Exhibit No. 3

MAWC – Exhibit 3
Ann E. Bulkley
Direct Testimony
File No. WR-2022-0303

PUBLIC VERSION

_____ Denotes Confidential

Exhibit No.:	
Issues:	Return on Equity and Capital Structure
Witness:	Ann E. Bulkley
Exhibit Type:	Direct Testimony
Sponsoring Party:	Missouri-American Water Company
File No.:	WR-2022-0303 SR-2022-0304
Date:	July 1, 2022

MISSOURI PUBLIC SERVICE COMMISSION

CASE NO. WR-2022-0303
CASE NO. SR-2022-0304

DIRECT TESTIMONY

OF

ANN E. BULKLEY

ON BEHALF OF

MISSOURI-AMERICAN WATER COMPANY

AFFIDAVIT

I, Ann E. Bulkley, under penalty of perjury, and pursuant to Section 509.030, RSMo, state that I am a Principle for The Brattle Group, that the accompanying testimony has been prepared by me or under my direction and supervision; that if inquiries were made as to the facts in said testimony, I would respond as therein set forth; and that the aforesaid testimony is true and correct to the best of my knowledge and belief.

Ann E. Bulkley

July 1, 2022
Dated

DIRECT TESTIMONY

ANN E. BULKLEY
MISSOURI-AMERICAN WATER COMPANY
CASE NO. WR-2022-0303
CASE NO. SR-2022-0304

TABLE OF CONTENTS

I. WITNESS IDENTIFICATION AND QUALIFICATIONS

Q. Please state your name, occupation and business address.

A. My name is Ann E. Bulkley. I am employed by The Brattle Group ("Brattle") as a Principal. My business address is One Beacon Street, Suite 2600, Boston, Massachusetts 02108.

Q. On whose behalf are you submitting this testimony?

A. I am submitting this testimony on behalf of Missouri-American Water Company ("MAWC" or the "Company"), a wholly-owned subsidiary of American Water Works Company, Inc. ("AWK").

Q. Please describe your background and professional experience in the energy and utility industries.

A. I hold a Bachelor's degree in Economics and Finance from Simmons College and a Master's degree in Economics from Boston University, with more than 25 years of experience consulting to the energy industry. I have advised numerous energy and utility clients on a wide range of financial and economic issues with primary concentrations in valuation and utility rate matters. Many of these assignments have included the determination of the cost of capital for valuation and ratemaking purposes. My qualifications and testimony listing are presented in more detail in Schedule AEB-A.

II. PURPOSE AND OVERVIEW OF TESTIMONY

Q. What is the purpose of your Direct Testimony?

A. The purpose of my Direct Testimony is to present evidence and provide a recommendation regarding MAWC's authorized return on equity ("ROE" or "cost

of equity") and to assess the reasonableness of its proposed capital structure for ratemaking purposes.

Q. Are you sponsoring any schedules in support of your Direct Testimony?

A. Yes. My analyses and recommendations are supported by the data presented in Schedules AEB-1 through Schedule AEB-9.

Q. How is the remainder of your Direct Testimony organized?

A. Section III provides a summary of my analyses and conclusions. Section IV reviews the regulatory principles pertinent to the development of the cost of capital. Section V discusses the current and prospective capital market conditions and the effect of those conditions on MAWC's cost of equity. Section VI explains my selection of a proxy group of risk comparable utilities. Section VII describes my analyses and the analytical basis for the recommendation of the appropriate ROE for MAWC. Section VIII provides a discussion of specific business and financial risks that have a direct bearing on the Company's authorized ROE in this case. Section IX provides an assessment of the reasonableness of MAWC's proposed capital structure as compared to the capital structures of the proxy group companies. Section X presents my conclusions and recommendations on the cost of equity and capital structure.

III. SUMMARY OF ROE ANALYSES AND CONCLUSIONS

Q. Please provide a brief overview of the analysis that led to your ROE recommendation.

A. As discussed in more detail below, it is important to consider the results of several analytical approaches in determining a reasonable recommendation for the

Company's ROE. To develop my ROE recommendation, I first developed a proxy group of utility companies. I did not limit the proxy group to water utilities, but included a broader group of utilities that face similar risk as MAWC because a proxy group composed only of water utilities would result in a small group of companies for which data is limited. To that proxy group, I applied the Constant Growth form of the Discounted Cash Flow ("DCF") model, the Capital Asset Pricing Model ("CAPM"), and the Empirical Capital Asset Pricing Model ("ECAPM"). It is appropriate to rely on several analytical approaches because market conditions affect the assumptions used in each model differently. Therefore, the use of multiple ROE estimation models is beneficial to provide benchmarks and a range of results to consider.

Q. Please summarize the key factors considered in your analyses and upon which you base your recommended ROE.

A. In developing my recommended ROE for MAWC, I considered the following:

- The *Hope* and *Bluefield* decisions[1] that established the standards for determining a fair and reasonable allowed ROE, including consistency of the allowed return with the returns of other businesses having similar risk, adequacy of the return to provide access to capital and support credit quality, and the requirement that the end result lead to just and reasonable rates.

- The effect of current and projected capital market conditions on investors' return requirements.

[1] *Federal Power Commission v. Hope Natural Gas Co*., 320 U.S. 591 (1944); Bluefield Waterworks & Improvement Co., v. Public Service Commission of West Virginia, 262 U.S. 679 (1923).

- The results of several analytical approaches that provide estimates of the Company's cost of equity.

- The Company's regulatory, business and financial risks relative to the proxy group of comparable companies, and the implications of those risks.

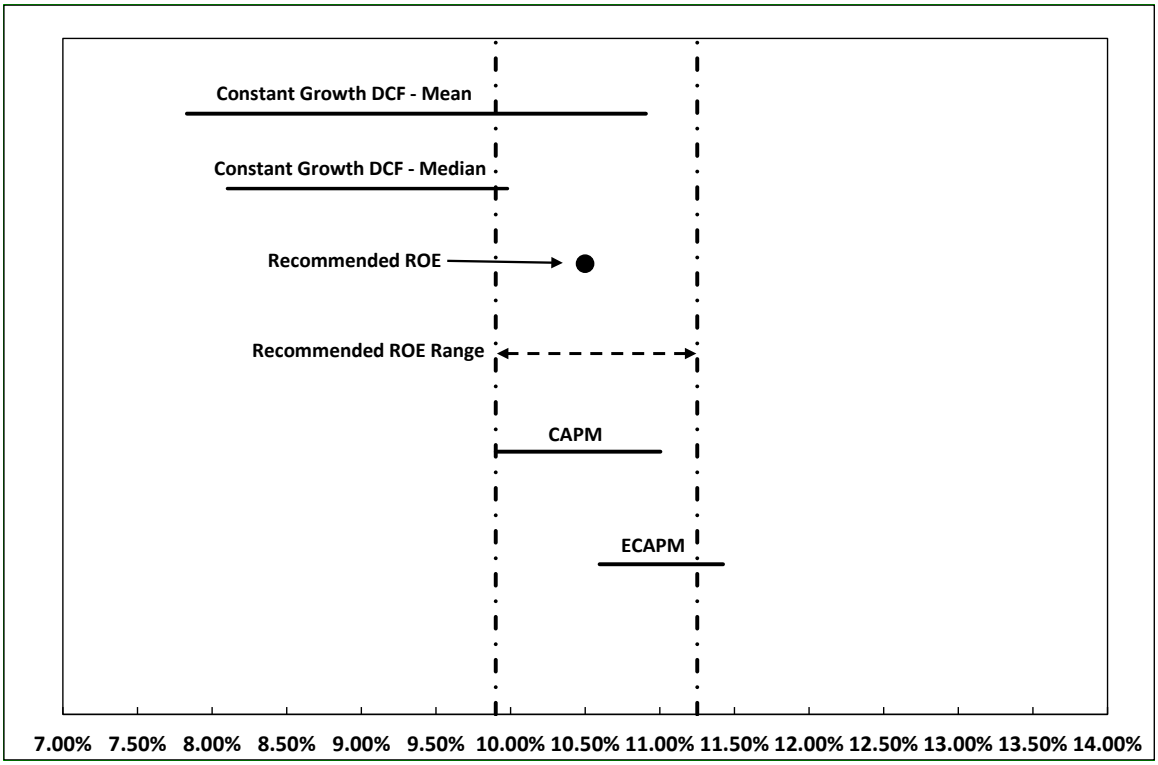
Q. Please explain how you assessed these factors.

A. After considering these factors and the results of my analyses, I relied on the range of results produced by the Constant Growth DCF model, the CAPM, and the ECAPM. As shown in Figure 1, these ROE estimation models produce a range of results. My conclusion as to where, within that range of results, MAWC's cost of equity falls is based on my assessment of market conditions, and the Company's business and financial risk relative to the proxy group. Although the companies in my proxy group are generally comparable to MAWC, each company is unique, and no two companies have exactly the same business and financial risk profiles. Accordingly, I considered the Company's business and financial risk in the aggregate in comparison to that of the proxy group companies when determining where MAWC's ROE falls within the reasonable range of analytical results to account for any residual differences in risk.

Q. Please summarize the results of the ROE estimation models that you considered to establish the range of ROEs for MAWC.

A. Figure 1 summarizes the range of results produced by the Constant Growth DCF, CAPM, and ECAPM.

Figure 1: Summary of Cost of Equity Results



As shown in Figure 1 (and in Schedule-1), the range of results produced by the ROE estimation models is wide. While it is common to consider multiple models to estimate the cost of equity, it is particularly important when the range of results varies considerably across methodologies. As a result, my ROE recommendation considers the range of results of the Constant Growth DCF model, as well as the results of the CAPM and ECAPM. My ROE recommendation also considers MAWC's company-specific risk factors and current and prospective capital market conditions.

Q. What is your conclusion regarding the appropriate authorized ROE for MAWC in this proceeding?

A. A reasonable range of ROE estimates for MAWC is from 9.90 percent to 11.25 percent. Considering management performance and the risk factors facing MAWC,

I believe that an ROE of 10.50 percent is reasonable and appropriate. The required ROE should be a forward-looking estimate; therefore, the analyses supporting my recommendation rely on forward-looking inputs and assumptions (e.g., projected analyst growth rates in the DCF model, forecasted risk-free rate and Market Risk Premium in the CAPM analysis, etc.). I also take into consideration capital market conditions, including the expectation that interest rates will increase over the near-term as a result of the Federal Reserve normalizing monetary policy in response to increased inflation.

Q. Please summarize the analysis you conducted in determining that MAWC's requested capital structure is reasonable and appropriate.

A. Because there is specific debt that has been identified for the wastewater services, the capital structures for water and wastewater services were calculated separately. Therefore, I have considered the reasonableness of the capital structure for both MAWC's water and wastewater services. Based on the analysis presented in Section IX of my testimony, I conclude that MAWC's proposed water and wastewater services equity ratio of 50.43 percent for the period ending May 31, 2023 is reasonable. To determine if MAWC's requested capital structures for both water and wastewater services was reasonable, I reviewed the capital structures of the utility subsidiaries of the proxy companies. As shown in Schedule AEB-9, the results of that analysis demonstrate that the average equity ratios for the utility operating companies of the proxy group range from 47.44 percent to 60.04 percent, with an average of 55.63 percent. Therefore, the Company's proposed equity ratios

for both water and wastewater service are well within the range of equity ratios established by the proxy group companies.

IV. REGULATORY PRINCIPLES

Q. Please describe the principles that guide the establishment of the cost of capital for a regulated utility.

A. The United States Supreme Court's *Hope* and *Bluefield* decisions established the standards for determining the fairness or reasonableness of a utility's authorized ROE. Among the standards established by the Court in those cases are: (1) consistency with other businesses having similar or comparable risks; (2) adequacy of the return to support credit quality and access to capital; and (3) the principle that the specific means of arriving at a fair return are not important, only that the end result leads to just and reasonable rates.[2]

Q. Is fixing a fair rate of return just about protecting the utility's interests?

A. No. As the court noted in *Bluefield,* a proper rate of return not only assures "confidence in the financial soundness of the utility and should be adequate, under efficient and economical management, to maintain and support its credit [but also] enable[s the utility] to raise the money necessary for the proper discharge of its public duties." *Bluefield Waterworks & Imp. Co. vs. Pub. Serv. Commn. of W. Va*., 262 US 679, 693, 43 S Ct 675, 679, 67 L Ed 1176 (1923). As the Court went on to explain in *Hope*, "[t]the rate-making process … involves balancing of the investor and consumer interests." *Fed Power Commn. v. Hope Nat. Gas Co*., 320 US 591, 603 (1944).

[2] *Bluefield*, 262 U.S. at 692-93; *Hope*, 320 U.S., at 603.

Q. Has the Missouri Public Utility Commission ("Commission") provided similar guidance in establishing the appropriate return on common equity?

A. Yes. The Commission follows the precedents of the *Hope* and *Bluefield* cases and acknowledges that utility investors are entitled to a fair and reasonable return. This position was set forth by the Commission as follows:

A "just and reasonable" rate is one that is fair to both the utility and its customers; it is no more than is sufficient to "keep public utility plants in proper repair for effective public service, and … to insure to the investors a reasonable return upon funds invested."[3]

Q. Why is it important for a utility to be allowed the opportunity to earn a return that is adequate to attract equity capital on reasonable terms?

A. A return that is adequate to attract capital on reasonable terms enables MAWC to continue providing safe, reliable water and wastewater service while maintaining its financial integrity. That return should be commensurate with returns expected elsewhere in the market for investments of equivalent risk. If it is not, equity investors will seek alternative investment opportunities for which the expected return reflects the perceived risks, thereby inhibiting MAWC's ability to attract capital at reasonable cost.

[3] *In the Matter of Missouri Gas Energy and its Tariff Filing to Implement a General Rate Increase for Natural Gas Service, Report and Order*, Missouri Public Service Commission, Case No. GR-2009-0355. February 10, 2010, at 7.

Q. Is a utility's ability to attract capital also affected by the ROEs that are authorized for other utilities?

A. Yes. Utilities compete directly for capital with other investments of similar risk, which include other water, natural gas and electric utilities. Therefore, the ROE awarded to a utility sends an important signal to investors regarding whether there is regulatory support for financial integrity, dividends, growth, and fair compensation for business and financial risk. The cost of capital represents an opportunity cost to investors. If higher returns are available elsewhere for other investments of comparable risk, investors have an incentive to direct their capital to those investments. Thus, an authorized ROE significantly below authorized ROEs for other water, natural gas and electric utilities can inhibit a utility's ability to attract capital for investment.

Q. Does the fact that MAWC is owned by AWK, a publicly-traded company affect your analysis?

A. No, it does not. In this proceeding, consistent with stand-alone ratemaking principles, it is appropriate to establish the cost of equity for MAWC, not AWK. More importantly however, it is important to establish a return on equity and capital structure that provide MAWC the ability to attract capital on reasonable terms, on a stand-alone basis, and within the AWK system. All utility operating subsidiaries within AWK corporate structure compete for discretionary capital. Unless MAWC is provided a reasonable opportunity to earn a market-based ROE with an appropriate capital structure, it will be at a disadvantage in attracting discretionary capital from parent company resources.

Q. What are your conclusions regarding regulatory guidelines and financial considerations?

A. The ratemaking process is premised on the principle that, in order for investors and companies to commit the capital needed to provide safe and reliable utility services, a utility must have the opportunity to recover the return of, and the market-required return on, its invested capital. Because utility operations are capital-intensive, regulatory decisions should enable the utility to attract capital on reasonable terms; doing so is in the long-term interests of the utility's customers.

The Commission's order in this case, therefore, should establish rates that provide MAWC with the opportunity to earn a ROE that is: (1) adequate to attract capital on reasonable terms; (2) sufficient to ensure its financial integrity; and (3) commensurate with returns on investments in enterprises with similar risk.

V. CAPITAL MARKET CONDITIONS

Q. Why is it important to consider capital market conditions in the estimation of the investor-required return on equity?

A. The ROE estimation models rely on market data that are either specific to the proxy group, in the case of the DCF model, or to the expectations of market risk, in the case of the CAPM. The results of the ROE estimation models can be affected by prevailing market conditions at the time the analysis is performed. While the ROE that is established in a rate proceeding is intended to be forward-looking, the analyst uses current and projected market data, specifically stock prices, dividends, growth rates and interest rates in the ROE estimation models to estimate the required return for the subject company.

As is discussed in the remainder of this section, analysts and regulatory commissions have concluded that current market conditions have affected the results of the ROE estimation models. As a result, it is important to consider the effect of these conditions on the ROE estimation models when determining the appropriate range and recommended ROE for a future period. If investors do not expect current market conditions to be sustained in the future, it is possible that the ROE estimation models will not provide an accurate estimate of investors' required return during that rate period. Therefore, it is important to consider projected market data to estimate the return for that forward-looking period.

Q. What factors are affecting the cost of equity for regulated utilities in the current and projected capital markets?

A. The cost of equity for regulated utility companies is being affected by several factors in the current and prospective capital markets, including: 1) high inflation, 2) changes in monetary policy, and 3) rising interest rates. These factors affect the market data and projections used in the ROE estimation models. In this section, I discuss each of these factors and how it affects the models used to estimate the cost of equity for regulated utilities.

Q. What effect do current and prospective market conditions have on the cost of equity for the Company?

A. The combination of persistently high inflation, the Federal Reserve's changes in monetary policy, and the dramatic shifts in market conditions all contribute to an expectation of increased market risk and an increase in the return on equity required by investors. It is essential that these factors be considered in determining an

appropriate forward-looking ROE. Inflation is currently at the highest level experienced in approximately 40 years. Interest rates, which have increased significantly from pandemic-related lows in 2020 are expected to continue to increase in direct response to the Federal Reserve's use of monetary policy to address inflation. Since there is a strong historical inverse correlation between interest rates and the share prices of utility stocks (share prices of utility stocks typically fall when interest rates rise), it is reasonable to expect that investors' required ROE for utility companies will also continue to increase. Therefore, ROE estimates based solely on current market conditions will understate the ROE required by investors during the future period that the Company's rates determined in this proceeding will be in effect.

A. The Effect of Monetary Policy on Market Dynamics

Q. Please summarize the monetary policy actions of the Federal Reserve in response to the economic effects of COVID-19.

A. In response to the COVID-19 pandemic, the Federal Reserve:

- decreased the Federal Funds rate twice in March 2020, resulting in a target range of 0.00 percent to 0.25 percent;
- increased its holdings of both Treasury and mortgaged-back securities;
- started expansive programs to support credit to large employers – the Primary Market Corporate Credit Facility to provide liquidity for new issuances of corporate bonds; and the Secondary Market Corporate Credit Facility to provide liquidity for outstanding corporate debt issuances; and

- supported the flow of credit to consumers and businesses through the Term Asset-Backed Securities Loan Facility.

In addition, Congress also passed the Coronavirus Aid, Relief, and Economic Security ("CARES") Act in March 2020, the Consolidated Appropriations Act, 2021 in December 2020, and the American Rescue Plan Act in March 2021, which included $2.2 trillion, $900 billion, and $1.9 trillion, respectively, in fiscal stimulus aimed at also mitigating the economic effects of COVID-19. These expansive monetary and fiscal programs mitigated the economic effects of the COVID-19 pandemic and provided additional support as the economy recovers from the COVID-19 recession.

Q. How did the accommodative monetary and fiscal policy affect the U.S. economy?

A. The expansive monetary and fiscal policy programs resulted in a strong economic recovery in 2021 from the COVID-19 induced recessionary period in 2020. In fact, according to the Bureau of Economic Analysis, real GDP grew by 5.7 percent in 2021 driven primarily by a 7.9 percent increase in personal consumption expenditures.[4] Moreover, the unemployment rate decreased from a high of 14.7 percent in April 2020 to 3.9 percent as of December 2021.[5] Finally, as I will discuss in more detail below, the economic recovery has also brought about a substantial

[4] Source: Bureau of Economic Analysis, News Release, February 24, 2022, at 8.

[5] Source: Bureau of Labor Statistics. https://data.bls.gov/timeseries/LNS14000000

increase in inflation, with the year-over-year ("YOY") change in the Consumer Price Index ("CPI") at 8.22 percent in April 2022.[6]

Q. Is the Federal Reserve normalizing monetary policy?

A. Yes. The dramatic increase in inflation has prompted the Federal Reserve to pursue an aggressive normalization of monetary policy, removing the accommodative policy programs used to mitigate the economic effects of COVID-19. As of the May 4, 2022 meeting, the Federal Reserve has taken the following actions:

- Completed its taper of Treasury bond and mortgage-backed securities purchases, decreasing monthly purchase plans by $60b (from $80b to $20b) since November 2021[7];
- Increased the target federal funds rate from 0.00 – 0.25 percent to 0.25 – 0.50 percent at the March 16, 2022 meeting[8] and then from 0.25 – 0.50 percent to 0.75 – 1.00 percent at the May 4, 2022 meeting;[9]
- Forecasted a total of seven rate increases in 2022 and four rate increases in 2023 which resulted a median forecast of the federal funds rate of 1.9 percent and 2.8 percent in 2022 and 2023, respectively;[10]
- Will begin reducing its holdings of Treasury and mortgage-backed securities on June 1, 2022.[11] The Federal Reserve will reduce the size of its balance sheet by only reinvesting principal payments on owned securities after the total amount of payments received exceeds a defined cap. For Treasury Securities, the cap will be set at $30 billion per month

6 Bureau of Labor Statistics, U.S. Department of Labor, The Economics Daily, Food prices up 10.8 percent for year ended April 2022; largest 12-month increase since November 1980 at https://www.bls.gov/opub/ted/2022/food-prices-up-10-8-percent-for-year-ended-april-2022-largest-12-month-increase-since-november-1980.htm

7 Source: Federal Reserve Bank of New York, https://www.newyorkfed.org/markets/domestic-market-operations/monetary-policy-implementation/treasury-securities/treasury-securities-operational-details#monthly-details.

8 Source: Federal Reserve, Press Release, (Mar. 16, 2022).

9 Source: Federal Reserve, Press Release, (May 4, 2022).

10 Federal Reserve, Summary of Economic Projections, March 16, 2022, at 2.

11 Source: Federal Reserve, Press Release, (May 4, 2022).

for the first three months and $60 billion per month after the first three months while for mortgage-backed securities the cap will be set at $17.5 billion per month for the first three months and $35 billion per month after the first three months.[12]

Q. What is the market response to the recent FOMC meetings?

A. The market response is an expectation that interest rates will continue to increase in response to Federal Reserve actions to address inflation. The CME Group uses federal funds rate futures contracts to determine investors' views regarding the probability of the target federal funds rate range at upcoming Federal Reserve meetings.[13] Figure 2 below summarizes investors' expectations regarding the level of the federal funds rate at each of the next eleven meetings as of May 5, 2022, based on The CME Group's methodology. As shown in Figure 2, investors expect the Federal Reserve to increase the federal funds rate at a faster pace than what was indicated in the forecasts released at the Federal Reserve's March 16, 2022 meeting. For example, according to the CME Group, there is a 53.6 percent probability[14] that the target federal funds rate range is 3.00 percent to 3.25 percent as of December 2022 which is greater than the Federal Reserve's median forecast of 1.90 percent. This is consistent with expectations of major financial institutions. In particular:

- Citigroup, Inc. is now projecting 50 basis point increases at the next four FOMC meetings followed by 25 basis point increases in October and December, reaching 3.50 to 3.75 percent.

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12 Source: Federal Reserve, Plans for Reducing the Size of the Federal Reserve's Balance Sheet, Press Release, (May 4, 2022).

13 https://www.cmegroup.com/education/demos-and-tutorials/fed-funds-futures-probability-tree-calculator.html

14 The probability of a rate hike is calculated by adding the probabilities of all target rate levels above the current target rate.

- Bank of America Corp. is projecting a 25 basis point increase in May, followed by two 50 basis point increases, and then a 25 basis point increase at each subsequent meeting through May 2023, reaching a range of 3.00 to 3.25 percent.
- Goldman Sachs Group Inc. is projecting 50 basis point increases at the May and June FOMC meetings with a 25 basis point increase at the four remaining meetings in 2022.[15]Moody's recently noted that the financial markets are close to fully pricing in three 50-basis point rate increases this year.[16]

Thus, the consensus of investors is an expectation that the Federal Reserve will pursue more aggressive monetary policy than indicated at the March 16, 2022, meeting to combat persistent high levels of inflation.

Figure 2: Investor Expectation of Future Federal Funds Rate Increases[17]

MEETING PROBABILITIES															
MEETING DATE	125-150	150-175	175-200	200-225	225-250	250-275	275-300	300-325	325-350	350-375	375-400	400-425	425-450	450-475	475-500
6/15/2022	12.9%	87.1%	0.0%	0.0%											
7/27/2022	0.0%	0.0%	12.8%	86.9%	0.3%	0.0%	0.0%	0.0%	0.0%						
9/21/2022	0.0%	0.0%	0.0%	6.8%	52.1%	41.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
11/2/2022	0.0%	0.0%	0.0%	0.0%	5.4%	43.0%	43.2%	8.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
12/14/2022	0.0%	0.0%	0.0%	0.0%	0.0%	5.2%	41.2%	43.2%	10.0%	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%
2/1/2023	0.0%	0.0%	0.0%	0.0%	0.0%	1.8%	17.4%	41.9%	31.9%	6.8%	0.3%	0.0%	0.0%	0.0%	0.0%
3/15/2023	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.8%	8.8%	28.4%	37.4%	20.6%	3.8%	0.2%	0.0%	0.0%
5/3/2023	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	1.5%	10.5%	29.2%	36.0%	19.2%	3.5%	0.1%	0.0%	0.0%
6/14/2023	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.8%	6.4%	20.7%	32.9%	26.8%	10.6%	1.7%	0.1%
7/26/2023	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.7%	5.5%	18.4%	30.9%	27.8%	13.2%	3.1%	0.3%

15 Lanman, Scott, "Wall Street Lifts Fed Forecasts; Citi See Four Half-Point Hikes," Bloomberg, March 25, 2022.
16 Moody's Analytics, Weekly Market Outlook, "Fed Girds for Stagflation", April 14, 2022.

17 CME Group; FedWatch tool as of May 5, 2022.

Q. Has the Federal Reserve provided additional support for investors' expectations regarding the federal funds rate?

A. Yes. Specifically, at the May 4, 2022 meeting, when the Federal Reserve increased the federal funds target rate by 50 basis points from a range of 0.25 – 0.50 percent to a range of 0.75 – 1.00 percent, Federal Reserve Chairman Powell noted at his press conference that additional 50 basis point increases may be needed at the next couple of meetings:

> [w]e are on a path to move our policy rate expeditiously to more normal levels. Assuming that economic and financial conditions evolve in line with expectations, there is a broad sense on the Committee that additional 50 basis point increases should be on the table at the next couple of meetings. We will make our decisions meeting by meeting, as we learn from incoming data and the evolving outlook for the economy. And we will continue to communicate our thinking as clearly as possible. Our overarching focus is using our tools to bring inflation back down to our 2 percent goal.[18]

B. Inflationary Expectations in Current and Projected Market Conditions

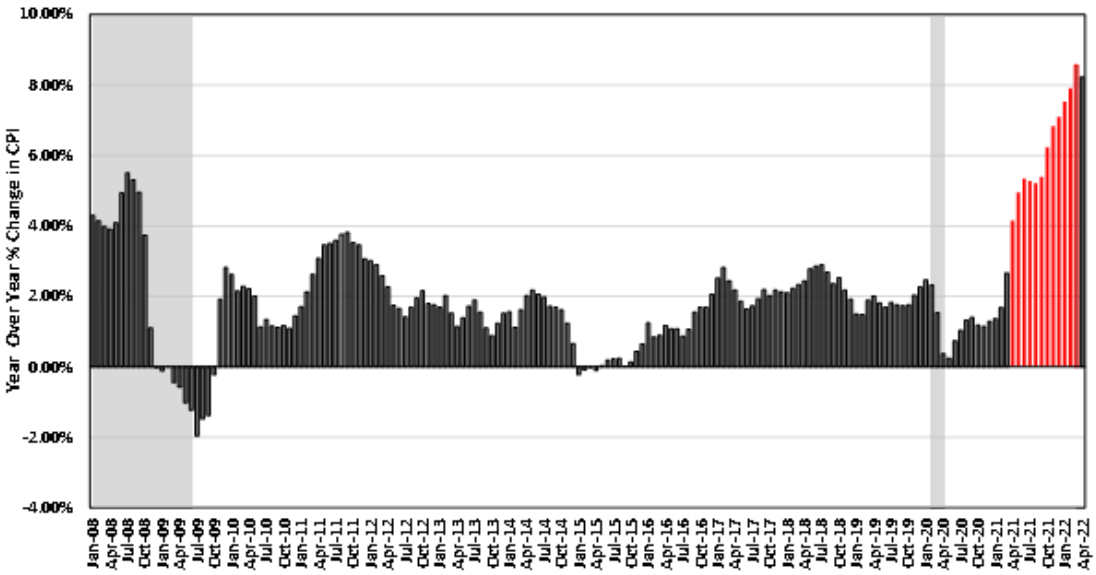
Q. Is the increase in inflation significant?

A. Yes. As shown in Figure 3, the YOY change in the Consumer Price Index ("CPI") published by the Bureau of Labor Statistics has increased steadily over the past year, rising from 1.37 percent in January 2021 to 8.22 percent in April 2022. The 8.22 percent YOY in the CPI in April; 2022 is down slightly from 8.56 percent in

[18] Source: Federal Reserve, Transcript of Chair Powell's Press Conference Opening Statement, (May 4, 2022), at 3.

March 2022 which was the largest 12-month increase since 1981 and significantly greater than any level seen since January 2008.[19]

Figure 3: Consumer Price Index – YOY Percent Change – January 2008 – April 2022[20]



Q. What are the expectations for inflation over the near-term?

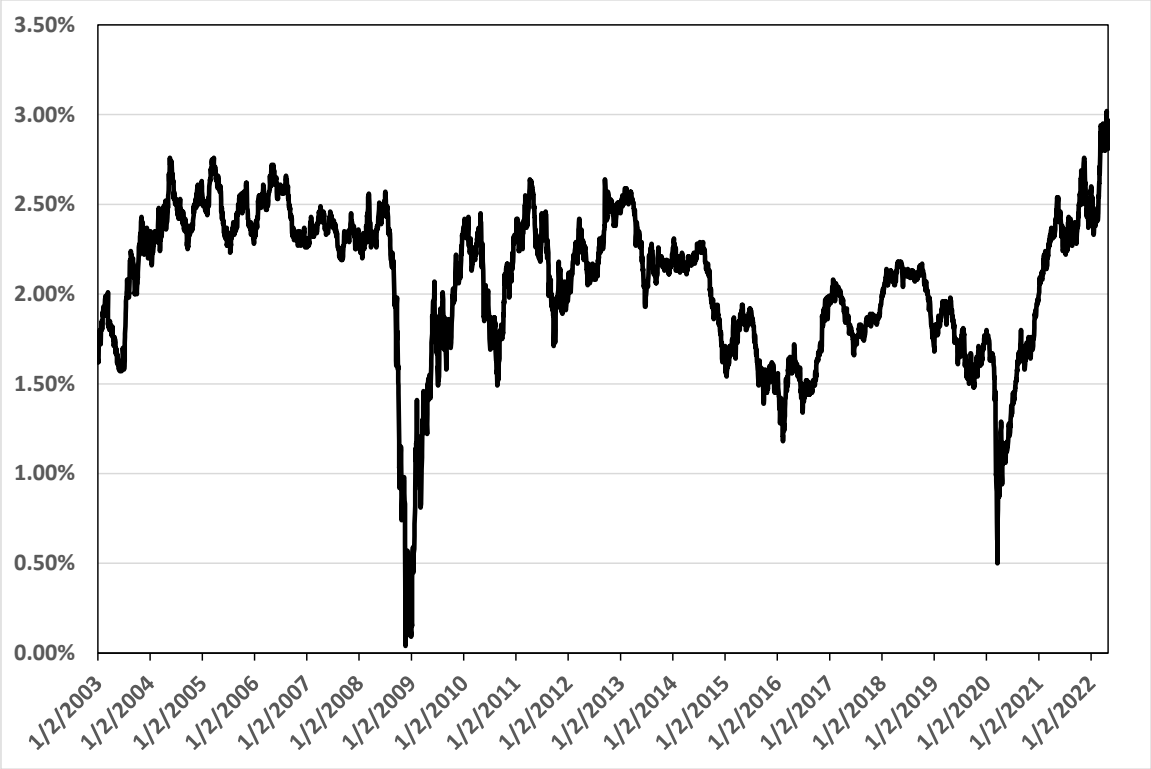
A. In his press conference following the May 4, 2022, meeting, Chairman Powell noted that "[i]nflation is much too high and we understand the hardship it is causing, and we're moving expeditiously to bring it back down".[21] Therefore, investors expect inflation to remain elevated over the near-term. One measure of investors' expectations regarding inflation is the breakeven inflation rate, which is calculated as the difference between the yield on a Treasury bond and the yield on a Treasury Inflation-Protected bond of the same maturity, since the yield on a Treasury Inflation-Protected bond would account for the effect of inflation. The maturity of

[19] Bureau of Labor Statistics, Consumer Price Index News Release, April 12, 2022, data accessed May 12, 2022.
[20] Source: Bureau of Labor Statistics, shaded area indicates a recession.
[21] Source: Federal Reserve, Transcript of Chair Powell's Press Conference Opening Statement, (May 4, 2022), at 1.

the bond selected would then reflect investors' views of inflation during the holding period of the bond. For example, the 10-year breakeven inflation rate calculated as the spread between the 10-year Treasury bond yield and the 10-year Treasury Inflation-Protected bond yield would reflect investors' expectations of inflation over the next 10 years. As shown in Figure 4 below, the 10-year breakeven inflation rate is currently greater than any level seen since January 2003. Furthermore, the 10-year breakeven inflation rate as of April 29, 2022 was 2.88 percent indicating that investors expect inflation will remain well above the Federal Reserve's 2 percent target over the next 10 years. There are many reasons why inflation is expected to remain elevated. For example, Kiplinger recently noted some key factors, including Russia's war in Ukraine, which led them to forecast an inflation rate of 6.3 percent for 2022:

The inflation rate is expected to ease further over the rest of this year, but will likely end 2022 at a still-high rate of about 6.3%. In 2023 the rate should fall faster, down to 3.0% by the end of the year. The higher cost of housing will keep inflation rates elevated for some time to come. Gasoline prices and heating costs are likely to stay high for a good while because of the war in Ukraine, but they may plateau instead of climbing more. The price of cars and trucks will also stay at a high level until the semiconductor shortage ends sometime next year. Continued spot shortages of various items will drive their price up, adding to the overall inflation rate. The latest is a shortage of baby formula.[22]

Figure 4: 10-year Breakeven Inflation Rate – Janaury 2003 – April 2022[23]



C. <u>The Effect of Inflation on Interest Rates and the Investor-Required Return</u>

[22] Payne, David, "Inflation Will Ease, But Only Gradually This Year," Kiplinger, May 11, 2022.

[23] Federal Reserve Bank of St. Louis, 10-Year Breakeven Inflation Rate [T10YIE], retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/T10YIE, April 29, 2022.

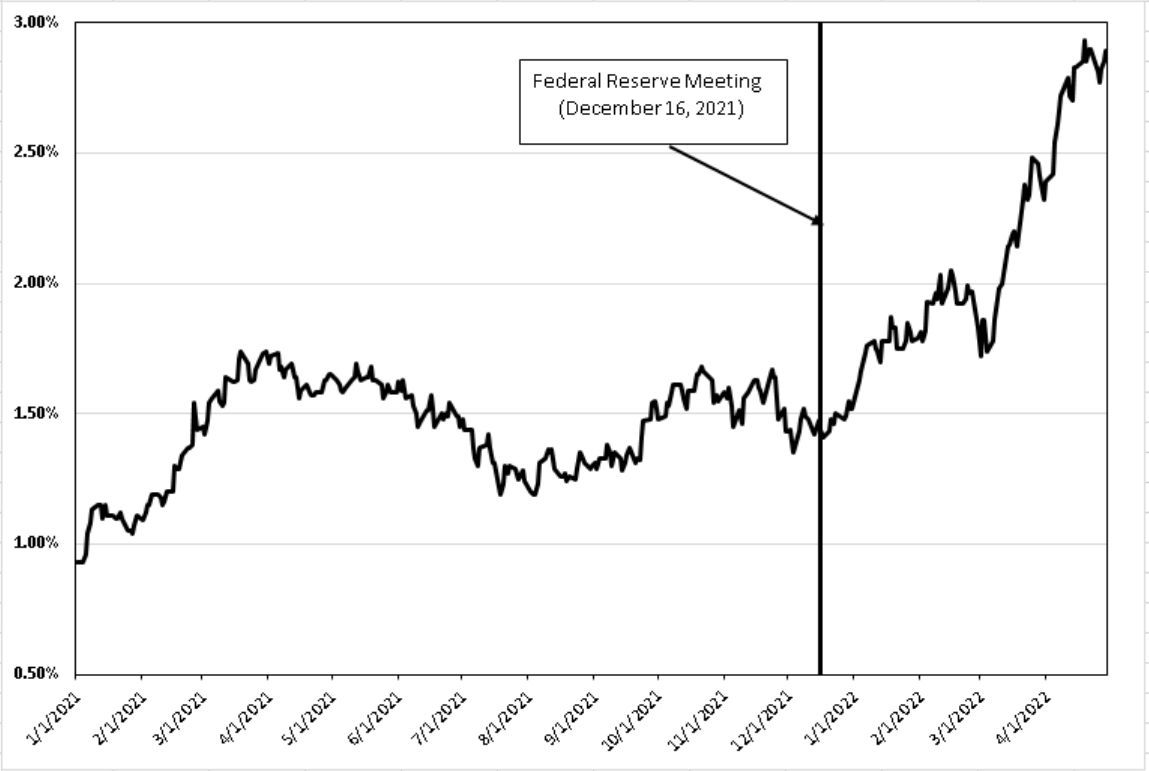
Q. What effect will inflation have on long-term interest rates?

Inflation and the Federal Reserve's normalization of monetary policy will likely result in increases in long-term interest rates. Specifically, inflation reduces the purchasing power of the future interest payments an investor expects to receive over the duration of the bond. This risk increases as the duration of the bond increases. As a result, if investors expect increased levels of inflation, they will require higher yields to compensate for the increased risk of inflation, which means interest rates will increase.

Q. Have the yields on long-term government bonds increased in response to inflation and the Federal Reserve's normalization of monetary policy?

A. Yes, they have. As noted above, at each of the December 2021, January 2022, March 2022, and May 2022 meetings, the Federal Reserve noted its continued concerns over the sustained increased levels of inflation. In addition, starting at the December 2021 meeting and continuing through the May 2022 meeting, the Federal Reserve accelerated the process of normalizing monetary policy to respond to inflation. As shown in Figure 5, since the Federal Reserve's December 2021 meeting, the yield on 10-year Treasury bond has doubled, increasing from 1.47 percent on December 15, 2021 to 2.89 percent on April 29, 2022. The increase is due to the Federal Reserve's announcements at the December 2021, January 2022, March 2022 and May 2022 meetings, actions the Federal Reserve has taken to normalize monetary policy, and the continued increased levels of inflation that are now expected to persist much longer than the Federal Reserve and investors had originally projected.

Figure 5: 10-Year Treasury Bond Yield – Janaury 2021 – April 2022[24]



Q. What views have equity analysts expressed about long-term government bond yields?

A. Leading equity analysts have noted that they expect the yields on long-term government bonds to remain elevated through at least the end of 2022. According to views of equity analysts summarized in Figure 6, the yield on the 10-year Treasury Bond is expected to range from 3.10 percent to 4.00 percent by the end of 2022, which is 48 to 138 basis points greater than the current 30-day average yield on the 10-year Treasury Bond as of April 29, 2022 of 2.62 percent. Furthermore, as of May 13, 2022, the yield on the 10-year Treasury was trading over 2.90 percent.

Figure 6: Equity Analysts Forecast

Bank	10-year U.S. Treasury Yield

[24] S&P Capital IQ Pro.

	30-day Average as of April 29, 2022	2022 Forecast
Advocate Capital Management [25]	2.62%	4.00%
Goldman Sachs[26]	2.62%	3.30%
Blue Chip Financial Forecasts (Consensus Estimate)[27]	2.62%	3.10%
BMO Economics[28]	2.62%	3.15%

Q. Have you considered any additional indicators that may imply long-term interest rates are expected to increase?

A. Yes, I have. I considered the net position of commercials (i.e., banks) in U.S. Treasury Bond futures contracts as reported in the Commitment of Traders ("COT") Report produced by the Commodity Futures Trading Commission ("CFTC"). A net position is defined as the total number of long positions in a futures contract minus the total number of short positions in a futures contract. A long position means that an investor agrees to purchase an asset in the future at a specified price today and therefore profits if the price of the underlying asset increases. Conversely, short position is when an investor agrees to sell an asset at a time in the future at a specified price today and profits if the price of the asset declines. Therefore, if banks are increasing the number of short positions and thus have a declining net position, the banks are assuming that the price of the asset will decline. As shown in Figure 7, the net position of banks in U.S. Treasury Bonds has been decreasing since the end of 2020. Therefore, banks are forecasting a

[25] MarketWatch, "This bond expert who called the spike in U.S. yields forecasts the 10-year to reach 4%," May 7, 2022. https://www.marketwatch.com/story/this-bond-expert-who-called-the-spike-in-u-s-yields-forecasts-the-10-year-to-reach-4-11651843223.

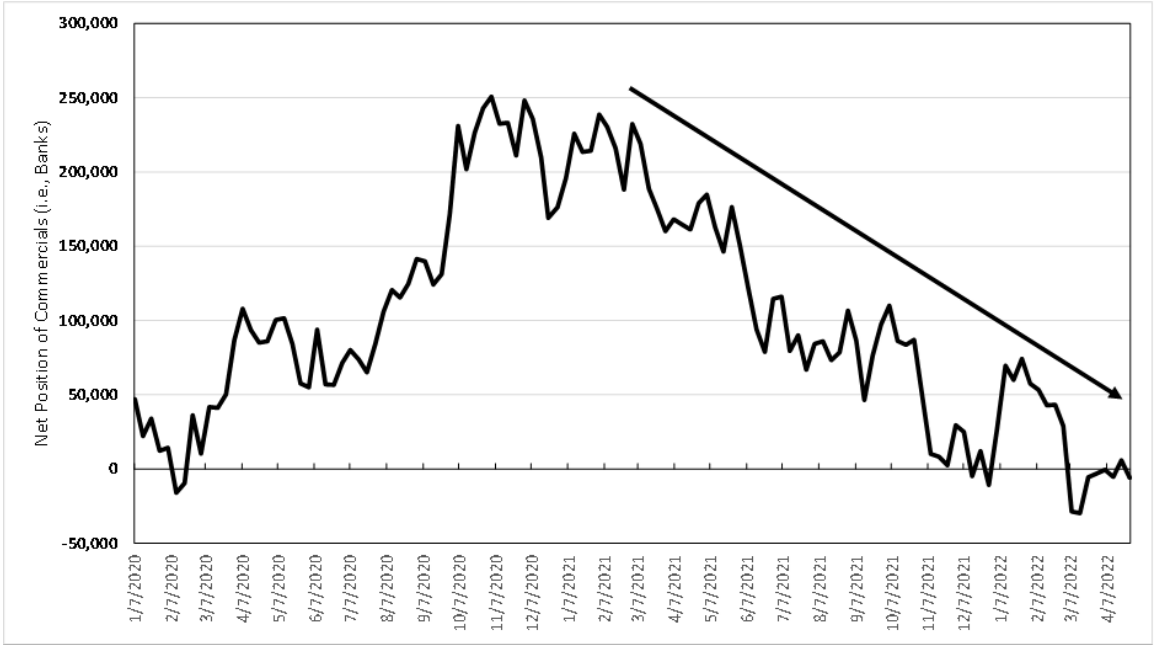
[26] Pollard, Amelia. "Goldman Lifts Yield Forecasts, Sees 10-Year Treasuries at 3.3%." Bloomberg.com, May 12, 2022.

[27] Blue Chip Financial Forecasts, Vol. 41, No. 5, April 29, 2022, at 2.

[28] BMO Economics, "Rates Scenario for May 11, 2022," May 11, 2022.

decrease in the price of long-term government bonds and thus the yields (which are inversely related to the price) to increase over the near-term.

Figure 7: Commitment of Traders Report – Net Position of Commercials (i.e., Banks) in U.S. Treasury Bond Futures Contracts[29]



D. Expected Performance of Utility Stocks and the Investor-Required ROE on Utility Investments

Q. Are utility share prices correlated to changes in the yields on long-term government bonds?

A. Yes, interest rates and utility share prices are inversely correlated which means, for example, that an increase in interest rates will result in a decline in the share prices of utilities. For example, Goldman Sachs and Deutsche Bank recently examined the sensitivity of share prices of different industries to changes in interest rates over the past five years. Both Goldman Sachs and Deutsche Bank found that utilities had

[29] Commitment of Traders Report, as of April 29, 2022 - https://www.cftc.gov/MarketReports/CommitmentsofTraders/HistoricalCompressed/index.htm

one of the strongest negative relationships with bond yields (i.e., increases in bond yields resulted in the decline of utility share prices).[30]

Q. How do equity analysts expect the utilities sector to perform in an increasing interest rate environment?

A. Notwithstanding recent outperformance by utilities due to investors moving to defensive sectors out of concern about heightened geopolitical risk and broader macroeconomic concerns, equity analysts project that utilities are likely to continue to underperform the broader market as interest rates increase.[31] For example, in its most recent Big Money Poll, which closed in mid-April 2022 and surveyed 112 money managers regarding the outlook for the next twelve months, the professional investors surveyed by Barron's selected the utility sector as the least attractive of all industries for investment.[32] In addition, Fidelity recently recommended underweighting the utility sector and noted that it classified the sector as underweight due to a combination of "poor fundamentals and expensive valuations".[33] Furthermore, regarding the recent increase in utility share prices, Fidelity stated that:

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30 Lee, Justina. "Wall Street Is Rethinking the Treasury Threat to Big Tech Stocks." Bloomberg.com, 11 Mar. 2021, www.bloomberg.com/news/articles/2021-03-11/wall-street-is-rethinking-the-treasury-threat-to-big-tech-stocks.

31 Sonenshine, Jacob. "Utilities Have Been Soaring as Treasuries Get Crushed. That Isn't Supposed to Happen." Barrons.com, April 11, 2022, https://www.barrons.com/articles/utilities-treasury-yields-outlook-51649457572?mod=hp_INTERESTS_bonds&refsec=hp_INTERESTS_bonds

32 Jasinski, Nicholas. Bullish Later: How Investors Are Sizing up Stocks, Barron's updated April 24, 2022.

33 Fidelity, "Top sectors to watch in Q2," May 4, 2022.

> Energy stocks have garnered a lot of attention, but in February utilities was the only sector with monthly returns in the 90th percentile of its historical range. In the past, powerful utilities rallies have signaled investors getting too defensive. The market typically has gained, and utilities have underperformed, in 12-month periods after top-decile monthly relative returns for the sector.[34]

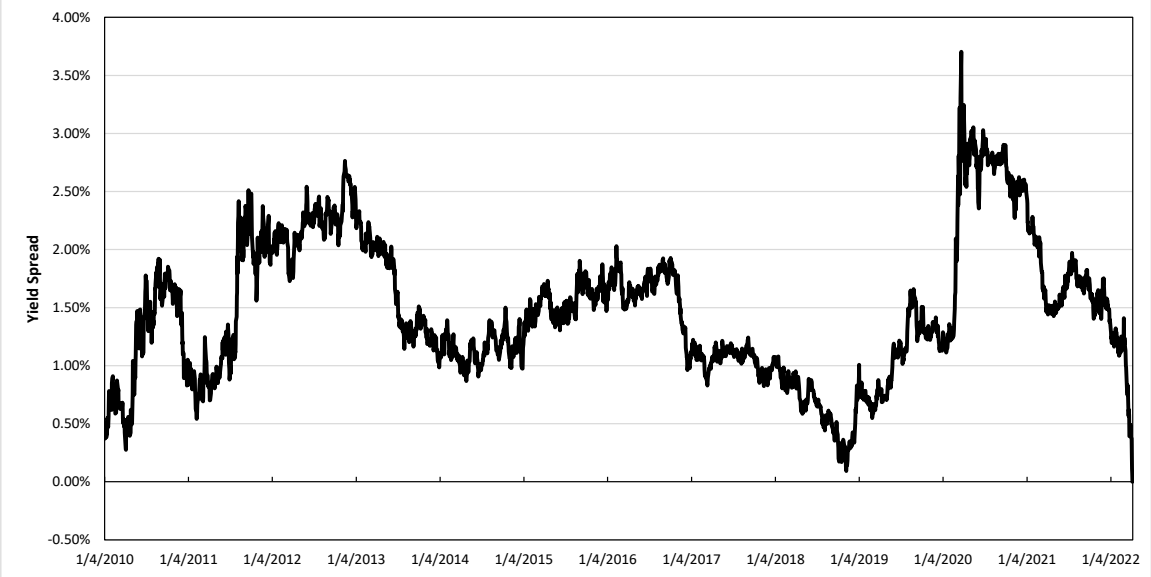
Q. Have you reviewed any market indicators that may imply that utilities will underperform over the near-term?

A. Yes, I have. As discussed above, the utility sector is considered a "bond proxy" and is therefore inversely related to changes in interest rates. For example, the utility sector tends to perform well when interest rates are low since the dividend yields for utilities offer investors the prospect of higher returns when compared to the yields on long-term government bonds. Conversely, the utility sector underperforms as the yields on long-term government bonds increase and the spread between the dividend yields on utility stocks and the yields on long-term government bonds decreases. Therefore, I examined the yield spread between the dividend yields of utility stocks and the yields on long-term government bonds from January 2010 through April 2022. I selected the dividend yield on the S&P Utilities Index as the measure of the dividend yields for the utility sector and the yield on the 10-year Treasury Bond as the estimate of the yield on long-term government bonds. As shown in Figure 8, the yield spread as of April 29, 2022 was 0.05 percent indicating that yield on the 10-year Treasury Bond is currently equivalent to the dividend yield for the S&P Utilities Index. Furthermore, the current yield spread of 0.05 percent is well below the long-term average since January 2010 of 1.47 percent. Given that the yield spread is currently negative and well below the long-

[34] *Ibid.*

term average as well as the expectation that interest rates will continue to increase, it is reasonable to conclude that utility sector will underperform over the near-term. This is because investors that purchased utility stocks as an alternative to the low yields on long-term government bonds will begin to rotate back into government bonds as the yields on long-term government bonds continue to increase thus resulting in a decrease in the share prices of utilities.

Figure 8: Yield Spread between the Dividend Yield on the S&P Utilities Index and the Yield on the 10-year Treasury Bond – January 2010 – April 2022[35]



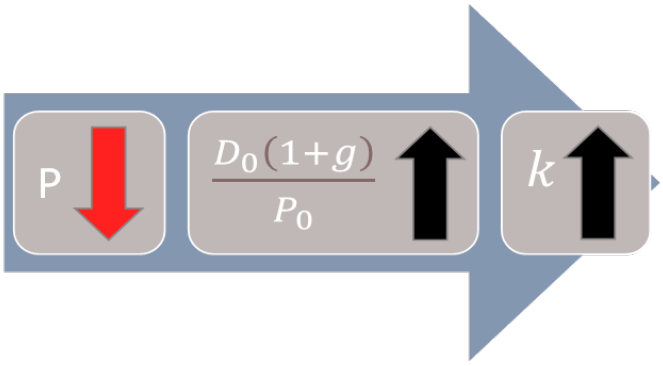
Q. What is the significance of the inverse relationship between interest rates and utility share prices in the current market?

A. As discussed above, the Federal Reserve is currently normalizing monetary policy in response to inflation which is expected to increase long-term government bond yields. If interest rates increase as expected, then the share prices of utilities will decline which results in the DCF model understating the cost of equity. For

35 Bloomberg Professional and S&P Capital IQ Pro.

example, Figure 9 below summarizes the effect of price on the dividend yield in the Constant Growth DCF model.

Figure 9: The Effect of a Decline in Stock Prices on the Constant Growth DCF Model



A decline in stock prices will increase the dividend yields and thus the estimate of the ROE produced by the Constant Growth DCF model. Therefore, this expected change in market conditions supports consideration of the range of ROE results produced by the mean to mean-high DCF results since the mean DCF results would likely understate the cost of equity during the period that the Company's rates will be in effect. Moreover, prospective market conditions warrant consideration of other ROE estimation models such as the CAPM and ECAPM, which may better reflect expected market conditions. For example, two out of three inputs to the CAPM (i.e., the market risk premium and risk-free rate) are forward-looking.

Q. Have state regulatory commissions considered market events and the utility's ability to attract capital in determining the equity return?

A. Yes. In a recent rate case for Consumers Energy Company, the Michigan Public Service Commission ("Michigan PSC") noted that it is important to consider how

a utility's access to capital could be affected in the near-term as a result of market reactions to global events like those that have occurred in the recent past. Specifically, the Michigan PSC stated that:

> [i]n setting the ROE at 9.90%, the Commission believes there is an opportunity for the company to earn a fair return during this period of atypical market conditions. This decision also reinforces the belief, as stated in the Commission's March 29 order, "that customers do not benefit from a lower ROE if it means the utility has difficulty accessing capital at attractive terms and in a timely manner." These conditions still hold true based on the evidence in the instant case. The fact that other utilities have been able to access capital despite lower ROEs, as argued by many intervenors, is also a relevant consideration. *It is also important to consider how extreme market reactions to global events, as have occurred in the recent past, may impact how easily capital will be able to be accessed during the future test period should an unforeseen market shock occur. The Commission will continue to monitor a variety of market factors in future rate cases to gauge whether volatility and uncertainty continue to be prevalent issues that merit more consideration in setting the ROE.*[36]

The Michigan PSC references "global events" and the overall effect the events could have on the ability of a utility to access capital. Consistent with the Michigan PSC's views, it is important to consider current market conditions and the impact of those conditions on the access to and cost of capital, and to position utilities to be able to maintain access in rapidly changing market conditions.

E. Conclusion

[36] Michigan Public Service Commission Order, Cause No. U-20697, Consumers Energy Company, at 165 (Dec. 17, 2020).

Q. What are your conclusions regarding the effect of current market conditions on the cost of equity for the Company?

A. Over the near-term, investors expect long-term interest rates to increase in response to continued elevated levels of inflation and the Federal Reserve's normalization of monetary policy. Because the share prices of utilities are inversely correlated to interest rates, an increase in long-term government bond yields will likely result in a decline in utility share prices, which is the reason a number of equity analysts expect the utility sector to underperform over the near-term. The expected underperformance of utilities means that DCF models using recent historical data likely underestimate investors' required return over the period that rates will be in effect. This change in market conditions also supports the use of other ROE estimation models such as the CAPM and the ECAPM, which may better reflect expected market conditions.

VI. PROXY GROUP SELECTION

Q. Why have you used a group of proxy companies to estimate the cost of equity for MAWC?

A. In this proceeding, I am estimating the cost of equity for MAWC, which is a rate-regulated subsidiary of AWK. Since the ROE is a market-based concept, and because MAWC's stock is not publicly traded, it is necessary to establish a group of companies that are both publicly traded and are comparable to the Company in certain fundamental business and financial respects to serve as its "proxy" for purposes of the ROE estimation process. The proxy companies used in my analyses all possess a set of operating and financial risk characteristics that are substantially

comparable to MAWC, and, therefore, provide a reasonable basis for deriving the appropriate ROE.

Q. Please provide a brief profile of MAWC.

A. MAWC is a wholly-owned subsidiary of AWK that provides water distribution service to approximately 475,000 customers and wastewater service to approximately 18,000 customers in Missouri.[37] In 2021, the Company had total operating revenues of $349 million which for MAWC's parent company, AWK, represented 10.50 percent of total regulated operating revenues.[38] The Company can accesses debt markets through American Water Capital Corp. ("AWCC") or independently. The current credit ratings for AWCC and AWK are as follows: (1) S&P - A (Outlook: Stable);[39] and (2) Moody's – Baa1 (Outlook: Stable).[40] **__ _____ _____.**

Q. How did you select the companies in your proxy group?

A. I began with the group of U.S. utilities that Value Line classifies as "Water Utilities" and "Natural Gas Distribution Companies". That combined group includes 17 domestic U.S. utilities. I simultaneously applied the following screening criteria to select companies that:

- pay consistent quarterly cash dividends because companies that do not cannot be analyzed using the Constant Growth DCF model;

37 Company provided data.
38 *Ibid*.
39 S&P Capital IQ accessed 4-24-22.
40 Moody's Investors Service accessed 4-24-22.

- have investment grade long-term issuer ratings from S&P and/or Moody's;
- are covered by at least two utility industry analysts;
- have positive long-term earnings growth forecasts from at least two utility industry equity analysts;
- derive more than 60.00 percent of their total operating income from regulated operations; and
- were not parties to a merger or transformative transaction during the analytical periods relied on.

Q. Did you consider any additional companies for inclusion in your proxy group?

A. Yes. I also considered the group of 36 companies that Value Line classifies as "Electric Utilities". In determining which electric utilities would qualify for inclusion in my proxy group, I started by relying on the criteria used to screen the water and natural gas utilities. I then applied two additional screening criteria to only include electric utilities that would be considered risk comparable to MAWC:

- have owned generation comprising less than 10 percent of the Company's MWh sales to ultimate customers to ensure that the electric utilities included did not own a substantial amount of generation and therefore had operations that were primarily transmission and distribution; and
- own water and wastewater operations.

Q. Did you include AWK in your proxy group?

A. No. Consistent with my general practice of excluding the subject company, or its parent holding company, from the proxy group, I have excluded AWK from my proxy group for MAWC.

Q. What is the composition of your proxy group?

A. The screening criteria discussed above resulted in a proxy group consisting of the companies in Figure 10.

Figure 10: Proxy Group Companies

Company	Ticker
American States Water Company	AWR
Atmos Energy Corporation	ATO
California Water Service Group	CWT
Essential Utilities, Inc.	WTRG
Eversource Energy	ES
Middlesex Water Company	MSEX
New Jersey Resources Corporation	NJR
NiSource Inc.	NI
Northwest Natural Gas Company	NWN
ONE Gas, Inc.	OGS
SJW Group	SJW
Spire, Inc.	SR
York Water Company	YORW

Q. Why did you include electric utilities and natural gas distribution companies in the proxy group?

A. Value Line currently classifies only seven companies as water utilities. Therefore, the universe of water utilities is already small before a set of screening criteria are applied. Additionally, there is currently a trend towards consolidation in the utility

industry, which reduces the number of available proxy companies.[41] Because there are a small number of companies that are available for inclusion in the proxy group, I also considered electric utilities and natural gas distribution companies that meet the screening criteria.

Q. Are electric utilities and natural gas distribution companies reasonably comparable to water utilities to be included in a proxy group used to estimate the cost of equity for a water utility?

A. Yes, I believe that it is reasonable to rely on a combined proxy group. As noted above, due to consolidation in the water utility industry, there is only a small group of water companies that can be included in the proxy group. In addition, the screening criteria relied on for my proxy group require that a company derive more than 60 percent of their operating income from regulated operations. Therefore, the electric utilities and natural gas distribution companies included in my proxy group generate a large portion of their operating income from regulated operations similar to MAWC and the water utilities that will be included in the proxy group. As a result, I believe that it is appropriate to include electric utilities and natural gas distribution companies in my proxy group.

[41] Chediak, Mark, et al. "Utility M&A Is So Hot Not Even Berkshire's Billions Won a Bid." Bloomberg.com, Bloomberg, 3 Jan. 2018, www.bloomberg.com/news/articles/2018-01-03/utility-m-a-is-so-hot-not-even-berkshire-s-billions-won-a-bid.

Q. Have other regulators considered the inclusion of other utility industry segments in the proxy group used to estimate the cost of equity for a water utility?

A. Yes. The Massachusetts Department of Public Utilities ("MDPU"), the Florida Public Service Commission ("FPUC") and the Kentucky Public Service Commission ("KYPSC") have considered the results of a proxy group that includes natural gas companies when determining the authorized ROE for water and wastewater utilities. In Docket No. 17-90, the MDPU determined that the use of a natural gas utility proxy group was appropriate for the purpose of demonstrating the comparability of the investment risk of the proxy group to Aquarion Water Company.[42]

In Docket No. 20180006-WS, the FPUC modified the methodology used to estimate the ROE for water and wastewater utilities in Florida to include a combined proxy group of natural gas and water utilities.[43] The FPUC has previously relied on a natural gas only proxy group to estimate the ROE for water and wastewater utilities[44]; however, to increase the size of the proxy group, the FPUC decided to rely on a combined proxy group. Specifically, the FPUC noted:

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42 Massachusetts Department of Public Utilities, Docket No. 17-90, Petition of Aquarion Water Company of Massachusetts, Inc., pursuant to G.L. c. 164, § 94, and G.L. c. 165, § 2, for Approval of a General Rate Increase as set forth in M.D.P.U. No. 3., October 31, 2018, p. 286-287.

43 *In re Water and wastewater industry annual reestablishment of authorized range of return on common equity for water and wastewater utilities pursuant to Section 367.081(4)(f),F.S.*, Docket No. 20180006-WS, Order No. PSC-2018-0327-PAA-WS, at 7.

44 Docket No. 170006-WS, In re. Water and wastewater industry annual reestablishment of authorized range of return on common equity for water and wastewater utilities pursuant to Section 367.081(4)(f),F.S., Order No. PSC-17-0249-PAA-WS, at 2.

> The leverage formula methodology shall be modified to include a combined proxy group of natural gas and WAW utilities as proxy companies in calculating the leverage formula. We find that the selected natural gas utilities and WAW utilities that derive at least 50 percent of their revenue from regulated rates. These utilities have market power and are influenced significantly by economic regulation. In Attachment 1, the returns calculated using the proxy group are adjusted to reflect the risks faced by Florida WAW utilities. The updated index consists of five natural gas companies and seven WAW companies that derive at least 50 percent of their total revenue from regulated operations. These companies have a median Standard and Poor's bond rating of "A"[45]

In Case No. 2018-00358 for Kentucky-American Water Company ("Kentucky American"), the KYPSC noted that the authorized ROE for Kentucky-American was within the range of DCF and CAPM results produced by Kentucky-American and the Attorney General.[46] To develop the DCF and CAPM models, Kentucky American and the Attorney General relied on two proxy groups: (1) a water only proxy group; and (2) a combined proxy group which included natural gas utilities.[47] Therefore, the KYPSC has also considered, when determining the authorized ROE for a water company, ROE results based on a proxy group that includes both natural gas and water utilities.

45 Docket No. 20180006-WS, In re. Water and wastewater industry annual reestablishment of authorized range of return on common equity for water and wastewater utilities pursuant to Section 367.081(4)(f),F.S., Order No. PSC-2018-0327-PAA-WS, at 8.

46 Case No. 2018-00358, In the matter of: Electronic Application of Kentucky-American Water Company for an Adjustment of Rates, Order, June 27, 2019, at 66.

47 *Id*., at 55-56.

VII. COST OF EQUITY ESTIMATION

Q. Please briefly discuss the ROE in the context of the regulated utility's overall rate of return ("ROR").

A. The overall ROR for a regulated utility is based on its weighted average cost of capital, in which the costs of the individual sources of capital are weighted by their respective book values. While the costs of debt and preferred stock can be directly observed, the cost of equity is market-based and, therefore, must be estimated based on observable market data.

Q. How is the required ROE determined?

A. The required ROE is estimated by using multiple analytical techniques that rely on market-based data to quantify investor expectations regarding required equity returns, adjusted for certain incremental costs and risks. Quantitative models produce a range of reasonable results from which the market-required ROE is selected. That selection must be based on a comprehensive review of relevant data and information and does not necessarily lend itself to a strict mathematical solution. The key consideration in determining the cost of equity is to ensure that the methodologies employed reasonably reflect investors' views of the financial markets in general and of the subject company (in the context of the proxy group) in particular.

Q. What methods did you use to determine MAWC's cost of equity?

A. I considered the results of the Constant Growth DCF model, the CAPM, and the ECAPM. As discussed in more detail below, a reasonable ROE estimate appropriately considers alternative methodologies and the reasonableness of their individual and collective results.

Q. Why is it important to use more than one analytical approach?

A. Because the cost of equity is not directly observable, it must be estimated based on both quantitative and qualitative information. When faced with the task of estimating the cost of equity, analysts and investors are inclined to gather and evaluate as much relevant data as reasonably can be analyzed. Several models have been developed to estimate the cost of equity, and I use multiple approaches to estimate the cost of equity. As a practical matter, however, all of the models available for estimating the cost of equity are subject to limiting assumptions or other methodological constraints. Consequently, many well-regarded finance texts recommend using multiple approaches when estimating the cost of equity. For example, Copeland, Koller, and Murrin[48] suggest using the CAPM and Arbitrage Pricing Theory model while Brigham and Gapenski[49] recommend the CAPM, DCF, and "bond yield plus risk premium" approaches.

Q. Do current market conditions increase the importance of using more than one analytical approach?

A. Yes. The effect of the low interest rate environment can be seen in the low dividend yields for utilities, which result in DCF cost of equity estimates that are understating the forward-looking cost of equity. The CAPM and ECAPM offer some balance to the sensitivity of the DCF model to low Treasury yields. Low interest rates also affect the CAPM in two ways: (1) the risk-free rate is lower, and (2) because the market risk premium is a function of interest rates, (i.e., it is the return on the broad

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[48] Tom Copeland, Tim Koller and Jack Murrin, Valuation: Measuring and Managing the Value of Companies, 3rd Ed. (New York: McKinsey & Company, Inc., 2000), at 214.

[49] Eugene Brigham, Louis Gapenski, Financial Management: Theory and Practice, 7th Ed. (Orlando: Dryden Press, 1994), at 341.

stock market less the risk-free interest rate), the risk premium should move higher when interest rates are lower. However, when applied appropriately, the CAPM will take into account the relationship between ROE and interest rates through the market risk premium component. Therefore, it is important to use multiple analytical approaches to moderate the impact that the historically low interest rate environment has had on the ROE estimates for the proxy group and, where possible, consider using projected market data in the models to estimate the return for the forward-looking period, reflecting the current and projected rising interest rate environment.

Q. Are you aware of any regulatory commissions that have recognized the importance of considering the results of multiple models?

A. Yes, several regulatory commissions consider the results of multiple ROE estimation methodologies such as the DCF, CAPM, and ECAPM in determining the authorized ROE, including the Minnesota Public Utilities Commission ("Minnesota PUC"),[50] the Michigan Public Service Commission ("Michigan PSC")[51], the Iowa Utilities Board ("IUB")[52], the Washington Utilities and Transportation Commission ("Washington UTC")[53] and the New Jersey Board of Public Utilities ("NJBPU").[54] For example, the Washington UTC has repeatedly emphasized that it "places value on each of the methodologies used to calculate the

50 Docket No. G011/GR-17-563, Findings of Fact, Conclusions and Order, at 27; Docket No. E015/GR-16-664, Findings of Fact, Conclusions and Order, at 60-61.

51 Michigan Public Service Commission Order, DTE Gas Company, Case No. U-18999, September 13, 2018, at 45-47.

52 Iowa Utilities Board, Iowa-American Water Company, RPU-2016-0002, Final Decision and Order issued February 27, 2017, at 35.

53 *Wash. Utils. & Transp. Comm'n v. PacifiCorp*, Docket UE-130043, Order 05, n. 89 (Dec. 4, 2013); *Wash. Utils. & Transp. Comm'n v. PacifiCorp*, Docket UE-100749, Order 06, ¶ 91 (March 25, 2011).

54 NJBPU Docket No. ER12111052, OAL Docket No. PUC16310-12, Order Adopting Initial Decision with Modifications and Clarifications, March 18, 2015, at 71.

cost of equity and does not find it appropriate to select a single method as being the most accurate or instructive."[55] The Washington UTC has also explained that "[f]inancial circumstances are constantly shifting and changing, and we welcome a robust and diverse record of evidence based on a variety of analytics and cost of capital methodologies."[56]

Additionally, in its recent order for DTE Gas Company ("DTE Gas") in Case No. U-18999, the Michigan PSC considered the results of each of the models presented by the ROE witnesses, which included the DCF, CAPM, and ECAPM in the determination of the authorized ROE.[57] The Commission also considered authorized ROEs in other states, increased volatility in capital markets and the company-specific business risks of DTE Gas.

Q. What are your conclusions about the results of the DCF and CAPM models?

A. Recent market data that is used as the basis for the assumptions for both models have been affected by market conditions. As a result, relying exclusively on historical assumptions in these models, without considering whether these assumptions are consistent with investors' future expectations, will underestimate the cost of equity that investors would require over the period that the rates in this case are to be in effect. In this instance, relying on the historically low dividend yields that are not expected to continue over the period that the new rates will be in effect will underestimate the ROE for MAWC.

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55 *Wash. Utils. & Transp. Comm'n v. PacifiCorp*, Docket UE-130043, Order 05, n. 89 (Dec. 4, 2013).
56 Wash. Utils. & Transp. Comm'n v. PacifiCorp, Docket UE-100749, Order 06, ¶ 91 (March 25, 2011).
57 Michigan Public Service Commission Order, DTE Gas Company, Case No. U-18999, September 13, 2018, at 45-47.

Furthermore, as discussed in Section V above, long-term interest rates have increased since August 2020 and this trend is expected to continue as the Federal Reserve normalizes monetary policy in response to increased inflation. Therefore, the use of current averages of Treasury bond yields as the estimate of the risk-free rate in the CAPM is not appropriate since recent market conditions are not expected to continue over the long-term. Instead, analysts should rely on projected yields of Treasury Bonds in the CAPM. The projected Treasury Bond yields result in CAPM estimates that are more reflective of the market conditions that investors expect during the period that the Company's rates will be in effect.

A. Constant Growth DCF Model

Q. Please describe the DCF approach.

A. The DCF approach is based on the theory that a stock's current price represents the present value of all expected future cash flows. In its most general form, the DCF model is expressed as follows:

$$P_0 = \frac{D_1}{(1+k)} + \frac{D_2}{(1+k)^2} + \ldots + \frac{D_\infty}{(1+k)^\infty} \quad [1]$$

Where P_0 represents the current stock price, D1…D∞ are all expected future dividends, and k is the discount rate, or required ROE. Equation [1] is a standard present value calculation that can be simplified and rearranged into the following form:

$$k = \frac{D_0(1+g)}{P_0} + g \qquad [2]$$

Equation [2] is often referred to as the Constant Growth DCF model in which the first term is the expected dividend yield and the second term is the expected long-term growth rate.

Q. What assumptions are required for the Constant Growth DCF model?

A. The Constant Growth DCF model requires the following assumptions: (1) a constant growth rate for earnings and dividends; (2) a stable dividend payout ratio; (3) a constant price-to-earnings ("P/E") ratio; and (4) a discount rate greater than the expected growth rate. To the extent any of these assumptions is violated, considered judgment and/or specific adjustments should be applied to the results.

Q. What market data did you use to calculate the dividend yield in your Constant Growth DCF model?

A. The dividend yield in my Constant Growth DCF model is based on the proxy companies' current annual dividend and average closing stock prices over the 30-, 90-, and 180-trading days as of April 29, 2022.

Q. Why did you use three averaging periods for stock prices?

A. In my Constant Growth DCF model, I use an average of recent trading days to calculate the price term (P_0) in the DCF model to ensure that the ROE is not skewed by anomalous events that may affect stock prices on any given trading day. The averaging period should also be reasonably representative of expected capital market conditions over the long-term. However, by necessity, analysts rely on historical prices which, have been volatile. Under these circumstances, where current market conditions cannot be expected to continue throughout the rate

period, it is important to recognize that current average prices in the Constant Growth DCF model are not consistent with forward-looking market expectations. Therefore, the results of my Constant Growth DCF model using historical data may underestimate the forward-looking cost of equity. As a result, I place more weight on the median to median-high results produced by my Constant Growth DCF model.

Q. Did you make any adjustments to the dividend yield to account for periodic growth in dividends?

A. Yes. Since utility companies tend to increase their quarterly dividends at different times throughout the year, it is reasonable to assume that dividend increases will be evenly distributed over calendar quarters. Given that assumption, it is reasonable to apply one-half of the expected annual dividend growth rate for purposes of calculating the expected dividend yield component of the DCF model. This adjustment ensures that the expected first year dividend yield is, on average, representative of the coming twelve-month period, and does not overstate the aggregated dividends to be paid during that time.

Q. Why is it important to select appropriate measures of long-term growth in applying the DCF model?

A. In its Constant Growth form, the DCF model (i.e., Equation [2]) assumes a single long-term growth rate in perpetuity. In order to reduce the long-term growth rate to a single measure, one must assume that the dividend payout ratio remains constant and that earnings per share, dividends per share, and book value per share all grow at the same constant rate. Over the long run, however, dividend growth

can only be sustained by earnings growth. For example, earnings growth rates tend to be least influenced by capital allocation decisions that companies may make in response to near-term changes in the business environment. Since such decisions may directly affect near-term dividend payout ratios, estimates of earnings growth are more indicative of long-term investor expectations than are dividend or book value growth estimates.

Q. What sources of long-term growth rates did you rely on in your Constant Growth DCF model?

A. My Constant Growth DCF model incorporates the following sources of long-term growth rates: (1) consensus long-term earnings growth estimates from Zacks Investment Research; (2) consensus long-term earnings growth estimates from Thomson First Call (provided by Yahoo! Finance); and (3) long-term earnings growth estimates from Value Line.

Q. How did you calculate the expected dividend yield?

A. I adjusted the dividend yield to reflect the growth rate that was being used in that particular scenario. This ensures that the growth rate used in the dividend yield calculation and the growth rate used as the "g" term of the DCF model are internally consistent.

Q. How did you calculate the range of results for the Constant Growth DCF model?

A. I calculated the low DCF result using the minimum growth rate (i.e., the lowest of the Thomson First Call, Zacks, and Value Line earnings growth rates) for each of the proxy group companies. Thus, the low result reflects the minimum DCF result

for the proxy group. I used a similar approach to calculate the high results, using the highest growth rate for each proxy group company. The mean results were calculated using the average growth rates from all sources.

Q. Please summarize the results of your Constant Growth DCF analyses.

A. Figure 11(see also Schedule AEB-3) presents the range of results produced by my proxy group. As shown in Figure 11, for the proxy group, the median and mean DCF results range from 9.36 percent to 9.53 percent, and the median high and mean high results are in the range of 9.86 percent to 11.07 percent. While I also summarize the median low and mean low DCF results, given the expected underperformance of utility stocks that I explained above and thus the likelihood that the DCF model is understating the cost of equity, I do not believe it is appropriate to consider the low DCF results at this time.

Figure 11: Summary of Constant Growth DCF Results

	Low	Mean	High
Constant Growth DCF - Mean			
30-Day Average	7.78%	9.36%	10.89%
90-Day Average	7.87%	9.44%	10.98%
180-Day Average	7.95%	9.53%	11.07%
Constant Growth DCF - Median			
30-Day Average	7.94%	9.25%	9.86%
90-Day Average	7.99%	9.36%	9.97%
180-Day Average	8.18%	9.46%	10.07%

Q. What are your conclusions about the results of the Constant Growth DCF model?

A. As discussed previously, one primary assumption of the DCF model is a constant P/E ratio. That assumption is heavily influenced by the market price of utility stocks. As discussed in Section V of my Direct Testimony, utility stocks are expected to underperform the broader market over the near-term as interest rates increase in response to inflationary pressures. Therefore, it is important to consider the results of the DCF models with caution because the DCF tends to understate the cost of equity in rising interest rate and higher inflationary environments, which currently exist. Therefore, while I have given weight to the results of the Constant Growth DCF model, my recommendation also gives weight to the results of other ROE estimation models.

B. CAPM Analysis

Q. Please briefly describe the Capital Asset Pricing Model ("CAPM").

A. The CAPM is a risk premium approach that estimates the cost of equity for a given security as a function of a risk-free return plus a risk premium to compensate investors for the non-diversifiable or "systematic" risk of that security. Systematic risk is the risk inherent in the entire market or market segment. This form of risk cannot be diversified away using a portfolio of assets. Non-systematic risk is the risk of a specific company that can be mitigated through portfolio diversification. The CAPM is defined by four components, each of which must theoretically be a forward-looking estimate:

$$K_e = r_f + \beta\left(r_m - r_f\right) \quad [3]$$

Where:

K_e = the required market ROE;

β = Beta coefficient of an individual security;

r_f = the risk-free ROR; and

r_m = the required return on the market as a whole.

In this specification, the term (r_m – r_f) represents the Market Risk Premium. According to the theory underlying the CAPM, since unsystematic risk can be diversified away, investors should only be concerned with systematic risk. Systematic risk is measured by Beta. Beta is a measure of the volatility of a security as compared to the market as a whole. Beta is defined as:

$$\beta = \frac{Covariance(r_e, r_m)}{Variance(r_m)} \quad [4]$$

The variance of the market return (i.e., Variance (rm)) is a measure of the uncertainty of the general market. The covariance between the return on a specific security and the general market (i.e., Covariance (re, rm)) reflects the extent to which the return on that security will respond to a given change in the general market return. Thus, Beta represents the risk of the security relative to the general market.

Q. What risk-free rate did you use in your CAPM analysis?

A. I relied on three sources for my estimate of the risk-free rate: (1) the current 30-day average yield on 30-year U.S. Treasury bonds (i.e., 2.72 percent);[58] (2) the projected 30-year U.S. Treasury bond yield for Q3 2022 through Q3 2023 (i.e., 3.34 percent);[59] and (3) the projected 30-year U.S. Treasury bond yield for 2023 through 2027 (i.e., 3.40 percent).[60]

Q. Would you place more weight on one of these scenarios?

A. Yes. Based on current market conditions, I place more weight on the results of the projected yields on the 30-year Treasury bonds. As discussed previously, the estimation of the cost of equity in this case should be forward-looking because it is the return that investors would receive over the future rate period. Therefore, the inputs and assumptions used in the CAPM analysis should reflect the expectations of the market at that time. While I have included the results of a CAPM analysis that relies on the current average risk-free rate, this analysis fails to take into

[58] Bloomberg Professional, as of April 29, 2022.
[59] Blue Chip Financial Forecasts, Vol. 41, No. 5, April 29, 2022, at 2.
[60] Blue Chip Financial Forecasts, Vol. 40, No. 12, December 1, 2021, at 14.

consideration the effect of the market's expectations for interest rate increases on the cost of equity.

Q. What Beta coefficients did you use in your CAPM analysis?

A. As shown in Schedule AEB-4, I used the Beta coefficients for the proxy group companies as reported by Bloomberg and Value Line. The Beta coefficients reported by Bloomberg were calculated using ten years of weekly returns relative to the S&P 500 Index. Value Line's calculation is based on five years of weekly returns relative to the New York Stock Exchange Composite Index.

Additionally, as shown in Schedule AEB-4, I also considered an additional CAPM analysis which relies on the long-term average utility Beta coefficient for the companies in my proxy group. The long-term average utility Beta coefficient was calculated as an average of the Value Line Beta coefficients for the companies in my proxy group from 2013 through 2021.

Q. How did you estimate the Market Risk Premium in the CAPM?

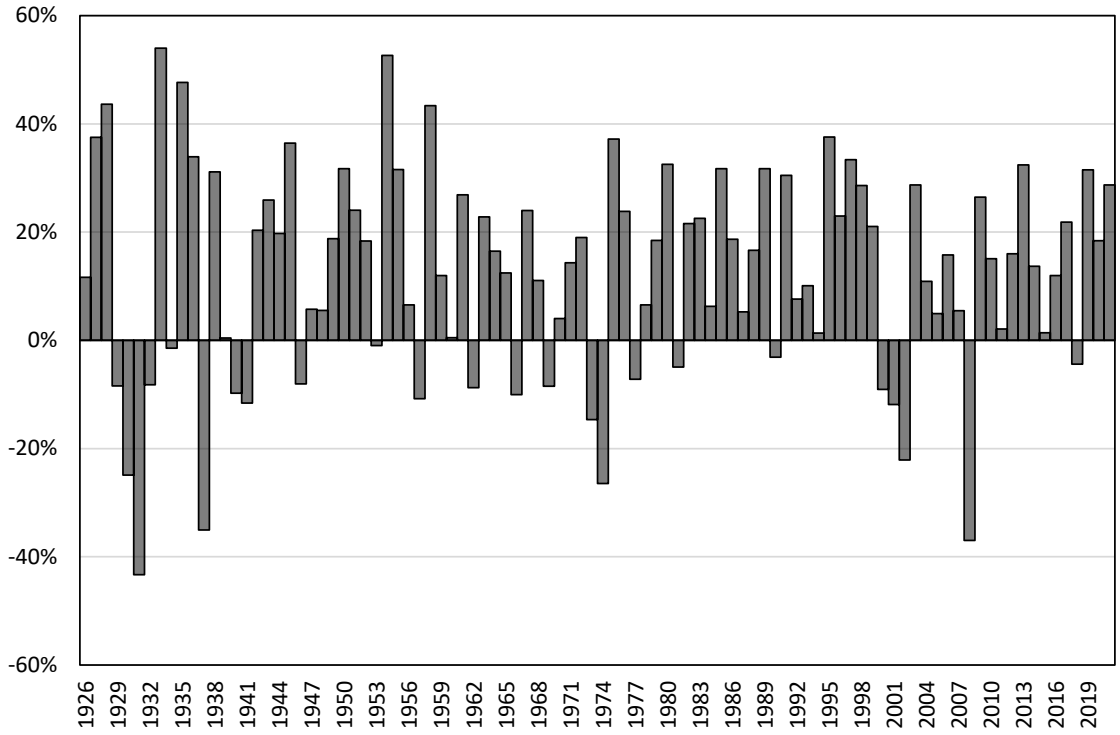
A. I estimated the Market Risk Premium ("MRP") as the difference between the implied expected equity market return and the risk-free rate. As shown in Schedule AEB-5, the expected return on the S&P 500 Index is calculated using the Constant Growth DCF model discussed earlier in my testimony for the companies in the S&P 500 Index. In my calculation of the market return, I included companies in the S&P 500 that: 1) had either a dividend yield or Value Line long-term earnings projection; and 2) had a Value Line long-term earnings growth rate that was greater than 0 percent and less than or equal to 20 percent. Based on an estimated market capitalization-weighted dividend yield of 1.73 percent and a weighted long-term

growth rate of 10.92 percent, the estimated required market return for the S&P 500 Index is 12.74 percent.

Q. How does the current expected market return of 12.68 percent compare to observed historical market returns?

A. Given the range of annual equity returns that have been observed over the past 95 years (shown in Figure 12 below), a current expected return of 12.74 percent is not unreasonable. In 49 of the past 95 years (i.e., in approximately half of all observations), the realized total equity return was at least 12.74 percent or greater.

Figure 12: Realized U.S. equity market returns (1926-2021)[61]



Q. Did you consider another form of the CAPM in your analysis?

A. Yes. I have also considered the results of an Empirical CAPM ("ECAPM" or alternatively referred to as the Zero-Beta CAPM)[62] in estimating the cost of equity for MAWC. The ECAPM calculates the product of the adjusted Beta coefficient and the market risk premium and applies a weight of 75.00 percent to that result. The model then applies a 25.00 percent weight to the market risk premium, without any effect from the Beta coefficient. The results of the two calculations are summed, along with the risk-free rate, to produce the ECAPM result, as noted in Equation [5] below:

[61] Depicts total annual returns on large company stocks, as reported in the 2022 Duff & Phelps SBBI Yearbook.
[62] *See e.g.*, Roger A. Morin, New Regulatory Finance, Public Utilities Reports, Inc., 2006, at 189.

$$k_e = r_f + 0.75\beta(r_m - r_f) + 0.25(r_m - r_f) \qquad [5]$$

Where:

k_e = the required market ROE
β = Adjusted Beta coefficient of an individual security
r_f = the risk-free rate of return
r_m = the required return on the market as a whole

In essence, the Empirical form of the CAPM addresses the tendency of the "traditional" CAPM to underestimate the cost of equity for companies with low Beta coefficients such as regulated utilities. In that regard, the ECAPM is not redundant to the use of adjusted Betas; rather, it recognizes the results of academic research indicating that the risk-return relationship is different (in essence, flatter) than estimated by the CAPM, and that the CAPM underestimates the "alpha," or the constant return term.[63]

As with the CAPM, my application of the ECAPM uses the forward-looking market risk premium estimates, the three yields on 30-year Treasury securities noted earlier as the risk-free rate, and the Bloomberg, Value Line and long-term average Beta coefficients.

Q. What are the results of your CAPM analyses?

A. As shown in Figure 13 (see also Schedule AEB-4), my traditional CAPM analyses produces a range of returns from 10.03 percent to 11.01 percent. The ECAPM analysis results range from 10.71 percent to 11.44 percent.

[63] *Id*., at 191.

Figure 13: Forward-Looking CAPM Results

		Current Risk Free Rate	Q3 2022 - Q3 2023 Projected Risk Free Rate	2023 - 2027 Projected Risk Free Rate
		[2.72%]	[3.34%]	[3.40%]
CAPM	Value Line Beta	10.53%	11.00%	11.01%
	Bloomberg Beta	10.89%	10.67%	10.68%
	Long-Term Avg. Beta	10.03%	10.20%	10.22%
ECAPM	Value Line Beta	11.08%	11.44%	11.44%
	Bloomberg Beta	11.35%	11.19%	11.20%
	Long-Term Avg. Beta	10.71%	10.84%	10.85%

Q. What are your conclusions as to the ROE derived from the DCF, CAPM and ECAPM analyses?

A. Based the results from these methodologies and the qualitative analyses presented in my Direct Testimony, a reasonable range of ROE results for MAWC is from 9.90 percent to 11.25 percent. Within that range an ROE of 10.50 percent is reasonable. The recommended return of 10.50 percent considers current and prospective capital market conditions, MAWC's company-specific risks relative to the proxy group and the Company's superior performance and service quality. I discuss MAWC's company-specific risks and superior management performance below.

VIII. BUSINESS RISKS AND MANAGEMENT PERFORMANCE

Q. Do the DCF, CAPM, and ECAPM results for the proxy group, taken alone, provide an appropriate estimate of the cost of equity for MAWC?

A. No. These results provide only a range of the appropriate estimate of MAWC's cost of equity. Several additional factors must be considered when determining where

the Company's cost of equity falls within the range of results. These factors, discussed below, should be considered with respect to their overall effect on MAWC's risk profile relative to the proxy group.

C. Risks Associated with Capital Expenditure Program

Q. How is MAWC's risk profile affected by its substantial capital expenditure program?

A. MAWC projects that the Company will spend approximately 2.07 billion on capital investments for the period from 2022-2026, including significant investment to replace aging infrastructure necessary to meet the needs of its customers and to comply with various regulations.

From a credit perspective, the additional pressure on cash flows associated with high levels of capital expenditures exerts corresponding pressure on credit metrics and, therefore, credit ratings. An S&P report explains:

> [T]here is little doubt that the U.S. electric industry needs to make record capital expenditures to comply with the proposed carbon pollution rules over the next several years, while maintaining safety standards and grid stability. We believe the higher capital spending and subsequent rise in debt levels could strain these companies' financial measures, resulting in an almost consistent negative discretionary cash flow throughout this higher construction period. To meet the higher capital spending requirements, companies will require ongoing and steady access to the capital markets, necessitating that the industry maintains its high credit quality. We expect that utilities will continue to effectively manage their regulatory risk by using various creative means to recover their costs and to finance their necessary higher spending.[64]

While this S&P report refers to electric utilities, the same applies to water utilities.

In an August 2016 report, S&P explains the importance of regulatory support for large capital projects:

[64] S&P, Ratings Direct, "U.S. Regulated Electric Utilities' Annual Capital Spending is Poised to Eclipse $100 Billion," July 2014.

> When applicable, a jurisdiction's willingness to support large capital projects with cash during construction is an important aspect of our analysis. This is especially true when the project represents a major addition to rate base and entails long lead times and technological risks that make it susceptible to construction delays. Broad support for all capital spending is the most credit-sustaining. Support for only specific types of capital spending, such as specific environmental projects or system integrity plans, is less so, but still favorable for creditors. Allowance of a cash return on construction work-in-progress or similar ratemaking methods historically were extraordinary measures for use in unusual circumstances, but when construction costs are rising, cash flow support could be crucial to maintain credit quality through the spending program. Even more favorable are those jurisdictions that present an opportunity for a higher return on capital projects as an incentive to investors.[65]

Q. Does MAWC have a capital tracking mechanism to recover some of the costs associated with its capital expenditures plan between rate cases?

A. Yes. MAWC has a Water and Sewer Infrastructure Rate Adjustment ("WSIRA") surcharge which allows MAWC to recover the costs associated with replacing and repairing aging water and wastewater infrastructure such as pipes, meters, valves, hydrants, service lines, sewer laterals, pumps, mechanical equipment, and system controls.[66] However, there is a cap on the annual amount of capital costs recovered through the WSIRA. The annual revenue collected through the WSIRA (revenue collected through the WSIRA minus the revenue associated with the plant being replaced) cannot exceed 15 percent of MAWC's total base revenue requirement approved by the Commission in the Company's last general rate proceeding.[67] Further, only a portion of the Company's total capital expenditures plan is eligible

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65 S&P Global Ratings, "Assessing U.S. Investor-Owned Utility Regulatory Environments," August 10, 2016, at 7.

66 Missouri American Water tariff. https://www.amwater.com/moaw/resources/PDF/Customer-Service/WSIRA_Annual_Custome_Notice.pdf?language_id=1

67 In the Matter of the Petition of Missouri –American Water Company for Approval to Establish a Water and Sewer Infrastructure Rate Adjustment ("WSIRA"), Order Approving Water and Sewer Infrastructure Rate Adjustments, Missouri Public Service Commission, File No. WO-2021-0428. January 12, 2022, at 4.

for recovery through the WSIRA. The Company will still rely on future rate case filings for authorization to recover on and of its capital expenditures for 2022-2026 and therefore the approved WSIRA mitigates but does not eliminate the cost recovery risk associated with MAWC's capital expenditure plans.

Q. Do the proxy group companies recover capital investments through a tracking mechanism?

A. Yes. As shown in Schedule AEB-6 approximately 83 percent of the companies in the proxy group have implemented infrastructure replacement recovery mechanisms. Consequently, the presence of the WSIRA while a positive regulatory mechanism, does not reduce the Company's risk vis-à-vis that of the proxy group.

Q. What are your conclusions regarding the effect of MAWC's capital spending program on its risk profile?

A. The Company's capital expenditure requirements as a percentage of net utility plant are significant and will continue over the next few years. Additionally, similar to a number of the operating subsidiaries of the proxy group, MAWC does have a capital tracking mechanism to recover some of the Company's projected capital expenditures.

D. Regulatory Risks

Q. Please explain how the regulatory framework affects investors' risk assessments.

A. The ratemaking process is premised on the principle that, for investors and companies to commit the capital needed to provide safe and reliable utility services, the subject utility must have the opportunity to recover invested capital and the

market-required return on such capital. Regulatory commissions recognize that because utility operations are capital intensive, regulatory decisions should enable the utility to attract capital at reasonable terms, which balance the long-term interests of investors and customers. In that respect, the regulatory framework in which a utility operates is one of the most important factors considered in both debt and equity investors' risk assessments.

Because investors have many investment alternatives, even within a given market sector, the Company's authorized return must be adequate on a relative basis to ensure its ability to attract capital under a variety of economic and financial market conditions. From the perspective of debt investors, the authorized return should enable the Company to generate the cash flow needed to meet its near-term financial obligations, make the capital investments needed to maintain and expand its systems, and maintain sufficient levels of liquidity to fund unexpected events. This financial liquidity must be derived not only from internally-generated funds, but also from efficient access to capital markets.

From the perspective of equity investors, the authorized return must be adequate to provide a risk-comparable return on the equity portion of the Company's capital investments. Because equity investors are the residual claimants on the Company's cash flows (that is, debt interest must be paid prior to any equity dividends), equity investors are particularly concerned with the regulatory framework in which a utility operates and its effect on future earnings and cash flows.

Q. Please explain how credit rating agencies consider regulatory risk in establishing a company's credit rating.

A. Both S&P and Moody's consider the overall regulatory framework in establishing credit ratings. Moody's establishes credit ratings based on four key factors: (1) business profile; (2) financial policy; (3) leverage and coverage; and (4) uplift for structural considerations. Within the business profile criteria, stability and predictability of regulatory environment and cost and investment recovery (sufficiency and timeliness) are each given a broad rating factor of 15.0 percent, while revenue risk is given a rating factor of 5.0 percent. Therefore, Moody's assigns regulatory risk a 35.0 percent weighting in the overall assessment of business and financial risk for regulated utilities.[68]

S&P also identifies the regulatory framework as an important factor in credit ratings for regulated utilities, stating: "One significant aspect of regulatory risk that influences credit quality is the regulatory environment in the jurisdictions in which a utility operates."[69] S&P identifies four specific factors that it uses to assess the credit implications of the regulatory jurisdictions of investor-owned regulated utilities: (1) regulatory stability; (2) tariff-setting procedures and design; (3) financial stability; and (4) regulatory independence and insulation."[70]

[68] Moody's Investors Service, Rating Methodology: Regulated Water Utilities, June 8, 2018, at 4.
[69] Standard & Poor's, Assessing U.S. Utility Regulatory Environments, August 10, 2016, at 2.
[70] *Ibid*.

Q. How does the regulatory environment in which a utility operates affect its access to and cost of capital?

A. The regulatory environment can significantly affect both the access to, and cost of capital in several ways. First, the proportion and cost of debt capital available to utility companies are influenced by the rating agencies' assessment of the regulatory environment. As noted by Moody's, "the characteristics and transparency of the concession(s) and regulations under which the utility operates, the track record of the regulatory regime in setting tariffs and applying regulations consistently are key elements in assessing the overall stability of a water utility's business profile."[71]

Q. Have you conducted any analysis of the regulatory framework in Missouri relative to the jurisdictions in which the companies in your proxy group operate?

A. Yes. I have evaluated the regulatory framework in Missouri considering two factors which are important to ensuring MAWC maintains access to capital at reasonable terms. As I will discuss in more detail below, the two factors are: 1) cost recovery mechanisms which allow a utility to recover costs in a timely manner between rate cases and provide the utility the opportunity to earn its authorized return; and 2) the ability of the Company to earn its authorized ROE because while an authorized ROE may be consistent with the authorized ROEs of other comparable water utilities, if the Company is unable to earn its authorized ROE, MAWC's ability to attract capital at reasonable terms could be affected.

[71] Moody's Investors Service, Rating Methodology: Regulated Water Utilities, June 8, 2018, at 7.

1. Cost Recovery Mechanisms

Q. Have you conducted any analysis to compare the cost recover mechanisms of MAWC to the cost recovery mechanisms approved in jurisdictions in which the companies in your proxy group operate?

A. Yes. I selected three mechanisms that are important to provide a regulated utility an opportunity to earn its authorized ROE. These are: 1) test year convention (i.e., forecast vs. historical); 2) use of revenue decoupling mechanisms or other clauses that mitigate volumetric risk; and 3) prevalence of capital cost recovery between rate cases. The results of this regulatory risk assessment are shown in Schedule AEB-6 and summarized below.

Test year convention: MAWC is proposing a historical test year that includes the costs for the 12-month period ending June 30, 2022 with a true up through December 31, 2022 as well as additional discrete adjustments through May 31, 2023. As shown in Schedule AEB-6, 55.17 percent of the companies in the proxy group provide service in jurisdictions that use a fully or partially forecast test year. Forecast test years have been relied on for several years and produce cost estimates that are more reflective of future costs which result in more accurate recovery of incurred costs and mitigates the regulatory lag associated with historical test years. As Lowry, Hovde, Getachew, and Makos explain in their 2010 report, "Forward Test Years for US Electric Utilities":

> This report provides an in depth discussion of the test year issue. It includes the results of empirical research which explores why the unit costs of electric IOUs are rising and shows that utilities operating under forward test years realize higher returns on capital and have credit ratings that are materially better than those of utilities operating under historical test years. The research suggests that shifting to a future test year is a prime strategy for rebuilding utility credit ratings as insurance against an uncertain future.[72]

Volumetric risk: As discussed in the testimony of Company Witness Mr. Rea, MAWC's usage from existing residential customers is affected by a long-term trend of declining use per customer. Usage is also affected significantly year to year due to seasonal weather variability. However, as discussed in Mr. Rea's testimony, the need to fund significant non-revenue producing investments does not vary with usage. The effect of having significant fixed operating costs being recovered on a variable basis results in difficulty recovering fixed costs.[73] Since a substantial portion of the Company's fixed costs are recovered on a variable basis, MAWC is likely to experience significant volatility in annual cost recovery. As a result, MAWC is proposing a revenue stabilization mechanism ("RSM") that would reconcile actual revenue with the revenue the Commission authorizes (i.e., "Authorized Revenues") the Company to collect in rates. In order to determine the relative risk of MAWC to the proxy group, I reviewed RSM mechanisms implemented by the proxy group. As shown in Schedule AEB-6, 58.62 percent of the operating companies of the proxy group have some form of mechanism that results in increased revenue stability. Therefore, if the Commission were to authorize the Company's proposed RSM, MAWC's volumetric risk would be more

[72] M.N. Lowry, D. Hovde, L. Getachew, and M. Makos, Forward Test Years for US Electric Utilities, at 1, prepared for Edison Electric Institute, August 2010.

[73] Direct Testimony (DT) of Charles B. Rea.

comparable to the proxy group. However, to the extent that MAWC is not granted its proposed RSM in this rate case, its risk would be substantially elevated, relative to the proxy group.

Capital cost recovery: As discussed previously, MAWC does have a capital tracking mechanism (the WSIRA) to recover approximately 70 percent of its capital expenditures plan from 2022-2026. Similarly, 82.76 percent of the operating companies in the proxy group have some form of capital cost recovery mechanism in place.

Q. Have you considered the Company's proposed uncollectible expense tracker and property tax expense tracker?

A. Yes, I have. As discussed in the testimony of Company Witness Mr. Selinger, the Company is proposing an uncollectible expense tracker to record to a regulatory asset/liability account any variances in actual uncollectible expense from the level that is established in base rates and a property tax tracker which would allow MAWC to record to a regulatory asset/liability account changes in property taxes as compared to the base levels approved in a general rate case. The use of a tracker is appropriate for both uncollectible and property tax expenses because the Company is unable to manage and control each cost. For example, as noted by Mr. Selinger, uncollectible expenses are very difficult to forecast since levels are driven primarily by changes in economic conditions.[74] Similarly, the Company is unable to control the level of property taxes assessed by the state or localities. Furthermore, in the case of property taxes, the expense paid by the Company is likely to only

[74] DT of Wesley E. Selinger.

trend upwards over time. Finally, the approval of these expense trackers would not decrease the risk of the Company as compared to the proxy group. As noted by S&P, the use of adjustment clauses for expenses that are outside of the control of the utility have "expanded greatly":

> Over the ensuing years, the use of adjustment clauses has expanded greatly. Adjustment clauses are generally reserved for expenses that are outside the control of the utility or are required by law or rule. Some jurisdictions have approved the use of adjustment clauses for recovery of environmental compliance, energy efficiency and conservation program expenses, transmission charges allocated to the utility by the Federal Energy Regulatory Commission, and/or expenses related to meeting renewable resource requirements. Such mechanisms have also been approved to pass through to customers all or a portion of the margins that the company receives from selling excess power or pipeline capacity in the open market through off-system sales.[75]

Furthermore, as shown in Schedule AEB-6, 7 out of 58 (12 percent) of the operating subsidiaries of the proxy group companies operate under formula rate plans which allow the companies to adjust rate periodically to reflect changes in expenses, revenues and capital expenditures.

Q. Will the use of a historical test year result in greater regulatory lag in the current market environment?

A. Yes, it will. As noted above, the Company is proposing a historical test year that includes the costs for the 12-month period ending June 30, 2022 with a true up through December 31, 2022 as well as additional discrete adjustments through May 31, 2023. While the true-up period will allow the Company to account for costs incurred after the rate case is filed, the test period will still be fully historical by the

[75] S&P Global Market Intelligence. " RRA Regulatory Focus Adjustment Clauses: A State-by-State Overview," November 12, 2019, at 2.

time rates go into effect. This increases the risk of regulatory lag in the current market environment due to the high levels of inflation. Current levels of inflation are considerably higher than the Federal Reserve's target of 2.0 percent. As of April 2022, the year over year change in inflation was 8.22 percent. While some amount of inflation can be offset through efficiencies and growth in operations, current levels are likely to result in increased regulatory lag, as operations and maintenance expenses increase significantly beyond the levels established in the test period for ratemaking purposes and beyond what can be reasonably expected to be achieved through productivity and efficiency offsets. Without the ability to adjust for inflationary pressure, it is likely that higher than normal inflation will reduce the likelihood that the Company will earn the authorized ROE that is determined in this rate proceeding. To the extent that cash flow is affected by inflation, credit metrics will also be stressed, potentially resulting in increased pressure on credit metrics.

Q. Has the Company experienced significant increases in costs due to inflation?

A. Yes. As discussed in the testimony of Company Witness Mr. O'Drain, the cost of water treatment chemicals, which MAWC uses to transform raw water into water that is safe for the customer to use, has increased significantly over the past few years. The increases have been driven by the effect of COVID-19, inflation in commodity prices, increases in energy prices due to the conflict in Ukraine and consolidation in the chemical industry.[76] As noted by Mr. O'Drain, these factors have resulted in an increase in chemical costs for the Company from 2021 to 2022 of 27 percent. Moreover, Mr. O'Drain expects the Company's chemical costs will

[76] DT of Thomas O'Drain.

increase 12 percent from 2022 to 2023.[77] While the Company has historically been able to mitigate rising costs through longer-term contracts, suppliers are not willing to enter into agreements that provide this level of price stability in the current market environment. This is important for two reasons. One, this is a discussion of only one cost for the Company, given the high levels in inflation, MAWC is likely seeing an increases in a number of operating costs. Two, because as noted above, high levels of inflation are expected to continue over the near-term, the risk of regulatory lag is significantly increased. This will likely make it difficult for the Company to earn the ROE that the Commission authorizes in this proceeding.

2. Earned ROE

Q. Is there evidence that MAWC has been unable to earn its authorized return on equity?

A. Yes. As shown in Figure 14, MAWC has persistently under-earned its authorized ROE. Over this period, the Company's average earned ROE was 8.26 percent as compared with the average authorized ROE of 9.75 percent, for an average under-earning of 158-165 basis points per year. This under-earning is due in part to the regulatory environment in Missouri which relies on historical test years for rate cases and where a limited number of adjustment mechanisms have historically been available to utilities. As discussed above, while the Company is proposing an RSM, uncollectible expense rider and property tax tracker in the current proceeding, the Company has only previously had a capital cost recovery mechanism approved to recover a portion of capital costs. The prior under earning and the near-term effect

[77] DT of Thomas O'Drain.

of inflation, highlights the importance of a constructive outcome in the current proceeding so that MAWC has the opportunity to earn its authorized ROE.

Figure 14: Earned vs. Authorized ROE

		Earned ROE	Authorized ROE	Earnings Differential (BPS)
		[1]	[2]	[3]
2021	[a]	7.46%	9.55%	(209)
2020	[b]	8.03%	9.75%	(172)
2019	[c]	8.57%	9.75%	(118)
2018	[d]	8.42%	9.75%	(133)
2017	[e]	7.67%	9.50% - 10.00%	(183 - 233)
2016	[f]	8.70%	9.75%	(105)
2015	[g]	7.90%	9.75%	(185)
Average	[h]	8.11%	9.75%	(158 - 165)

Notes:
[2][a]: From AWK Fall 2021 Investor Day Presentation, November 2021, "The ROE is the Company's view of the ROE allowed in the case; however, the ROE was not disclosed in the Order or the applicable settlement agreement," p. 60
[2][e]: From Docket No. WR-2017-0285, Stipulation and Agreement, p. 3.
[2][g]: From Docket No. WR-2015- 0301, p. 3.

3. State Jurisdictional Regulatory Environment Comparison

Q. Have you developed any additional analyses to evaluate the regulatory environment in Missouri as compared to the jurisdictions in which the companies in your proxy group operate?

A. Yes. I have conducted two additional analyses to compare the regulatory framework of Missouri to the jurisdictions in which the companies in the proxy group operate. Specifically, I considered two different rankings: (1) the Regulatory

Research Associates ("RRA") ranking of regulatory jurisdictions; and (2) S&P's ranking of the credit supportiveness of regulatory jurisdictions.

Q. Please explain how you used the RRA ratings to compare the regulatory jurisdictions of the proxy group companies with the Company's regulatory jurisdiction.

A: RRA develops their ranking based on their assessment of how investors perceive the regulatory risk associated with ownership of utility securities in that jurisdiction, specifically reflecting their assessment of the probable level and quality of earnings to be realized by a state's utilities as a result of regulatory, legislative, and court actions. RRA assigns a ranking for each regulatory jurisdiction between "Above Average/1" to "Below Average/3," with nine total rankings between these categories. I applied a numeric ranking system to the RRA rankings with "Above Average/1" assigned the highest ranking ("1") and "Below Average/3" assigned the lowest ranking ("9"). As shown in Schedule AEB-7, the Missouri regulatory environment is ranked as "Average/3," while the proxy group is ranked close to "Average/2".

Q. How did you conduct your analysis of the S&P credit supportiveness ranking?

A. S&P classifies the regulatory jurisdictions into five categories ranging from "Credit Supportive" to "Most Credit Supportive" based on the level of credit supportiveness. Similar to the RRA regulatory ranking analysis discussed above, I assigned a numerical ranking to each jurisdiction ranked by S&P, from most credit supportive ("1") to credit supportive ("5"). As shown in Schedule AEB-8, the proxy group is ranked between very credit supportive and highly credit supportive

while the Missouri regulatory jurisdiction is only ranked as very credit supportive. Thus, similar to the results using the RRA regulatory rankings, Missouri is perceived as being below the average for the proxy group.

Q. What are your conclusions regarding the perceived risks related to the Missouri regulatory environment?

A. As discussed throughout this section of my testimony, both Moody's and S&P have identified the supportiveness of the regulatory environment as an important consideration in developing their overall credit ratings for regulated utilities. Considering the regulatory adjustment mechanisms, many of the companies in the proxy group have timely cost recovery (through forecasted test years, cost recovery trackers and revenue stabilization mechanisms) similar to MAWC, assuming the approval of the Company's proposed RSM, uncollectible expense rider and property tax tracker. Without approval of the Company's RSM, uncollectible expense rider and property tax tracker; however, the companies in the proxy group would have more timely cost recovery than MAWC. Additionally, the Company has not earned its authorized ROE since 2015. Finally, the RRA jurisdictional ranking and the S&P credit supportiveness ranking for Missouri indicates greater risk than the average for the proxy group. For these reasons, I conclude that the Company has slightly greater risk than the proxy group if the RSM, uncollectible expense rider and property tax tracker are approved indicating that the ROE for MAWC should be slightly greater than the proxy group median. On the other hand, if the RSM, uncollectible expense rider and property tax tracker are not approved, then MAWC's risk relative to the proxy group would be significantly increased

warranting an ROE towards the high of my recommended ROE range of 9.90 percent to 11.25 percent.

IX. CAPITAL STRUCTURE

Q. What is the proposed capital structure for MAWC?

A. As discussed in the Direct Testimony of Company witness Mr. James Merante, the Company is proposing to use the capital structure that finances MAWC's rate base and operations for setting rates in this case. As projected through May 31, 2023, the capital structure is composed of 49.57 percent long-term debt and 50.43 percent equity.

Q. Is the Company's proposed capital structure reflective of the way the Company is operated and consistent with industry norms?

A. Yes, it is for several reasons. Most importantly, the Company's proposed test-year capital structure is reflective of the way the Company is operated.[78] As discussed in the Direct Testimony of Company witness Mr. Merante, the proposed capital structure reflects the financing of MAWC's rate base assets and operating costs. In addition to considering the operations of the Company, I also examined the capital structures of the operating companies of the proxy group as well as the capital structures that have recently been authorized for natural gas and water utilities. In each case, the Company's proposal is within the established range.

[78] DT of James Merante.

Q. Why is it appropriate to compare the Company's equity ratio to the proxy companies?

A. The review of the capital structure of MAWC should be based on the operations and risk factors of MAWC as an independent entity, unrelated to the capital structures of its financing sources. However, consistent with the determination of the ROE, which is based on the expected return for a proxy group of companies that are comparable in risk to MAWC it is important to consider the financial risk of the operating companies of the proxy group. The equity ratio is a measure of the financial risk of the company, and the authorized ROE is the return to compensate investors for that risk. If the Commission is going to rely on the ROE estimates for the proxy companies to establish the authorized ROE for MAWC, it is important that the financial risk of MAWC be similar to the financial risk of the proxy group. This is accomplished when the equity ratio of the subject company (in this case MAWC) is within the range established by the proxy group.

Q. Have you conducted any analysis to determine the reasonableness of the Company's capital structure?

A. Yes. I conducted two analyses. I reviewed the Company's actual capital structure in comparison with the actual capital structures of the utility operating companies of the proxy group companies. In addition, I reviewed the Company's actual capital structure as compared with the recently authorized capital structures for regulated water and natural gas distribution companies.

Q. Please discuss your analysis of the capital structures of the proxy group companies.

A. I calculated the mean proportions of common equity, long-term debt and preferred equity for the most recent year for each of the companies in the proxy group at the operating subsidiary level.[79] My analysis of the capital structures of the proxy group companies is provided in Schedule AEB-9 and shown in Figure 15 below. As shown in Figure 15, the mean common equity ratio for the proxy group at the operating subsidiary level was 55.63 percent, within a range from 47.44 percent to 60.04 percent. MAWC's proposed equity ratio of 50.43 percent is more conservative than the mean equity ratio and well within the range of equity ratios established by the proxy group.

[79] Long-term debt includes the current portion of long-term debt, assuming that the current portion would be refinanced with debt at maturity. The average amount of preferred equity was less than 1 percent across the proxy group companies.

Figure 15: Equity Ratios of Proxy Companies[80]

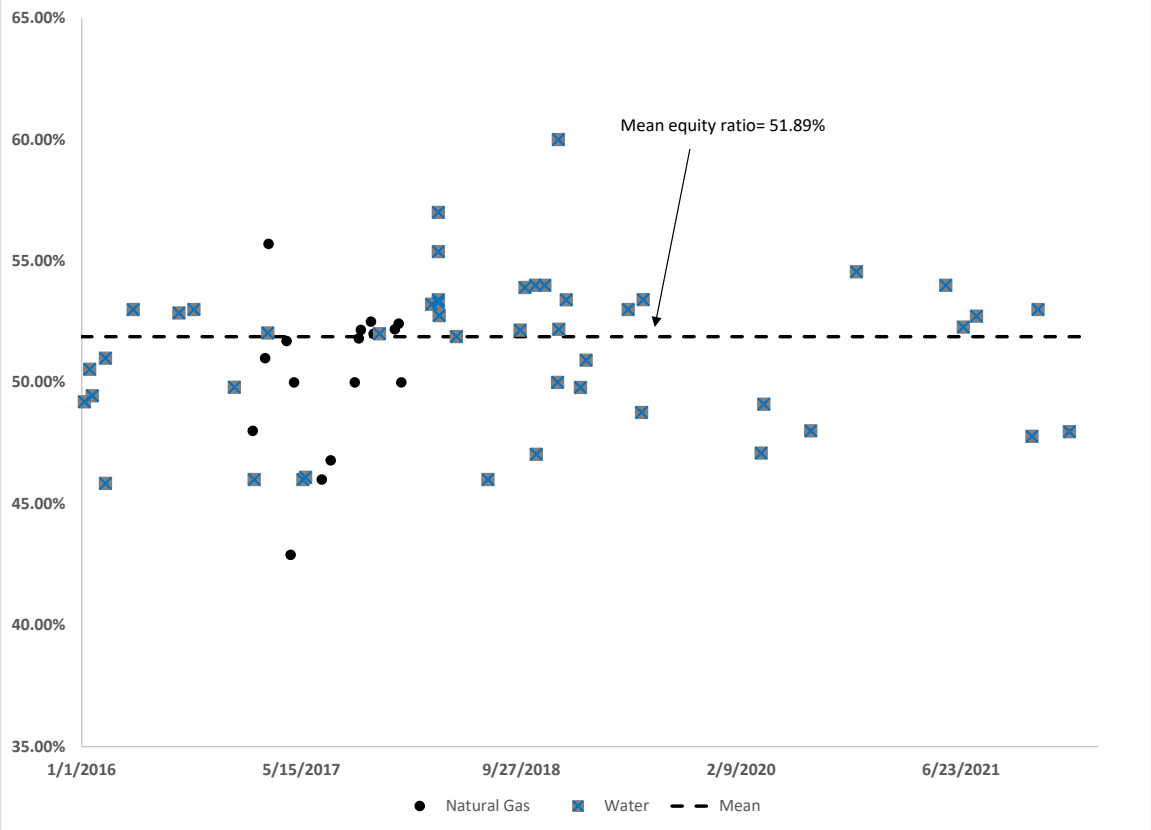
Proxy Group Company	Ticker	2020	2019
American States Water Company	AWR	56.76%	65.94%
Atmos Energy Corporation	ATO	58.31%	58.43%
California Water Service Group	CWT	52.23%	46.73%
Essential Utilities, Inc.	WTRG	55.83%	54.82%
Eversource Energy	ES	54.99%	54.39%
Middlesex Water Company	MSEX	59.21%	62.71%
NiSource Inc.	NI	54.43%	54.33%
New Jersey Resources Corporation	NJR	55.45%	58.87%
Northwest Natural Gas Company	NWN	47.44%	49.19%
One Gas Inc.	OGS	60.04%	63.28%
SJW Corporation	SJW	56.66%	55.13%
Spire Inc.	SR	58.52%	60.85%
York Water Company	YORW	53.27%	56.50%
	MEAN	55.63%	57.01%
Proxy Group	LOW	47.44%	46.73%
	HIGH	60.04%	65.94%

Q. How do the proposed equity ratios in this case compare with the equity ratios that have been recently authorized for water and natural gas utilities?

A. As shown in Figure 16 below, the majority of the recently authorized equity ratios for the operating companies of the proxy group natural gas and water utilities are in the range of 50-55 percent. MAWC's proposed equity ratio of 50.43 percent is at the low end of the range of authorized equity ratios for companies of comparable risk and slightly below the average of recently authorized equity ratios. Therefore, I conclude that MAWC's capital structure is reasonable and appropriate as compared with recent authorized returns.

[80] This analysis relies on the capital structures of the operating company of the proxy group companies which is filed in annual reports at the state regulatory commissions. As of the preparation of my Direct Testimony, this data has not been filed by the utility operating companies for 2021. Therefore, I am relying on the most recently available information, which is 2020 data.

Figure 16: Average Authorized Equity Ratios for Natural Gas & Water Utilities[81]



Q. Are there other factors to be considered in setting the Company's capital structure?

A. Yes. While the treatment of excess accumulated deferred taxes (excess ADIT) resulting from the Tax Cuts and Jobs Act of 2017 (TCJA) has largely been addressed by regulators, change in cash flow coverage ratios continues to be an issue for utilities. All three rating agencies have noted that the TCJA has negative implications for utility cash flows. S&P and Fitch specifically identified increasing the equity ratio as one approach to ensure that utilities have sufficient cash flows following the federal income tax rate reductions and the loss of bonus depreciation.

[81] Figure 2 excludes jurisdictions that include zero cost items in the capital structure: Arkansas, Indiana, Michigan and Florida.

As S&P noted "[r]egulators must also recognize that tax reform is a strain on utility credit quality, and we expect companies to request stronger capital structures and other means to offset some of the negative impact".[82] Furthermore, following the passage of tax reform (June 2018) Moody's downgraded the rating outlook for the entire utilities sector and downgraded the ratings of many utilities based in part on the negative effects of the TCJA on cash flows over the next several years.

S&P continues to maintain a negative outlook for the utility industry in 2022 and noted that since downgrades outpaced upgrades for a second consecutive year in 2021 for the first time ever, the median investor-owned utility credit rating fell to the "BBB" category.[83] Further, S&P expects continued pressure on cash flows over the near-term as utilities continue to increase leverage to fund capital expenditure plans necessary to improve safety and reliability. Finally, S&P also highlighted inflation, higher interest rates and rising commodity prices as additional risks that could further constrain the credit metrics for utilities over the near-term. In regard to inflation, S&P noted:

82 Standard & Poor's Ratings, "U.S. Tax Reform: For Utilities' Credit Quality, Challenges Abound", January 24, 2018, at 5.

83 S&P Global Ratings, "For the First Time Ever, The Median Investor-Owned Utility Ratings Falls To The 'BBB' Category," January 20, 2022.

> Inflation recently spiked to its highest level in decades after rising for several consecutive months in 2021. Given the sustained increase to the U.S. consumer price index in 2021, inflation no longer appears to be just transitory and may have financial implications for the investor-owned North American regulated utility industry. Because of the regulatory lag within the industry, inflation, which causes prices to rise, typically leads to a weakening of financial performance. The regulatory lag is the timing difference between when costs are incurred and when regulators allow those costs to be fully recovered from ratepayers.[84]

The credit ratings agencies continued concerns over the negative effects or the TCJA, inflation, and increased capital expenditures underscores the importance of maintaining adequate cash flow metrics for the industry, as a whole, and MAWC, particularly, in the context of this proceeding.

Q. What is your conclusion with regard to MAWC's proposed capital structures?

A. I have considered the actual capital structures of the proxy group operating companies, recently authorized equity ratios for natural gas and water utilities and the concerns of the rating agencies with respect to the weakened coverage ratios of the utility sector following tax reform. I conclude that MAWC's proposed common equity ratio of 50.43 percent as of May 31, 2023 is reasonable when benchmarked against recently authorized equity ratios and the actual equity ratios of the operating companies of the proxy group companies. Further, the equity ratio and ROE recommendation, considered together, consider MAWC's overall financial risk. I further conclude that it is important to recognize that tax reform has permanently reduced the financial flexibility of utilities, which has been recognized by the credit rating agencies. Finally, I consider the current and expected interest rate environment, inflationary pressures and the Company's significant capital

[84] Ibid.

expenditures program and conclude that the Company's proposed equity ratio is reasonable and appropriate.

X. CONCLUSIONS AND RECOMMENDATION

Q. What is your conclusion regarding a fair ROE for MAWC?

A. Figure 17 below, provides a summary of my analytical results. Based on the various quantitative analyses discussed in my Direct Testimony and the qualitative analyses presented in my Direct Testimony, a reasonable range of ROE results for MAWC is from 9.90 percent to 11.25 percent. I am recommending that the Commission set the Company's rate of return on common equity at 10.50 percent. The recommended ROE takes into consideration the current conditions in capital markets including the expectation for rising interest rates, and increase in inflationary pressures, both of which increase the cost of capital. Finally, the recommendation takes into consideration the relative business and financial risk of MAWC as compared to the proxy group. This ROE would enable the company to maintain its financial integrity and therefore its ability to attract capital at reasonable terms under a variety of economic and financial market conditions, while continuing to provide safe, reliable and affordable water and wastewater service to customers in Missouri.

Figure 17: Summary of Analytical Results

		Low	Mean	High
Constant Growth DCF Mean [1]	30-Day Average	7.78%	9.36%	10.89%
	90-Day Average	7.87%	9.44%	10.98%
	180-Day Average	7.95%	9.53%	11.07%
	Constant Growth Average	7.87%	9.44%	10.98%
Constant Growth DCF Median	30-Day Average	7.94%	9.25%	9.86%
	90-Day Average	7.99%	9.36%	9.97%
	180-Day Average	8.18%	9.46%	10.07%
	Constant Growth Average	8.04%	9.36%	9.97%

		Current 30-day Average Treasury Bond Yield	Near-Term Blue Chip Forecast Yield	Long-Term Blue Chip Forecast Yield
CAPM	Value Line Beta	10.89%	11.00%	11.01%
	Bloomberg Beta	10.53%	10.67%	10.68%
	Long-term Avg. Beta	10.03%	10.20%	10.22%
ECAPM	Value Line Beta	11.35%	11.44%	11.44%
	Bloomberg Beta	11.08%	11.19%	11.20%
	Long-term Avg. Beta	10.71%	10.84%	10.85%

Q. What is your conclusion with respect to MAWC's proposed capital structure for water distribution service and wastewater service?

A. My conclusion is that MAWC's proposed equity ratio of 50.43 percent and long-term debt ratio of 49.57 percent for the period ending May 31, 2023, for its water and wastewater services is reasonable compared to the mean and range established by the capital structures for the proxy group companies and taking in consideration the effect of the TCJA, increased capital expenditures and inflation on cash flows and therefore should be adopted.

Q. Does this conclude your Direct Testimony?

A. Yes.

SUMMARY OF ROE ANALYSES RESULTS

		Low	Mean	High
Constant Growth DCF Mean [1]	30-Day Average	7.78%	9.36%	10.89%
	90-Day Average	7.87%	9.44%	10.98%
	180-Day Average	7.95%	9.53%	11.07%
	Constant Growth Average	7.87%	9.44%	10.98%
Constant Growth DCF Median	30-Day Average	7.94%	9.25%	9.86%
	90-Day Average	7.99%	9.36%	9.97%
	180-Day Average	8.18%	9.46%	10.07%
	Constant Growth Average	8.04%	9.36%	9.97%

		Current 30-day Average Treasury Bond Yield	Near-Term Blue Chip Forecast Yield	Long-Term Blue Chip Forecast Yield
CAPM	Value Line Beta	10.89%	11.00%	11.01%
	Bloomberg Beta	10.53%	10.67%	10.68%
	Long-term Avg. Beta	10.03%	10.20%	10.22%
ECAPM	Value Line Beta	11.35%	11.44%	11.44%
	Bloomberg Beta	11.08%	11.19%	11.20%
	Long-term Avg. Beta	10.71%	10.84%	10.85%

[1] Excludes the result for Middlesex Water Company

PROXY GROUP SCREENING DATA AND RESULTS - FINAL PROXY GROUP

Company	Ticker	[1] Dividends	[2] S&P Credit Rating Between BBB- and AAA	[3] % Regulated Operating Income > 60%	[4] Announced Merger	[5] Covered by More Than 1 Analyst	[6] Positive Growth Rates from at least two sources (Value Line, Yahoo! First Call, and Zacks)	[7] Electric Companies with < 10% Generation	[8] Electric Companies with Water Operations
American States Water Company	AWR	Yes	A+	83.18%	No	Yes	Yes	n/a	n/a
Atmos Energy Corporation	ATO	Yes	A-	100.00%	No	Yes	Yes	n/a	n/a
California Water Service Group	CWT	Yes	A+	96.28%	No	Yes	Yes	n/a	n/a
Essential Utilities, Inc.	WTRG	Yes	A	101.03%	No	Yes	Yes	n/a	n/a
Eversource Energy	ES	Yes	A-	92.02%	No	Yes	Yes	0.28%	Yes
Middlesex Water Company	MSEX	Yes	A	89.86%	No	Yes	Yes	n/a	n/a
NiSource Inc.	NI	Yes	BBB+	99.51%	No	Yes	Yes	n/a	n/a
New Jersey Resources Corporation	NJR	Yes	A+	67.22%	No	Yes	Yes	n/a	n/a
Northwest Natural Gas Company	NWN	Yes	A+	99.84%	No	Yes	Yes	n/a	n/a
ONE Gas, Inc.	OGS	Yes	BBB+	100.00%	No	Yes	Yes	n/a	n/a
SJW Group	SJW	Yes	A-	98.99%	No	Yes	Yes	n/a	n/a
Spire, Inc.	SR	Yes	A-	91.43%	No	Yes	Yes	n/a	n/a
York Water Company	YORW	Yes	A-	100.00%	No	Yes	Yes	n/a	n/a

Notes:
[1] Source: Bloomberg Professional
[2] Source: Bloomberg Professional
[3] Source: Form 10-K's for 2021, 2020, and 2019
[4] Source: S&P Capital IQ Pro Financial News Releases
[5] Source: Yahoo! Finance and Zacks
[6] Source: Yahoo! Finance, Value Line Investment Survey, and Zacks
[7] Source: S&P Capital IQ Pro
[8] Source: S&P Capital IQ Pro

30-DAY CONSTANT GROWTH DCF -- MAWC PROXY GROUP

Company	Ticker	[1] Annualized Dividend	[2] Stock Price	[3] Dividend Yield	[4] Expected Dividend Yield	[5] Value Line Earnings Growth	[6] Yahoo! Finance Earnings Growth	[7] Zacks Earnings Growth	[8] Average Growth Rate	[9] Low ROE	[10] Mean ROE	[11] High ROE
American States Water Company	AWR	$1.46	$86.51	1.69%	1.73%	5.50%	4.90%	n/a	5.20%	6.63%	6.93%	7.23%
Atmos Energy Corporation	ATO	$2.72	$118.57	2.29%	2.38%	7.50%	7.76%	7.30%	7.52%	9.68%	9.90%	10.14%
California Water Service Group	CWT	$1.00	$57.13	1.75%	1.83%	6.50%	11.70%	n/a	9.10%	8.31%	10.93%	13.55%
Essential Utilities, Inc.	WTRG	$1.07	$49.56	2.16%	2.25%	10.00%	6.40%	6.10%	7.50%	8.33%	9.75%	12.27%
Eversource Energy	ES	$2.55	$89.54	2.85%	2.94%	5.50%	6.70%	6.20%	6.13%	8.43%	9.07%	9.64%
Middlesex Water Company	MSEX	$1.16	$99.35	1.17%	1.19%	4.50%	2.70%	n/a	3.60%	3.88%	4.79%	5.69%
NiSource Inc.	NI	$0.94	$31.20	3.01%	3.12%	10.50%	3.52%	7.20%	7.07%	6.59%	10.19%	13.67%
New Jersey Resources Corporation	NJR	$1.45	$45.41	3.19%	3.28%	4.50%	6.00%	6.00%	5.50%	7.77%	8.78%	9.29%
Northwest Natural Gas Company	NWN	$1.93	$51.45	3.75%	3.85%	6.00%	5.70%	4.50%	5.40%	8.34%	9.25%	9.86%
ONE Gas, Inc.	OGS	$2.48	$87.86	2.82%	2.89%	6.00%	2.90%	5.00%	4.63%	5.76%	7.52%	8.91%
SJW Group	SJW	$1.44	$66.18	2.18%	2.28%	14.00%	5.70%	n/a	9.85%	7.94%	12.13%	16.33%
Spire, Inc.	SR	$2.74	$73.13	3.75%	3.88%	9.00%	7.31%	5.00%	7.10%	8.84%	10.98%	12.92%
York Water Company	YORW	$0.78	$42.68	1.83%	1.87%	5.00%	4.90%	n/a	4.95%	6.77%	6.82%	6.87%
Mean				2.50%	2.58%	7.27%	5.86%	5.91%	6.43%	7.48%	9.00%	10.49%
Mean excluding Middlesex				**2.61%**	**2.69%**	**7.50%**	**6.12%**	**5.91%**	**6.66%**	**7.78%**	**9.36%**	**10.89%**
Median				2.29%	2.38%	6.00%	5.70%	6.05%	6.13%	7.94%	9.25%	9.86%

Notes:
[1] Source: Bloomberg Professional
[2] Source: Bloomberg Professional, equals 30-day average as of April 30, 2022
[3] Equals [1] / [2]
[4] Equals [3] x (1 + 0.50 x [8])
[5] Source: Value Line
[6] Source: Yahoo! Finance
[7] Source: Zacks
[8] Equals Average ([5], [6], [7])
[9] Equals [3] x (1 + 0.50 x Minimum ([5], [6], [7]) + Minimum ([5], [6], [7])
[10] Equals [4] + [8]
[11] Equals [3] x (1 + 0.50 x Maximum ([5], [6], [7]) + Maximum ([5], [6], [7])

90-DAY CONSTANT GROWTH DCF -- MAWC PROXY GROUP

Company	Ticker	[1] Annualized Dividend	[2] Stock Price	[3] Dividend Yield	[4] Expected Dividend Yield	[5] Value Line Earnings Growth	[6] Yahoo! Finance Earnings Growth	[7] Zacks Earnings Growth	[8] Average Growth Rate	[9] Low ROE	[10] Mean ROE	[11] High ROE
American States Water Company	AWR	$1.46	$89.57	1.63%	1.67%	5.50%	4.90%	n/a	5.20%	6.57%	6.87%	7.17%
Atmos Energy Corporation	ATO	$2.72	$110.97	2.45%	2.54%	7.50%	7.76%	7.30%	7.52%	9.84%	10.06%	10.31%
California Water Service Group	CWT	$1.00	$60.32	1.66%	1.73%	6.50%	11.70%	n/a	9.10%	8.21%	10.83%	13.45%
Essential Utilities, Inc.	WTRG	$1.07	$48.94	2.19%	2.27%	10.00%	6.40%	6.10%	7.50%	8.36%	9.77%	12.30%
Eversource Energy	ES	$2.55	$87.20	2.92%	3.01%	5.50%	6.70%	6.20%	6.13%	8.50%	9.15%	9.72%
Middlesex Water Company	MSEX	$1.16	$102.08	1.14%	1.16%	4.50%	2.70%	n/a	3.60%	3.85%	4.76%	5.66%
NiSource Inc.	NI	$0.94	$29.39	3.20%	3.31%	10.50%	3.52%	7.20%	7.07%	6.77%	10.38%	13.87%
New Jersey Resources Corporation	NJR	$1.45	$42.44	3.42%	3.51%	4.50%	6.00%	6.00%	5.50%	7.99%	9.01%	9.52%
Northwest Natural Gas Company	NWN	$1.93	$50.09	3.85%	3.96%	6.00%	5.70%	4.50%	5.40%	8.44%	9.36%	9.97%
ONE Gas, Inc.	OGS	$2.48	$82.02	3.02%	3.09%	6.00%	2.90%	5.00%	4.63%	5.97%	7.73%	9.11%
SJW Group	SJW	$1.44	$67.17	2.14%	2.25%	14.00%	5.70%	n/a	9.85%	7.90%	12.10%	16.29%
Spire, Inc.	SR	$2.74	$68.13	4.02%	4.16%	9.00%	7.31%	5.00%	7.10%	9.12%	11.27%	13.20%
York Water Company	YORW	$0.78	$44.40	1.76%	1.80%	5.00%	4.90%	n/a	4.95%	6.70%	6.75%	6.80%
Mean				2.57%	2.65%	7.27%	5.86%	5.91%	6.43%	7.56%	9.08%	10.57%
Mean excluding Middlesex				**2.69%**	**2.78%**	**7.50%**	**6.12%**	**5.91%**	**6.66%**	**7.87%**	**9.44%**	**10.98%**
Median				2.45%	2.54%	6.00%	5.70%	6.05%	6.13%	7.99%	9.36%	9.97%

Notes:
[1] Source: Bloomberg Professional
[2] Source: Bloomberg Professional, equals 90-day average as of April 30, 20222
[3] Equals [1] / [2]
[4] Equals [3] x (1 + 0.50 x [8])
[5] Source: Value Line
[6] Source: Yahoo! Finance
[7] Source: Zacks
[8] Equals Average ([5], [6], [7])
[9] Equals [3] x (1 + 0.50 x Minimum ([5], [6], [7]) + Minimum ([5], [6], [7])
[10] Equals [4] + [8]
[11] Equals [3] x (1 + 0.50 x Maximum ([5], [6], [7]) + Maximum ([5], [6], [7])

180-DAY CONSTANT GROWTH DCF -- MAWC PROXY GROUP

Company	Ticker	[1] Annualized Dividend	[2] Stock Price	[3] Dividend Yield	[4] Expected Dividend Yield	[5] Value Line Earnings Growth	[6] Yahoo! Finance Earnings Growth	[7] Zacks Earnings Growth	[8] Average Growth Rate	[9] Low ROE	[10] Mean ROE	[11] High ROE
American States Water Company	AWR	$1.46	$90.69	1.61%	1.65%	5.50%	4.90%	n/a	5.20%	6.55%	6.85%	7.15%
Atmos Energy Corporation	ATO	$2.72	$102.41	2.66%	2.76%	7.50%	7.76%	7.30%	7.52%	10.05%	10.28%	10.52%
California Water Service Group	CWT	$1.00	$61.62	1.62%	1.70%	6.50%	11.70%	n/a	9.10%	8.18%	10.80%	13.42%
Essential Utilities, Inc.	WTRG	$1.07	$48.52	2.21%	2.29%	10.00%	6.40%	6.10%	7.50%	8.38%	9.79%	12.32%
Eversource Energy	ES	$2.55	$86.78	2.94%	3.03%	5.50%	6.70%	6.20%	6.13%	8.52%	9.16%	9.74%
Middlesex Water Company	MSEX	$1.16	$104.13	1.11%	1.13%	4.50%	2.70%	n/a	3.60%	3.83%	4.73%	5.64%
NiSource Inc.	NI	$0.94	$27.20	3.46%	3.58%	10.50%	3.52%	7.20%	7.07%	7.04%	10.65%	14.14%
New Jersey Resources Corporation	NJR	$1.45	$40.06	3.62%	3.72%	4.50%	6.00%	6.00%	5.50%	8.20%	9.22%	9.73%
Northwest Natural Gas Company	NWN	$1.93	$48.83	3.95%	4.06%	6.00%	5.70%	4.50%	5.40%	8.54%	9.46%	10.07%
ONE Gas, Inc.	OGS	$2.48	$75.40	3.29%	3.37%	6.00%	2.90%	5.00%	4.63%	6.24%	8.00%	9.39%
SJW Group	SJW	$1.44	$67.96	2.12%	2.22%	14.00%	5.70%	n/a	9.85%	7.88%	12.07%	16.27%
Spire, Inc.	SR	$2.74	$66.04	4.15%	4.30%	9.00%	7.31%	5.00%	7.10%	9.25%	11.40%	13.34%
York Water Company	YORW	$0.78	$46.14	1.69%	1.73%	5.00%	4.90%	n/a	4.95%	6.63%	6.68%	6.73%
Mean				2.65%	2.73%	7.27%	5.86%	5.91%	6.43%	7.64%	9.16%	10.65%
Mean excluding Middlesex				**2.78%**	**2.87%**	**7.50%**	**6.12%**	**5.91%**	**6.66%**	**7.95%**	**9.53%**	**11.07%**
Median				2.66%	2.76%	6.00%	5.70%	6.05%	6.13%	8.18%	9.46%	10.07%

Notes:
[1] Source: Bloomberg Professional
[2] Source: Bloomberg Professional, equals 180-day average as of April 30, 2022
[3] Equals [1] / [2]
[4] Equals [3] x (1 + 0.50 x [8])
[5] Source: Value Line
[6] Source: Yahoo! Finance
[7] Source: Zacks
[8] Equals Average ([5], [6], [7])
[9] Equals [3] x (1 + 0.50 x Minimum ([5], [6], [7]) + Minimum ([5], [6], [7])
[10] Equals [4] + [8]
[11] Equals [3] x (1 + 0.50 x Maximum ([5], [6], [7]) + Maximum ([5], [6], [7])

CAPITAL ASSET PRICING MODEL -- CURRENT RISK-FREE RATE & VL BETA

$K = Rf + \beta (Rm - Rf)$
$K = Rf + 0.25 \times (Rm - Rf) + 0.75 \times \beta \times (Rm - Rf)$

Company	Ticker	[1] Current 30-day average of 30-year U.S. Treasury bond yield	[2] Beta (β)	[3] Market Return (Rm)	[4] Market Risk Premium (Rm − Rf)	[5] CAPM ROE	[6] ECAPM ROE
American States Water Company	AWR	2.72%	0.65	12.74%	10.02%	9.23%	10.11%
Atmos Energy Corporation	ATO	2.72%	0.80	12.74%	10.02%	10.73%	11.23%
California Water Service Group	CWT	2.72%	0.65	12.74%	10.02%	9.23%	10.11%
Essential Utilities, Inc.	WTRG	2.72%	0.95	12.74%	10.02%	12.24%	12.36%
Eversource Energy	ES	2.72%	0.90	12.74%	10.02%	11.73%	11.99%
Middlesex Water Company	MSEX	2.72%	0.70	12.74%	10.02%	9.73%	10.48%
NiSource Inc.	NI	2.72%	0.85	12.74%	10.02%	11.23%	11.61%
New Jersey Resources Corporation	NJR	2.72%	1.00	12.74%	10.02%	12.74%	12.74%
Northwest Natural Gas Company	NWN	2.72%	0.80	12.74%	10.02%	10.73%	11.23%
ONE Gas, Inc.	OGS	2.72%	0.80	12.74%	10.02%	10.73%	11.23%
SJW Group	SJW	2.72%	0.80	12.74%	10.02%	10.73%	11.23%
Spire, Inc.	SR	2.72%	0.85	12.74%	10.02%	11.23%	11.61%
York Water Company	YORW	2.72%	0.85	12.74%	10.02%	11.23%	11.61%
Mean						10.89%	11.35%
Median						10.73%	11.23%

Notes:
[1] Source: Bloomberg Professional 30-day average as of April 30, 2022
[2] Source: Value Line reports
[3] Source: Schedule AEB-5
[4] Equals [3] - [1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPITAL ASSET PRICING MODEL -- NEAR-TERM PROJECTED RISK-FREE RATE & VL BETA

$K = Rf + \beta (Rm - Rf)$
$K = Rf + 0.25 \times (Rm - Rf) + 0.75 \times \beta \times (Rm - Rf)$

Company	Ticker	[1] Near-term projected 30-year U.S. Treasury bond yield (Q3 2022 - Q3 2023)	[2] Beta (β)	[3] Market Return (Rm)	[4] Market Risk Premium (Rm − Rf)	[5] CAPM ROE	[6] ECAPM ROE
American States Water Company	AWR	3.34%	0.65	12.74%	9.40%	9.45%	10.27%
Atmos Energy Corporation	ATO	3.34%	0.80	12.74%	9.40%	10.86%	11.33%
California Water Service Group	CWT	3.34%	0.65	12.74%	9.40%	9.45%	10.27%
Essential Utilities, Inc.	WTRG	3.34%	0.95	12.74%	9.40%	12.27%	12.38%
Eversource Energy	ES	3.34%	0.90	12.74%	9.40%	11.80%	12.03%
Middlesex Water Company	MSEX	3.34%	0.70	12.74%	9.40%	9.92%	10.62%
NiSource Inc.	NI	3.34%	0.85	12.74%	9.40%	11.33%	11.68%
New Jersey Resources Corporation	NJR	3.34%	1.00	12.74%	9.40%	12.74%	12.74%
Northwest Natural Gas Company	NWN	3.34%	0.80	12.74%	9.40%	10.86%	11.33%
ONE Gas, Inc.	OGS	3.34%	0.80	12.74%	9.40%	10.86%	11.33%
SJW Group	SJW	3.34%	0.80	12.74%	9.40%	10.86%	11.33%
Spire, Inc.	SR	3.34%	0.85	12.74%	9.40%	11.33%	11.68%
York Water Company	YORW	3.34%	0.85	12.74%	9.40%	11.33%	11.68%
Mean						11.00%	11.44%
Median						10.86%	11.33%

Notes:
[1] Source: Blue Chip Financial Forecasts, Vol. 41, No. 5. May 1, 2022, at 2
[2] Source: Value Line reports
[3] Source: Schedule AEB-5
[4] Equals [3] - [1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPITAL ASSET PRICING MODEL -- LONG-TERM PROJECTED RISK-FREE RATE & VL BETA

$K = Rf + \beta (Rm - Rf)$
$K = Rf + 0.25 \times (Rm - Rf) + 0.75 \times \beta \times (Rm - Rf)$

Company	Ticker	[1] Projected 30-year U.S. Treasury bond yield (2023 - 2027)	[2] Beta (β)	[3] Market Return (Rm)	[4] Market Risk Premium (Rm − Rf)	[5] CAPM ROE	[6] ECAPM ROE
American States Water Company	AWR	3.40%	0.65	12.74%	9.34%	9.47%	10.29%
Atmos Energy Corporation	ATO	3.40%	0.80	12.74%	9.34%	10.87%	11.34%
California Water Service Group	CWT	3.40%	0.65	12.74%	9.34%	9.47%	10.29%
Essential Utilities, Inc.	WTRG	3.40%	0.95	12.74%	9.34%	12.27%	12.39%
Eversource Energy	ES	3.40%	0.90	12.74%	9.34%	11.80%	12.04%
Middlesex Water Company	MSEX	3.40%	0.70	12.74%	9.34%	9.94%	10.64%
NiSource Inc.	NI	3.40%	0.85	12.74%	9.34%	11.34%	11.69%
New Jersey Resources Corporation	NJR	3.40%	1.00	12.74%	9.34%	12.74%	12.74%
Northwest Natural Gas Company	NWN	3.40%	0.80	12.74%	9.34%	10.87%	11.34%
ONE Gas, Inc.	OGS	3.40%	0.80	12.74%	9.34%	10.87%	11.34%
SJW Group	SJW	3.40%	0.80	12.74%	9.34%	10.87%	11.34%
Spire, Inc.	SR	3.40%	0.85	12.74%	9.34%	11.34%	11.69%
York Water Company	YORW	3.40%	0.85	12.74%	9.34%	11.34%	11.69%
Mean						11.01%	11.44%
Median						10.87%	11.34%

Notes:
[1] Source: Blue Chip Financial Forecasts, Vol. 40, No. 12, December 1, 2021, at 14
[2] Source: Value Line reports
[3] Source: Schedule AEB-5
[4] Equals [3] - [1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPITAL ASSET PRICING MODEL -- CURRENT RISK-FREE RATE & BLOOMBERG BETA

$$K = Rf + \beta\,(Rm - Rf)$$
$$K = Rf + 0.25 \times (Rm - Rf) + 0.75 \times \beta \times (Rm - Rf)$$

Company	Ticker	[1] Current 30-day average of 30-year U.S. Treasury bond yield	[2] Beta (β)	[3] Market Return (Rm)	[4] Market Risk Premium (Rm − Rf)	[5] CAPM ROE	[6] ECAPM ROE
American States Water Company	AWR	2.72%	0.65	12.74%	10.02%	9.23%	10.11%
Atmos Energy Corporation	ATO	2.72%	0.75	12.74%	10.02%	10.19%	10.83%
California Water Service Group	CWT	2.72%	0.69	12.74%	10.02%	9.60%	10.39%
Essential Utilities, Inc.	WTRG	2.72%	0.85	12.74%	10.02%	11.26%	11.63%
Eversource Energy	ES	2.72%	0.81	12.74%	10.02%	10.83%	11.30%
Middlesex Water Company	MSEX	2.72%	0.78	12.74%	10.02%	10.58%	11.12%
NiSource Inc.	NI	2.72%	0.81	12.74%	10.02%	10.86%	11.33%
New Jersey Resources Corporation	NJR	2.72%	0.82	12.74%	10.02%	10.95%	11.39%
Northwest Natural Gas Company	NWN	2.72%	0.72	12.74%	10.02%	9.89%	10.60%
ONE Gas, Inc.	OGS	2.72%	0.81	12.74%	10.02%	10.87%	11.34%
SJW Group	SJW	2.72%	0.83	12.74%	10.02%	11.07%	11.48%
Spire, Inc.	SR	2.72%	0.76	12.74%	10.02%	10.30%	10.91%
York Water Company	YORW	2.72%	0.86	12.74%	10.02%	11.31%	11.67%
Mean						10.53%	11.08%
Median						10.83%	11.30%

Notes:
[1] Source: Bloomberg Professional 30-day average as of April 30, 2022
[2] Source: Bloomberg Professional
[3] Source: Schedule AEB-5
[4] Equals [3] - [1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPITAL ASSET PRICING MODEL -- NEAR-TERM PROJECTED RISK-FREE RATE & BLOOMBERG BETA

$$K = Rf + \beta\,(Rm - Rf)$$
$$K = Rf + 0.25 \times (Rm - Rf) + 0.75 \times \beta \times (Rm - Rf)$$

Company	Ticker	[1] Near-term projected 30-year U.S. Treasury bond yield (Q3 2022 - Q3 2023)	[2] Beta (β)	[3] Market Return (Rm)	[4] Market Risk Premium (Rm − Rf)	[5] CAPM ROE	[6] ECAPM ROE
American States Water Company	AWR	3.34%	0.65	12.74%	9.40%	9.45%	10.27%
Atmos Energy Corporation	ATO	3.34%	0.75	12.74%	9.40%	10.35%	10.94%
California Water Service Group	CWT	3.34%	0.69	12.74%	9.40%	9.80%	10.53%
Essential Utilities, Inc.	WTRG	3.34%	0.85	12.74%	9.40%	11.35%	11.70%
Eversource Energy	ES	3.34%	0.81	12.74%	9.40%	10.95%	11.39%
Middlesex Water Company	MSEX	3.34%	0.78	12.74%	9.40%	10.71%	11.22%
NiSource Inc.	NI	3.34%	0.81	12.74%	9.40%	10.98%	11.42%
New Jersey Resources Corporation	NJR	3.34%	0.82	12.74%	9.40%	11.06%	11.48%
Northwest Natural Gas Company	NWN	3.34%	0.72	12.74%	9.40%	10.07%	10.74%
ONE Gas, Inc.	OGS	3.34%	0.81	12.74%	9.40%	10.98%	11.42%
SJW Group	SJW	3.34%	0.83	12.74%	9.40%	11.17%	11.56%
Spire, Inc.	SR	3.34%	0.76	12.74%	9.40%	10.45%	11.02%
York Water Company	YORW	3.34%	0.86	12.74%	9.40%	11.40%	11.73%
Mean						10.67%	11.19%
Median						10.95%	11.39%

Notes:
[1] Source: Blue Chip Financial Forecasts, Vol. 41, No. 5. May 1, 2022, at 2
[2] Source: Bloomberg Professional
[3] Source: Schedule AEB-5
[4] Equals [3] - [1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPITAL ASSET PRICING MODEL -- LONG-TERM PROJECTED RISK-FREE RATE & BLOOMBERG BETA

$$K = Rf + \beta\,(Rm - Rf)$$
$$K = Rf + 0.25 \times (Rm - Rf) + 0.75 \times \beta \times (Rm - Rf)$$

Company	Ticker	[1] Projected 30-year U.S. Treasury bond yield (2023 - 2027)	[2] Beta (β)	[3] Market Return (Rm)	[4] Market Risk Premium (Rm − Rf)	[5] CAPM ROE	[6] ECAPM ROE
American States Water Company	AWR	3.40%	0.65	12.74%	9.34%	9.47%	10.29%
Atmos Energy Corporation	ATO	3.40%	0.75	12.74%	9.34%	10.36%	10.96%
California Water Service Group	CWT	3.40%	0.69	12.74%	9.34%	9.82%	10.55%
Essential Utilities, Inc.	WTRG	3.40%	0.85	12.74%	9.34%	11.36%	11.70%
Eversource Energy	ES	3.40%	0.81	12.74%	9.34%	10.96%	11.40%
Middlesex Water Company	MSEX	3.40%	0.78	12.74%	9.34%	10.73%	11.23%
NiSource Inc.	NI	3.40%	0.81	12.74%	9.34%	10.99%	11.43%
New Jersey Resources Corporation	NJR	3.40%	0.82	12.74%	9.34%	11.07%	11.49%
Northwest Natural Gas Company	NWN	3.40%	0.72	12.74%	9.34%	10.09%	10.75%
ONE Gas, Inc.	OGS	3.40%	0.81	12.74%	9.34%	11.00%	11.43%
SJW Group	SJW	3.40%	0.83	12.74%	9.34%	11.18%	11.57%
Spire, Inc.	SR	3.40%	0.76	12.74%	9.34%	10.47%	11.03%
York Water Company	YORW	3.40%	0.86	12.74%	9.34%	11.41%	11.74%
Mean						10.68%	11.20%
Median						10.96%	11.40%

Notes:
[1] Source: Blue Chip Financial Forecasts, Vol. 40, No. 12, December 1, 2021, at 14
[2] Source: Bloomberg Professional
[3] Source: Schedule AEB-5
[4] Equals [3] - [1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPITAL ASSET PRICING MODEL -- CURRENT RISK-FREE RATE & VALUE LINE LT AVERAGE BETA

$K = Rf + \beta (Rm - Rf)$
$K = Rf + 0.25 \times (Rm - Rf) + 0.75 \times \beta \times (Rm - Rf)$

Company	Ticker	[1] Current 30-day average of 30-year U.S. Treasury bond yield	[2] Beta (β)	[3] Market Return (Rm)	[4] Market Risk Premium (Rm − Rf)	[5] CAPM ROE	[6] ECAPM ROE
American States Water Company	AWR	2.72%	0.69	12.74%	10.02%	9.67%	10.44%
Atmos Energy Corporation	ATO	2.72%	0.73	12.74%	10.02%	10.06%	10.73%
California Water Service Group	CWT	2.72%	0.71	12.74%	10.02%	9.79%	10.52%
Essential Utilities, Inc.	WTRG	2.72%	0.75	12.74%	10.02%	10.23%	10.86%
Eversource Energy	ES	2.72%	0.72	12.74%	10.02%	9.95%	10.64%
Middlesex Water Company	MSEX	2.72%	0.74	12.74%	10.02%	10.12%	10.77%
NiSource Inc.	NI	2.72%	0.72	12.74%	10.02%	9.95%	10.64%
New Jersey Resources Corporation	NJR	2.72%	0.81	12.74%	10.02%	10.79%	11.28%
Northwest Natural Gas Company	NWN	2.72%	0.69	12.74%	10.02%	9.62%	10.40%
ONE Gas, Inc.	OGS	2.72%	0.72	12.74%	10.02%	9.90%	10.61%
SJW Group	SJW	2.72%	0.75	12.74%	10.02%	10.23%	10.86%
Spire, Inc.	SR	2.72%	0.72	12.74%	10.02%	9.90%	10.61%
York Water Company	YORW	2.72%	0.75	12.74%	10.02%	10.23%	10.86%
Mean						10.03%	10.71%
Median						9.95%	10.64%

Notes:
[1] Source: Bloomberg Professional 30-day average as of April 30, 2022
[2] Source: Schedule AEB-4 p. 4
[3] Source: Schedule AEB-5
[4] Equals [3] - [1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPITAL ASSET PRICING MODEL -- NEAR-TERM PROJECTED RISK-FREE RATE & VALUE LINE LT AVERAGE BETA

$K = Rf + \beta (Rm - Rf)$
$K = Rf + 0.25 \times (Rm - Rf) + 0.75 \times \beta \times (Rm - Rf)$

Company	Ticker	[1] Near-term projected 30-year U.S. Treasury bond yield (Q3 2022 - Q3 2023)	[2] Beta (β)	[3] Market Return (Rm)	[4] Market Risk Premium (Rm − Rf)	[5] CAPM ROE	[6] ECAPM ROE
American States Water Company	AWR	3.34%	0.69	12.74%	9.40%	9.87%	10.58%
Atmos Energy Corporation	ATO	3.34%	0.73	12.74%	9.40%	10.23%	10.86%
California Water Service Group	CWT	3.34%	0.71	12.74%	9.40%	9.97%	10.66%
Essential Utilities, Inc.	WTRG	3.34%	0.75	12.74%	9.40%	10.39%	10.98%
Eversource Energy	ES	3.34%	0.72	12.74%	9.40%	10.12%	10.77%
Middlesex Water Company	MSEX	3.34%	0.74	12.74%	9.40%	10.28%	10.90%
NiSource Inc.	NI	3.34%	0.72	12.74%	9.40%	10.12%	10.77%
New Jersey Resources Corporation	NJR	3.34%	0.81	12.74%	9.40%	10.91%	11.37%
Northwest Natural Gas Company	NWN	3.34%	0.69	12.74%	9.40%	9.81%	10.54%
ONE Gas, Inc.	OGS	3.34%	0.72	12.74%	9.40%	10.07%	10.74%
SJW Group	SJW	3.34%	0.75	12.74%	9.40%	10.39%	10.98%
Spire, Inc.	SR	3.34%	0.72	12.74%	9.40%	10.07%	10.74%
York Water Company	YORW	3.34%	0.75	12.74%	9.40%	10.39%	10.98%
Mean						10.20%	10.84%
Median						10.12%	10.77%

Notes:
[1] Source: Blue Chip Financial Forecasts, Vol. 41, No. 5. May 1, 2022, at 2
[2] Source: Schedule AEB-4 p. 4
[3] Source: Schedule AEB-5
[4] Equals [3] - [1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPITAL ASSET PRICING MODEL -- LONG-TERM PROJECTED RISK-FREE RATE & VALUE LINE LT AVERAGE BETA

$K = Rf + \beta (Rm - Rf)$
$K = Rf + 0.25 \times (Rm - Rf) + 0.75 \times \beta \times (Rm - Rf)$

Company	Ticker	[1] Projected 30-year U.S. Treasury bond yield (2023 - 2027)	[2] Beta (β)	[3] Market Return (Rm)	[4] Market Risk Premium (Rm − Rf)	[5] CAPM ROE	[6] ECAPM ROE
American States Water Company	AWR	3.40%	0.69	12.74%	9.34%	9.88%	10.60%
Atmos Energy Corporation	ATO	3.40%	0.73	12.74%	9.34%	10.25%	10.87%
California Water Service Group	CWT	3.40%	0.71	12.74%	9.34%	9.99%	10.68%
Essential Utilities, Inc.	WTRG	3.40%	0.75	12.74%	9.34%	10.40%	10.99%
Eversource Energy	ES	3.40%	0.72	12.74%	9.34%	10.14%	10.79%
Middlesex Water Company	MSEX	3.40%	0.74	12.74%	9.34%	10.30%	10.91%
NiSource Inc.	NI	3.40%	0.72	12.74%	9.34%	10.14%	10.79%
New Jersey Resources Corporation	NJR	3.40%	0.81	12.74%	9.34%	10.92%	11.38%
Northwest Natural Gas Company	NWN	3.40%	0.69	12.74%	9.34%	9.83%	10.56%
ONE Gas, Inc.	OGS	3.40%	0.72	12.74%	9.34%	10.09%	10.75%
SJW Group	SJW	3.40%	0.75	12.74%	9.34%	10.40%	10.99%
Spire, Inc.	SR	3.40%	0.72	12.74%	9.34%	10.09%	10.75%
York Water Company	YORW	3.40%	0.75	12.74%	9.34%	10.40%	10.99%
Mean						10.22%	10.85%
Median						10.14%	10.79%

Notes:
[1] Source: Blue Chip Financial Forecasts, Vol. 40, No. 12, December 1, 2021, at 14
[2] Source: Schedule AEB-4 p. 4
[3] Source: Schedule AEB-5
[4] Equals [3] - [1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

HISTORICAL BETA - 2013 - 2021

		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
Company	Ticker	12/31/2013	12/31/2014	12/31/2015	12/31/2016	12/31/2017	12/31/2018	12/31/2019	12/31/2020	12/31/2021	Average
American States Water Company	AWR	0.65	0.70	0.70	0.75	0.80	0.70	0.65	0.65	0.65	0.69
Atmos Energy Corporation	ATO	0.80	0.80	0.80	0.70	0.70	0.60	0.60	0.80	0.80	0.73
California Water Service Group	CWT	0.60	0.70	0.75	0.75	0.80	0.70	0.70	0.65	0.70	0.71
Essential Utilities, Inc.	WTRG	0.60	0.70	0.75	0.70	0.75	0.70	0.65	0.95	0.95	0.75
Eversource Energy	ES			0.75	0.70	0.65	0.60	0.55	0.90	0.90	0.72
Middlesex Water Company	MSEX	0.75	0.70	0.70	0.75	0.80	0.75	0.75	0.75	0.70	0.74
NiSource Inc.	NI	0.85	0.85	NMF	NMF	0.60	0.50	0.55	0.85	0.85	0.72
New Jersey Resources Corporation	NJR	0.70	0.80	0.80	0.80	0.80	0.70	0.70	0.95	1.00	0.81
Northwest Natural Gas Company	NWN	0.65	0.70	0.65	0.65	0.70	0.60	0.60	0.80	0.85	0.69
ONE Gas, Inc.	OGS				0.70	0.70	0.65	0.65	0.80	0.80	0.72
SJW Group	SJW	0.85	0.85	0.75	0.75	0.70	0.60	0.60	0.85	0.80	0.75
Spire, Inc.	SR	0.65	0.70	0.70	0.70	0.70	0.65	0.65	0.85	0.85	0.72
York Water Company	YORW	0.70	0.65	0.75	0.75	0.80	0.75	0.70	0.80	0.85	0.75
Mean		0.71	0.74	0.74	0.73	0.73	0.65	0.64	0.82	0.82	0.73

Notes:
[1] Value Line, dated December 26, 2013.
[2] Value Line, dated December 31, 2014.
[3] Value Line, dated December 30, 2015.
[4] Value Line, dated December 29, 2016.
[5] Value Line, dated December 28, 2017.
[6] Value Line, dated December 27, 2018.
[7] Value Line, dated December 26, 2019.
[8] Value Line, dated December 30, 2020.
[9] Value Line, dated December 29, 2021.
[10] Average ([1] - [9])

MARKET RISK PREMIUM DERIVED FROM ANALYSTS' LONG-TERM GROWTH ESTIMATES

[1] Estimated Weighted Average Dividend Yield	1.73%
[2] Estimated Weighted Average Long-Term Growth Rate	10.92%
[3] S&P 500 Estimated Required Market Return	12.74%

STANDARD AND POOR'S 500 INDEX

		[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]
Name	Ticker	Shares Outst'g	Price	Market Capitalization	Weight in Index	Estimated Dividend Yield	Cap-Weighted Dividend Yield	Value Line Long-Term Growth Est.	Cap-Weighted Long-Term Growth Est.
Agilent Technologies Inc	A	300.11	119.27	35,794.48	0.13%	0.70%	0.00%	11.50%	0.01%
American Airlines Group Inc	AAL	649.52	18.77	12,191.40					
Advance Auto Parts Inc	AAP	61.09	199.63	12,195.60	0.04%	3.01%	0.00%	16.00%	0.01%
Apple Inc	AAPL	16,185.18	157.65	2,551,593.78	9.27%	0.58%	0.05%	14.00%	1.30%
AbbVie Inc	ABBV	1,766.29	146.88	259,431.94	0.94%	3.84%	0.04%	4.50%	0.04%
AmerisourceBergen Corp	ABC	209.14	151.29	31,640.34	0.11%	1.22%	0.00%	6.50%	0.01%
ABIOMED Inc	ABMD	45.55	286.58	13,052.29	0.05%			7.50%	0.00%
Abbott Laboratories	ABT	1,763.48	113.50	200,155.21	0.73%	1.66%	0.01%	10.00%	0.07%
Accenture PLC	ACN	662.43	300.36	198,968.68	0.72%	1.29%	0.01%	12.00%	0.09%
Adobe Inc	ADBE	472.50	395.95	187,086.38	0.68%			15.50%	0.11%
Analog Devices Inc	ADI	523.32	154.38	80,789.37	0.29%	1.97%	0.01%	11.00%	0.03%
Archer-Daniels-Midland Co	ADM	562.71	89.56	50,396.13	0.18%	1.79%	0.00%	13.00%	0.02%
Automatic Data Processing Inc	ADP	417.75	218.18	91,144.04	0.33%	1.91%	0.01%	9.00%	0.03%
Autodesk Inc	ADSK	217.31	189.28	41,132.06	0.15%			18.00%	0.03%
Ameren Corp	AEE	258.09	92.90	23,976.75	0.09%	2.54%	0.00%	6.50%	0.01%
American Electric Power Co Inc	AEP	513.54	99.11	50,897.35	0.18%	3.15%	0.01%	6.50%	0.01%
AES Corp/The	AES	667.40	20.42	13,628.21	0.05%	3.10%	0.00%	14.00%	0.01%
Aflac Inc	AFL	644.17	57.28	36,897.77	0.13%	2.79%	0.00%	9.00%	0.01%
American International Group Inc	AIG	806.25	58.51	47,173.57		2.19%		31.50%	
Assurant Inc	AIZ	57.71	181.88	10,495.93	0.04%	1.50%	0.00%	15.50%	0.01%
Arthur J Gallagher & Co	AJG	209.61	168.49	35,317.86	0.13%	1.21%	0.00%	14.50%	0.02%
Akamai Technologies Inc	AKAM	160.90	112.28	18,065.74	0.07%			9.50%	0.01%
Albemarle Corp	ALB	117.11	192.83	22,582.71	0.08%	0.82%	0.00%	15.00%	0.01%
Align Technology Inc	ALGN	78.81	289.91	22,846.36	0.08%			17.00%	0.01%
Alaska Air Group Inc	ALK	126.09	54.39	6,857.93					
Allstate Corp/The	ALL	275.97	126.54	34,921.50		2.69%			
Allegion plc	ALLE	87.81	114.24	10,030.84	0.04%	1.44%	0.00%	10.50%	0.00%
Applied Materials Inc	AMAT	883.40	110.35	97,482.64	0.35%	0.94%	0.00%	14.50%	0.05%
Amcor PLC	AMCR	1,513.73	11.86	17,952.80	0.07%	4.05%	0.00%	15.00%	0.01%
Advanced Micro Devices Inc	AMD	1,620.16	85.52	138,555.91	0.50%			17.50%	0.09%
AMETEK Inc	AME	231.17	126.26	29,187.65	0.11%	0.70%	0.00%	10.00%	0.01%
Amgen Inc	AMGN	534.20	233.19	124,570.10	0.45%	3.33%	0.02%	5.50%	0.02%
Ameriprise Financial Inc	AMP	110.58	265.49	29,357.09	0.11%	1.88%	0.00%	15.00%	0.02%
American Tower Corp	AMT	456.28	241.02	109,973.33	0.40%	2.32%	0.01%	9.00%	0.04%
Amazon.com Inc	AMZN	508.72	2,485.63	1,264,489.69				26.50%	
Arista Networks Inc	ANET	308.20	115.57	35,619.14	0.13%			4.50%	0.01%
ANSYS Inc	ANSS	87.03	275.69	23,992.20	0.09%			8.50%	0.01%
Anthem Inc	ANTM	241.09	501.93	121,007.79	0.44%	1.02%	0.00%	12.50%	0.05%
Aon PLC	AON	212.38	287.99	61,164.47	0.22%	0.78%	0.00%	7.00%	0.02%
A O Smith Corp	AOS	131.05	58.43	7,657.19	0.03%	1.92%	0.00%	11.00%	0.00%
APA Corp	APA	346.93	40.93	14,199.72		1.22%			
Air Products and Chemicals Inc	APD	221.72	234.07	51,897.30	0.19%	2.77%	0.01%	12.00%	0.02%
Amphenol Corp	APH	597.14	71.50	42,695.44	0.16%	1.12%	0.00%	12.00%	0.02%
Aptiv PLC	APTV	270.92	106.40	28,825.36				21.50%	
Alexandria Real Estate Equities Inc	ARE	163.22	182.16	29,731.79	0.11%	2.53%	0.00%	9.00%	0.01%
Atmos Energy Corp	ATO	135.43	113.40	15,357.99	0.06%	2.40%	0.00%	7.50%	0.00%
Activision Blizzard Inc	ATVI	780.92	75.60	59,037.78	0.21%	0.62%	0.00%	14.00%	0.03%
AvalonBay Communities Inc	AVB	139.82	227.48	31,805.80	0.12%	2.80%	0.00%	6.50%	0.01%
Broadcom Inc	AVGO	408.28	554.39	226,346.90		2.96%		23.00%	
Avery Dennison Corp	AVY	82.36	180.60	14,873.31	0.05%	1.66%	0.00%	9.00%	0.00%
American Water Works Co Inc	AWK	181.75	154.08	28,004.50	0.10%	1.70%	0.00%	8.50%	0.01%
American Express Co	AXP	753.06	174.71	131,567.11	0.48%	1.19%	0.01%	12.00%	0.06%
AutoZone Inc	AZO	19.85	1,955.47	38,814.12	0.14%			14.00%	0.02%
Boeing Co/The	BA	591.64	148.84	88,059.10					
Bank of America Corp	BAC	8,064.86	35.68	287,754.03	1.05%	2.35%	0.02%	7.50%	0.08%
Baxter International Inc	BAX	503.53	71.06	35,780.77	0.13%	1.58%	0.00%	9.50%	0.01%
Bath & Body Works Inc	BBWI	238.49	52.89	12,613.74		1.51%		26.50%	
Best Buy Co Inc	BBY	224.97	89.93	20,231.37	0.07%	3.91%	0.00%	9.50%	0.01%
Becton Dickinson and Co	BDX	284.77	247.19	70,392.54	0.26%	1.41%	0.00%	6.00%	0.02%
Franklin Resources Inc	BEN	502.12	24.59	12,347.23	0.04%	4.72%	0.00%	9.00%	0.00%
Brown-Forman Corp	BF/B	309.80	67.44	20,892.57	0.08%	1.12%	0.00%	12.00%	0.01%
Biogen Inc	BIIB	147.15	207.44	30,525.00				-10.50%	
Bio-Rad Laboratories Inc	BIO	24.88	512.06	12,738.52	0.05%			9.50%	0.00%
Bank of New York Mellon Corp/The	BK	807.80	42.06	33,975.98	0.12%	3.23%	0.00%	5.00%	0.01%
Booking Holdings Inc	BKNG	40.76	2,210.31	90,081.18	0.33%			14.00%	0.05%
Baker Hughes Co	BKR	984.58	31.02	30,541.55		2.32%			
BlackRock Inc	BLK	151.73	624.68	94,780.20	0.34%	3.12%	0.01%	10.00%	0.03%
Ball Corp	BLL	321.21	81.16	26,069.57		0.99%		21.00%	
Bristol-Myers Squibb Co	BMY	2,129.06	75.27	160,254.65		2.87%			
Broadridge Financial Solutions Inc	BR	116.77	144.13	16,830.49	0.06%	1.78%	0.00%	9.00%	0.01%
Berkshire Hathaway Inc	BRK/B	1,287.63	322.83	415,686.88	1.51%			6.00%	0.09%
Brown & Brown Inc	BRO	282.22	61.98	17,491.75	0.06%	0.66%	0.00%	10.50%	0.01%
Boston Scientific Corp	BSX	1,429.45	42.11	60,194.01	0.22%			16.00%	0.03%
BorgWarner Inc	BWA	239.97	36.83	8,838.21	0.03%	1.85%	0.00%	9.50%	0.00%
Boston Properties Inc	BXP	156.71	117.60	18,428.74		3.33%		-1.50%	
Citigroup Inc	C	1,972.47	48.21	95,092.97	0.35%	4.23%	0.01%	7.00%	0.02%
Conagra Brands Inc	CAG	479.88	34.93	16,762.03	0.06%	3.58%	0.00%	4.00%	0.00%
Cardinal Health Inc	CAH	277.06	58.05	16,083.39	0.06%	3.38%	0.00%	5.00%	0.00%
Carrier Global Corp	CARR	848.24	38.27	32,462.22		1.57%			
Caterpillar Inc	CAT	533.37	210.54	112,296.56	0.41%	2.11%	0.01%	8.00%	0.03%

STANDARD AND POOR'S 500 INDEX

Name	Ticker	[4] Shares Outst'g	[5] Price	[6] Market Capitalization	[7] Weight in Index	[8] Estimated Dividend Yield	[9] Cap-Weighted Dividend Yield	[10] Value Line Long-Term Growth Est.	[11] Cap-Weighted Long-Term Growth Est.
Chubb Ltd	CB	423.71	206.45	87,475.14	0.32%	1.55%	0.00%	12.50%	0.04%
Cboe Global Markets Inc	CBOE	106.19	112.98	11,997.23	0.04%	1.70%	0.00%	10.00%	0.00%
CBRE Group Inc	CBRE	330.67	83.04	27,458.67	0.10%			10.00%	0.01%
Crown Castle International Corp	CCI	433.03	185.21	80,201.86	0.29%	3.17%	0.01%	12.00%	0.03%
Carnival Corp	CCL	989.70	17.30	17,121.83					
Ceridian HCM Holding Inc	CDAY	150.11	56.13	8,425.62					
Cadence Design Systems Inc	CDNS	275.76	150.85	41,598.25	0.15%			12.00%	0.02%
CDW Corp/DE	CDW	134.95	163.18	22,021.30	0.08%	1.23%	0.00%	11.00%	0.01%
Celanese Corp	CE	108.31	146.94	15,914.92	0.06%	1.85%	0.00%	9.50%	0.01%
Constellation Energy Corp	CEG	326.66	59.21	19,341.78		0.95%			
Cerner Corp	CERN	293.97	93.64	27,527.16	0.10%	1.15%	0.00%	9.50%	0.01%
CF Industries Holdings Inc	CF	209.11	96.83	20,248.51	0.07%	1.65%	0.00%	19.50%	0.01%
Citizens Financial Group Inc	CFG	496.11	39.40	19,546.62	0.07%	3.96%	0.00%	8.50%	0.01%
Church & Dwight Co Inc	CHD	242.77	97.56	23,684.74	0.09%	1.08%	0.00%	8.00%	0.01%
CH Robinson Worldwide Inc	CHRW	127.27	106.15	13,509.29	0.05%	2.07%	0.00%	9.00%	0.00%
Charter Communications Inc	CHTR	167.86	428.49	71,925.47				21.50%	
Cigna Corp	CI	320.95	246.78	79,204.78	0.29%	1.82%	0.01%	10.00%	0.03%
Cincinnati Financial Corp	CINF	160.36	122.66	19,669.14	0.07%	2.25%	0.00%	15.00%	0.01%
Colgate-Palmolive Co	CL	837.94	77.05	64,563.43	0.23%	2.44%	0.01%	5.00%	0.01%
Clorox Co/The	CLX	123.06	143.47	17,655.13	0.06%	3.23%	0.00%	5.00%	0.00%
Comerica Inc	CMA	130.76	81.90	10,709.24	0.04%	3.32%	0.00%	6.00%	0.00%
Comcast Corp	CMCSA	4,470.57	39.76	177,749.86	0.65%	2.72%	0.02%	10.50%	0.07%
CME Group Inc	CME	359.42	219.34	78,834.96	0.29%	1.82%	0.01%	7.50%	0.02%
Chipotle Mexican Grill Inc	CMG	27.96	1,455.61	40,701.77	0.15%			20.00%	0.03%
Cummins Inc	CMI	142.08	189.19	26,879.17	0.10%	3.07%	0.00%	8.00%	0.01%
CMS Energy Corp	CMS	290.14	68.69	19,929.51	0.07%	2.68%	0.00%	6.50%	0.00%
Centene Corp	CNC	584.89	80.55	47,112.65	0.17%			10.00%	0.02%
CenterPoint Energy Inc	CNP	629.43	30.61	19,266.91	0.07%	2.22%	0.00%	5.00%	0.00%
Capital One Financial Corp	COF	399.00	124.62	49,723.38		1.93%			
Cooper Cos Inc/The	COO	49.30	361.04	17,799.99	0.06%	0.02%	0.00%	19.00%	0.01%
ConocoPhillips	COP	1,296.05	95.52	123,798.79	0.45%	1.93%	0.01%	20.00%	0.09%
Costco Wholesale Corp	COST	443.22	531.72	235,671.07	0.86%	0.68%	0.01%	10.50%	0.09%
Campbell Soup Co	CPB	301.70	47.22	14,246.46	0.05%	3.13%	0.00%	5.00%	0.00%
Copart Inc	CPRT	237.50	113.65	26,991.53	0.10%			12.00%	0.01%
Camden Property Trust	CPT	106.52	156.89	16,712.08	0.06%	2.40%	0.00%	2.50%	0.00%
Charles River Laboratories International Inc	CRL	50.80	241.51	12,268.47	0.04%			6.50%	0.00%
Salesforce Inc	CRM	993.92	175.94	174,869.76	0.64%			16.50%	0.10%
Cisco Systems Inc	CSCO	4,154.17	48.98	203,471.15	0.74%	3.10%	0.02%	8.00%	0.06%
CSX Corp	CSX	2,174.26	34.34	74,664.09	0.27%	1.16%	0.00%	10.00%	0.03%
Cintas Corp	CTAS	102.33	397.26	40,649.63	0.15%	0.96%	0.00%	13.50%	0.02%
Catalent Inc	CTLT	179.13	90.56	16,221.83				21.00%	
Coterra Energy Inc	CTRA	810.98	28.79	23,348.09		7.78%			
Cognizant Technology Solutions Corp	CTSH	521.17	80.90	42,162.73	0.15%	1.33%	0.00%	7.00%	0.01%
Corteva Inc	CTVA	726.77	57.69	41,927.59		0.97%			
Citrix Systems Inc	CTXS	125.91	100.10	12,603.89	0.05%			8.00%	0.00%
CVS Health Corp	CVS	1,313.19	96.13	126,237.34	0.46%	2.29%	0.01%	6.00%	0.03%
Chevron Corp	CVX	1,964.86	156.67	307,834.93		3.63%		25.00%	
Caesars Entertainment Inc	CZR	214.40	66.28	14,210.10					
Dominion Energy Inc	D	810.67	81.64	66,183.43	0.24%	3.27%	0.01%	11.50%	0.03%
Delta Air Lines Inc	DAL	641.08	43.03	27,585.50				49.00%	
DuPont de Nemours Inc	DD	508.53	65.93	33,527.32		2.00%			
Deere & Co	DE	306.78	377.55	115,826.30		1.11%		21.50%	
Discover Financial Services	DFS	280.97	112.46	31,597.32	0.11%	2.13%	0.00%	16.00%	0.02%
Dollar General Corp	DG	228.79	237.53	54,343.30	0.20%	0.93%	0.00%	10.00%	0.02%
Quest Diagnostics Inc	DGX	117.37	133.84	15,708.13	0.06%	1.97%	0.00%	7.50%	0.00%
DR Horton Inc	DHI	352.03	69.59	24,497.77	0.09%	1.29%	0.00%	11.00%	0.01%
Danaher Corp	DHR	727.08	251.13	182,590.85	0.66%	0.40%	0.00%	17.00%	0.11%
Walt Disney Co/The	DIS	1,820.63	111.63	203,237.26				30.50%	
DISH Network Corp	DISH	290.57	28.51	8,284.21	0.03%			2.00%	0.00%
Digital Realty Trust Inc	DLR	284.67	146.12	41,595.69		3.34%		-3.50%	
Dollar Tree Inc	DLTR	225.11	162.45	36,569.12	0.13%			12.00%	0.02%
Dover Corp	DOV	144.16	133.30	19,216.93	0.07%	1.50%	0.00%	9.00%	0.01%
Dow Inc	DOW	728.10	66.50	48,418.78		4.21%			
Domino's Pizza Inc	DPZ	36.05	338.00	12,183.21	0.04%	1.30%	0.00%	16.50%	0.01%
Duke Realty Corp	DRE	384.46	54.75	21,048.91	0.08%	2.05%	0.00%	2.50%	0.00%
Darden Restaurants Inc	DRI	124.73	131.73	16,431.21	0.06%	3.34%	0.00%	15.50%	0.01%
DTE Energy Co	DTE	193.74	131.04	25,387.95	0.09%	2.70%	0.00%	4.50%	0.00%
Duke Energy Corp	DUK	769.90	110.16	84,812.07	0.31%	3.58%	0.01%	7.00%	0.02%
DaVita Inc	DVA	95.08	108.37	10,304.14	0.04%			16.00%	0.01%
Devon Energy Corp	DVN	660.43	58.17	38,417.10		6.88%		29.50%	
DXC Technology Co	DXC	244.48	28.70	7,016.52	0.03%			6.00%	0.00%
Dexcom Inc	DXCM	98.13	408.58	40,092.32				34.00%	
Electronic Arts Inc	EA	281.22	118.05	33,198.26	0.12%	0.58%	0.00%	9.00%	0.01%
eBay Inc	EBAY	567.29	51.92	29,453.49	0.11%	1.69%	0.00%	16.50%	0.02%
Ecolab Inc	ECL	286.30	169.34	48,481.36	0.18%	1.20%	0.00%	8.00%	0.01%
Consolidated Edison Inc	ED	354.19	92.74	32,847.86	0.12%	3.41%	0.00%	3.50%	0.00%
Equifax Inc	EFX	122.34	203.52	24,897.62	0.09%	0.77%	0.00%	10.50%	0.01%
Edison International	EIX	380.80	68.79	26,194.96		4.07%			
Estee Lauder Cos Inc/The	EL	232.42	264.06	61,373.88	0.22%	0.91%	0.00%	14.00%	0.03%
Eastman Chemical Co	EMN	128.95	102.67	13,239.30	0.05%	2.96%	0.00%	9.50%	0.00%
Emerson Electric Co	EMR	594.00	90.18	53,566.92	0.19%	2.28%	0.00%	11.50%	0.02%
Enphase Energy Inc	ENPH	135.03	161.40	21,793.52				30.00%	
EOG Resources Inc	EOG	585.39	116.76	68,350.02	0.25%	2.57%	0.01%	16.00%	0.04%
EPAM Systems Inc	EPAM	56.98	264.99	15,100.19				23.50%	
Equinix Inc	EQIX	91.02	719.08	65,452.10	0.24%	1.72%	0.00%	15.00%	0.04%
Equity Residential	EQR	376.04	81.50	30,647.42		3.07%		-2.00%	
Eversource Energy	ES	344.75	87.40	30,130.80	0.11%	2.92%	0.00%	5.50%	0.01%
Essex Property Trust Inc	ESS	65.33	329.27	21,512.20		2.67%		-2.50%	
Eaton Corp PLC	ETN	399.57	145.02	57,945.64	0.21%	2.23%	0.00%	11.50%	0.02%
Entergy Corp	ETR	203.16	118.85	24,145.21	0.09%	3.40%	0.00%	3.00%	0.00%
Etsy Inc	ETSY	127.18	93.19	11,852.00				29.00%	

STANDARD AND POOR'S 500 INDEX

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Evergy Inc	EVRG	226.99	67.85	15,401.48	0.06%	3.38%	0.00%	7.50%	0.00%
Edwards Lifesciences Corp	EW	621.75	105.78	65,768.93	0.24%			12.50%	0.03%
Exelon Corp	EXC	980.14	46.78	45,850.81		2.89%			
Expeditors International of Washington Inc	EXPD	167.40	99.07	16,584.12	0.06%	1.17%	0.00%	11.50%	0.01%
Expedia Group Inc	EXPE	157.09	174.75	27,452.18					
Extra Space Storage Inc	EXR	134.25	190.00	25,507.69	0.09%	3.16%	0.00%	6.00%	0.01%
Ford Motor Co	F	3,948.91	14.16	55,916.61		2.82%		29.00%	
Diamondback Energy Inc	FANG	177.55	126.23	22,412.26		1.90%			
Fastenal Co	FAST	575.55	55.31	31,833.89	0.12%	2.24%	0.00%	8.50%	0.01%
Meta Platforms Inc	FB	2,293.52	200.47	459,781.75				21.50%	
Fortune Brands Home & Security Inc	FBHS	132.35	71.25	9,429.72	0.03%	1.57%	0.00%	11.00%	0.00%
Freeport-McMoRan Inc	FCX	1,450.26	40.55	58,808.04		1.48%		27.00%	
FactSet Research Systems Inc	FDS	37.90	403.49	15,291.06	0.06%	0.88%	0.00%	9.50%	0.01%
FedEx Corp	FDX	259.18	198.74	51,509.04	0.19%	1.51%	0.00%	13.00%	0.02%
FirstEnergy Corp	FE	570.93	43.31	24,727.06	0.09%	3.60%	0.00%	10.00%	0.01%
F5 Inc	FFIV	60.47	167.41	10,122.45	0.04%			7.00%	0.00%
Fidelity National Information Services Inc	FIS	610.73	99.15	60,553.98		1.90%		28.00%	
Fiserv Inc	FISV	646.39	97.92	63,294.90	0.23%			13.00%	0.03%
Fifth Third Bancorp	FITB	685.91	37.53	25,742.01	0.09%	3.20%	0.00%	11.50%	0.01%
FleetCor Technologies Inc	FLT	77.34	249.52	19,298.13	0.07%			11.00%	0.01%
FMC Corp	FMC	125.89	132.54	16,685.86	0.06%	1.60%	0.00%	10.50%	0.01%
Fox Corp	FOX	247.10	33.24	8,213.47		1.44%			
Fox Corp	FOXA	315.81	35.84	11,318.49	0.04%	1.34%	0.00%	10.50%	0.00%
First Republic Bank/CA	FRC	179.06	149.22	26,719.33	0.10%	0.72%	0.00%	13.50%	0.01%
Federal Realty Investment Trust	FRT	78.69	117.06	9,211.22	0.03%	3.66%	0.00%	2.50%	0.00%
Fortinet Inc	FTNT	160.27	289.01	46,319.34				21.50%	
Fortive Corp	FTV	358.45	57.50	20,610.76	0.07%	0.49%	0.00%	12.00%	0.01%
General Dynamics Corp	GD	277.71	236.53	65,685.56	0.24%	2.13%	0.01%	6.00%	0.01%
General Electric Co	GE	1,100.67	74.55	82,054.58	0.30%	0.43%	0.00%	15.00%	0.04%
Gilead Sciences Inc	GILD	1,253.89	59.34	74,405.65	0.27%	4.92%	0.01%	13.50%	0.04%
General Mills Inc	GIS	602.21	70.73	42,594.45	0.15%	2.88%	0.00%	4.00%	0.01%
Globe Life Inc	GL	99.18	98.08	9,727.38	0.04%	0.85%	0.00%	8.00%	0.00%
Corning Inc	GLW	844.61	35.19	29,721.90	0.11%	3.07%	0.00%	20.00%	0.02%
General Motors Co	GM	1,458.02	37.91	55,273.65	0.20%			12.00%	0.02%
Generac Holdings Inc	GNRC	63.78	219.38	13,992.93				23.50%	
Alphabet Inc	GOOG	313.38	2,299.33	720,554.84				23.50%	
Alphabet Inc	GOOGL	300.76	2,282.19	686,400.59					
Genuine Parts Co	GPC	141.60	130.05	18,414.43	0.07%	2.75%	0.00%	8.50%	0.01%
Global Payments Inc	GPN	281.97	136.98	38,623.98	0.14%	0.73%	0.00%	16.50%	0.02%
Garmin Ltd	GRMN	193.13	109.74	21,193.54	0.08%	2.66%	0.00%	10.00%	0.01%
Goldman Sachs Group Inc/The	GS	341.86	305.49	104,434.51	0.38%	2.62%	0.01%	5.00%	0.02%
WW Grainger Inc	GWW	51.10	500.03	25,552.53	0.09%	1.38%	0.00%	7.00%	0.01%
Halliburton Co	HAL	901.98	35.62	32,128.39		1.35%		26.00%	
Hasbro Inc	HAS	139.44	88.06	12,279.26	0.04%	3.18%	0.00%	11.50%	0.01%
Huntington Bancshares Inc/OH	HBAN	1,439.18	13.15	18,925.15	0.07%	4.71%	0.00%	12.00%	0.01%
HCA Healthcare Inc	HCA	302.02	214.55	64,797.96	0.24%	1.04%	0.00%	12.50%	0.03%
Home Depot Inc/The	HD	1,035.07	300.40	310,934.73	1.13%	2.53%	0.03%	10.00%	0.11%
Hess Corp	HES	311.26	103.07	32,081.88		1.46%			
Hartford Financial Services Group Inc/The	HIG	328.87	69.93	22,997.53	0.08%	2.20%	0.00%	6.50%	0.01%
Huntington Ingalls Industries Inc	HII	40.07	212.74	8,523.85	0.03%	2.22%	0.00%	10.00%	0.00%
Hilton Worldwide Holdings Inc	HLT	279.22	155.29	43,360.38					
Hologic Inc	HOLX	249.38	71.99	17,952.94				25.00%	
Honeywell International Inc	HON	680.73	193.51	131,728.64	0.48%	2.03%	0.01%	11.00%	0.05%
Hewlett Packard Enterprise Co	HPE	1,300.14	15.41	20,035.10	0.07%	3.11%	0.00%	6.50%	0.00%
HP Inc	HPQ	1,053.37	36.63	38,584.80	0.14%	2.73%	0.00%	15.50%	0.02%
Hormel Foods Corp	HRL	545.00	52.39	28,552.45	0.10%	1.99%	0.00%	6.50%	0.01%
Henry Schein Inc	HSIC	137.17	81.10	11,124.73	0.04%			7.00%	0.00%
Host Hotels & Resorts Inc	HST	714.15	20.35	14,532.95	0.05%	0.59%	0.00%	8.50%	0.00%
Hershey Co/The	HSY	145.99	225.77	32,960.39	0.12%	1.60%	0.00%	6.50%	0.01%
Humana Inc	HUM	126.49	444.56	56,233.73	0.20%	0.71%	0.00%	12.00%	0.02%
Howmet Aerospace Inc	HWM	417.62	34.12	14,249.30	0.05%	0.23%	0.00%	12.50%	0.01%
International Business Machines Corp	IBM	899.44	132.21	118,914.30	0.43%	4.99%	0.02%	0.50%	0.00%
Intercontinental Exchange Inc	ICE	560.44	115.81	64,904.09	0.24%	1.31%	0.00%	6.50%	0.02%
IDEXX Laboratories Inc	IDXX	84.22	430.48	36,254.16	0.13%			14.00%	0.02%
IDEX Corp	IEX	76.01	189.82	14,427.46	0.05%	1.14%	0.00%	10.00%	0.01%
International Flavors & Fragrances Inc	IFF	254.75	121.30	30,900.57	0.11%	2.61%	0.00%	7.00%	0.01%
Illumina Inc	ILMN	157.09	296.65	46,600.16	0.17%			10.00%	0.02%
Incyte Corp	INCY	221.50	74.96	16,603.34				25.50%	
Intel Corp	INTC	4,089.00	43.59	178,239.51	0.65%	3.35%	0.02%	6.00%	0.04%
Intuit Inc	INTU	282.81	418.75	118,427.53	0.43%	0.65%	0.00%	18.50%	0.08%
International Paper Co	IP	370.63	46.28	17,152.71	0.06%	4.00%	0.00%	12.50%	0.01%
Interpublic Group of Cos Inc/The	IPG	393.66	32.62	12,841.32	0.05%	3.56%	0.00%	12.00%	0.01%
IPG Photonics Corp	IPGP	52.54	94.48	4,964.17	0.02%			17.00%	0.00%
IQVIA Holdings Inc	IQV	189.28	217.99	41,260.93	0.15%			14.50%	0.02%
Ingersoll Rand Inc	IR	407.97	43.96	17,934.27		0.18%			
Iron Mountain Inc	IRM	290.56	53.73	15,611.90	0.06%	4.60%	0.00%	10.00%	0.01%
Intuitive Surgical Inc	ISRG	358.96	239.30	85,898.41	0.31%			13.00%	0.04%
Gartner Inc	IT	81.17	290.55	23,582.49				20.50%	
Illinois Tool Works Inc	ITW	311.90	197.11	61,478.61	0.22%	2.48%	0.01%	11.00%	0.02%
Invesco Ltd	IVZ	455.03	18.38	8,363.36	0.03%	4.08%	0.00%	15.50%	0.00%
Jacobs Engineering Group Inc	J	129.22	138.55	17,903.02	0.07%	0.66%	0.00%	15.00%	0.01%
JB Hunt Transport Services Inc	JBHT	104.85	170.85	17,913.62	0.07%	0.94%	0.00%	11.00%	0.01%
Johnson Controls International plc	JCI	702.63	59.87	42,066.28	0.15%	2.34%	0.00%	14.00%	0.02%
Jack Henry & Associates Inc	JKHY	72.83	189.58	13,806.16	0.05%	1.03%	0.00%	10.50%	0.01%
Johnson & Johnson	JNJ	2,631.40	180.46	474,862.80	1.72%	2.50%	0.04%	8.00%	0.14%
Juniper Networks Inc	JNPR	322.57	31.52	10,167.37	0.04%	2.66%	0.00%	9.00%	0.00%
JPMorgan Chase & Co	JPM	2,939.77	119.36	350,890.95	1.27%	3.35%	0.04%	7.50%	0.10%
Kellogg Co	K	340.16	68.50	23,300.69	0.08%	3.39%	0.00%	3.50%	0.00%
KeyCorp	KEY	928.85	19.31	17,936.09	0.07%	4.04%	0.00%	9.50%	0.01%
Keysight Technologies Inc	KEYS	181.98	140.27	25,525.63	0.09%			13.00%	0.01%
Kraft Heinz Co/The	KHC	1,223.95	42.63	52,177.07	0.19%	3.75%	0.01%	5.50%	0.01%

STANDARD AND POOR'S 500 INDEX

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Kimco Realty Corp	KIM	618.01	25.33	15,654.12	0.06%	3.16%	0.00%	8.50%	0.00%
KLA Corp	KLAC	149.24	319.26	47,644.77		1.32%		21.00%	
Kimberly-Clark Corp	KMB	336.93	138.83	46,775.30	0.17%	3.34%	0.01%	5.50%	0.01%
Kinder Morgan Inc	KMI	2,267.47	18.15	41,154.63	0.15%	6.12%	0.01%	19.00%	0.03%
CarMax Inc	KMX	160.54	85.78	13,770.95	0.05%			13.00%	0.01%
Coca-Cola Co/The	KO	4,335.03	64.61	280,086.22	1.02%	2.72%	0.03%	7.00%	0.07%
Kroger Co/The	KR	723.31	53.96	39,029.70	0.14%	1.56%	0.00%	6.50%	0.01%
Loews Corp	L	246.39	62.84	15,483.40	0.06%	0.40%	0.00%	12.50%	0.01%
Leidos Holdings Inc	LDOS	136.34	103.51	14,112.76	0.05%	1.39%	0.00%	8.50%	0.00%
Lennar Corp	LEN	258.62	76.49	19,781.92	0.07%	1.96%	0.00%	8.50%	0.01%
Laboratory Corp of America Holdings	LH	92.70	240.28	22,273.96	0.08%	1.20%	0.00%	6.00%	0.00%
L3Harris Technologies Inc	LHX	192.88	232.26	44,797.15		1.93%			
Linde PLC	LIN	503.51	311.96	157,075.60		1.50%			
LKQ Corp	LKQ	284.70	49.63	14,129.66	0.05%	2.01%	0.00%	14.00%	0.01%
Eli Lilly & Co	LLY	950.16	292.13	277,570.24	1.01%	1.34%	0.01%	11.50%	0.12%
Lockheed Martin Corp	LMT	266.11	432.12	114,990.16	0.42%	2.59%	0.01%	6.50%	0.03%
Lincoln National Corp	LNC	172.61	60.15	10,382.67	0.04%	2.99%	0.00%	11.50%	0.00%
Alliant Energy Corp	LNT	250.81	58.81	14,750.37	0.05%	2.91%	0.00%	4.50%	0.00%
Lowe's Cos Inc	LOW	661.12	197.73	130,723.46	0.47%	1.62%	0.01%	15.50%	0.07%
Lam Research Corp	LRCX	138.72	465.76	64,607.90	0.23%	1.29%	0.00%	17.00%	0.04%
Lumen Technologies Inc	LUMN	1,032.76	10.06	10,389.57	0.04%	9.94%	0.00%	3.50%	0.00%
Southwest Airlines Co	LUV	592.85	46.72	27,697.72				29.50%	
Las Vegas Sands Corp	LVS	764.11	35.43	27,072.38	0.10%			13.50%	0.01%
Lamb Weston Holdings Inc	LW	144.45	66.10	9,547.95	0.03%	1.48%	0.00%	5.00%	0.00%
LyondellBasell Industries NV	LYB	327.62	106.03	34,737.76	0.13%	4.26%	0.01%	5.50%	0.01%
Live Nation Entertainment Inc	LYV	227.44	104.88	23,854.12					
Mastercard Inc	MA	964.92	363.38	350,632.99	1.27%	0.54%	0.01%	13.00%	0.17%
Mid-America Apartment Communities Inc	MAA	115.43	196.68	22,702.38	0.08%	2.21%	0.00%	8.50%	0.01%
Marriott International Inc/MD	MAR	327.25	177.52	58,094.13	0.21%			17.50%	0.04%
Masco Corp	MAS	235.94	52.69	12,431.68	0.05%	2.13%	0.00%	9.00%	0.00%
McDonald's Corp	MCD	739.61	249.16	184,279.98	0.67%	2.22%	0.01%	10.00%	0.07%
Microchip Technology Inc	MCHP	555.99	65.20	36,250.61	0.13%	1.55%	0.00%	10.00%	0.01%
McKesson Corp	MCK	149.80	309.61	46,378.96	0.17%	0.61%	0.00%	10.00%	0.02%
Moody's Corp	MCO	185.38	316.48	58,668.11	0.21%	0.88%	0.00%	9.00%	0.02%
Mondelez International Inc	MDLZ	1,383.92	64.48	89,235.42	0.32%	2.17%	0.01%	9.50%	0.03%
Medtronic PLC	MDT	1,341.54	104.36	140,003.01	0.51%	2.41%	0.01%	8.50%	0.04%
MetLife Inc	MET	814.45	65.68	53,492.88	0.19%	3.05%	0.01%	7.50%	0.01%
MGM Resorts International	MGM	435.33	41.04	17,866.07		0.02%		25.00%	
Mohawk Industries Inc	MHK	63.54	141.06	8,962.81	0.03%			10.50%	0.00%
McCormick & Co Inc/MD	MKC	250.23	100.57	25,165.23	0.09%	1.47%	0.00%	6.00%	0.01%
MarketAxess Holdings Inc	MKTX	37.74	263.61	9,949.17	0.04%	1.06%	0.00%	11.50%	0.00%
Martin Marietta Materials Inc	MLM	62.36	354.22	22,089.16	0.08%	0.69%	0.00%	8.50%	0.01%
Marsh & McLennan Cos Inc	MMC	501.91	161.70	81,159.49	0.29%	1.32%	0.00%	12.00%	0.04%
3M Co	MMM	569.06	144.22	82,069.69	0.30%	4.13%	0.01%	5.50%	0.02%
Monster Beverage Corp	MNST	529.66	85.68	45,381.61	0.16%			11.50%	0.02%
Altria Group Inc	MO	1,810.56	55.57	100,612.65	0.37%	6.48%	0.02%	5.50%	0.02%
Molina Healthcare Inc	MOH	58.70	313.45	18,399.52	0.07%			11.00%	0.01%
Mosaic Co/The	MOS	361.99	62.42	22,595.35		0.72%		56.50%	
Marathon Petroleum Corp	MPC	558.57	87.26	48,741.17		2.66%			
Monolithic Power Systems Inc	MPWR	46.51	392.24	18,242.69	0.07%	0.76%	0.00%	18.00%	0.01%
Merck & Co Inc	MRK	2,528.35	88.69	224,239.63	0.81%	3.11%	0.03%	8.00%	0.07%
Moderna Inc	MRNA	403.02	134.41	54,169.92					
Marathon Oil Corp	MRO	718.56	24.92	17,906.54		1.28%			
Morgan Stanley	MS	1,756.16	80.59	141,529.01	0.51%	3.47%	0.02%	10.50%	0.05%
MSCI Inc	MSCI	81.27	421.25	34,234.15	0.12%	0.99%	0.00%	15.50%	0.02%
Microsoft Corp	MSFT	7,479.03	277.52	2,075,581.24	7.54%	0.89%	0.07%	17.50%	1.32%
Motorola Solutions Inc	MSI	167.45	213.69	35,781.96	0.13%	1.48%	0.00%	8.00%	0.01%
M&T Bank Corp	MTB	179.76	166.64	29,954.71	0.11%	2.88%	0.00%	8.00%	0.01%
Match Group Inc	MTCH	285.15	79.15	22,569.46	0.08%			18.50%	0.02%
Mettler-Toledo International Inc	MTD	22.74	1,277.53	29,045.92	0.11%			13.50%	0.01%
Micron Technology Inc	MU	1,116.67	68.19	76,145.52		0.59%		24.00%	
Norwegian Cruise Line Holdings Ltd	NCLH	419.10	20.03	8,394.59					
Nasdaq Inc	NDAQ	164.68	157.37	25,915.38	0.09%	1.53%	0.00%	6.00%	0.01%
Nordson Corp	NDSN	57.94	215.69	12,497.29	0.05%	0.95%	0.00%	12.00%	0.01%
NextEra Energy Inc	NEE	1,964.50	71.02	139,518.79	0.51%	2.39%	0.01%	11.00%	0.06%
Newmont Corp	NEM	793.65	72.85	57,817.48	0.21%	3.02%	0.01%	9.50%	0.02%
Netflix Inc	NFLX	444.27	190.36	84,572.00	0.31%			12.50%	0.04%
NiSource Inc	NI	405.73	29.12	11,814.97	0.04%	3.23%	0.00%	10.50%	0.00%
NIKE Inc	NKE	1,268.76	124.70	158,214.37		0.98%		24.00%	
NortonLifeLock Inc	NLOK	582.28	25.04	14,580.17	0.05%	2.00%	0.00%	9.50%	0.01%
Nielsen Holdings PLC	NLSN	359.69	26.81	9,643.37		0.90%			
Northrop Grumman Corp	NOC	155.45	439.40	68,302.53	0.25%	1.43%	0.00%	8.50%	0.02%
ServiceNow Inc	NOW	200.46	478.10	95,839.93				44.50%	
NRG Energy Inc	NRG	242.15	35.90	8,693.33		3.90%		-10.50%	
Norfolk Southern Corp	NSC	238.33	257.88	61,461.31	0.22%	1.92%	0.00%	10.00%	0.02%
NetApp Inc	NTAP	222.54	73.25	16,300.76	0.06%	2.73%	0.00%	8.00%	0.00%
Northern Trust Corp	NTRS	207.94	103.05	21,428.63	0.08%	2.72%	0.00%	8.00%	0.01%
Nucor Corp	NUE	268.41	154.78	41,543.73	0.15%	1.29%	0.00%	12.00%	0.02%
NVIDIA Corp	NVDA	2,504.01	185.47	464,419.48		0.09%		21.50%	
NVR Inc	NVR	3.32	4,376.21	14,507.14	0.05%			5.50%	0.00%
Newell Brands Inc	NWL	413.50	23.15	9,572.53		3.97%			
News Corp	NWS	152.35	19.91	3,033.29		1.00%			
News Corp	NWSA	380.98	19.86	7,566.24		1.01%			
NXP Semiconductors NV	NXPI	262.55	170.90	44,870.31	0.16%	1.98%	0.00%	12.00%	0.02%
Realty Income Corp	O	597.90	69.36	41,470.41	0.15%	4.27%	0.01%	3.50%	0.01%
Old Dominion Freight Line Inc	ODFL	113.76	280.12	31,866.73	0.12%	0.43%	0.00%	12.00%	0.01%
Organon & Co	OGN	253.64	32.33	8,200.08		3.46%			
ONEOK Inc	OKE	446.59	63.33	28,282.67	0.10%	5.91%	0.01%	12.00%	0.01%
Omnicom Group Inc	OMC	205.73	76.13	15,662.45	0.06%	3.68%	0.00%	6.00%	0.00%
Oracle Corp	ORCL	2,668.16	73.40	195,842.72	0.71%	1.74%	0.01%	10.00%	0.07%
O'Reilly Automotive Inc	ORLY	65.92	606.55	39,983.78	0.15%			13.00%	0.02%

STANDARD AND POOR'S 500 INDEX

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Otis Worldwide Corp	OTIS	422.79	72.84	30,796.31		1.59%			
Occidental Petroleum Corp	OXY	936.91	55.09	51,614.32		0.94%		30.50%	
Paramount Global	PARA	608.38	29.12	17,715.97	0.06%	3.30%	0.00%	4.50%	0.00%
Paycom Software Inc	PAYC	60.21	281.47	16,946.75	0.06%			20.00%	0.01%
Paychex Inc	PAYX	361.02	126.73	45,751.68	0.17%	2.49%	0.00%	9.00%	0.01%
PACCAR Inc	PCAR	347.70	83.05	28,876.49	0.10%	1.64%	0.00%	5.00%	0.01%
Healthpeak Properties Inc	PEAK	539.50	32.81	17,701.00		3.66%		-7.50%	
Public Service Enterprise Group Inc	PEG	502.08	69.66	34,974.75	0.13%	3.10%	0.00%	4.00%	0.01%
Penn National Gaming Inc	PENN	166.20	36.57	6,077.93				28.00%	
PepsiCo Inc	PEP	1,382.68	171.71	237,420.67	0.86%	2.50%	0.02%	6.00%	0.05%
Pfizer Inc	PFE	5,647.77	49.07	277,136.27	1.01%	3.26%	0.03%	6.50%	0.07%
Principal Financial Group Inc	PFG	252.24	68.14	17,187.36	0.06%	3.76%	0.00%	6.00%	0.00%
Procter & Gamble Co/The	PG	2,399.30	160.55	385,207.13	1.40%	2.28%	0.03%	6.50%	0.09%
Progressive Corp/The	PGR	584.88	107.36	62,792.61	0.23%	0.37%	0.00%	4.50%	0.01%
Parker-Hannifin Corp	PH	128.48	270.82	34,794.41	0.13%	1.96%	0.00%	12.50%	0.02%
PulteGroup Inc	PHM	237.63	41.76	9,923.30	0.04%	1.44%	0.00%	9.50%	0.00%
Packaging Corp of America	PKG	93.70	161.17	15,102.27	0.05%	2.48%	0.00%	9.00%	0.00%
PerkinElmer Inc	PKI	126.16	146.61	18,495.88	0.07%	0.19%	0.00%	10.00%	0.01%
Prologis Inc	PLD	739.75	160.29	118,573.73	0.43%	1.97%	0.01%	6.00%	0.03%
Philip Morris International Inc	PM	1,550.11	100.00	155,011.00	0.56%	5.00%	0.03%	7.00%	0.04%
PNC Financial Services Group Inc/The	PNC	415.00	166.10	68,931.50	0.25%	3.61%	0.01%	11.50%	0.03%
Pentair PLC	PNR	165.40	50.75	8,394.05	0.03%	1.66%	0.00%	13.00%	0.00%
Pinnacle West Capital Corp	PNW	113.00	71.20	8,045.32	0.03%	4.78%	0.00%	1.50%	0.00%
Pool Corp	POOL	40.07	405.22	16,238.79	0.06%	0.79%	0.00%	19.00%	0.01%
PPG Industries Inc	PPG	236.19	127.99	30,230.47	0.11%	1.84%	0.00%	4.00%	0.00%
PPL Corp	PPL	735.77	28.31	20,829.51		2.83%			
Prudential Financial Inc	PRU	376.43	108.51	40,845.99	0.15%	4.42%	0.01%	5.50%	0.01%
Public Storage	PSA	175.36	371.50	65,145.13	0.24%	2.15%	0.01%	8.00%	0.02%
Phillips 66	PSX	481.10	86.76	41,740.24	0.15%	4.24%	0.01%	17.00%	0.03%
PTC Inc	PTC	116.95	114.21	13,357.09					
PVH Corp	PVH	68.01	72.78	4,949.55	0.02%	0.21%	0.00%	13.50%	0.00%
Quanta Services Inc	PWR	143.77	115.98	16,674.33	0.06%	0.24%	0.00%	16.50%	0.01%
Pioneer Natural Resources Co	PXD	241.96	232.47	56,248.21		6.50%		23.00%	
PayPal Holdings Inc	PYPL	1,158.04	87.93	101,826.46	0.37%			16.00%	0.06%
QUALCOMM Inc	QCOM	1,120.00	139.69	156,452.80	0.57%	2.15%	0.01%	19.00%	0.11%
Qorvo Inc	QRVO	108.43	113.78	12,337.39	0.04%			14.50%	0.01%
Royal Caribbean Cruises Ltd	RCL	255.06	77.73	19,825.81					
Everest Re Group Ltd	RE	39.45	274.71	10,836.76	0.04%	2.26%	0.00%	17.50%	0.01%
Regency Centers Corp	REG	171.37	68.83	11,795.60	0.04%	3.63%	0.00%	12.50%	0.01%
Regeneron Pharmaceuticals Inc	REGN	108.03	659.11	71,202.34	0.26%			12.50%	0.03%
Regions Financial Corp	RF	937.15	20.72	19,417.67	0.07%	3.28%	0.00%	10.50%	0.01%
Robert Half International Inc	RHI	110.82	98.31	10,894.42	0.04%	1.75%	0.00%	7.50%	0.00%
Raymond James Financial Inc	RJF	207.90	97.46	20,261.93	0.07%	1.40%	0.00%	10.50%	0.01%
Ralph Lauren Corp	RL	46.29	104.34	4,829.48	0.02%	2.64%	0.00%	11.50%	0.00%
ResMed Inc	RMD	146.29	199.97	29,252.61	0.11%	0.84%	0.00%	8.50%	0.01%
Rockwell Automation Inc	ROK	116.20	252.67	29,359.24	0.11%	1.77%	0.00%	10.00%	0.01%
Rollins Inc	ROL	492.46	33.54	16,517.14	0.06%	1.19%	0.00%	10.50%	0.01%
Roper Technologies Inc	ROP	105.60	469.92	49,624.96	0.18%	0.53%	0.00%	8.50%	0.02%
Ross Stores Inc	ROST	351.39	99.77	35,058.38	0.13%	1.24%	0.00%	14.00%	0.02%
Republic Services Inc	RSG	315.79	134.27	42,400.59	0.15%	1.37%	0.00%	10.50%	0.02%
Raytheon Technologies Corp	RTX	1,487.22	94.91	141,151.58	0.51%	2.32%	0.01%	7.50%	0.04%
SBA Communications Corp	SBAC	107.83	347.11	37,428.52		0.82%		42.50%	
Signature Bank/New York NY	SBNY	63.07	242.25	15,277.50	0.06%	0.92%	0.00%	12.00%	0.01%
Starbucks Corp	SBUX	1,150.30	74.64	85,858.39	0.31%	2.63%	0.01%	16.50%	0.05%
Charles Schwab Corp/The	SCHW	1,816.00	66.33	120,455.55	0.44%	1.21%	0.01%	9.00%	0.04%
SolarEdge Technologies Inc	SEDG	55.39	250.41	13,869.21	0.05%			19.50%	0.01%
Sealed Air Corp	SEE	146.08	64.21	9,379.93	0.03%	1.25%	0.00%	13.50%	0.00%
Sherwin-Williams Co/The	SHW	260.13	274.96	71,525.62	0.26%	0.87%	0.00%	11.50%	0.03%
SVB Financial Group	SIVB	58.84	487.64	28,692.74	0.10%			5.00%	0.01%
J M Smucker Co/The	SJM	108.46	136.93	14,851.15	0.05%	2.89%	0.00%	4.00%	0.00%
Schlumberger NV	SLB	1,413.46	39.01	55,139.11		1.79%		23.00%	
Snap-on Inc	SNA	53.37	212.49	11,341.44	0.04%	2.67%	0.00%	4.50%	0.00%
Synopsys Inc	SNPS	153.10	286.79	43,907.26	0.16%			14.00%	0.02%
Southern Co/The	SO	1,063.22	73.39	78,029.86	0.28%	3.71%	0.01%	5.50%	0.02%
Simon Property Group Inc	SPG	328.34	118.00	38,744.36	0.14%	5.59%	0.01%	2.50%	0.00%
S&P Global Inc	SPGI	347.03	376.50	130,655.67	0.47%	0.90%	0.00%	10.50%	0.05%
Sempra Energy	SRE	315.77	161.36	50,952.97	0.19%	2.84%	0.01%	11.50%	0.02%
STERIS PLC	STE	100.13	224.05	22,433.45	0.08%	0.77%	0.00%	11.50%	0.01%
State Street Corp	STT	367.12	66.97	24,585.69	0.09%	3.40%	0.00%	8.00%	0.01%
Seagate Technology Holdings PLC	STX	214.84	82.04	17,625.80	0.06%	3.41%	0.00%	16.00%	0.01%
Constellation Brands Inc	STZ	162.76	246.09	40,054.35	0.15%	1.30%	0.00%	5.00%	0.01%
Stanley Black & Decker Inc	SWK	150.97	120.15	18,138.44	0.07%	2.63%	0.00%	6.00%	0.00%
Skyworks Solutions Inc	SWKS	161.67	113.30	18,317.32	0.07%	1.98%	0.00%	15.50%	0.01%
Synchrony Financial	SYF	501.49	36.81	18,459.81	0.07%	2.39%	0.00%	9.50%	0.01%
Stryker Corp	SYK	378.15	241.26	91,233.43	0.33%	1.15%	0.00%	8.50%	0.03%
Sysco Corp	SYY	507.45	85.48	43,376.57	0.16%	2.29%	0.00%	17.50%	0.03%
AT&T Inc	T	7,159.00	18.86	135,018.74	0.49%	5.89%	0.03%	3.00%	0.01%
Molson Coors Beverage Co	TAP	200.52	54.14	10,856.21		2.81%		49.50%	
TransDigm Group Inc	TDG	55.46	594.81	32,989.35	0.12%			16.50%	0.02%
Teledyne Technologies Inc	TDY	46.77	431.55	20,181.87	0.07%			14.50%	0.01%
Bio-Techne Corp	TECH	39.29	379.69	14,917.26	0.05%	0.34%	0.00%	17.50%	0.01%
TE Connectivity Ltd	TEL	322.17	124.78	40,200.87	0.15%	1.80%	0.00%	10.50%	0.02%
Teradyne Inc	TER	161.59	105.46	17,041.70	0.06%	0.42%	0.00%	8.50%	0.01%
Truist Financial Corp	TFC	1,331.41	48.35	64,373.87	0.23%	3.97%	0.01%	7.00%	0.02%
Teleflex Inc	TFX	46.90	285.62	13,395.58	0.05%	0.48%	0.00%	15.00%	0.01%
Target Corp	TGT	463.67	228.65	106,019.06	0.39%	1.57%	0.01%	13.00%	0.05%
TJX Cos Inc/The	TJX	1,174.43	61.28	71,969.32	0.26%	1.93%	0.01%	20.00%	0.05%
Thermo Fisher Scientific Inc	TMO	391.44	552.92	216,434.45	0.79%	0.22%	0.00%	15.50%	0.12%
T-Mobile US Inc	TMUS	1,253.57	123.14	154,365.10	0.56%			7.50%	0.04%
Tapestry Inc	TPR	263.99	32.92	8,690.55	0.03%	3.04%	0.00%	10.00%	0.00%
Trimble Inc	TRMB	250.37	66.70	16,699.68	0.06%			10.00%	0.01%

STANDARD AND POOR'S 500 INDEX

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T Rowe Price Group Inc	TROW	227.30	123.04	27,966.62	0.10%	3.90%	0.00%	9.50%	0.01%
Travelers Cos Inc/The	TRV	239.96	171.06	41,047.73	0.15%	2.17%	0.00%	8.00%	0.01%
Tractor Supply Co	TSCO	112.15	201.45	22,591.81	0.08%	1.83%	0.00%	14.50%	0.01%
Tesla Inc	TSLA	1,036.01	870.76	902,116.07				51.50%	
Tyson Foods Inc	TSN	292.46	93.16	27,245.11	0.10%	1.98%	0.00%	6.00%	0.01%
Trane Technologies PLC	TT	233.84	139.89	32,712.16		1.92%			
Take-Two Interactive Software Inc	TTWO	115.46	119.51	13,798.27	0.05%			12.50%	0.01%
Twitter Inc	TWTR	763.58	49.02	37,430.59				39.00%	
Texas Instruments Inc	TXN	922.13	170.25	156,993.31	0.57%	2.70%	0.02%	8.50%	0.05%
Textron Inc	TXT	215.08	69.25	14,894.50	0.05%	0.12%	0.00%	8.50%	0.00%
Tyler Technologies Inc	TYL	41.47	394.71	16,370.20	0.06%			14.00%	0.01%
Under Armour Inc	UA	253.22	14.19	3,593.16					
Under Armour Inc	UAA	188.67	15.36	2,897.96				33.00%	
United Airlines Holdings Inc	UAL	326.73	50.50	16,499.81					
UDR Inc	UDR	318.40	53.21	16,942.12	0.06%	2.86%	0.00%	10.50%	0.01%
Universal Health Services Inc	UHS	67.21	122.53	8,235.49	0.03%	0.65%	0.00%	11.00%	0.00%
Ulta Beauty Inc	ULTA	52.23	396.80	20,723.67	0.08%			15.00%	0.01%
UnitedHealth Group Inc	UNH	938.95	508.55	477,502.51	1.73%	1.14%	0.02%	12.00%	0.21%
Union Pacific Corp	UNP	628.03	234.29	147,139.98	0.53%	2.01%	0.01%	9.00%	0.05%
United Parcel Service Inc	UPS	733.44	179.98	132,004.35	0.48%	3.38%	0.02%	11.50%	0.06%
United Rentals Inc	URI	71.61	316.52	22,666.63	0.08%			18.00%	0.01%
US Bancorp	USB	1,485.04	48.56	72,113.49	0.26%	3.79%	0.01%	6.50%	0.02%
Visa Inc	V	1,645.72	213.13	350,752.09	1.27%	0.70%	0.01%	12.00%	0.15%
VF Corp	VFC	388.90	52.00	20,222.90	0.07%	3.85%	0.00%	9.50%	0.01%
Valero Energy Corp	VLO	408.10	111.48	45,494.54	0.17%	3.52%	0.01%	11.00%	0.02%
Vulcan Materials Co	VMC	132.89	172.29	22,896.31	0.08%	0.93%	0.00%	8.50%	0.01%
Vornado Realty Trust	VNO	191.74	38.71	7,422.37		5.48%		-19.00%	
Verisk Analytics Inc	VRSK	158.76	204.05	32,394.57	0.12%	0.61%	0.00%	10.50%	0.01%
VeriSign Inc	VRSN	109.55	178.69	19,574.60	0.07%			8.50%	0.01%
Vertex Pharmaceuticals Inc	VRTX	255.53	273.22	69,817.00	0.25%			18.50%	0.05%
Ventas Inc	VTR	399.55	55.55	22,194.95	0.08%	3.24%	0.00%	10.50%	0.01%
Viatris Inc	VTRS	1,209.58	10.33	12,494.92		4.65%			
Verizon Communications Inc	VZ	4,199.64	46.30	194,443.52	0.71%	5.53%	0.04%	2.50%	0.02%
Westinghouse Air Brake Technologies Corp	WAB	182.65	89.91	16,421.88	0.06%	0.67%	0.00%	9.00%	0.01%
Waters Corp	WAT	60.41	303.02	18,303.92	0.07%			6.00%	0.00%
Walgreens Boots Alliance Inc	WBA	863.77	42.40	36,623.98	0.13%	4.50%	0.01%	7.50%	0.01%
Warner Bros Discovery Inc	WBD	2,426.84	18.15	44,047.22					
Western Digital Corp	WDC	312.92	53.07	16,606.56				20.50%	
WEC Energy Group Inc	WEC	315.44	100.05	31,559.27	0.11%	2.91%	0.00%	6.00%	0.01%
Welltower Inc	WELL	453.97	90.81	41,224.74	0.15%	2.69%	0.00%	3.50%	0.01%
Wells Fargo & Co	WFC	3,801.59	43.63	165,863.33	0.60%	2.29%	0.01%	5.50%	0.03%
Whirlpool Corp	WHR	56.20	181.52	10,201.79	0.04%	3.86%	0.00%	9.50%	0.00%
Waste Management Inc	WM	415.21	164.44	68,276.64	0.25%	1.58%	0.00%	7.50%	0.02%
Williams Cos Inc/The	WMB	1,217.31	34.29	41,741.66	0.15%	4.96%	0.01%	10.00%	0.02%
Walmart Inc	WMT	2,752.78	152.99	421,148.12	1.53%	1.46%	0.02%	7.50%	0.11%
W R Berkley Corp	WRB	265.19	66.49	17,632.22	0.06%	0.52%	0.00%	17.50%	0.01%
Westrock Co	WRK	263.21	49.53	13,036.99	0.05%	2.02%	0.00%	17.00%	0.01%
West Pharmaceutical Services Inc	WST	74.08	315.06	23,338.38	0.08%	0.23%	0.00%	17.00%	0.01%
Willis Towers Watson PLC	WTW	111.49	214.86	23,954.31	0.09%	1.53%	0.00%	11.00%	0.01%
Weyerhaeuser Co	WY	747.08	41.22	30,794.43		1.75%		22.00%	
Wynn Resorts Ltd	WYNN	115.92	70.48	8,169.90				27.00%	
Xcel Energy Inc	XEL	544.65	73.26	39,901.28	0.14%	2.66%	0.00%	6.00%	0.01%
Exxon Mobil Corp	XOM	4,225.67	85.25	360,238.71		4.13%			
DENTSPLY SIRONA Inc	XRAY	215.45	39.99	8,615.93	0.03%	1.25%	0.00%	12.00%	0.00%
Xylem Inc/NY	XYL	180.09	80.50	14,497.49	0.05%	1.49%	0.00%	6.50%	0.00%
Yum! Brands Inc	YUM	288.20	117.01	33,722.28	0.12%	1.95%	0.00%	10.50%	0.01%
Zimmer Biomet Holdings Inc	ZBH	209.32	120.75	25,275.63	0.09%	0.80%	0.00%	7.00%	0.01%
Zebra Technologies Corp	ZBRA	52.81	369.66	19,521.74	0.07%			10.50%	0.01%
Zions Bancorp NA	ZION	151.35	56.51	8,552.68	0.03%	2.69%	0.00%	7.50%	0.00%
Zoetis Inc	ZTS	471.25	177.25	83,529.24	0.30%	0.73%	0.00%	11.00%	0.03%

Notes:
[1] Equals sum of Col. [9]
[2] Equals sum of Col. [11]
[3] Equals ([1] x (1 + (0.5 x [2]))) + [2]
[4] Source: Bloomberg Professional as of March 31, 2022
[4] Source: Bloomberg Professional as of March 31, 2022
[6] Equals [4] x [5]
[7] Equals weight in S&P 500 based on market capitalization [6] if Growth Rate >0% and ≤20%
[4] Source: Bloomberg Professional as of March 31, 2022
[9] Equals [7] x [8]
[10] Source: Value Line, as of March 31, 2022
[11] Equals [7] x [10]

COMPARISON OF MAWC AND PROXY GROUP COMPANIES
RISK ASSESSMENT

Company	Ticker	State	Utility Type	Revenue Requirement Test Year	Infrastructure Cost Recovery Mechanism	Revenue Stabilization or Decoupling	Citations
American States Water Co							2021 10-K, page 51 (test year), 41 (Decoupling), 28-30 (capital tracker).
	AWR	California	Water	Fully Forecast	Yes	Full	
	AWR	California	Electric	Fully Forecast	Yes	Full	
Atmos Energy Corporation							
	ATO	Colorado	Gas	Historical	Yes	No	Test Year: 2021 10-K, p. 9-10; S&P Global - Market Intelligence Rate Case History (Past Rate Cases), accessed 2/23/22
	ATO	Kansas	Gas	Historical	Yes	Partial	
	ATO	Kentucky	Gas	Fully Forecast	Yes	Partial	Infrastructure Cost Recovery: 2021 10-K, p. 9
	ATO	Louisiana	Gas	Historical	Yes	FRP	Revenue Decoupling: 2021 10-K, p. 9; Tariffs (Colorado, Virginia); S&P Global Market Intelligence, Regulatory Focus:
	ATO	Mississippi	Gas	Historical	Yes	FRP	Adjustment Clauses, dated November 12, 2019
	ATO	Tennessee	Gas	Historical	Yes	FRP	
	ATO	Texas	Gas	Historical	Yes	FRP	
	ATO	Virginia	Gas	Historical	Yes	Partial	
California Water Service Group							Test Year: 2021 10-K, page 8 (California); Kona Water Service, Docket No. 2018-0388, Order No. 37124 (Hawaii); S&P
	CWT	California	Water	Fully Forecast	Yes	Full	Global Market Intelligence, Commission Profiles (New Mexico, Washington)
	CWT	Hawaii	Water	Fully Forecast	No	No	Infrastructure Cost Recovery:2021 10-K (California, p. 9), Tariffs (HI, WA, NM)
	CWT	New Mexico	Water	Historical	No	No	Revenue Decoupling: 2021 10-K, p. 8 (California); Tariffs (HI, WA, NM)
	CWT	Washington	Water	Historical	Yes	No	
Essential Utilities, Inc.							
	WTRG	Pennsylvania	Water	Fully Forecast	Yes	No	Test Year: S&P Global Market Intelligence, Commission Profiles; S&P Global - Market Intelligence Rate Case History
	WTRG	Pennsylvania	Gas	Fully Forecast	Yes	No	(Past Rate Cases), accessed 2/23/22
	WTRG	Ohio	Water	Partially Forecast	Yes	No	Infrastructure Cost Recovery: 2021 10-K, p. 9
	WTRG	Illinois	Water	Fully Forecast	Yes	Full	Revenue Decoupling: 2021 10-K, p. 11
	WTRG	Texas	Water	Historical	Yes	No	
	WTRG	New Jersey	Water	Partially Forecast	Yes	No	
	WTRG	North Carolina	Water	Historical	Yes	No	
	WTRG	Indiana	Water	Fully Forecast	Yes	No	
	WTRG	Virginia	Water	Historical	Yes	No	
	WTRG	Kentucky	Gas	Fully Forecast	Yes	Partial	
	WTRG	West Virginia	Gas	Historical	No	No	
Eversource Energy							
	ES	Connecticut	Electric	Fully Forecast	Yes	Full	Test Year: S&P Global Market Intelligence, Commission Profiles
	ES	Connecticut	Gas	Fully Forecast	Yes	Full	Infrastructure Cost Recovery: S&P Global Market Intelligence, Regulatory Focus: Adjustment Clauses, dated 11/12/19
	ES	Connecticut	Water	Fully Forecast	Yes	Full	(CT - Gas and Electric, Mass - Gas and Electric, NH - Electric); 2021 10-K, p. 11 (water utilities)
	ES	Massachusetts	Electric	Historical	Yes	Full	Revenue Decoupling: 2021 10-K, p. 3 (CT), p. 5 (Mass-Electric), p. 6 (NH-Electric), p. 8 (Mass and CT - Gas), p. 10 (CT -
	ES	Massachusetts	Gas	Historical	Yes	Full	Water)
	ES	Massachusetts	Water	Historical	Yes	No	
	ES	New Hampshire	Electric	Historical	Yes	Partial	
	ES	New Hampshire	Water	Historical	Yes	No	
Middlesex Water Company							
	MSEX	New Jersey	Water	Partially Forecast	Yes	No	Test Year: S&P Global Market Intelligence, Commission Profiles
	MSEX	Delaware	Water	Historical	Yes	No	Infrastructure Cost Recovery/ Revenue Decoupling: Tariffs (NJ, DE, PA)
	MSEX	Pennsylvania	Water	Fully Forecast	No	No	
NiSource Inc.							
	NI	Indiana	Electric	Fully Forecast	Yes	Partial	Test Year: S&P Global Market Intelligence, Commission Profiles; S&P Global - Market Intelligence Rate Case History
	NI	Indiana	Gas	Fully Forecast	Yes	No	(Past Rate Cases), accessed 2/23/22
	NI	Kentucky	Gas	Fully Forecast	Yes	Partial	Infrastructure Cost Recovery: S&P Global Market Intelligence, Regulatory Focus: Adjustment Clauses, dated 11/12/19
	NI	Maryland	Gas	Partially Forecast	Yes	Partial	Revenue Decoupling: S&P Global Market Intelligence, Regulatory Focus: Adjustment Clauses, dated 11/12/19
	NI	Ohio	Gas	Partially Forecast	Yes	SFV	
	NI	Pennsylvania	Gas	Fully Forecast	Yes	Partial	
	NI	Virginia	Gas	Historical	Yes	Partial	
New Jersey Resources Corporation							Test Year: S&P Global Market Intelligence, Commission Profiles
	NJR	New Jersey	Gas	Partially Forecast	Yes	Full	Infrastructure Cost / RDM: S&P Global Market Intelligence, Regulatory Focus: Adjustment Clauses, dated 11/12/19
Northwest Natural Gas Company							
	NWN	Oregon	Gas	Fully Forecast	No	Partial	Test Year: S&P Global Market Intelligence, Commission Profiles
	NWN	Washington	Gas	Historical	No	No	Infrastructure Cost / RDM: S&P Global Market Intelligence, Regulatory Focus: Adjustment Clauses, dated 11/12/19
ONE Gas, Inc.							
	OGS	Kansas	Gas	Historical	Yes	Partial	Test Year: S&P Global Market Intelligence, Commission Profiles
	OGS	Oklahoma	Gas	Historical	No	FRP	Infrastructure Cost Recovery / RDM : ONE Gas 2021 10-K, p. 6; S&P Global Market Intelligence, Regulatory Focus:
	OGS	Texas	Gas	Historical	Yes	Partial	Adjustment Clauses, dated 11/12/19
SJW Group							
	SJW	California	Water	Fully Forecast	Yes	No	Test Year: S&P Global Market Intelligence, Commission Profiles
	SJW	Connecticut	Water	Fully Forecast	Yes	Full	Infrastructure Cost Recovery/Revenue Decoupling: 2021 10-K, pg. 5-8.
	SJW	Maine	Water	Partially Forecast	Yes	No	
	SJW	Texas	Water	Historical	No	No	
Spire, Inc.							
	SR	Alabama	Gas	Fully Forecast	No	FRP	Test Year: S&P Global Market Intelligence, Commission Profiles; Tariffs (AL, MS)
	SR	Mississippi	Gas	Historical	No	FRP	Infrastructure Cost Recovery / RDM: S&P Global Market Intelligence, Regulatory Focus: Adjustment Clauses, dated
	SR	Missouri - East	Gas	Partially Forecast	Yes	Partial	11/12/19; Tariff (AL, MS)
	SR	Missouri - West	Gas	Partially Forecast	Yes	Partial	
York Water Company							Test Year: S&P Global Market Intelligence, Commission Profiles
	YORW	Pennsylvania	Water	Fully Forecast	Yes	No	Infrastructure Cost / RDM: 2021 10-K (p. 29 & p. 41)

Proxy Group Totals	Fully Foreca	23	Yes	48	Full	11	
	Partially For	9	No	10	Partial	15	
	Historical	26			FRP	7	
					SFV	1	
					No	24	
	Forecast	55.17%	CCRM	82.76%	NVRD	58.62%	

MAWC	Missouri	Water	Historical	Yes	Proposing	Data provided by MAWC

COMPARISON OF MAWC AND PROXY GROUP COMPANIES
RRA JURISDICTIONAL RANKINGS

		[1]	[2]
		RRA	
	Operation State	Rank	Numeric Rank
American States Water Co	California	Average / 2	5
Atmos Energy Corporation	Colorado	Average / 1	4
	Kansas	Below Average / 1	7
	Kentucky	Average / 2	5
	Louisiana (PSC)	Average / 2	5
	Mississippi	Above Average / 3	3
	Tennessee	Above Average / 3	3
	Texas (RRC)	Average / 1	4
	Virginia	Average / 1	4
California Water Service Group	California	Average / 2	5
	Hawaii	Average / 2	5
	New Mexico	Below Average / 2	8
	Washington	Average / 3	6
Essential Utilities, Inc.	Pennsylvania	Above Average / 2	2
	Ohio	Average / 3	6
	Illinois	Average / 2	5
	Texas (PUC)	Average / 3	6
	New Jersey	Below Average / 1	7
	North Carolina	Above Average / 3	3
	Indiana	Average / 1	4
	Virginia	Average / 1	4
	Kentucky	Average / 2	5
	West Virginia	Below Average / 2	8
Eversource Energy	Conneticut	Below Average / 1	7
	Massachusetts	Average / 2	5
	New Hampshire	Average / 2	5
Middlesex Water Company	New Jersey	Below Average / 1	7
	Delaware	Average / 3	6
	Pennsylvania	Above Average / 2	2
NiSource Inc.	Indiana	Average / 1	4
	Kentucky	Average / 2	5
	Maryland	Average / 3	6
	Ohio	Average / 3	6
	Pennsylvania	Above Average / 2	2
	Virginia	Average / 1	4
New Jersey Resources Corporation	New Jersey	Below Average / 1	7
Northwest Natural Gas Company	Oregon	Average / 2	5
	Washington	Average / 3	6
ONE Gas, Inc.	Kansas	Below Average / 1	7
	Oklahoma	Average / 2	5
	Texas (RRC)	Average / 1	4
SJW Group	California	Average / 2	5
	Connecticut	Below Average / 1	7
	Maine	Average / 3	6
	Texas (PUC)	Average / 3	6
Spire, Inc.	Alabama	Above Average / 1	1
	Mississippi	Above Average / 3	3
	Missouri	Average / 3	6
York Water Company	Pennsylvania	Above Average / 2	2
Proxy Group Average		Average / 2	4.96
MAWC	Missouri	Average / 3	6

Notes
[1] Source: State Regulatory Evaluations, Regulatory Research Associates, as of March 10, 2022.
[2] AA/1= 1, AA/2= 2, AA/3= 3, A/1= 4, A/2= 5, A/3=6, BA/1= 7, BA/2= 8, BA/3= 9

COMPARISON OF MAWC AND PROXY GROUP COMPANIES
S&P JURISDICTIONAL RANKINGS

		[1]	[2]
		S&P	
	Operation State	Rank	Numeric Rank
American States Water Co	California	More Credit Supportive	4
Atmos Energy Corporation	Colorado	Very Credit Supportive	3
	Kansas	Highly Credit Supportive	2
	Kentucky	Most Credit Supportive	1
	Louisiana	Highly Credit Supportive	2
	Mississippi	More Credit Supportive	4
	Tennessee	Highly Credit Supportive	2
	Texas (RRC)	Highly Credit Supportive	2
	Virginia	Highly Credit Supportive	2
California Water Service Group	California	More Credit Supportive	4
	Hawaii	More Credit Supportive	4
	New Mexico	Credit Supportive	5
	Washington	Very Credit Supportive	3
Essential Utilities, Inc.	Pennsylvania	Highly Credit Supportive	2
	Ohio	Very Credit Supportive	3
	Illinois	Very Credit Supportive	3
	Texas (PUC)	Very Credit Supportive	3
	New Jersey	More Credit Supportive	4
	North Carolina	Highly Credit Supportive	2
	Indiana	Highly Credit Supportive	2
	Virginia	Highly Credit Supportive	2
	Kentucky	Most Credit Supportive	1
	West Virginia	Very Credit Supportive	3
Eversource Energy	Connecticut	More Credit Supportive	4
	Massachusetts	Highly Credit Supportive	2
	New Hampshire	Highly Credit Supportive	2
Middlesex Water Company	New Jersey	More Credit Supportive	4
	Delaware	Very Credit Supportive	3
	Pennsylvania	Highly Credit Supportive	2
NiSource Inc.	Indiana	Highly Credit Supportive	2
	Kentucky	Most Credit Supportive	1
	Maryland	Very Credit Supportive	3
	Ohio	Very Credit Supportive	3
	Pennsylvania	Highly Credit Supportive	2
	Virginia	Highly Credit Supportive	2
New Jersey Resources Corporation	New Jersey	More Credit Supportive	4
Northwest Natural Gas Company	Oregon	Highly Credit Supportive	2
	Washington	Very Credit Supportive	3
ONE Gas, Inc.	Kansas	Highly Credit Supportive	2
	Oklahoma	More Credit Supportive	4
	Texas (RRC)	Highly Credit Supportive	2
SJW Group	California	More Credit Supportive	4
	Connecticut	More Credit Supportive	4
	Maine	Highly Credit Supportive	2
	Texas (PUC)	Very Credit Supportive	3
Spire, Inc.	Alabama	Most Credit Supportive	1
	Mississippi	More Credit Supportive	4
	Missouri	Very Credit Supportive	3
York Water Company	Pennsylvania	Highly Credit Supportive	2
Proxy Group Average		Highly credit supportive / Very credit supportive	2.71
MAWC	Missouri	Very Credit Supportive	3

Notes
[1] Source: Updated Views On North American Utility Regulatory Jurisdictions - November 2021, Standard and Poor's Ratings Services, November 4, 2021.
[2] Most= 1, Highly= 2, Very= 3, More= 4, Credit Supportive= 5

CAPITAL STRUCTURE ANALYSIS

COMMON EQUITY RATIO [1]

Proxy Group Company	Ticker	2020	2019	MRY
American States Water Company	AWR	56.76%	65.94%	56.76%
Atmos Energy Corporation	ATO	58.31%	58.43%	58.31%
California Water Service Group	CWT	52.23%	46.73%	52.23%
Essential Utilities, Inc.	WTRG	55.83%	54.82%	55.83%
Eversource Energy	ES	54.99%	54.39%	54.99%
Middlesex Water Company	MSEX	59.21%	62.71%	59.21%
NiSource Inc.	NI	54.43%	54.33%	54.43%
New Jersey Resources Corporation	NJR	55.45%	58.87%	55.45%
Northwest Natural Gas Company	NWN	47.44%	49.19%	47.44%
One Gas Inc.	OGS	60.04%	63.28%	60.04%
SJW Corporation	SJW	56.66%	55.13%	56.66%
Spire Inc.	SR	58.52%	60.85%	58.52%
York Water Company	YORW	53.27%	56.50%	53.27%
	MEAN	55.63%	57.01%	55.63%
Proxy Group	LOW	47.44%	46.73%	47.44%
	HIGH	60.04%	65.94%	60.04%

CAPITAL STRUCTURE ANALYSIS

LONG-TERM DEBT RATIO [1]

Proxy Group Company	Ticker	2020	2019	MRY
American States Water Company	AWR	43.24%	34.06%	43.24%
Atmos Energy Corporation	ATO	41.69%	41.57%	41.69%
California Water Service Group	CWT	47.77%	53.27%	47.77%
Essential Utilities, Inc.	WTRG	44.17%	45.18%	44.17%
Eversource Energy	ES	44.35%	44.88%	44.35%
Middlesex Water Company	MSEX	40.43%	36.89%	40.43%
NiSource Inc.	NI	45.57%	45.67%	45.57%
New Jersey Resources Corporation	NJR	44.55%	41.13%	44.55%
Northwest Natural Gas Company	NWN	52.56%	50.81%	52.56%
One Gas Inc.	OGS	39.96%	36.72%	39.96%
SJW Corporation	SJW	43.34%	44.87%	43.34%
Spire Inc.	SR	41.48%	39.15%	41.48%
York Water Company	YORW	46.73%	43.50%	46.73%
	MEAN	44.30%	42.90%	44.30%
Proxy Group	LOW	39.96%	34.06%	39.96%
	HIGH	52.56%	53.27%	52.56%

CAPITAL STRUCTURE ANALYSIS

PREFERRED EQUITY RATIO [1]

Proxy Group Company	Ticker	2020	2019	MRY
American States Water Company	AWR	0.00%	0.00%	0.00%
Atmos Energy Corporation	ATO	0.00%	0.00%	0.00%
California Water Service Group	CWT	0.00%	0.00%	0.00%
Essential Utilities, Inc.	WTRG	0.00%	0.00%	0.00%
Eversource Energy	ES	0.66%	0.72%	0.66%
Middlesex Water Company	MSEX	0.35%	0.40%	0.35%
NiSource Inc.	NI	0.00%	0.00%	0.00%
New Jersey Resources Corporation	NJR	0.00%	0.00%	0.00%
Northwest Natural Gas Company	NWN	0.00%	0.00%	0.00%
One Gas Inc.	OGS	0.00%	0.00%	0.00%
SJW Corporation	SJW	0.00%	0.00%	0.00%
Spire Inc.	SR	0.00%	0.00%	0.00%
York Water Company	YORW	0.00%	0.00%	0.00%
	MEAN	0.08%	0.09%	0.08%
Proxy Group	LOW	0.00%	0.00%	0.00%
	HIGH	0.66%	0.72%	0.66%

COMMON EQUITY RATIO - UTILITY OPERATING COMPANIES [2]

Company Name	Ticker	2020	2019	MRY
Golden State Water / Bear Valley	AWR	56.76%	65.94%	56.76%
Atmos Energy Corporation	ATO	58.31%	58.43%	58.31%
California Water Service	CWT	51.34%	46.46%	51.34%
New Mexico Water Service Water Division	CWT	67.06%	65.26%	67.06%
New Mexico Water Service Sewer Division	CWT	59.47%	56.79%	59.47%
Washington Water Service	CWT	71.93%	52.53%	71.93%
Hawaii Water Service Kaanapali Division	CWT	48.93%	49.76%	48.93%
Hawaii Water Service Pukalani Division	CWT	64.56%	65.06%	64.56%
Aqua Pennsylvania Water	WTRG	51.14%	51.03%	51.14%
Aqua Pennsylvania Wastewater	WTRG	97.07%	95.39%	97.07%
Peoples Natural Gas Company	WTRG	61.48%	56.71%	61.48%
Peoples Gas Company	WTRG	79.59%	71.96%	79.59%
Aqua Ohio Water	WTRG	64.62%	61.27%	64.62%
Aqua Ohio Wastewater	WTRG	72.82%	60.35%	72.82%
Aqua Illinois	WTRG	54.57%	57.96%	54.57%
Aqua Texas	WTRG	50.17%	48.96%	50.17%
Aqua New Jersey, Inc. Water	WTRG	50.28%	59.64%	50.28%
Aqua New Jersey, Inc. Wastewater	WTRG	100.00%	100.00%	100.00%
Aqua North Carolina	WTRG	50.62%	50.65%	50.62%
Aqua Indiana Aboite Division	WTRG	100.00%	100.00%	100.00%
Aqua Indiana Consumers Indiana Div.	WTRG	100.00%	100.00%	100.00%
Aqua Indiana Darlington Div.	WTRG	100.00%	100.00%	100.00%
Aqua Indiana Heir Division	WTRG	100.00%	100.00%	100.00%
Aqua Indiana Sani Tech, Inc.	WTRG	100.00%	100.00%	100.00%
Aqua Indiana Southeastern Utilities	WTRG	100.00%	100.00%	100.00%
Aqua Indiana Wedgewood Park	WTRG	100.00%	100.00%	100.00%
Aqua Indiana White Oak Div.	WTRG	100.00%	100.00%	100.00%
Aqua Indiana Wildwood Shores Div.	WTRG	100.00%	100.00%	100.00%
Aqua Indiana Wymberly Division	WTRG	100.00%	100.00%	100.00%
Aqua Virginia	WTRG	55.23%	49.44%	55.23%
Delta Gas	WTRG	56.93%	60.20%	56.93%
Peoples Gas of WV	WTRG	48.44%	48.10%	48.44%
Connecticut Light and Power Company	ES	55.42%	54.53%	55.42%
Yankee Gas Company	ES	61.97%	60.83%	61.97%
Aquarion Water Company	ES	58.76%	56.60%	58.76%
NSTAR Electric Company	ES	54.95%	55.00%	54.95%
NSTAR Gas Company	ES	55.54%	55.53%	55.54%
Aquarion Water Company	ES	58.76%	56.60%	58.76%
Public Service Company of NH	ES	48.66%	47.77%	48.66%
Aquarion Water Company	ES	58.76%	56.60%	58.76%
Middlesex Water Company	MSEX	59.03%	62.54%	59.03%
Pinelands Water	MSEX	100.00%	100.00%	100.00%
Pinelands WW	MSEX	100.00%	100.00%	100.00%
Twin Lakes Util.	MSEX		100.00%	100.00%
Northern Indiana Public Service Company LLC	NI	58.01%	56.43%	58.01%
Columbia Gas of Kentucky, Inc.	NI	54.68%	54.23%	54.68%
Columbia Gas of Maryland, Inc.	NI	54.95%	52.38%	54.95%
Columbia Gas of Ohio, Inc.	NI	50.45%	53.00%	50.45%
Columbia Gas of Pennsylvania, Inc.	NI	55.68%	55.59%	55.68%
Columbia Gas of Virginia, Inc.	NI	43.69%	42.53%	43.69%
New Jersey Natural Gas Company	NJR	55.45%	58.87%	55.45%
Northwest Natural Gas Company	NWN	47.44%	49.19%	47.44%
Kansas Gas Service Company, Inc.	OGS	60.33%	63.55%	60.33%
Oklahoma Natural Gas Company	OGS	59.85%	63.10%	59.85%
Texas Gas Service Company, Inc.	OGS	59.99%	63.23%	59.99%
San Jose Water	SJW	54.02%	51.46%	54.02%
CT Water	SJW	59.12%	56.58%	59.12%
Avon Water	SJW		92.15%	92.15%
Heritage Village Water	SJW		80.56%	80.56%
Maine Water Co.	SJW	58.39%	54.21%	58.39%
Canyon Lake Water Service Company	SJW	74.05%	71.88%	74.05%
Spire Alabama Inc.	SR	64.35%	66.82%	64.35%
Spire Gulf Inc.	SR	40.55%	37.18%	40.55%
Spire Mississippi Inc.	SR	100.00%	100.00%	100.00%
Spire Missouri Inc.	SR	56.68%	59.05%	56.68%
York Water Company	YORW	53.27%	56.50%	53.27%

Notes:

[1] Ratios are weighted by actual common capital, preferred equity, and long-term debt of Operating Subsidiaries.

[2] Natural Gas, Electric and Water operating subsidiaries where data was unable to be obtained for 2020 and 2019 were removed from the analysis.

LONG-TERM DEBT RATIO - UTILITY OPERATING COMPANIES [2]

Company Name	Ticker	2020	2019	MRY
Golden State Water / Bear Valley	AWR	43.24%	34.06%	43.24%
Atmos Energy Corporation	ATO	41.69%	41.57%	41.69%
California Water Service	CWT	48.66%	53.54%	48.66%
New Mexico Water Service Water Division	CWT	32.94%	34.74%	32.94%
New Mexico Water Service Sewer Division	CWT	40.53%	43.21%	40.53%
Washington Water Service	CWT	28.07%	47.47%	28.07%
Hawaii Water Service Kaanapali Division	CWT	51.07%	50.24%	51.07%
Hawaii Water Service Pukalani Division	CWT	35.44%	34.94%	35.44%
Aqua Pennsylvania Water	WTRG	48.86%	48.97%	48.86%
Aqua Pennsylvania Wastewater	WTRG	2.93%	4.61%	2.93%
Peoples Natural Gas Company	WTRG	38.52%	43.29%	38.52%
Peoples Gas Company	WTRG	20.41%	28.04%	20.41%
Aqua Ohio Water	WTRG	35.38%	38.73%	35.38%
Aqua Ohio Wastewater	WTRG	27.18%	39.65%	27.18%
Aqua Illinois	WTRG	45.43%	42.04%	45.43%
Aqua Texas	WTRG	49.83%	51.04%	49.83%
Aqua New Jersey, Inc. Water	WTRG	49.72%	40.36%	49.72%
Aqua New Jersey, Inc. Wastewater	WTRG	0.00%	0.00%	0.00%
Aqua North Carolina	WTRG	49.38%	49.35%	49.38%
Aqua Indiana Aboite Division	WTRG	0.00%	0.00%	0.00%
Aqua Indiana Consumers Indiana Div.	WTRG	0.00%	0.00%	0.00%
Aqua Indiana Darlington Div.	WTRG	0.00%	0.00%	0.00%
Aqua Indiana Heir Division	WTRG	0.00%	0.00%	0.00%
Aqua Indiana Sani Tech, Inc.	WTRG	0.00%	0.00%	0.00%
Aqua Indiana Southeastern Utilities	WTRG	0.00%	0.00%	0.00%
Aqua Indiana Wedgewood Park	WTRG	0.00%	0.00%	0.00%
Aqua Indiana White Oak Div.	WTRG	0.00%	0.00%	0.00%
Aqua Indiana Wildwood Shores Div.	WTRG	0.00%	0.00%	0.00%
Aqua Indiana Wymberly Division	WTRG	0.00%	0.00%	0.00%
Aqua Virginia	WTRG	44.77%	50.56%	44.77%
Delta Gas	WTRG	43.07%	39.80%	43.07%
Peoples Gas of WV	WTRG	51.56%	51.90%	51.56%
Connecticut Light and Power Company	ES	43.30%	44.03%	43.30%
Yankee Gas Company	ES	38.03%	39.17%	38.03%
Aquarion Water Company	ES	41.24%	43.40%	41.24%
NSTAR Electric Company	ES	44.52%	44.43%	44.52%
NSTAR Gas Company	ES	44.46%	44.47%	44.46%
Aquarion Water Company	ES	41.24%	43.40%	41.24%
Public Service Company of NH	ES	51.34%	52.23%	51.34%
Aquarion Water Company	ES	41.24%	43.40%	41.24%
Middlesex Water Company	MSEX	40.62%	37.05%	40.62%
Pinelands Water	MSEX	0.00%	0.00%	0.00%
Pinelands WW	MSEX	0.00%	0.00%	0.00%
Twin Lakes Util.	MSEX		0.00%	0.00%
Northern Indiana Public Service Company LLC	NI	41.99%	43.57%	41.99%
Columbia Gas of Kentucky, Inc.	NI	45.32%	45.77%	45.32%
Columbia Gas of Maryland, Inc.	NI	45.05%	47.62%	45.05%
Columbia Gas of Ohio, Inc.	NI	49.55%	47.00%	49.55%
Columbia Gas of Pennsylvania, Inc.	NI	44.32%	44.41%	44.32%
Columbia Gas of Virginia, Inc.	NI	56.31%	57.47%	56.31%
New Jersey Natural Gas Company	NJR	44.55%	41.13%	44.55%
Northwest Natural Gas Company	NWN	52.56%	50.81%	52.56%
Kansas Gas Service Company, Inc.	OGS	39.67%	36.45%	39.67%
Oklahoma Natural Gas Company	OGS	40.15%	36.90%	40.15%
Texas Gas Service Company, Inc.	OGS	40.01%	36.77%	40.01%
San Jose Water	SJW	45.98%	48.54%	45.98%
CT Water	SJW	40.88%	43.42%	40.88%
Avon Water	SJW		7.85%	7.85%
Heritage Village Water	SJW		19.44%	19.44%
Maine Water Co.	SJW	41.61%	45.79%	41.61%
Canyon Lake Water Service Company	SJW	25.95%	28.12%	25.95%
Spire Alabama Inc.	SR	35.65%	33.18%	35.65%
Spire Gulf Inc.	SR	59.45%	62.82%	59.45%
Spire Mississippi Inc.	SR	0.00%	0.00%	0.00%
Spire Missouri Inc.	SR	43.32%	40.95%	43.32%
York Water Company	YORW	46.73%	43.50%	46.73%

Notes:

[1] Ratios are weighted by actual common capital, preferred equity, and long-term debt of Operating Subsidiaries.

[2] Natural Gas, Electric and Water operating subsidiaries where data was unable to be obtained for 2020 and 2019 were removed from the analysis.

PREFERRED EQUITY RATIO - UTILITY OPERATING COMPANIES [2]

Company Name	Ticker	2020	2019	MRY
Golden State Water / Bear Valley	AWR	0.00%	0.00%	0.00%
Atmos Energy Corporation	ATO	0.00%	0.00%	0.00%
California Water Service	CWT	0.00%	0.00%	0.00%
New Mexico Water Service Water Division	CWT	0.00%	0.00%	0.00%
New Mexico Water Service Sewer Division	CWT	0.00%	0.00%	0.00%
Washington Water Service	CWT	0.00%	0.00%	0.00%
Hawaii Water Service Kaanapali Division	CWT	0.00%	0.00%	0.00%
Hawaii Water Service Pukalani Division	CWT	0.00%	0.00%	0.00%
Aqua Pennsylvania Water	WTRG	0.00%	0.00%	0.00%
Aqua Pennsylvania Wastewater	WTRG	0.00%	0.00%	0.00%
Peoples Natural Gas Company	WTRG	0.00%	0.00%	0.00%
Peoples Gas Company	WTRG	0.00%	0.00%	0.00%
Aqua Ohio Water	WTRG	0.00%	0.00%	0.00%
Aqua Ohio Wastewater	WTRG	0.00%	0.00%	0.00%
Aqua Illinois	WTRG	0.00%	0.00%	0.00%
Aqua Texas	WTRG	0.00%	0.00%	0.00%
Aqua New Jersey, Inc. Water	WTRG	0.00%	0.00%	0.00%
Aqua New Jersey, Inc. Wastewater	WTRG	0.00%	0.00%	0.00%
Aqua North Carolina	WTRG	0.00%	0.00%	0.00%
Aqua Indiana Aboite Division	WTRG	0.00%	0.00%	0.00%
Aqua Indiana Consumers Indiana Div.	WTRG	0.00%	0.00%	0.00%
Aqua Indiana Darlington Div.	WTRG	0.00%	0.00%	0.00%
Aqua Indiana Heir Division	WTRG	0.00%	0.00%	0.00%
Aqua Indiana Sani Tech, Inc.	WTRG	0.00%	0.00%	0.00%
Aqua Indiana Southeastern Utilities	WTRG	0.00%	0.00%	0.00%
Aqua Indiana Wedgewood Park	WTRG	0.00%	0.00%	0.00%
Aqua Indiana White Oak Div.	WTRG	0.00%	0.00%	0.00%
Aqua Indiana Wildwood Shores Div.	WTRG	0.00%	0.00%	0.00%
Aqua Indiana Wymberly Division	WTRG	0.00%	0.00%	0.00%
Aqua Virginia	WTRG	0.00%	0.00%	0.00%
Delta Gas	WTRG	0.00%	0.00%	0.00%
Peoples Gas of WV	WTRG	0.00%	0.00%	0.00%
Connecticut Light and Power Company	ES	1.28%	1.44%	1.28%
Yankee Gas Company	ES	0.00%	0.00%	0.00%
Aquarion Water Company	ES	0.00%	0.00%	0.00%
NSTAR Electric Company	ES	0.52%	0.57%	0.52%
NSTAR Gas Company	ES	0.00%	0.00%	0.00%
Aquarion Water Company	ES	0.00%	0.00%	0.00%
Public Service Company of NH	ES	0.00%	0.00%	0.00%
Aquarion Water Company	ES	0.00%	0.00%	0.00%
Middlesex Water Company	MSEX	0.36%	0.40%	0.36%
Pinelands Water	MSEX	0.00%	0.00%	0.00%
Pinelands WW	MSEX	0.00%	0.00%	0.00%
Twin Lakes Util.	MSEX		0.00%	0.00%
Northern Indiana Public Service Company LLC	NI	0.00%	0.00%	0.00%
Columbia Gas of Kentucky, Inc.	NI	0.00%	0.00%	0.00%
Columbia Gas of Maryland, Inc.	NI	0.00%	0.00%	0.00%
Columbia Gas of Ohio, Inc.	NI	0.00%	0.00%	0.00%
Columbia Gas of Pennsylvania, Inc.	NI	0.00%	0.00%	0.00%
Columbia Gas of Virginia, Inc.	NI	0.00%	0.00%	0.00%
New Jersey Natural Gas Company	NJR	0.00%	0.00%	0.00%
Northwest Natural Gas Company	NWN	0.00%	0.00%	0.00%
Kansas Gas Service Company, Inc.	OGS	0.00%	0.00%	0.00%
Oklahoma Natural Gas Company	OGS	0.00%	0.00%	0.00%
Texas Gas Service Company, Inc.	OGS	0.00%	0.00%	0.00%
San Jose Water	SJW	0.00%	0.00%	0.00%
CT Water	SJW	0.00%	0.00%	0.00%
Avon Water	SJW		0.00%	0.00%
Heritage Village Water	SJW		0.00%	0.00%
Maine Water Co.	SJW	0.00%	0.00%	0.00%
Canyon Lake Water Service Company	SJW	0.00%	0.00%	0.00%
Spire Alabama Inc.	SR	0.00%	0.00%	0.00%
Spire Gulf Inc.	SR	0.00%	0.00%	0.00%
Spire Mississippi Inc.	SR	0.00%	0.00%	0.00%
Spire Missouri Inc.	SR	0.00%	0.00%	0.00%
York Water Company	YORW	0.00%	0.00%	0.00%

Notes:

[1] Ratios are weighted by actual common capital, preferred equity, and long-term debt of Operating Subsidiaries.

[2] Natural Gas, Electric and Water operating subsidiaries where data was unable to be obtained for 2020 and 2019 were removed from the analysis.