free rate adopted for applications of
6 the RPM and CAPM is 3.91%. This risk-free rate of 3.91% is based on the average of the
7 *Blue Chip* consensus forecast of the expected yields on 30-year U.S. Treasury bonds for
8 the six quarters ending with the second calendar quarter of 2024, and long-term projections
9 for the years 2024 to 2028 and 2029 to 2033.

10 **Q. Why do you use the 30-year Treasury yield in your analyses?**

11 A. The yield on long-term U.S. Treasury Bonds is almost risk-free, and its term is consistent
12 with the long-term cost of capital to public utilities measured by the yields on A2 rated
13 public utility bonds, the long-term investment horizon inherent in utilities’ common stocks,
14 and the long-term life of the jurisdictional rate base to which the allowed fair rate of return
15 (*i.e.*, cost of capital) will be applied. In contrast, short-term U.S. Treasury yields are more
16 volatile and largely a function of Federal Reserve monetary policy.

17 **Q. Please explain the estimation of the expected risk premium for the market used in
18 your CAPM analyses.**

19 A. The basis of the market risk premium is explained in detail in note 1 on page 2 of Exhibit
20 DWD-6. As discussed previously, the market risk premium is derived from an average of:

- 21 (i) Ibbotson-based market risk premiums;
22 (ii) *Value Line* data-based market risk premiums; and

1 (iii) Bloomberg data-based market risk premiums.

2 The long-term income return on U.S. Government Securities of 5.02% was
3 deducted from the SBBI - 2022 monthly historical total market return of 12.37%, which
4 results in a historical market equity risk premium of 7.35%.⁴⁹ I applied a linear OLS
5 regression to the monthly annualized historical returns on the S&P 500 relative to historical
6 yields on long-term U.S. Government Securities from SBBI - 2022. That regression
7 analysis yielded a market equity risk premium of 8.71%. The PRPM market equity risk
8 premium is 10.86% and is derived using the PRPM relative to the yields on long-term U.S.
9 Treasury securities from January 1926 through December 2022.

10 The *Value Line* Summary and Index-derived forecasted total market equity risk
11 premium is derived by deducting the forecasted risk-free rate of 3.91%, discussed above,
12 from the *Value Line* Summary and Index projected total annual market return of 16.06%,
13 resulting in a forecasted total market equity risk premium of 12.15%. The S&P 500
14 projected market equity risk premium using *Value Line* data is derived by subtracting the
15 projected risk-free rate of 3.91% from the projected total return of the S&P 500 of 15.52%.
16 The resulting market equity risk premium is 11.61%.

17 The S&P 500 projected market equity risk premium using Bloomberg data is
18 derived by subtracting the projected risk-free rate of 3.91% from the projected total return
19 of the S&P 500 of 11.23%. The resulting market equity risk premium is 7.32%.

20 These six market risk premiums, when averaged, resulted in an average total market
21 equity risk premium of 9.67%.

⁴⁹ SBBI – 2022, at 256-258, 274-276.

1
2

**Table 7: Summary of the Calculation of the Market Risk Premium
for Use in the CAPM⁵⁰**

Historical Spread Between Total Returns of Large Stocks and Long-Term Government Bond Yields (1926 – 2021)	7.35%
Regression Analysis on Historical Data	8.71%
PRPM Analysis on Historical Data	10.86%
Prospective Equity Risk Premium using Total Market Returns from <i>Value Line</i> Summary & Index less Projected 30-Year Treasury Bond Yields	12.15%
Prospective Equity Risk Premium using Measures of Capital Appreciation and Income Returns from <i>Value Line</i> for the S&P 500 less Projected 30-Year Treasury Bond Yields	11.61%
Prospective Equity Risk Premium using Measures of Capital Appreciation and Income Returns from Bloomberg Professional Services for the S&P 500 less Projected 30-Year Treasury Bond Yields	<u>7.32%</u>
Average	<u>9.67%</u>

3 **Q. What are the results of your application of the traditional and empirical CAPM to**
4 **the Utility Proxy Group?**

5 A. As shown on page 1 of Exhibit DWD-6, the mean result of my CAPM/ECAPM analysis is
6 11.77%, the median is 11.38%, and the average of the two is 11.58%. Consistent with my
7 reliance on the average of mean and median DCF results discussed above, the indicated
8 common equity cost rate using the CAPM/ECAPM is 11.58%.

⁵⁰ As shown on page 2 of Exhibit DWD-6.

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

4 **Q. Why did you also consider a proxy group of domestic, non-price regulated**
5 **companies?**

6 A. In the *Hope* and *Bluefield* cases, the U.S. Supreme Court did not specify that comparable
7 risk companies had to be utilities. Since the purpose of rate regulation is to be a substitute
8 for the competition of the marketplace, non-price regulated firms operating in the
9 competitive marketplace make an excellent proxy if they are comparable in total risk to the
10 Utility Proxy Group being used to estimate the cost of common equity. The selection of
11 such domestic, non-price regulated competitive firms theoretically and empirically results
12 in a proxy group which is comparable in total risk to the Utility Proxy Group.

13 **Q. How did you select non-price regulated companies that are comparable in total risk**
14 **to the Utility Proxy Group?**

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

22 (i) They must be covered by *Value Line*;

23 (ii) They must be domestic, non-price regulated companies, *i.e.*, non-utilities;

1 (iii) Their beta must lie within plus or minus two standard deviations of the average
2 unadjusted beta of the Utility Proxy Group; and

3 (iv) The residual standard errors of the *Value Line* regressions which gave rise to the
4 unadjusted betas must lie within plus or minus two standard deviations of the
5 average residual standard error of the Utility Proxy Group.

6 Betas are a measure of market or systematic risk, which is not diversifiable. The
7 residual standard errors of the regressions were used to measure each firm's company-
8 specific, diversifiable risk. Companies that have similar betas and similar residual standard
9 errors resulting from the same regression analyses have similar total investment risk.

10 **Q. Have you prepared an exhibit which shows the data from which you selected the 20**
11 **domestic, non-price regulated companies that are comparable in total risk to the**
12 **Utility Proxy Group?**

13 A. Yes, the basis of my selection, and both proxy groups' regression statistics, are shown in
14 Exhibit DWD-7.

15 **Q. Did you calculate common equity cost rates using the DCF, RPM, and CAPM for the**
16 **Non-Price Regulated Proxy Group?**

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

1 Page 2 of Exhibit DWD-8 contains the derivation of the DCF cost rates. As shown,
2 the indicated common equity cost rate using the DCF for the Non-Price Regulated Proxy
3 Group comparable in total risk to the Utility Proxy Group, is 9.54%.

4 Pages 3 through 5 of Exhibit DWD-8 contain the data and calculations that support
5 the 12.40% RPM cost rate. As shown on line 1 of page 3 of Exhibit DWD-8, the consensus
6 prospective yield on Moody's Baa2-rated corporate bonds for the six quarters ending in
7 the second quarter of 2024, and for the years 2024 to 2028 and 2029 to 2033, is 6.05%.⁵¹
8 Since the Non-Price Regulated Proxy Group has an average Moody's long-term issuer
9 rating of Baa1, a 0.17% downward adjustment of the prospective Baa2-rated corporate
10 bond yield is necessary to reflect a difference in ratings.⁵²

11 When the beta-adjusted risk premium of 6.52%⁵³ relative to the Non-Price
12 Regulated Proxy Group is added to the adjusted prospective Baa1-rated corporate bond
13 yield of 5.88%, the indicated RPM cost rate is 12.40%.

14 Page 6 contains the inputs and calculations that support my indicated
15 CAPM/ECAPM cost rate of 11.61%.

16 **Q. What is the cost rate of common equity based on the Non-Price Regulated Proxy**
17 **Group comparable in total risk to the Utility Proxy Group?**

18 A. As shown on page 1 of Exhibit DWD-8, the results of the DCF, RPM, and CAPM applied
19 to the Non-Price Regulated Proxy Group comparable in total risk to the Utility Proxy
20 Group are 9.54%, 12.40%, and 11.61%, respectively. The average of the mean and median

⁵¹ *Blue Chip Financial Forecasts*, December 2, 2022, at p. 14 and January 1, 2023 at p. 2.

⁵² The 0.17% downward adjustment is equal to one-third of the spread between A2 and Baa2 corporate bond yields, as illustrated in note 2 on page 3 of Exhibit DWD-8.

⁵³ Derived on page 5 of Exhibit DWD-8.

1 of these models is 11.40%, which I used as the indicated common equity cost rate for the
2 Non-Price Regulated Proxy Group.

3 **VIII. CONCLUSION OF COMMON EQUITY COST RATE BEFORE ADJUSTMENT**

4 **Q. What is the indicated range of common equity cost rates before adjustments?**

5 A. Based on the results of the application of multiple cost of common equity models to the
6 Utility Proxy Group, my recommended range of ROEs attributable to the Utility Proxy
7 Group is between 10.13% and 11.13%. The indicated range is equal to 50 basis points
8 above and below the midpoint of my results.

9 I used multiple cost of common equity models as primary tools in arriving at my
10 recommended common equity cost rate, because no single model is so inherently precise
11 that it can be relied on solely to the exclusion of other theoretically sound models. The use
12 of multiple models adds reliability to the estimation of the common equity cost rate, and
13 the prudence of using multiple cost of common equity models is supported in both the
14 financial literature and regulatory precedent.

15 As discussed previously, after determining the indicated range of ROE attributable
16 to a comparable group, there must be an evaluation of relative risk between that group and
17 the target company to determine whether it is appropriate to apply adjustments to the
18 comparable group's indicated ROE to better reflect the target company's specific risks.

19 **IX. ADJUSTMENTS TO THE COMMON EQUITY COST RATE**

20 **A. BUSINESS RISK ADJUSTMENT**

21 **Q. Does Bluegrass Water have increased business risk compared with your Utility Proxy**
22 **Group?**

1 A. Yes, it does. Bluegrass Water faces extraordinary operating risks because of its acquisition
2 of mainly troubled water and wastewater systems, which is only exacerbated by its small
3 size.

4 **Q. Please summarize the extraordinary business risk that faces Bluegrass Water.**

5 A. As described in detail in Messrs. Cox and Freeman’s direct testimonies, the Company faces
6 significant risks due to its acquisition of troubled water and wastewater systems, often at
7 the behest of the Commonwealth. These acquired systems often have significant
8 challenges in all phases of service to their existing customers and Bluegrass Water must
9 invest significant capital to ensure safe and reliable service. While rehabilitating troubled
10 systems is generally a small portion of the operations of the companies that comprise my
11 Utility Proxy Group, it is the majority of the operations of Bluegrass Water. As such, the
12 Company’s increased business risk as compared to the Utility Proxy Group should be
13 reflected in its authorized ROE.

14 **Q. Does Bluegrass Water’s smaller size compared with the Utility Proxy Group increase
15 its business risk?**

16 A. Yes. Bluegrass Water’s smaller size relative to the Utility Proxy Group companies
17 indicates greater relative business risk for the Company because, all else being equal, size
18 has a material bearing on risk.

19 Size affects business risk because smaller companies generally are less able to cope
20 with significant events that affect sales, revenues, and earnings. For example, smaller
21 companies face more risk exposure to business cycles and economic conditions, both
22 nationally and locally. Additionally, the loss of revenues from a few larger customers

1 would have a greater effect on a small company than on a bigger company with a larger,
2 more diverse, customer base.

3 As further evidence illustrates that smaller firms are riskier, investors generally
4 demand greater returns from smaller firms to compensate for less marketability and
5 liquidity of their securities. Duff & Phelps' (now Kroll) discusses the nature of the small-
6 size phenomenon, providing an indication of the magnitude of the size premium based on
7 several measures of size. In discussing "Size as a Predictor of Equity Premiums," Kroll
8 states:

9 The size effect is based on the empirical observation that companies of
10 smaller size are associated with greater risk and, therefore, have greater cost
11 of capital [sic]. The "size" of a company is one of the most important risk
12 elements to consider when developing cost of equity capital estimates for
13 use in valuing a business simply because size has been shown to be a
14 *predictor* of equity returns. In other words, there is a significant (negative)
15 relationship between size and historical equity returns - as size *decreases*,
16 returns tend to *increase*, and vice versa. (footnote omitted) (emphasis in
17 original)⁵⁴

18 Furthermore, in "The Capital Asset Pricing Model: Theory and Evidence," Fama
19 and French note size is indeed a risk factor which must be reflected when estimating the
20 cost of common equity. On page 38, they note:

21 . . . the higher average returns on small stocks and high book-to-market
22 stocks reflect unidentified state variables that produce undiversifiable risks
23 (covariances) in returns not captured in the market return and are priced
24 separately from market betas.⁵⁵

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

⁵⁴ Kroll: Cost of Capital Navigator: U.S. Cost of Capital Module, "Size as a Predictor of Equity Returns," at 1
⁵⁵ Fama & French, at 25-43.

1 Also, it is a basic financial principle that the use of funds invested, and not the
2 source of funds, is what gives rise to the risk of any investment.⁵⁶ Eugene Brigham, a well-
3 known authority, states:

4 A number of researchers have observed that portfolios of small-firms (sic)
5 have earned consistently higher average returns than those of large-firm
6 stocks; this is called the “small-firm effect.” On the surface, it would seem
7 to be advantageous to the small firms to provide average returns in a stock
8 market that are higher than those of larger firms. In reality, it is bad news
9 for the small firm; **what the small-firm effect means is that the capital**
10 **market demands higher returns on stocks of small firms than on**
11 **otherwise similar stocks of the large firms.** (emphasis added)⁵⁷

12 Consistent with the financial principle of risk and return discussed above, increased
13 relative risk due to small size must be considered in the allowed rate of return on common
14 equity. Therefore, the Commission’s authorization of a cost rate of common equity in this
15 proceeding must appropriately reflect the unique risks of Bluegrass Water, including its
16 small size, which is justified and supported above by evidence in the financial literature.

17 **Q. Is there a way to quantify a relative risk adjustment due to Bluegrass Water’s greater**
18 **business risk relative to the Utility Proxy Group?**

19 **A.** Yes. In the absence of other empirical methods, I compared Bluegrass Water’s and the
20 Utility Proxy Group’s relative size, as measured by an estimated market capitalization of
21 common equity for Bluegrass Water.

22 **Table 8: Size as Measured by Market Capitalization for the Company and the**
23 **Utility Proxy Group**

⁵⁶ Richard A. Brealey and Stewart C. Myers, Principles of Corporate Finance (McGraw-Hill Book Company, 1996), at 204-205, 229.

⁵⁷ Eugene F. Brigham, Fundamentals of Financial Management, Fifth Edition (The Dryden Press, 1989), at 623.

	Market Capitalization* (\$ Millions)	Times Greater Than the Company
Bluegrass Water	\$15.374	
Utility Proxy Group Median	\$3,439.009	320.8x
*From page 1 of Exhibit DWD-9.		

1 The Company’s estimated market capitalization was at \$15.374 million as of
2 January 13, 2023, compared with the median market capitalization of the Utility Proxy
3 Group of \$3.44 billion as of January 13, 2023. The Utility Proxy Group’s market
4 capitalization is 223.7 times the size of Bluegrass Water’s estimated market capitalization.

5 As a result, it is necessary to upwardly adjust the indicated range of common equity
6 cost rates to reflect Bluegrass Water’s greater risk due to its smaller relative size. The
7 determination is based on the size premiums for portfolios of New York Stock Exchange,
8 American Stock Exchange, and NASDAQ listed companies ranked by deciles for the 1926
9 to 2021 period. The average size premium for the Utility Proxy Group with a market
10 capitalization of \$3.44 billion falls in the 5th decile, while Bluegrass Water’s market
11 capitalization of \$15.374 million places the Company in the 10th decile. The size premium
12 spread between the 5th decile and the 10th decile is 3.91%. Even though a 3.91% upward
13 size adjustment is indicated, I applied a size premium of 1.00% to Bluegrass Water’s
14 indicated range of common equity cost rates.

15 **Q. What is the indicated range of common equity cost rates after adjustment for the**
16 **Bluegrass Water’s smaller size relative to the Utility Proxy Group?**

1 A. After applying the 1.00% size adjustment to the indicated range of common equity cost
2 rates between 10.13% and 11.13%, based on the Utility Proxy Group results, a range of
3 common equity cost rates between 11.13% and 12.13% is applicable to Bluegrass Water.

4 **X. CONCLUSION**

5 **Q. Using the fair, just and reasonable standard applicable in utility rate cases, what is**
6 **your recommended return on investor-supplied capital for Bluegrass Water?**

7 A. Given the Company's actual capital structure which consists of 38.84% long-term debt at
8 an embedded debt cost rate of 6.80% and 61.16% common equity at my recommended
9 ROE of 11.65%, I conclude that an appropriate return on investor-supplied capital for the
10 Company is 9.77%. A common equity cost rate of 11.65% is consistent with the *Hope* and
11 *Bluefield* standard of a fair, just and reasonable return which ensures the integrity of
12 presently invested capital and enables the attraction of needed new capital on reasonable
13 terms. It also ensures that Bluegrass Water will be able to continue providing safe,
14 adequate, and reliable service to the benefit of its customers. Thus, it balances the interests
15 of both customers and the Company.

16 **Q. Does this conclude your Direct Testimony?**

17 A. Yes, it does.

STATE OF NEW JERSEY §
 §
COUNTY OF BURLINGTON §

AFFIDAVIT OF DYLAN W. D'ASCENDIS

BEFORE ME, the undersigned authority, on this day personally appeared Dylan W. D'Ascendis, who having been placed under oath by me did depose as follows:

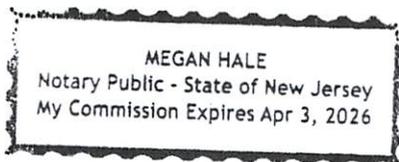
1. "My name is Dylan W. D'Ascendis. I am of sound mind and capable of making this affidavit. The facts stated herein are true and correct based on my personal knowledge. My current position is Partner at ScottMadden, Inc.
2. I have prepared the foregoing direct testimony and the information contained in this document is true and correct to the best of my knowledge."

Further affiant sayeth not.



Dylan W. D'Ascendis

SUBSCRIBED AND SWORN TO BEFORE ME by the said Dylan W. D'Ascendis on this 3rd day of Feb., 2023.





Notary Public, State of New Jersey

My commission expires: 03, Apr. 2026

APPENDIX A



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 14 years. Dylan has testified as an expert witness on over 125 occasions regarding rate of return, cost of service, rate design, and valuation before more than 35 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
- Rate of Return
- Valuation
- Mutual Fund Benchmarking
- Capital Market Risk
- Regulatory Strategy
- Cost of Service

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
Regulatory Commission of Alaska				
ENSTAR Natural Gas Company	08/22	ENSTAR Natural Gas Company	Docket No. TA334-4	Rate of Return
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
Alberta Utilities Commission				
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
Arizona Corporation Commission				
Arizona Water Company	12/22	Arizona Water Company – Eastern Group	Docket No. W-01445A-22-0286	Rate of Return
EPCOR Water Arizona, Inc.	08/22	EPCOR Water Arizona, Inc.	Docket No. WS-01303A-22-0236	Rate of Return
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
Arkansas Public Service Commission				
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
Colorado Public Utilities Commission				
Atmos Energy Corporation	08/22	Atmos Energy Corporation	Docket No. 22AL-0348G	Rate of Return
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
Delaware Public Service Commission				
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
Public Service Commission of the District of Columbia				
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
Federal Energy Regulatory Commission				
LS Power Grid California, LLC	10/20	LS Power Grid California, LLC	Docket No. ER21-195-000	Rate of Return
Florida Public Service Commission				
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
Hawaii Public Utilities Commission				
Launiupoko Irrigation Company, Inc.	12/20	Launiupoko Irrigation Company, Inc.	Docket No. 2020-0217 / Transferred to 2020-0089	Capital Structure

Sponsor	Date	Case/Applicant	Docket No.	Subject
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
Illinois Commerce Commission				
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
Indiana Utility Regulatory Commission				
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
Kansas Corporation Commission				
Atmos Energy Corporation	07/19	Atmos Energy Corporation	19-ATMG-525-RTS	Rate of Return
Kentucky Public Service Commission				
Water Service Corporation of KY	06/22	Water Service Corporation of KY	2022-00147	Rate of Return
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
Louisiana Public Service Commission				
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
Maine Public Utilities Commission				
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
Maryland Public Service Commission				
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
Massachusetts Department of Public Utilities				
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
Minnesota Public Utilities Commission				

Sponsor	Date	Case/Applicant	Docket No.	Subject
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
Mississippi Public Service Commission				
Great River Utility Operating Co.	07/22	Great River Utility Operating Co.	Docket No. 2022-UN-86	Rate of Return
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
Missouri Public Service Commission				
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
Public Utilities Commission of Nevada				
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
New Hampshire Public Utilities Commission				
Aquarion Water Company of New Hampshire, Inc.	12/20	Aquarion Water Company of New Hampshire, Inc.	Docket No. DW 20-184	Rate of Return
New Jersey Board of Public Utilities				
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
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
New Mexico Public Regulation Commission				
Southwestern Public Service Co.	01/21	Southwestern Public Service Co.	Case No. 20-00238-UT	Return on Equity
North Carolina Utilities Commission				
Carolina Water Service, Inc.	07/22	Carolina Water Service, Inc.	Docket No. W-354 Sub 400	Rate of Return
Aqua North Carolina, Inc.	06/22	Aqua North Carolina, Inc.	Docket No. W-218 Sub 573	Rate of Return
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
North Dakota Public Service Commission				
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
Public Utilities Commission of Ohio				
Duke Energy Ohio, Inc.	10/21	Duke Energy Ohio, Inc.	Case No. 21-887-EL-AIR	Return on Equity

Sponsor	Date	Case/Applicant	Docket No.	Subject
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
Pennsylvania Public Utility Commission				
Borough of Ambler	06/22	Borough of Ambler – Bureau of Water	Docket No. R-2022-3031704	Rate of Return
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
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
South Carolina Public Service Commission				
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
South Dakota Public Service Commission				
Northern States Power Company	06/22	Northern States Power Company	Docket No. EL22-017	Rate of Return
Tennessee Public Utility Commission				
Piedmont Natural Gas Company	07/20	Piedmont Natural Gas Company	Docket No. 20-00086	Return on Equity
Public Utility Commission of Texas				
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
Virginia State Corporation Commission				
Washington Gas Light Company	06/22	Washington Gas Light Company	PUR-2022-00054	Return on Equity
Virginia Natural Gas, Inc.	04/21	Virginia Natural Gas, Inc.	PUR-2020-00095	Return on Equity

Sponsor	Date	Case/Applicant	Docket No.	Subject
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
Public Service Commission of West Virginia				
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

Bluegrass Water (KY) Utility Operating Company, Inc.
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of Dylan W. D'Ascendis, CRRA, CVA

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EXHIBIT 1

Bluegrass Water (KY) Utility Operating Company, Inc.
Recommended Capital Structure and Cost Rates
for Ratemaking Purposes

<u>Type Of Capital</u>	<u>Ratios (1)</u>	<u>Cost Rate</u>	<u>Weighted Cost Rate</u>
Long-Term Debt	38.84%	6.80% (2)	2.64%
Common Equity	<u>61.16%</u>	11.65% (3)	<u>7.13%</u>
Total	<u>100.00%</u>		<u>9.77%</u>

Notes:

- (1) Company provided.
- (2) From page 1 of Exhibit DWD-3.
- (2) From page 2 of this Exhibit.

Bluegrass Water (KY) Utility Operating Company, Inc.
Brief Summary of Common Equity Cost Rate

<u>Line No.</u>	<u>Principal Methods</u>	<u>Proxy Group of Six Water Companies</u>	<u>Proxy Group of Six Water Companies ex PRPM</u>
1.	Discounted Cash Flow Model (DCF) (1)	9.16%	9.16%
2.	Risk Premium Model (RPM) (2)	12.09%	11.31%
3.	Capital Asset Pricing Model (CAPM) (3)	11.58%	11.39%
4.	Market Models Applied to Comparable Risk, Non-Price Regulated Companies (4)	<u>11.40%</u>	<u>11.24%</u>
5.	Indicated Common Equity Cost Rate before Adjustment for Unique Risk	10.13% - 11.13%	9.74% - 10.74%
6.	Business Risk Adjustment (5)	<u>1.00%</u>	<u>1.00%</u>
7.	Indicated Common Equity Cost Rate after Adjustment	<u>11.13% - 12.13%</u>	<u>10.74% - 11.74%</u>
8.	Recommended Common Equity Cost Rate	<u><u>11.65%</u></u>	

- Notes: (1) From page 1 of Exhibit DWD-4.
(2) From page 1 of Exhibit DWD-5.
(3) From page 1 of Exhibit DWD-6.
(4) From page 1 of Exhibit DWD-8.
(5) Business risk adjustment to reflect Bluegrass Water's unique risk compared to the Utility Proxy Group as detailed in the accompanying Direct Testimony.

EXHIBIT 2

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

	2021	2020	2019	2018	2017	5 YEAR AVERAGE
	(MILLIONS OF DOLLARS)					
<u>Capitalization Statistics</u>						
<u>Amount of Capital Employed</u>						
Total Permanent Capital	\$5,897,865	\$5,348,616	\$4,493,345	\$3,706,817	\$3,275,675	
Short-Term Debt	\$155,749	\$340,249	\$220,672	\$214,758	\$215,958	
Total Capital Employed	\$6,053,614	\$5,688,865	\$4,714,017	\$3,921,575	\$3,491,633	
<u>Indicated Average Capital Cost Rates (2)</u>						
Total Debt	3.51 %	3.78 %	4.01 %	4.55 %	4.62 %	
Preferred Stock	5.76 %	5.76 %	5.84 %	5.92 %	5.91 %	
<u>Capital Structure Ratios</u>						
Based on Total Permanent Capital:						
Long-Term Debt	50.40 %	50.92 %	47.81 %	45.58 %	46.01 %	48.14 %
Preferred Stock	0.05	0.06	0.06	0.11	0.12	0.08
Common Equity	49.55	49.02	52.13	54.31	53.87	51.78
Total	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %
<u>Based on Total Capital:</u>						
Total Debt, Including Short-Term Debt	52.56 %	54.67 %	51.78 %	49.31 %	49.87 %	51.64 %
Preferred Stock	0.05	0.06	0.07	0.10	0.11	0.07
Common Equity	47.39	45.28	48.16	50.60	50.02	48.29
Total	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %
<u>Financial Statistics</u>						
<u>Financial Ratios -- Market Based</u>						
Earnings / Price Ratio	3.20	3.24	2.64	3.33	3.79	3.24
Market / Average Book Ratio	352.63	315.40	332.39	304.57	296.61	320.32
Dividend Yield	1.67	1.83	1.77	1.97	2.02	1.85
Dividend Payout Ratio	52.51	56.85	74.00	59.40	54.53	59.46
Rate of Return on Average Book Common Equity	11.22 %	10.24 %	9.22 %	9.99 %	11.34 %	10.40 %
Total Debt / EBITDA (3)	5.05 x	5.57 x	5.92 x	4.37 x	3.48 x	4.88 x
Funds from Operations / Total Debt (4)	11.39 %	12.12 %	14.53 %	22.17 %	23.56 %	16.75 %
Total Debt / Total Capital	52.56 %	54.67 %	51.78 %	49.31 %	49.87 %	51.64 %

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

Capital Structure Based upon Total Permanent Capital for the
Proxy Group of Six 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>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>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>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>Middlesex Water Company</u>						
Long-Term Debt	46.87 %	44.61 %	42.20 %	38.94 %	38.65 %	42.25 %
Preferred Stock	0.30	0.33	0.37	0.59	0.64	0.45
Common Equity	52.83	55.06	57.43	60.47	60.71	57.30
Total Capital	<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>Proxy Group of Six Water Companies</u>						
Long-Term Debt	50.57 %	50.92 %	47.81 %	45.58 %	46.01 %	48.18 %
Preferred Stock	0.05	0.06	0.06	0.11	0.12	0.08
Common Equity	49.38	49.02	52.13	54.31	53.87	51.74
Total Capital	<u>100.00 %</u>					

Source of Information
Annual Forms 10-K

EXHIBIT 3

Bluegrass Water (KY) Utility Operating Company, Inc.
Calculation of the Effective Cost Rate of Long-Term Debt by Issuance

Series	Loan Amount (1)	Interest Rate (1)	Issuance Expense (1)	Net Proceeds (2)	Net Proceeds Ratio (3)	Effective Cost Rate to Maturity (4)
Bluegrass Water (KY)	\$ 2,900,000	6.70%	\$ 21,750	\$ 2,878,250	99.25	6.80%

Notes:

- (1) Company provided.
- (2) Loan amount less issuance expenses.
- (3) Net proceeds divided by loan amount.
- (4) Calculated based upon projected cash flows throughout the life of the debt issue.

EXHIBIT 4

Bluegrass Water (KY) Utility Operating Company, Inc.
Indicated Common Equity Cost Rate Using the Discounted Cash Flow Model for the
Proxy Group of Six Water Companies

	[1]	[2]	[3]	[4]	[5]	[6]	[7]
Proxy Group of Six Water Companies	Average Dividend Yield (1)	Value Line Projected Five Year Growth in EPS (2)	Zack's Five Year Projected Growth Rate in EPS (3)	Yahoo! Finance Projected Five Year Growth in EPS (4)	Average Projected Five Year Growth in EPS (3)	Adjusted Dividend Yield (4)	Indicated Common Equity Cost Rate (5)
American States Water Company	1.71 %	5.50 %	NA %	4.40 %	4.95 %	1.75 %	6.70 %
American Water Works Company, Inc.	1.76	3.00	8.10	8.28	6.46	1.82	8.28
California Water Service Group	1.63	6.50	NA	11.70	9.10	1.70	10.80
Essential Utilities Inc.	2.47	10.00	6.10	6.60	7.57	2.56	10.13
Middlesex Water Company	1.43	6.00	NA	2.70	4.35	1.46	5.81
SJW Group	1.92	12.00	NA	9.80	10.90	2.02	12.92
						Average	9.11 %
						Median	9.21 %
						Average of Mean and Median	9.16 %

NA= Not Available

Notes:

- (1) Indicated dividend at 01/13/2023 divided by the average closing price of the last 60 trading days ending 01/13/2023 for each company.
- (2) From pages 2 through 7 of this Exhibit.
- (3) Average of columns 2 through 4 excluding negative growth rates.
- (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, $1.71\% \times (1 + (1/2 \times 4.95\%)) =$
- (5) Column 5 + Column 6.

Source of Information:

Value Line Investment Survey
www.zacks.com Downloaded on 01/13/2023
www.yahoo.com Downloaded on 01/13/2023

ESSENTIAL UTIL. NYSE-WTRG				RECENT PRICE	P/E RATIO	RELATIVE P/E RATIO	DIV'D YLD	VALUE LINE																						
				47.57	24.8 (Trailing: 25.4, Median: 25.0)	1.51	2.5%																							
TIMELINESS	4	Lowered 12/9/22	High: 19.0, 21.5, 28.1, 28.2, 31.1, 35.8, 39.6, 39.4, 47.3	Low: 15.4, 16.8, 20.6, 22.4, 24.4	54.5, 53.9, 53.7, 30.4, 41.1, 38.5	Target Price Range 2025 2026 2027																								
SAFETY	3	Lowered 1/8/21	LEGENDS 17.50 x Dividends p sh divided by Interest Rate ... Relative Price Strength 5-for-4 split 9/13 Options: Yes Shaded area indicates recession						128																					
TECHNICAL	4	Raised 12/16/22							96																					
BETA	.95	(1.00 = Market)							80																					
18-Month Target Price Range										64																				
Low-High Midpoint (% to Mid)										48																				
\$41-\$76 \$59 (25%)										40																				
2025-27 PROJECTIONS										32																				
Price	Gain	Ann'l Total							24																					
70 (+45%)	12%	Return							16																					
45 (-5%)	2%								12																					
Institutional Decisions										% TOT. RETURN 11/22																				
10Q2022	2Q2022	3Q2022							THIS STOCK																					
292	277	301							VL ARITH.																					
248	249	222							1 yr. 4.5																					
181504	183099	184861							3 yr. 16.1																					
										5 yr. 41.7																				
										49.4																				
2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	© VALUE LINE PUB. LLC	25-27											
3.23	3.61	3.71	3.93	4.21	4.10	4.32	4.32	4.37	4.61	4.62	4.56	4.71	4.03	5.96	7.43	8.20	8.20	Revenues per sh	8.95											
1.01	1.10	1.14	1.29	1.42	1.45	1.51	1.82	1.89	1.87	2.07	2.12	1.90	1.73	2.21	2.89	3.05	3.20	"Cash Flow" per sh	4.00											
.56	.57	.58	.62	.72	.83	.87	1.16	1.20	1.14	1.32	1.35	1.08	1.04	1.12	1.67	1.80	1.95	Earnings per sh	2.25											
.35	.38	.41	.44	.47	.50	.54	.58	.63	.69	.74	.79	.85	.91	.97	1.04	1.11	1.20	Div'd Decl'd per sh	1.55											
1.64	1.43	1.58	1.66	1.89	1.90	1.98	1.73	1.84	2.07	2.16	2.69	2.78	2.49	3.41	4.04	3.75	3.85	Cap'l Spending per sh	3.80											
5.57	5.85	6.26	6.50	6.81	7.21	7.90	8.63	9.27	9.78	10.43	11.02	11.28	17.58	19.09	20.50	20.60	21.75	Book Value per sh	26.90											
165.41	166.75	169.21	170.61	172.46	173.60	175.43	177.93	178.59	176.54	177.39	177.71	178.09	220.76	245.39	252.87	263.00	268.00	Common Shs Outst'g	280.00											
34.7	32.0	24.9	23.1	21.1	21.3	21.9	21.2	20.8	23.5	23.9	24.7	32.6	39.1	39.6	28.3	26.2		Avg Ann'l P/E Ratio	26.0											
1.87	1.70	1.50	1.54	1.34	1.34	1.39	1.19	1.09	1.18	1.25	1.24	1.76	2.08	2.03	1.55	1.60		Relative P/E Ratio	1.45											
1.8%	2.1%	2.8%	3.1%	3.1%	2.8%	2.8%	2.4%	2.5%	2.6%	2.3%	2.4%	2.4%	2.2%	2.2%	2.2%	2.4%		Avg Ann'l Div'd Yield	2.7%											
CAPITAL STRUCTURE as of 9/30/22										757.8	768.6	779.9	814.2	819.9	809.5	838.1	889.7	1462.7	1878.1	2155	2200	Revenues (\$mill)	2500							
Total Debt \$6536.8 mill. Due in 5 Yrs \$882.1 mill.										153.1	205.0	213.9	201.8	234.2	239.7	192.0	224.5	284.8	431.6	475	523			Net Profit (\$mill)	630					
LT Debt \$6173.6 mill. LT Interest \$230.0 mill. (54% of Cap'l)										39.0%	10.0%	10.5%	6.9%	8.2%	6.6%	--	--	--	1.0%	8.0%					Income Tax Rate	15.0%				
Pension Assets-12/21 \$433.1 mill. Oblig. \$452.9 mill.										--	1.1%	2.4%	3.1%	3.8%	6.3%	6.8%	7.2%	4.5%	4.8%	5.0%	5.0%					AFUDC % to Net Profit	6.0%			
Pfd Stock None										52.7%	48.9%	48.5%	50.3%	48.4%	50.6%	54.4%	43.1%	54.0%	52.7%	53.5%	53.5%					Long-Term Debt Ratio	53.0%			
Common Stock 262,290,857 shares as of 10/21/22										47.3%	51.1%	51.5%	49.7%	51.6%	49.4%	45.6%	56.9%	46.0%	47.3%	46.5%	45.5%					Common Equity Ratio	47.0%			
MARKET CAP: \$12.5 billion (Large Cap)										2929.7	3003.6	3216.0	3469.5	3587.7	3965.4	4407.8	6824.2	10192	10964	11620	12150					Total Capital (\$mill)	16000			
CURRENT POSITION (SMILL.)										3936.2	4167.3	4402.0	4688.9	5001.6	5399.9	5930.3	6345.8	9512.9	10252	10900	11600					Net Plant (\$mill)	13500			
Cash Assets										6.6%	8.0%	7.8%	6.9%	7.6%	7.1%	5.5%	4.2%	3.7%	4.8%	5.0%	5.5%					Return on Total Cap'l	5.5%			
Receivables										11.0%	13.4%	12.9%	11.7%	12.7%	12.2%	9.6%	5.8%	6.1%	8.3%	9.0%	8.5%					Return on Shr. Equity	8.5%			
Inventory (AvgCst)										11.0%	13.4%	12.9%	11.7%	12.7%	12.2%	9.6%	5.8%	6.1%	8.3%	9.0%	8.5%					Return on Com Equity	8.5%			
Other										61%	50%	52%	60%	56%	59%	79%		1.1%	3.3%	3.5%	3.0%					Retained to Com Eq	2.5%			
Current Assets																													All Div's to Net Prof	69%
Accts Payable										<p>BUSINESS: Essential Utilities, Inc. became the new name for Aqua America on Feb. 3, 2020, to reflect the acquisition of Peoples, a natural gas utility, which occurred in 3/20. In 2021, Aqua Amer. provided water and wastewater services to about 5 million people in PA, OH, TX, IL, NC, NJ, IN, VA NS WS. Employs 3,211. Acquired AquaSource, 7/13; N. Maine Util., 7/15; and others. Water respn. for 52% of revenues in 2021; residential, 30%; commercial, 8.0%; industrial, wastewater & other, 14%. Gas 46%; other, 2.0%. Off. & dir. own less than 1% of the common stock; BlackRock, 10.6%; Vanguard, 9.7%; Can. Pen. Plan 8.6% (3/22 proxy). Pres. & CEO: Christopher Franklin, Inc.: PA Addr.: 762 W Lancaster Ave., Bryn Mawr, PA 19010. Tel.: 610-525-1400. Int.: www.essential.co.</p>																				
Debt Due										<p>Essential Utilities probably closed 2022 on a positive note. In the third quarter, the water and natural gas utility posted share earnings of \$0.26, much higher than the depressed year-earlier figure and our \$0.22 estimate. Despite operating costs rising over 9%, rate increases granted by several state regulators allowed revenue growth to outpace expenses by a comfortable margin. In the December interim, we think the company's share net rose a solid 7%, to \$0.47.</p>																				
Other										<p>The positive profit momentum ought to continue into this year. When the previously granted rate relief is combined with some new higher tariffs that are scheduled to be implemented in 2023, we think that Essential's share earnings can increase 8%. The utility's acquisition policy (more below) will also contribute to the bottom line and help offset the impact of having more shares outstanding.</p>																				
Current Liab.										<p>Essential is one of the main members in this group that is improving its profitability by merging with smaller entities. Just like industry giant, American Water Works, it has been purchasing independent water districts that operate in the same states as it does. Due to the inherent inefficiencies that face these water districts, they make good acquisition targets, as substantial cost savings can be achieved.</p>																				
ANNUAL RATES of change (per sh)										<p>The construction budget is large. In addition to the takeovers, the company is spending heavily to modernize its pipelines, wastewater facilities, and other assets. Annual outlays will likely average about \$1 billion.</p>																				
Past 10 Yrs										<p>New equity is being issued. The company announced that it has authorized a \$500 million at-the-market (ATM) program to raise funds. The ATM method provides management with more discretion over when it sells shares. Instead of flooding the market all at once, it can wait until conditions are favorable and sell them in smaller portions.</p>																				
Past 5 Yrs										<p>All of our metrics suggest that investors can find better selections elsewhere. The equity is ranked to underperform in the year ahead. Moreover, the stock's prospects are below the Value Line median for both the next 18-month and 3- to 5-year periods.</p>																				
Est'd '19-'21 to '25-'27										<p><i>James A. Flood</i> <i>January 6, 2023</i></p>																				
Revenues										<p>Revenues 3.5%, 5.0%, 7.5%</p>																				
"Cash Flow"										<p>"Cash Flow" 5.0%, 3.0%, 10.0%</p>																				
Earnings										<p>Earnings 6.0%, 1.0%, 10.0%</p>																				
Dividends										<p>Dividends 7.5%, 7.0%, 8.0%</p>																				
Book Value										<p>Book Value 11.0%, 14.0%, 6.0%</p>																				
QUARTERLY REVENUES (\$ mill.)										<p>Cal-endar Mar.31 Jun.30 Sep.30 Dec.31 Full Year</p>																				
2019										<p>201.1 218.9 243.6 226.1 889.7</p>																				
2020										<p>255.6 384.5 348.6 474.0 1462.7</p>																				
2021										<p>583.5 397.0 361.9 535.7 1878.1</p>																				
2022										<p>699.3 448.8 434.6 572.3 2155</p>																				
2023										<p>690 475 440 595 2200</p>																				
EARNINGS PER SHARE A										<p>Cal-endar Mar.31 Jun.30 Sep.30 Dec.31 Full Year</p>																				
2019										<p>.09 .25 .38 .28 1.04</p>																				
2020										<p>.21 .29 .22 .40 1.12</p>																				
2021										<p>.72 .32 .19 .44 1.67</p>																				
2022										<p>.76 .31 .26 .47 1.80</p>																				
2023										<p>.81 .38 .28 .48 1.95</p>																				
QUARTERLY DIVIDENDS PAID B										<p>Cal-endar Mar.31 Jun.30 Sep.30 Dec.31 Full Year</p>																				
2018										<p>.2047 .2047 .219 .219 .85</p>																				
2019										<p>.219 .219 .2343 .2343 .91</p>																				
2020										<p>.2343 .2343 .2507 .2507 .97</p>																				
2021										<p>.2507 .2507 .2682 .2682 1.04</p>																				
2022										<p>.2682 .2682 .287 .287</p>																				

(A) Diluted eqs. Excl. nonrec. gains: '12, 18c. Excl. gain from disc. operations: '12, 7c; '13, 9c; '14, 11c. Quarterly EPS do not add in '19 due to a large change in the number of shares outstanding in the Dec. period. Next earnings report mid-February.

(B) Dividends historically paid in early March, June, Sept., & Dec. ■ Div'd. reinvestment plan available (5% discount).

(C) In millions, adjusted for stock split.

(D) Includes intangibles: 12/31/21, \$1.231 bill./\$4.87 a share.

Company's Financial Strength B++
Stock's Price Stability 90
Price Growth Persistence 65
Earnings Predictability 60

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MIDDLESEX WATER NDQ-MSEX				RECENT PRICE	86.05	P/E RATIO	34.8 (Trailing: 36.0, Median: 24.0)	RELATIVE P/E RATIO	2.12	DIV'D YLD	1.5%	VALUE LINE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
TIMELINESS 3 Lowered 12/9/22	High: 19.4	19.6	22.5	23.7	28.0	44.5	46.7	60.3	67.7	76.1	121.4	121.1																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
SAFETY 2 New 10/21/11	Low: 16.5	17.5	18.6	19.1	21.2	25.0	32.2	34.0	51.0	48.8	67.1	74.2																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
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BETA .70 (1.00 = Market)	18-Month Target Price Range Low-High Midpoint (% to Mid) \$75-\$160 \$118 (35%)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
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LLC</th><th>25-27</th> </tr> </thead> <tbody> <tr> <td>6.16</td><td>6.50</td><td>6.79</td><td>6.75</td><td>6.60</td><td>6.50</td><td>6.98</td><td>7.19</td><td>7.26</td><td>7.77</td><td>8.16</td><td>8.00</td><td>8.42</td><td>7.72</td><td>8.10</td><td>8.17</td><td>9.30</td><td>9.90</td><td>Revenues per sh</td><td>10.85</td> </tr> <tr> <td>1.33</td><td>1.49</td><td>1.53</td><td>1.40</td><td>1.55</td><td>1.46</td><td>1.56</td><td>1.72</td><td>1.84</td><td>1.97</td><td>2.17</td><td>2.24</td><td>2.89</td><td>2.90</td><td>3.25</td><td>3.28</td><td>3.45</td><td>3.70</td><td>"Cash Flow" per sh</td><td>4.10</td> </tr> <tr> <td>.82</td><td>.87</td><td>.89</td><td>.72</td><td>.96</td><td>.84</td><td>.90</td><td>1.03</td><td>1.13</td><td>1.22</td><td>1.38</td><td>1.38</td><td>1.96</td><td>2.01</td><td>2.18</td><td>2.07</td><td>2.50</td><td>2.70</td><td>Earnings per sh A</td><td>3.00</td> </tr> <tr> <td>.68</td><td>.69</td><td>.70</td><td>.71</td><td>.72</td><td>.73</td><td>.74</td><td>.75</td><td>.76</td><td>.78</td><td>.81</td><td>.86</td><td>.91</td><td>.98</td><td>1.04</td><td>1.11</td><td>1.18</td><td>1.28</td><td>Div'd Decl'd per sh B</td><td>1.50</td> </tr> <tr> <td>2.31</td><td>1.66</td><td>2.12</td><td>1.49</td><td>1.90</td><td>1.50</td><td>1.36</td><td>1.26</td><td>1.40</td><td>1.59</td><td>2.91</td><td>3.08</td><td>4.40</td><td>5.11</td><td>6.04</td><td>4.53</td><td>5.00</td><td>5.25</td><td>Cap'l Spending per sh</td><td>6.00</td> </tr> <tr> <td>9.52</td><td>10.05</td><td>10.03</td><td>10.33</td><td>11.13</td><td>11.27</td><td>11.48</td><td>11.82</td><td>12.24</td><td>12.74</td><td>13.40</td><td>14.02</td><td>15.17</td><td>18.57</td><td>19.81</td><td>20.99</td><td>22.55</td><td>22.70</td><td>Book Value per sh</td><td>22.80</td> </tr> <tr> <td>13.17</td><td>13.25</td><td>13.40</td><td>13.52</td><td>15.57</td><td>15.70</td><td>15.82</td><td>15.96</td><td>16.12</td><td>16.23</td><td>16.30</td><td>16.35</td><td>16.40</td><td>17.43</td><td>17.47</td><td>17.52</td><td>17.75</td><td>17.85</td><td>Common Shs Outst'g C</td><td>18.00</td> </tr> <tr> <td>22.7</td><td>21.6</td><td>19.8</td><td>21.0</td><td>17.8</td><td>21.7</td><td>20.8</td><td>19.7</td><td>18.5</td><td>19.1</td><td>25.6</td><td>28.4</td><td>22.2</td><td>29.7</td><td>30.1</td><td>44.3</td><td>36.9</td><td></td><td>Avg Ann'l P/E Ratio</td><td>28.0</td> </tr> <tr> <td>1.23</td><td>1.15</td><td>1.19</td><td>1.40</td><td>1.13</td><td>1.36</td><td>1.32</td><td>1.11</td><td>.97</td><td>.96</td><td>1.34</td><td>1.43</td><td>1.20</td><td>1.58</td><td>1.55</td><td>2.43</td><td>2.11</td><td></td><td>Relative P/E Ratio</td><td>1.30</td> </tr> <tr> <td>3.7%</td><td>3.7%</td><td>4.0%</td><td>4.7%</td><td>4.2%</td><td>4.0%</td><td>4.0%</td><td>3.7%</td><td>3.7%</td><td>3.3%</td><td>2.3%</td><td>2.2%</td><td>2.1%</td><td>1.6%</td><td>1.6%</td><td>1.2%</td><td>1.3%</td><td></td><td>Avg Ann'l Div'd Yield</td><td>1.8%</td> </tr> <tr> <td colspan="13"> CAPITAL STRUCTURE as of 9/30/22 Total Debt \$308.8 mill. Due in 5 Yrs \$43.7 mill. LT Debt \$301.2 mill. LT Interest \$7.5 mill. (Total interest coverage: 9.3x) (45% of Cap'l) </td> <td>110.4</td><td>114.8</td><td>117.1</td><td>126.0</td><td>132.9</td><td>130.8</td><td>138.1</td><td>134.6</td><td>141.6</td><td>143.1</td><td>165</td><td>177</td><td>Revenues (\$mill)</td><td>195</td> </tr> <tr> <td colspan="13"> Pension Assets-12/21 \$100.8 mill. Oblig. \$113.7 mill. Pfd Stock \$2.4 mill. Pfd Div'd: \$1 mill. </td> <td>14.4</td><td>16.6</td><td>18.4</td><td>20.0</td><td>22.7</td><td>22.8</td><td>32.5</td><td>33.9</td><td>38.4</td><td>36.5</td><td>44.5</td><td>48.0</td><td>Net Profit (\$mill)</td><td>54.0</td> </tr> <tr> <td colspan="13"> Common Stock 17,639,000 shs. as of 10/28/22 </td> <td>33.9%</td><td>34.1%</td><td>35.0%</td><td>34.5%</td><td>34.0%</td><td>32.7%</td><td>2.8%</td><td>--</td><td>2.8%</td><td>2.8%</td><td>21.0%</td><td>21.0%</td><td>Income Tax Rate</td><td>21.0%</td> </tr> <tr> <td colspan="13"> MARKET CAP: \$1.5 billion (Small Cap) </td> <td>3.4%</td><td>1.9%</td><td>1.7%</td><td>1.9%</td><td>2.7%</td><td>3.1%</td><td>1.4%</td><td>3.4%</td><td>3.9%</td><td>3.9%</td><td>2.5%</td><td>2.5%</td><td>AFUDC % to Net Profit</td><td>2.5%</td> </tr> <tr> <td colspan="13"> CURRENT POSITION (SMILL) </td> <td>41.5%</td><td>40.4%</td><td>40.5%</td><td>39.4%</td><td>37.9%</td><td>37.5%</td><td>37.8%</td><td>41.5%</td><td>44.0%</td><td>45.3%</td><td>43.0%</td><td>43.0%</td><td>Long-Term Debt Ratio</td><td>42.0%</td> </tr> <tr> <td>Cash Assets</td><td>4.5</td><td>3.5</td><td>2.9</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>57.5%</td> </tr> <tr> <td>Other</td><td>29.6</td><td>30.9</td><td>38.6</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>Current Assets</td><td>34.1</td><td>34.4</td><td>41.5</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>Accts Payable</td><td>30.4</td><td>21.1</td><td>25.9</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>Debt Due</td><td>9.3</td><td>6.7</td><td>7.6</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>Other</td><td>17.1</td><td>28.8</td><td>59.5</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>Current Liab.</td><td>56.8</td><td>56.6</td><td>93.0</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td colspan="13"> ANNUAL RATES Past 10 Yrs. Past 5 Yrs. Est'd '19-'21 to '25-'27 </td> <td>316.5</td><td>321.4</td><td>335.8</td><td>345.4</td><td>355.4</td><td>370.7</td><td>404.1</td><td>556.7</td><td>621.5</td><td>676.3</td><td>705</td><td>715</td><td>Total Capital (\$mill)</td><td>715</td> </tr> <tr> <td>Revenues</td><td>2.0%</td><td>5.0%</td><td>5.0%</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>"Cash Flow"</td><td>8.0%</td><td>9.5%</td><td>4.5%</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>Earnings</td><td>9.5%</td><td>11.0%</td><td>6.0%</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>Dividends</td><td>3.5%</td><td>6.0%</td><td>6.0%</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>Book Value</td><td>6.0%</td><td>9.0%</td><td>2.5%</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td colspan="13"> QUARTERLY REVENUES (\$ mill.) </td> <td>435.2</td><td>446.5</td><td>465.4</td><td>481.9</td><td>517.8</td><td>557.2</td><td>618.5</td><td>705.7</td><td>796.6</td><td>865.4</td><td>900</td><td>915</td><td>Net Plant (\$mill)</td><td>945</td> </tr> <tr> <td>Cal-endar</td><td>Mar.31</td><td>Jun. 30</td><td>Sep. 30</td><td>Dec. 31</td><td>Full Year</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>2019</td><td>30.7</td><td>33.4</td><td>37.8</td><td>32.7</td><td>134.6</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>2020</td><td>31.8</td><td>35.3</td><td>39.9</td><td>34.6</td><td>141.6</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>2021</td><td>32.5</td><td>36.7</td><td>39.9</td><td>34.0</td><td>143.1</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>2022</td><td>36.2</td><td>39.7</td><td>47.7</td><td>41.4</td><td>165</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>2023</td><td>42.0</td><td>43.0</td><td>50.0</td><td>42.0</td><td>177</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td colspan="13"> EARNINGS PER SHARE A </td> <td>5.4%</td><td>5.9%</td><td>6.3%</td><td>6.6%</td><td>7.1%</td><td>6.9%</td><td>8.9%</td><td>6.7%</td><td>6.8%</td><td>6.0%</td><td>6.5%</td><td>7.0%</td><td>Return on Total Cap'l</td><td>8.0%</td> </tr> <tr> <td>Cal-endar</td><td>Mar.31</td><td>Jun. 30</td><td>Sep. 30</td><td>Dec. 31</td><td>Full Year</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>2019</td><td>.39</td><td>.49</td><td>.66</td><td>.46</td><td>2.01</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>2020</td><td>.44</td><td>.55</td><td>.72</td><td>.47</td><td>2.18</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>2021</td><td>.39</td><td>.62</td><td>.65</td><td>.41</td><td>2.07</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>2022</td><td>.68</td><td>.50</td><td>.80</td><td>.52</td><td>2.50</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>2023</td><td>.53</td><td>.62</td><td>.90</td><td>.65</td><td>2.70</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td colspan="13"> QUARTERLY DIVIDENDS PAID B </td> <td>7.8%</td><td>8.7%</td><td>9.2%</td><td>9.6%</td><td>10.3%</td><td>9.8%</td><td>12.9%</td><td>10.4%</td><td>11.0%</td><td>9.9%</td><td>11.0%</td><td>12.0%</td><td>Return on Shr. Equity</td><td>13.0%</td> </tr> <tr> <td>Cal-endar</td><td>Mar.31</td><td>Jun. 30</td><td>Sep. 30</td><td>Dec. 31</td><td>Full Year</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>2018</td><td>.22375</td><td>.22375</td><td>.22375</td><td>.24</td><td>.91</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>2019</td><td>.24</td><td>.24</td><td>.24</td><td>.2562</td><td>.98</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>2020</td><td>.2562</td><td>.2562</td><td>.2562</td><td>.2725</td><td>1.04</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>2021</td><td>.2725</td><td>.2725</td><td>.2725</td><td>.29</td><td>1.11</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>2022</td><td>.29</td><td>.29</td><td>.29</td><td>.3125</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> </tbody> </table>													2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	© VALUE LINE PUB. LLC	25-27	6.16	6.50	6.79	6.75	6.60	6.50	6.98	7.19	7.26	7.77	8.16	8.00	8.42	7.72	8.10	8.17	9.30	9.90	Revenues per sh	10.85	1.33	1.49	1.53	1.40	1.55	1.46	1.56	1.72	1.84	1.97	2.17	2.24	2.89	2.90	3.25	3.28	3.45	3.70	"Cash Flow" per sh	4.10	.82	.87	.89	.72	.96	.84	.90	1.03	1.13	1.22	1.38	1.38	1.96	2.01	2.18	2.07	2.50	2.70	Earnings per sh A	3.00	.68	.69	.70	.71	.72	.73	.74	.75	.76	.78	.81	.86	.91	.98	1.04	1.11	1.18	1.28	Div'd Decl'd per sh B	1.50	2.31	1.66	2.12	1.49	1.90	1.50	1.36	1.26	1.40	1.59	2.91	3.08	4.40	5.11	6.04	4.53	5.00	5.25	Cap'l Spending per sh	6.00	9.52	10.05	10.03	10.33	11.13	11.27	11.48	11.82	12.24	12.74	13.40	14.02	15.17	18.57	19.81	20.99	22.55	22.70	Book Value per sh	22.80	13.17	13.25	13.40	13.52	15.57	15.70	15.82	15.96	16.12	16.23	16.30	16.35	16.40	17.43	17.47	17.52	17.75	17.85	Common Shs Outst'g C	18.00	22.7	21.6	19.8	21.0	17.8	21.7	20.8	19.7	18.5	19.1	25.6	28.4	22.2	29.7	30.1	44.3	36.9		Avg Ann'l P/E Ratio	28.0	1.23	1.15	1.19	1.40	1.13	1.36	1.32	1.11	.97	.96	1.34	1.43	1.20	1.58	1.55	2.43	2.11		Relative P/E Ratio	1.30	3.7%	3.7%	4.0%	4.7%	4.2%	4.0%	4.0%	3.7%	3.7%	3.3%	2.3%	2.2%	2.1%	1.6%	1.6%	1.2%	1.3%		Avg Ann'l Div'd Yield	1.8%	CAPITAL STRUCTURE as of 9/30/22 Total Debt \$308.8 mill. Due in 5 Yrs \$43.7 mill. LT Debt \$301.2 mill. LT Interest \$7.5 mill. (Total interest coverage: 9.3x) (45% of Cap'l)													110.4	114.8	117.1	126.0	132.9	130.8	138.1	134.6	141.6	143.1	165	177	Revenues (\$mill)	195	Pension Assets-12/21 \$100.8 mill. Oblig. \$113.7 mill. Pfd Stock \$2.4 mill. Pfd Div'd: \$1 mill.													14.4	16.6	18.4	20.0	22.7	22.8	32.5	33.9	38.4	36.5	44.5	48.0	Net Profit (\$mill)	54.0	Common Stock 17,639,000 shs. as of 10/28/22													33.9%	34.1%	35.0%	34.5%	34.0%	32.7%	2.8%	--	2.8%	2.8%	21.0%	21.0%	Income Tax Rate	21.0%	MARKET CAP: \$1.5 billion (Small Cap)													3.4%	1.9%	1.7%	1.9%	2.7%	3.1%	1.4%	3.4%	3.9%	3.9%	2.5%	2.5%	AFUDC % to Net Profit	2.5%	CURRENT POSITION (SMILL)													41.5%	40.4%	40.5%	39.4%	37.9%	37.5%	37.8%	41.5%	44.0%	45.3%	43.0%	43.0%	Long-Term Debt Ratio	42.0%	Cash Assets	4.5	3.5	2.9																57.5%	Other	29.6	30.9	38.6																	Current Assets	34.1	34.4	41.5																	Accts Payable	30.4	21.1	25.9																	Debt Due	9.3	6.7	7.6																	Other	17.1	28.8	59.5																	Current Liab.	56.8	56.6	93.0																	ANNUAL RATES Past 10 Yrs. Past 5 Yrs. Est'd '19-'21 to '25-'27													316.5	321.4	335.8	345.4	355.4	370.7	404.1	556.7	621.5	676.3	705	715	Total Capital (\$mill)	715	Revenues	2.0%	5.0%	5.0%																	"Cash Flow"	8.0%	9.5%	4.5%																	Earnings	9.5%	11.0%	6.0%																	Dividends	3.5%	6.0%	6.0%																	Book Value	6.0%	9.0%	2.5%																	QUARTERLY REVENUES (\$ mill.)													435.2	446.5	465.4	481.9	517.8	557.2	618.5	705.7	796.6	865.4	900	915	Net Plant (\$mill)	945	Cal-endar	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	36.2	39.7	47.7	41.4	165															2023	42.0	43.0	50.0	42.0	177															EARNINGS PER SHARE A													5.4%	5.9%	6.3%	6.6%	7.1%	6.9%	8.9%	6.7%	6.8%	6.0%	6.5%	7.0%	Return on Total Cap'l	8.0%	Cal-endar	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	.68	.50	.80	.52	2.50															2023	.53	.62	.90	.65	2.70															QUARTERLY DIVIDENDS PAID B													7.8%	8.7%	9.2%	9.6%	10.3%	9.8%	12.9%	10.4%	11.0%	9.9%	11.0%	12.0%	Return on Shr. Equity	13.0%	Cal-endar	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	.29	.29	.3125															
2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	© VALUE LINE PUB. LLC	25-27																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
6.16	6.50	6.79	6.75	6.60	6.50	6.98	7.19	7.26	7.77	8.16	8.00	8.42	7.72	8.10	8.17	9.30	9.90	Revenues per sh	10.85																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
1.33	1.49	1.53	1.40	1.55	1.46	1.56	1.72	1.84	1.97	2.17	2.24	2.89	2.90	3.25	3.28	3.45	3.70	"Cash Flow" per sh	4.10																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
.82	.87	.89	.72	.96	.84	.90	1.03	1.13	1.22	1.38	1.38	1.96	2.01	2.18	2.07	2.50	2.70	Earnings per sh A	3.00																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
.68	.69	.70	.71	.72	.73	.74	.75	.76	.78	.81	.86	.91	.98	1.04	1.11	1.18	1.28	Div'd Decl'd per sh B	1.50																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
2.31	1.66	2.12	1.49	1.90	1.50	1.36	1.26	1.40	1.59	2.91	3.08	4.40	5.11	6.04	4.53	5.00	5.25	Cap'l Spending per sh	6.00																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
9.52	10.05	10.03	10.33	11.13	11.27	11.48	11.82	12.24	12.74	13.40	14.02	15.17	18.57	19.81	20.99	22.55	22.70	Book Value per sh	22.80																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
13.17	13.25	13.40	13.52	15.57	15.70	15.82	15.96	16.12	16.23	16.30	16.35	16.40	17.43	17.47	17.52	17.75	17.85	Common Shs Outst'g C	18.00																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
22.7	21.6	19.8	21.0	17.8	21.7	20.8	19.7	18.5	19.1	25.6	28.4	22.2	29.7	30.1	44.3	36.9		Avg Ann'l P/E Ratio	28.0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
1.23	1.15	1.19	1.40	1.13	1.36	1.32	1.11	.97	.96	1.34	1.43	1.20	1.58	1.55	2.43	2.11		Relative P/E Ratio	1.30																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
3.7%	3.7%	4.0%	4.7%	4.2%	4.0%	4.0%	3.7%	3.7%	3.3%	2.3%	2.2%	2.1%	1.6%	1.6%	1.2%	1.3%		Avg Ann'l Div'd Yield	1.8%																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
CAPITAL STRUCTURE as of 9/30/22 Total Debt \$308.8 mill. Due in 5 Yrs \$43.7 mill. LT Debt \$301.2 mill. LT Interest \$7.5 mill. (Total interest coverage: 9.3x) (45% of Cap'l)													110.4	114.8	117.1	126.0	132.9	130.8	138.1	134.6	141.6	143.1	165	177	Revenues (\$mill)	195																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
Pension Assets-12/21 \$100.8 mill. Oblig. \$113.7 mill. Pfd Stock \$2.4 mill. Pfd Div'd: \$1 mill.													14.4	16.6	18.4	20.0	22.7	22.8	32.5	33.9	38.4	36.5	44.5	48.0	Net Profit (\$mill)	54.0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
Common Stock 17,639,000 shs. as of 10/28/22													33.9%	34.1%	35.0%	34.5%	34.0%	32.7%	2.8%	--	2.8%	2.8%	21.0%	21.0%	Income Tax Rate	21.0%																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
MARKET CAP: \$1.5 billion (Small Cap)													3.4%	1.9%	1.7%	1.9%	2.7%	3.1%	1.4%	3.4%	3.9%	3.9%	2.5%	2.5%	AFUDC % to Net Profit	2.5%																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
CURRENT POSITION (SMILL)													41.5%	40.4%	40.5%	39.4%	37.9%	37.5%	37.8%	41.5%	44.0%	45.3%	43.0%	43.0%	Long-Term Debt Ratio	42.0%																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
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ANNUAL RATES Past 10 Yrs. Past 5 Yrs. Est'd '19-'21 to '25-'27													316.5	321.4	335.8	345.4	355.4	370.7	404.1	556.7	621.5	676.3	705	715	Total Capital (\$mill)	715																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
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2022	36.2	39.7	47.7	41.4	165																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
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EARNINGS PER SHARE A													5.4%	5.9%	6.3%	6.6%	7.1%	6.9%	8.9%	6.7%	6.8%	6.0%	6.5%	7.0%	Return on Total Cap'l	8.0%																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
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(A) Diluted earnings. Next earnings report due early March.

(B) Dividends historically paid in mid-Feb., May, Aug., and November. Div'd reinvestment plan available.

(C) In millions.

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% (4/22 proxy). Add.: 485 C Route 1 South, Suite 400, Iselin, NJ 08830. Telephone: 732-634-1500. Int.: www.middlesexwater.com.

Middlesex Water's September-period financial results received a considerable boost from a recent regulatory rate hike approval. Notably, the New Jersey Board of Public Utilities signed off on a base rate increase earlier this year, specifically relating to its Middlesex operations. In combination with an uptick in customer water consumption, third-quarter revenues jumped nearly 20% year over year, despite a slight reduction in customer rates across its Delaware water system (effective September 1st). Meanwhile, earnings rose 23% from the previous-year tally, to \$0.80 per share, reflecting strong revenue expansion that more than offset modestly higher operating expenses.

We are lifting our 2022 and 2023 top-and bottom-line estimates accordingly. For this year, we are adding \$10 million and \$0.05 to our revenue and earnings calls, to \$165 million and \$2.50 per share, respectively. We envision respectable high single-digit growth in 2023, as well. Revenues are likely to expand 7%, to \$177 million (up from our previous estimate of \$160 million), while net income is poised

for an 8% annual advance, to \$2.70 per share (up from \$2.50). **The board of directors recently raised the quarterly dividend payout 8%, to just over \$0.31 per share.** That was brought about by the company's healthy capital position and solid financial growth prospects subsequent to the abovementioned rate approval. Furthermore, we expect steady annual increases in the distribution over the 3- to 5-year stretch, which ought to peg the payout ratio, on average, to around 50%, over that time frame.

Spending on upgrading aging infrastructure and outdated water systems ought to be a main headline over the pull to mid-decade. Indeed, in the years to come, capital is apt to be allocated to water main repairs, pipeline replacements, treatment facility upgrades, and operating technology enhancements.

Neutrally ranked Middlesex stock is currently trading firmly within our 3- to 5-year Target Price Range. Thus, we advise subscribers to remain on the sidelines until a more-attractive entry point is available.

Nicholas Patrikis January 6, 2023

Company's Financial Strength	B++
Stock's Price Stability	90
Price Growth Persistence	95
Earnings Predictability	90

EXHIBIT 5

Bluegrass Water (KY) Utility Operating Company, Inc.
 Summary of Risk Premium Models for the
Proxy Group of Six Water Companies

	<u>Proxy Group of Six Water Companies</u>	<u>Proxy Group of Six Water Companies ex PRPM</u>
Predictive Risk Premium Model (PRPM) (1)	12.64 %	NA %
Risk Premium Using an Adjusted Total Market Approach (2)	<u>11.53</u>	<u>11.31</u>
Average	<u><u>12.09 %</u></u>	<u><u>11.31</u></u>

Notes:

- (1) From page 2 of this Exhibit.
- (2) From page 3 of this Exhibit.

Bluegrass Water (KY) Utility Operating Company, Inc.
Indicated ROE
Derived by the Predictive Risk Premium Model (1)

	[1]	[2]	[3]	[4]	[5]	[6]	[7]
Proxy Group of Six 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%	0.47%	0.38%	1.8791	9.02%	3.91%	12.93%
American Water Works Company, Inc.	0.28%	0.38%	0.28%	4.4375	16.09%	3.91%	NMF
California Water Service Group	0.33%	0.62%	0.33%	1.9253	7.92%	3.91%	11.83%
Essential Utilities Inc.	0.45%	0.66%	0.45%	2.1972	12.46%	3.91%	16.37%
Middlesex Water Company	0.34%	0.82%	0.34%	1.8982	7.98%	3.91%	11.89%
SJW Group	0.42%	0.59%	0.42%	1.5887	8.32%	3.91%	12.23%
						Average	13.05%
						Median	12.23%
						Average of Mean and Median	12.64%

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) Recommended variance based on the long-term average predicted variance.
- (3) $(1 + (\text{Column [3]} * \text{Column [4]}^{\wedge 1.2}) - 1)$.
- (4) From note 2 on page 2 of Exhibit DWD-6.
- (5) Column [5] + Column [6].

Bluegrass Water (KY) Utility Operating Company, Inc.
Indicated Common Equity Cost Rate
Through Use of a Risk Premium Model
Using an Adjusted Total Market Approach

<u>Line No.</u>		<u>Proxy Group of Six Water Companies</u>	<u>Proxy Group of Six Water Companies ex PRPM</u>
1.	Prospective Yield on Aaa Rated Corporate Bonds (1)	5.05 %	5.05 %
2.	Adjustment to Reflect Yield Spread Between Aaa Rated Corporate Bonds and A2 Rated Public Utility Bonds (2)	<u>0.83</u>	<u>0.83</u>
3.	Adjusted Prospective Yield on A2 Rated Public Utility Bonds	5.88 %	5.88 %
4.	Adjustment to Reflect Bond Rating Difference of Proxy Group (3)	<u>0.10</u>	<u>0.10</u>
5.	Adjusted Prospective Bond Yield	5.98 %	5.98 %
6.	Equity Risk Premium (4)	<u>5.55</u>	<u>5.33</u>
7.	Risk Premium Derived Common Equity Cost Rate	<u><u>11.53 %</u></u>	<u><u>11.31 %</u></u>

- Notes:
- (1) Consensus forecast of Moody's Aaa Rated Corporate bonds from Blue Chip Financial Forecasts (see pages 9 and 10 of this Exhibit).
 - (2) The average yield spread of A2 rated public utility bonds over Aaa rated corporate bonds of 0.83% from page 4 of this Exhibit.
 - (3) Adjustment to reflect the A3 Moody's LT issuer rating of the Utility Proxy Group as shown on page 5 of this Exhibit. The 0.10% upward adjustment is derived by taking 1/3 of the spread between A2 and Baa2 Public Utility Bonds ($1/3 * 0.30\% = 0.10\%$) as derived from page 4 of this Exhibit.
 - (4) From page 7 of this Exhibit.

Bluegrass Water (KY) Utility Operating Company, 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>
Dec-2022	4.41 %	5.27 %	5.56 %
Nov-2022	4.90	5.75	6.05
Oct-2022	<u>5.10</u>	<u>5.88</u>	<u>6.18</u>
Average	<u><u>4.80 %</u></u>	<u><u>5.63 %</u></u>	<u><u>5.93 %</u></u>

Selected Bond Spreads

A2 Rated Public Utility Bonds Over Aaa Rated Corporate Bonds:
0.83 % (1)

Baa2 Rated Public Utility Bonds Over A2 Rated Public Utility Bonds:
0.30 % (2)

Notes:

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

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

Source of Information:

Bloomberg Professional Services

Bluegrass Water (KY) Utility Operating Company, Inc.
Comparison of Long-Term Issuer Ratings for
Proxy Group of Six Water Companies

<u>Proxy Group of Six Water Companies</u>	<u>Moody's</u>		<u>Standard & Poor's</u>	
	<u>Long-Term Issuer Rating</u>		<u>Long-Term Issuer Rating</u>	
	<u>January 2023</u>		<u>January 2023</u>	
	<u>Long-Term Issuer Rating</u>	<u>Numerical Weighting (1)</u>	<u>Long-Term Issuer Rating</u>	<u>Numerical Weighting (1)</u>
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-	7.0
Average	<u>A3</u>	<u>7.0</u>	<u>A</u>	<u>5.8</u>

Notes:

- (1) From page 6 of this Exhibit.
- (2) Ratings that of Golden State Water Company.
- (3) Ratings that of New Jersey American Water Co., and Pennsylvania American Water Co.
- (4) Ratings that of PNG Companies and Aqua Pennsylvania, Inc. (S&P).
- (5) Ratings are that of San Jose Water Company, Connecticut Water Inc. and Connecticut Water Service 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

<u>Moody's Bond Rating</u>	<u>Numerical Bond Weighting</u>	<u>Standard & Poor's Bond Rating</u>
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-

Bluegrass Water (KY) Utility Operating Company, Inc.
Judgment of Equity Risk Premium for the
Proxy Group of Six Water Companies

<u>Line No.</u>		<u>Proxy Group of Six Water Companies</u>	<u>Proxy Group of Six Water Companies ex PRPM</u>
1.	Calculated equity risk premium based on the total market using the beta approach (1)	6.52 %	6.32 %
2.	Mean equity risk premium based on a study using the holding period returns of public utilities with A2 rated bonds (2)	<u>4.58</u>	<u>4.34</u>
3.	Average equity risk premium	<u><u>5.55 %</u></u>	<u><u>5.33 %</u></u>

Notes: (1) From page 8 of this Exhibit.
(2) From page 11 of this Exhibit.

Bluegrass Water (KY) Utility Operating Company, Inc.
Derivation of Equity Risk Premium Based on the Total Market Approach
Using the Beta for the
Proxy Group of Six Water Companies

<u>Line No.</u>	<u>Equity Risk Premium Measure</u>	<u>Proxy Group of Six Water Companies</u>	<u>Proxy Group of Six Water Companies ex PRPM</u>
1.	Kroll Equity Risk Premium (1)	6.13 %	6.13 %
2.	Regression on Kroll Risk Premium Data (2)	7.26	7.26
3.	Kroll Equity Risk Premium based on PRPM (3)	9.76	NA
4.	Equity Risk Premium Based on Value Line Summary and Index (4)	11.01	11.01
5.	Equity Risk Premium Based on Value Line S&P 500 Companies (5)	10.47	10.47
6.	Equity Risk Premium Based on Bloomberg S&P 500 Companies (6)	<u>6.18</u>	<u>6.18</u>
7.	Conclusion of Equity Risk Premium	8.47 %	8.21 %
8.	Adjusted Beta (7)	<u>0.77</u>	<u>0.77</u>
9.	Forecasted Equity Risk Premium	<u><u>6.52</u> %</u>	<u><u>6.32</u> %</u>

Notes:

- (1) Based on the arithmetic mean historical monthly returns on large company common stocks from Kroll 2022 SBI® Yearbook 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.
- (3) The Predictive Risk Premium Model (PRPM) is discussed in the accompanying direct testimony. The Kroll equity risk premium based on the PRPM is derived by applying the PRPM to the monthly risk premiums between Kroll large company common stock monthly returns and average Aaa and Aa2 corporate monthly bond yields, from January 1928 through December 2022.
- (4) The equity risk premium based on the Value Line Summary and Index is derived by subtracting the average consensus forecast of Aaa corporate bonds of 5.05% (from page 3 of this Exhibit) from the projected 3-5 year total annual market return of 16.06% (described fully in note 1 on page 2 of Exhibit DWD-6).
- (5) Using data from Value Line for the S&P 500, an expected total return of 15.52% was derived based upon expected dividend yields and long-term earnings growth estimates as a proxy for capital appreciation. Subtracting the average consensus forecast of Aaa corporate bonds of 5.05% results in an expected equity risk premium of 10.47%.
- (6) Using data from the Bloomberg Professional Services for the S&P 500, an expected total return of 11.23% was derived based upon expected dividend yields and long-term earnings growth estimates as a proxy for capital appreciation. Subtracting the average consensus forecast of Aaa corporate bonds of 5.05% results in an expected equity risk premium of 6.18%.
- (7) Average of mean and median beta from Exhibit DWD-6.

Sources of Information:

Kroll 2022 SBI® Yearbook
Industrial Manual and Mergent Bond Record Monthly Update.
Value Line Summary and Index
Blue Chip Financial Forecasts, December 2, 2022 and January 1, 2023
Bloomberg Professional Services

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

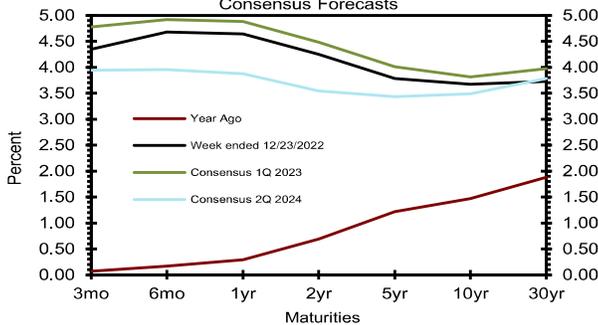
Interest Rates	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month				Latest Qtr	1Q 2023	2Q 2023	3Q 2023	4Q 2023	1Q 2024
	Dec 23	Dec 16	Dec 9	Dec 2	Nov	Oct	Sep	4Q 2022*	2023	2023	2023	2023	2024	2024
Federal Funds Rate	4.33	3.83	3.83	3.83	3.78	3.08	2.56	3.59	4.7	5.0	4.9	4.7	4.4	4.0
Prime Rate	7.50	7.00	7.00	7.00	6.95	6.25	5.73	6.76	7.8	8.1	8.0	7.8	7.5	7.2
SOFR	4.30	4.01	3.80	3.81	3.73	3.04	2.50	3.55	4.6	4.9	4.8	4.6	4.4	4.1
Commercial Paper, 1-mo.	4.28	4.23	4.15	4.00	3.88	3.28	2.80	3.71	4.8	5.1	4.9	4.6	4.4	4.0
Treasury bill, 3-mo.	4.35	4.34	4.32	4.37	4.32	3.87	3.22	4.17	4.8	4.9	4.8	4.6	4.3	3.9
Treasury bill, 6-mo.	4.68	4.71	4.72	4.69	4.61	4.31	3.71	4.53	4.9	5.0	4.8	4.5	4.3	4.0
Treasury bill, 1 yr.	4.64	4.66	4.72	4.73	4.73	4.43	3.89	4.61	4.9	4.9	4.7	4.4	4.2	3.9
Treasury note, 2 yr.	4.25	4.25	4.33	4.37	4.50	4.38	3.86	4.39	4.5	4.4	4.2	3.9	3.8	3.5
Treasury note, 5 yr.	3.78	3.67	3.72	3.79	4.06	4.18	3.70	4.00	4.0	4.0	3.9	3.7	3.6	3.4
Treasury note, 10 yr.	3.67	3.51	3.52	3.63	3.89	3.98	3.52	3.82	3.8	3.8	3.7	3.6	3.6	3.5
Treasury note, 30 yr.	3.73	3.53	3.51	3.71	4.00	4.04	3.56	3.89	4.0	4.0	3.9	3.9	3.8	3.8
Corporate Aaa bond	4.88	4.66	4.68	4.87	5.23	5.41	4.87	5.15	5.1	5.2	5.2	5.1	4.9	4.8
Corporate Baa bond	5.56	5.34	5.38	5.57	5.95	6.22	5.64	5.90	6.1	6.3	6.2	6.1	5.9	5.8
State & Local bonds	4.24	4.18	4.19	4.26	4.50	4.62	4.31	4.46	4.3	4.4	4.3	4.3	4.3	4.2
Home mortgage rate	6.27	6.31	6.33	6.49	6.81	6.90	6.11	6.69	6.5	6.5	6.3	6.2	6.0	5.8

Key Assumptions	History								Consensus Forecasts-Quarterly					
	1Q 2021	2Q 2021	3Q 2021	4Q 2021	1Q 2022	2Q 2022	3Q 2022	4Q 2022**	1Q 2023	2Q 2023	3Q 2023	4Q 2023	1Q 2024	2Q 2024
Fed's AFE \$ Index	103.4	102.9	105.0	107.0	108.4	113.7	119.0	120.6	118.7	118.1	117.6	117.1	116.8	116.9
Real GDP	6.3	7.0	2.7	7.0	-1.6	-0.6	3.2	1.0	-0.2	-0.7	0.3	0.9	1.3	1.7
GDP Price Index	5.2	6.3	6.2	6.8	8.3	9.0	4.4	4.3	3.6	3.0	2.7	2.5	2.3	2.2
Consumer Price Index	4.1	8.2	6.7	7.9	9.2	10.5	5.7	4.5	3.4	3.1	2.9	2.6	2.4	2.3
PCE Price Index	4.5	6.4	5.6	6.2	7.5	7.3	4.3	4.2	3.2	2.8	2.6	2.5	2.4	2.2

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. *Interest rate data for 4Q 2022 based on historical data through the week ended December 23. **Data for 4Q 2022 for the Fed's AFE \$ Index based on data through the week ended December 23. Figures for 4Q 2022 Real GDP, GDP Chained Price Index, Consumer Price Index, and PCE Price Index are consensus forecasts from the December 2022 survey.

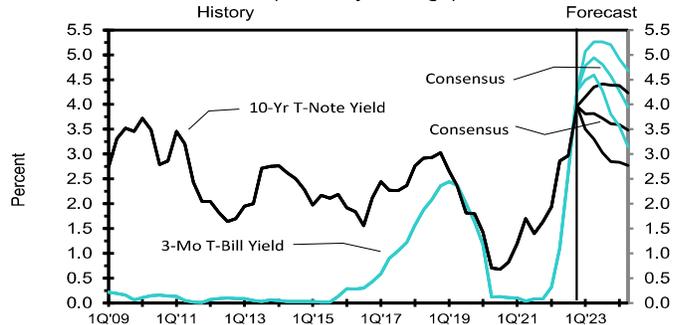
U.S. Treasury Yield Curve

Week ended Dec 23, 2022 & Year Ago vs. 1Q 2023 & 2Q 2024



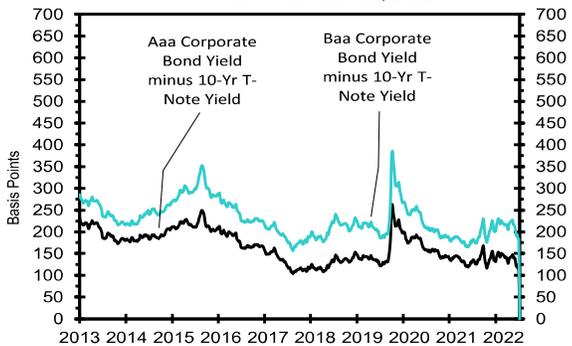
US 3-Mo T-Bills & 10-Yr T-Note Yield

(Quarterly Average)



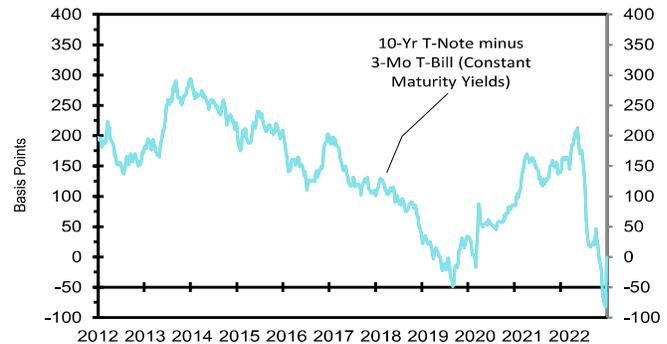
Corporate Bond Spreads

As of week ended Dec 23, 2022



U.S. Treasury Yield Curve

As of week ended Dec 23, 2022



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 2024 through 2028 and averages for the five-year periods 2024-2028 and 2029-2033. 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	
		2024	2025	2026	2027	2028	2024-2028	2029-2033
1. Federal Funds Rate	CONSENSUS	3.7	2.9	2.8	2.8	2.7	3.0	2.8
	Top 10 Average	4.5	3.7	3.6	3.5	3.4	3.7	3.4
	Bottom 10 Average	2.7	2.2	2.2	2.2	2.2	2.3	2.3
2. Prime Rate	CONSENSUS	6.8	6.1	5.9	5.9	5.9	6.1	5.9
	Top 10 Average	7.6	6.8	6.7	6.6	6.5	6.8	6.5
	Bottom 10 Average	5.9	5.3	5.3	5.3	5.3	5.4	5.3
3. SOFR	CONSENSUS	3.7	2.9	2.8	2.8	2.7	3.0	2.8
	Top 10 Average	4.4	3.6	3.4	3.3	3.2	3.6	3.3
	Bottom 10 Average	3.0	2.3	2.2	2.2	2.2	2.4	2.2
4. Commercial Paper, 1-Mo	CONSENSUS	3.7	3.1	3.0	2.9	2.9	3.1	2.9
	Top 10 Average	4.4	3.6	3.5	3.4	3.3	3.6	3.3
	Bottom 10 Average	3.2	2.6	2.5	2.4	2.4	2.6	2.5
5. Treasury Bill Yield, 3-Mo	CONSENSUS	3.7	3.0	2.9	2.8	2.8	3.0	2.8
	Top 10 Average	4.4	3.7	3.6	3.5	3.4	3.7	3.4
	Bottom 10 Average	2.9	2.2	2.3	2.2	2.2	2.4	2.3
6. Treasury Bill Yield, 6-Mo	CONSENSUS	3.7	3.0	3.0	3.0	2.9	3.1	3.0
	Top 10 Average	4.4	3.7	3.7	3.6	3.5	3.8	3.5
	Bottom 10 Average	3.1	2.4	2.4	2.4	2.4	2.5	2.4
7. Treasury Bill Yield, 1-Yr	CONSENSUS	3.8	3.1	3.1	3.1	3.0	3.2	3.1
	Top 10 Average	4.4	3.8	3.7	3.6	3.5	3.8	3.6
	Bottom 10 Average	3.1	2.5	2.5	2.5	2.5	2.6	2.6
8. Treasury Note Yield, 2-Yr	CONSENSUS	3.6	3.2	3.2	3.1	3.1	3.2	3.1
	Top 10 Average	4.4	3.9	3.8	3.8	3.7	3.9	3.8
	Bottom 10 Average	2.7	2.5	2.6	2.6	2.6	2.6	2.6
9. Treasury Note Yield, 5-Yr	CONSENSUS	3.6	3.3	3.4	3.4	3.3	3.4	3.4
	Top 10 Average	4.4	4.0	4.0	4.0	3.9	4.1	3.9
	Bottom 10 Average	2.9	2.7	2.7	2.8	2.8	2.8	2.9
10. Treasury Note Yield, 10-Yr	CONSENSUS	3.7	3.5	3.6	3.6	3.6	3.6	3.7
	Top 10 Average	4.4	4.2	4.4	4.4	4.3	4.3	4.3
	Bottom 10 Average	3.0	2.9	2.8	2.9	3.0	2.9	3.0
11. Treasury Bond Yield, 30-Yr	CONSENSUS	4.0	3.9	3.9	4.0	3.9	3.9	4.0
	Top 10 Average	4.6	4.5	4.7	4.6	4.6	4.6	4.7
	Bottom 10 Average	3.4	3.3	3.3	3.3	3.3	3.3	3.3
12. Corporate Aaa Bond Yield	CONSENSUS	5.1	4.9	5.0	5.0	5.0	5.0	5.1
	Top 10 Average	5.7	5.5	5.6	5.6	5.6	5.6	5.7
	Bottom 10 Average	4.6	4.4	4.4	4.4	4.5	4.4	4.5
13. Corporate Baa Bond Yield	CONSENSUS	6.2	5.9	5.9	6.0	5.9	6.0	6.0
	Top 10 Average	6.6	6.4	6.5	6.5	6.5	6.5	6.6
	Bottom 10 Average	5.7	5.3	5.3	5.4	5.4	5.4	5.5
14. State & Local Bonds Yield	CONSENSUS	4.4	4.2	4.3	4.3	4.3	4.3	4.4
	Top 10 Average	4.8	4.7	4.8	4.7	4.7	4.7	4.8
	Bottom 10 Average	3.9	3.7	3.8	3.9	3.9	3.9	3.9
15. Home Mortgage Rate	CONSENSUS	5.9	5.5	5.5	5.5	5.5	5.6	5.5
	Top 10 Average	6.6	6.2	6.2	6.2	6.2	6.3	6.2
	Bottom 10 Average	5.3	4.8	4.8	4.8	4.8	4.9	4.9
A. Fed's AFE Nominal \$ Index	CONSENSUS	117.6	116.0	114.5	113.5	112.2	114.8	110.7
	Top 10 Average	120.7	119.3	118.5	118.0	117.9	118.9	116.7
	Bottom 10 Average	115.1	112.9	110.7	109.2	107.2	111.0	105.4
		----- Year-Over-Year, % Change -----					Five-Year Averages	
		2024	2025	2026	2027	2028	2024-2028	2029-2033
B. Real GDP	CONSENSUS	1.4	2.2	2.1	2.0	2.0	1.9	1.9
	Top 10 Average	2.2	2.6	2.6	2.4	2.4	2.5	2.3
	Bottom 10 Average	0.5	1.8	1.7	1.7	1.7	1.5	1.6
C. GDP Chained Price Index	CONSENSUS	2.3	2.1	2.1	2.1	2.1	2.1	2.1
	Top 10 Average	2.7	2.4	2.3	2.3	2.3	2.4	2.2
	Bottom 10 Average	2.0	1.9	1.9	1.9	1.9	1.9	1.9
D. Consumer Price Index	CONSENSUS	2.4	2.2	2.2	2.2	2.2	2.2	2.1
	Top 10 Average	2.8	2.5	2.4	2.3	2.3	2.5	2.3
	Bottom 10 Average	2.0	2.0	2.0	2.0	2.0	2.0	2.0
E. PCE Price Index	CONSENSUS	2.3	2.1	2.1	2.1	2.1	2.1	2.1
	Top 10 Average	2.6	2.4	2.4	2.3	2.2	2.4	2.2
	Bottom 10 Average	1.9	1.9	1.9	1.9	2.0	1.9	1.9

Bluegrass Water (KY) Utility Operating Company, 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>Implied Equity Risk Premium</u>	<u>Proxy Group of Six Water Companies ex PRPM</u>
1.	Historical Equity Risk Premium (1)	4.28 %
2.	Regression of Historical Equity Risk Premium (2)	4.80
3.	Forecasted Equity Risk Premium Based on PRPM (3)	NA
4.	Forecasted Equity Risk Premium based on Projected Total Return on the S&P Utilities Index (Value Line Data) (4)	3.57
5.	Forecasted Equity Risk Premium based on Projected Total Return on the S&P Utilities Index (Bloomberg Data) (5)	4.69
6.	Average Equity Risk Premium (6)	4.34 %

- 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.
- (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 - December 2022.
- (4) Using data from Value Line for the S&P Utilities Index, an expected return of 9.45% was derived based on expected dividend yields and long-term growth estimates as a proxy for market appreciation. Subtracting the expected A2 rated public utility bond yield of 5.88%, calculated on line 3 of page 3 of this Exhibit results in an equity risk premium of 3.57%. (9.45% - 5.88% = 3.57%)
- (5) Using data from Bloomberg Professional Services for the S&P Utilities Index, an expected return of 10.57% was derived based on expected dividend yields and long-term growth estimates as a proxy for market appreciation. Subtracting the expected A2 rated public utility bond yield of 5.88%, calculated on line 3 of page 3 of this Exhibit results in an equity risk premium of 4.69%. (10.57% - 5.88% = 4.69%)
- (6) Average of lines 1 through 5.

EXHIBIT 6

Bluegrass Water (KY) Utility Operating Company, Inc.
Indicated Common Equity Cost Rate Through Use
of the Traditional Capital Asset Pricing Model (CAPM) and Empirical Capital Asset Pricing Model (ECAPM)

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Proxy Group of Six Water Companies	Value Line Adjusted Beta	Bloomberg Adjusted Beta	Average Beta	Market Risk Premium (1)	Risk-Free Rate (2)	Traditional CAPM Cost Rate	ECAPM Cost Rate	Indicated Common Equity Cost Rate (3)
American States Water Company	0.65	0.76	0.71	9.67 %	3.91 %	10.77 %	11.47 %	11.12 %
American Water Works Company, Inc.	0.90	0.94	0.92	9.67	3.91	12.80	13.00	12.90
California Water Service Group	0.70	0.78	0.74	9.67	3.91	11.06	11.69	11.38
Essential Utilities Inc.	0.95	0.84	0.90	9.67	3.91	12.61	12.85	12.73
Middlesex Water Company	0.70	0.71	0.71	9.67	3.91	10.77	11.47	11.12
SJW Group	0.80	0.68	0.74	9.67	3.91	11.06	11.69	11.38
Mean			0.79			11.51 %	12.03 %	11.77 %
Median			0.74			11.06 %	11.69 %	11.38 %
Average of Mean and Median			0.77			11.29 %	11.86 %	11.58 %

CAPM/ECAPM Results Excluding the PRPM MRP

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Proxy Group of Six Water Companies	Value Line Adjusted Beta	Bloomberg Adjusted Beta	Average Beta	Market Risk Premium (1)	Risk-Free Rate (2)	Traditional CAPM Cost Rate	ECAPM Cost Rate	Indicated Common Equity Cost Rate (3)
American States Water Company	0.65	0.76	0.71	9.43 %	3.91 %	10.61 %	11.29 %	10.95 %
American Water Works Company, Inc.	0.90	0.94	0.92	9.43	3.91	12.59	12.77	12.68
California Water Service Group	0.70	0.78	0.74	9.43	3.91	10.89	11.50	11.19
Essential Utilities Inc.	0.95	0.84	0.90	9.43	3.91	12.40	12.63	12.51
Middlesex Water Company	0.70	0.71	0.71	9.43	3.91	10.61	11.29	10.95
SJW Group	0.80	0.68	0.74	9.43	3.91	10.89	11.50	11.19
Mean			0.79			11.33 %	11.83 %	11.58 %
Median			0.74			10.89 %	11.50 %	11.19 %
Average of Mean and Median			0.77			11.11 %	11.67 %	11.39 %

Notes on page 2 of this Exhibit.

Bluegrass Water (KY) Utility Operating Company, 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: Kroll, Value Line, and Bloomberg as illustrated below:

Measure 1: Kroll Arithmetic Mean MRP (1926-2021)

Arithmetic Mean Monthly Returns for Large Stocks 1926-2021:	12.37 %
Arithmetic Mean Income Returns on Long-Term Government Bonds:	5.02
MRP based on Kroll Historical Data:	7.35 %

Measure 2: Application of a Regression Analysis to Kroll Historical Data (1926-2021)

8.71 %

Measure 3: Application of the PRPM to Kroll Historical Data: (January 1926 - December 2022)

10.86 %

Measure 4: Value Line Projected MRP (Thirteen weeks ending January 13, 2023)

Total projected return on the market 3-5 years hence*:	16.06 %
Projected Risk-Free Rate (see note 2):	3.91
MRP based on Value Line Summary & Index:	12.15 %

*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:	15.52 %
Projected Risk-Free Rate (see note 2):	3.91
MRP based on Value Line data	11.61 %

Measure 6: Bloomberg Projected MRP

Total return on the Market based on the S&P 500:	11.23 %
Projected Risk-Free Rate (see note 2):	3.91
MRP based on Bloomberg data	7.32 %

Average of Value Line, Kroll, and Bloomberg MRP: 9.67 %

Average MRP Excluding the PRPM MRP: 9.43 %

- (2) 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 9 and 10 of Exhibit DWD-5.) The projection of the risk-free rate is illustrated below:

First Quarter 2023	4.00 %
Second Quarter 2023	4.00
Third Quarter 2023	3.90
Fourth Quarter 2023	3.90
First Quarter 2024	3.80
Second Quarter 2024	3.80
2024-2028	3.90
2029-2033	4.00
	3.91 %

- (3) Average of Column 6 and Column 7.

Sources of Information:

Value Line Summary and Index
Blue Chip Financial Forecasts, December 2, 2022 and January 1, 2023
Kroll 2022 SBBi® Yearbook
Bloomberg Professional Services

EXHIBIT 7

Bluegrass Water (KY) Utility Operating Company, 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 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 2.7426 – 3.2710 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 0.1321. 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

$$\text{Thus, } 0.1321 = \frac{3.0068}{\sqrt{518}} = \frac{3.0068}{22.7596}$$

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

Bluegrass Water (KY) Utility Operating Company, Inc.
Basis of Selection of Comparable Risk
Domestic Non-Price Regulated Companies

	[1]	[2]	[3]	[4]
	Value Line Adjusted Beta	Unadjusted Beta	Residual Standard Error of the Regression	Standard Deviation of Beta
<u>Proxy Group of Six Water Companies</u>				
American States Water Company	0.65	0.42	2.3839	0.0593
American Water Works Company, Inc.	0.85	0.75	3.1906	0.0794
California Water Service Group	0.70	0.47	3.0022	0.0747
Essential Utilities Inc.	0.95	0.91	2.7036	0.0673
Middlesex Water Company	0.70	0.52	3.3913	0.0844
SJW Group	0.80	0.68	3.3691	0.0839
Average	<u>0.78</u>	<u>0.63</u>	<u>3.0068</u>	<u>0.0748</u>
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.)	2.7426	3.2710		
Std. dev. of the Res. Std. Err.	0.1321			
2 std. devs. of the Res. Std. Err.	0.2642			

Source of Information: Valueline Proprietary Database, December 2022

Bluegrass Water (KY) Utility Operating Company, Inc.
Proxy Group of Non-Price Regulated Companies
Comparable in Total Risk to the
Proxy Group of Six Water Companies

	[1]	[2]	[3]	[4]
<u>Proxy Group of Twenty Non-Price Regulated Companies</u>	<u>Value Line Adjusted Beta</u>	<u>Unadjusted Beta</u>	<u>Residual Standard Error of the Regression</u>	<u>Standard Deviation of Beta</u>
Adobe Inc.	0.75	0.55	3.2558	0.0810
Amgen	0.75	0.56	2.7921	0.0695
Becton, Dickinson	0.75	0.59	2.9628	0.0738
Bristol-Myers Squibb	0.85	0.76	3.0330	0.0755
Broadridge Fin'l	0.85	0.70	2.7610	0.0687
Check Point Software	0.75	0.57	2.8358	0.0706
C.H. Robinson	0.75	0.56	3.0116	0.0750
CSG Systems Int'l	0.75	0.58	3.1079	0.0774
Quest Diagnostics	0.80	0.69	3.0218	0.0752
Heartland Express	0.75	0.55	2.9497	0.0734
Henry (Jack) & Assoc	0.85	0.70	2.8821	0.0717
Kimberly-Clark	0.70	0.51	2.8091	0.0699
Lancaster Colony	0.70	0.50	2.9638	0.0738
McCormick & Co.	0.80	0.66	2.8331	0.0705
Monster Beverage	0.85	0.73	3.0556	0.0761
Northrop Grumman	0.85	0.74	2.9186	0.0727
Progressive Corp.	0.75	0.60	2.8617	0.0712
RLI Corp.	0.80	0.66	2.8575	0.0711
Rollins, Inc.	0.85	0.72	2.9831	0.0743
Tyler Technologies	0.75	0.56	3.2280	0.0804
Average	<u>0.78</u>	<u>0.62</u>	<u>2.9562</u>	<u>0.0736</u>
Proxy Group of Six Water Companies	<u>0.78</u>	<u>0.63</u>	<u>3.0068</u>	<u>0.0748</u>

Source of Information:

Valueline Proprietary Database, December 2022

EXHIBIT 8

Bluegrass Water (KY) Utility Operating Company, Inc.
Summary of Cost of Equity Models Applied to
Proxy Group of Twenty Non-Price Regulated Companies
Comparable in Total Risk to the
Proxy Group of Six Water Companies

<u>Principal Methods</u>	Proxy Group of Twenty Non-Price Regulated Companies	Proxy Group of Twenty Non-Price Regulated Companies ex PRPM
Discounted Cash Flow Model (DCF) (1)	9.54 %	9.54 %
Risk Premium Model (RPM) (2)	12.40	12.20
Capital Asset Pricing Model (CAPM) (3)	<u>11.61</u>	<u>11.42</u>
	Mean <u>11.18 %</u>	<u>11.05 %</u>
	Median <u>11.61 %</u>	<u>11.42 %</u>
	Average of Mean and Median <u>11.40 %</u>	<u>11.24 %</u>

Notes:

- (1) From page 2 of this Exhibit.
- (2) From page 3 of this Exhibit.
- (3) From page 6 of this Exhibit.

Bluegrass Water (KY) Utility Operating Company, Inc.
DCF Results for the Proxy Group of Non-Price-Regulated Companies Comparable in Total Risk to the
Proxy Group of Six Water Companies

	[1]	[2]	[3]	[4]	[6]	[7]	[8]
Proxy Group of Twenty 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)
	%	%	%	%	%	%	%
Adobe Inc.	-	13.50	13.20	13.56	13.42	-	NA
Amgen	3.11	5.50	7.70	6.25	6.48	3.21	9.69
Becton, Dickinson	1.51	4.50	9.50	5.50	6.50	1.56	8.06
Bristol-Myers Squibb	3.00	NA	5.70	3.88	4.79	3.07	7.86
Broadridge Fin'l	2.06	9.50	NA	11.80	10.65	2.17	12.82
Check Point Software	-	8.50	7.30	7.02	7.61	-	NA
C.H. Robinson	2.58	8.50	9.00	3.83	7.11	2.67	9.78
CSG Systems Int'l	1.79	12.00	NA	7.00	9.50	1.88	11.38
Quest Diagnostics	1.78	4.00	NA	(15.60)	4.00	1.82	5.82
Heartland Express	0.51	8.50	NA	13.30	10.90	0.54	11.44
Henry (Jack) & Assoc	1.07	8.00	9.00	9.00	8.67	1.12	9.79
Kimberly-Clark	3.53	5.50	6.40	6.90	6.27	3.64	9.91
Lancaster Colony	1.72	3.50	NA	3.00	3.25	1.75	5.00
McCormick & Co.	1.89	4.50	5.30	1.00	3.60	1.92	5.52
Monster Beverage	-	10.50	11.40	14.12	12.01	-	NA
Northrop Grumman	1.32	6.50	2.40	3.00	3.97	1.35	5.32
Progressive Corp.	0.31	6.50	19.90	27.12	13.20	0.33	13.53
RLJ Corp.	0.80	12.00	NA	9.80	10.90	0.84	11.74
Rollins, Inc.	1.33	10.50	NA	8.20	9.35	1.39	10.74
Tyler Technologies	-	12.00	NA	7.20	9.60	-	NA
						Mean	9.28
						Median	9.79
					Average of Mean and Median		9.54

NA= Not Available

(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 January 13, 2023. 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 01/13/2023
www.yahoo.com Downloaded on 01/13/2023

Bluegrass Water (KY) Utility Operating Company, Inc.
Indicated Common Equity Cost Rate
Through Use of a Risk Premium Model
Using an Adjusted Total Market Approach

<u>Line No.</u>		<u>Proxy Group of Twenty Non-Price Regulated Companies</u>	<u>Proxy Group of Twenty Non-Price Regulated Companies ex PRPM</u>
1.	Prospective Yield on Baa2 Rated Corporate Bonds (1)	6.05 %	6.05 %
2.	Adjustment to Reflect Bond rating Difference of Non-Price Regulated Companies (2)	<u>(0.17)</u>	<u>(0.17)</u>
3.	Adjusted Prospective Bond Yield	5.88 %	5.88 %
4.	Equity Risk Premium (3)	<u>6.52</u>	<u>6.32</u>
5.	Risk Premium Derived Common Equity Cost Rate	<u>12.40 %</u>	<u>12.20 %</u>

Notes: (1) Average forecast of Baa2 corporate bonds based upon the consensus of nearly 50 economists reported in Blue Chip Financial Forecasts dated December 2, 2022 and January 1, 2023 (see pages 9 and 10 of Exhibit DWD-5). The estimates are detailed below.

First Quarter 2023	6.10 %
Second Quarter 2023	6.30
Third Quarter 2023	6.20
Fourth Quarter 2023	6.10
First Quarter 2024	5.90
Second Quarter 2024	5.80
2024-2028	6.00
2029-2033	<u>6.00</u>
Average	<u>6.05 %</u>

(2) The average yield spread of Baa rated corporate bonds over A corporate bonds for the three months ending December 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:

	<u>A Corp. Bond Yield</u>	<u>Baa Corp. Bond Yield</u>	<u>Spread</u>
Dec-22	5.10 %	5.58 %	0.48 %
Nov-22	5.58	6.07	0.49
Oct-22	5.74	6.26	<u>0.52</u>
	Average yield spread		<u>0.50</u>
	1/3 of spread		<u>0.17</u>

(3) From page 5 of this Exhibit.

Bluegrass Water (KY) Utility Operating Company, Inc.
Comparison of Long-Term Issuer Ratings for the
Proxy Group of Twenty Non-Price Regulated Companies of Comparable risk to the
Proxy Group of Six Water Companies

<u>Proxy Group of Twenty Non-Price Regulated Companies</u>	<u>Moody's Long-Term Issuer Rating January 2023</u>		<u>Standard & Poor's Long-Term Issuer Rating January 2023</u>	
	<u>Long-Term Issuer Rating</u>	<u>Numerical Weighting (1)</u>	<u>Long-Term Issuer Rating</u>	<u>Numerical Weighting (1)</u>
Adobe Inc.	A2	6.0	A+	5.0
Amgen	Baa1	8.0	BBB+	8.0
Becton, Dickinson	Baa2	13.0	BBB	12.0
Bristol-Myers Squibb	A2	6.0	A+	5.0
Broadridge Fin'l	Baa1	8.0	BBB+	8.0
Check Point Software	NA	--	NA	--
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	--
Kimberly-Clark	A2	6.0	A	6.0
Lancaster Colony	NA	--	NA	--
McCormick & Co.	Baa2	9.0	BBB	9.0
Monster Beverage	NA	--	NA	--
Northrop Grumman	Baa1	8.0	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	--
Average	<u>Baa1</u>	<u>8.1</u>	<u>BBB+</u>	<u>7.9</u>

Notes:

(1) From page 6 of Exhibit DWD-5.

Source of Information:

Bloomberg Professional Services

Bluegrass Water (KY) Utility Operating Company, Inc.
Derivation of Equity Risk Premium Based on the Total Market Approach
Using the Beta for
Proxy Group of Twenty Non-Price Regulated Companies of Comparable risk to the
Proxy Group of Six Water Companies

<u>Line No.</u>	<u>Equity Risk Premium Measure</u>	<u>Proxy Group of Twenty Non-Price Regulated Companies</u>	<u>Proxy Group of Twenty Non-Price Regulated Companies ex PRPM</u>
1.	Kroll Equity Risk Premium (1)	6.13 %	6.13 %
2.	Regression on Kroll Risk Premium Data (2)	7.26	7.26
3.	Kroll Equity Risk Premium based on PRPM (3)	9.76	NA
4.	Equity Risk Premium Based on <u>Value Line</u> Summary and Index (4)	11.01	11.01
5	Equity Risk Premium Based on <u>Value Line</u> S&P 500 Companies (5)	10.47	10.47
6.	Equity Risk Premium Based on Bloomberg S&P 500 Companies (6)	<u>6.18</u>	<u>6.18</u>
7.	Conclusion of Equity Risk Premium	8.47 %	8.21 %
8.	Adjusted Beta (7)	<u>0.77</u>	<u>0.77</u>
9.	Forecasted Equity Risk Premium	<u><u>6.52 %</u></u>	<u><u>6.32 %</u></u>

Notes:

- (1) From note 1 of page 8 of Exhibit DWD-5.
- (2) From note 2 of page 8 of Exhibit DWD-5.
- (3) From note 3 of page 8 of Exhibit DWD-5.
- (4) From note 4 of page 8 of Exhibit DWD-5.
- (5) From note 5 of page 8 of Exhibit DWD-5.
- (6) From note 6 of page 8 of Exhibit DWD-5.
- (7) Average of mean and median beta from page 6 of this Exhibit.

Sources of Information:

Kroll 2022 SBBI® Yearbook
Value Line Summary and Index
Blue Chip Financial Forecasts, December 2, 2022 and January 1, 2023
Bloomberg Professional Services

Bluegrass Water (KY) Utility Operating Company, Inc.
Traditional CAPM and ECAPM Results for the Proxy Group of Non-Price-Regulated Companies Comparable in Total Risk to the
Proxy Group of Six Water Companies

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Proxy Group of Twenty 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)
Adobe Inc.	0.85	1.42	1.14	9.67 %	3.91 %	14.93 %	14.59 %	14.76 %
Amgen	0.70	0.67	0.68	9.67	3.91	10.48	11.26	10.87
Becton, Dickinson	0.75	0.69	0.72	9.67	3.91	10.87	11.55	11.21
Bristol-Myers Squibb	0.80	0.51	0.65	9.67	3.91	10.19	11.04	10.62
Broadridge Fin'l	0.90	0.98	0.94	9.67	3.91	13.00	13.14	13.07
Check Point Software	0.75	0.73	0.74	9.67	3.91	11.06	11.69	11.38
C.H. Robinson	0.75	0.88	0.81	9.67	3.91	11.74	12.20	11.97
CSG Systems Int'l	0.75	0.82	0.79	9.67	3.91	11.55	12.05	11.80
Quest Diagnostics	0.80	0.69	0.75	9.67	3.91	11.16	11.76	11.46
Heartland Express	0.70	0.80	0.75	9.67	3.91	11.16	11.76	11.46
Henry (Jack) & Assoc	0.85	0.74	0.80	9.67	3.91	11.64	12.13	11.88
Kimberly-Clark	0.70	0.66	0.68	9.67	3.91	10.48	11.26	10.87
Lancaster Colony	0.65	0.50	0.57	9.67	3.91	9.42	10.46	9.94
McCormick & Co.	0.75	0.73	0.74	9.67	3.91	11.06	11.69	11.38
Monster Beverage	0.85	0.74	0.79	9.67	3.91	11.55	12.05	11.80
Northrop Grumman	0.80	0.67	0.73	9.67	3.91	10.97	11.62	11.29
Progressive Corp.	0.75	0.76	0.75	9.67	3.91	11.16	11.76	11.46
RLI Corp.	0.80	0.78	0.79	9.67	3.91	11.55	12.05	11.80
Rollins, Inc.	0.85	0.86	0.85	9.67	3.91	12.13	12.49	12.31
Tyler Technologies	0.85	1.20	1.02	9.67	3.91	13.77	13.72	13.74
Mean			0.78			11.49 %	12.01 %	11.75 %
Median			0.75			11.16 %	11.76 %	11.46 %
Average of Mean and Median			0.77			11.33 %	11.89 %	11.61 %

Notes:

- (1) From Exhibit DWD-6, note 1.
- (2) From Exhibit DWD-6, note 2.
- (3) Average of CAPM and ECAPM cost rates.

Bluegrass Water (KY) Utility Operating Company, Inc.
Traditional CAPM and ECAPM Results Excluding the PRPM MRP for the Proxy Group of Non-Price-Regulated Companies Comparable in Total Risk to the
Proxy Group of Six Water Companies

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Proxy Group of Twenty 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
Adobe Inc.	0.85	1.42	1.14	9.43 %	3.91 %	14.66 %	14.33 %	14.50 %
Amgen	0.70	0.67	0.68	9.43	3.91	10.32	11.08	10.70
Becton, Dickinson	0.75	0.69	0.72	9.43	3.91	10.70	11.36	11.03
Bristol-Myers Squibb	0.80	0.51	0.65	9.43	3.91	10.04	10.86	10.45
Broadridge Fin'l	0.90	0.98	0.94	9.43	3.91	12.77	12.92	12.84
Check Point Software	0.75	0.73	0.74	9.43	3.91	10.89	11.50	11.19
C.H. Robinson	0.75	0.88	0.81	9.43	3.91	11.55	12.00	11.77
CSG Systems Int'l	0.75	0.82	0.79	9.43	3.91	11.36	11.85	11.61
Quest Diagnostics	0.80	0.69	0.75	9.43	3.91	10.98	11.57	11.28
Heartland Express	0.70	0.80	0.75	9.43	3.91	10.98	11.57	11.28
Henry (Jack) & Assoc	0.85	0.74	0.80	9.43	3.91	11.45	11.93	11.69
Kimberly-Clark	0.70	0.66	0.68	9.43	3.91	10.32	11.08	10.70
Lancaster Colony	0.65	0.50	0.57	9.43	3.91	9.29	10.30	9.79
McCormick & Co.	0.75	0.73	0.74	9.43	3.91	10.89	11.50	11.19
Monster Beverage	0.85	0.74	0.79	9.43	3.91	11.36	11.85	11.61
Northrop Grumman	0.80	0.67	0.73	9.43	3.91	10.79	11.43	11.11
Progressive Corp.	0.75	0.76	0.75	9.43	3.91	10.98	11.57	11.28
RLJ Corp.	0.80	0.78	0.79	9.43	3.91	11.36	11.85	11.61
Rollins, Inc.	0.85	0.86	0.85	9.43	3.91	11.93	12.28	12.10
Tyler Technologies	0.85	1.20	1.02	9.43	3.91	13.53	13.48	13.51
Mean			<u>0.78</u>			<u>11.31 %</u>	<u>11.82 %</u>	<u>11.56 %</u>
Median			<u>0.75</u>			<u>10.98 %</u>	<u>11.57 %</u>	<u>11.28 %</u>
Average of Mean and Median			<u>0.77</u>			<u>11.15 %</u>	<u>11.70 %</u>	<u>11.42 %</u>

Notes:

- (1) From Exhibit DWD-6, note 1.
- (2) From Exhibit DWD-6, note 2.
- (3) Average of CAPM and ECAPM cost rates.

EXHIBIT 9

Bluegrass Water (KY) Utility Operating Company, Inc.
Derivation of Investment Risk Adjustment Based upon
Kroll Associates' Size Premia for the Decile Portfolios of the NYSE/AMEX/NASDAQ

Line No.	[1] Market Capitalization on January 13, 2023 (millions)	[2] Applicable Decile of the NYSE/AMEX/ NASDAQ (2)	[3] Applicable Size Premium (3)	[4] Spread from Applicable Size Premium (4)
1.	\$ 15,374	10	4.80%	
2.	\$ 3,439,009	5	0.89%	3.91%
		[A]	[C]	[D]

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

*From 2022 Kroll Cost of Capital Navigator

Notes:

- (1) From page 2 of this Exhibit.
- (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 3.91% in Column [4]. Line No. 2 is derived as follows
3.91% = 4.8% - 0.89%.

Bluegrass Water (KY) Utility Operating Company, Inc.
Market Capitalization of Bluegrass Water (KY) Utility Operating Company, Inc. and the
Proxy Group of Six Water Companies

Company	[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 January 13, 2023	[5] Market-to-Book Ratio on January 13, 2023 (2)	[6] Market Capitalization on January 13, 2023 (3) (millions)
Bluegrass Water (KY) Utility Operating Company, Inc.	NA	NA	\$ 4,567 (4)	NA		
Based upon Proxy Group of Six Water Companies					336.6 (5)	\$ 15,374 (6)
Proxy Group of Six Water Companies						
American States Water Company	36,936	\$ 18,571	\$ 685,947	\$ 95,480	514.1 %	\$ 3,526,676
American Water Works Company, Inc.	181,611	40,185	7,298,000	158,870	395.3	28,852,554
California Water Service Group	53,716	22,023	1,182,980	62,390	283.3	3,351,341
Essential Utilities Inc.	252,868	20,503	5,184,450	48,790	238.0	12,337,411
Middlesex Water Company	17,522	20,987	367,726	81,810	389.8	1,433,475
SIW Group	30,181	34,277	1,034,519	80,180	233.9	2,419,940
Median	45,326	\$ 21,505	\$ 1,108,750	\$ 80,995	336.6 %	\$ 3,439,009

NA= Not Available

Notes: (1) Column 3 / Column 1.

(2) Column 4 / Column 2.

(3) Column 1 * Column 4.

(4) Book equity of the Company.

(5) The market-to-book ratio of Bluegrass Water (KY) Utility Operating Company, Inc. on January 13, 2023 is assumed to be equal to the market-to-book ratio of Proxy Group of Six Water Companies on January 13, 2023 as appropriate.

(6) Column [3] multiplied by Column [5].

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