STATE OF INDIANA

INDIANA UTILITY REGULATORY COMMISSION

VERIFIED PETITION OF CITIZENS WATER OF WESTFIELD, LLC FOR (1) AUTHORITY TO INCREASE RATES AND CHARGES FOR WATER UTILITY SERVICE AND APPROVAL OF A NEW SCHEDULE OF RATES AND CHARGES; (2) AUTHORITY TO IMPLEMENT AND APPROVAL OF A SYSTEM DEVELOPMENT CHARGE; AND (3) APPROVAL OF CERTAIN REVISIONS TO ITS TERMS AND CONDITIONS APPLICABLE TO WATER UTILITY SERVICE	)))))))))	**CAUSE NO. 46020**

VERIFIED DIRECT TESTIMONY
of
R. JEFFREY MALINAK

On
Behalf of
Petitioner,
Citizens Water of Westfield, LLC

Petitioner's Exhibit No. 3

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I. INTRODUCTION AND BACKGROUND

A. QUALIFICATIONS

Q1. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A1. My name is R. Jeffrey Malinak. My business address is 800 17th Street NW, Washington, DC 20006.

Q2. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A2. I currently am a Managing Principal in the Washington, D.C. office of Analysis Group, Inc. ("AG"), an international economic and financial consulting services firm.

Q3. PLEASE DESCRIBE THE SERVICES PROVIDED BY ANALYSIS GROUP.

A3. AG is an economic, financial, and strategy consulting firm, headquartered in Boston, Massachusetts.

Q4. PLEASE DESCRIBE YOUR EDUCATIONAL AND WORK BACKGROUND.

A4. I have over 25 years of experience in the field of economic and financial consulting, in which I have provided microeconomic, finance, and accounting consulting advice and other services to attorneys and companies in both litigation and non-litigation settings. My main areas of subject matter expertise are financial economics and the valuation of corporations and other assets, including corporate finance and the assessment of cost of capital. I spent approximately seven years of my career at Putnam, Hayes & Bartlett, Inc. (PHB), an economic and financial consulting firm with large consulting practices in the energy industry and other regulated industries. While at PHB, approximately half of my time was spent on litigation matters and regulatory proceedings, including rate cases, in the electric utility and the energy sector more broadly. My work on these matters included

revenue requirements modeling; analysis of the economics of coal mining and transportation; analysis of the operations and economics of nuclear, coal, wood scrap, and natural gas power plants; forecasting of load and related generation capacity requirements; assessment of the cost of capital for generation and for transmission and distribution (both electric and natural gas); calculation of the cost of compliance with environmental regulations; modeling and forecasting of emission allowance prices; and other types of work. Since joining Analysis Group in the mid-1990s, I have continued to work on projects in the energy and environmental economics areas, including regulatory matters. I hold a Master's in Business Administration in Finance and Accounting from the University of Texas at Austin and a B.A. in Social Sciences from Stanford University. My resume, which is included as Appendix A, provides more details on my background and prior experience.

Q5. HAVE YOU PREVIOUSLY TESTIFIED BEFORE THIS COMMISSION?

A5. No. However, I have testified on several occasions in other state and federal regulatory proceedings, as is set forth in my resume.

B. PURPOSE OF TESTIMONY

Q6. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A6. My testimony has two purposes. First, Citizens Water of Westfield, LLC, the Petitioner in this proceeding ("Westfield Water"), has asked me to provide an estimate of its cost of equity capital to use in determining its allowed rate of return following this proceeding.[1] Second, I have been asked to review and opine on the economic principles underlying the

[1] In the remainder of my testimony, I occasionally may drop the word "capital" and just refer to a firm's "cost of equity."

"fair value" utility ratemaking paradigm, including the roles of the utility cost of equity capital, and both historical and future inflation, in setting a fair allowed rate of return on a fair value rate base.[2]

Q7. WHAT IS THE GENERAL FRAMEWORK FOR YOUR ANALYSIS?

A7. My analysis is based on established economic and finance theory principles as applied to regulated public utilities. My cost of equity analysis is based on standard finance principles and widely accepted approaches to estimate a company's cost of equity. My economic analysis of the fair value public utility regulatory framework is based on decades of published economic and finance literature, and statutory and regulatory precedent, including in Indiana.

Q8. WHAT HAVE YOU DONE TO PREPARE YOURSELF TO TESTIFY IN THIS PROCEEDING?

A8. I have reviewed and analyzed a large amount of relevant information from a variety of sources including textbooks in finance and economics, research published in academic journals, financial and economic analysis and data on public water companies and the water industry in the United States and Indiana, prior decisions by the Indiana Utility Regulatory Commission ("IURC"), and other sources. I also have relied on my own prior experience with regulatory finance and economics.

In completing my work in this matter, I have been assisted by other employees of AG, working under my direction and supervision. My work on this proceeding is ongoing,

[2] I understand that Westfield Water is a for-profit, investor-owned utility and that it is appropriate to analyze it on a stand-alone basis.

and I may conduct further analysis or review additional materials, including testimony filed by other witnesses in this matter. I reserve the right to update, refine, or revise my opinions as appropriate.

C. SUMMARY OF CONCLUSIONS

i. COST OF EQUITY ESTIMATE

Q9. PLEASE SUMMARIZE YOUR GENERAL APPROACH TO ESTIMATING WESTFIELD WATER'S CURRENT EQUITY COST OF CAPITAL.

A9. I have estimated Westfield Water's opportunity cost of equity capital, which is the rate of return on its equity that investors would require for alternative investments of comparable risk. This approach is based on fundamental financial economic principles including the necessary tradeoff between risk and expected return, as well as past federal and state legal precedent, including the seminal *Hope* and Bluefield decisions by the United States Supreme Court.[3]

In addition, it is important to note that Westfield Water is a privately-held company whose equity securities are not listed on any public exchange. Thus, it is not possible to directly observe a cost of equity capital for Westfield Water in the way that it is for public companies whose equity securities are publicly-traded and for whom third-party investors or others provide analysis, including earnings forecasts. Therefore, I estimate Westfield Water's cost of equity capital by analyzing financial information, including risk and return

[3] The U.S. Supreme Court's decision in the *FPC v. Hope Natural Gas* and *Bluefield Waterworks v. Pub. Serv. Comm'n* cases set forth legal and economic principles for evaluating regulated utility rate proposals (*FPC v. Hope Nat. Gas Co.*, 320 U.S. 591 (1944) and Bluefield Waterworks & Improvements Co. v. Pub. Serv. Comm'n, 262 U.S. 679, (1923)).

data, for a sample of 16 publicly traded firms whose assets and businesses have risks comparable to those of Westfield Water.[4] This sample, which is summarized in Attachment RJM-1, is composed of 8 firms in the regulated water industry and 8 firms with substantial operations in the regulated natural gas distribution industry.

Q10. WHAT CORE METHODOLOGIES DID YOU USE TO DETERMINE WESTFIELD WATER'S COST OF EQUITY CAPITAL?

A10. I have relied on several cost of capital models that have a long history and strong support in the finance field, including the Capital Asset Pricing Model ("CAPM") and the Constant Growth and Multi-Stage versions of the Discounted Cash Flow ("DCF") Model ("CGDCF" and "MSDCF").[5] My application of these models is based on analysis of market and other data for my sample of publicly-traded companies, all of which have liquid securities and an analyst following. I analyzed these firms' dividend yields, expected earnings growth rates, the correlation of changes in the value of their equity securities with changes in the value of the overall market, and other potentially relevant variables. The results of these analyses provide the core estimates of rates of return required to determine Westfield Water's cost of equity.

[4] Use of a sample rather than an observation for a single firm also can improve the statistical reliability of a cost of equity estimate.

[5] Reliance on multiple models is supported by the past orders of the IURC. *See e.g.,* IURC order in Cause No. 43680, April 30, 2010, at p. 46: "The Commission recognizes that the cost of common equity cannot be precisely calculated and estimating it requires the use of judgment. Due to this lack of precision, the use of multiple methods is desirable because no single method will produce the most reasonable result under all conditions and circumstances."

Q11. DID YOU NEED TO APPLY ANY OTHER METHODOLOGIES OR ANALYSIS IN REACHING YOUR FINAL OPINION REGARDING WESTFIELD WATER'S COST OF EQUITY CAPITAL?

A11. Yes. The results of the CAPM and DCF methods provide my primary basis for determining Westfield Water's cost of equity capital. However, since these methods were originally developed, there has been a significant amount of theoretical and empirical research by financial economists that suggests the potential need for refinements.[6] Many of these refinements involve the need to account for certain types of risks not captured by the original models by making adjustments to the core model results.

Q12. ARE ANY SUCH ADJUSTMENTS NECESSARY IN THIS CASE?

A12. Yes. One such adjustment that has strong theoretical and empirical support in financial economics research, including recent empirical work, is an adjustment for differences in liquidity, defined as the degree of difficulty and cost with which an investment can be bought or sold for cash. At one end of the spectrum, there are highly liquid investments such as the publicly-traded common stock of the comparable firms in my sample. The stock of these public firms typically can be bought and sold essentially immediately and at a low transaction cost. Towards the other (illiquid) end of the spectrum is an equity investment in a small, privately owned regulated utility such as Westfield Water. This relative illiquidity makes an investment in Westfield Water's equity significantly riskier than an investment in the equity of the firms in my sample. For example, if Citizens wanted

[6] *See, e.g.*, J. R. Graham and C. R. Harvey, "The Theory and Practice of Corporate Finance: Evidence from the Field," *Journal of Financial Economics*, Vol. 60, (2001), pp. 187–243.

to sell its equity in Westfield Water, it would have to incur substantial transaction costs to put together a private offering or to take the company public so that its equity would be truly comparable to the equity of the firms in my sample. Such an effort also would create delay in selling the investment, during which market conditions could change, such that it might no longer make economic sense to sell. In contrast, an investment in the equity of the firms in my sample can be liquidated quickly and at relatively little cost. Thus, all else equal, investments in public companies are lower risk compared to investments in otherwise comparable private firms. As a result, the cost of capital for an illiquid equity investment in a private firm such as Westfield Water is higher and the value of its equity is lower than that of public firms. This finding is supported by a large body of both theoretical and empirical evidence developed by financial economics researchers, as I discuss in more detail later in my testimony.[7]

Q13. HAVE YOU QUANTIFIED THE EFFECT OF THIS LACK OF LIQUIDITY ON WESTFIED WATER'S COST OF EQUITY CAPITAL?

A13. Yes. The risk premium that investors demand for a lack of liquidity (or lack of marketability) has been quantified or "priced" by finance researchers using a variety of methodologies. Published studies typically have found that the equity of private companies must be sold at a substantial discount compared to equity of comparable traded companies.

[7] The lack of a parameter to price liquidity risk is one hypothesis that has been proposed to explain the empirical finding that the "security market line" predicted by the CAPM is "flatter" than predicted by the theory. This finding supports the addition of a risk premium to the costs of equity determined for liquid public firms when assessing the cost of equity for otherwise comparable but illiquid investments. *See, e.g.*, Liu, W., "A liquidity-augmented capital asset pricing model," *Journal of Financial Economics*, Vol. 82, No. 3, (2006), pp. 631-671, at pp. 657-661. I discuss these findings in more detail below.

These studies measure this discount, which I then translate using a straightforward financial calculation into an increase (i.e., a premium) in the required rate of return, or cost of capital, for the equity of private firms such as Westfield Water relative to the cost of equity capital of the public firms in my sample. The result of my analysis is an adder of **1.48** percent to the cost of equity that I determine for my sample of public companies.

Q14. CAN YOU PLEASE SUMMARIZE THE RESULTS OF YOUR COST OF EQUITY ANALYSIS?

A14. Yes. My results are summarized in **Table 1**.

Table 1
Summary of Westfield Water Cost of Equity Results[8]

Methodology	Cost of Equity Capital For a Company with Liquid Securities	Cost of Equity Capital for Westfield Water
CAPM – All Beta Measures		
Water Companies Only	9.3%	10.8%
Full Sample Incl Gas Companies	9.4%	10.9%
CAPM – Valueline Adjusted Betas Only		
Water Companies Only	10.0%	11.5%
Full Sample Incl Gas Companies	10.4%	11.9%
Constant Growth DCF		
Water Companies Only	9.2%	10.7%
Full Sample Incl Gas Companies	9.8%	11.2%
Multi-Stage DCF		
Water Companies Only	7.1%	8.6%
Full Sample Incl Gas Companies	7.8%	9.3%

[8] See Attachment RJM-2.

As shown in **Table 1**, the results of the multiple models indicate a relatively wide range of the potential opportunity cost of equity capital for Westfield Water, from a low of 8.6 percent based on the Multi-Stage DCF for the water companies in my sample to 11.9 percent based on the CAPM using Value Line betas, and as applied to the entire sample of firms. In all cases, the 1.48 percent adjustment for lack of liquidity must be included for the cost of capital estimate to be valid (second column in Table 1).

Q15. WHY DO YOU SHOW THE CAPM RESULTS SEPARATELY FOR THE VALUE LINE BETAS ONLY?

A15. Because I consider Value Line to be a particularly trustworthy source for such data due to its long history and wide usage. In addition, as suggested by the results above, the Value Line betas were consistently higher on average than both the "raw" and "adjusted" betas that I obtained from Bloomberg covering 1-, 2- and 5-year periods. Thus, I have included in **Table 1** a cost of equity based on the Value Line betas by themselves as a separate, highly credible estimate.

Q16. WHAT IS A REASONABLE RANGE FOR WESTFIELD WATER'S COST OF EQUITY CAPITAL BASED ON THESE RESULTS?

A16. If one were to give equal weight to the two extremes, which I do not believe is appropriate, the cost of equity would be 10.2 percent.[9] Specifically, for the reasons I describe in more detail below, I give more weight to the CAPM results than to the DCF results. Nevertheless, I believe a reasonable range for Westfield Water's cost of equity capital is **10.2 to 10.9**

[9] (11.85% + 8.60%) / 2 = 10.225% (see Attachment RJM-2).

percent. The low end of this range gives significant weight to the MSDCF results for water companies only, as 10.2 percent is below all four of my reported CAPM results. However, the single best point estimate in my opinion is **10.9 percent**, which is based on the median CAPM results for all 16 firms in my sample, and a beta based on all measures, including both "raw" and "adjusted" measures, and both Value Line and Bloomberg betas calculated over various time periods.[10]

Q17. WHY DO YOU GIVE MORE WEIGHT TO THE CAPM RESULTS THAN THE DCF RESULTS?

A17. I believe that the CAPM results should be given more weight than the DCF results for both theoretical and empirical reasons.

First, the CAPM is better grounded in financial economic theory than the DCF Model in that the CAPM is based more directly on the fundamental principle of finance that there is a tradeoff between risk and expected return.[11] This principle, which is just another expression of the common-sense economic statement that there is "no free lunch," is that one cannot expect a higher return unless one accepts more risk. The CAPM is based directly on this principle. In addition, the CAPM explicitly controls for the fact that in modern financial markets investors can diversify their investment portfolio at relatively low cost. Thus, under the CAPM, a firm's cost of capital goes up in proportion to its non-diversifiable risk. These theoretically sound factors are not explicitly or directly captured

[10] I note as well that the average across the four measures for water companies is 10.4 percent and for all companies it is 10.8 percent.
[11] *See, e.g.*, Ross, S. A., R. Westerfield, and J. F. Jaffe, *Corporate finance*, Irwin/McGraw-Hill, (2010), at p. 386: "We have argued many times that the expected return on a security compensates for its risk."

by the DCF Method. Indeed, while the DCF method includes the market's expectations in growth of future earnings, its inputs do not explicitly account for the risk associated with the volatility of those earnings (*i.e.*, the possibility that earnings growth might be higher or lower than expected). Perhaps in part for these reasons, researchers have found that more than 73% of financial managers use the CAPM (with modifications in some cases), when estimating the cost of equity capital, whereas only 16 percent used a version of the DCF Model.[12]

Second, while application of both the CAPM and DCF Models in this case relies on a selection of appropriate comparable firms, the DCF Method also relies heavily on subjective analyst forecasts for which the underlying assumptions cannot be observed, and that often are proven wrong, as well as other judgmental factors.[13] While application of the CAPM also requires some expert judgment, its inputs do not depend on an evaluation of a handful of people (the analysts) but are observed directly from analysis of market data. For example, a key input to the CAPM, which is referred to as "beta," is a measure of relative risk that is directly computed from stock price returns. Thus, given the uncertainty and potential error in analyst earnings forecasts relative to the CAPM inputs, in my opinion the CAPM results should be given more weight.

[12] *See* Graham, J. R., and C. R. Harvey, "The Theory and Practice of Corporate Finance: Evidence from the Field," *Journal of Financial Economics*, Vol. 60, (2001), pp. 187–243, at pp. 201-202.
[13] One such underlying assumption is the regulatory rate of return that will be allowed in the future for each utility. The need for this assumption creates a kind of "circularity" problem that is not present when using the CAPM.

Finally, the CAPM has undergone a great deal of empirical testing over the years and, while there is evidence that certain risk factors, such as liquidity risk, are not priced by the CAPM, overall the empirical results are supportive of the model.

These are the primary reasons that I believe the CAPM produces more reliable estimates of the cost of equity capital for Westfield Water than does the DCF Model. Nevertheless, as noted, I believe that the DCF Model also is a valid way to calculate the cost of equity for a regulated utility and, therefore, have given significant weight to the low cost of capital calculated using the MSDCF for water companies by using it to calculate the low end of my recommended range.

ii. FAIR VALUE RATEMAKING AND RATE OF RETURN

Q18. COULD YOU PLEASE SUMMARIZE THE BASIC ECONOMIC PRINCIPLES UNDERLYING AN APPROPRIATE UTILITY RATEMAKING PARADIGM?

A18. Yes. The United States system for producing and delivering certain goods and services in industries characterized by natural monopoly, such as the water industry, typically involves independently-owned and operated firms, referred to as public utilities, combined with regulation. A primary goal of the regulation of these industries is to ensure that regulated firms make the necessary investments and operate in such a manner as to allow them to provide high quality goods and services at rates that are just and reasonable and do not produce excess monopoly profits for the firm.[14] This goal can be accomplished by

[14] The term "natural monopoly" is used to refer to firms in industries characterized by high start-up costs and economies of scale such that the relevant product or service can be produced most efficiently by a single firm, usually in a single geographic territory. *See, e.g.*, Samuelson. P. A., and W.D. Nordhaus, *Economics*, McGraw-Hill Irwin, Nineteenth edition, (2010), at pp. 173-175.

implementing a regulatory regime that mimics as closely as possible results that would prevail in a free and competitive marketplace. Both classical economic theory and empirical observation have shown that, all else equal, free, competitive markets produce the largest economic benefits to consumers (known as consumer surplus) and society.[15] Regulators can attempt to achieve this result by creating appropriate investment incentives for producers. A properly administered fair value rate regime can increase the probability of achieving this economic objective.

Q19. CAN YOU PLEASE BRIEFLY SUMMARIZE WHAT IS MEANT BY A FAIR VALUE RATE REGIME?

A19. Yes. Since the beginning of rate of return regulation, regulators, academics and courts have wrestled with the appropriate way in which to value a regulated firm's assets, how to calculate the appropriate depreciation amount to include in rates (return "of" capital) and how to determine an appropriate rate of return (return "on" capital), in order to achieve the most efficient economic results and maximize societal benefits. Prior to the 1940s, regulators generally attempted to determine the fair market value of the assets of regulated entities to use as a base upon which to calculate a fair rate of return. This attempt to value a utility's assets at their competitive market value is the core attribute of a fair value rate regime.

[15] Competitive markets maximize social welfare except, generally, for the following three reasons. "The first reason is … abuses of market power by monopolies or oligopolies. A second major reason is … informational failures, such as those which occur when consumers have inadequate information. A third reason is … externalities like pollution.", Samuelson. P. A., and Nordhaus, W. D., *Economics*, McGraw-Hill Irwin, Nineteenth edition, (2010), at p. 201.

Q20. WHY DID REGULATORS ATTEMPT TO VALUE UTILITY ASSETS IN THIS MANNER?

A20. Because they realized that in an unregulated market environment asset owners will attempt to earn a fair return on the market value of their assets, as opposed to, for example, their historical cost. This basic principle follows from the fact that an owner can just sell his or her assets for their cash market value if he or she does not want to employ them in a business. The cash market value in turn will be paid by a buyer who will expect to earn a fair rate of return on his/her cash outlay. Thus, the asset's historical cost is of little economic meaning other than to the extent it might be a relevant input to determining the transaction price.

Q21. YOU MENTIONED THE HISTORICAL COST APPROACH. CAN YOU PLEASE COMMENT ON THE FAIR VALUE VERSUS HISTORICAL COST APPROACHES?

A21. Yes. First, from an economic perspective, the fair value approach should lead to outcomes that are at least as economically efficient as the historical cost approach. However, partly in response to disputes that arose over the appropriate measure of the fair value of a utility's assets, as well as a regulatory desire for a more straightforward approach, the historical cost regulatory paradigm was introduced and ultimately was adopted in most of the United States.

Q22. FROM AN ECONOMIC PERSPECTIVE, HOW DOES A FAIR VALUE PARADIGM COMPARE TO AN HISTORICAL COST PARADIGM?

A22. While a historical cost approach can provide reasonable economic investment incentives to firms, a fair value paradigm, if administered effectively, theoretically can produce more economically efficient investment incentives because it more closely mimics the results that they would obtain in an unregulated market.[16] However, the costs of administration may be higher under a fair value regime due to the need to revalue the rate base at the time of each rate case. This potentially higher administrative cost is one reason that the historical cost approach has been widely adopted. In other words, lawmakers and regulators have been willing to sacrifice potentially more economically efficient outcomes for perceived greater practicality and simplicity.

Q23. ARE THERE OTHER IMPORTANT DIFFERENCES BETWEEN THE TWO APPROACHES?

A23. Yes. Specifically, there are important differences in risk and in the time pattern of cost recovery between the two methods. First, from a risk perspective, a regulated firm theoretically is more likely to earn either more or less than its cost of capital on an investment under a fair value regime. For example, if there is a technological advance that makes an asset or portfolio of assets obsolete, or if there is significantly more physical deterioration than expected, the current market value of the asset(s) could fall significantly and permanently under a fair value regime. Such a decline would cause the return on

[16] *See, e.g.*, Myers, S., "The application of finance theory to public utility rate cases," *The Bell Journal of Economics and Management Science*, Vol. 3, No. 1, (1972), pp. 84-87. "Thus, the straightforward approach based on CMV [competitive market value of a utility's assets] is exactly equivalent to (long-run) marginal cost pricing." Furthermore, "[l]ong run marginal cost ("LRMC") pricing [is] the usual condition for welfare maximization and efficient allocation of resources." The "CMV" measure of asset value, which I discuss below, is the economically appropriate measure of value for use in a fair value rate regime.

investment in the asset(s), and potentially the amount of depreciation included in rates, to fall below the originally expected levels at the time of the next rate case. Under a historical cost regime, by contrast, there would be no such mechanism for reducing a utility's rates and profits under these circumstances, assuming that the initial investments were determined to be prudent by the regulator. Similarly, if there is a significant, prolonged deflation in asset values, like during the Great Depression, rates could be reduced under a fair value regime, but not under a historical cost regime. Thus, while on average a utility regulated under a fair value regime can expect to earn its nominal cost of capital, it is by no means guaranteed to do so. Under a historical cost regime, by contrast, the regulated firm is virtually guaranteed to earn its expected nominal cost of capital on any investment deemed to have been prudently incurred when made.

In addition, under a historical cost regime, the return of and on invested capital that is included in rates starts high and declines over time as the rate base is depreciated, whereas under a fair value regime, this quantity can theoretically go up or down over time as the fair value rate base and, potentially, associated deprecation are revalued at the time of each rate case.

Q24. ARE THERE ANY RISKS FACED BY INVESTORS IN A REGULATED UTILITY THAT ARE THE SAME UNDER BOTH APPROACHES?

A24. Yes. Under either approach, utility investors bear the risk that inflation will be higher than expected during the period between rate cases, thereby resulting in inflation-adjusted, or real returns, that are below those that were expected at the time of investment until the next rate case. Indeed, as I describe below, Westfield Water has experienced real returns over

the last three years that are well below the expected real returns embedded in its cost of capital. Conversely, if inflation is lower than expected, utility investors can earn real returns that are greater than expected, at least for a period of time.

In addition, other actions taken by regulators, or other regulations, for example ex-post excess earnings tests can increase the risk for the utility and effectively increase its cost of capital, while also weakening its investment incentives.[17] Such regulatory risks vary across jurisdictions and utilities.

Finally, unexpected declines in demand that result in lower revenue than expected, or unexpected increases in operating costs, for which the utility is not made whole in some form, can result in unexpected losses under either type of regime in the absence of a true-up mechanism.

Q25. PLEASE EXPLAIN HOW A PROPERLY ADMINISTERED REGULATED RATE OF RETURN REGIME CAN ACHIEVE THE OBJECTIVES YOU DESCRIBE.

A25. In a competitive market, price competition theoretically will drive firms' profits (returns) down to a point where the companies earn zero "economic profits," which means they will on average earn no more and no less than their opportunity cost of capital as a percentage of the value of their invested capital, over the longer term. Of course, after the fact and over shorter time horizons, some firms may earn less than their cost of capital and some may earn more. But in a competitive market, a firm should not expect to earn more than

[17] I understand that Indiana has an excess earnings review process that is triggered with water utilities returns above 110% of their approved rate of return based on Operating Income / Authorized Rate Base (see, IC Section 8-1-2-42.5, GAO 2018-1 and December 18, 2003 Memorandum to Chairman Huston Re: Summary Results of Periodic Review for Calendar Year 2022).

the opportunity cost of capital on the value of its invested capital, on average and over the longer run.[18] A regulatory system that succeeds in replicating these results (within a reasonable approximate range) as closely as feasible will provide more appropriate investment incentives and increase the probability of maximizing consumer and societal benefits.

Q26. HOW DO YOU APPLY THIS FRAMEWORK TO A REGULATED ENTERPRISE, SUCH AS WESTFIELD WATER, UNDER A FAIR VALUE RATE REGIME?

A26. A regulated firm's profits are a function of two variables, the approved value of the fixed assets the firm has acquired with prudently invested capital, usually referred to as the firm's "rate base," and the firm's approved rate of return.[19] If the regulated rate bases, rates, and costs of capital of firms operating under a regulated fair value rate base system are set at or close to the values that would prevail in a competitive market, then the utilities will have the appropriate incentives.[20] As a result, the regulated firm will be able to attract the appropriate amount of capital at a reasonable cost, and there will be an economically efficient allocation of resources in the relevant sector of the economy.

Q27. WHAT VALUE SHOULD BE ASSIGNED TO A REGULATED FIRM'S RATE BASE UNDER A FAIR VALUE REGIME TO ACCOMPLISH THIS OBJECTIVE?

[18] It is important to note that the opportunity cost of capital conceptually includes compensation for the risk of future inflation.
[19] Prudently incurred operating expenses, including labor, maintenance, and the costs of commodities such as fuel or water, are typically passed through to customers at cost, and thus should not materially affect the firm's profits.
[20] However, as noted previously, Indiana's excess earnings regulation can result in a review of the rate of return that a utility earns and, therefore, weakens the potentially better incentives available under its fair value regime.

A27. There is a clear answer to this question based on decades of study and research by regulatory and financial economists. The value, which I will refer to as the "Competitive Market Value" or "CMV" of a firm's fixed assets, is defined as the cost of replicating the productive capability of a firm's fixed asset base with the most efficient current technology.[21] The logic for this definition is that the sales price of the firm's existing fixed assets (that is, their current market value in the sense of selling them in a secondary market), would be determined in significant part by competition with the cost of a system using currently new technology.[22]

Q28. IS THERE A VALUE IN THE RECORD THAT REASONABLY COULD APPROXIMATE THE CMV OF WESTFIELD WATER'S RATE BASE?

A28. Yes. In this case, Westfield Water Witness Bui testifies that the "Replacement Cost New Less Depreciation" ("RCNLD") of Westfield's fixed assets is less than the CMV of those assets, i.e., less than the cost to replicate the productive capacity of those fixed assets with current technology.[23] Moreover, Westfield Water Witness Jackson testifies that the proposed FVRB is significantly lower than the RCNLD.[24]

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[21] I use the terminology from a well-known published paper on these topics (*see* Myers, S., "The application of finance theory to public utility rate cases," *The Bell Journal of Economics and Management Science*, Vol. 3, No. 1, (1972), pp. 58-97).

[22] The new technology will cause the value of the existing investment to decline in economic terms due to obsolescence. Of course, the value of a used fixed asset also will decline over time due to physical deterioration. The combined reduction in present value of the asset due to these two factors is referred to as "economic depreciation". *See, e.g.*, Brealey, R. A., S. C. Myers, and F. Allen, *Principles of Corporate Finance*, McGraw-Hill, (2020), at p. 328.

[23] Verified Direct Testimony of Ann Bui, at pp. 9-10 (hereinafter "Bui Direct Testimony").

[24] A key reason for the difference is that the proposed FVRB is calculated using the agreed upon historical value of the assets that were part of Citizen's original acquisition of Westfield Water (so-called "pre-2012 assets"), rather than their larger RCNLD value. Verified Direct Testimony of Craig Jackson at p. 15 hereinafter "Jackson Direct Testimony."

Q29. WHAT COST OF CAPITAL SHOULD BE USED IN SETTING THE ALLOWED RATE OF RETURN ON WESTFIELD WATER'S FAIR VALUE RATE BASE?

A29. Economic principles provide an answer to this question as well. The appropriate rate of return to apply to Westfield Water's fair value rate base, determined as the CMV of its fixed assets, is the firm's full nominal cost of capital.[25] To see this, it is useful to cite a simple example. Assume that a water utility operating under a fair value regime must decide whether and when to buy a new water pump. By definition, the price of that pump is its competitive market value, or CMV. In order for the investment in the pump to make economic sense for the utility, it must expect to earn its nominal cost of capital on that new investment. This same logic applies to the utility's existing assets valued at their CMV. Thus, use of a nominal cost of capital as the allowed rate of return is appropriate and consistent with fundamental financial economic principles.[26]

Q30. WHAT WOULD BE THE EFFECT OF SETTING THE ALLOWED RATE OF RETURN BELOW WESTFIELD WATER'S NOMINAL OPPORTUNITY COST OF EQUITY CAPITAL?

A30. All else equal, such a lower rate of return, even if it is in place just for the period of time before the next rate case, would discourage Westfield Water from making efficient and

[25] The term, "nominal cost of capital," refers to a rate of return that has not been reduced by some measure of expected inflation that is incorporated in that rate of return. *See, e.g.,* Myers, S., "The application of finance theory to public utility rate cases," *The Bell Journal of Economics and Management Science*, Vol. 3, No. 1, (1972), p. 78.
[26] "[T]he cost of capital, as defined here, includes an adjustment for expected inflation […] Long-run equilibrium requires that the expected rate of return on a firm's CMV be *R*, its cost of capital." *See*, Myers, S., "The application of finance theory to public utility rate cases," *The Bell Journal of Economics and Management Science*, Vol. 3, No. 1, (1972), pp. 78, 85.

timely investments. By definition, such a failure to invest efficiently would risk causing costs to consumers that are higher in the long run than they should be.

Q31. ARE THERE ANY OTHER INCREASED COSTS THAT CUSTOMERS WOULD BEAR IF WESTFIELD WATER'S ALLOWED RATE OF RETURN IS SET BELOW ITS COST OF CAPITAL?

A31. Yes. Westfield Water's customers may be forced to bear increased borrowing costs because the firm's annual standalone cash flow and profitability credit metrics could be lower than they should be given the risk of the firm's business.

Q32. SHOULD THE COMMISSION REMOVE SOME MEASURE OF INFLATION FROM THE NOMINAL COST OF CAPITAL DUE TO THE FACT THAT THE CMV REFLECTS PAST INFLATION?

A32. No. Westfield Water's nominal cost of capital should not be reduced for either past or future inflation. No adjustment for past inflation should be made because Westfield Water's rates have been fixed since they were set as part of a settlement in connection with Citizen's acquisition of Westfield Water in 2013. As a result, they have not been adjusted upwards for inflation, which has been significantly higher than long-run historical averages over the last several years. Indeed, the lack of an inflation adjustment has caused Westfield Water's real (inflation adjusted) Return on Equity ("ROE") to be well below its real cost of equity capital over the last three to five years. Specifically, Westfield Water's real ROE averaged just 4.1 percent over the last five years ending September 30, 2023, compared to

an estimated expected real cost of equity capital of 6.7 percent.[27] The shortfall was even more pronounced over the last three years as Westfield Water's real ROE has averaged just 1.8 percent versus an estimated real cost of equity capital of 6.7 percent.[28] Such low real rates of return represent economic losses and are not sustainable. Thus, calculating the allowed rate of return by subtracting an amount from the nominal cost of equity capital based on historical inflation would compound the losses that Westfield Water already has incurred, while discouraging needed capital investment in the future.

Q33. SHOULD THE COMMISSION REDUCE WESTFIELD WATER'S COST OF EQUITY CAPITAL TO REFLECT EXPECTED FUTURE INFLATION?

A33. No. First, as noted above, if Westfield Water's allowed rate of return is set below its nominal cost of equity, by definition Westfield Water will be undercompensated for its risk on an expected basis, at least until its next rate case.[29] All else equal, this type of rate approach will reduce Westfield Water's economic incentives to make needed capital investments. In addition, subtracting expected inflation in calculating the allowed rate of return would reduce the likelihood that Westfield Water will earn a sufficient real return

[27] See Exhibit RJM-11.

[28] This value is even further below my estimate of Westfield Water's current real equity cost of capital of 8.1 percent (1.109/1.0261-1). 2.61 percent is the breakeven expected inflation rate based on November 2023 20-year Treasury yields. Source: 20-year Breakeven Inflation Rate [T20YIEM], retrieved from FRED, Federal Reserve Bank of St. Louis.

[29] Theoretically, if an approved return is set below the firm's nominal cost of capital, an offsetting adjustment could be made in another aspect of the ratemaking process to compensate the firm for the economic loss / increased risk. For example, one could implement a process by which the rate base and associated depreciation are automatically increased/decreased frequently and between rate cases, for example, based on an inflation index. Such a process is an element of one type of historical/original cost approach called "trended original cost," or "TOC," which I discuss below. While this approach is an original cost method and, therefore, not directly relevant to the treatment of inflation under a fair value regime, the treatment of inflation under the TOC approach has some relevance to my analysis in this case.

on equity because inflation risk will be inappropriately increased for Westfield Water, in effect creating asymmetric inflation risk. To see this, consider that expected inflation embedded in Westfield Water's nominal cost of equity is approximately 2.61 percent and its required real rate of return is 8.1 percent. If the allowed rate of return is set at 8.1 percent by subtracting expected inflation, then, in order for Westfield Water to earn at least its required real rate of return before its next rate case, actual inflation will have to be zero or negative during that period. This outcome of zero or negative inflation certainly is possible, but unlikely. Thus, if inflation is positive as expected, Westfield Water's real rate of return automatically will be below its required real rate of return. Requiring Westfield Water to earn below its opportunity cost of capital on an expected basis (at least until its next rate case) in this manner, while also shifting inflation risk asymmetrically to Westfield Water, would provide perverse investment incentives and, ultimately, would increase costs to customers in the long run by discouraging needed capital investment.

Q34. IN ADDITION TO THE UNECONOMIC INCENTIVES CREATED BY THIS ASSYMETRIC INFLATION RISK AND THE ALLOWED RATE OF RETURN BELOW WESTFIELD WATER'S COST OF CAPITAL, IS THERE ANY OTHER BASIS FOR USING THE NOMINAL COST OF CAPITAL AS THE ALLOWED RATE OF RETURN IN THIS CASE?

A34. Yes.

Q35. AND WHAT IS THAT BASIS?

A35. As does so much in finance, the answer comes down to risk and return. As noted above, under a fair value rate regime, the value of the rate base can decline below its expected

value due to unexpectedly high obsolescence or physical deterioration or, importantly, deflation. If such an environment is prevailing at the time of a future Westfield Water rate case, the utility's rates and profitability would be reduced because the value of the rate base would be reduced. In addition, the utility's allowed rate of return may be reduced simultaneously (all else equal) if interest rates are reduced due to the deflationary economic environment, thereby lowering the cost of capital. [30] Demand for water also may be reduced in such a scenario because deflation often is accompanied by an economic downturn. This potential "triple hit" to Westfield Water's rates and profitability represents a significant risk of a type experienced by unregulated firms and that is not present under a historical cost regime. Use of a nominal cost of capital as the allowed rate of return provides some compensation for this higher risk under a fair value rate regime.

Q36. BUT ISN'T SUCH A SCENARIO VIRTUALLY IMPOSSIBLE?

A36. No. While such a scenario is unlikely, it is by no means impossible. First, there are real world examples of recent deflation in well-developed economies. Specifically, Japan has had long stretches of deflation over recent decades, and China has been in a deflationary environment for the last 6 months. Furthermore, deflation has played a central role in the worst economic meltdowns in U.S. history, such as the Great Depression, and is one of the risks feared by participants in the financial markets. For example, in a 2017 article, financial economics researchers found that prices of inflation swaps and options suggest that investors believe that there is a relatively substantial probability that deflation could

[30] Theoretically, the amount of depreciation included in rates also could be reduced, assuming that such a reduction is allowed under the relevant Indiana law and regulations. Such a reduction would reflect the fact that the CMV of the rate base declined but that its useful life did not.

happen in the U.S. for potentially extended horizons. Specifically, they found that investors believed that the probability that realized inflation will be less than zero (i.e., deflation) was 18.8 percent for a 1-year time horizon, 13.8 percent for a two-year horizon, 5.7 percent for a five-year horizon and 1.4 percent for a ten-year horizon.[31]

Q37. ARE THERE ANY OTHER REASONS NOT TO REDUCE WESTFIELD WATER'S ALLOWED RATE OF RETURN BELOW ITS COST OF EQUITY CAPITAL, WHETHER BY SUBTRACTING SOME MEASURE OF INFLATION OR OTHERWISE?

A37. Yes. Westfield Water is subject to an excess earnings review process that is triggered if its earnings are above 110% of its approved rate of return. As a result, Westfield Water could earn substantially less than its approved rate of return but not substantially more. This creates an asymmetric risk for Westfield Water for which there may be inadequate compensation included in the nominal cost of equity capital that I have calculated.[32] All else equal, this earnings cap acts as a disincentive for Westfield Water to make needed capital investments. In addition, all else equal, regulatory risk is higher under a fair value regime due to the need to both revalue the CMV in addition to determining a new allowed rate of return at the time of each rate case. In sum, reducing Westfield Water's allowed return below its cost of capital would just compound these issues, increasing the risk of

[31] Fleckenstein, M, F.A. Longstaff, and H. Lustig, "Deflation Risk," *The Review of Financial Studies*, Vol. 30, No. 8, (2017), pp. 2719-27-60, at p. 2742.
[32] Theoretically, if the large majority of firms in my sample also face ex-post excess earnings tests, then the risk of such tests could be incorporated implicitly in my cost of capital.

higher customer water bills in the future due to delayed or inefficient investment by Westfield Water.

Q38. PLEASE SUMMARIZE YOUR CONCLUSIONS ABOUT ANY POTENTIAL INFLATION ADJUSTMENTS TO WESTFIELD WATER'S COST OF EQUITY.

A38. Based on my review of the economic theory of CMV ratemaking, Indiana's FVRB ratemaking regime, and Westfield Water's specific circumstances, I do not believe any adjustment to Westfield Water's nominal cost of capital, whether equal to historic or expected inflation rates, is appropriate in this case.

Q39. HOW IS YOUR TESTIMONY STRUCTURED?

A39. In Section II, I first provide a brief overview of the U.S. water supply industry, the continued growth in capital investment required to maintain safe and reliable water supply system operations, and Westfield Water's capital investment and operational experience over the past several decades. In Section III, I present my cost of equity analyses, present the results of my calculations, and explain the conclusions I have drawn based on my review of the evidence in this case. In Section IV, I consider Indiana's fair value ratemaking regulatory framework and present my recommended approach for using my estimated cost of equity to calculate a fair rate of return on Westfield Water's fair value rate base.

II. BACKGROUND ON WATER UTILITIES AND WESTFIELD WATER

A. OVERVIEW OF WATER UTILITIES IN THE UNITED STATES

Q40. HOW WOULD YOU GENERALLY CHARACTERIZE UNITED STATES ("U.S.") WATER UTILITIES?

A40. U.S. water utility systems are highly capital-intensive, requiring extensive infrastructure to reliably deliver a safe drinking water supply.[33] Beyond the extensive pipe and main infrastructure required to deliver water supply to customers, water utility systems require water sources (reservoirs, wells, etc.), treatment systems, storage, and pumping systems.[34] According to a report prepared for the National Association of Water Companies, "[t]he water utility industry is the most capital intensive among state regulated infrastructure industries."[35] Furthermore, continued investment in infrastructure is needed because "insufficient infrastructure investment can lead to the possible future degradation of drinking water and ecosystems, as well as inefficient operation of systems, greater water

[33] S&P Global RRA Water Advisory Special Report, July 2023. Note I use the description "water utility" to capture classic rate regulated companies as well as other forms of ownership, including municipal governments, homeowner associations, regional authorities, and cooperatives. *See, also,* United States Government Accountability Office, "Private Water Utilities: Actions Needed to Enhance Ownership Data," March 2021, available at: https://www.gao.gov/assets/gao-21-291.pdf.
[34] S&P Global RRA Water Advisory Special Report, July 2023.
[35] Wharton, Joe, Villadsen, Benta, Bishop, Heidi "Alternative Regulation and Ratemaking Approaches for Water Companies," *The Brattle Group*, September 23, 2013, available at: https://www.brattle.com/wp-content/uploads/2017/10/6135_alternative_regulation_and_ratemaking_approaches_for_water_companies_wharton_villadsen_bishop_nawc_sep_23_2013.pdf.

loss, and higher cost."[36] In other words, significant future capital investment will be required to maintain safe, reliable water supply while accommodating population growth.[37]

Q41. ARE U.S. WATER UTILITIES GENERALLY EXPECTED TO HAVE SUBSTANTIAL CAPITAL SPENDING OVER THE NEXT DECADE?

A41. Yes. The S&P Global report on the "Intro to Water Utilities: Current Trends and Growth Drivers" reports:

> The water utility sector has been accelerating its capital spending budgets for decades. The group continues to outpace electric and multi-utilities when comparing capex to depreciation and amortization, and its spending rate is similar to the gas utility level, which began to accelerate in the last decade.[38]

As shown in **Figure 1**, the growth in water system capital investment over the last decade has accelerated. Investor-owned water utilities have experienced a compound annual growth rate of 7.5% between 2012 and 2022. This strong growth highlights the water utility industry's need for capital investment to address its aging infrastructure.

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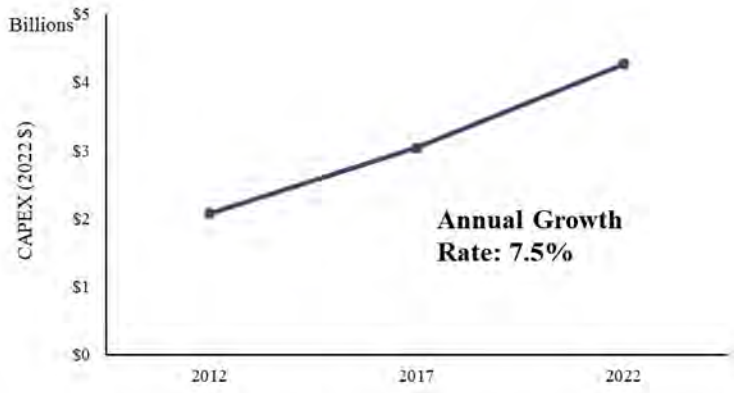
[36] Wharton, Joe, Villadsen, Benta, Bishop, Heidi "Alternative Regulation and Ratemaking Approaches for Water Companies," *The Brattle Group*, September 23, 2013, available at: https://www.brattle.com/wp-content/uploads/2017/10/6135_alternative_regulation_and_ratemaking_approaches_for_water_companies_wharton_villadsen_bishop_nawc_sep_23_2013.pdf.

[37] *See* Mckinsey & Company, "US Water Infrastructure: Making Funding Count," November 2021, available at: https://www.mckinsey.com/industries/electric-power-and-natural-gas/our-insights/us-water-infrastructure-making-funding-count#/.

[38] S&P Global RRA Water Advisory Special Report, July 2023.

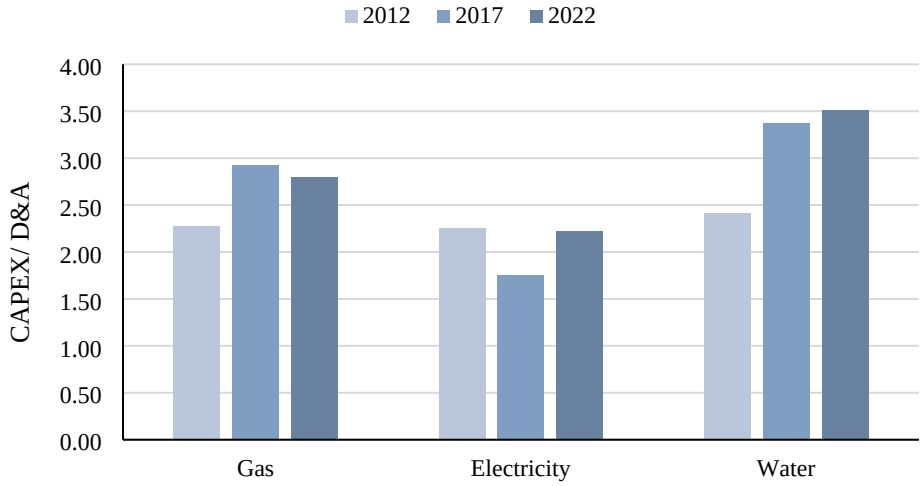
Figure 1
Capital Expenditure (CAPEX) of Investor-Owned Water Utilities 2012-2022.



Moreover, the water utility industry is more capital intensive when compared to other regulated utilities. The ratio of capital expenditures (Capex) to depreciation and amortization (D&A) provides a measure of industry capital intensity.[39] As **Figure 2** shows, over the 2012-2022 time period, water industry capital intensity consistently outpaced gas and electric industry capital intensity. Moreover, as of 2022, the ratio of Capex to D&A for water industries had an average value of 3.5, while the electricity utility and gas utility industries had values of 2.2 and 2.8 respectively.[40] In addition, **Figure 2** shows that the water utility industry's ratio of Capex to D&A has grown more rapidly than the gas utility industry since 2012. The electricity industry, by comparison, has stayed relatively constant over the same period. In other words, the water utility industry investment has grown more rapidly than the other regulated utilities over the past ten years.

[39] S&P Global Market Intelligence, "Water utility capex investments continue to accelerate," April 19, 2022, available at: https://www.spglobal.com/marketintelligence/en/news-insights/research/water-utility-capex-investments-continue-to-accelerate.
[40] S&P Global Market Intelligence, "Utility Capital Expenditures update – H1 2023: 2012-2027F," March 14, 2023.

Figure 2
The Ratio of Capital Expenditures (CAPEX) to Depreciation and Amortization (D&A) for the Gas, Electricity and Water Utility Industries, 2012-2022.[41]



Finally, the EPA recently estimated that the U.S. drinking water infrastructure is in need of over $600 billion in investments over the next 20 years due to aging infrastructure and increasingly stringent water regulations.[42]

Q42. DO INDIANA'S WATER UTILITIES FACE THE SAME FUTURE INVESTMENT REQUIREMENTS?

A42. Yes. Indiana water utilities are no different. In fact, according to a 2016 evaluation of Indiana's water utilities by the Indiana Finance Authority, the State's water utilities were

[41] S&P Global Market Intelligence, "Utility Capital Expenditures update – H1 2023: 2012-2027F," March 14, 2023.
[42] US EPA, "Drinking Water Infrastructure Needs Survey and Assessment, 7th Report to Congress," September 2023, available at https://www.epa.gov/system/files/documents/2023-09/Seventh%20DWINSA_September2023_Final.pdf. *See Also*: Mckinsey & Company, "US Water Infrastructure: Making Funding Count," November 2021, available at: https://www.mckinsey.com/industries/electric-power-and-natural-gas/our-insights/us-water-infrastructure-making-funding-count#/.

behind their neighboring states in upgrading aging water infrastructure and require significant capital investment to maintain water mains across the state.[43]

B. BACKGROUND ON WESTFIELD WATER

Q43. HOW HAVE WESTFIELD WATER'S OPERATIONS ACCOMMODATED CUSTOMER GROWTH OVER RECENT YEARS?

A43. Westfield Water, like other medium-sized water utilities,[44] requires significant future capital investment. Since the acquisition, the number of customers served by Westfield Water has increased from approximately 10,600 to more than 21,000 in 2023.[45] This increase is mirrored in the quantity of water served to the community.[46] Additionally, Westfield Water's rate base has grown to accommodate new customer growth and other system investment requirements as shown in **Figure 3**, which shows customer and rate base growth from 2018 to 2022. For example, in 2022, there was increased investment in wells, structures (e.g., water storage and treatment facilities), pumping equipment, and transmission and distribution mains, which makes up the largest investment category. Westfield Water will continue to require new capital investment to accommodate new customer growth, address aging infrastructure and to respond to new regulations.[47]

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[43] "Evaluation of Indiana's Water Utilities, An analysis of the State's aging infrastructure," Indiana Finance Authority, November 2016, available at: https://www.in.gov/ifa/files/IFA-Evaluation-of-Indianas-Water-Utilities-Report-11-18-2016.pdf

[44] Westfield has a current population of ~50,000 and is considered a medium to large system based on AWWA designations.

[45] *See* Testimony of Jeffrey A. Willman, p. 8.

[46] *See:* Citizens Water of Westfield annual reports to the Indiana Utility Regulatory Commission for the years 2018 – 2022.

[47] *See* Testimony of Jeffrey A. Willman, p. 8.

While the number of customers served by Westfield Water and the volume of water supplied have increased from 2018 to 2022, the utility's operations and maintenance (O&M) costs per gallon produced, as well as per 100 miles of mains, have remained stable (see **Figure 4**).[48] Going forward, capital investment is expected to continue in the future to accommodate system growth and ensure safe and reliable service. At the same time, based on the past several years, growth in customer connections and output should be expected to maintain relatively stable O&M costs as measured on a per 100 miles of water main or per million gallons basis (**Figure 4**). In summary, Westfield Water has managed to maintain stable total costs while growing its rate base to keep up with the rapid population growth in Westfield over the last five years, which has resulted in declining unit costs.

[48] Over this same period, the utility's O&M cost per customer account has also remained stable between $219-$234 per customer. *See:* Citizens Water of Westfield annual reports to the Indiana Utility Regulatory Commission for the years 2018 – 2022.

Figure 3
Citizens Water of Westfield Customers and Rate Base, 2018 – 2022.

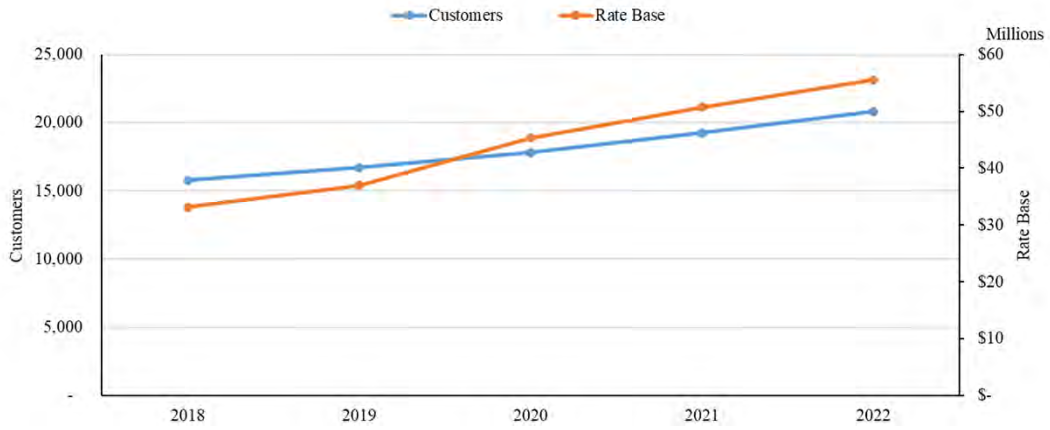
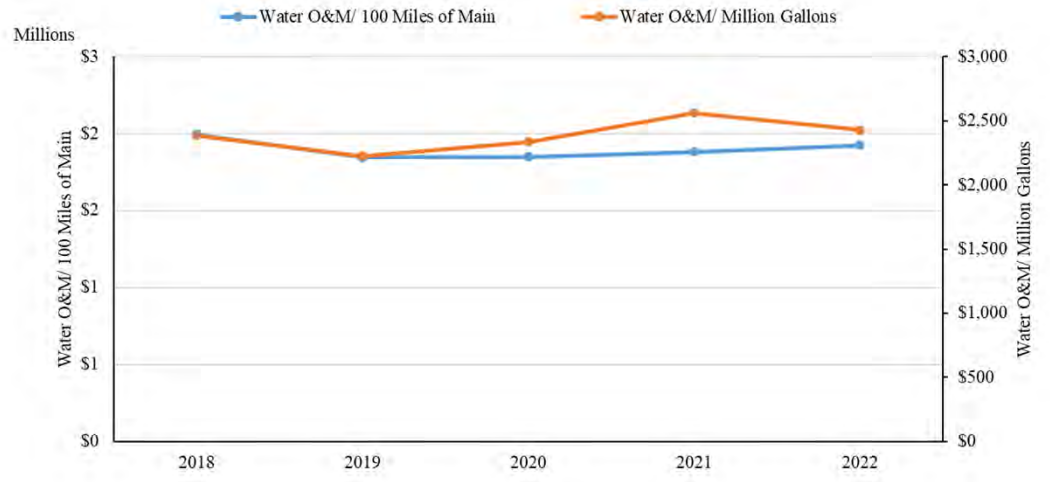


Figure 4
Citizens Water of Westfield Operation and Maintenance (O&M) Expenses Per Million Gallons and Per 100 Miles of Water Main, 2018 – 2022.



Q44. HOW DO WESTFIELD WATER'S RATES AND COSTS COMPARE TO OTHER INDIANA WATER UTILITIES AND OTHER U.S. WATER UTILITIES?

A44. Westfield Water rates compare favorably to peer utilities in Indiana, as well as utilities serving similar populations across the country. For example, as of January 1, 2023, the

average monthly bill for a residential Westfield Water customer using approximately 5,000 gallons of water was $32.96.[49] Across all Indiana investor-owned water utilities this was 4th lowest.[50]

Westfield Water's costs to serve consumers also compares favorably to water utilities across the country (see **Table 2**).[51] For example, Westfield Water's 2021 O&M expenses per million gallons are below the national median, placing it between the median and 75th percentile.[52] The national median O&M cost per customer for FY2021 was approximately $372. Westfield Water's O&M cost per customer, which was approximately $231 in 2021, was below this median value and above the 75th percentile. Westfield Water's. O&M cost per 100 miles of main also was between the median and the 75th percentile. Lastly, Westfield Water performed better than the industry median in the number of water main breaks per year per 100 miles of water main. In conclusion, Westfield Water has managed to keep costs low despite growing its customer base at a rapid pace. Its customers will benefit from these lower O&M costs after the current rate case is completed.

[49] Citizens Water of Westfield Annual Report to the IURC, 2023.
[50] *Id*.
[51] Water utilities are typically compared using several benchmarks. The American Water Works Association (AWWA) publishes a report presenting national average utility performance metrics in several areas, including Organizational Development, Business Operations, Customer Relations, Water Operations, and Wastewater Operations. For the purpose of my testimony in this case, I focus on the Water Operations section of the report, which includes various metrics such as Operations & Maintenance Costs and water production. *See* American Water Works Association, "AWWA Utility Benchmarking: Performance Management for Water and Wastewater 2022," 2022.
[52] "Water Loss Legislative Report for 2022," Indiana Finance Authority, 2022, available at: https://www.in.gov/ifa/files/2022-Water-Loss-Report.pdf; American Water Works Association, "AWWA Utility Benchmarking: Performance Management for Water and Wastewater 2022," 2022. Note that the percentile rankings refer to relative performance, defined as the inverse of O&M costs per customer. Therefore, lower O&M costs per customer translate into a higher percentile performance ranking.

Table 2
Comparison of Citizens Water of Westfield Business Operations Performance and Operations and Maintenance Costs to National Benchmark Standards for Utilities Serving Populations between 10,000-50,000, FY2021.

		National Benchmark Statistics[1]		
	Citizens Water of Westfield	25th Percentile	Median	75th Percentile
O&M[2] per Million Gallons	$2,563	$6,080	$4,273	$1,609
O&M per Customer Account	$231	$565	$372	$201
O&M per 100 Miles of Main	$1,880,658	$4,221,715	$2,494,158	$1,349,655
Daily Water Demand per FTE Employees[3]	0.57	0.09	0.12	0.25
Planned Maintenance Ratio	48%	41%	69%	90%
Operating Ratio[4]	67%	86%	74%	17%
Breaks per 100 Miles of Pipe	4.2	14.1	7.4	2.7

Notes:
[1] AWWA benchmark values presented are for utilities serving populations between 10,000 and 50,000.
[2] O&M represents expenses associated with the operation and maintenance of the utility.
[3] Daily demand shown in million gallons. FTE Employees are the number of full time equivalent employees.
[4] Operating ratio is defined as total O&M Costs per Operational Revenue.

Sources:
[1] Citizens Water of Westfield 2021 Annual Report to the Indiana Utility Regulatory Commission.
[2] AWWA Utility Benchmarking: Performance Management for Water and Wastewater, 2022.
[3] Citizens Energy Group Annual Financial Report, 2022.

Q45. HOW DO WESTFIELD WATER'S PERFORMANCE METRICS COMPARE TO THOSE OF OTHER U.S. WATER UTILITIES?

A45. Westfield Water compares favorably to other water utilities that serve comparable populations across a number of key performance metrics. **Table 2** summarizes Westfield Water's performance in 2021 relative to national benchmarks.

Westfield Water performance metrics demonstrate that the utility has grown significantly in recent years while maintaining an aging infrastructure. A planned maintenance ratio is the fraction of maintenance time which was scheduled versus maintenance in response to a failure. In 2021, Westfield Water had a planned maintenance

ratio of 48% which was below the median of 69%.[53] This signifies that Westfield Water had a higher fraction of unplanned maintenance than its peers.

Another performance metric by which we can evaluate Westfield Water is its operating ratio, which is the ratio of O&M Costs to operating revenue. Westfield Water's 2021 operating ratio is 67%, or in other words, 67% of Westfield Water's revenue was spent on operating and maintenance costs. This value falls below the median of 74% and places is it in the upper half of peer utilities.[54] Lastly, Westfield Water's daily water demand per full time employee equivalent (FTE) is well above the 75th percentile of its peer water utilities in 2021 demonstrating that Westfield Water's customer base has grown faster than it has grown its labor force in recent years.[55]

Moreover, Westfield Water's performance can also be assessed via the water loss audits performed by the State of Indiana. According to the 2022 audit, approximately half of the utilities in Indiana lost more than 0-39 gallons per connection per day, with overall average losses of 50 gallons/connection/day.[56] Westfield Water, which participated in the audit, lost approximately 28 gallons per customer per day, which places it close to the top quartile of Indiana's water utilities.[57]

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[53] Citizens Water of Westfield Annual Report to the IURC, 2021; American Water Works Association, "AWWA Utility Benchmarking: Performance Management for Water and Wastewater 2022," 2022.
[54] Citizens Water of Westfield Annual Report to the IURC, 2021; American Water Works Association, "AWWA Utility Benchmarking: Performance Management for Water and Wastewater 2022," 2022.
[55] Citizens Water of Westfield Annual Report to the IURC, 2021; American Water Works Association, "AWWA Utility Benchmarking: Performance Management for Water and Wastewater 2022," 2022.
[56] "Water Loss Legislative Report for 2022," Indiana Finance Authority, 2022, available at: https://www.in.gov/ifa/files/2022-Water-Loss-Report.pdf
[57] Citizens Water of Westfield Annual Report to the IURC, 2021. Note that the percentile rankings refer to relative performance, defined as the inverse of water losses per customer. Therefore, lower water losses per customer translate into a higher percentile performance ranking.

Westfield Water's comparison to its peer water utilities around the country shows that it has managed to keep costs low while both rapidly growing its customer base as well as maintaining high levels of performance. However, as is shown by its planned maintenance ratio as well as the aging infrastructure of the nation's water distribution system, Westfield Water will continue to require continued capital investment in the future.

III. ESTIMATING THE COST OF EQUITY CAPITAL FOR WESTFIELD WATER

A. THE COST OF CAPITAL AND ALLOWED RATES OF RETURN FOR REGULATED UTILITIES

Q46. HOW ARE REGULATED UTILITIES' ALLOWED RATES OF RETURN DETERMINED?

A46. In general, regulated utilities finance their capital expenditures and operations with a combination of debt and equity financing.[58] The weighted average rate, or cost, of these two types of financing constitutes the firms' "weighted average cost of capital," or "WACC," which is the overall rate of return that the firm is allowed to earn on its capital investment and that is included in customers' rates. This WACC must be approved by the appropriate regulatory body.

Q47. WHAT FACTORS DETERMINE REGULATED UTILITIES' DECISION TO USE DEBT VERSUS EQUITY FINANCING?

A47. As a general matter, debt financing can be obtained at a lower cost (rate) than equity financing for two reasons. First, all else equal, a debt investment is lower risk than equity because its holders are paid before equity holders. Second, for taxable entities, debt interest

[58] Brealey, R. A., S. C. Myers, and F. Allen, *Principles of Corporate Finance*, McGraw-Hill, (2020), at pp. 87-94 and 205-213.

is tax deductible, whereas dividends to equity holders are not. Therefore, one might think that utilities would want to finance their investments with a very high level of debt. But we do not observe that in practice because debt financing comes with an economic cost: the firm's equity becomes riskier as debt (leverage) is added to a firm's capital structure, and, therefore, the cost of equity rises (investors demand a higher rate of return for the equity of more leveraged firms).[59] As a result, firms will attempt to finance with a mix of debt and equity in their capital structure that minimizes their WACC. While any single firm is not at its optimal capital structure at any point in time, the average debt and equity levels for an industry often are used as a measure of the "optimal" capital structure for a firm in that industry.

Q48. WHAT IS THE RELEVANCE OF THIS DISCUSSION FOR THE DETERMINATION OF A FIRM'S COST OF EQUITY CAPITAL?

A48. It is important to determine whether the target firm's capital structure is significantly different than the industry capital structure to make sure that the target firm's (in this case, Westfield Water's) financial risk is comparable to that of the industry. If that is the case, then the cost of equity that is determined based on a sample of firms in the industry does not need to be adjusted for financial risk in order for that cost of equity to be used as a measure of the cost of equity of the target firm.

Q49. IS THAT THE CASE IN THIS PROCEEDING?

[59] This increased risk of a firm's equity capital due to leverage often is referred to as the "financial risk" of the equity. *See, e.g.*, Brealey, R. A., S. C. Myers, and F. Allen, "Principles of corporate finance," McGraw-Hill, (2020), at p. 459.

A49. Yes, as shown in Attachment RJM-3, Westfield Water's target capital structure is projected to be approximately 46 percent debt and 54 percent equity as of June 30, 2025, which is closely in line with the capital structures of the water firms in my sample of comparable companies (medians of 45 percent debt and 55 percent equity), and generally in line with those of my entire sample including gas distribution companies (48% debt and 52% equity). In addition, **Table 3** below shows Value Line's forecast data for 2026-2028 for the six water companies included in my DCF cost of capital analysis. These data show a median projected capital structure of 47 percent debt and 53 percent equity, which also is quite close to Westfield Water's projected capital structure, as well as the current capital structure for the water firms included in Attachment RJM-3. These data provide further support for an optimal book capital structure for water companies in the range of Westfield Water's projected structure, which closely matches that of the comparable public water firms.[60] Therefore, no financial risk adjustment is required to the cost of equity determined for my sample of comparable firms, in order to use that result to determine Westfield Water's cost of equity. I now turn to a description of the role of the cost of equity in utility ratemaking, followed by my analysis of Westfield Water's cost of equity.

[60] I also note that Westfield Water also has a maximum debt to capitalization ratio of 55% per its Amended and Restated Credit and Continuing Covenant Agreement with PNC Bank. *See* Section 9.14.

Table 3
Public Water Companies – Value Line 2026-28 Forecast Data[61]

Company	LT Debt Ratio	Equity Ratio
	[1]	[2]
American States Water Company	50.0%	50.0%
American Water Works	57.5%	42.5%
California Water Service Group	38.0%	62.0%
Essential Utilities	56.0%	44.0%
Middlesex Water Company	40.5%	59.5%
SJW Group	44.0%	56.0%
Mean	47.7%	52.3%
Median	47.0%	53.0%

B. THE ROLE OF THE COST OF EQUITY IN UTILITY RATEMAKING

Q50. PLEASE DESCRIBE THE ROLE OF THE COST OF EQUITY CAPITAL IN UTILITY RATEMAKING.

A50. The cost of equity capital establishes a utility's allowed rate of return based on the firm's opportunity cost of equity capital. The opportunity cost of capital is defined as the expected market rate of return that could be achieved by investing in assets with the same level of risk as those of the target firm.[62] By setting the cost of equity based on what investors expect to earn for investments in assets with a similar risk profile, capital investors will be willing to consider making equity investments in the utility. A regulated utility's approved cost of equity capital has a significant impact on a utility's ability to raise equity to support the capital investment needed to maintain safe and reliable services.

[61] The values are hardcoded from the Value Line Investment Survey reports dated October 6, 2023.
[62] *See, e.g.*, Brealey, R. A., S. C. Myers, and F. Allen, *Principles of Corporate Finance*, McGraw-Hill (2020), at pp. 9-10.

Q51. HOW IS THE COST OF EQUITY ESTIMATED FOR REGULATED UTILITIES?

A51. A firm's cost of equity is estimated based on what investors in a company's stock expect to receive in return for holding the stock and bearing ownership risk. Ownership of a firm's common stock represents holding shares in its equity and includes voting rights to participate in the firm's operating decisions. However, because investors' expected future return on equity for any individual company cannot be observed in the marketplace, cost of equity is estimated using empirical analyses of historical and prospective stock market data.

Q52. WHAT TYPES OF APPROACHES ARE USED TO ESTIMATE A FIRM'S COST OF EQUITY?

A52. Financial economists have long established empirical economic methodologies to estimate the market cost of equity capital faced by individual companies. These models are based on financial theory as well as practice. I rely on two well-accepted models as the basis for my opinion regarding Westfield Water's cost of equity.[63] The first such model, which has strong theoretical and empirical support, is the Capital Asset Pricing Model (CAPM). Another model that has theoretical support, and that often is used in utility rate cases, is the Discounted Cash Flow (DCF) Model. In addition to these two models, as the Commission is aware,[64] there are other methods such as the equity premium and comparable earnings

[63] As discussed in more detail below, I make one important adjustment to the base results of each of these models in arriving at my recommended cost of equity.

[64] *See, e.g.,* Commission Cause No. 43680 at Petition of Indiana-American Water Company, Inc. for Authority to Increase its Rates and Charges for Water and Sewer Service and for Approval of New Schedules of Rates and Charges Applicable thereto, for approval of Changes to Rules and Regulations applicable to Such Service and for Authorization to Defer in a Pension/OPEB Balancing Account Over- and Under-Recoveries for pass Through to Customers, April 30, 2010, at pp. 45-46.

approaches, as well as extensions and attempted refinements of the CAPM that adjust for risks not captured by the CAPM.[65] I discuss the strengths and weaknesses of the DCF and CAPM models, as well as other models, in more detail below.

Q53. HOW HAVE YOU APPLIED THE CAPM AND DCF MODELS IN THIS CASE?

A53. A company's expected cost of equity can be estimated using the CAPM and DCF models by gathering market data on the company itself, as well as on companies that engage in similar businesses (a "proxy group") and then using these data to estimate a company's cost of capital.

C. DISCUSSION OF CAPM, DCF AND OTHER COST OF EQUITY MODELS

Q54. PLEASE DESCRIBE THE CAPM.

A54. The Capital Asset Pricing Model, or CAPM, is an approach to calculating the cost of equity that is based fundamentally on the observation that equity investors in modern capital markets can easily and cheaply diversify their portfolios.[66] By doing so, it has been shown that investors can protect themselves from idiosyncratic risk, which is the portion of a security's total risk that is associated uniquely with the company issuing the securities. It follows, therefore, that investors should only be concerned with a security's systematic or market risk, which is the risk left over after reducing or eliminating unique risk through diversification. This leftover systematic risk is measured by the correlation between the security's returns and the returns on the market as a whole.

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[65] One well known set of empirical tests of the CAPM, including suggestions for refinements, were performed by Ken French and Eugene Fama, resulting in the so-called "Fama-French" factors. *See, e.g.*, Brealey, R. A., S. C. Myers, and F. Allen, *Principles of Corporate Finance*, McGraw-Hill (2020), at pp. 209-212.

[66] *See, e.g.*, Brealey, R. A., S. C. Myers, and F. Allen, *Principles of Corporate Finance*, McGraw-Hill, (2020 at pp. 205-213.

The CAPM is mathematically expressed as:

$$K_j = R_f + \beta_j(R_m - R_f)$$

where: K_j is the required rate of return for stock j;

R_f is the risk-free rate of return;

R_m is the expected return on the market portfolio; and

β_j is the beta coefficient, or systematic risk, for stock j.

$(R_m - R_f)$ is often referred to as the equity (or market) risk premium ("ERP"). The security j's systematic risk is captured by β_j, defined as:

$$\beta_j = \frac{Covariance(R_j, R_m)}{Variance\ (R_m)}$$

The variance of the market return reflects the uncertainty of the general market, while the covariance between the return on a specific security and the general market reflects the extent to which the return on that security responds to changes in the general market returns.

Hence the CAPM describes how, all else equal, an investor taking on more market risk (that is, a stock with a higher beta) will expect to be compensated at a higher rate of return. In this way, the CAPM explicitly includes a premium for the only type of risk, systematic risk, that investors should price into stocks, given investors' ability to diversify their portfolios. Thus, the CAPM is based more directly on the fundamental principle of finance that there is a tradeoff between risk and expected return, and one cannot earn a higher expected return unless one accepts more risk.

Q55. HAVE THERE BEEN ANY EMPIRICAL OR OTHER TESTS OF THE PRACTICAL SOUNDNESS OR VIABILITY OF THE CAPM?

A55. Yes. The predictions of the CAPM have been tested extensively.

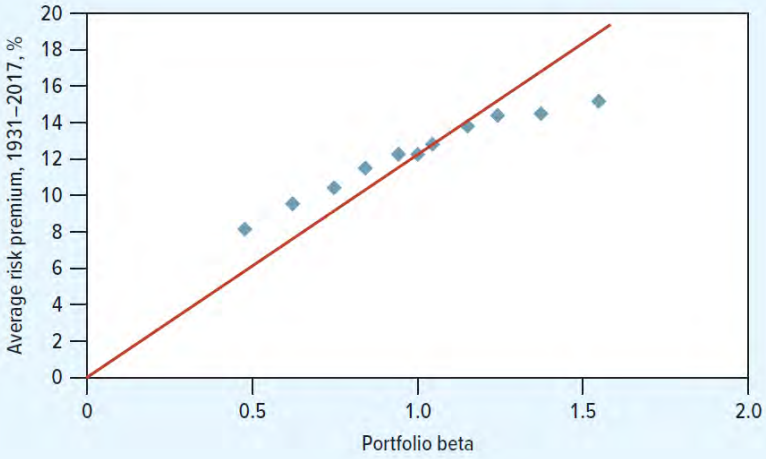
Q56. PLEASE DESCRIBE EMPIRICAL TESTS OF THE CAPM MODEL.

A56. Since its development, the CAPM has undergone a number of empirical tests.[67] One of the more well-known findings of this research is that the relationship between beta and the expected risk premium is not exactly as is predicted by the CAPM, at least for certain time periods. Here is one chart from a leading graduate finance textbook[68]:

FIGURE 8.8

The capital asset pricing model states that the expected risk premium from any investment should lie on the security market line. The dots show the actual average risk premiums from portfolios with different betas. The high-beta portfolios generated higher average returns, just as predicted by the CAPM. But the high-beta portfolios plotted below the market line, and the low-beta portfolios plotted above. A line fitted to the 10 portfolio returns would be "flatter" than the security market line.

Source: F. Black, "Beta and Return," *Journal of Portfolio Management* 20 (Fall 1993), pp. 8–18. Updates courtesy of Adam Kolasinski.



The first thing to note about this chart is that it generally supports the CAPM in that average risk premia (y-axis) do indeed increase in a mostly linear fashion with beta (x-axis). As the chart's caption states, "The high-beta portfolios generated higher average returns, just as predicted by the CAPM." The second thing to note is that, in the particular dataset analyzed in Fischer Black's 1993 article, the CAPM appears to underestimate the risk premium for stocks with betas less than one while overestimating the risk premium for

[67] A good summary can be found in Brealey, R. A., S. C. Myers, and F. Allen, *Principles of Corporate Finance*, McGraw-Hill (2020), at pp. 209-217. The discussion in this section draws heavily from this source.
[68] Brealey, R. A., S. C. Myers, and F. Allen, Principles of Corporate Finance, McGraw-Hill (2020), at p. 210.

stocks with high betas.[69] Other research shows that the above finding can vary depending on the time period analyzed. As shown in the next figure below from the leading finance textbook, if the data sample used to calculate average returns is limited to the 1931-1965 period, the results show risk premia that are much closer to being on the security market line and, therefore, are more supportive of the CAPM and the model's prediction that the only measure of risk that should matter for the cost of equity is the covariance of an asset's returns with those of the market (beta).[70] The results suggest that the empirical finding of a "flatter" security market line is due to incorporation of data from a recent, relatively short time-period (1966 to 2017).

[69] It is important to note that regulated utility betas generally are less than one and, therefore, regulated utilities' measured betas may result in an understated cost of equity capital based on the CAPM – at least from a purely empirical standpoint.
[70] Brealey, R. A., S. C. Myers, and F. Allen, Principles of Corporate Finance, McGraw-Hill (2020), at p. 211.

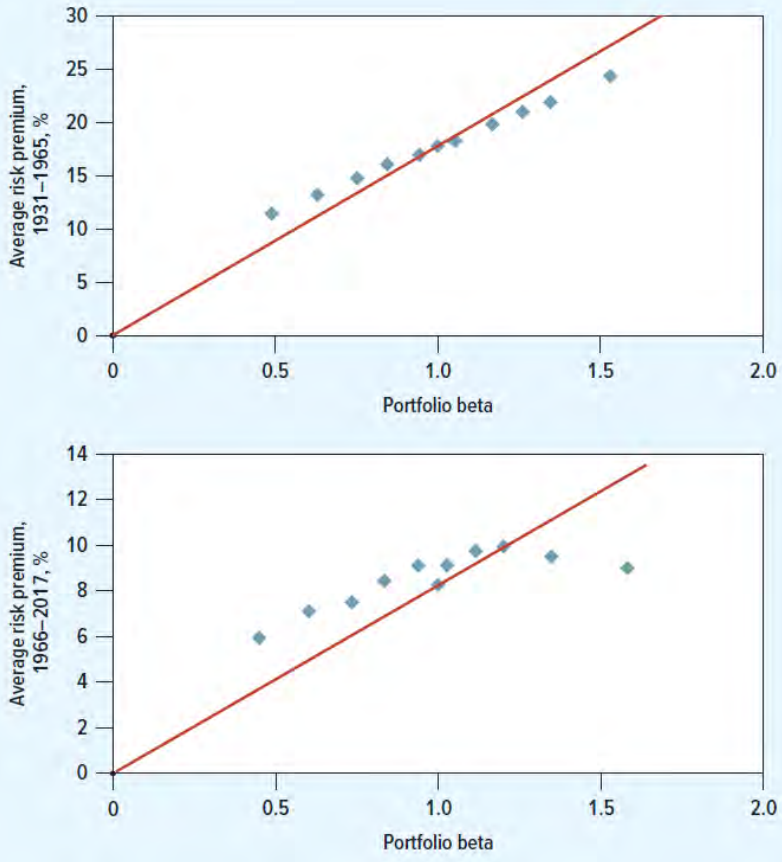


FIGURE 8.9

The relationship between beta and actual average return has been weaker since the mid-1960s. Stocks with the highest betas have provided poor returns.

Source: F. Black, "Beta and Return," *Journal of Portfolio Management* 20 (Fall 1993), pp. 8–18. Updates courtesy of Adam Kolasinski.

Q57. THESE EMPIRICAL TESTS SEEM TO SUGGEST THAT THE CAPM BETA CAPTURES THE MAJORITY OF RISK FACTORS RELEVANT TO THE COST OF EQUITY, BUT NOT ALL OF THEM. HAVE RESEARCHERS ATTEMPTED TO IDENTIFY OTHER POTENTIALLY RELEVANT RISK FACTORS?

A57. Yes. Perhaps the most important and well-known line of empirical research along these lines was led by Eugene Fama of the University of Chicago and Kenneth French of Dartmouth University.[71] Their research focused on three factors other than beta that could

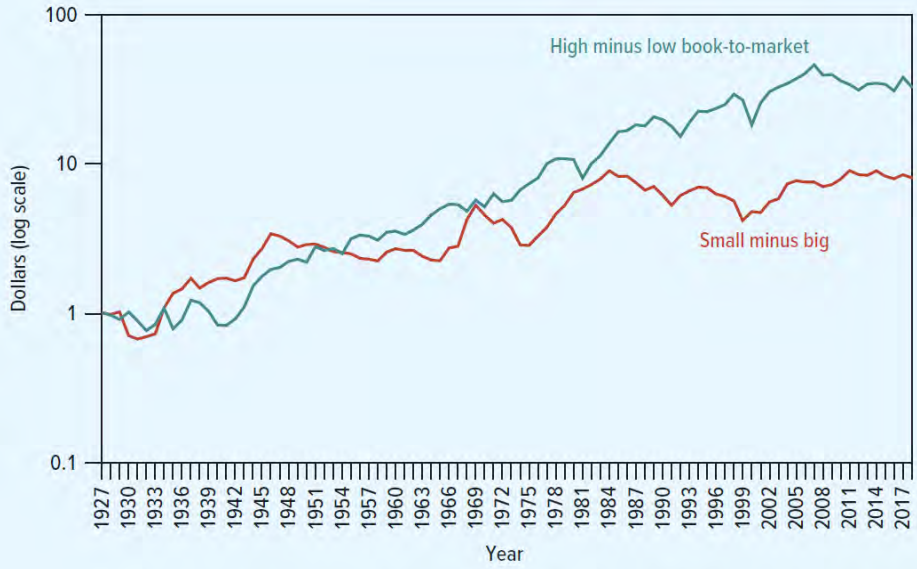
[71] *See, e.g.*, Fama, E.F. and K.R. French, "The Cross-Section of Expected Stock Returns," *Journal of Finance*, Vol. 47, No. 2 (1992), pp. 427-465.

explain the cross-section of stock price returns and, therefore, potentially identify and quantify the effects of risk factors not captured by the CAPM beta. These factors were Size (small- versus large-capitalization firms), Value (high ratios of book to market value) and Growth (low ratios of book to market value).[72] As shown in the figure below, they found that "Value" firms and smaller firms have tended to have higher returns than predicted by the CAPM, suggesting that these variables measure risks not captured by the CAPM beta and, therefore, should be included along with the CAPM beta when determining the cost of equity capital.[73]

FIGURE 8.10

The red line shows the cumulative difference between the returns on small-firm and large-firm stocks from 1926 to 2017. The green line shows the cumulative difference between the returns on high book-to-market-value stocks (i.e., value stocks) and low book-to-market-value stocks (i.e., growth stocks).

Source: Kenneth French's website, mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html.



However, as stated by the authors of the leading finance textbook from which the charts above were taken:

[72] A potential size effect was first documented by several academic papers in the early 1980s. *See, e.g.*, Banz, R.W., "The Relationship Between Return and Market Value of Common Stocks," *Journal of Financial Economics*, Vol. 9, No. 1 (1981), pp. 3-18.
[73] Brealey, R. A., S. C. Myers, and F. Allen, Principles of Corporate Finance, McGraw-Hill (2020), at p. 212.

> Again, it is hard to judge how seriously the CAPM is damaged by this finding. The relationship among stock returns and firm size and book-to-market ratio has been well-documented. However, if you look long and hard at past returns, you are bound to find some strategy that just by chance would have worked in the past. This practice is known as 'data mining' or 'data snooping.' Maybe the size and book-to-market effects are simply chance results that stem from data snooping. If so, they should have vanished once they were discovered. There is some evidence that this is the case. For example, if you look again at **Figure 8.10**, you will see that since the mid-1980s, small-firm stocks have under-performed just about as often as they have overperformed.[74]

A key to avoiding the problems of data mining or data-snooping is that there must be sound theoretical basis for predicting the findings in advance. For example, no such sound theoretical basis exists for a size effect, per se. In sum, while the CAPM has some shortcomings, one of which I have accounted for as described below, it has strong theoretical and empirical support. Indeed, it has been thoroughly tested for decades and has stood the test of time well. Thus, I use the CAPM as one of the models for estimating Westfield Water's cost of equity capital in this case.

Q58. HOW DO ANALYSTS CONTROL FOR THE POTENTIAL EMPIRICAL SHORTCOMINGS OF THE CAPM DISCUSSED ABOVE?

A58. One approach would be to calculate a cost of equity based on the Fama-French three factor model. Yet another would be to use modified versions of the CAPM based on the empirical findings, such as the finding that the security market line is "flatter" than predicted by the

[74] Brealey, R. A., S. C. Myers, and F. Allen, *Principles of Corporate Finance*, McGraw-Hill (2020), at p. 212.

CAPM. One such modified version of the CAPM, referred to as the Empirical CAPM, or "ECAPM," has been proposed by Mr. Richard Morin.[75]

Q59. DO YOU USE EITHER OF THESE APPROACHES?

A59. No.

Q60. WHY NOT?

A60. As noted, it is perfectly reasonable to make an adjustment to the CAPM results, or to the results of other cost of equity models, such as the DCF Model, provided that there is both theoretical and empirical support for the adjustment. In fact, I make such an adjustment in this case. However, the classical CAPM is often relied on by financial practitioners and, in my experience, by regulators, as a fundamental indicator of the cost of capital. Moreover, I also note that there is ongoing evaluation of the CAPM's performance and adjustments using alternative models where the underlying theoretical framework is not always clearly supported by empirical analyses.[76] Therefore, I do not rely on either of these approaches to modify the core CAPM results.

Q61. ARE THERE RISK PREMIUM-TYPE METHODS OTHER THAN THE CAPM THAT HAVE BEEN USED TO ESTIMATE THE COST OF EQUITY FOR WATER COMPANIES AND OTHER REGULATED UTILITIES?

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[75] Morin proposes the following formula to estimate a firm's cost of equity: $K = R_f + 0.25\left(R_m - R_f\right) + 0.75\,\beta\left(R_m - R_f\right)$. *See* Morin, R. A., *New Regulatory Finance*, Public Utilities Reports, Inc. (2006), at p. 190.

[76] My reliance on an approach that is supported by both theory and empirical evidence is supported by the authors of the leading graduate finance textbook I have cited: "There is no doubt that the evidence on the CAPM is less convincing that scholars once thought. But it will be hard to reject the CAPM beyond all reasonable doubt. **Since data and statistics are unlikely to give final answers, the plausibility of the CAPM *theory* will have to be weighed along with the empirical 'facts.'"** Brealey, R. A., S. C. Myers, and F. Allen, *Principles of Corporate Finance*, McGraw-Hill (2020), at p. 212 (bold emphasis added, italicized emphasis in the original).

A61. I am aware of one such method, sometimes referred to as the "risk premium approach," in which spreads are calculated between the returns on the stocks of publicly-traded comparable firms and U.S. Treasury rates. The average premium is then added to current Treasury rates to get an estimate of the cost of equity capital.

Q62. WHY HAVE YOU NOT USED THIS APPROACH?

A62. In my opinion, it is simply a less robust application of the CAPM. Essentially, this methodology assumes that every firm has a beta = 1.00. This assumption ignores the data showing that regulated utilities' betas are consistently less than 1.00, which also is consistent with theory suggesting that returns on investments in regulated utilities should be lower risk than average.

Q63. WHAT ARE SOME REASONABLE ADJUSTMENTS TO THE BASIC CAPM THAT YOU BELIEVE ARE APPROPRIATE?

A63. There are two. The first adjustment reflects the empirical finding that "raw" or unadjusted betas calculated using historical data have a tendency to revert towards 1.00 when they are used to predict future betas. Therefore, analysts often adjust the raw historical betas towards 1.00 based on that empirical finding. Specifically, raw betas lower than 1.00 are adjusted upwards while raw betas greater than 1.00 are adjusted downwards. I discuss this adjustment further below.

The second adjustment I make is for the fact that the securities of the companies in my sample are all publicly traded and highly liquid, whereas an equity investment in Westfield Water is not. As a result, the cost of capital for Westfield Water must be adjusted upwards to account for its relative lack of liquidity.

Q64. CAN YOU PLEASE DESCRIBE THIS SECOND ADJUSTMENT IN MORE DETAIL?

A64. Yes. There is one risk factor not captured by the CAPM (or the DCF Model for that matter) that has both strong theoretical and empirical support, and that is the impact of liquidity on the value of assets and, therefore, the economic cost of equity capital.[77] Specifically, as a theoretical matter, investors will pay more for investments that they can easily liquidate (turn into spendable cash) quickly and at low cost, than they will for less liquid investments. This follows from the fact that the whole purpose of investing is to increase one's cash flows to enable consumption of goods and services. Less liquid investments provide less ready access to their cash value and, therefore, should be less valuable than more liquid investments (in the same asset).[78] In addition to this strong theoretical support, there is a large body of empirical research which has found significant differences in asset value associated with differences in liquidity.[79]

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[77] Indeed, economic researchers have found specifically that the basic CAPM does not capture liquidity risk and that a significant liquidity risk premium must be added to the basic CAPM results for less liquid securities in order to explain their actual returns. This result supports adding a significant premium to the cost of capital for less liquid securities. *See*, Liu, W., "A liquidity-augmented capital asset pricing model," *Journal of Financial Economics*, Vol. 82, No. 3, (2006), pp. 631-671, at pp. 657-661. While my liquidity adjustment is based on a different methodology than adding a liquidity factor to the CAPM, the finding of this paper strongly supports my adjustment.

[78] *See* Amihud, Y., H. Mendelson, and L. H. Pedersen, "Liquidity and Asset Prices," *Foundations and Trends in Finance*, Vol. 1, No. 4, (2005), pp. 269-346, at p. 279: "The basic idea is as follows. A risk-neutral investor who buys a security and expects to pay transaction costs when selling it, will take into account this [fact] when valuing the security. She knows that the buyer will also do that, and so on. Consequently, the investor will have to consider, in her valuation, the entire future stream of transaction costs that will be paid on the security. Then, the price discount due to illiquidity is the present value of the expected stream of transaction costs through its lifetime. Translating this into the required return on the security which is costly to trade, we obtain that the required return is the return that would be required on a similar security which is perfectly liquid, plus the expected trading cost per period, i.e., the product of the probability of trading by the transaction cost."

[79] *See* Section 3 of Amihud, Y., H. Mendelson, and L. H. Pedersen, "Liquidity and Asset Prices," *Foundations and Trends in Finance*, Vol. 1, No. 4 (2005), pp. 269-346 for an in-depth discussion of the empirical evidence on the liquidity effect.

Q65. HOW HAVE YOU INCORPORATED THE OBSERVATION THAT LIQUIDITY RISK IS NOT CAPTURED BY THE CAPM OR DCF MODEL INTO YOUR ANALYSIS IN THIS CASE?

A65. The securities of the Water and Gas Distribution companies whose data are included in my CAPM analysis are publicly traded, whereas Westfield Water is a privately held corporation. Investments in privately held corporations are subject to additional liquidity risk compared to liquid investments in publicly traded companies. This additional risk is not priced by the CAPM, which relies on the measurement of the returns on highly liquid publicly-traded securities to measure beta, nor is the risk priced by my DCF Model calculations, which also rely on data for publicly-traded companies. Therefore, the CAPM and DCF results need to be adjusted to account for the additional liquidity risk faced (and, therefore, the additional compensation required) by investors in privately held corporations. I describe my methodology for calculating a liquidity risk adjustment for this proceeding within Section III.D.iii, below.

Q66. WHAT ADDITIONAL RISK DO INVESTORS OF PRIVATELY HELD CORPORATIONS FACE?

A66. As touched on above, investors in privately held companies lack an active market in which to seamlessly trade their investment.[80] In other words, investors of private companies are forced to hold relatively illiquid investments.[81] If they want to liquidate their investments,

[80] Koeplin, J., A. Sarin, and A. C. Shapiro, "The private company discount," *Journal of Applied Corporate Finance*, Vol. 12, No. 4 (2000), pp. 94-101, at p. 95: "[S]tockholders in public companies typically have a ready market in which to sell their shares, whereas stockholders in private companies lack that outlet."

[81] Liquidity can be defined as "the ease of trading a security." Amihud, Y., H. Mendelson, and L. H. Pedersen, "Liquidity and Asset Prices," *Foundations and Trends in Finance*, Vol. 1, No. 4 (2005), pp. 269-346, at p. 270.

they face non-trivial costs in finding interested buyers.[82] In addition to these search costs, potential buyers are likely to face significant information acquisition costs, as information about privately held companies is either lacking or is less reliable.[83] Private companies also lack access to public equity capital markets. Therefore, raising additional capital is more costly for privately held corporations compared to publicly traded companies.[84] When deciding whether to invest in private companies, investors will evaluate the risk of incurring the costs mentioned above (and potentially others), and will expect to be adequately compensated.

Q67. IS THERE EMPIRICAL EVIDENCE THAT A LIQUIDITY ADJUSTMENT TO THE BASE CAPM RESULTS IS WARRANTED IN THE CASE OF A PRIVATELY-HELD COMPANY LIKE WESTFIELD WATER?

A67. Yes. Recent empirical research on the determinants of stock price returns in the vein of Fama and French found weak empirical support for a size effect, but strong support for a liquidity effect.[85] The authors of this research state:

> To explain why size itself is compensated, it must be that people demand a larger return (lower price) to trade in small,

[82] Amihud, Y., H. Mendelson, and L. H. Pedersen, "Liquidity and Asset Prices," *Foundations and Trends in Finance*, Vol. 1, No. 4, (2005), pp. 269-346, at p. 271: "A searching trader incurs financing costs or opportunity costs as long as his trade is delayed, and, further, he may need to give price concessions in the negotiation with the counterparty that he eventually finds."

[83] De Franco, G., I. Gavious, J. Y. Jin, and G. D. Richardson, "Do Private Company Targets that Hire Big 4 Auditors Receive Higher Proceeds?" *Contemporary Accounting Research,* Vol. 28, No. 1 (2011), pp. 215-262, at pp. 218-219: "Less demand for financial information leads to less sophisticated accounting systems and weaker internal controls, all of which increases the unintentional errors in private-firm earnings. Private firms also potentially have innate characteristics that can lead to higher information risk."

[84] De Franco, G., I. Gavious, J. Y. Jin, and G. D. Richardson, "Do Private Company Targets that Hire Big 4 Auditors Receive Higher Proceeds?" *Contemporary Accounting Research,* Vol. 28, No. 1 (2011), pp. 215-262, at pp. 218-219; Ross, S. A., R. Westerfield, and J. F. Jaffe, *Corporate Finance,* Irwin/McGraw-Hill (2010), at p. 386: "We have argued many times that the expected return on a security compensates for its risk."

[85] Alquist, R., R. Israel, and T. Moskowitz, "Fact, Fiction, and the Size Effect," *The Journal of Portfolio Management,* Vol. 45, No. 1 (2018).

> illiquid and costly-to-trade (and short) stocks---but this sounds exactly like a liquidity premium story. The case for size itself to matter seems harder to make.
>
> ...
>
> Therefore, although the data do not seem to yield a large size premium above and beyond any illiquidity premium, theory, too, struggles with why size per se would provide a return premium separate from market risks and liquidity.
>
> ...
>
> Liquidity also seems to provide stronger empirical premium than size.[86]

Thus, these authors found strong empirical support that a lack of liquidity results in a lower price (and thus, implicitly, a greater expected return/cost of capital) that is not captured by the basic CAPM or DCF Model. Therefore, I incorporate an adjustment to my base CAPM and DCF results for the lack of liquidity of an investment in Westfield Water's private equity relative to an investment in the liquid securities of my sample of public water and gas distribution companies.

Q68. ARE THERE ANY COST OF CAPITAL MODELS OTHER THAN THE CAPM THAT CAN PROVIDE USEFUL INFORMATION IN DETERMINING WESTFIELD WATER'S COST OF EQUITY?

A68. Yes, although not as robust and widely used as the CAPM, the Discounted Cash Flow, or DCF Model, historically has been used to provide input into determinations of the cost of

[86] Alquist, R., R. Israel, and T. Moskowitz, "Fact, Fiction, and the Size Effect," *The Journal of Portfolio Management*, Vol. 45, No. 1 (2018), at pp. 22-23, 26.

equity capital for regulated utilities. While the shortcomings of the DCF Model, which I discuss further below, compel me to give the results less weight, the DCF Model can produce more appropriate results when applied to regulated utilities than when it is applied to other types of companies.[87] Accordingly, I also have calculated the cost of equity based on the Constant Growth and Multistage Growth versions of the DCF in addition to my results based on the CAPM.

Q69. PLEASE DESCRIBE THE DCF APPROACH.

A69. The constant growth DCF approach is based on the theory that a stock's current price represents the present value of all expected future cash flows. In the most general form, the DCF Model is expressed in the following way:

$$P_0 = \frac{D_1}{(1+r)} + \frac{D_2}{(1+r)^2} + \ldots + \frac{D_N}{(1+r)^N}$$

where P_0 is the stock price at time 0, $D_1 \ldots D_N$ are the expected future dividends, for periods $1 \ldots N$ with N tends to infinity, and r is the discount rate, or the required return on equity (ROE). The equation above can be rewritten in a more compact way isolating the required return on equity r:

[87] For example, one shortcoming of the DCF Model is its reliance on subjective forecasts of future earnings. Because regulated utilities' earnings arguably are more predictable than other firms, earnings forecast errors for utilities may be smaller than for other firms, all else equal. However, as discussed below, this does not change the fact that earnings forecasts for utilities still are subjective and potentially biased.

$r = \frac{D_1}{P_0} + g$ This equation is referred to as the Constant Growth DCF Model in which $\frac{D_1}{P_0}$ is the expected dividend yield and g is the expected long-term dividend growth rate.[88] This formula states that expected return equals the dividend yield plus the expected rate of growth in dividends.

Q70. PLEASE DESCRIBE THE MULTISTAGE DCF MODEL

A70. The Multistage DCF Model expands upon the constant growth model by introducing multiple stages where the expected growth rate can be varied. Instead of assuming a constant long-term growth rate in perpetuity, the multistage model can be configured to vary the growth rates over time.[89] Using multiple growth rates allows the multistage DCF analysis to capture variation in short-term and long-term earnings growth.

For example, if a company's short-term growth rate is known to be high or low, a multistage analysis can use an initial rate for a few years, an interim rate can then be applied in the intermediate term, and then a long-term rate based on projected long-term economic growth can be used in perpetuity. In this proceeding, the ability to select multiple growth rates allows the analysis to differentiate the ongoing accelerated annual capital investment growth of the water industry with the long-run where the growth rate would be expected to be more in line with long-term economic growth projections.

Q71. WHAT ARE STRENGTHS OF THE DCF?

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[88] *See, e.g.,* Brealey, R. A., S. C. Myers, and F. Allen, *Principles of Corporate Finance*, McGraw-Hill (2020), at pp. 87-89. Note that the earnings growth rate often reported by security analysts is typically assumed to equal the dividend growth rate in the application of the DCF Model.

[89] *See, e.g.,* Brealey, Richard A., Stewart C. Myers, and Franklin Allen, *Principles of Corporate Finance*, McGraw-Hill (2020), at pp. 90-92.

A71. A key strength of the DCF Model is that it represents a straightforward, relatively common-sense approach to estimate the cost of equity for an equity security or share of stock in that it links the current share value to the discounted cash flows (i.e., dividends) that an investor would expect to be paid for its investment. Next, the inputs required to apply the DCF Model can be obtained from publicly available data sources. Finally, the application of the DCF Model to firms with relatively stable earnings and dividends, such as regulated utilities, reduces the uncertainty that can arise when applying the model to firms subject to greater earnings volatility or that have limited historical data, and/or have uncertain timing and magnitude of future dividends.

Q72. WHAT ARE THE WEAKNESSES OF THE DCF?

A72. There are a number of significant weaknesses. First, the DCF Model relies on long-term forecasts of each firm's future earnings and dividend growth rates. Analyst growth rate forecasts, which typically are short term (3-5 years), rely on subjective assessments of a firm's future operations and assumptions of future earnings performance that rely on interpretation and judgment, including projections of future "macro" factors such as whether a recession is expected or not. In addition, in the case of utilities, analysts must make assumptions regarding future regulatory allowed rates of return for a given company, which introduces a kind of circularity in using their earnings forecasts to estimate an allowed rate of return for another utility. The need to rely on such subjective assessments makes it unrealistic to expect that analyst forecasts can be consistently free from bias and accurate over time.

Second, the DCF Model does not explicitly capture earnings volatility or risk. Specifically, the analyst earnings forecasts are point estimates without information regarding the size of the potential range of uncertainty around those estimates. For example, one could have an earnings estimate with a narrow range of alternatives, reflecting a great deal of certainty in the estimate (lower risk), versus an estimate with a wide range of alternative results, which reflects significant uncertainty, or higher risk. But the DCF Model does not distinguish between those two types of estimates.

Third, and related to the earnings risk point above, the DCF Model does not explicitly address the tradeoff between risk and return in the same way that the CAPM does, for example. This trade-off, which is one of the most fundamental principles of finance theory, is the observation that one cannot expect to earn a higher return without also bearing more risk.[90] This observation has been borne out by empirical evidence.

Finally, the constant growth DCF Model assumes a constant dividend growth rate into perpetuity. This assumption can be relaxed through the use of a multi-stage model, but even that model requires assumptions regarding growth into perpetuity.

Q73. PLEASE DESCRIBE ANY SUCH TESTS OF THE DCF MODEL FOR USE IN DEVELOPING A COST OF EQUITY CAPITAL FOR PUBLIC UTILITIES.

A73. I am aware of one such study, published in 2011, titled "New approach to estimating the cost of common equity capital for public utilities."[91] This study compared the results of the DCF Model to results from the CAPM and what it refers to as a "consumption-based

[90] This principle could be considered to be a derivative of the familiar economic adage that "there is no free lunch."
[91] Ahern, P.M, F. J. Hanley, and R. A. Michelfelder, "New Approach to Estimating the Cost of Common Equity Capital for Public Utilities," *Journal of Regulatory Economics*, Vol. 40 (2011), pp. 261-278.

asset pricing model." One of the findings of the study was that the consumption-based model and the CAPM produced similar cost of capital results, while the DCF Model produced somewhat lower results than the other two methods. Specifically, the paper concludes as follows:

> The estimates of the cost of common equity from the consumption asset pricing model compare well with rates of return on the book value of common equity and with the CAPM, although both the model and the CAPM are substantially higher than the DCF. This is quite common in the practice of the cost of common equity in the utility industry.[92]

Overall, the paper concludes that its "[Consumption-based] model is not necessarily superior to other models in its practical results, yet these results do indicate that it should be used to provide additional estimates of the cost of common equity."[93] While the paper's analysis and conclusions are not definitive, they are more supportive of the CAPM than the DCF Model.

D. APPLICATION OF THE ANALYTICAL APPROACHES TO ESTIMATE WESTFIELD WATER'S COST OF EQUITY

i. SELECTION OF A REASONABLE PROXY GROUP

Q74. WHY DID YOU USE A PROXY GROUP TO ESTIMATE THE COST OF EQUITY FOR WESTFIELD WATER?

[92] Ahern, P.M, F. J. Hanley, and R. A. Michelfelder, "New Approach to Estimating the Cost of Common Equity Capital for Public Utilities," *Journal of Regulatory Economics,* Vol. 40 (2011), pp. 261-278, at p. 277. One of these two authors of this paper subsequently published another article in 2015 regarding the "General Consumption Asset Pricing Model," or GCAPM, that was introduced in the above cited article. That article found that the equity costs of capital calculated by the GACPM generally were greater than those calculated using the CAPM. Michelfelder, R.A., "Empirical Analysis of the Generalized Asset Pricing Model: Estimating the Cost of Capital," *Journal of Economics and Business,* Vol. 40 (2015), pp. 37-50.

[93] Ahern, P.M, F. J. Hanley, and R. A. Michelfelder, R.A., "New Approach to Estimating the Cost of Common Equity Capital for Public Utilities," *Journal of Regulatory Economics*, Vol. 40 (2011), pp. 261-278, at p. 261.

A74. As noted, the cost of equity for a particular company cannot be observed directly in equity markets.[94] The standard approach to calculate an estimated cost of equity is to define a proxy group of companies whose main line of business is comparable to Westfield Water's. The proxy group companies' current and projected key financial metrics are then used as inputs into the cost of equity estimation analysis.

Q75. HOW DID YOU SELECT THE COMPANIES IN YOUR PROXY GROUP?

A75. I defined a list of potential companies starting with a group of U.S. utilities that are classified as water utilities and natural gas distribution companies by Value Line, Zacks and Bloomberg. This resulted in a list of 19 companies. I then excluded companies that: (1) are not traded on NASDAQ or NYSE; (2) are subsidiaries of other companies; and (3) for natural gas distribution companies, derive less than 50% of their total operating income from regulated operations. The list of companies that form my selected proxy group is shown in **Table 4** and **Attachment RJM-1**.

Q76. WHY DID YOU INCLUDE NATURAL GAS DISTRIBUTION COMPANIES IN YOUR PROXY GROUP?

A76. Natural gas companies have a number of similarities when compared to water utilities—they are state regulated firms that use relatively low-pressure pipes in ground to deliver a storable commodity to residential, commercial and industrial customers.[95] In addition, similar to water utilities companies, my selected natural gas distribution companies

[94] If the company is publicly-traded, one can estimate the company's cost of equity by analyzing public data on the firm's stock price, earnings estimates, etc. However, there is significant uncertainty regarding the statistical validity of an analysis of a single firm's data.
[95] *See e.g.,* Beecher, J. A., "Economic Regulation of Utility Infrastructure," Lincoln Institute of Land Policy (2013).

generate at least 50 percent of their operating income from regulated operations. Finally, the sample of U.S. water utilities companies is small and includes only ten companies. Because, all else equal, a reduced size of the sample can result in less reliable cost of equity estimates, using a larger proxy group can improve the statistical reliability and robustness of the results.[96]

Q77. DO YOU EXCLUDE ANY COMPANIES FROM THE RESULTING GROUP DEFINED ABOVE?

A77. Yes. I exclude three companies, Global Water Resources Inc., RGCO Resources and Consolidated Water.

Q78. WHY DO YOU EXCLUDE THESE COMPANIES?

A78. I exclude Global Water Resources Inc. and RGCO Resources because I considered them outliers, based on their financial performance compared to the rest of the peers. In particular, the former experiences negative growth rates, while the latter experiences unusually high growth rates. Moreover, I exclude Consolidated Water because its business is located on U.S. soil but outside the mainland United States. Specifically, it is in the Caribbean islands, which have their own local governments and unique regulations, in addition to being subject to some federal laws and regulations of the U.S.

Q79. WHAT IS THE COMPOSITION OF YOUR PROXY GROUP?

[96] NYU Professor Aswath Damodaran states that "if you can find ways of controlling for differences across companies […] you will get more reliable estimates of relative value using a larger sample of less comparable firms than a very small sample of more comparable ones." *See* Damodaran, A., *Investment Valuation: Tools and Techniques for Determining the Value of Any Asset*, John Wiley & Sons (2012), at pp. 462-463.

A79. The selection criteria discussed above led to a proxy group consisting of the companies shown in **Table 4**.

Table 4
List of Companies in the Proxy Group

Company	Ticker	Industry
American States Water Company	AWR	Water
American Water Works	AWK	Water
Artesian Resources Corporation	ARTNA	Water
California Water Service Group	CWT	Water
Essential Utilities	WTRG	Water
Middlesex Water Company	MSEX	Water
SJW Group	SJW	Water
York Water Company	YORW	Water
Atmos Energy	ATO	Gas Distribution
Chesapeake Utilities	CPK	Gas Distribution
New Jersey Resources	NJR	Gas Distribution
Nisource Inc.	NI	Gas Distribution
Northwest Natural Holding Company	NWN	Gas Distribution
ONE Gas Inc.	OGS	Gas Distribution
Southwest Gas Holding	SWX	Gas Distribution
Spire Inc.	SR	Gas Distribution

Q80. HOW IS THE ANALYSIS STRUCTURED?

A80. For each approach to estimating the cost of equity, I provide separate estimates for the water group, the gas distribution group, and the entire sample. This diverse composition of the proxy group allows for a deeper exploration of how estimates for the cost of equity vary across firms and different reference industries.

a. DATA SOURCES

Q81. WHAT DATA AND DATA SOURCES DO YOU USE TO APPLY THE DCF AND CAPM MODELS?

A81. In my analysis, I rely on data from multiple sources to offer a comprehensive view of the companies I evaluate. To provide insight into the capital structure of these companies, I utilize S&P Capital IQ data, encompassing information on long-term debt, preferred stocks, and the book value of equity. Additionally, the number of outstanding common shares is obtained from Refinitiv, and I incorporate Issuer debt ratings from S&P for a well-rounded assessment. When conducting my DCF analysis, I source relevant data from various providers, such as Refinitiv, which offers details on dividends and closing stock prices, as well as Value Line, Zack, and Yahoo Finance for earnings growth data. In my CAPM analysis, I determine the risk-free rate using the one-week average market yield on U.S. Treasury Securities with a 20-year constant maturity from FRED, Federal Reserve Bank of St. Louis. I use the Equity Risk Premium from the 2023 SBBI Yearbook, Kroll LLC. Moreover, I gather beta values from multiple sources, including the Value Line Investment Survey, and utilize raw and adjusted beta data from Bloomberg.

b. Capital Asset Pricing Model

Q82. WHAT RISK-FREE RATE DID YOU USE IN YOUR CAPM ANALYSIS?

A82. I estimated the risk-free rate using the current one-week average yield on the 20-year U.S. Treasury bond as of December 11, 2023, which is 4.46%.

Q83. WHY DID YOU SELECT THIS PARTICULAR METHOD FOR DETERMINING A U.S. TREASURY BOND YIELD?

A83. First, I chose the 20-year rate because the cost of equity capital is a long-term measure and the 20-year rate is a long-term rate. Second, daily interest rates can be relatively volatile or "noisy" based on unobservable factors. Therefore, I use a one-week average rate to

reduce the possibility of using a rate that is temporarily too high or too low. Finally, I took a look at the trends in interest rates over the shorter and longer periods just to make sure that there was no clear trend that I needed to consider. As shown in Attachments RJM-6, RJM-7 and RJM-8, interest rates have trended upward in recent years, and more recently downward, as the economy adjusts to changes in federal reserve bank interest rate setting policy. Over the last year, rates have been relatively flat and more recently have been in the 4 to 5 percent range. These trends broadly support the use of 4.46% as my risk-free rate.

Q84. WHAT METHODS DID YOU USE TO CALCULATE THE BETA COEFFICIENTS YOU USE IN YOUR CAPM ANALYSIS?

A84. I relied on the beta values reported by Value Line as well as Bloomberg. Value Line betas are calculated based on weekly observations over a period of five years, while from Bloomberg, I select 1-year daily, 2-year weekly and 5-year monthly beta values. Value Line betas are adjusted according to the method proposed by Blume (1975),[97] which corrects the historic beta for its tendency to revert towards the market average of one. This adjustment produces the forecasted beta, a forward-looking estimate of beta that better fits the forward-looking nature of the CAPM. Bloomberg provides raw and adjusted beta values, and I used both in my analysis. For this reason, adjusted betas theoretically are more accurate measures of systematic risk than raw betas for use in the CAPM.

[97] See Blume, M. E., "Betas and their regression tendencies," *The Journal of Finance*, Vol. 30, No. 3 (1975), pp. 785-795.

Q85. WHY DO YOU INCLUDE BETAS CALCULATED OVER DIFFERENT TIME PERIODS?

A85. Because betas for individual firms are not necessarily stationary over time due to changes in risk-relevant variables such as leverage ratios, major acquisitions or divestitures of businesses with different risk, and potentially unobserved factors that can change a firm's systematic risk. In addition, it is conceivable that certain events, such as new laws or regulations, could affect a whole industry and change its systematic risk profile. So I include betas calculated over different time periods to make sure there is no evidence of significant changes. As shown in Attachment RJM-9, median raw and adjusted Bloomberg betas are quite similar across the 1-year daily, 2-year weekly and 5-year monthly data series.

Q86. WHAT NUMERICAL BETAS DID YOU USE IN YOUR ANALYSIS?

A86. As shown in Attachment RJM-9, I present results based on the raw and adjusted Bloomberg betas averaged across the 1-, 2- and 5-year measures, for the Value Line betas alone, and for all of the beta measures. However, I rely primarily on the last two calculational methods. First, I rely on the "All Beta Measures" average because it gives approximately equal weight to the adjusted Bloomberg betas (which are lower than the Value Line adjusted betas), the unadjusted Bloomberg Betas and the Value Line adjusted betas, which implicitly recognizes that all three measures arguably have some validity.[98] The All Beta Measures median beta for water companies is 0.67, for gas companies is 0.70, and for the

[98] Giving equal weight to the unadjusted Bloomberg betas could be considered "conservative" in that the evidence is strong that unadjusted betas likely understate the systematic risk of low-beta firms such as utilities.

full sample is 0.69. Second, I rely on the Value Line betas separately because Value Line is a well-known and trusted source that has been around for a long time. The median Value Line beta for water companies is 0.78, for gas companies is 0.85, and for the full sample is 0.83.

Q87. WHAT EQUITY RISK PREMIUM DID YOU USE IN YOUR CAPM ANALYSIS?

A87. I used an equity risk premium (R_m - R_f) of 7.17%. This figure is the average historical equity risk premium for large company stock returns over the income component of long-term government bond returns from 1926 to 2022 according to the 2023 SBBI Yearbook. The 2023 SBBI Yearbook contains the well-known compilation of capital market series originally developed by Professor Roger G. Ibbotson of the Yale School of Management and now published by Kroll. The maturity of the long-term bonds used in the 2023 SBBI Yearbook is 20 years, consistent with my choice of the 20-year Treasury bonds as the risk-free rate which I discussed previously.

Q88. ARE THERE OTHER APPROACHES TO SELECTING THE EQUITY RISK PREMIUM?

A88. Yes. There are several alternatives that some analysts use, including surveys of financial managers and calculations of "implied" risk premiums using various models, including estimating the expected market rate of return by conducting a DCF analysis on the dividend paying firms in the S&P500. However, this latter approach suffers from the same drawbacks as the DCF Model that I discussed above and in, my experience, tends to yield an unrealistically high equity risk premium. In addition, other models produce implied equity risk premia that are lower than the long-run historical average actual premium upon

which I rely. Use of such models rather than the long-run historical average depends on the assumption that investors see equity investments (i.e., investments in the stock market) as generally less risky than they have been historically.[99] However, I have not seen compelling evidence that this is the case. The conclusion stated in a leading finance textbook is as follows:

> Out of this debate [regarding the appropriate equity risk premium] only one firm conclusion emerges: Trying to pin down an exact number for the market risk premium is about as hopeless as eating spaghetti with a one-pronged fork. History contains some clues, but ultimately, we have to judge whether investors on average have received what they expected. Many financial economists rely on the evidence of history and therefore work with a risk premium of about 7%. The remainder generally use a somewhat lower figure. Brealey, Myers, and Allen have no official position on the issue, but we believe that a range of 5% to 8% is reasonable for the risk premium in the United States.[100]

I am among the "many" finance professionals referred to in this quote who believe that the best, most unbiased and reliable estimate of the equity premium to use in the CAPM is the premium calculated based on long-term market returns from a reputable source like the 2023 SBBI Yearbook.[101] Such a long-term average incorporates the effects of many kinds of extreme events such as the Great Depression, multiple wars, high inflation, low inflation, the Great Financial Crisis in 2008 and 2009, major technological changes and others. In addition, as noted, I have seen no compelling reason that investors have received "more"

[99] See generally, the discussion in Brealey, R. A., S. C. Myers, and F. Allen, *Principles of Corporate Finance*, McGraw-Hill (2020), at pp. 170-174.
[100] See generally, the discussion in Brealey, R. A., S. C. Myers, and F. Allen, *Principles of Corporate Finance*, McGraw-Hill (2020), at p. 174.
[101] "Stocks, Bonds, Bills, and Inflation (SBBI) Yearbook," Kroll, 2023, available at: https://www.kroll.com/en/cost-of-capital/stocks-bonds-bills-inflation-sbbi-yearbook (viewed December 20, 2023).

or "less" than they expected historically, or that investors would expect "more" or "less" than this long-term average in the future.

Q89. WHAT ARE THE RESULTS OF YOUR CAPM ANALYSES BEFORE CONSIDERING RISK FACTORS NOT CAPTURED BY THE CAPM?

A89. As shown in **Table 5**, the traditional CAPM for the entire sample produces median returns of 9.43 and 10.38 percent; and mean returns of 9.50 and 10.42 percent, before making needed adjustments for liquidity as discussed below.[102]

Table 5
Summary of CAPM Results

Company Sample	Cost of Equity Using Value Line Beta	Cost of Equity Using All Beta Measures
Entire Sample:		
Mean	10.42%	9.50%
Median	10.38%	9.43%
Water Sample:		
Mean	10.24%	9.48%
Median	10.02%	9.29%
Gas Distribution Sample:		
Mean	10.60%	9.52%
Median	10.55%	9.45%

[102] *See* Attachment RJM-2.

ii. DISCOUNTED CASH FLOW ANALYSIS

Q90. WHAT ARE THE NECESSARY STEPS TO IMPLEMENT THE CONSTANT GROWTH DCF MODEL?

A90. The initial step of applying the constant growth DCF Model involves the calculation of the dividend yield for the relevant company. Typically, this is determined by assessing the current annualized dividend, divided by the stock price. Subsequently, the second step entails estimating investors' long-term growth expectations for the company. Finally, in the last step, the calculated dividend yield and the estimated growth rate are used to estimate the company's cost of common equity.

Q91. WHAT MARKET DATA DO YOU USE TO CALCULATE THE DIVIDEND YIELD IN YOUR CONSTANT GROWTH DCF MODEL?

A91. The dividend yield in my DCF Model is based on the proxy group companies' current annualized dividend and the stock price as of November 15, 2023. Because utility dividends are typically paid quarterly,[103] using stock price and dividend payments after the close of the third quarter (when utility dividends are typically declared) is likely to capture actual dividend pay dates for the proxy companies (dividends are paid during the weeks following the quarter's completion).

Q92. HOW DO YOU ESTIMATE THE LONG-TERM GROWTH EXPECTATIONS FOR A COMPANY?

[103] "Q4 2022 Financial Update," Edison Electric Institute (EEI), 2022, available at https://www.eei.org/-/media/Project/EEI/Documents/Issues-and-Policy/Finance-And-Tax/QFU_Dividends/2022_Q4_Dividends.pdf?la=en&hash=1CCB98C222961981E60CE20C071788BAB1D44E66 (viewed December 20, 2023).

A92. I employ a company's growth projections developed by third parties.

Q93. WHICH SOURCES OF LONG-TERM EARNINGS GROWTH RATES DID YOU USE?

A93. The DCF Model considers three different sources: (1) Zacks Investment Research; (2) Yahoo! Finance; and (3) Value Line.

Q94. DID YOU MAKE ANY ADJUSTMENTS TO THE LONG-TERM EARNINGS GROWTH RATES?

A94. I made just two adjustments to the data for two companies for the Value Line growth data. The companies were one water company, American Water, and one gas company, Southwest Gas. In each case, I made the adjustment because for each company there was an unusual effect on earnings growth due to a divestment during Value Line's three-year base earnings period used to calculate growth in earnings per share. These adjustments had the effect of increasing American Water's projected growth rate from 3 to 7 percent and reducing Southwest Gas's projected growth rate from 10 to 4 percent. In both cases, these adjustments produce rates that are more appropriate for use in the DCF Model. In addition, the adjusted growth rates were more in line with those of the other two data sources. [104]

Q95. DID YOU CONSIDER MAKING ADJUSTMENTS TO THE GROWTH FORECASTS FROM THE OTHER TWO SOURCES, ZACKS AND YAHOO! FINANCE?

[104] *See* Attachment RJM-4.

A95. Yes. However, unlike in Value Line's case, I was unable to obtain the underlying data or bases for the forecasts provided by these other services, other than to determine that they claim to "aggregate" forecasts from other experts.[105] This lack of information made it impossible to evaluate whether they needed to be adjusted for any potential biases. Such biases certainly were possible. For example, in some cases, there were major discrepancies between Zack's and Yahoo! and Value Line. For instance, Yahoo!'s growth rate for Middlesex Water Company is 2.70% versus 5.00% for Value Line. Going in the other direction, Yahoo!'s growth rate for American Water Works is 10.80% versus 6.50% for Value Line. However, lack of information on how the estimates from the other services were determined precluded adjustments similar to those I made to the Value Line data.

Q96. WHICH COMPANIES DID YOU INCLUDE IN YOUR DCF ANALYSIS?

A96. I included all of the gas distribution companies in my proxy group, and six of the eight water companies. I eliminated two water companies, York and Artesian, for purposes of my DCF analysis due to data limitations. Specifically, I excluded York and Artesian because Value Line does not provide a consensus 5-year earnings growth.

Q97. WHAT WERE THE RESULTS OF YOUR DCF ANALYSIS FOR THE ENTIRE SAMPLE OF WATER UTILITIES AND GAS DISTRIBUTION COMPANIES?

A97. **Table 6** shows the results of the constant growth DCF analysis (CGDCF). The mean and median CGDCF results for the entire sample employing the average growth rates, but

[105] *See* https://data.nasdaq.com/databases/ZGH#anchor-product-overview (viewed February 2, 2024); https://finance.yahoo.com/news/yahoo-u-where-do-earnings-estimates-come-from-120535078.html (viewed February 2,2024).

before adding a premium to reflect the lack of liquidity of an equity investment in Westfield Water, are 9.57% and 9.75%, respectively.

Table 6
Summary of Constant Growth DCF Results

Company	Cost of Equity
Entire Sample:	
Mean	9.57%
Median	9.75%
Water Sample:	
Mean	8.82%
Median	9.21%
Gas Distribution Sample:	
Mean	10.12%
Median	9.86%

Q98. WHAT ARE THE RESULTS OF YOUR DCF WHEN YOU CONSIDER ONLY THE SAMPLE OF WATER COMPANIES?

A98. The mean and median DCF results for the sample of water companies, employing the average growth rates are 8.82% and 9.21%, respectively.

Q99. WHAT ARE THE RESULTS OF YOUR DCF WHEN YOU CONSIDER ONLY THE SAMPLE OF GAS DISTRIBUTION COMPANIES?

A99. The mean and median DCF results for the sample of gas distribution companies, when considering the average growth rates are 10.12% and 9.86%, respectively.

Q100. WHAT ARE YOUR CONCLUSIONS ABOUT THE RESULTS OF THE CONSTANT GROWTH DCF MODEL?

A100. As depicted in **Table 6**, the estimated cost of equity varies among the different samples. Water companies yield the lowest figures, while gas distribution companies produce the highest values. Consequently, the results from water companies can be regarded as a potential lower bound for a CGDCF measure of Westfield Water's cost of equity.

Q101. PLEASE DESCRIBE THE MULTI-STAGE DCF MODEL YOU USED TO ESTIMATE ROE.

A101. I used a three-stage DCF model to allow for the incorporation of different growth rate projections over 5-year, 15-year and beyond 15-year stages.

Q102. WHAT ASSUMPTIONS DID YOU USE FOR THE MULTI-STAGE GROWTH RATES FOR WATER COMPANIES?

A102. For the initial 5-year stage I used the same growth rates that I used for the constant growth rate DCF. For the second stage, I calculated the growth rate by dividing 5.07% by the median of the first-stage growth rates of the full sample and then multiplying it by the first-stage growth rate of each company. I estimated the 5.07% by calculating the growth in annual water utility capacity expenditure required to meet the EPA's projected 20-year water utility infrastructure requirements.[106] For the third stage I assumed the average of multiple nominal GDP growth projections, 3.98%.

[106] I estimated an initial annualized water utility capital expenditure of $23.8 Billion in 2022 based on 2020 total water utility infrastructure capital expenditure estimated by the Bureau of Economic Analysis, adjusted for inflation and previous growth in water infrastructure investment. This annual value would need to grow at a rate of 5.07% per annum to reach EPA's $625 billion water industry infrastructure investment requirement over the next 20 years. *See* "Drinking Water Infrastructure Needs Survey and Assessment, 7th Report to Congress," EPA, September 2023, available at https://www.epa.gov/ground-water-and-drinking-water/epas-7th-drinking-water-infrastructure-needs-survey-and-assessment (viewed December 20, 2023); *See also*, Bennett, J., R. Kornfeld, D. E. Sichel,, and D. B. Wasshausen, "Measuring Infrastructure in the Bureau of Economic Analysis National Economic Accounts," December 2020, updated September 2021, available at https://www.bea.gov/research/papers/2020/measuring-infrastructure-bureau-economic-analysis-national-economic-accounts (viewed December 20, 2023).

Q103. WHAT ASSUMPTIONS DID YOU USE FOR THE MULTI-STAGE GROWTH RATES FOR GAS COMPANIES?

A103. As for water companies, for the first 5-year stage I used the same growth rates that I used for the constant growth rate DCF. For the second stage, I used the projected nominal growth in GDP for those years, which is about 3.99%. Finally, for the third stage I again assumed the average of multiple nominal GDP growth projections, 3.98%.

Q104. WHY DID YOU USE DIFFERENT ASSUMPTIONS FOR THE GAS DISTRIBUTION COMPANIES?

A104. Because, unlike for water companies, I did not find clear evidence that the future investment needed for expansion of gas infrastructure is greater than the growth rate of nominal GDP. That is, I did not find clear evidence of the need for greater-than-normal investment as I did for the water companies.

Q105. WHAT ARE THE RESULTS OF YOUR MULTI-STAGE DCF ANALYSIS?

A105. The mean and median multi-stage DCF results for the entire sample are 7.85% and 7.82%, respectively. The mean and median multi-stage DCF results for the sample of water companies are 7.01% and 7.12%, respectively. The mean and median multi-stage DCF results for the sample of gas distribution companies are 8.49% and 8.41 %, respectively. It is important to note that all of these results are based on the highly liquid securities of publicly-traded firms and, therefore, need to be adjusted upwards to arrive at a cost of equity for Westfield Water due to the fact than an equity investment in Westfield Water would be extremely illiquid in comparison. I discuss this liquidity premium in the next section.

iii. LIQUIDITY PREMIUM

Q106. HOW DO YOU ESTIMATE THE INCREMENTAL RISK FACED BY INVESTORS OF PRIVATELY HELD COMPANIES?

A106. I estimate the incremental risk faced by investors of private companies in three steps. In the first step, I estimate the difference in value between privately held and publicly traded companies (the "Private Company Discount" or "PCD"). In the second step, I convert the estimated PCD to an increase in the cost of equity capital (a "Liquidity Premium" or "LP") using a perpetual growth terminal value equation.[107] Attachment RJM-10 contains the results of my estimation.

For step one, I estimate the PCD following two approaches. First, I rely on a cross-section of existing studies that quantify the costs of going public ("Cost of Going Public Approach," as indicated in Attachment RJM-10). These studies span different time periods and samples and typically include direct costs (*e.g.*, flotation costs, underwriting discounts, legal, auditing and advertising fees) as well as some indirect costs (*e.g.*, underpricing observed around Initial Public Offerings) as relevant costs faced by companies going public. These studies yield a PCD between 13.80% and 31.87%, with a mean and a median of 21.93% and 21.22%, respectively.[108] The rationale behind this method is that a privately held company needs to incur these costs if it decides to become publicly traded and lower

[107] Pratt, S. P. and R. J. Grabowski, *Cost of Capital: Applications and Examples*, John Wiley & Sons (2014), at p. 662: "One can also reflect the added risk due to the lack of liquidity by increasing the cost of equity capital by an amount that results in a value reduction to the as-if-public value equivalent to applying the PCD." *See also,* Saad, M. and A. Samet, "Liquidity and the Implied Cost of Capital," *Journal of International Financial Markets, Institutions and. Money*, Vol. 51 (2017), pp. 15-38.

[108] These studies generally measure the PCD as the total costs that a private firm has to pay to go public as a percentage of the proceeds it obtains from going public.

investors' risk due to lack of liquidity. The main shortcoming of this method is that it does not consider other obstacles that might prevent private companies from going public or other hard to measure costs (e.g., the time and risk of failure of an initial public offering) that companies might face when going public.[109]

My second approach to estimate the PCD relies on trading multiples and option pricing ("Cost of Corporate Liquidity Approach," as indicated in Attachment RJM-10). This approach is based on the well-documented empirical finding that privately held companies are systematically sold at a discount compared to similar publicly traded companies. Two of the studies considered quantify the PCD as the percentage difference in acquisition multiples between public and private companies (Officer 2007 and De Franco et al. 2009, *see* Attachment RJM-10 for details), while the third study considered (Longstaff 2017, *see* Attachment RJM-10 for details) uses an option framework to model illiquidity as a restriction on stopping rules that investors follow to trade assets. These studies yield a range of values that span 17.28% to 39.70%, with a mean and a median of 24.83% and 21.74%, respectively.

The two sets of studies considered to estimate the PCD yield close estimates. Jointly considered, all the studies yield a mean and a median of 23.27% and 21.34%, respectively, as shown in Attachment RJM-10.

[109] Some authors think that this method might be conservative and underestimate the true PCD. *See, e.g.*, Pratt, S. P., and R. J. Grabowski, *Cost of Capital: Applications and Examples*, John Wiley & Sons (2014), at p. 651: "Therefore, if anything, a proxy probably underestimates the appropriate discount."

I next convert the estimated PCD to an increase in the cost of capital using a perpetual growth terminal value equation. Specifically, I use the following equation:[110]

$$K'_e = \frac{(K_e - g)}{(1 + PCD)} + g$$

I use the K_e value obtained through the application of CAPM discussed in Section III.D.i.b and a growth rate of 3.98%, which corresponds to the long-term nominal expected GDP growth used in Attachment RJM-5. Once I obtained the value of K'_e, I obtain the Liquidity Premium (LP) as $K'_e - K_e$. My analysis yields a mean and a median LP of 1.72% and 1.48%, respectively.

E. RECOMMENDED COST OF EQUITY

Q107. WHAT IS YOUR RECOMMENDED COST OF EQUITY?

A107. First, my recommended cost of equity is based on the results shown in **Table 1** that include the 1.48 percent liquidity premium. As discussed above, economic theory and empirical evidence strongly support this adjustment.[111] These results show a fairly wide potential range for Westfield Water's opportunity cost of capital, from a low of 8.60 percent based on the Multi-Stage DCF Model as applied to water companies, to 11.85 percent based on the CAPM with Value Line betas as applied to the entire sample of firms.[112] If the high and low ends of these results are given equal weight, the cost of equity conclusion would

[110] This equation can be derived by starting from the perpetual growth terminal value equation: V = CF (1+g) / (K_e– g), where V is the value of a public company, CF is its cash flow, *g* is a growth rate, and $K_e$is the public company's cost of equity capital. Rearranged, this equation becomes: (K_e – *g*) V = CF (1+*g*). If V is higher due to the PCD, one can write the value of a private company (V') as: V' = (1 – PCD) V. Then. one can estimate the cost of equity capital for a private company (K'_e) as: (K'_e – *g*) V' = (K_e – *g*) V, which rearranged becomes K'_e = (K_e – *g*) / (1 – PCD) + *g*.

[111] Further, I understand that the IURC has considered adjustments for liquidity risk in the past. *See* IURC Order in Cause No. 44880, at p. 12.

[112] Note that the CAPM results for Gas Distribution companies based on Value Line betas is approximately 12 percent. I exclude this number from consideration because it does not incorporate results for water companies.

be 10.2 percent ((8.60+11.85)/2 = 10.23 percent). However, for several reasons, I believe that the CAPM results should be given significantly more weight than the DCF results in this case (as I discuss further below). On this basis, I conclude that a reasonable range of the current opportunity cost of equity capital for Westfield Water is in a range from **10.2 to 10.9 percent** which, as noted, includes the 1.48 percent adjustment for lack of liquidity. This range gives significant weight to the MSDCF result because 10.2 percent is lower than any of the CAPM results based either on all beta measures or on the Value Line betas, and 10.9 percent is well below the high end of the CAPM range (11.8 percent based on the Value Line betas). However, in my opinion, the best point estimate within this range is **10.9 percent,** which is based on the CAPM results for my entire sample of water and gas companies, as well as a beta based on all measures. I have determined this value for the cost of equity because, first of all, its reliance on a measure of the central tendency of a broad set of beta measures reduces statistical error due to measurement "noise," as well as the possibility that betas can change over time for individual firms. Second, I have more confidence in the CAPM results than I do in the MSDCF results and, therefore, I give more weight to the CAPM results.

Q108. WHY DO YOU HAVE MORE CONFIDENCE IN THE CAPM?

A108. The first reason is that I believe that the CAPM is better grounded than the DCF Method in financial economic theory in that the CAPM is based more directly on the fundamental principle of finance that there is a tradeoff between risk and expected return. This principle, which is just another expression of the common-sense economic statement that there is "no free lunch," is that one cannot earn a higher expected return unless one accepts more risk.

The CAPM is based directly on this principle. In addition, the CAPM explicitly controls for the fact that investors are able to diversify their investment portfolio at relatively low cost. Thus, under the CAPM, a firm's cost of capital goes up in proportion to its non-diversifiable risk. These sound theoretical propositions are not explicitly captured by the DCF Method.

Second, as discussed above, the CAPM has been subject to significant empirical tests and does a reasonably good job of predicting future realized returns (see **Figures 8.8** and **8.9** above, reproduced from a leading graduate finance textbook). Furthermore, to the extent that the basic CAPM has fallen short of capturing all relevant risks, one can make adjustments to the core results, as I do by giving weight to adjusted betas as well as adding a premium for liquidity risk in this case.

Third, the DCF Method relies heavily on subjective analyst forecasts for which the underlying assumptions cannot be observed. This reliance makes the DCF results potentially biased and unreliable. Thus, I conclude that my CAPM results are more reasonable and reliable.

Q109. IS THERE ANY OTHER SUPPORT FOR YOUR DECISION TO GIVE MORE WEIGHT TO THE CAPM RESULTS THAN TO THE DCF RESULTS?

A109. Yes. In addition to the theoretical and empirical evidence discussed above, there is evidence that the CAPM is the model of choice for use in the "real world" by both academics and practitioners.[113] For example, financial economics researchers found that

[113] *See, e.g.*, Brealey, R. A., S. C. Myers, and F. Allen, *Principles of Corporate Finance*, McGraw-Hill, (2020), at pp. 198-213.

more than 73 percent of finance practitioners surveyed in 1999 reported that they "always or almost always use the CAPM" to calculate the cost of equity capital.[114] Furthermore, the researchers found that:

> The second and third most popular methods [were] average stock returns and multibeta CAPM, respectively. **Few firms back the cost of equity out from a dividend discount model.**[115] (emphasis added)

This dominance of the CAPM (sometimes with certain marginal adjustments) is due in significant part to its strong theoretical basis in modern portfolio theory, as well as its favorable performance under empirical testing.

Q110. THEN WHY GIVE ANY WEIGHT TO THE DCF MODEL RESULTS AT ALL?

A110. First, because the model is theoretically sound, although not to the extent of the CAPM as discussed above. It therefore can provide some useful information regarding a reasonable range for the equity cost of capital in particular cases. I believe that one of those cases is determining the cost of capital for a regulated utility such as Westfield Water, because some of the key shortcomings of the DCF Model, such as low predictability of dividend increases or unreliability of earnings forecasts, are less of a problem for utilities than for other firms, due to the existence of regulation and a more predictable business in general.

Q111. WHY DO YOU RELY ON THE MSDCF RESULTS RATHER THAN THE CGDCF RESULTS WHEN CALCULATING THE LOW END OF YOUR REASONABLE RANGE?

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[114] Graham, J. R., and C. R. Harvey, "The Theory and Practice of Corporate Finance: Evidence from the Field," *Journal of Financial Economics*, Vol. 60, (2001), pp. 187–243, at p. 201.
[115] Graham, J. R., and C. R. Harvey, "The Theory and Practice of Corporate Finance: Evidence from the Field," *Journal of Financial Economics*, Vol. 60, (2001), pp. 187–243, at p. 201.

A111. While I believe that both DCF Models are useful and relevant, the economic logic for the MSDCF Model makes more sense to me. In particular, the earnings growth forecasts for individual firms that are available generally are relatively short-term forecasts, on the order of 3-5 years, whereas the CGDCF Model effectively requires growth rates in perpetuity. It may not be appropriate to assume that these shorter-term growth rates will apply in perpetuity. For example, the median growth rate for my sample of water firms is approximately 6.2 percent, while the median growth rate for my sample of gas distribution firms is approximately 5.9 percent. In both cases, this is above current projections of nominal GDP growth. I believe it is more economically reasonable to expect that such growth rates in excess of nominal GDP growth cannot last forever, which is what the CGDCF implicitly assumes. Therefore, I put more weight on the results based on the MSDCF Model, which produce the lowest costs of equity capital that I have calculated. Indeed, the low end of my cost of capital range gives a 50% weight to the water company MSDCF rate, which is the lowest cost of equity value that I calculate. Of course, I give less weight to the DCF Model results in general, whether from the CGDCF or MSDCF version, than I give to the CAPM results.

Q112. WHY DO YOU SAY THAT YOU ARE GIVING WEIGHT TO THE DCF RESULTS GIVEN THAT YOUR CHOSEN COST OF CAPITAL, 10.9 PERCENT, IS BASED SOLELY ON THE CAPM MODEL?

A112. For two reasons. First, the low end of my range, 10.2%, explicitly gives 50% weight to the MSDCF results and 50% to the Value Line results of 11.85%. In fact, I consider the Value Line CAPM-based results to be more reliable than the MSDCF results. Indeed, Value Line

and its betas have been around a long time and have been relied on by finance experts in multiple settings, while the DCF Model has the shortcomings described previously. Second, my point-estimate of 10.9% is below both all the Value Line CAPM cost of capital estimates, as well as the CGDCF results for gas companies or the full sample. Thus, while from a calculational standpoint the 10.9% value is based on the CAPM plus a liquidity premium, it is supported by and based in part on the MSDCF Model results.

IV. APPROPRIATE RETURN ON A FAIR VALUE RATE BASE ("FVRB")

A. INDIANA'S STATUTES AND PRECEDENT FOR FAIR VALUE RATEMAKING

Q113. WHAT IS THE STATUTORY BASIS FOR FAIR VALUE RATEMAKING IN INDIANA?

A113. I understand that fair value ratemaking is required under Indiana state law:

> The commission shall value all property of every public utility actually used and useful for the convenience of the public at its fair value, giving such consideration as it deems appropriate in each case to all bases of valuation which may be presented or which the commission is authorized to consider by the following provisions of this section.[116]

This law is consistent with United States Supreme Court precedent defining permissible methods of valuing the property of public utilities. In *Smyth v. Ames* (1898), the U.S. Supreme Court found that:

> The basis of all calculations as to the reasonableness of rates […] must be the fair value of the property being used by it for the convenience of the public; and in order to ascertain that value, the original cost of construct-ion, the amount expended in permanent improvements, the amount and

[116] Indiana Code 8-1-2-6. *See also*, *PSC v. City of Indianapolis*, 131 N.E.2d 308, 317 (Ind. 1956), "No legislature may enact a law providing for a valuation of utility property for ratemaking purposes at other than its full fair value."

> market value of its bonds and stock, the present as compared with the original cost of construction, the probable earning capacity of the property under particular rates prescribed by statute, and the sum required to meet operating expenses, are all matters for consideration, and are to be given such weight as may be just and right in each case.[117]

In *Federal Power Commission v. Hope Natural Gas Co* (1944), the U.S. Supreme Court found that:

> The rate-making process under the Act, i.e., the fixing of "just and reasonable" rates, involves a balancing of the investor and the consumer interests. […] [T]he investor interest has a legitimate concern with the financial integrity of the company whose rates are being regulated. […] By that standard the return to the equity owner should be commensurate with returns on investments in other enterprises having corresponding risks. That return, moreover, should be sufficient to assure confidence in the financial integrity of the enterprise, so as to maintain its credit and to attract capital […] The conditions under which more or less might be allowed are not important here. Nor is it important to this case to determine the various permissible ways in which any rate base on which the return is computed might be arrived at. For we are of the view that the end result in this case cannot be condemned under the Act as unjust and unreasonable from the investor or company viewpoint.[118]

In a dissenting opinion, Justice Reed summarizes the Court's opinion:

> Historical cost, prudent investment and reproduction cost were all relevant factors in determining fair value […] I agree with the Court in not imposing a rule of prudent investment alone in determining the rate base. This leaves the Commission free, as I understand it, to use any available evidence for its finding of fair value, including both prudent investment and the cost of installing at the present time an efficient system for furnishing the needed utility service.[119]

Q114. PLEASE SUMMARIZE THE KEY REGULATORY FEATURES OF FAIR VALUE RATEMAKING IN INDIANA.

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[117] *Smyth v. Ames*, 169 U.S. 466, (1898).
[118] *FPC v. Hope Nat. Gas Co.*, 320 U.S. 591, (1944).
[119] *FPC v. Hope Nat. Gas Co.*, 320 U.S. 591, (1944).

A114. Based on my understanding of Indiana state law and precedent, there are three key regulatory features of fair value ratemaking. First, fair value ratemaking does not require any single method for calculating the value of the rate base. In particular, by statute and precedent, the Commission is not limited to original cost approaches.[120] Second, fair value ratemaking in Indiana requires the Commission to set the return to the equity owner commensurate with returns on investments in other enterprises having corresponding risks. From an economic standpoint, this rate of return is equal to the opportunity cost of equity capital.[121] Third, fair value determinations are the end result of a Commission's adjudicatory process. As such, regardless of the specific methodology employed to value the rate base, the end result of a fair value ratemaking process must yield returns sufficient to assure confidence in the financial integrity of the regulated company, maintain its credit standing, and continue to attract capital at reasonable rates.

Q115. HOW DOES THE COMMISSION APPLY THE FAIR VALUE FRAMEWORK?

A115. The Commission applies the fair value regulatory framework consistent with legal precedent, state law, administrative regulations, and previous IURC orders. The fair value

[120] By "original cost," I refer to rate base valuation approaches that fix asset values at their original book value, use straight-line depreciation based on an asset's accounting life rather than economic usefulness, apply a nominal cost of capital (i.e., a cost of capital that is not reduced by some measure of expected inflation), and require regulatory reviews of the prudence of individual investments. This method is also called "historical cost," "book value," and the "prudent investment" ratemaking approach. *See, e.g.,* Kahn, Alfred E., *The Economics of Regulation, Principles and Institutions*, The MIT Press, 1988, at p. 38.

[121] The term, "opportunity cost of capital," relies on the basic economic principle of an "opportunity cost," which is the profit or other benefit that an economic actor foregoes by choosing one course of action over another. The foregone benefit is an economic cost of pursuing the chosen course of action. Hence the term, "opportunity cost." The opportunity cost of capital for the investment under review is therefore the rate of return on alternative investments of equivalent risk. *See e.g.*, Brealey, R. A., S. C. Myers, and F. Allen, *Principles of Corporate Finance*, McGraw-Hill, (2020) at pp. 9-10.

regulatory framework requires both a determination of the fair value of a utility's rate base and a fair return on the fair value of the rate base.

Q116. HOW DOES THE COMMISSION DETERMINE THE FAIR VALUE RATE BASE?

A116. Consistent with the relevant laws and precedent, I understand that the Commission determines a fair value rate base as the end result of an adjudicatory proceeding typically initiated as part of a utility rate case filing. The Commission's evaluation requires the consideration of multiple methods of computing the utility rate base including utility asset replacement (or reproduction) cost, replacement cost new less depreciation ("RCNLD") with and/or without additional adjustments as needed for technological obsolescence, original cost depreciated, prudent investment, and present value.[122]

Q117. HOW DOES THE COMMISSION DETERMINE THE FAIR RATE OF RETURN ON A FAIR VALUE RATE BASE?

A117. Consistent with the laws and precedent described above, the Commission considers the following principles when evaluating and establishing a fair return:

- Comparability of the proposed rate of return to returns on investments in entities with comparable risks;

[122] "[T]he [Indiana Court of Appeals] gave the Commission the following four basic directives regarding the concept of 'fair value': (a) that it is upon the statutory fair value of which used and useful property of the utility should be allowed to earn a return; (b) that fair value is not an either/or situation as to original cost or reproduction cost new, but fair value is the conclusion or final figure drawn from all the various values or factors to be weighed in accordance with statute by the Commission; (c) that in its determination of fair value the Commission may not ignore the commonly known and recognized fact of inflation; and (d) that while original cost was one of the factors which the Commission should consider in arriving at a fair value figure, it is not, in and of itself, an accurate reflection of the 'fair value' of the Company's property." *See* Indiana Utility Regulatory Commission, "Petition of Indiana Michigan Power Company, an Indiana Corporation, for Authority to Increase its Rates and Charges for Electric Service, for Approval of New Schedules of Rates, and Rules and Regulations, for Approval of Revised Depreciation Rates and for Approval to Establish and Implement a System Sales Tracking Provision," Cause No. 39314, November 12, 1993.

- Return sufficient to ensure confidence in the financial integrity of the utility;
- Return sufficient to maintain the utility's credit; and,
- Return sufficient to attract future capital as needed.[123]

When applying these principles, the Commission relies on empirical estimates of a utility's cost of equity based on the return on investments in entities with comparable risks, along with consideration of the utility's capital structure and the utility's cost of debt. These three components are required to compute the utility's weighted average cost of capital, which is set as the utility's permissible rate of return.[124]

Q118. HOW DO PAST FAIR VALUE RATE BASE DETERMINATIONS ALIGN WITH THESE FACTORS?

A118. The Commission has found itself in the position of assessing the argument that original cost less depreciation should be the sole basis by which to define the fair value rate base.[125] I understand in many cases the Commission has considered depreciated original cost as an important component of the fair value rate base. However, consistent with the laws and precedent described above, the Commission also has routinely recognized and

[123] Commission Cause No. 42029, Petition of Indiana-American Water Company, Inc. for Authority to Increase its Rates and Charges for Water and Sewer Service and for Approval of New Schedules of Rates and Charges Applicable thereto, November 6, 2002, at p. 38.
[124] *See, e.g.,* Commission Cause No. 43680 at Petition of Indiana-American Water Company, Inc. for Authority to Increase its Rates and Charges for Water and Sewer Service and for Approval of New Schedules of Rates and Charges Applicable thereto, for approval of Changes to Rules and Regulations Applicable to Such Service and for Authorization to Defer in a Pension/OPEB Balancing Account Over- and Under-Recoveries for pass Through to Customers, April 30, 2010 at pp. 54, 58.
[125] *See, e.g.,* Commission Cause No. 43680 at Petition of Indiana-American Water Company, Inc., at pp. 54-59.

appropriately weighed the requirement that the fair value rate base should include consideration of RCNLD.[126]

Q119. SIMILARLY, HOW DO PAST DETERMINATIONS OF THE APPROPRIATE ALLOWED RATE OF RETURN ALIGN WITH THE RELEVANT FACTORS LISTED ABOVE?

A119. In the past, the Commission has recognized the need to consider the proper treatment of historical inflation and expected future inflation when arriving at a determination of a fair value rate base and a fair return on a fair value rate base. I address the treatment of both types of inflation in detail below.

B. ECONOMIC PRINCIPLES FOR FAIR VALUE RATEMAKING

Q120. PLEASE DESCRIBE ECONOMIC PRINCIPLES FOR SETTING AN APPROPRIATE RETURN OF AND ON INVESTMENT IN UTILITY ASSETS USED FOR THE PROVISION OF SERVICE TO UTILITY CUSTOMERS.

A120. From an economic perspective, utility rate regulation seeks to emulate competitive market pressures to incentivize the provision of reliable utility service to customers at reasonable costs.[127] Rates should be designed to "give the regulated firm a reasonable opportunity to recover the costs of the investments it makes efficiently to meet its service obligations and

[126] "In the Indianapolis Water Co. case, the Court of Appeals reaffirmed the holding in *Public Serv. Comm'n v. City of Indianapolis*, 235 Ind. 70, 131 N.E.2d 308, 325, (1956) that 'reproduction cost new cannot be disregarded in fixing a valuation for rate making purposes.' The Court of Appeals expressly stated that this observation is as pertinent today as in 1956." *See* Indiana Utility Regulatory Commission, "Re Indiana-American Water Company, Inc.," Cause No. 39595, February 2, 1994.

[127] *See, e.g.*, Giacchino, L.R. and J.A. Lesser, *Principles of Utility Corporate Finance*, Public Utilities Reports, Inc., (2011) at p. 4: "The fundamental economic goal of regulation is straightforward: to mimic a competitive market outcome, even when the underlying market is not competitive. In other words, purely economic regulation strives to achieve outcomes that capture the benefits of purely competitive markets when those markets are themselves not competitive."

no more than is necessary to do so."[128] The net present value ("NPV") investment criterion will ensure rates are set appropriately so long as:

$$C_0 \leq \sum_{t=1}^{n} \frac{\pi_t}{(1+r)^t}$$

where: C_0 is the original cost of a needed utility asset;

r is the firm's nominal after-tax opportunity cost of capital; and

π_t is equal to net cash flow (defined as revenue minus operating costs, taxes, and other expenses)

If the NPV investment criterion is met, which simply means that the present value of the future cash flows from an asset is equal to its cost, then the regulated firm will be willing to make the investment since it will recover its costs, including a return on its investment greater than or equal to its opportunity cost of capital.

Q121. DOES THE NPV INVESTMENT CRITERION REQUIRE THE USE OF A SINGLE METHOD OF COMPUTING THE VALUE OF A UTILITY'S RATE BASE?

A121. No. In fact, "[t]here are many (infinite) different streams of cash flows that satisfy the [NPV investment criterion] […] for a single asset firm."[129] For example, under original cost ratemaking for a single-asset firm, rates are initially high and then decline continuously as the value of the rate base declines due to accounting depreciation. Conversely, under trended original cost ratemaking, rates are initially low and increase

[128] Joskow, P., "Regulation of Natural Monopoly," *Handbook of Law and Economics*, Vol. 2, (2007), pp. 1227-1348 at p. 1289.
[129] Joskow, P., "Regulation of Natural Monopoly," *Handbook of Law and Economics*, Vol 2, (2007), pp. 1227-1348 at p. 1290.

continuously.[130] Thus, although different methods can satisfy the NPV criterion, different ratemaking approaches result in different cash flow patterns over time or across different states-of-the-world. As a result, different rate bases will result in different economic consequences for the regulated utility.[131] The important thing from an economic perspective is that the NPV of the projected cash flows, which depend on the rate of depreciation as well as the projected rate base and the allowed rate of return, must equal the cost of the asset when discounted at the appropriate opportunity cost of capital.[132]

Q122. PLEASE DESCRIBE HOW THE BOOK VALUE OF A UTILITY'S ASSETS CAN BE USED TO INFORM THE PROPER MEASUREMENT OF A FAIR VALUE RATE BASE.

A122. In 1923, Justice Louis Brandeis proposed the "prudent investment" approach for ratemaking.[133] Under this approach, regulators are obligated to review whether utility investments reflected "prudent" or reasonable decisions. If the investments were prudent, investors are permitted to earn a return of and on the "original cost" of this investment. Straight-line depreciation is used based on the accounting life of the underlying asset. As a result, the net book value of a firm's assets reflects the cost actually incurred by a firm and recognizes the fact that, all else equal, the value of those assets can be expected to

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[130] Anderson, E. R. and D. E. Mead, "A Comparison of Original Cost and Trended Original Cost Ratemaking Methods," *The Energy Journal*, Vol. 4, No. 2 (April 1983), pp. 151-158.
[131] *See, e.g.*, Greenwald, B., "Rate Base Selection and the Structure of Regulation," *The RAND Journal of Economics*, Vol. 15, No. 1 (Spring, 1984), pp. 85-95.
[132] As discussed further below, it also is important to consider potential differences in risk across different rate regimes. For example, historical cost or trended original cost may be considered less risky for a regulated firm than a fair value rate regime that depends on periodic revaluations of the competitive market value of a utility's rate base.
[133] *Southwestern Bell Telephone Company v. Public Service Commission of Missouri*, 262 U.S. 276, (1923).

decline as the asset ages. Thus, net book value provides at least one potentially useful data point for determining a firm's FVRB. At any given point in time, returns are calculated as the firm's nominal cost of capital multiplied by the original cost of prudently incurred plant and equipment less accumulated depreciation.[134]

Q123. PLEASE DESCRIBE HOW THE COMPETITIVE MARKET VALUE (CMV) OF A UTILITY'S ASSETS CAN BE USED TO INFORM THE PROPER MEASUREMENT OF A FAIR VALUE RATE BASE.

A123. Unlike the book value of a firm's assets, the competitive market value of a utility's assets is measured by the cost to reproduce their productive capacity at long-run equilibrium in a competitive market.[135] This result is derived from the simple fact that "old" or "used" productive assets, such as a water pump, must compete in secondary markets with brand new assets that do the same thing.[136] In this sense, the CMV of a firm's assets represents their current rather than historic value. It is the market value or price of the firm's assets at a point in time. Thus, rather than using straight line depreciation, the CMV of a firm's assets reflects economic depreciation including the impacts of physical depreciation and technological innovation/obsolescence, as well as general inflation.[137] So defined, the CMV of the firm's assets is exactly equal to the reproduction cost of the productive

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[134] *See, e.g.*, Joskow, P., "Regulation of Natural Monopoly," *Handbook of Law and Economics*, Vol 2, (2007), pp. 1227-1348.
[135] *See, e.g.*, Myers, S., "The application of finance theory to public utility rate cases," *The Bell Journal of Economics and Management Science*, Vol. 3, No. 1 (Spring, 1972), pp. 58-97.
[136] *See, e.g.*, Joskow, P., "Regulation of Natural Monopoly," *Handbook of Law and Economics*, Vol 2, (2007), pp. 1227-1348 at p. 1291: "The changes in the prices of new machines affect the value of old machines because new machines must compete with old machines producing the same product."
[137] *See, e.g.*, Joskow, P., "Regulation of Natural Monopoly," *Handbook of Law and Economics*, Vol 2, (2007), pp. 1227-1348.

capability of the assets of the firm.[138] The appropriate rate of return on this cost is still the firm's nominal cost of capital.[139] The CMV approach is analogous to mark-to-market accounting, while the original cost approach is analogous to book accounting. Standard investment theory suggests that equity investors expect a return on a firm's competitive market value rather than the historic book value of the firm.[140]

Q124. IS THE RETURN ASSOCIATED WITH A COMPETITIVE MARKET VALUE RATE BASE NECESSARILY HIGHER THAN THE RETURN ON AN ORIGINAL COST RATE BASE?

A124. No. Just as the net book value of the assets associated with any firm may be higher or lower than the market value of those assets, so too may the CMV of a utility's assets be higher or lower than the original cost of the utility's assets.[141] Over the long run, utilities regulated using a CMV rate base may earn their opportunity cost of capital on average, but any individual utility may earn more or less due to financial risks including technological innovation/obsolescence, general deflation, or accelerated physical depreciation due to inadequate operations and maintenance of capital equipment or unexpected environmental factors such as unexpectedly severe weather.

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[138] *See, e.g.*, Myers, S., "The application of finance theory to public utility rate cases," *The Bell Journal of Economics and Management Science*, Vol. 3, No. 1 (Spring, 1972), pp. 58-97.
[139] *See, e.g.*, Myers, S., "The application of finance theory to public utility rate cases," *The Bell Journal of Economics and Management Science*, Vol. 3, No. 1 (Spring, 1972), pp. 58-97.
[140] *See, e.g.*, Brealey, R., S. Myers, and A. Marcus, *Fundamentals of Corporate Finance*, 8th ed., McGraw Hill, (2015), at p. 60: "The book value of equity measures the cash that shareholders have contributed in the past plus the cash that the company has retained and reinvested in the business on their behalf. But this often bears little resemblance to the total market value that investors place on the shares. […] Shareholders are concerned with the market value of their shares; market value, not book value, is the price at which they can sell their shares."
[141] *See, e.g.*, Data on Price and Value to Book Ratio by Sector in the United States, available at: https://www.stern.nyu.edu/~adamodar/pc/datasets/pbvdata.xls.

Q125. FROM AN ECONOMIC PERSPECTIVE, CAN THERE BE EFFICIENCY BENEFITS FROM VALUING RATE BASES USING RATES BASED ON COMPETITIVE MARKET VALUE RATHER THAN ORIGINAL COST?

A125. Yes. Under original cost ratemaking, regulators' primary mechanism for controlling a utility's investment incentives is identifying and disallowing imprudent or wasteful expenditures. In practice, utilities often enjoy a presumption of prudence in these proceedings, setting a high evidentiary bar for demonstrating imprudence on the part of intervenors.[142] As a result, original cost ratemaking can fail to result in the optimal mix of inputs (e.g. capital, labor, and other operating expenses) used to provide utility service to customers.[143] In contrast, replacement cost approaches like the CMV, if properly administered by regulators and regulated firms, can be expected to provide incentives for utilities to choose a more economically efficient input mix for any given level of utility service.[144]

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[142] *See, e.g., Southwestern Bell Telephone Company v. Public Service Commission of Missouri*, 262 U.S. 276 (1923): "Every investment may be assumed to have been made in the exercise of reasonable judgment, unless the contrary is shown." *See also,* Rose, K. and R. Burns., "An Interim Report Overview and Discussion Of The Key Regulatory Issues In Implementing The Electric Utility Provisions Of The Clean Air Act Amendments Of 1990," *The National Regulatory Research Institute*, (June 1991): "The prudence test dates back to a concurring opinion of Supreme Court Justice Louis Brandeis in 1923. State commissions have developed […] guidelines in applying the prudence test [including] there is a presumption of prudence […] The presumption of prudence resulted in few prudence cases before 1973. The Brandeis guideline basically states that every investment and expenditure is presumed to be the result of reasonable judgment unless the contrary is shown. State commissions have interpreted this as requiring a rebuttable presumption of prudence. Without such affirmative evidence showing mismanagement, inefficiency, or bad faith, an investment decision is presumed to be prudent."

[143] For example, see the large academic literature on the Averch-Johnson effect, suggesting that monopolies regulated under original cost ratemaking will tend to use an inefficient input mix – specifically, for any given level of output, the regulated firm uses too much capital relative to labor. *See* Averch, H. and L.L. Johnson, "Behavior of the Firm under Regulatory Constraint," *American Economic Review*, Vol. 52, pp. 1052-1069.

[144] In effect, a well administered CMV regime should incorporate prudency determinations through calculation of the competitive market value of the utility's assets. For example, if an asset was imprudently purchased such that it either produced at too high a cost, or was not used and useful at all, all or part of its cost could be excluded from the CMV

Q126. PLEASE EXPLAIN HOW AN OBJECTIVE ESTIMATE OF A UTILITY'S REPRODUCTION OR REPLACEMENT COSTS CAN BE CALCULATED.

A126. An appropriately calculated CMV rate base would be an estimate of the cost to reproduce the productive capacity of a utility's capital asset base with the most efficient system available at the time of the analysis. Such a value can be approximated using approaches such as an estimated RCNLD that captures "economic" depreciation as opposed to book depreciation.

Q127. PLEASE DESCRIBE THE IMPLICATIONS OF THESE OBSERVATIONS REGARDING THE ECONOMICS OF FAIR VALUE RATEMAKING FOR WESTFIELD WATER'S CALCULATION OF ITS FVRB AND THE COMMISSION'S DETERMINATION OF THE FVRB IN THIS CASE.

A127. I do not offer an opinion regarding the appropriate FVRB in this case. However, based on my review of the testimonies of Westfield Water witnesses Ann Bui and Craig Jackson, in my opinion Westfield Water's proposed FVRB (based primarily on an RCNLD estimate) is a better measure than depreciated historical cost, and has a high likelihood of being lower than the CMV based on the manner in which it was calculated.[145] First, Ms. Bui's testimony presents the analytical framework and analyses that estimate the RCNLD based on: 1) the current cost to replace Westfield Water's assets based on inflation adjusted asset values using engineering-based inflation estimates, and, 2) depreciation adjustments that

rate base by regulators as part of their deliberations in a regular rate case. *See, e.g.*, Greenwald, B., "Rate Base Selection and the Structure of Regulation," *The RAND Journal of Economics*, Vol. 15, No. 1 (Spring, 1984), pp. 85-95.

[145] Jackson Direct Testimony at pp. 13-14 and Bui Direct Testimony at pp. 9-10.

reduce the asset value to generally account for wear and tear, deterioration, and obsolescence.[146] Ms. Bui also testifies that the current replacement cost of Westfield Water's assets would be above her RCNLD estimate. I understand that Ms. Bui's analysis of current replacement cost reflects the minimum cost to reproduce the productive capacity of Westfield Water's current system. Thus, I understand that Ms. Bui's testimony is that her RCNLD is less than the CMV rate base value that would result if Westfield Water's system was rebuilt now.

Second, Mr. Jackson's testimony explains that Westfield Water's proposed FVRB is significantly lower than Ms. Bui's estimated RNCLD.[147] As Mr. Jackson's testimony describes, when Westfield Water was acquired a settlement agreement was reached that separates the FVRB into two components (pre-2012 assets and post-2011 assets). The settlement agreement stipulates that the pre-2012 rate base assets will not be increased for inflation. The settlement agreement therefore results in Westfield Water's FVRB being almost entirely composed (> 90%) of rate base investment that was completed post-2011. Because the investment was completed recently, the assets are newer and earlier in their useful lives, and the impact of inflation is lower than if the rate base included decades of system investments. In addition, Mr. Jackson's proposed FVRB is notably lower than Ms. Bui's RCLND and its value is closer to the original cost of Westfield Water's capital investment in post-2011 assets.[148]

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[146] Bui Direct Testimony at pp. 13-17.
[147] Jackson Direct testimony at p. 15. Ms. Bui reports a test period fair value RCNLD of $128.9 MM, considerably greater than Mr. Jackson's proposed test period FVRB of $89.89 MM. Note also that Mr. Jackson reports that the Pre-2012 assets rate base proposed by the Company is $7.313 MM as of June 30, 2023.
[148] Jackson Direct Testimony at p. 15.

Q128. YOU NOTE THAT A FAIR VALUE RATE BASE REGIME REQUIRES THE USE OF ECONOMIC DEPRECIATION IN DETERMINING RATES AS WELL AS THE CMV RATE BASE. HAVE YOU CONSIDERED THE DEPRECIATION RATES THAT WESTFIELD WATER PROPOSES TO USE TO DETERMINE ITS RATES AND FVRB?

A128. Yes. I have reviewed the depreciation rates relied upon by Ms. Bui and Mr. Jackson in the determination of the FVRB. Westfield Water's approved annualized depreciation rates by type of asset were established based on Citizens Energy Group's 2016 depreciation study of the Group's assets in use at that time.[149] I understand that application of these rates to Westfield Water's link period and forward test year projections of assets in service yields effective overall rates of 1.66% and 1.53%, respectively.[150] I have considered how Westfield Water's approved depreciation rates compare to corresponding estimates of economic depreciation. In particular, the U.S. Bureau of Economic Analysis (BEA) produces depreciation studies that evaluate economic depreciation.[151] I compare these BEA economic depreciation rates to Westfield Water's book depreciation rates to determine whether the latter rates approximate economic depreciation.

Q129. PLEASE EXPLAIN.

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[149] Citizens Energy Group, 2016 Depreciation Study, Gannett Fleming Valuation and Rate Consultants, LLC, December 7, 2017, at vi and as approved by the IURC in its order on Cause No. 45039, December 27, 2018 at p. 4.
[150] Verified Direct Testimony of Camela Johnson at pp. 16-17.
[151] Bureau of Economic Analysis, "Fixed Asset Depreciation Estimates," available at https://apps.bea.gov/national/pdf/BEA_depreciation_rates.pdf?_gl=1*1hfslox*_ga*NTU2NjMxNDA0LjE2OTk5NzY3MjU.*_ga_J4698JNNFT*MTY5OTk3NjcyNS4xLjEuMTY5OTk3Nzg3Mi4wLjAuMA (viewed November 15, 2023).

A129. Economic depreciation evaluates the change (generally a decline) in asset value based on changes in the estimated market prices at which the used assets can be sold in secondary markets. The BEA follows established principles that estimate the economic depreciation of several asset classes.[152] The BEA's most recent estimate of annual economic depreciation of water system supply assets is 1.52% for government owned water systems and 2.25% for privately owned water systems. Westfield Water's link year and forward test year rates (1.66% and 1.53%) are roughly in line with or towards the low end of the range of the BEA's estimates, meaning that Westfield Water's annualized accounting depreciation rates are aligned generally with economic depreciation rates.

C. BASIC ECONOMIC PRINCIPLES FOR DETERMINING A FAIR RETURN ON A FAIR VALUE RATE BASE

Q130. HOW IS A REGULATED UTILITY ENSURED ACCESS TO CAPITAL AT REASONABLE RATES UNDER FAIR VALUE REGULATION?

A130. Under fair value regulation, the regulator should set the permitted rate of return using the firm's nominal opportunity cost of capital.[153] The opportunity cost of capital is defined as the expected market rate of return that could be achieved by investing in assets with the

[152] Bureau of Economic Analysis, "Fixed Asset Depreciation Estimates," available at: https://apps.bea.gov/national/pdf/BEA_depreciation_rates.pdf?_gl=1*1hfslox*_ga*NTU2NjMxNDA0LjE2OTk5NzY3MjU.*_ga_J4698JNNFT*MTY5OTk3NjcyNS4xLjEuMTY5OTk3Nzg3Mi4wLjAuMA (viewed November 15, 2023). BEA endeavors to derive depreciation rates based on resale market used asset prices wherever possible. BEA depreciation rates are primarily derived by Fraumeni from estimates made by Hulten and Wykoff under the auspices of the U.S. Department of the Treasury. *See* Fraumeni B.M., "The Measurement of Depreciation in the U.S. National Income and Product Accounts, *Survey of Current Business*, Vol. 77, (July 1997), pp. 7–23*; See also Fixed Assets and Consumer Durable Goods in the United States, 1925-97.* Bureau of Economic Analysis, Washington, DC: U.S. Government Printing Office, (September 2003), pp. M-29-M-33.

[153] *See, e.g.*, Myers, S., "The application of finance theory to public utility rate cases," *The Bell Journal of Economics and Management Science*, Vol. 3, No. 1, (1972), pp. 58-97; Myers, S. "Rate of Return Regulation – A Critical Appraisal," Presented at the FCC Future Planning Conference, July 12, 1976; Joskow, Paul, "Regulation of Natural Monopoly," *Handbook of Law and Economics* Vol. 2, (2007), pp. 1227-1348.

same level of risk.[154] By setting the rate of return based on what investors expect to earn for investments in assets with a similar risk profile, capital investors will be willing to consider making equity investments in the utility. At the same time, potential utility equity investors will consider other factors such as the financial strength of the utility and the historic regulatory treatment received by the utility.

Q131. PLEASE EXPLAIN HOW YOUR ESTIMATES OF WESTFIELD WATER'S NOMINAL COST OF EQUITY INCLUDE COMPENSATION FOR EXPECTED FUTURE INFLATION.

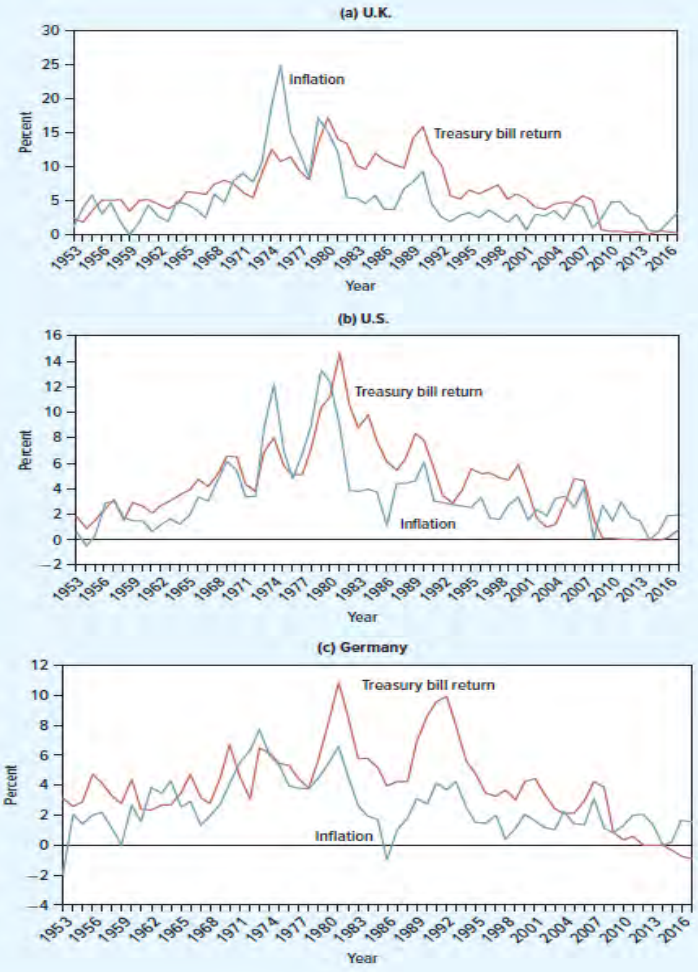
A131. The opportunity cost of capital that is determined using the CAPM or DCF approaches, as I have calculated earlier in my testimony, includes compensation for estimated future inflation as well as the risk that future inflation will be different than expected. This fact can be seen most clearly by considering that the cost of capital estimated using the CAPM starts with a U.S. Treasury interest rate that is determined in significant part by expectations of future inflation. This basic economic proposition is supported by both theory and empirical evidence. The chart below, which is sourced from a leading graduate corporate finance textbook, shows that interest rates rise and fall with inflation as predicted by economist Irving Fisher's theory of the impact of inflation on interest rates.[155]

[154] *See, e.g.,* Brealey, R., S. Myers, and A. Marcus, *Fundamentals of Corporate Finance*, 8th ed., McGraw Hill, (2015), at pp. 234-245, 332.
[155] Brealey, R. A., S. C. Myers, and F. Allen, Principles of Corporate Finance, McGraw-Hill (2020), at p. 66.

FIGURE 3.8

The return on Treasury bills and the rate of inflation in the U.K., U.S., and Germany, 1953–2017

Source: E. Dimson, P. R. Marsh, and M. Staunton, *Triumph of the Optimists: 101 Years of Investment Returns* (Princeton, NJ: Princeton University Press, 2002), with updates provided by the authors.



Thus, the data strongly suggest that U.S. Treasury interest rates incorporate expected future inflation. Of course, this makes both economic and common sense because firms and investors ultimately care about the effect of their investment efforts on their future ability to consume goods and services, the cost of which is affected by future inflation. As such, investors and firms seek to earn a return on their investments that exceeds inflation, referred to in economics as a "positive real rate of return."

D. THE TREATMENT OF HISTORICAL AND FUTURE INFLATION UNDER INDIANA FVRB RATEMAKING AND ITS RELEVANCE FOR THE RISK OF INDIANA UTILITIES

Q132. IN PREVIOUS CASES, HAS THE COMMISSION CONSIDERED POSSIBLE ADJUSTMENTS TO A UTILITY'S ALLOWED RATE OF RETURN TO ACCOUNT FOR HISTORIC OR EXPECTED INFLATION WHEN USING A FAIR VALUE RATE BASE?

A132. Yes. At times in the past, I understand that the Commission has adjusted a utility's allowed rate of return downwards when the fair value rate base is greater than an original cost basis. The logic used to make this adjustment has been described as a desire to control for the impact of historical inflation in determining the FVRB:

> The Commission has asserted in previous rate cases, insofar as the fair value rate base contains historical inflation, that it is historical inflation and not the prospective inflation that should be removed from the cost of capital to estimate a fair rate of return. The Commission previously explained that "[i]n order to avoid over-compensating Petitioner for the effects of historical inflation, it is necessary to remove the historical inflation component from the costs of capital to derive a fair return."[156]

In these instances, the Commission has typically subtracted a measure of historic inflation from the utility's allowed rate of return used to determine future rates.[157]

Q133. IS IT EVER APPROPRIATE TO APPLY AN INFLATION ADJUSTMENT TO THE NOMINAL OPPORTUNITY COST OF CAPITAL IN THE CONTEXT OF UTILITY RATEMAKING?

[156] IURC Order in Cause No. 43680, at p. 58.
[157] *See, e.g.,* IURC Order in Cause Nos. 42029 and 43680.

A133. Yes. In the context of original cost ratemaking, it can be appropriate to apply a real cost of capital to a "trended original cost" rate base. The problem of compensating regulated utilities for inflation and inflation risk has been extensively studied in other contexts. For example, in the 1980s, the Federal Energy Regulatory Commission ("FERC") required oil pipelines to be valued via a "Trended Original Cost" ("TOC") approach.[158]

Q134. WHAT IS A "TRENDED ORIGINAL COST" APPROACH?

A134. The TOC approach is a variant of the original or historical cost ratemaking method and thus the particulars of its application are not directly relevant to the appropriate application of the fair value regime in Indiana. However, the manner in which inflation is discussed and treated under a TOC approach provides some insights relevant to the appropriate treatment of inflation under a fair value regime.

Q135. PLEASE EXPLAIN.

A135. As an initial matter, it is important to remember that the profits earned by a regulated enterprise generally are determined by multiplying the value of its invested capital, or rate base, by an appropriate allowed rate of return. Thus, it is important to consider both of these variables together. Under the TOC approach as applied by FERC, the rate base and depreciation included in rates are inflated each year via a pre-authorized inflation index. Therefore, to avoid over-compensating utilities for inflation, given that the rate base itself was providing such compensation, FERC chose to remove expected inflation from the cost of equity (i.e. calculate a "real" cost of equity) prior to calculating a utility's return while

[158] *Williams Pipe Line Company*, Opinion No. 154-B, June 28, 1985, 31 FERC ¶ 61,377 (1985).

automatically trending the rate base.[159] This adjustment was made because, going forward, the regulated firms at issue would be compensated for inflation by increasing their rate base (and depreciation included in rates) at the inflation rate. Thus, while not directly applicable in this case because TOC is a form of historical cost ratemaking, its application by regulators shows that, if the nominal rate of return is reduced by inflation, then it is necessary to adjust the rate base for future inflation on an ongoing and continuous basis in order to compensate the utility for inflation risk. To do otherwise would subject the relevant utility to inappropriately high and asymmetric inflation risk over time.

Q136. HOW IS THIS DISCUSSION OF THE TOC APPROACH RELEVANT TO THE APPLICATION OF THE FVRB REGIME IN INDIANA?

A136. Unlike the automatic annual updating of the rate base employed under the TOC approach, I understand that the FVRB under Indiana state laws and regulation does not adjust until there is a new rate case. This delay between rate cases creates "regulatory lag."[160] As a result, Indiana's current FVRB regime provides *retrospective* rather than *prospective* or *contemporaneous* compensation for changes in the FVRB.[161] For example, if the CMV of

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[159] *Williams Pipe Line Company*, Opinion No. 154-B, June 28, 1985, 31 FERC ¶ 61,377 (1985).
[160] *See, e.g.*, Myers, S., "The application of finance theory to public utility rate cases," *The Bell Journal of Economics and Management Science*, Vol. 3, No. 1 (Spring, 1972), pp. 60-61.
[161] Original cost ratemaking provides prospective compensation for inflation by setting a utility's return equal to the nominal cost of capital multiplied by the depreciated original cost of the rate base. TOC ratemaking provides contemporaneous compensation for inflation by setting a utility's return via automatic inflation of the rate base and a real rate of return. Indiana's FVRB regime provides retrospective compensation for inflation via delayed increases to the rate base and a rate of return reduced by the historic inflation rate. For additional discussion of how cash flows differ over time under original cost and TOC ratemaking, *see* Anderson, E. R. and D. E. Mead. "A Comparison of Original Cost and Trended Original Cost Ratemaking Methods," *The Energy Journal*, Vol. 4, No. 2 (April 1983), pp. 151-158.

a utility's rate base were to increase, the utility would not be able to receive a higher return until its next rate case.

Q137. WHAT ARE THE IMPLICATIONS OF REGULATORY LAG AND RETROSPECTIVE RATE BASE CHANGES FOR UTILITIES REGULATED UNDER THE FVRB REGIME IN INDIANA?

A137. The combination of regulatory lag and retrospective changes in rate base value creates additional risk for regulated utilities in Indiana. As I explain in detail below, utilities regulated under Indiana's FVRB regime face incremental, asymmetric risk due to the combination of regulatory lag, regulatory uncertainty associated with future rate cases, Indiana's "excess earnings" test, deflation, and technological and economic obsolescence.

Q138. WHY DO REDUCTIONS TO THE NOMINAL COST OF CAPITAL BASED ON HISTORICAL OR FUTURE INFLATION CREATE ADDITIONAL RISKS TO REGULATED UTILITIES IN INDIANA?

A138. If the allowed rate of return under a FVRB regime is ever set below the nominal cost of capital, the allowed rate of return is guaranteed to result in cash flows that produce an annual return on investment below the nominal cost of capital until the next rate case. Although it is possible for a future rate case to "make up" for some of these missing cash flows through, for example, increases in the FVRB, the combination of regulatory lag and uncertainty about the outcome of future rate cases means that this hypothetical future compensation is uncertain and therefore risky from the perspective of the utility. All else equal, the asymmetric risk of a utility earning less than its nominal cost of capital each year reduces the regulated utility's incentives to invest in needed infrastructure because this risk

raises the economic cost of each capital investment. In the long run, inefficient investment incentives increase the risk of inefficient capital allocation, which in turn results in higher costs to customers in the long run.

Q139. ARE THERE ANY OTHER POTENTIAL INCREASED COSTS TO CUSTOMERS FROM REDUCING THE ALLOWED RATE OF RETURN BELOW ITS NOMINAL COST OF EQUITY CAPITAL?

A139. Yes. If the allowed rate of return is set below a utility's nominal cost of equity capital, then its earnings and cash flows will be set at a level lower than is suggested by the risk of the firm's assets. All else equal, this could lead to higher borrowing costs as lenders increase their assessment of the regulated utility's risk. These higher borrowing costs would be borne by customers to the extent they are passed along in rates.

Q140. ARE THERE ANY OTHER REASONS THAT THE NOMINAL COST OF EQUITY THAT YOU CALCULATE SHOULD NOT BE ADJUSTED DOWNWARDS WHEN DETERMINING A REGULATED UTILITY'S ALLOWED RATE OF RETURN?

A140. Yes. An additional reason is that utilities operating under a fair value regulatory rate regime face additional inflation-related and regulatory risks that are not faced by utilities regulated under historical cost regimes. Specifically, under a fair value regime, the CMV can be adjusted downwards at the time of the next rate case if there has been an unusually large decline in value due to physical deterioration or obsolescence, or if there has been deflation (i.e., a general decline in market prices) rather than inflation. The reduction in the utility's rate base would reduce revenues and profits by reducing return on capital and, potentially, return of capital by reducing depreciation included in rates. Additionally,

deflationary environments often are associated with declines in economic activity, including large recessions. In that case, demand for water would decline below the projected level, thus putting more pressure on the utility's revenues and profits. And finally, the utility's allowed rate of return likely would be reduced because interest rates can be expected to decline in a down economy. All of these factors would cause the utilities' rates and profits to be reduced below their projected level and they likely would stay reduced for an extended period. This is a significant systematic risk that is not faced by a utility regulated under a historical cost regime.[162]

In addition, the need for regulators to set both the CMV, as well as an allowed rate of return at the time of each rate case, introduces additional regulatory risk that is not faced by utilities regulated under an historical cost regime and rate of return regulation.

Finally, I understand that there is an "excess earnings test" under Indiana law that triggers a review process if utilities' rates of return are above 110% of their approved costs of capital.[163] Such a review process and potential earnings cap creates an asymmetric risk from an economic point of view in which a utility can earn substantially less than its cost of capital but not substantially more. All of these risk factors strongly support approval of an allowed rate of return on equity that is not reduced below the nominal cost of capital that I recommend in this case.

[162] Indeed, all else equal, to the extent that the regulated firms in my cost of capital sample are regulated under an historical cost approach rather than a fair value regime, the cost of capital that I calculate would be understated for application to Westfield Water.
[163] See, IC Section 8-1-2-42.5, GAO 2018-1 and December 18, 2003, Memorandum to Chairman Huston Re: Summary Results of Periodic Review for Calendar Year 2022.

Q141. YOU MENTION DEFLATION. ISN'T DEFLATION IN THE UNITED STATES VIRTUALLY IMPOSSIBLE?

A141. No. Deflation definitely can occur in developed nations such as the United States, and for extended periods. For example, Japan famously has experienced deflationary conditions for decades, even as its economy has performed reasonably well.[164] China currently is in a deflationary environment, which started over 6 months ago, and there is a concern that deflation in China could continue or even worsen in the future.[165] Perhaps more importantly, economic researchers have measured the expected risk of deflation in the United States using the prices of inflation derivatives and found such risk to be significant. Specifically, in a 2017 article, Fleckenstein et al., found that the implied probability that the realized inflation rate will be less than zero (*i.e.*, deflation) is 18.8 percent for a 1-year time horizon, 13.8 percent for a two-year horizon, 5.7 percent for a five-year horizon and 1.4 percent for a ten-year horizon.[166]

E. WESTFIELD WATER'S COST OF EQUITY SHOULD NOT BE ADJUSTED DOWNWARDS FOR EITHER HISTORICAL OR EXPECTED INFLATION WHEN CALCULATING THE RETURN ON A FAIR VALUE RATE BASE

Q142. PLEASE DESCRIBE HOW WESTFIELD WATER'S RATES WERE SET PRIOR TO THIS CASE.

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[164] *See, e.g.* Yamazaki M., and R. Shimizu, "As Japan emerges from deflation, banks get wake-up call on interest rate swing," *Reuters*, December 5, 2023, available at https://www.reuters.com/business/finance/japan-emerges-deflation-banks-get-wake-up-call-interest-rate-swing-2023-12-05/ (viewed February 1, 2024).
[165] *See, e.g.* "China's consumer prices fall fastest in 3 years, factory-gate deflation deepens," *Reuters*, December 10, 2023, available at https://www.reuters.com/world/china/chinas-consumer-prices-fall-fastest-3-years-factory-gate-deflation-deepens-2023-12-09/ (viewed February 1, 2024). *See, also,* Xie, S.Y., "Deflation Worries Deepen in China," *The Wall Street Journal*, January 12, 2024, available at https://www.wsj.com/world/china/deflation-worries-deepen-in-china-e193c735?mod=china_more_article_pos35 (viewed February 13, 2024).
[166] *See* Fleckenstein, M, F.A. Longstaff, and H. Lustig, "Deflation Risk," *The Review of Financial Studies*, Vol. 30, No. 8, (2017), pp. 2719-27-60, at p. 2742.

A142. I understand that the Common Council of the City of Westfield ("Westfield City Council") "withdrew the City's water utility from Commission jurisdiction with respect to the approval of rates and charges in 1989." Thus, Westfield Water's rates were set by ordinance by the City of Westfield prior to this case. As part of the original settlement agreement to acquire Westfield Water, I understand Citizens agreed to implement the rate schedules adopted by the City and in effect at the time of the transaction.[167]

Q143. PLEASE DESCRIBE THE RATE SCHEDULES WESTFIELD WATER AGREED TO IMPLEMENT AT THE TIME OF THE INITIAL ACQUISITION.

A143. At the time of acquisition, O.W. Krohn and Associates, a consulting company hired by the City of Westfield, estimated that Westfield Water would require $30 million in capital investment spending over the next five to seven years, including two additional storage towers, one additional ground storage tank, a new 30 inch water transmission / distribution main, routine main extensions, loops & replacements, and an additional water treatment plant.[168] O.W. Krohn and Associates recommended a rate increase to ensure that debt service on the proposed capital projects was recovered in the revenue requirement.[169]

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[167] Indiana Utility Regulatory Commission, "Order of the Commission," Cause No. 44273, p. 3, available at: https://iurc.portal.in.gov/_entity/sharepointdocumentlocation/a28c94f8-3c83-e611-810e-1458d04f0178/bb9c6bba-fd52-45ad-8e64-a444aef13c39?file=44273order_112513.pdf. (viewed December 20, 2023) "[T]he City's existing rates and charges for water service are lawfully approved by the City Council pursuant to Ind. Code § 8-1.5-3-8. […] The City's current water user rates and charges were adopted by the Westfield City Council. These rates and charges provide for annual increases to the City's water user rates and charges effective January 1, 2013 through January 1, 2016…[T]he Settling Parties agreed the Citizens Joint Petitioners would implement the rate schedules adopted by the City and in effect at the time of closing the transaction…[T]here were five separate ordinances that lead to the agreed-upon rates: Ordinances 12-01,12-02, 13- 20, 13-27 and 13-28."

[168] "City of Westfield, Indiana Municipal Water Utility Pro Forma Revenue Requirements Proposed Water Rates & Charges," O.W. Krohn and Associates, p. 23.

[169] "City of Westfield, Indiana Municipal Water Utility Pro Forma Revenue Requirements Proposed Water Rates & Charges," O.W. Krohn and Associates, p. 26.

Importantly, no rate of return or cost of equity was included explicitly in the pro forma revenue requirements providing the basis for the City of Westfield's rate increases.[170] Ultimately, the City of Westfield approved staggered overall rate increases for the Water System from 2013 to 2016.[171]

Q144. HAS WESTFIELD WATER INCREASED ITS RATES SINCE 2016?

A144. No. Since 2016, Westfield Water has held its rates fixed despite a 7,807 (51%) increase in total connections, and a $3,013,710 (59%) increase in associated operating expenses.[172] Additionally, the CPI-U inflation index has increased 22% on a cumulative basis, while the Handy-Whitman construction index has increased 49% on a cumulative basis since 2016.[173]

Q145. ARE WESTFIELD WATER'S RATES CURRENTLY HIGH ENOUGH TO ADEQUATELY COMPENSATE POTENTIAL EQUITY INVESTORS?

A145. No. As shown in Attachment RJM-11, Westfield Water's real rate of return on book equity ("ROE") for the last three years ending 9/30/23 ranged from -0.2 to 2.8 percent and averaged 1.8 percent.[174] Over the last five years, the range was -0.2 to 8.2 percent, for an

[170] "City of Westfield, Indiana Municipal Water Utility Pro Forma Revenue Requirements Proposed Water Rates & Charges," O.W. Krohn and Associates, p. 29.
[171] "Verified Rebuttal Testimony of Todd Burtron On Behalf of Joint Petitioner City of Westfield," pp. 28-34, available at https://iurc.portal.in.gov/_entity/sharepointdocumentlocation/4e01dfd6-5e84-e611-8124-1458d04ea8b8/bb9c6bba-fd52-45ad-8e64-a444aef13c39?file=sandy_engle_rebuttal_testimony_-_cause_44273_5_30_20134-50-46pm[1].pdf (viewed December 20, 2023).
[172] Values for total connections and operating expenses are taken from the 2016 & 2022 Citizens Water of Westfield Annual Reports to the IURC.
[173] "Consumer Price Index for All Urban Consumers: All items in U.S City Average," FRED Economic data, available at https://fred.stlouisfed.org/series/CPIAUCSL (viewed December 20, 2023); Handy Whitman Construction index, available at https://www.pjm.com/-/media/committees-groups/subcommittees/cds/postings/handy-whitman-index.ashx. (1061-714)/714=48.6% (viewed December 20, 2023).
[174] ROE is calculated as (Net Income)/(Average Book Equity).

average of 4.1 percent. These returns are far below the real rates of return implied by Westfield Water's cost of equity capital during this period. These implied real rates of return over the last three and five years ranged from 5.9 to 7.8 percent and averaged 6.7 percent over both periods. These actual real rates of return of 1.8 and 4.1 percent also are well below Westfield Water's current real cost of equity of 8.1 percent ((1.109 / 1.0261) – 1) = 8.08 percent).

Westfield Water's real rates of return on rate base ("RORB") and invested capital ("ROIC") show a similar pattern. Westfield Water's RORB ranged from 0.2% to 8.0% between 2019 and 2022, averaging 4.2%.[175] Moreover, the ROIC ranged from -2.1% to 1.5% and averaged just 0.2%.[176]

Absent an increase in its authorized rates, Westfield Water would find it difficult to attract the level of equity capital required to fund its projected investment spending program because it is currently unable to offer potential investors a rate of return at or above the opportunity cost of their capital. Low levels of equity capitalization could lead to negative impacts on Westfield Water's credit rating and an increased cost of debt.[177] These higher borrowing costs likely would be passed on to Westfield Water's customers.

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[175] Returns on rate base are presented in Citizens Water of Westfield's annual reports to the IURC. Real returns on rate base are calculated by adjusting the RORB for inflation using the equation (1+ RORB) / (1 + inflation) -1. *See* Citizens Water of Westfield Annual Reports to the IURC 2019-2022, p F-5, line "Actual Rate of Return". Annual inflation rates are calculated using the Bureau of Labor Statistics' Urban Consumer Price Index (CPI-U) on a December-to-December basis. The CPI-U is available at https://beta.bls.gov/dataViewer/view/timeseries/CUUR0000SA0;jsessionid=109169578E3902BE3D233200E77364F2.

[176] The RORB and ROIC use operating income as the numerator in the calculation and the resulting returns should be compared to Westfield Water's weighted average cost of capital ("WACC"), not its cost of equity capital.

[177] *See* "Regulated Water Utilities," Moody's Investor Service, June 8, 2018, available at: https://www.yorkshirewater.com/media/c1xccerz/appendix-f2-moodys-rating-methodologies-regulated-water-utilities-jun-2018.pdf. (viewed December 20, 2023).

Q146. HAVE WESTFIELD WATER'S HISTORIC RATES PROVIDED COMPENSATION FOR EXPECTED INFLATION VIA A NOMINAL RATE OF RETURN OR ACTUAL INFLATION VIA INDEXED ADJUSTMENTS TO ANNUAL REVENUE REQUIREMENTS?

A146. No. As discussed above, Westfield Water's rates were set by the City of Westfield to cover the current cost of service and debt associated with anticipated capital investment (as of 2012), while simultaneously satisfying certain debt coverage metrics. The rates were not set explicitly to achieve a particular rate of return or to compensate for the risk of either actual or expected inflation. This fact became abundantly clear in recent years based on the data in RJM-11 showing that Westfield Water's average real ROE for the last three and five years was well below its historical and current real cost of equity capital.

Q147. DO YOUR CURRENT COST OF EQUITY ESTIMATES FOR WESTFIELD WATER IN THIS PROCEEDING REFLECT THE IMPACT OF HISTORICAL INFLATION?

A147. No. As discussed above, the cost of equity must be set at the opportunity cost of capital i.e., the rate of return that investors would expect to earn from investments of the same risk. Investors require compensation for future inflation risk. For example, as noted, nominal Treasury bonds persistently have offered higher rates of return than Treasury Inflation-Protected Securities (TIPS)—debt securities for which the coupon and principal payments are indexed to the consumer price index (CPI).[178] Importantly, this inflation

[178] *See, e.g.*, Gürkaynak, R. S., B. Sack, and J. H. Wright, "The TIPS Yield Curve and Inflation Compensation," *American Economic Journal: Macroeconomics*, Vol. 2, No. 1, 2010, pp. 70-92.

premium is related solely to investor expectations for future inflation rather than historical inflation. As such, historical inflation has no impact on Westfield Water's recommended cost of equity.

Q148. IS IT APPROPRIATE TO ADJUST WESTFIELD WATER'S CURRENT COST OF EQUITY DOWNWARDS BY AN AMOUNT EQUAL TO HISTORICAL INFLATION PRIOR TO CALCULATING THE RETURN ASSOCIATED WITH ASSETS PLACED INTO SERVICE PRIOR TO JANUARY 1, 2012?

A148. No. First, as discussed above, Westfield Water and its owners already effectively have borne the cost of historical inflation in the form of low real rates of return over the last 3 and 5-years that are well below its cost of capital. These low returns were caused by its fixed rates in the face of high inflation. Adjusting its allowed future rate of return for historical inflation would effectively double-count this economic cost. Second, also as discussed above, if the rate of return on equity used to set Westfield Water's rates is set below its nominal cost of capital, it would be inconsistent with financial economic theory and would cause Westfield Water to earn less than its full cost of capital and bear uneconomically high inflation risk going forward, at least until its next rate case. This asymmetric risk would discourage efficient investment and capital allocation, all else equal, and potentially raise borrowing costs higher than necessary, both of which ultimately would raise costs to consumers.

In addition, and specifically with respect to assets placed into service prior to January 1, 2012, I understand that the settlement agreement for the acquisition of Westfield Water requires that the sum of the net original cost of assets placed into service prior to

January 1, 2012 and the fair value increment will not be less than $19,430,000 or greater than $21,581,800 for the water utility assets.[179] Citizens is permitted to earn a return on, but not of, the unamortized amounts of the fair value increment of $6,960,000 for the water utility. This fair value increment was the result of negotiations at the time of the sale of Westfield Water and no adjustment has been made to this fair value increment to reflect inflation since then.[180] This represents another reason that it would be inappropriate to adjust the current nominal cost of equity downwards to reflect the impact of historical inflation for assets placed into service prior to 2012.

Q149. IS IT APPROPRIATE TO ADJUST WESTFIELD WATER'S CURRENT COST OF EQUITY DOWNWARDS BY AN AMOUNT EQUAL TO HISTORICAL INFLATION PRIOR TO CALCULATING THE RETURN ASSOCIATED WITH ASSETS BROUGHT INTO SERVICE BETWEEN JANUARY 1, 2012 AND JUNE 30, 2023?

A149. No. Westfield Water's historic revenue requirements and rates were set by the City of Westfield to provide a return of debt associated with projected capital expenditures and meet certain debt coverage metrics. Thus, Westfield Water's rates and rate of return were not adjusted for actual or expected inflation through a historical inflation rate or nominal rate of return for assets placed into service between January 1, 2012 and June 30, 2023. As

[179] "Settling Parties' Verified Joint Responses To The Commission's Questions Set Forth In Its October 25, 2013, Docket Entry," Cause No. 44273, October 30, 2013, available at: https://iurc.portal.in.gov/_entity/sharepointdocumentlocation/530a47d3-7e84-e611-8107-1458d04eabe0/bb9c6bba-fd52-45ad-8e64-a444aef13c39?file=admmea_10_30_20136-46-44pm[2].pdf (viewed December 20, 2023).
[180] This lack of adjustment has reduced Westfield Water's historical revenues and profits, all else equal, thus contributing to its low historical rates of return on investment.

a result, the utility already has borne the cost of historical inflation through real rates of return that have been depressed as noted above. Subtracting historical inflation from the allowed rate of return in this case would effectively double-count this economic cost.

Furthermore, as discussed above, if Westfield Water's nominal cost of capital is reduced by historical inflation, or future inflation for that matter, in calculating the allowed rate of return used to set rates, it would result in a return on investment below the nominal cost of capital, at least until the next rate case. In addition, there would be a high probability that Westfield Water would earn less than its expected real rate of return, at least until its next rate case, because its allowed rate of return would equal its expected real rate of return. Indeed, Westfield Water could earn its expected real rate of return prior to its next rate case only if future inflation turned out to be zero or negative (deflation).[181] All else equal, this asymmetric inflation risk coupled with earning less than its nominal cost of capital would reduce Westfield Water's incentives to invest in needed infrastructure because it would raise the economic cost of each capital investment. Such uneconomic incentives would increase the risk of inefficient capital allocation, which in turn would increase costs to customers in the long run. In addition, the utility's reduced profitability would harm its credit metrics which potentially would increase its borrowing costs and lead to higher rates if such costs are passed along to customers.

Q150. IS IT APPROPRIATE TO ADJUST WESTFIELD WATER'S CURRENT COST OF EQUITY DOWNWARDS BY AN AMOUNT EQUAL TO EXPECTED FUTURE

[181] This risk of Westfield Water earning less than its real cost of capital is by no means remote. In fact, as I discuss below, Westfield Water has earned less than its real cost of capital on average for the last 3-5 years.

INFLATION PRIOR TO CALCULATING THE RETURN ASSOCIATED WITH ASSETS PLACED INTO SERVICE ON OR AFTER JULY 1, 2023?

A150. No. First, I understand that, like virtually all utilities, Westfield Water is planning future capital expenditures over the next few years. Whether using a CMV or original cost approach, the nominal cost of equity is the appropriate rate of return to apply when calculating the overall weighted average cost of capital because the competitive market value of these expenditures will be equal to their original cost. Furthermore, reducing the allowed rate of return by subtracting expected future inflation from the nominal cost of capital for purposes of calculating the return associated with Westfield Water's planned future capital expenditures would subject Westfield Water to the same set of costs and risks discussed above for Westfield Water's existing assets as of July 1, 2023. Such an outcome would be contrary to a desire to maximize economic benefits to society, as well as long-standing federal and Indiana precedent.[182]

Q151. IS WESTFIELD WATER PROPOSING A FVRB EQUAL TO THEIR CMV?

A151. No. I understand that Petitioner's Witness Craig Jackson is proposing a FVRB equal to $82,057,254 in the Base Period, $88,355,069 in the Link Period, and $89,890,020 in the Test Period. These values, which are far below Petitioner's Witness Bui's estimate of the RCNLD for all of Westfield Water's existing assets, were calculated by excluding Ms. Bui's RCNLD for the pre-2012 assets from the total value and adding only the pre-2012

[182] *FPC v. Hope Nat. Gas Co.*, 320 U.S. 591 (1944); Commission Cause No. 42029, Petition of Indiana-American Water Company, Inc. for Authority to Increase its Rates and Charges for Water and Sewer Service and for Approval of New Schedules of Rates and Charges Applicable thereto, at 38, November 6, 2002.

original cost based value.[183] All else equal, this reduction in value makes it more likely that the proposed FVRB is below the CMV of Westfield Water's existing assets which, in turn, would reduce Westfield Water's rates below their appropriate economic level, regardless of allowed rate of return ultimately approved.

Q152. WHAT ARE THE PRACTICAL CONSEQUENCES OF A HISTORICAL OR EXPECTED INFLATION ADJUSTMENT TO WESTFIELD WATER'S COST OF EQUITY GIVEN THEIR PROPOSED FVRB?

A152. I have explained why the nominal cost of equity is the appropriate return on equity when a utility's rate base is set equal to its CMV. Because Westfield Water is proposing a FVRB far below current estimates for its CMV, any additional adjustments for historical or expected inflation to Westfield Water's nominal cost of equity will result in excessively low returns. Given additional risks associated with FVRB ratemaking, such returns would likely be too low to attract investors to fund Westfield Water's planned capital spending program at reasonable rates of return, maintain Westfield Water's credit, or provide a rate of return comparable to investments of similar risk. Such an outcome is contrary to fundamental economic principles as well as IURC precedent.[184]

Q153. PLEASE SUMMARIZE YOUR CONCLUSIONS ABOUT ANY POTENTIAL INFLATION ADJUSTMENTS TO WESTFIELD WATER'S COST OF EQUITY.

[183] Jackson Direct Testimony at p. 14. *See also* Attachment CLJ-4.
[184] Commission Cause No. 42029, Petition of Indiana-American Water Company, Inc. for Authority to Increase its Rates and Charges for Water and Sewer Service and for Approval of New Schedules of Rates and Charges Applicable thereto, November 6, 2002, at p. 38.

A153. Based on my review of the economic theory of CMV ratemaking, Indiana's FVRB regime, and Westfield Water's specific circumstances, I do not believe any adjustment to Westfield Water's nominal cost of capital, whether equal to historic or expected inflation rates, is appropriate in this case.

Q154. DOES THIS CONCLUDE YOUR TESTIMONY?

A154. Yes.

INDEX OF ATTACHMENTS

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RJM-1	Proxy Group
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RJM-9	Equity Cost of Capital Capital Asset Pricing Model
RJM-10	Liquidity Premium Analysis
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VERIFICATION

The undersigned affirms under the penalties for perjury that the foregoing testimony is true to the best of his knowledge, information, and belief.

R. Jeffrey Malinak

Attachment RJM-1
Proxy Group

Company	Ticker	Industry
American States Water Company	AWR	Water
American Water Works	AWK	Water
Artesian Resources Corporation	ARTNA	Water
California Water Service Group	CWT	Water
Essential Utilities	WTRG	Water
Middlesex Water Company	MSEX	Water
SJW Group	SJW	Water
York Water Company	YORW	Water
Atmos Energy	ATO	Gas Distribution
Chesapeake Utilities	CPK	Gas Distribution
New Jersey Resources	NJR	Gas Distribution
Nisource Inc.	NI	Gas Distribution
Northwest Natural Holding Company	NWN	Gas Distribution
ONE Gas Inc.	OGS	Gas Distribution
Southwest Gas Holding	SWX	Gas Distribution
Spire Inc.	SR	Gas Distribution

Notes:
[1] To be included the proxy group, a company needs to satisfy the following criteria: (1) listed on Value Line in the Oil/Gas Distribution or Water Utility industry; (2) traded on NYSE or NASDAQ; (3) not a subsidiary. Oil or gas distribution companies need to satisfy an additional criterion: (4) have greater or equal to 50% of their operating income derived from regulated operations in FY2022.

[2] RGCO Resources and Global Water Resources Inc. are excluded from the proxy group because of negative growth rates or unusually high growth rates. Consolidated Water was excluded because its operations are mainly located in the Carribean.

Sources:
[1] Value Line.

[2] "Stock Screener", Nasdaq, available at https://www.nasdaq.com/market-activity/stocks/screener.

[3] Corporate Structure, S&P Capital IQ.

[4] The most recently available Form 10-Ks of each company prior to October 10, 2023.

Attachment RJM-2
Citizen's Water of Westfield, LLC
Summary of Equity Cost of Capital Calculations

	Median, Without Liquidity Premium	Median, With Liquidity Premium
	[1]	[2]
Capital Asset Pricing Model (CAPM)		
All Beta Measures		
Water Companies	9.29%	10.77%
Gas Distribution Companies	9.45%	10.92%
Full Sample	9.43%	10.91%
Value Line Betas		
Water Companies	10.02%	11.50%
Gas Distribution Companies	10.55%	12.03%
Full Sample	10.38%	11.85%
Average of 1-, 2- and 5-year Bloomberg Betas - Raw		
Water Companies	8.48%	9.96%
Gas Distribution Companies	8.41%	9.89%
Full Sample	8.42%	9.90%
Average of 1-, 2- and 5-year Bloomberg Betas - Adjusted		
Water Companies	9.53%	11.01%
Gas Distribution Companies	9.48%	10.96%
Full Sample	9.49%	10.97%
Discounted Cash Flow (DCF) Approach		
Constant Growth		
Water Companies	9.21%	10.69%
Gas Distribution Companies	9.86%	11.34%
Full Sample	9.75%	11.23%
Multi-Stage		
Water Companies	7.12%	8.60%
Gas Distribution Companies	8.41%	9.89%
Full Sample	7.82%	9.29%

Note:
[2] Equals [1] + 1.48%, the median of the liquidity premium estimates in Attachment RJM-10.

Sources:
[A] See Attachment RJM-4 for the constant growth DCF results.
[B] See Attachment RJM-5 for the multi-stage DCF results.
[C] See Attachment RJM-10 for the liquidity premium results.
[D] See Attachment RJM-9 for the capital asset pricing model results.

Attachment RJM-3
Capital Structure Data

			Book Value							Market Value		
Company	Ticker	Issuer Rating - Long Term	Long-term Debt		Preferred Stock		Book Value of Equity		Total Book Value	Market Cap of Equity		Total Market Value
			$000s	%	$000s	%	$000s	%	$000s	$000s	%	$000s
		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]
Panel A: Water Companies												
American States Water Company	AWR	A	$576,376	43.3%	$0	0.0%	$755,066	56.7%	$1,331,442	$2,859,415	83.2%	$3,435,791
American Water Works	AWK	A	11,607,000	54.5%	2,000	0.0%	9,701,000	45.5%	21,310,000	22,546,826	66.0%	34,155,826
Artesian Resources Corporation	ARTNA		175,597	43.6%	0	0.0%	227,273	56.4%	402,870	408,743	69.9%	584,340
California Water Service Group	CWT		1,052,070	43.1%	0	0.0%	1,389,516	56.9%	2,441,586	2,718,188	72.1%	3,770,258
Essential Utilities	WTRG	A	6,615,516	54.1%	0	0.0%	5,614,698	45.9%	12,230,214	8,707,530	56.8%	15,323,046
Middlesex Water Company	MSEX	A	350,446	45.7%	2,084	0.3%	413,561	54.0%	766,091	1,102,061	75.8%	1,454,591
SJW Group	SJW	A-	1,519,281	56.2%	0	0.0%	1,182,716	43.8%	2,701,997	1,845,140	54.8%	3,364,421
York Water Company	YORW	A-	157,771	42.6%	0	0.0%	212,544	57.4%	370,315	509,878	76.4%	667,649
Mean			2,756,757	47.9%	511	0.0%	2,437,047	52.1%	5,194,314	5,087,223	69.4%	7,844,490
Median			814,223	44.7%	0	0.0%	968,891	55.2%	1,886,514	2,281,664	71.0%	3,400,106
Panel B: Gas Distribution Companies												
Atmos Energy	ATO	A-	6,553,097	39.1%	0	0.0%	10,205,205	60.9%	16,758,302	16,149,749	71.1%	22,702,846
Chesapeake Utilities	CPK		645,742	42.8%	0	0.0%	864,228	57.2%	1,509,970	1,609,359	71.4%	2,255,101
New Jersey Resources	NJR		2,642,199	56.9%	0	0.0%	2,000,836	43.1%	4,643,035	4,115,162	60.9%	6,757,361
Nisource Inc.	NI	BBB+	11,002,800	56.8%	1,152,600	5.9%	7,230,400	37.3%	19,385,800	10,422,286	46.2%	22,577,686
Northwest Natural Holding Company	NWN	A+	1,294,578	51.1%	0	0.0%	1,240,278	48.9%	2,534,856	1,420,970	52.3%	2,715,548
ONE Gas Inc.	OGS	A-	1,580,263	37.3%	0	0.0%	2,654,826	62.7%	4,235,089	3,658,068	69.8%	5,238,331
Southwest Gas Holding	SWX	BBB-	5,284,844	61.8%	0	0.0%	3,262,826	38.2%	8,547,670	4,114,908	43.8%	9,399,752
Spire Inc.	SR	A-	3,702,500	53.4%	242,000	3.5%	2,986,500	43.1%	6,931,000	3,030,467	43.4%	6,974,967
Mean			4,088,253	49.9%	174,325	1.2%	3,805,637	48.9%	8,068,215	5,565,121	57.4%	9,827,699
Median			3,172,350	52.2%	0	0.0%	2,820,663	46.0%	5,787,018	3,886,488	56.6%	6,866,164
Panel C: Full Sample												
Mean			3,422,505	48.9%	87,418	0.6%	3,121,342	50.5%	6,631,265	5,326,172	63.4%	8,836,095
Median			1,549,772	48.4%	0	0.0%	1,695,176	51.5%	3,468,543	2,944,941	67.9%	4,504,295
Panel D: Citizen's Water of Westfield, LLC												
Citizens Water of Westfield, LLC [12]		AA-	56,000,000	46.4%			64,771,317	53.6%	120,771,317			

Notes and Sources:
[1] The Issuer Rating - Long Term is the S&P Long-Term Issuer Rating as of October 22, 2023. Westfield Water's rating is dated on April 22, 2023. Source: Refinitiv and S&P Global Ratings.
[2] Equals to long-term debt in Q2 2023. Source: S&P Capital IQ.
[3] Equals to [2] / [8].
[4] Equals to preferred stocks in Q2 2023. Source: S&P Capital IQ.
[5] Equals to [4] / [8].
[6] Equals to shareholder equity in Q2 2023. Source: S&P Capital IQ.
[7] Equals to [6] / [8].
[8] Equals to [2] + [4] + [6].
[9] Equals to the common shares outstanding multiplied by the most recent closing price as of October 22, 2023. Source: Refinitiv.
[10] Equals to [9] / [11].
[11] Equals to [2] + [4] + [9].
[12] Source: Jackson Direct Testimony, Attachment CLJ-2. The financials for Westfield Water are pro forma results that exclude customer deposits for the period ending on June 30, 2025.

Attachment RJM-4
Equity Cost of Capital
Constant Growth Discounted Cash Flow Approach

Company	Ticker	Cumulative Dividend in Past Year	Last Price	Dividend Yield	Expected Dividend Yield	Zacks Earnings Growth	Yahoo Finance Earnings Growth	Value Line Earnings Growth	Average Earnings Growth	Cost of Equity
		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
Panel A: Water Companies										
American States Water Company	AWR	$1.62	$80.57	2.01%	2.13%	6.30%	4.40%	6.50%	5.73%	7.86%
American Water Works	AWK	$2.73	$130.45	2.09%	2.25%	8.18%	8.07%	7.00%	7.75%	10.00%
California Water Service Group	CWT	$1.03	$51.30	2.01%	2.18%	NA	10.80%	6.50%	8.65%	10.83%
Essential Utilities	WTRG	$1.17	$35.42	3.30%	3.50%	5.60%	5.40%	7.50%	6.17%	9.67%
Middlesex Water Company	MSEX	$1.25	$65.73	1.90%	1.97%	NA	2.70%	5.00%	3.85%	5.82%
SJW Group	SJW	$1.50	$64.97	2.31%	2.45%	NA	6.10%	6.50%	6.30%	8.75%
Mean		$1.55	$71.41	2.27%	2.42%	6.69%	6.25%	6.50%	6.41%	8.82%
Median		$1.38	$65.35	2.05%	2.22%	6.30%	5.75%	6.50%	6.23%	9.21%
Panel B: Gas Distribution Companies										
Atmos Energy	ATO	$2.96	$113.53	2.61%	2.79%	7.25%	6.90%	7.00%	7.05%	9.84%
Chesapeake Utilities	CPK	$2.25	$92.76	2.43%	2.58%	NA	7.00%	6.00%	6.50%	9.08%
New Jersey Resources	NJR	$1.59	$42.55	3.74%	3.95%	6.00%	6.00%	5.00%	5.67%	9.62%
Nisource Inc.	NI	$0.99	$25.75	3.83%	4.12%	7.00%	6.70%	9.50%	7.73%	11.85%
Northwest Natural Holding Company	NWN	$2.43	$37.36	6.50%	6.78%	3.70%	2.80%	6.50%	4.33%	11.11%
ONE Gas Inc.	OGS	$2.57	$61.79	4.16%	4.39%	5.00%	5.00%	6.50%	5.50%	9.89%
Southwest Gas Holding	SWX	$2.48	$61.43	4.04%	4.21%	5.00%	4.00%	3.50%	4.17%	8.37%
Spire Inc.	SR	$2.88	$59.91	4.81%	5.10%	4.22%	NA	8.00%	6.11%	11.21%
Mean		$2.27	$61.89	4.01%	4.24%	5.45%	5.49%	6.50%	5.88%	10.12%
Median		$2.45	$60.67	3.93%	4.16%	5.00%	6.00%	6.50%	5.89%	9.86%
Panel C: Full Sample										
Mean		$1.96	$65.97	3.27%	3.46%	5.83%	5.84%	6.50%	6.11%	9.57%
Median		$1.94	$61.61	2.95%	3.15%	5.80%	6.00%	6.50%	6.14%	9.75%

Notes:

[1] Source: Refinitiv Eikon, equals the sum of gross dividends paid between November 15, 2022 and November 15, 2023.

[2] Source: Refinitiv Eikon, equals the closing price as of November 15, 2023.

[3] Equals [1] / [2].

[4] Equals [3] x (1 + [8]).

[5] Source: Zacks. Equals the projected 3-5 year earnings growth rate.

[6] Source: Yahoo! Finance. Equals the projected 5-year earnings growth rate.

[7] Source: Value Line. Equals the projected 3-5 year earnings growth rate, except for American Water Works (AWK) and Southwest Gas Holding (SWX). I calculated AWK's average earnings growth rate because there was a large gain from a business sale in 2022, skewing analyst projections. I calculated SWX's average earnings growth rate because there was a large loss from a business sale in 2022, skewing analyst projections. See workpapers for calculations.

[8] Equals Average ([5], [6], [7]).

[9] Equals [4] + [8].

[10] Artesian Resources Corporation and York Water Company are excluded from the proxy group and all DCF analyses because only one earnings growth projection is available.

Attachment RJM-5
Equity Cost of Capital
Multi-Stage Discounted Cash Flow Approach

[A] Median of First Stage Growth Rates - Water (5 Years):	6.23%
[B] Median of Second Stage Growth Rate - Water (15 Years):	5.07%
[C] Second Stage Growth Rate - Gas Distribution (15 Years):	3.99%
[D] Third Stage Growth Rate (Perpetuity):	3.98%

Company	Ticker	Cumulative Dividend in Past Year	Last Price	Projected Dividend - Year 1	Projected Dividend - Year 6	Projected Dividend - Year 21	Cost of Equity
		[1]	[2]	[3]	[4]	[5]	[6]
Panel A: Water Companies							
American States Water Company	AWR	$1.62	$80.57	$1.72	$2.24	$4.42	6.43%
American Water Works	AWK	$2.73	$130.45	$2.94	$4.21	$10.29	7.25%
California Water Service Group	CWT	$1.03	$51.30	$1.12	$1.67	$4.50	7.49%
Essential Utilities	WTRG	$1.17	$35.42	$1.24	$1.65	$3.41	8.14%
Middlesex Water Company	MSEX	$1.25	$65.73	$1.30	$1.56	$2.49	5.76%
SJW Group	SJW	$1.50	$64.97	$1.59	$2.14	$4.48	6.99%
Mean		$1.55	$71.41	$1.65	$2.25	$4.93	7.01%
Median		$1.38	$65.35	$1.45	$1.90	$4.45	7.12%
Panel B: Gas Distribution Companies							
Atmos Energy	ATO	$2.96	$113.53	$3.17	$4.33	$7.78	7.10%
Chesapeake Utilities	CPK	$2.25	$92.76	$2.40	$3.21	$5.76	6.81%
New Jersey Resources	NJR	$1.59	$42.55	$1.68	$2.18	$3.92	8.17%
Nisource Inc.	NI	$0.99	$25.75	$1.06	$1.49	$2.67	8.67%
Northwest Natural Holding Company	NWN	$2.43	$37.36	$2.53	$3.12	$5.61	10.84%
ONE Gas Inc.	OGS	$2.57	$61.79	$2.71	$3.49	$6.28	8.61%
Southwest Gas Holding	SWX	$2.48	$61.43	$2.58	$3.16	$5.69	8.22%
Spire Inc.	SR	$2.88	$59.91	$3.06	$4.03	$7.24	9.47%
Mean		$2.27	$61.89	$2.40	$3.13	$5.62	8.49%
Median		$2.45	$60.67	$2.56	$3.18	$5.73	8.41%
Panel C: Full Sample							
Mean		$1.96	$65.97	$2.08	$2.75	$5.32	7.85%
Median		$1.94	$61.61	$2.06	$2.68	$5.05	7.82%

Notes and Sources:

[A] Equals the median of the first-stage growth rates of the full sample. See Attachment RJM-4, column [8].

[B] The second-stage growth rate of each water company is calculated as: [Rate to Match the EPA's Infrastructure Investment Requirement] / [A] x [First-Stage Growth Rate]. I estimated an initial annualized water utility capital expenditure of $23.8 Billion in 2022 based on 2020 total water utility infrastructure capital expenditure estimated by the Bureau of Economic Analysis, adjusted for inflation and previous growth in water infrastructure investment. This annual value would need to grow at a rate of 5.07% per annum to reach EPA's $625 billion water industry infrastructure investment requirement over the next 20 years. See, EPA, "Drinking Water Infrastructure Needs Survey and Assessment, 7th Report to Congress," September 2023, available at: https://www.epa.gov/ground-water-and-drinking-water/epas-7th-drinking-water-infrastructure-needs-survey-and-assessment and Bennett, Jennifer, Kornfeld, Robert, Sichel, Daniel E., and Wasshausen, David B. "Measuring Infrastructure in the Bureau of Economic Analysis National Economic Accounts, December 2020, updated September 2021, available at: https://www.bea.gov/research/papers/2020/measuring-infrastructure-bureau-economic-analysis-national-economic-accounts.

[C] The second-stage growth for gas distribution companies equals the nominal GDP growth in a 15-year period, which is the average of multiple mid-term projections. Source: Congressional Budget Office, Social Security Administration and Energy Information Agency.

[D] The third-stage growth equals the nominal GDP growth in perpetuity, which is the average of multiple long-term projections. Source: Congressional Budget Office, Federal Reserve, Social Security Administration and Energy Information Agency.

[1] Source: Refinitiv Eikon, equals the sum of gross dividends paid between November 15, 2022 and November 15, 2023.

[2] Source: Refinitiv Eikon, equals the closing price as of November 15, 2023.

[3] Equals [1] x (1 + [First-Stage Growth Rate]). For years 1-5, the projected dividend of each proxy company grows annually at the first-stage growth rate, which is the average earnings growth rate as presented in Attachment RJM-4, column [8]. Row [A] presents the median of the first-stage growth rates of the full sample.

[4] Equals [1] x (1 + [First-Stage Growth Rate])^{5} x (1 + [Second-Stage Growth Rate]). For years 6-20, the projected dividend of each proxy company grows annually at the second-stage growth rate as explained in note [B]. Row [B] presents the median of the second-stage growth rates of the full sample.

[5] Equals [1] x (1 + [First-Stage Growth Rate])^{5} x (1 + [Second-Stage Growth Rate])^{15} x (1+[C]). For years 21 to perpetuity, the projected dividend grows at the rate of [C] annually.

[6] Equals the positive root of R by solving the following equation: [1] = $[DIV_1]/(1+R) + [DIV_2]/(1+R)^2 + \ldots + [DIV_{20}]/(1+R)^{20} + 1/(1+R)^{20}$ x $[DIV_{21}]/(R-[C])$. See notes [3], [4] and [5] for the methodology of calculating the projected dividend of each year ($[DIV_n]$).

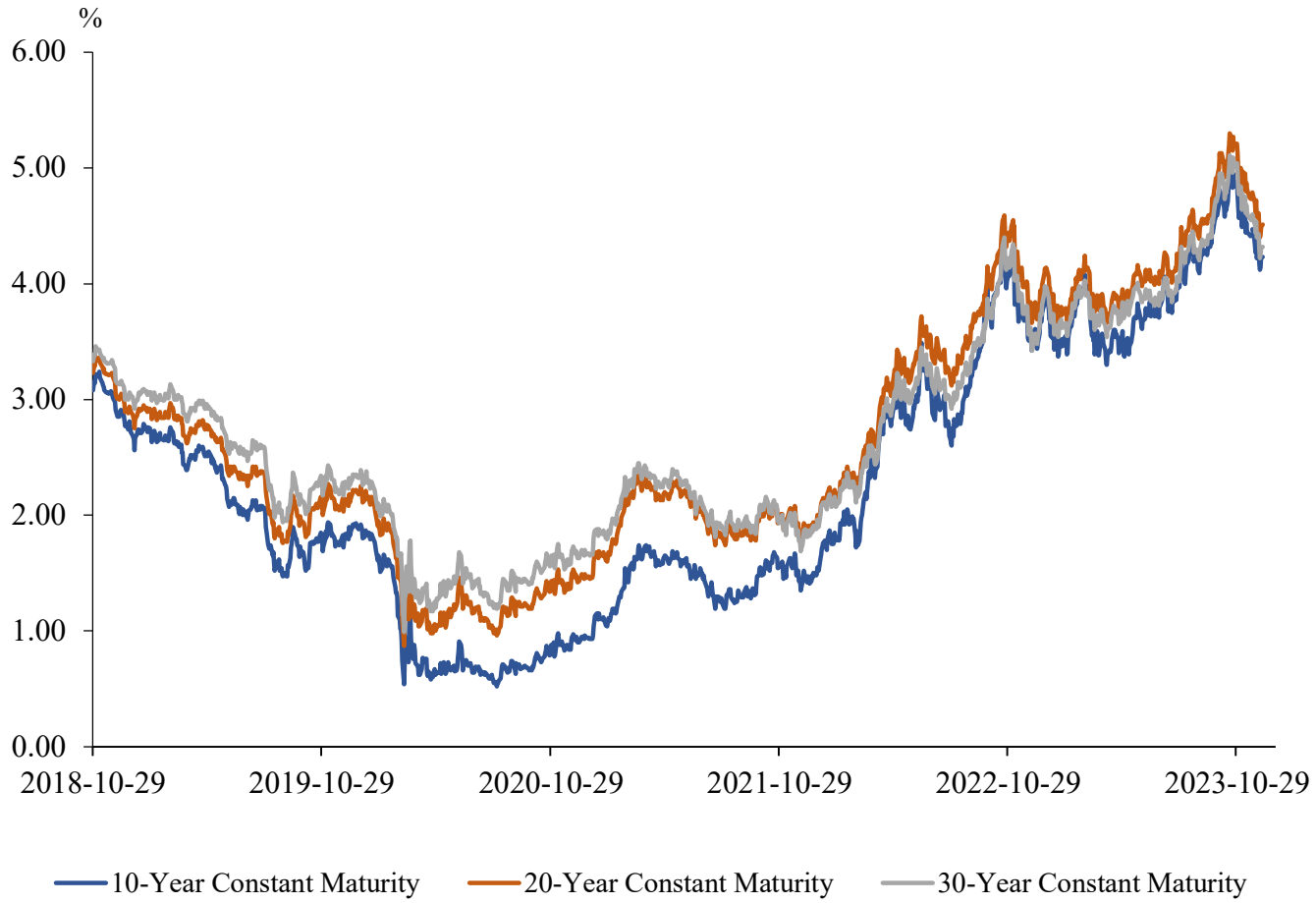
Attachment RJM-6
20-Year Constant Maturity U.S. Treasury Rate And Inflation Rate, 2004-2023

Sources:

[1] Market Yield on U.S. Treasury Securities at 20-Year Constant Maturity, Quoted on an Investment Basis [DGS20], retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/DGS20, December 13, 2023.

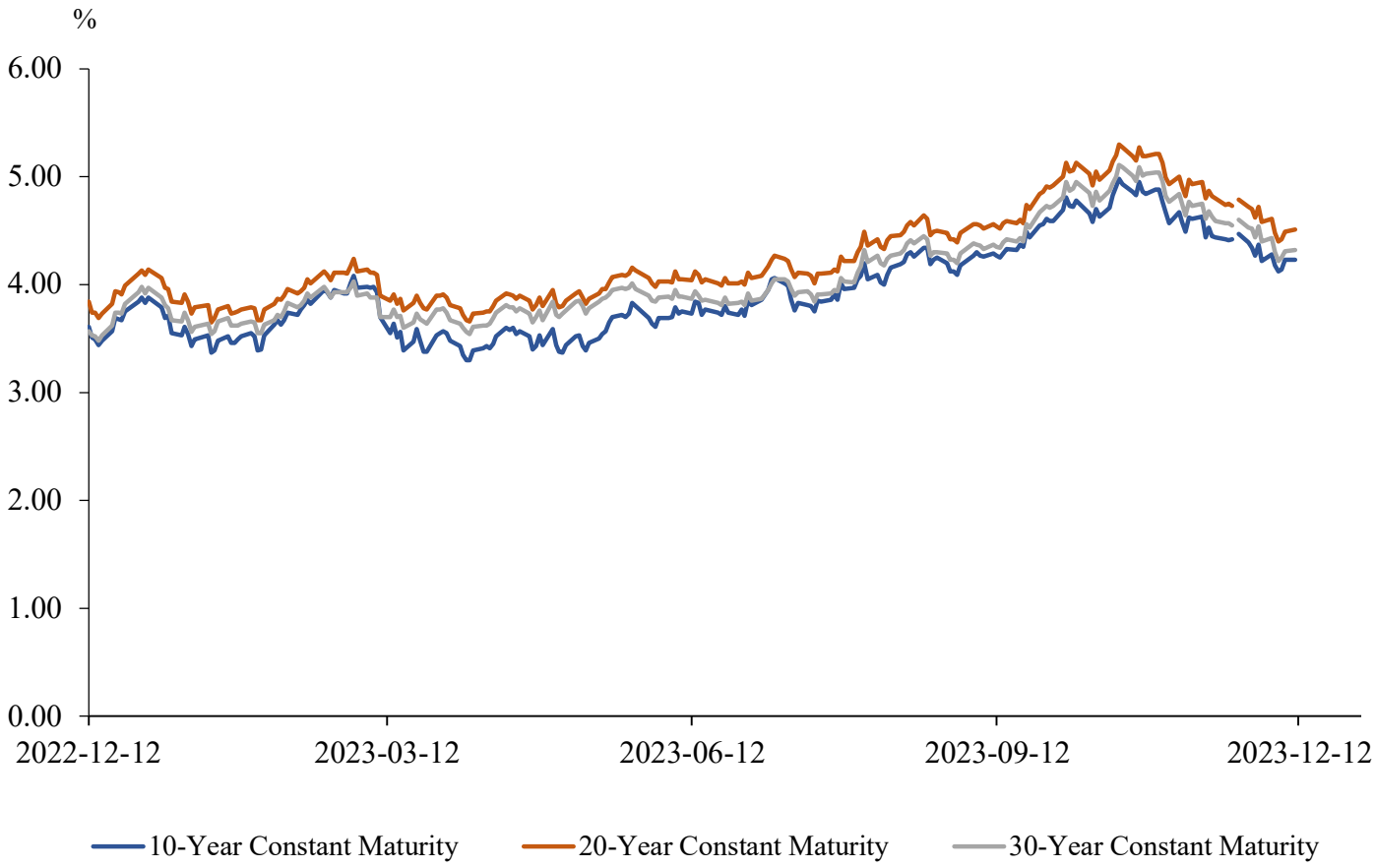
[2] 20-year Breakeven Inflation Rate [T20YIEM], retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/T20YIEM, December 13, 2023.

Attachment RJM-7
Market Yields On U.S. Treasury Securities In The Past 5 Years



Source:
Board of Governors of the Federal Reserve System (US), Market Yield on U.S. Treasury Securities at 10-, 20-, and 30-Year Constant Maturity, Quoted on an Investment Basis, retrieved from FRED, Federal Reserve Bank of St. Louis; Accessed December 13, 2023.

Attachment RJM-8
Market Yields On U.S. Treasury Securities In The Past 1 Year



Source:
Board of Governors of the Federal Reserve System (US), Market Yield on U.S. Treasury Securities at 10-, 20-, and 30-Year Constant Maturity, Quoted on an Investment Basis, retrieved from FRED, Federal Reserve Bank of St. Louis; Accessed December 13, 2023.

Attachment RJM-9
Equity Cost of Capital
Capital Asset Pricing Model

Cost of Equity = Rf + Beta (Rm − Rf)

[A] Risk-free Rate of Return (Rf) = 4.46%
[B] Market Risk Premium (Rm − Rf) = 7.17%

		Value Line		Bloomberg 1-Year Daily Data				Bloomberg 2-Year Weekly Data				Bloomberg 5-Year Monthly Data				Average Bloomberg Betas				All Beta Measures	
Company	Ticker	Beta	Cost of Equity	Raw Beta	Cost of Equity	Adjusted Beta	Cost of Equity	Raw Beta	Cost of Equity	Adjusted Beta	Cost of Equity	Raw Beta	Cost of Equity	Adjusted Beta	Cost of Equity	Raw Beta	Cost of Equity	Adjusted Beta	Cost of Equity	Average Beta	Cost of Equity
		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]
Panel A: Water Companies																					
American States Water Company	AWR	0.70	9.48%	0.60	8.78%	0.74	9.73%	0.59	8.68%	0.73	9.67%	0.43	7.52%	0.62	8.89%	0.54	8.33%	0.69	9.43%	0.64	9.08%
American Water Works	AWK	0.95	11.27%	0.73	9.67%	0.82	10.32%	0.90	10.91%	0.93	11.15%	0.62	8.90%	0.75	9.81%	0.75	9.82%	0.83	10.43%	0.84	10.51%
Artesian Resources Corporation	ARTNA	0.70	9.48%	0.49	7.97%	0.66	9.19%	0.37	7.13%	0.58	8.63%	0.18	5.76%	0.46	7.72%	0.35	6.95%	0.57	8.51%	0.54	8.31%
California Water Service Group	CWT	0.70	9.48%	0.67	9.29%	0.78	10.07%	0.62	8.87%	0.74	9.79%	0.45	7.72%	0.64	9.02%	0.58	8.63%	0.72	9.63%	0.67	9.24%
Essential Utilities	WTRG	1.00	11.63%	0.67	9.24%	0.78	10.03%	0.72	9.61%	0.81	10.28%	0.77	9.96%	0.84	10.51%	0.72	9.60%	0.81	10.27%	0.84	10.50%
Middlesex Water Company	MSEX	0.75	9.84%	0.77	9.96%	0.85	10.52%	0.59	8.72%	0.73	9.69%	0.75	9.82%	0.83	10.42%	0.70	9.50%	0.80	10.21%	0.75	9.85%
SJW Group	SJW	0.85	10.55%	0.45	7.69%	0.63	9.00%	0.49	7.99%	0.66	9.21%	0.60	8.75%	0.73	9.72%	0.51	8.15%	0.68	9.31%	0.68	9.34%
York Water Company	YORW	0.80	10.20%	0.39	7.28%	0.60	8.73%	0.40	7.36%	0.60	8.78%	0.60	8.78%	0.74	9.73%	0.47	7.81%	0.64	9.08%	0.64	9.03%
Mean		0.81	10.24%	0.60	8.73%	0.73	9.70%	0.59	8.66%	0.72	9.65%	0.55	8.40%	0.70	9.48%	0.58	8.60%	0.72	9.61%	0.70	9.48%
Median		0.78	10.02%	0.63	9.01%	0.76	9.88%	0.59	8.70%	0.73	9.68%	0.60	8.77%	0.73	9.72%	0.56	8.48%	0.71	9.53%	0.67	9.29%
Panel B: Gas Distribution Companies																					
Atmos Energy	ATO	0.85	10.55%	0.60	8.73%	0.73	9.69%	0.62	8.93%	0.75	9.83%	0.66	9.16%	0.77	9.99%	0.62	8.94%	0.75	9.84%	0.74	9.78%
Chesapeake Utilities	CPK	0.80	10.20%	0.50	8.06%	0.67	9.25%	0.47	7.80%	0.64	9.08%	0.60	8.73%	0.73	9.69%	0.52	8.20%	0.68	9.34%	0.67	9.24%
New Jersey Resources	NJR	0.95	11.27%	0.58	8.61%	0.72	9.62%	0.59	8.71%	0.73	9.69%	0.66	9.20%	0.77	10.01%	0.61	8.84%	0.74	9.77%	0.77	9.96%
Nisource Inc.	NI	0.90	10.91%	0.52	8.21%	0.68	9.35%	0.66	9.21%	0.78	10.02%	0.51	8.10%	0.67	9.28%	0.56	8.51%	0.71	9.55%	0.72	9.66%
Northwest Natural Holding Company	NWN	0.80	10.20%	0.49	7.95%	0.66	9.18%	0.43	7.55%	0.62	8.91%	0.59	8.67%	0.73	9.66%	0.50	8.06%	0.67	9.25%	0.66	9.17%
ONE Gas Inc.	OGS	0.80	10.20%	0.58	8.58%	0.72	9.60%	0.47	7.83%	0.65	9.10%	0.67	9.24%	0.78	10.04%	0.57	8.55%	0.71	9.58%	0.69	9.44%
Southwest Gas Holding	SWX	0.90	10.91%	0.75	9.84%	0.83	10.44%	0.48	7.89%	0.65	9.14%	0.31	6.66%	0.54	8.32%	0.51	8.13%	0.68	9.30%	0.70	9.45%
Spire Inc.	SR	0.85	10.55%	0.55	8.40%	0.70	9.47%	0.55	8.38%	0.70	9.46%	0.51	8.14%	0.68	9.30%	0.54	8.31%	0.69	9.41%	0.69	9.42%
Mean		0.86	10.60%	0.57	8.55%	0.71	9.57%	0.53	8.29%	0.69	9.40%	0.56	8.49%	0.71	9.54%	0.56	8.44%	0.70	9.50%	0.71	9.52%
Median		0.85	10.55%	0.56	8.49%	0.71	9.54%	0.51	8.14%	0.68	9.30%	0.59	8.70%	0.73	9.68%	0.55	8.41%	0.70	9.48%	0.70	9.45%
Panel C: Full Sample																					
Mean		0.83	10.42%	0.58	8.64%	0.72	9.64%	0.56	8.47%	0.71	9.53%	0.56	8.44%	0.70	9.51%	0.57	8.52%	0.71	9.56%	0.70	9.50%
Median		0.83	10.38%	0.58	8.60%	0.72	9.61%	0.57	8.53%	0.71	9.57%	0.60	8.74%	0.73	9.70%	0.55	8.42%	0.70	9.49%	0.69	9.43%

Notes:

[A] One-week average market yield on U.S. Treasury Securities at 20-Year Constant Maturity, as of 12/11/2023. Source: Board of Governors of the Federal Reserve System (US), Retrieved from FRED, Federal Reserve Bank of St. Louis.

[B] Source: 2023 SBBI Yearbook, Kroll LLC.

[1] Source: Value Line Investment Survey.

[2] Equals [A] + [1] x [B].

[3], [5], [7], [9], [11], [13] Source: Bloomberg, as of 10/25/2023.

[4] Equals [A] + [3] x [B].

[6] Equals [A] + [5] x [B].

[8] Equals [A] + [7] x [B].

[10] Equals [A] + [9] x [B].

[12] Equals [A] + [11] x [B].

[14] Equals [A] + [13] x [B].

[15] Equals the average of [3], [7], [11].

[16] Equals [A] + [15] x [B].

[17] Equals the average of [5], [9], [13].

[18] Equals [A] + [17] x [B].

[19] Equals the average of [1], [15], [17].

[20] Equals [A] + [19] x [B].

Attachment RJM-10
Liquidity Premium Analysis

Input Data Used in the Model

[A]	Growth Rate	3.98%
[B]	Cost of Equity ("Ke")	9.43%

	Reference		Liquidity Discount ("LD")	Pre LD Ke	Post LD Ke	Liquidity Premium ("LP")
			[1]	[2]	[3]	[4]
I.	***Cost of Going Public Approach***					
[C]	Ritter (1987)					
[C1]	Firm Commitment Offer		21.22%	9.43%	10.90%	1.47%
[C2]	Best Effort Offer		31.87%	9.43%	11.98%	2.55%
[D]	Ang and Brau (2002)					
[D1]	Public PLBO		13.80%	9.43%	10.31%	0.87%
[D2]	Subsidiary PLBO		15.64%	9.43%	10.44%	1.01%
[D3]	Private PLBO		17.75%	9.43%	10.61%	1.18%
[E]	Chaplinsky et al. (2017)					
[E1]	ECG IPOs		30.44%	9.43%	11.82%	2.39%
[E2]	Control IPOs		22.82%	9.43%	11.04%	1.61%
		Mean	21.93%	9.43%	11.01%	1.58%
		Median	21.22%	9.43%	10.90%	1.47%
II.	***Price of Corporate Liquidity Approach***					
[F]	Officer (2007)					
[F1]	Stand-alone private corporations		17.28%	9.43%	10.57%	1.14%
[F2]	Subsidiaries of other corporations		28.31%	9.43%	11.59%	2.15%
[G]	De Franco et al. (2009)					
[G1]	EV/EBITDA		39.70%	9.43%	13.02%	3.59%
[G2]	EV/Sales		20.20%	9.43%	10.81%	1.38%
[H]	Longstaff (2017)					
[H1]	2 to 5 years horizon		21.34%	9.43%	10.91%	1.48%
[H2]	1 day to 30 years horizon		22.15%	9.43%	10.98%	1.55%
		Mean	24.83%	9.43%	11.31%	1.88%
		Median	21.74%	9.43%	10.95%	1.51%
III.	***Both Approaches Combined (Whole Group)***					
		Mean	23.27%	9.43%	11.15%	1.72%
		Median	21.34%	9.43%	10.91%	1.48%

Notes:

[A] Long-term nominal expected GDP growth. Source: see Attachment RJM-5.

[B] Median CAPM Equity Cost of Capital, Water and Gas Proxy Group. Source: Attachment RJM-19.

[C] Ritter, J., "The Cost of Going Public", Journal of Financial Economics, (1987), Vol. 19, No. 2, pp. 269-281.

[C1] Table 4, Column "Avg Total Cost (%)", Row "All offers", p. 273. Numbers divided by 100. Firm Commitment Offer refers to a type of contract between the firm and the investment banker in which the latter guarantees to deliver agreed-upon proceeds independently of its ability to place the firm's newly-issued shares. For more details, see Ritter (1987), at p. 269.

[C2] Table 4, Column "Avg Total Cost (%)", Row "All offers", p. 273. Numbers divided by 100. Best Effort Offer refers to a type of contract between the firm and the investment banker in which the latter maintains the ability to withdraw its offer if it is not able to place an agreed-upon minimum number of shares. For more details, see Ritter (1987), at p. 270.

[D] Ang, J. S., and Brau, J. C., "Firm Transparency and the Costs of Going Public", *The Journal of Financial Research*, (2002), Vol. XXV, No. 1, pp. 1-17.

[D1] Table 3, Column "Public PLBO", Row "Total Flotation Costs", at p. 13. Public PLBO is the sample of previous leveraged buyouts (PLBO) that were publicly traded firms before the LBO.

[D2] Table 3, Column "Subsidiary PLBO", Row "Total Flotation Costs", at p. 13. Subsidiary PLBO is the sample of previous LBOs that were subsidiaries of publicly traded firms before the LBO.

[D3] Table 3, Column "Private PLBO", Row "Total Flotation Costs", at p. 13. Private PLBO is the sample of previous LBOs that were privately held before the LBO.

[E] Chaplinsky, S., Weiss Hanley, K., and Moon, S. K., "The JOBS Act and the Costs of Going Public", *Journal of Accounting Research*, (2017), Vol. 55, No. 4, pp. 795-836.

[E1] Table 2, Column "EGC IPO - Mean", Row "Total Costs (%)", at p. 807. The EGC IPO group includes emerging growth companies (EGCs) that filed for an initial public offering from April 5, 2012 through April 30, 2015.

[E2] Table 2, Column "Control IPO - Mean", Row "Total Costs (%)", at p. 807. The Control IPO group includes firms that went public between January 1, 2003, and April 4, 2012, and have revenues less than or equal to $1 billion adjusted for 2012 purchasing power dollar.

[F] Officer, M. S., "The price of corporate liquidity: Acquisition discounts for unlisted targets", Journal of Financial Economics, (2007), Vol. 83, pp. 571-598.

[F1] Table 3, Column "Stand-alone", Row "Average acquisition discount", at p. 583.

[F2] Table 3, Column "Subsidiary", Row "Average acquisition discount", at p. 583.

[G] De Franco, G., Gavious, I., Jin, J.Y. and Richardson, G.D., "Do Private Company Targets that Hire Big 4 Auditors Receive Higher Proceeds?", *Contemporary Accounting Research*, (2011), Vol. 28, pp. 215-262.

[G1] Table 3, Panel C, Column (1), Row "Multivariate Analysis - Private Company Discount (%)", at p. 235.

[G2] Table 3, Panel C, Column (2), Row "Multivariate Analysis - Private Company Discount (%)", at p.235.

[H] Longstaff, F.A., "Valuing Thinly Traded Assets", Management Studies - Articles in Advance, (2017), Vol. 64, No. 8, pp 1-11.

[H1] I calculate the difference between 100% and each entry in Table 1 at p. 5. I then average the obtained discounts across the 2 and 5 years time horizon for all volatility levels included in the table.

[H2] I calculate the difference between 100% and each entry in Table 1 at p. 5. I then average the obtained discounts across all time horizons for all volatility levels included in the table.

[1] Liquidity Discount estimates from the literature. Sources listed near each individual estimate.

[2] Equals [B].

[3] Equals ([B]- [A])/(100% - [1]) + [A].

[4] Equals [3] - [2].

Attachment RJM-11
Returns on Equity, Rate Base, and Invested Capital
Westfield Water and Citizens South Madison: 2019 - 2023

			10/2018 - 9/2019	10/2019 - 9/2020	10/2020 - 9/2021	10/2021 - 9/2022	10/2022 - 9/2023	Average of Last 3 Years	Average of Last 5 Years
[1]	Net Income	[A]	$3,215,000	$3,835,000	$3,572,000	$3,724,000	$3,604,000		
[2]	Average Equity	[B]	$36,271,500	$39,536,000	$43,074,500	$46,692,500	$54,357,500		
[3]	**Return on Equity**	**[C] = [A] / [B]**	**8.9%**	**9.7%**	**8.3%**	**8.0%**	**6.6%**	**7.6%**	**8.3%**
[4]	Operating Income	[D]	$3,709,000	$4,412,000	$4,199,000	$4,394,000	$4,692,000		
[5]	Average Total Capital Investment (Equity + Debt)	[E]	$50,405,000	$59,457,500	$63,000,000	$74,082,000	$89,166,000		
[6]	**Return on Invested Capital**	**[F] = [D] / [E]**	**7.4%**	**7.4%**	**6.7%**	**5.9%**	**5.3%**	**6.0%**	**6.5%**
	Actual Real Returns								
[7]	Inflation Rate	[G]	1.7%	1.4%	5.4%	8.2%	3.7%		
[8]	**Real Return on Equity**	**[H] = (1+[C]) / (1+[G])-1**	**7.0%**	**8.2%**	**2.8%**	**-0.2%**	**2.8%**	**1.8%**	**4.1%**
[9]	**Real Return on Invested Capital**	**[I] = (1+[F]) / (1+[G])-1**	**5.6%**	**6.0%**	**1.2%**	**-2.1%**	**1.5%**	**0.2%**	**2.4%**
	Expected Real Returns on Equity								
[10]	20 Year Treasury Rate	[J]	2.7%	1.5%	1.8%	2.8%	4.1%		
[11]	**Nominal Cost of Equity Capital CAPM Unadjusted for Liquidity Premium**	**[K] = [J] + β(Rm - Rf)**	**7.6%**	**6.5%**	**6.8%**	**7.7%**	**9.1%**	**7.9%**	**7.6%**
[12]	**With Liquidity Premium of 1.48%**	**[L] = [K] + 1.48%**	**9.1%**	**8.0%**	**8.3%**	**9.2%**	**10.5%**	**9.3%**	**9.0%**
[13]	20-Year Breakeven Inflation Rate	[M]	1.9%	1.6%	2.2%	2.6%	2.5%		
[14]	**Expected Real Return on Equity**	**[N] = (1+[L]) / (1+[M])-1**	**7.1%**	**6.3%**	**5.9%**	**6.4%**	**7.8%**	**6.7%**	**6.7%**

Notes and Sources:

[1] Source: Combined Citizens Water of Westfield and Citizens South Madison Income Statements, 2018-2023. See RJM-11 p. 4 of 5. Citizens Water of Westfield and Citizens South Madison merged into a single entity in 2023.

[2] Source: Combined Citizens Water of Westfield and Citizens South Madison Balance Sheets, 2018-2023. See RJM-11 p. 3 of 5. Numbers are averages of ((End of year)+(Beginning of year))/2), adjusted to dollars.

[3] Return on Equity is calculated by dividing the Net Income by the Total Equity.

[4] Source: Combined Citizens Water of Westfield and Citizens South Madison Income Statements, 2018-2023. See RJM-11 p. 4 of 5.

[5] Source: Citizens Water of Westfield Balance Sheets, 2017-2023. See RJM-11 p. 3 of 5. Numbers are averages ((End of year)+(Beginning of year))/2).

[6] Return on Invested Capital is calculated by dividing the Operating Income by the Total Capital Investment, which is the sum of equity and debt.

[7] An average annual inflation rate was calculated on the October-September Year to match Citizens Water of Westfield's financial documents. Source: Bureau of Labor Statistics, Urban Consumer Price Index.

[8] The Real Return on Equity is calculated by adjusting the return on equity for inflation using the equation (1+Return on Equity)/(1+Inflation Rate)-1. Source: Federal Reserve Economic Data, Market Yield on U.S. Treasury Securities at 20-Year Constant Maturity.

[9] The Real Return on Invested Capital is calculated by adjusting the return on equity for inflation using the equation (1+Return on Invested Capital)/(1+Inflation Rate)-1. Source: Federal Reserve Economic Data, Market Yield on U.S. Treasury Securities at 20-Year Constant Maturity.

[10] Monthly 20-year US Treasury rates were used to create an average annual Sept.-Oct. year value to match the Citizens Water of Westfield financial information. Source: Federal Reserve Economic Data, Market Yield on U.S. Treasury Securities at 20-Year Constant Maturity.

[11] The cost of capital is calculated using the capital asset pricing model (CAPM) where the cost of capital, $K = Rf + \beta(Rm - Rf)$. In this formula, the 20 year treasury rate is used as the risk free rate (Rf). The market premium (Rm-Rf) used is 7.17% as previously used in this testimony. The Beta (β) used is 0.69, which represents the median beta for all beta measures as calculated in Attachment RJM-9. Source: 2023 SBBI Yearbook, Kroll LLC.

[12] The liquidity premium is added to the Cost of Equity Capital as calculated using the CAPM to account for the the relative lack of liquidity of Citizens Water of Westfield.

[13] Monthly 20-year inflation breakeven rates are used to calculate an annual average inflation breakeven rate on the October-September calendar to match Citizens Water of Westfield's financial information. Source: FRED St. Louis Federal Reserve Economic Data, 20-year breakeven inflation rate.

[14] The expected real return on equity for Citizens Water of Westfield is calculated by adjusting the nominal return on equity with the liquidity premium included for inflation using the equation (1+Nominal Cost of Equity with Liqidity Premium)/(1 + Breakeven Rate) - 1.

Attachment RJM-11
Balance Sheets for Westfield Water and Citizens South Madison, 2018-2023
Totals may not add due to rounding

In Thousands of Dollars

	2018	2019	2020	2021	2022	2023
Assets						
Property, Plant & Equipment	$ 74,328	$ 86,249	$ 100,065	$ 113,492	$ 134,711	$ 157,199
Investments	-	-	-	-	625	732
Cash and cash equivalents	2,450	6,196	1,537	2,676	8,287	11,345
Other current assets	1,419	1,673	2,300	1,947	1,162	2,797
Other non-current assets	15	410	401	402	-	-
Total Assets	**78,212**	**94,528**	**104,303**	**118,517**	**144,785**	**172,073**
Capitalization and Liabilities						
Equity	$ 34,790	$ 37,753	$ 41,319	$ 44,830	$ 48,555	$ 60,160
Long-term debt	8,348	19,919	19,924	19,927	34,852	34,765
Other long-term borrowings	3,500	-	1,000	-	-	-
Other noncurrent liabilities	29,443	33,552	38,893	48,011	57,982	72,902
Current maturities of long-term debt	-	-	-	-	-	-
Short-term borrowings	-	-	-	2,500	-	-
Other current liabilities	2,131	3,304	3,167	3,249	3,396	4,246
Total Capitalization and Liabilities	**78,212**	**94,528**	**104,303**	**118,517**	**144,785**	**172,073**

Notes:

[1] All years presented are inclusive of financial information for both Citizens Water of Westfield as well as Citizens South Madison.

[2] Periods presented are for the 12 months ended September 30. For example, 2019 represents October 1, 2018 - September 30, 2019.

Attachment RJM-11
Income Statements for Westfield Water and Citizens South Madison, 2018-2023
Totals may not add due to rounding

In Thousands of Dollars

	2018	2019	2020	2021	2022	2023
Operating Revenues	$ 10,035	$ 10,425	$ 11,451	$ 11,775	$ 12,896	$ 13,966
Other operating expenses	3,875	4,007	4,321	4,523	5,202	5,764
Depreciation and Amortization	1,272	1,352	1,505	1,740	1,890	2,178
Taxes	1,110	1,357	1,213	1,313	1,410	1,332
Total Operating Expenses	6,257	6,716	7,039	7,576	8,502	9,274
Total Operating Income (Loss)	**3,778**	**3,709**	**4,412**	**4,199**	**4,394**	**4,692**
Other Income (Expense)	182	222	223	195	318	289
Interest Charges	-	-	-	-	-	-
Interest on Long-Term Debt	271	634	800	800	1,024	1,440
Other Interest	183	82	-	22	(36)	(63)
Total Interest Charges	454	716	800	822	988	1,377
Net Income (Loss)	**$ 3,506**	**$ 3,215**	**$ 3,835**	**$ 3,572**	**$ 3,724**	**$ 3,604**

Notes:

[1] All years presented are inclusive of financial information for both Citizens Water of Westfield as well as Citizens South Madison.

[2] Periods presented are for the 12 months ended September 30. For example, 2019 represents October 1, 2018 - September 30, 2019.

Attachment RJM-11
Cashflow Statements for Westfield Water and Citizens South Madison, 2018-2023
Totals may not add due to rounding

In Thousands of Dollars

	2018	2019	2020	2021	2022	2023
Operating Activities:						
Net cash provided (used) by operations	$ 4,314	$ 6,393	$ 5,520	$ 6,246	$ 6,546	$ 7,440
Investing Activities:						
Construction expenditures (cash basis)	(3,560)	(7,979)	(8,952)	(4,822)	(11,563)	(8,921)
Other investing activities	-	-	-	-	-	-
Net cash used by investing activities	**(3,560)**	**(7,979)**	**(8,952)**	**(4,822)**	**(11,563)**	**(8,921)**
Financing Activities:						
Proceeds from bank line of credit/term loan	-	-	1,000	1,500	4,000	-
Repayment of bank line of credit	-	(3,500)	-	-	-	-
Proceeds from issuance of long-term debt and bond refunding	-	20,082	-	-	15,086	-
Principal payments of long-term debt and bond refunding	-	(8,365)	-	-	(6,500)	-
Bond issuance costs	-	(165)	-	-	(174)	-
Additional paid-in capital	-	-	-	-	-	8,000
CIAC and customer advances, net	(303)	(2,069)	(1,957)	(1,724)	(1,561)	(3,354)
Other financing activities	(850)	(250)	(270)	(60)	-	-
Net cash provided (used) by financing activities	**(1,153)**	**5,733**	**(1,227)**	**(284)**	**10,851**	**4,646**
Net change in cash	**(399)**	**4,147**	**(4,659)**	**1,140**	**5,834**	**3,165**
Cash at beginning of period	2,849	2,450	6,597	1,938	3,078	8,912
Cash at end of period	**$ 2,450**	**$ 6,597**	**$ 1,938**	**$ 3,078**	**$ 8,912**	**$ 12,077**
Cash & cash equivalents		$ 5,600	$ 674	$ 1,667	$ 8,287	$ 11,345
Bond restricted funds		401	401	402	625	732
Total cash & restricted cash		**$ 6,001**	**$ 1,075**	**$ 2,069**	**$ 8,912**	**$ 12,077**

Notes:

[1] All years presented are inclusive of financial information for both Citizens Water of Westfield as well as Citizens South Madison.

[2] Periods presented are for the 12 months ended September 30. For example, 2019 represents October 1, 2018 - September 30, 2019.

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Mr. Malinak specializes in financial economics, with particular expertise in damages estimation, applied finance theory, and business and asset valuation. He has provided deposition and arbitration testimony on economic damages issues, and has testified on financial integrity, cost of capital and economic issues in utility rate hearings and at a Federal Energy Regulatory Commission hearing. Mr. Malinak has directed litigation projects in many industries on issues related to securities (including derivative securities), antitrust, breach of contract, taxation, regulatory economics, and intellectual property claims. Mr. Malinak has frequently addressed class certification and damages issues in securities fraud cases, as well as the myriad economic, financial, and accounting issues common to most damages calculations, such as cost of capital and prejudgment interest.

He has considerable experience in tax-related work, including leading Analysis Group teams in *Black & Decker, Inc. v. United States* and *Chemtech Royalty Associates L.P. v. United States,* as well as in financial institutions and risk management, having been heavily involved in the *Winstar* savings and loan litigations, and having also completed a major project on the risk of Fannie Mae. Mr. Malinak has acted as a management consultant to clients in the energy, environmental, and health care industries, and as an economic valuation and business strategy consultant to clients with new technology, intellectual property, and intangible assets.

He has acted as the treasurer, head of the audit and finance committee, and a member of the executive committee and board of directors of the Meridian International Center, an international leadership organization that works with partners in the government, private, NGO, and educational sectors to create lasting international partnerships through leadership programs and cultural exchanges. Prior to joining Analysis Group, Mr. Malinak was a principal at Putnam, Hayes & Bartlett, Inc.

EDUCATION

M.B.A. (Finance and Accounting), University of Texas Graduate School of Business (Austin, Texas)

B.A., Social Sciences, *with Distinction*, Stanford University (Palo Alto, California)

PROFESSIONAL EXPERIENCE

2000- *Managing Principal,* Analysis Group, Inc. (Washington, D.C.).
Financial and economic analysis and testimony related to complex securities, finance, accounting, antitrust and general business litigation. Financial and economic consulting related to public policy issues and business and other asset valuation.

1997-1999 *Vice President,* Analysis Group, Inc. (Washington, D.C.).

1996-1997 *Vice-President and Secretary/Treasurer*, Malinak Medical Products, Inc., (Phoenix, Arizona), a wholesale medical supplies and service company.

1994-1996 *Principal,* Putnam, Hayes & Bartlett, Inc. (Washington, D.C.).

1988-1993 *Associate,* Putnam, Hayes & Bartlett, Inc. (Washington, D.C.).

1986-1987 *Staff Consultant,* Peterson & Co. (Houston, Texas).

SELECTED REPRESENTATIVE CONSULTING ENGAGEMENTS

Regulatory Consulting

Water Utility Rate Case
Retained as an expert by a water utility to provide financial and economic testimony in a rate case that has yet to be filed. Areas of analysis currently include benchmarking the utility's cost of service and performance against comparable utilities, determining an appropriate economic valuation methodology for the utility's rate base, and analyzing the utility's cost of equity capital.

Public Utilities Commission of Ohio
Case Nos. 22-0900-EL-SSO; 22-0901-EL-ATA; 22-0902-EL-AAM
Pre-filed direct testimony focused on whether AES Ohio's (formerly Dayton Power & Light) proposed Electric Security Plan 4 ("ESP 4") would be more favorable in the aggregate to DP&L's customers than a hypothetical Market Rate Offer ("MRO").

Federal Energy Regulatory Commission
Tri-State Generation and Transmission ("G&T") Association, Inc. ("Tri-State"), Docket Nos. ER21-2818-000 and EL22-4-000 (consolidated)
Pre-filed direct and hearing testimony related to the appropriate fee for United Power, Inc. ("UP"), a Distribution Cooperative, to pay to Tri-State, a G&T Cooperative of which UP is a member, in order for UP to exit its membership. The testimony focused on the appropriate financial/economic methodology for calculating an exit fee given UP's position as both a customer and owner, as well as the effect of different exit fees on Tri-State's financial statements and credit worthiness.

Public Utilities Commission of Ohio
Case 19-0162-EL-RDR
Pre-filed direct testimony focused on (a) the amount of a two-year extension of Dayton Power and Light's (DP&L's) distribution modernization rider (DMR-E) that would be required to put DP&L in a financial position to invest in grid modernization at a reasonable cost and return it to a level of financial health consistent with its peers, and (b) whether such DMR-E would be favorable to DP&L's customers.

Public Utilities Commission of Ohio
Case 20-680-EL-UNC
Pre-filed direct testimony focused on (a) the appropriate measure of earnings under Ohio's prospective Significantly Excess Earnings Test ("SEET"), (b) whether DP&L's existing Electric Security Plan ("ESP") was more favorable in the aggregate than a hypothetical Market Rate Offer ("MRO"), and (c) analysis of DP&L's financial condition and integrity under various financial assumptions.

South Carolina Public Service Commission
Rate Proceeding Involving Nuclear Power Plant Costs
Docket numbers 2017-207-E, 2017-305-E, and 2017-370-E
Overall project management and analysis of economic and financial issues in a rate proceeding to determine the portion of over $5 billion in capital and financing costs for an abandoned nuclear construction project that should be allowed in electricity rates. Issues addressed included the impact of

regulatory disallowances on cost of capital, measurement of shareholder losses due to regulatory and political actions, and the appropriate calculation of utility revenue requirements.

Public Utilities Commission of Ohio, Dayton Power & Light (DP&L)
Rate Proceedings
Expert witness for DP&L on financial and economic issues in several rate proceedings. (See Deposition and Trial Testimony section below.)

South Carolina Public Service Commission
Application for Increase in Gas Rates and Charges, Docket No. 2005-113-G
Overall project management and analysis of the appropriate cost of capital for a natural gas distribution system.

US Environmental Protection Agency (EPA), Washington, DC
Expert affidavit and declaration on behalf of a number of energy firms in a Freedom of Information Act matter regarding the value of information contained in confidential business documents.

US EPA and/or Public Interest Groups v. Various Defendant Firms
Analysis of the then-current value of pollution control costs allegedly avoided due to noncompliance with Clean Water Act regulations. Work included review and critique of the EPA's BEN financial model for calculating the economic benefit of noncompliance with Clean Water Act regulations.

General Business Litigation

Blue Mountain, et al. v. Bob Evans Farms, Inc.
Court of Chancery of the State of Delaware
Overall project management and analysis of the long-term growth rate in cash flows for a consumer packaged goods food business that was part of an acquisition. Key issues included the nature of the competitive forces affecting the relevant segment of the food industry, as well as the economics of long-term cash flow growth rates.

Major Commercial Bank v. Federal Deposit Insurance Corporation (FDIC)
American Arbitration Association, Washington, DC
Overall project management and analysis of the value of distressed commercial real estate and related loans in Puerto Rico. Also, in-depth analysis of proper accounting for impaired loans and other real estate owned (OREO) following US generally accepted accounting principles (GAAP).

General Motors Acceptance Corporation (GMAC) v. Field Auto City, Inc.
Circuit Court for the City of Alexandria, Virginia
Coauthored expert report regarding the damages sustained by a car dealership due to the alleged improper withdrawal of floor plan financing by GMAC.

In re: Genuity, et al., Debtors
US Bankruptcy Court, Southern District of New York
Analysis of asset purchase agreement and damages in this bankruptcy proceeding. Key issues included the cause of bankruptcy, the value of the enterprise, and the economic and financial impact of the proposed restructuring agreement.

Philip L. Chabot, Jr. v. Brickfield, Burchette & Ritts, P.C., et al.
US District Court, District of Columbia
Expert report regarding the value of an equity interest in a greenfield steel company at various stages in the firm life cycle, including the seed capital and start-up financing stages.

FDIC as Receiver for Various Savings and Loan Institutions v. United States
US Court of Federal Claims, Washington, DC
Overall project management and analysis of damages. Key issues included the appropriateness of various damages theories and the value of leverage in the regulated thrift industry.

Robert Haft v. Herbert Haft and Dart Group
District of Columbia and Delaware Chancery Courts
Analysis of the value of large holdings of common stock and options on the common stock of a number of public and private companies with over $1 billion in combined revenues. Key issues included assumptions to use in a discounted cash flow analysis (DCF), the valuation of employee stock options, and the applicability of minority and marketability discounts to securities prices.

Tax-Related Litigation

Tribune Media Company and Affiliates v. Commissioner of Internal Revenue
U.S. Tax Court, Washington, DC
Overall case management and analysis of a complex transaction and financial and industry data. Work included analysis of the economics and value of a major sports franchise, and valuation of a debt guarantee.

Illinois Toolworks Inc. and Subsidiaries v. Commissioner of Internal Revenue
U.S. Tax Court, Washington, DC
Overall case management and analysis of financial data and complex transactions. Work included assessing the economic substance and business purpose of a series of complex transactions in a repatriation matter.

Chemtech Royalty Associates, L.P., by Dow Europe, S.A. as Tax Matters Partner v. United States
US District Court, Middle District of Louisiana
Overall case management and analysis of financial data and complex transactions. Work included assessing whether certain instruments were more akin to debt or equity from an economic point of view.

Major Non-U.S. Multinational Company v. United States
Government Tax-Related Investigation
Overall case management and analysis of computerized accounting data. Work involved obtaining and analyzing all of the computerized accounting data for a large division of a major multinational to determine the way the firm accounted for certain intercompany transactions and managed its cash flow.

Santa Clara Valley Housing Group, Inc., et al. v. United States
US District Court, Northern District of California, San Francisco Division
Overall case management and analysis of finance and valuation issues. Work included assessing the economic substance and business purpose of a transaction involving issuance of warrants, the valuation of the warrants, and the market valuation of an S corporation’s securities.

Tax Payer v. Tax Transaction Participant
American Arbitration Association, Chicago
Overall case management and analysis of finance and valuation issues. Work included assessing the economic substance of a transaction involving the purchase of emerging market distressed consumer and trade debt, determining the value of this distressed debt, and performing forensic accounting analysis.

National Westminster Bank, PLC v. United States
US Court of Federal Claims
Overall case management and analysis of accounting issues. Work included the reconstruction of the financial statements of the US branches of a foreign bank, based on accounting and other information that was incomplete and, in many cases, over 20 years old.

WFC Holdings Corp. v. United States
US District Court, District of Maryland, Baltimore Division
Overall case management and analysis of economic issues. Key issues included the economic substance and business purpose of a transaction involving the formation of a special purpose entity.

Black and Decker, Inc. v. United States
US District Court, District of Maryland, Baltimore Division
Overall case management and analysis of economic issues. Key issues included the economic substance and business purpose of a transaction involving the formation of a special purpose entity and the payoff structures of different financial instruments.

Flat Top Insurance Agency v. United States
US District Court, Southern District of West Virginia
Expert report regarding the economic life and value of insurance renewal intangible assets to be used for tax depreciation purposes.

Trigon Insurance Company vs. United States
US District Court, Eastern District of Virginia, Richmond Division
Overall case management and analysis of economic issues in a tax refund case involving a customer base as an intangible asset.

Securities and Commodity Market Litigation

Class v. Community Bank, et al.
US District Court for the Middle District of Pennsylvania
Overall case management and analysis of the materiality to investors of information regarding internal controls on loan underwriting and other information regarding bank performance. Key issues include factors affecting community bank valuations over time and the impact of different types of information disclosure on bank equity prices.

United States v. Mark David Radley, et al.
US District Court for the Southern District of Texas, Houston Division
Overall case management and analysis of natural gas liquids markets, propane price movements, market microstructure issues, and allegations regarding market power and price manipulation. Key issues included the size and definition of the relevant market, the appropriate measurement of market power in the context of futures/forward contract markets, and appropriate methods for analyzing trading behavior and specific claims of price manipulation.

United States Securities and Exchange Commission v. Agora, Inc., Pirate Investor, LLC and Frank Porter Stansberry
US District Court for the District of Maryland, Baltimore Division
Overall case management and analysis of the materiality to investors of certain information regarding a nuclear fuel processing firm contained in an investor newsletter. Key issues included the effect of public information releases on the firm's stock price.

Class v. Life Sciences Company 1
US District Court, District of Massachusetts
Expert report on damages and participation in a mediation hearing. The analysis addressed the value of the common stock and other securities of a life sciences company at different times and under different assumptions.

Class v. Life Sciences Company 2
US District Court, District of Massachusetts
Expert report on the alleged damages of the lead plaintiff, which was a hedge fund, and analysis of alleged classwide damages. The expert report, which was filed in support of a motion in opposition to class certification, addressed the economic impact on the lead plaintiff of the simultaneous increase in value of a short position in the life sciences firm's common stock and the decrease in value of the plaintiff's convertible bond position.

In re: Xcelera.com Securities Litigation
US District Court for the District of Massachusetts
Overall case management and analysis of the efficiency of the market for the equity securities of an internet-related firm for class certification purposes in a 10b-5 matter. Key issues included the existence of limits to arbitrage (e.g., short sales constraints) and the extent of participation by traders who were trading based on non-fundamental economic criteria during the class period.

Muzinich & Co., Inc., et al. v. Raytheon Company, et al.
US District Court for the District of Idaho
Overall case management and analysis of the efficiency of the market for the unregistered 144A bonds of a construction firm. Key issues included the existence of appropriate analyst coverage, the amount of trading volume, the nature of the reaction of the bond prices to new information, and the size of the bid-ask spread.

Plaintiff Class v. Sun Company, Inc.
Court of Common Pleas, Philadelphia County
Overall case management and analysis of trading in Sun common stock related to allegations that a preferred stock redemption rate calculation was affected by stock price manipulation.

Plaintiff Class v. Centocor, Inc.
US District Court, Eastern District of Pennsylvania
Analysis of alleged securities fraud damages and other economic issues in a 10b-5 matter involving allegations surrounding the announcement of the outcome of joint venture negotiations. Key issues included the measurement of abnormal stock returns in the presence of extreme volatility and the analysis of damages, if any, to various investor subclasses, including day traders and short-sellers.

Plaintiff Class v. Kemper Mutual Funds
US District Court, Northern District of Illinois
Analysis regarding distribution of returns on over 130,000 S&P 500 futures transactions in investigation of improper trading and self-dealing by the fund manager in a class action involving investors in two public equity mutual funds. Key issues included definition of hedging strategies, trade matching methods, and appropriate statistical methods.

Plaintiff Class v. Paine Webber
Texas State Court, Beaumont
Analysis of the sale prices for limited partnership units. Key issues included the amount of damages sustained by two different investor classes, the average settlement amounts in securities fraud matters, and the value of a company after a roll-up reorganization into an equity financed company.

Non-Securities Class Action Litigation

Confidential Matter: Class v. United States of America
US District Court for the District of Columbia
Overall case management and analysis of cost models and methodologies relevant to determining appropriate government user fees.

Beverly Clark, et al., v. Prudential Insurance Company of America
US District Court for the District of New Jersey
Analysis of damages and other issues related to class certification. Key issues included the appropriate damages methodology and the extent to which individual inquiry was required to accurately determine damages.

Antitrust Litigation

The Scotts Company v. Central Garden & Pet Company
US District Court, Northern District of California
Overall case management and analysis of antitrust damages. Key issues included the appropriate herbicide product market definition, the measurement of market power, and the effect of the trend towards big box retailers on herbicide manufacturers and distributors.

Act, Inc. v. Sylvan Learning Systems
US District Court, Northern District of Iowa
Overall case management and analysis of market power issues and antitrust damages.

Independent Service Provider v. IBM
Texas State Court, Corpus Christi
Damages and antitrust analyses prepared on behalf of IBM. Key issues included definition of relevant markets, calculation of the defendant's market share, calculation of antitrust and business disparagement damages, and valuation of settlement options.

Thermo Electron & Rolls Royce, Inc. v. Florida Power & Light
US District Court, Florida
Analysis of damages due to alleged anticompetitive acts by an electric utility. Key issues included forecasting of fuel prices, business decision-making procedures, profitability of cogeneration facilities and the appropriate cost of capital to use in evaluating investments in electricity generation facilities.

ETSI Pipeline Project, et al. v. Burlington Northern, et al.
US District Court, Eastern District of Texas
Assistance to counsel in rebutting opposing expert's lost profits damages claim. Key issues included the appropriate measure of lost profits and the appropriate discount and interest rates to apply in valuing the lost profits stream.

Environmental Insurance and Other Insurance Litigation

Financial Institutions v. Group of Insurers/Reinsurers
Analysis of potential trading and other losses due to business interruption resulting from a major hurricane.

Alcoa Inc., and Northwest Alloys, Inc., v. Accident and Casualty Insurance Company, et al.
Superior Court of the State of Washington, King County
Analysis of the history of environmental regulation of various pollutants to determine the extent of government and industry knowledge regarding those pollutants at various policy dates. Analysis of economic damages due to environmental contamination.

General Electric v. Environmental Insurance Firms
Environmental Insurance Settlement Matter
Analysis of the value of future environmental remediation cost liabilities for settlement purposes, including the determination of the appropriate discount and inflation rates to use in valuing projected environmental remediation costs.

Intellectual Property Litigation

Joint Medical Products Corporation v. Depuy, Inc., et al.
US District Court, District of Connecticut
Analysis of patent damages. Key issues: the factors driving the buying decision in the hip implant market, fixed versus variable costs, and relevant licensing rates for comparable products.

Wang Laboratories, Inc. v. America Online, Inc. and Netscape Communications Corp.
US District Court, Eastern District of Virginia
Valuation of patented online services software interface features. Key issue: the economic value of customer retention.

BTG USA, Inc. v. Magellan Corp.; BTG v. Trimble Navigation
US District Court, Eastern District of Pennsylvania
Patent damages: analysis of prejudgment interest, reasonable royalty, value of inventory on hand, preparation and investments made and business commenced (as of patent reissuance) involving a patent directed to secret or secure communications technology employed in global positioning systems products.

Polaroid v. Kodak
US District Court, District of Massachusetts
Patent damages: analysis and preparation of trial exhibits in support of academic witness's discount and interest rate testimony. Analysis of fixed and variable costs for use in a lost profits study involving an instant photography technology patent.

Management Consulting and Valuation Projects

Fannie Mae
Overall responsibility for assisting in the preparation of a white paper appearing on Fannie Mae's website, including analysis of the financial risk of Fannie Mae. Key issues included the appropriate model to use in evaluating the risk of a large regulated mortgage banking and guarantee business with a sophisticated hedging operation using derivatives.

Environmental Insurance Firm
Expert report regarding the appropriate discount and inflation rates to use in calculating the present value of projected environmental remediation costs. Participation in settlement meetings.

Hospital Management
Analysis of the value of a hospital in connection with a proposed hospital merger transaction. Key issues included the appropriate measure of hospital profits, the cost of capital to use in valuing those profits, and the impact of market forces (e.g., managed care) on the hospital's future revenues.

Major Federal Government Agency
Review of decision making methods and data regarding a large government energy project. Key issues included the best quantitative methods to use to support the government's decision, the appropriate discount rates to use in valuing different projects, and the option value of flexibility when projecting the cost of private and government megaprojects.

Wood Flooring Manufacturer
Preparation of an economic feasibility study for the installation of a cogeneration facility by a basketball court flooring manufacturer. Effort included extensive research into the cost of constructing a facility and the projected cost of power in the Upper Peninsula of Michigan.

Deposition and Trial Testimony

Dillon Trust Company LLC, et al. v. United States
United States Court of Federal Claims
Expert and rebuttal reports, deposition and trial testimony regarding the solvency of relevant entities before and after certain transactions involving those entities, and the economic characteristics of the bidding process and bids received in an auction for the sale of stock in a privately held company.

Federal Energy Regulatory Commission
Tri-State Generation and Transmission ("G&T") Association, Inc. ("Tri-State"), Docket Nos. ER21-2818-000 and EL22-4-000 (consolidated)
Pre-filed direct and hearing testimony related to the appropriate fee for United Power, Inc. ("UP"), a Distribution Cooperative, to pay to Tri-State, a G&T Cooperative of which UP is a member, in order for UP to exit its membership. The testimony focused on the appropriate financial/economic methodology for calculating an exit fee given UP's position as both a customer and owner, as well as the effect of different exit fees on Tri-State's financial statements and credit worthiness.

Public Utilities Commission of Ohio
Cases 20-1041-EL-UNC and 19-1121-EL-UNC
Prefiled direct, deposition, and hearing testimony focused on the issues of (a) whether Dayton Power & Light (DP&L) had significantly excessive earnings in 2018 and 2019 under Ohio's SEET regulation, (b)and (b) the appropriate method for calculating DP&L's Return on Equity for purposes of the SEET.

McConnell v. McConnell
Circuit Court for the County of Orange, Virginia
Expert and rebuttal reports and hearing testimony regarding the meaning of "personal efforts" as applied to investing, and the increase or decrease in value of marital assets due to such personal efforts.

Public Utilities Commission of Ohio
Cases 16-0395-EL-SSO, 16-0396-EL-ATA, and 16-0397-EL-AAM
Prefiled direct, deposition, and hearing testimony (in both 2017 and 2019) focused on the issues of (a) whether the amended stipulation and recommendation signed by Dayton Power and Light (DP&L) and various parties in interest is more favorable in the aggregate for ratepayers than a hypothetical MRO, and (b) the impact of different rate plans and other assumptions on the financial integrity of DP&L.

Public Utilities Commission of Ohio
Cases 12-426-EL-SSO, 12-427-EL-ATA, 12-428-EL-AAM, 12-429-EL-WVR, and 12-672-EL-RDR
Prefiled direct, rebuttal, deposition, and hearing testimony on the issues of (a) whether the proposed electricity rate stabilization plan filed by DP&L is more favorable in the aggregate for ratepayers than a hypothetical MRO, (b) the impact of different rate plans on the financial integrity of DP&L, and (c) the current cost of capital for DP&L.

Humana Military Healthcare Services, Inc., v. Blue Cross and Blue Shield of North Carolina, et al.
US District Court, Middle District of North Carolina, Durham Division
Expert report and deposition testimony regarding the amount of trade secret damages in the context of a large government managed care contract procurement.

Pragmatech Software v. Silknet Software, Inc.
American Arbitration Association (Boston Office)
Expert report and testimony at an arbitration hearing regarding the proper measure of damages in a breach of contract case involving alleged improper use of intellectual property / confidential information.

PUBLICATIONS

"Estimating the Cost of Capital," Litigation Services Handbook, The Role of the Financial Expert, Chapter 10 (pp. 10.1-10.25), Sixth Edition (2017) (co-authored with J. McLean).

"Estimating the Cost of Capital," Litigation Services Handbook, The Role of the Financial Expert, Chapter 7 (pp. 7.1-7.22), Fourth Edition (2007) (co-authored with G. Jetley and L. Stamm).

PRESENTATIONS

"The Impact of Regulatory Uncertainty on Electric Utilities, Rate Payers, and Investors," presentation to the Rutgers University CRRI (Center for Research in Regulated Industries) Western Energy Conference, June 2019 (with Megan Accordino, Ryan Hughes, Hunter Holland and Maria Schweitzer).

"First Mover Advantages and e-Competition: Sustaining Superior Profitability in e-Commerce," presented as part of a panel titled, "Effective Use of Expert Witnesses in e-Commerce Antitrust Litigation," at a regional meeting of the antitrust litigation section of the American Bar Association, February 2001.

"Savings & Loan Financial Modeling Issues," presentation to the Receivership Goodwill Section of the Federal Deposit Insurance Corporation, October 2000 (confidential).

"Internet Patents -- Monetary Remedies" (with John C. Jarosz), American Intellectual Property Law Association (22nd Mid-Winter Institute titled, "IP Law in Cyberspace"), February 1999.

BOARD POSITIONS

Meridian International Center, Washington, D.C.

2014-2020 Member, Board of Directors and Executive Committee
Treasurer and Chairman of the Audit and Finance Committee

PREVIOUS PROFESSIONAL POSITIONS

Meridian International Center, Washington, D.C.

2013-2014 Member, Audit Committee

American Society of International Law, Washington, D.C.

2009-2011 Member, Audit Committee