BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

DOCKET NO. W-354, SUB 360

In the Matter of
Application by Carolina Water Service, Inc. of North Carolina
for Authority to Adjust and Increase Rates for
Water and Sewer Utility Service in All of Its Service Areas in
North Carolina, Except Corolla Light and Monteray Shores Service
Area

Pre-filed Direct Testimony

Of

DYLAN D'ASCENDIS, CRRA, CVA

On Behalf Of
CAROLINA WATER SERVICE, INC. OF NORTH CAROLINA

September 4, 2018

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I. INTRODUCTION

A. Witness Identification

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

A. My name is Dylan W. D'Ascendis. My business address is 3000 Atrium Way, Suite 241, Mount Laurel, NJ 08054.

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

A. I am a Director at ScottMadden, Inc.

B. Background and Qualifications

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

A. I offer expert testimony on behalf of investor-owned utilities on rate of return issues and class cost of service issues. I also assist in the preparation of rate filings, including but not limited to revenue requirements and original cost and lead/lag studies. I am a graduate of the University of Pennsylvania, where I received a Bachelor of Arts degree in Economic History. I also hold a Masters of Business Administration from Rutgers University with a concentration in Finance and International Business, which was conferred with high honors. I am a Certified Rate of Return Analyst ("CRRA") and a Certified Valuation Analyst ("CVA"). My full professional qualifications are provided in Appendix A.

II. PURPOSE OF TESTIMONY

Q. **What is the purpose of your testimony in this proceeding?**

A. The purpose of my testimony is to present evidence on behalf of Carolina Water Service, Inc. of North Carolina. ("CWSNC" or the "Company") about the appropriate capital structure and corresponding cost rates the Company should be given the opportunity to earn on its jurisdictional rate base.

Q. **Have you prepared an exhibit in support of your recommendation?**

A. Yes. I have prepared D'Ascendis Exhibit No. 1 which consists of Schedules DWD-1 through DWD-8.

Q. **What is your recommended cost of capital for CWSNC?**

A. I recommend the North Carolina Utilities Commission ("NCUC" or the "Commission") authorize the Company the opportunity to earn an overall rate of return between 8.91% and 9.12% based on a test year ending December 31, 2017. The ratemaking capital structure consists of 47.11% long-term debt at an embedded debt cost rate of 6.00%, and 52.89% common equity at my recommended range of common equity cost rates between 11.50% and 11.90%. The overall rate of return is summarized on page 1 of Schedule DWD-1 and in Table 1 below:

Table 1: Summary of Overall Rate of Return

Type of Capital	Ratios	Cost Rate	Weighted Cost Rate
Long-Term Debt	47.11%	6.00%	2.83%
Common Equity	52.89%	11.50% - 11.90%	6.08% - 6.29%
Total	100.00%		8.91% - 9.12%

III. SUMMARY

Q. **Please summarize your recommended range of common equity cost rates.**

A. My recommended range of common equity cost rates between 11.50% and 11.90% is summarized on page 2 of Schedule DWD-1. I have assessed the market-based common equity cost rates of companies of relatively similar, but not necessarily identical, risk to CWSNC. Using companies of relatively comparable risk as proxies is consistent with the principles of fair rate of return established in the *Hope*[1] and *Bluefield*[2] cases. No proxy group can be identical in risk to any single company, so there must be an evaluation of relative risk between the company and the proxy group to see if it is appropriate to make adjustments to the proxy group's indicated rate of return.

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

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1 *Federal Power Commission v. Hope Natural Gas Co.*, 320 U.S. 591 (1944).
2 *Bluefield Water Works Improvement Co. v. Public Serv. Comm'n*, 262 U.S. 679 (1922).

The results derived from each are as follows:

Table 2: Summary of Common Equity Cost Rate

	Utility Proxy Group
Discounted Cash Flow Model	9.10%
Risk Premium Model	12.12
Capital Asset Pricing Model	11.31
Cost of Equity Models Applied to Comparable Risk, Non-Price Regulated Companies	12.63
Indicated Common Equity Cost Rate Before Adjustment	11.50%
Size Adjustment	0.40
Recommended Range of Common Equity Cost Rates After Adjustment	11.50% - 11.90%

After analyzing the indicated common equity cost rates derived by these models, I conclude that a common equity cost rate of 11.50% for the Company is indicated before any Company-specific adjustments. The indicated common equity cost rate was then adjusted upward by 0.40% to reflect CWSNC's smaller relative size as compared with the members of the Utility Proxy Group, resulting in a size-adjusted indicated common equity cost rate of 11.90%. My recommended range is defined by the indicated common equity cost rate before adjustment (11.50%) and the size-adjusted common equity cost rate (11.90%).

IV. GENERAL PRINCIPLES

Q. **What general principles have you considered in arriving at your recommended range of common equity cost rates between 11.50% and 11.90%?**

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

A. Business Risk

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

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

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

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

A. Water and wastewater utilities have an ever-increasing responsibility to be stewards of the environment from which supplies are drawn in order to preserve and protect essential natural resources of the United States. This increased environmental stewardship is a direct result of compliance with the Safe Water Drinking Act and response to continuous monitoring by the Environmental Protection Agency ("EPA") and state and local governments of the water supply for potential contaminants and their resultant regulations. This, plus aging infrastructure, necessitate additional capital

investment in the distribution and treatment of water, exacerbating the pressure on free cash flows arising from increased capital expenditures for infrastructure repair and replacement. The significant amount of capital investment and, hence, high capital intensity, is a major risk factor for the water and wastewater utility industry.

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

> Following several decades of neglect, the nation's water infrastructure was left in terrible condition. Pipeline systems were antiquated and waste facilities needed to be upgraded and expanded to handle greater demand. The neglect was not purposeful. It was mostly caused by regulators not wanting to raise customers (i.e. voters) water bills, and utilities not wanting to make sizable investments, in which there was uncertainty regarding the what [sic] level of return they would be granted. Fortunately, the two sides got together and realized that massive amounts of funds would be required to modernize the domestic water delivery systems. Though they are playing catch up, most believe the industry and regulators have done a decent job of addressing the issue. Fixing the water infrastructure will still take many years, but the commitment has been made to resolve the problem.

> Perhaps the most important reason behind the strong operation performance turned in by the group is due to the overall national regulatory climate. State authorities realized that the past history of keeping water rates too low came at a high cost. Most public utility commissions understood that they would have to work in partnership with the industry to make sure that the burdensome construction programs were undertaken. Since regulators literally legislate what a utility is allowed to earn on its investment, their importance cannot be overstated. [3]

[3] *Value Line Investment Survey*, January 12, 2018.

The water and wastewater industries also experience low depreciation rates. Depreciation rates are one of the principal sources of internal cash flows for all utilities (through a utility's depreciation expense), and are vital to a company to fund ongoing replacements and repairs of the system. Water / wastewater utilities' assets have long lives, and therefore have long capital recovery periods. As such, they face greater risk due to inflation, which results in a higher replacement cost per dollar of net plant.

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

[4] Free Cash Flow = Operating Cash Flow (funds from operations) minus Capital Expenditures.

The water and wastewater utility industry's high degree of capital intensity and low depreciation rates, coupled with the need for substantial infrastructure capital spending, require regulatory support in the form of adequate and timely rate relief, particularly a sufficient authorized return on common equity, so that the industry can successfully meet the challenges it faces.

B. Financial Risk

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

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

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

A. Yes, similar bond ratings/issuer credit ratings reflect, and are representative of, similar combined business and financial risks (*i.e.*, total risk) faced by bond investors.[5] Although specific business or financial risks may differ

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

between companies, the same bond/credit rating indicates that the combined risks are roughly similar, albeit not necessarily equal, as the purpose of the bond/credit rating process is to assess credit quality or credit risk and not common equity risk.

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

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

V. CAPITAL STRUCTURE

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

A. I recommend the use of a ratemaking capital structure consisting of 47.11% long-term debt and 52.89% common equity as shown on page 1 of Schedule DWD-1. This capital structure is based on a test year capital structure for CWSNC, ending December 31, 2017.

Q. **How does your proposed ratemaking common equity ratio of 52.89% for CWSNC compare with the total equity ratios maintained by the companies in your Utility Proxy Group?**

A. My proposed ratemaking common equity ratio of 52.89% for CWSNC is reasonable and consistent with the range of total equity ratios maintained, on average, by the companies in the Utility Proxy Group on which I base

my recommended common equity cost rate. As shown on page 2 of Schedule DWD-2, the common equity ratios of the Utility Proxy Group range from 44.12% to 62.25%, with a midpoint of 53.19% and an average of 54.61% in 2017. The equity ratio, on average, maintained by the Utility Proxy Group is higher than the equity ratio requested by the Company.

In my opinion, a capital structure consisting of 47.11% long-term debt and 52.89% total equity is appropriate for ratemaking purposes for CWSNC in the current proceeding because it is comparable, but conservative, to the average capital structure ratios (based on total permanent capital) maintained by the water companies in the Utility Proxy Group on whose market data I base my recommended common equity cost rate.

Q. **What cost rate for long-term debt is most appropriate for use in a cost of capital determination for CWSNC?**

A. A long-term debt cost rate of 6.00% is reasonable and appropriate as it is based on a test year of the Company's long-term debt outstanding ending December 31, 2017.

VI. CWSNC AND THE UTILITY PROXY GROUP

Q. **Are you familiar with the operations of CWSNC?**

A. Yes. CWSNC's is headquartered in Charlotte, North Carolina, and its operations span the state from Bear Paw to Corolla. CWSNC serves approximately 35,000 water customers and 15,000 sewer customers. CWSNC is not publicly-traded.

Q. **Please explain how you chose your proxy group of six water companies.**

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

(i) They are included in the Water Utility Group of *Value Line's Standard Edition* (January 12, 2018);

(ii) They have 70% or greater of 2017 total operating income and 70% or greater of 2017 total assets attributable to regulated water operations;

(iii) At the time of preparation of this testimony, they had not publicly announced that they were involved in any major merger or acquisition activity (*i.e.*, one publicly-traded utility merging with or acquiring another);

(iv) They have not cut or omitted their common dividends during the five years ending 2017 or through the time of the preparation of this testimony;

(v) They have *Value Line* and Bloomberg adjusted betas;

(vi) They have a positive *Value Line* five-year dividends per share ("DPS") growth rate projection; and

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

The following six companies met these criteria: American States Water Co., American Water Works Co., Inc., Aqua America, Inc., California Water Service Group, Middlesex Water Co., and York Water Co.

Q. **Please describe schedule DWD-2, page 1.**

A. Page 1 of Schedule DWD-2 contains comparative capitalization and financial statistics for the six water companies identified above for the years 2013 to 2017.

During the five-year period ending 2017, the historically achieved average earnings rate on book common equity for the group averaged 10.68%. The average common equity ratio based on total permanent capital (excluding short-term debt) was 54.56%, and the average dividend payout ratio was 58.60%.

Total debt to earnings before interest, taxes, depreciation, and amortization ("EBITDA") for the years 2013 to 2017 ranges between 3.51 and 3.56, with an average of 3.45. Funds from operations to total debt range from 22.50% to 26.48%, with an average of 24.38%.

VII. COMMON EQUITY COST RATE MODELS

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

A. Yes. The DCF model is market-based because market prices are used in developing the dividend yield component of the model. The RPM is market-based because the bond ratings and expected bond yields used in the application of the RPM reflect the market's assessment of bond/credit risk. In addition, the use of beta coefficients (β) to determine the equity risk

premium reflects the market's assessment of market/systematic risk, since beta coefficients are derived from regression analyses of market prices. The Predictive Risk Premium Model ("PRPM") uses monthly market returns in addition to expectations of the risk-free rate. The CAPM is market-based for many of the same reasons that the RPM is market-based (*i.e.*, the use of expected bond yields and betas). Selection of the comparable risk non-price regulated companies is market-based because it is based on statistics which result from regression analyses of market prices and reflect the market's assessment of total risk.

A. Discounted Cash Flow Model

Q. **What is the theoretical basis of the DCF model?**

A. The theory underlying the DCF model is that the present value of an expected future stream of net cash flows during the investment holding period can be determined by discounting those cash flows at the cost of capital, or the investors' capitalization rate. DCF theory indicates that an investor buys a stock for an expected total return rate, which is derived from cash flows received in the form of dividends plus appreciation in market price (the expected growth rate). Mathematically, the dividend yield on market price plus a growth rate equals the capitalization rate, *i.e.*, the total common equity return rate expected by investors.

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

A. I use the single-stage constant growth DCF model.

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

A. The unadjusted dividend yields are based on the proxy companies' dividends as of March 29, 2018, divided by the average of closing market prices for the 60 trading days ending March 29, 2018.[6]

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

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

DCF theory calls for the use of the full growth rate, or D_1, in calculating the dividend yield component of the model. Since the various companies in the Utility Proxy Group increase their quarterly dividend at various times during the year, a reasonable assumption is to reflect one-half the annual dividend growth rate in the dividend yield component, or $D_{1/2}$. Because the dividend should be representative of the next twelve-month period, my adjustment is a conservative approach that does not overstate the dividend yield. Therefore, the actual average dividend yields in Column 1 on page 1 of Schedule DWD-3 have been adjusted upward to reflect one-half the average projected growth rate shown in Column 6.

[6] See Schedule DWD-3, page 1, column 1.

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

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

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

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

A. As shown on page 1 of Schedule DWD-3, the mean result of the application of the single-stage DCF model is 9.12%, the median result is 9.07%, and the average of the two is 9.10% for the Utility Proxy Group. In arriving at a conclusion for the DCF-indicated common equity cost rate for the Utility Proxy Group, I have relied on an average of the mean and the median results of the DCF. This approach takes into consideration all the proxy

companies' results, while mitigating the high and low outliers of those individual results.

B. The Risk Premium Model

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

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

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

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

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

Q. **Please explain the PRPM.**

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

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

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[7] Autoregressive conditional heteroscedasticity. See "A New Approach for Estimating the Equity Risk Premium for Public Utilities", Pauline M. Ahern, Frank J. Hanley and Richard A. Michelfelder, Ph.D. The Journal of Regulatory Economics (December 2011), 40:261-278.

[8] www.nobelprize.org.

The inputs to the model are the historical returns on the common shares of each company in the Utility Proxy Group minus the historical monthly yield on long-term U.S. Treasury securities through March 2018. Using a generalized form of ARCH, known as GARCH, I calculate each Utility Proxy Group company's projected equity risk premium using Eviews© statistical software. When the GARCH Model is applied to the historical return data, it produces a predicted GARCH variance series[9] and a GARCH coefficient[10]. Multiplying the predicted monthly variance by the GARCH coefficient and annualizing it[11] produces the predicted annual equity risk premium. I then add the forecasted 30-year U.S. Treasury Bond yield, 3.69%[12], to each company's PRPM-derived equity risk premium to arrive at an indicated cost of common equity. The 30- year Treasury yield is a consensus forecast derived from the *Blue Chip Financial Forecasts ("Blue Chip")*[13]. The mean PRPM indicated common equity cost rate for the Utility Proxy Group is 13.52%, the median is 13.33%, and the average of the two is 13.43%. Consistent with my reliance on the average of the median and mean results of the DCF, I will rely on the average of the mean and median results of the Utility Proxy Group PRPM to calculate a cost of common equity rate of 13.43%.

9 Illustrated on Columns 1 and 2 of page 2 of Schedule DWD-4.
10 Illustrated on Column 4 of page 2 of Schedule DWD-4.
11 Annualized Return = (1+Monthly Return)^12 - 1
12 See column 6 of page 2 of Schedule DWD-4.
13 *Blue Chip Financial Forecasts*, December 1, 2017 at p. 14 and April 1, 2018 at p. 2.

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

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

Q. **Please explain the basis of the expected bond yield of 5.00% applicable to the Utility Proxy Group.**

A. The first step in the total market approach RPM analysis is to determine the expected bond yield. Because both ratemaking and the cost of capital, including common equity cost rate, are prospective in nature, a prospective yield on similarly-rated long-term debt is essential. I rely on a consensus forecast of about 50 economists of the expected yield on Aaa-rated corporate bonds for the six calendar quarters ending with the third calendar quarter of 2019 and the long-term projections for 2019 to 2023, and 2024 to 2028 from Blue Chip. As shown on Line No. 1 of page 3 of Schedule DWD-4, the average expected yield on Moody's Aaa-rated corporate bonds is 4.66%. In order to derive an expected yield on A2 rated-public utility bonds, I make an upward adjustment of 0.28%, which represents a recent spread between Aaa corporate bonds and A2-rated public utility bonds, in order to adjust the expected Aaa corporate bond yield to an equivalent Moody's A2-rated public utility bond.[14] Adding that recent 0.28% spread to

[14] As shown on Line No. 2 and explained in note 2 of page 3 of Schedule DWD-4.

the expected Aaa corporate bond yield of 4.66% results in an expected A2 public utility bond of 4.94%.

Since the Utility Proxy Group's average Moody's long-term issuer rating is A2/A3, another adjustment to the expected A2 public utility bond yield is needed to reflect the difference in bond ratings. An upward adjustment of 0.06%, which represents one-sixth of a recent spread between A2 and A3 public utility bond yields, is necessary to make the A2 prospective bond yield applicable to an A2/A3 public utility bond.[15] Adding the 0.06% to the 4.94% prospective A2 public utility bond yield results in a 5.00% expected bond yield for the Utility Proxy Group.

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

A. The components of the beta derived risk premium model are 1) an expected market equity risk premium over corporate bonds, and 2) the beta coefficient. The derivation of the beta-derived equity risk premium that I apply to the Utility Proxy Group is shown on lines 1 through 11 of page 8 of Schedule DWD-4. The total beta-derived equity risk premium I apply is based on an average of: 1) Historical data-based equity risk premiums; 2) *Value Line*-based equity risk premiums; and 3) Bloomberg-based equity risk premium. Each of these is described in turn.

[15] As shown on Line No. 4 and explained in note 3 on page 3 of Schedule DWD-4.

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

A. To derive a historical market equity risk premium, I used the most recent holding period returns for the large company common stocks from the 2017 Stocks, Bonds, Bills, and Inflation ("SBBI") Yearbook ("SBBI – 2017")[16] less the average historical yield on Moody's Aaa/Aa-rated corporate bonds for the period 1928 to 2016. The use of holding period returns over a very long period of time is appropriate because it is consistent with the long-term investment horizon presumed by investing in a going concern, *i.e.*, a company expected to operate in perpetuity.

SBBI's long-term arithmetic mean monthly total return rate on large company common stocks was 11.69% and the long-term arithmetic mean monthly yield on Moody's Aaa/Aa-rated corporate bonds was 6.13%.[17] As shown on line 1 of page 8 of Schedule DWD-4, subtracting the mean monthly bond yield from the total return on large company stocks results in a long-term historical equity risk premium of 5.56%.

I used the arithmetic mean monthly total return rates for the large company stocks and yields (income returns) for the Moody's Aaa/Aa corporate bonds, because they are appropriate for the purpose of estimating the cost of capital as noted in SBBI – 2017.[18] The use of the arithmetic mean return rates and yields is appropriate because historical

[16] SBBI Appendix A Tables: Morningstar Stocks, Bonds, Bills, & Inflation 1926-2016.
[17] As explained in note 1 on page 9 of Schedule DWD-4.
[18] SBBI – 2017, at 10-22.

total returns and equity risk premiums provide insight into the variance and standard deviation of returns needed by investors in estimating future risk when making a current investment. If investors relied on the geometric mean of historical equity risk premiums, they would have no insight into the potential variance of future returns because the geometric mean relates the change over many periods to a constant rate of change, thereby obviating the year-to-year fluctuations, or variance, which is critical to risk analysis.

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

A. To derive the regression analysis-derived market equity risk premium of 7.31%, shown on line 2 of page 8 of Schedule DWD-4, I used the same monthly annualized total returns on large company common stocks relative to the monthly annualized yields on Moody's Aaa/Aa corporate bonds as mentioned above. The relationship between interest rates and the market equity risk premium was modeled using the observed monthly market equity risk premium as the dependent variable, and the monthly yield on Moody's Aaa/Aa corporate bonds as the independent variable. I used a linear Ordinary Least Squares ("OLS") regression, in which the market equity risk premium is expressed as a function of the Moody's Aaa/Aa corporate bonds yield:

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

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

A. I used the same PRPM approach described previously to develop another equity risk premium estimate. The inputs to the model are the historical monthly returns on large company common stocks minus the monthly yields on Aaa/Aa corporate bonds during the period from January 1928 through March 2018.[19] Using the previously discussed generalized form of ARCH, known as GARCH, the projected equity risk premium is determined using Eviews© statistical software. The resulting PRPM predicted market equity risk premium is 6.66%.[20]

The average historical data-based equity risk premium is 6.51%, which is shown on line 4 of page 8 of Schedule DWD-4.

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

A. As noted previously, because both ratemaking and the cost of capital are prospective, a prospective market equity risk premium is needed. The derivation of the forecasted or prospective market equity risk premium can be found in note 4 on page 8 of Schedule DWD-4. Consistent with my calculation of the dividend yield component in my DCF analysis, this prospective market equity risk premium is derived from an average of the three- to five-year median market price appreciation potential by *Value Line* for the thirteen weeks ending March 30, 2018, plus an average of the

[19] Data from January 1926-December 2016 is from SBBI – 2017. Data from January – March 2018 is from Bloomberg Professional Services.

[20] Shown on Line No. 3 on page 8 of Schedule DWD-4.

median estimated dividend yield for the common stocks of the 1,700 firms covered in *Value Line*'s Standard Edition.[21]

The average median expected price appreciation is 33%, which translates to a 7.39% annual appreciation, and, when added to the average of *Value Line's* median expected dividend yields of 1.95%, equates to a forecasted annual total return rate on the market of 9.34%. The forecasted Aaa bond yield of 4.66% is deducted from the total market return of 9.34%, resulting in an equity risk premium of 4.68%, shown on page 8, line 5 of Schedule DWD-4.

Q. **Please explain the derivation of an equity risk premium based on the S&P 500 companies.**

A. Using data from *Value Line*, I calculate an expected total return on the S&P 500 using expected dividend yields and long-term growth estimates as a proxy for capital appreciation. The expected total return for the S&P 500 is 15.73%. Subtracting the prospective yield on Aaa Corporate bonds of 4.66% results in an 11.07% projected equity risk premium.

The average *Value Line*-based Equity risk premium is 7.87%, which is shown on Line No. 7 on page 8 of Schedule DWD-4.

[21] As explained in detail in page 2, note 1 of Schedule DWD-5.

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

A. Using data from Bloomberg Professional Services, I calculate an expected total return on the S&P 500 using expected dividend yields and long-term growth estimates as a proxy for capital appreciation, identical to the method described above. The expected total return for the S&P 500 is 14.59%. Subtracting the prospective yield on Aaa Corporate bonds of 4.66% results in a 9.93% projected equity risk premium.

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

A. I give equal weight to equity risk premiums based on each source, historical, *Value Line*, and Bloomberg, in arriving at my conclusion of 8.10%.[22]

After calculating the average market equity risk premium of 8.10%, I adjust it by beta to account for the risk of the Utility Proxy Group. As discussed below, the beta coefficient is a meaningful measure of prospective relative risk to the market as a whole and is a logical means by which to allocate a company's, or proxy group's, share of the market's total equity risk premium relative to corporate bond yields. As shown on page 1 of Schedule DWD-5, the average of the mean and median beta coefficient for the Utility Proxy Group is 0.82. Multiplying the beta coefficient of the Utility Proxy Group of 0.82 by the market equity risk premium of 8.10%

[22] 8.10% = (6.51% + 7.87% + 9.93%)/3. See Line No. 9 on page 8 of Schedule DWD-4.

results in a beta-adjusted equity risk premium of 6.64% for the Utility Proxy Group.

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

A. I estimated three equity risk premiums based on S&P Utility Index holding returns, and two equity risk premiums based on the expected returns of the S&P Utilities Index, using *Value Line* and Bloomberg data, respectively. Turning first to the S&P Utility Index holding period returns, I derived a long-term monthly arithmetic mean equity risk premium between the S&P Utility Index total returns of 10.63% and monthly A-rated public utility bond yields of 6.59% from 1928 to 2017 to arrive at an equity risk premium of 4.04%.[23] I then used the same historical data to derive an equity risk premium of 5.61% based on a regression of the monthly equity risk premiums. The final S&P Utility Index holding period equity risk premium involved applying the PRPM using the historical monthly equity risk premiums from January 1928 to March 2018 to arrive at a PRPM-derived equity risk premium of 4.18% for the S&P Utility Index. The average of the three S&P Utilities Index holding return equity risk premiums is 4.61%.

I then derived expected total returns on the S&P Utilities Index of 9.80% and 10.31% using data from *Value Line* and Bloomberg Professional Services, respectively, and subtracted the prospective A2-rated public utility

[23] As shown on Line No. 1 on page 12 of Schedule DWD-4.

bond yield (4.94%[24]), which results in risk premiums of 4.86% and 5.37%, respectively. As with the market equity risk premiums, I averaged the risk premium based on each source (*i.e.*, Historical, *Value Line*, and Bloomberg) to arrive at my utility-specific equity risk premium of 4.95%.[25]

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

A. The equity risk premium I apply to the Utility Proxy Group is 5.80%, which is the average of the beta-derived and the S&P utility equity risk premiums of 6.64% and 4.95%, respectively.[26]

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

A. As shown on Line No. 7 of Schedule DWD-4, page 3, I calculate a common equity cost rate of 10.80% for the Utility Proxy Group based on the total market approach of the RPM.

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

A. As shown on page 1 of Schedule DWD-4, the indicated RPM-derived common equity cost rate is 12.12%, which gives equal weight to the PRPM (13.43%) and the adjusted market approach results (10.80%).

[24] Derived on Line No. 3 of page 3 of Schedule DWD-4.
[25] 4.95% = (4.41% + 4.86% + 5.37%)/3.
[26] As shown on page 7 of Schedule DWD-4.

C. The Capital Asset Pricing Model

Q. Please explain the theoretical basis of the CAPM.

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

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

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

Where:

R_s = Return rate on the common stock

R_f = Risk-free rate of return

R_m = Return rate on the market as a whole

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

Numerous tests of the CAPM have measured the extent to which security returns and beta coefficients are related as predicted by the CAPM, confirming its validity. The empirical CAPM ("ECAPM") reflects the reality that while the results of these tests support the notion that the beta coefficient is related to security returns, the empirical Security Market Line ("SML") described by the CAPM formula is not as steeply sloped as the predicted SML.[27] In view of theory and practical research, I have applied both the traditional CAPM and the ECAPM to the companies in the Utility Proxy Group and averaged the results.

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

A. With respect to the beta coefficient, I considered two methods of calculation: the average of the Beta coefficients of the Utility Proxy Group companies reported by Bloomberg Professional Services, and the average of the Beta coefficients of the Utility Proxy Group companies as reported by *Value Line*. While both of those services adjust their calculated (or "raw") Beta coefficients to reflect the tendency of the Beta coefficient to regress to the market mean of 1.00, *Value Line* calculates the Beta coefficient over a five-year period, while Bloomberg's calculation is based on two years of data.

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

A. As shown in column 5 on page 1 of Schedule DWD-5, the risk-free rate adopted for both applications of the CAPM is 3.69%. This risk-free rate of

[27] Roger A. Morin, New Regulatory Finance (Public Utility Reports, Inc., 2006), at p. 175.

3.69% is based on the average of the *Blue Chip* consensus forecast of the expected yields on 30-year U.S. Treasury bonds for the six quarters ending with the third calendar quarter of 2019 and long-term projections for the years 2019 to 2023 and 2024 to 2028.

Q. **Why is the yield on long-term U.S. Treasury Bonds appropriate for use as the risk-free rate?**

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

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

A. The basis of the market risk premium is explained in detail in Note 1 on Schedule DWD-5. As discussed previously, the market risk premium is derived from an average of:

(i) Historical data-based market risk premiums;

(ii) *Value Line* data-based market risk premiums; and

(iii) Bloomberg data-based market risk premium.

The long-term income return on U.S. Government Securities of 5.17% was deducted from the SBBI-2017 monthly historical total market

return of 11.97%, which results in an historical market equity risk premium of 6.80%.[28] I applied a linear OLS regression to the monthly annualized historical returns on the S&P 500 relative to historical yields on long-term U.S. Government Securities from SBBI-2017. That regression analysis yielded a market equity risk premium of 8.49%. The PRPM market equity risk premium is 7.55%, and is derived using the PRPM relative to the yields on long-term U.S. Treasury securities from January 1926 through March 2018. The average of the historical data-based market risk premiums is 7.61%.

The *Value Line*-derived forecasted total market equity risk premium is derived by deducting the forecasted risk-free rate of 3.69%, discussed above, from the *Value Line* projected total annual market return of 9.34%, resulting in a forecasted total market equity risk premium of 5.65%. The S&P 500 projected market equity risk premium using *Value Line* data is derived by subtracting the projected risk-free rate of 3.69% from the projected total return of the S&P 500 of 15.73%. The resulting market equity risk premium is 12.04%. The average *Value Line* market risk premium is 8.84%.

The S&P 500 projected market equity risk premium using Bloomberg data is derived by subtracting the projected risk-free rate of 3.69% from the projected total return of the S&P 500 of 14.59%. The resulting market equity risk premium is 10.90%.

[28] SBBI – 2017, at Appendix A-1 (1) through .A-1 (3) and Appendix A-7 (19) through A-7 (21).

These three sources (historical, *Value Line*, and Bloomberg), when averaged, result in an average total market equity risk premium of 9.12%.[29]

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

A. As shown on page 1 of Schedule DWD-5, the mean result of my CAPM/ECAPM analyses is 11.25%, the median is 11.37%, and the average of the two is 11.31%. Consistent with my reliance on the average of mean and median DCF results discussed above, the indicated common equity cost rate using the CAPM/ECAPM is 11.31%.

D. Common Equity Cost Rates for a Proxy Group of Domestic, Non-Price Regulated Companies Based on the DCF, RPM, and CAPM

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

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

[29] 9.12% = (7.61% + 8.84% + 10.90%)/3.

empirically results in a proxy group which is comparable in total risk to the Utility Proxy Group.

Q. **How did you select unregulated companies that are comparable in total risk to the regulated public Utility Proxy Group?**

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

(i) They must be covered by *Value Line Investment Survey* (Standard Edition);

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

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

(iv) The residual standard errors of the *Value Line* regressions which gave rise to the unadjusted beta coefficients must lie within plus or

minus two standard deviations of the average residual standard error of the Utility Proxy Group.

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

Q. **Have you prepared a schedule which shows the data from which you selected the seventeen domestic, non-price regulated companies that are comparable in total risk to the Utility Proxy Group?**

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

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

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

Page 2 of Schedule DWD-7 contains the derivation of the DCF cost rates. As shown, the indicated common equity cost rate using the DCF for

the Non-Price Regulated Proxy Group comparable in total risk to the Utility Proxy Group, is 14.15%.

Pages 3 through 5 contain the data and calculations that support the 12.46% RPM cost rate. As shown on Line No. 1 of page 3 of Schedule DWD-7, the consensus prospective yield on Moody's Baa rated corporate bonds for the six quarters ending in the third quarter of 2019, and for the years 2019 to 2023 and 2024 to 2028, is 5.41%.[30]

When the beta-adjusted risk premium of 7.05%[31] relative to the Non-Price Regulated Proxy Group is added to the prospective Baa2 rated corporate bond yield of 5.41%, the indicated RPM cost rate is 12.46%.

Page 6 contains the inputs and calculations that support my indicated CAPM/ECAPM cost rate of 11.78%.

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

A. As shown on page 1 of Schedule DWD-7, the results of the DCF, RPM, and CAPM applied to the Non-Price Regulated Proxy Group comparable in total risk to the Utility Proxy Group are 14.15%, 12.46%, and 11.78%, respectively. The average of the mean and median of these models is 12.63%, which I use as the indicated common equity cost rate for the Non-Price Regulated Proxy Group.

[30] *Blue Chip Financial Forecasts*, December 1, 2017, at p. 14 and April 1, 2018, at p. 2.
[31] Derived on page 5 of Schedule DWD-7.

VIII. CONCLUSION OF COMMON EQUITY COST RATE BEFORE ADJUSTMENT

Q. **What is the indicated common equity cost rate before adjustment?**

A. Based on the results of the application of multiple cost of common equity models to the Utility Proxy Group and the Non-Price Regulated Proxy Group, the indicated cost of equity before adjustments is 11.50%. I use multiple cost of common equity models as primary tools in arriving at my recommended common equity cost rate, because no single model is so inherently precise that it can be relied on solely to the exclusion of other theoretically sound models. The use of multiple models adds reliability to the estimation of the common equity cost rate, and the prudence of using multiple cost of common equity models is supported in both the financial literature and regulatory precedent.

Based on these common equity cost rate results, I conclude that a common equity cost rate of 11.50% is reasonable and appropriate for the Company before any adjustment is made for relative risk between the Company and the Utility Proxy Group. The 11.50% indicated ROE is the approximate average of the mean and median results produced by my application of the models as explained above.

IX. ADJUSTMENTS TO THE COMMON EQUITY COST RATE

A. Size Adjustment

Q. **Is there a way to quantify a relative risk adjustment due to CWSNC's small size relative to the proxy group?**

A. Yes. The Company has greater relative risk than the average company in the Utility Proxy Group because of its smaller size compared with the group, as measured by an estimated market capitalization of common equity for CWSNC (whose common stock is not publicly-traded).

Table 5: Size as Measured by Market Capitalization for the Company and the Utility Proxy Group

	Market Capitalization* ($ Millions)	Times Greater than the Company
CWSNC	$182.481	
Utility Proxy Group	$4,240.418	23.2x

*From page 1 of Schedule DWD-8.

The Company's estimated market capitalization was at $182.481 million as of March 29, 2018, compared with the market capitalization of the average water company in the Utility Proxy Group of $4.240 billion as of March 29, 2018. The Utility Proxy Group's market capitalization is 23.2 times the size of CWSNC's estimated market capitalization.

Q. **Please explain why size has a bearing on business risk.**

A. Company size is a significant element of business risk for which investors expect to be compensated through higher returns. Generally, smaller companies are less able to cope with significant events that affect sales,

revenues, and earnings. For example, smaller companies face more risk exposure to business cycles and economic conditions, both nationally and locally. Additionally, the loss of revenues from a few larger customers would have a greater effect on a small company than on a much larger company with a larger, more diverse, customer base.

Further evidence of the risk effects of size include the fact that investors demand greater returns to compensate for the lack of marketability and liquidity of the securities of smaller firms. For these reasons, the Commission should authorize a cost of common equity in this proceeding that reflects CWSNC's relevant risk, including the impact of its small size.

As a result, it is necessary to upwardly adjust the indicated common equity cost rate of 11.50% to reflect CWSNC's greater risk due to its smaller relative size. The determination is based on the size premiums for portfolios of New York Stock Exchange ("NYSE"), American Stock Exchange ("AMEX"), and NASDAQ listed companies ranked by deciles for the 1926 to 2016 period. The average size premium for the Utility Proxy Group with a market capitalization of $4.240 billion falls in the 4th decile, while CWSNC's market capitalization of $182.481 million puts the Company in the 10th decile. The size premium spread between the 4th decile and the 10th decile is 4.61%. Even though a 4.61% upward size adjustment is indicated, I apply a size premium of 0.40% to CWSNC's indicated common equity cost rate.

Q. **What is the indicated cost of common equity after your adjustment for size?**

A. After applying the 0.40% size adjustment to the indicated cost of common equity of 11.50%, a size-adjusted cost of common equity of 11.90% results.

X. ECONOMIC CONDITIONS IN NORTH CAROLINA

Q. **Did you consider the economic conditions in North Carolina in arriving at your recommended cost of common equity?**

A. Yes, I did. As the Commission has stated, it "…is and must always be mindful of the North Carolina Supreme Court's command that the Commission's task is to set rates as low as possible consistent with the dictates of the United States and North Carolina Constitutions."[32] In that regard, the cost of common equity should be neither excessive nor confiscatory; it should be the minimum amount needed to meet the *Hope* and *Bluefield* Comparable Risk, Capital Attraction, and Financial Integrity standards.

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

> … adjusting investors' required costs based on factors upon which investors do not base their willingness to invest is an unsupportable theory or concept. The

[32] State of North Carolina Utilities Commission, Docket No. E-7, Sub 1026, Order Granting General Rate Increase, Sept. 24, 2013 at 24; see also DEC Remand Order at 40 ("the Commission in every case seeks to comply with the North Carolina Supreme Court's mandate that the Commission establish rates as low as possible within Constitutional limits.").

> proper way to take into account customer ability to pay is in the Commission's exercise of fixing rates as low as reasonably possible without violating constitutional proscriptions against confiscation of property. This is in accord with the "end result" test of Hope. This the Commission has done.[33]

The Supreme Court agreed, and upheld the Commission's Order on Remand.[34] The Supreme Court also made clear, however, that "in retail electric service rate cases the Commission must make findings of fact regarding the impact of changing economic conditions on customers when determining the proper ROE for a public utility."[35] The Commission made such additional findings of fact in its Order on Remand.[36] In light of the Cooper I decision, I present measures of economic conditions in the State and in the nation for the Commission to consider.

Q. **What specific measures of economic conditions have you reviewed?**

A. I have reviewed the following:

(i) Unemployment rates from the United States, North Carolina, and the counties comprising CWSNC's service territory;

(ii) The growth in Gross National Product ("GDP") in both the United States and North Carolina;

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

[34] State ex rel. Utils. Comm'n v. Cooper, 366 N.C. 484, 739 S.E.2d 541 (2013) (Cooper I)).

[35] State of North Carolina ex rel. Utilities Commission v. Cooper, 758 S.E.2d 635, 642 (2014) ("Cooper II").

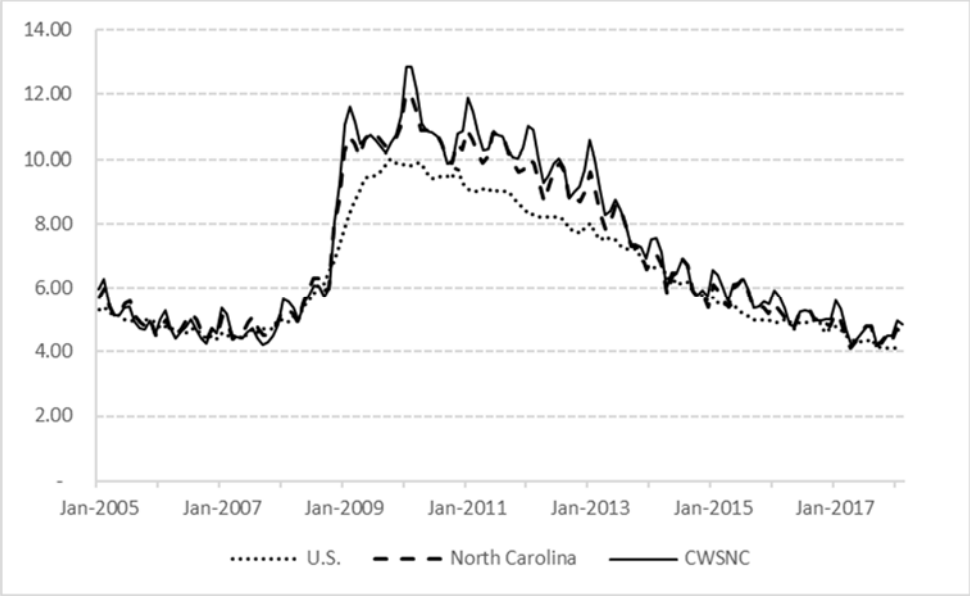
[36] State of North Carolina Utilities Commission, Docket No. E-22, Sub 479, Order on Remand, July 23, 2015, at 4-10.

(iii) Median household income in the United States and in North Carolina; and

(iv) National income and consumption trends.

Turning first to the rate of unemployment, as noted above it has fallen substantially in North Carolina and the U.S. since late 2009 and early 2010, when the rates peaked at 10.00% and 12.00%, respectively. Although the unemployment rate in North Carolina rather exceeded the national rate during and after the 2008/2009 financial crisis, by the latter portion of 2013, the two were largely consistent. By February 2018, the unemployment rate had fallen to less than one-half of those peak levels: 4.10% nationally; and 4.60% in North Carolina. (*see* Chart 1, below).

Chart 1: Unemployment Rate: U.S. North Carolina, and CWSNC



Since the conclusion of the Company's last rate filing in November 2017, the unemployment rate in North Carolina has risen slightly from

4.50% to 4.60%. That 0.10% increase is slightly higher than the U.S. unemployment rate which has stayed flat at 4.10%. Still, over the entire period of 2005 through 2017, the correlation between North Carolina's unemployment rate and the national rate was approximately 98%.

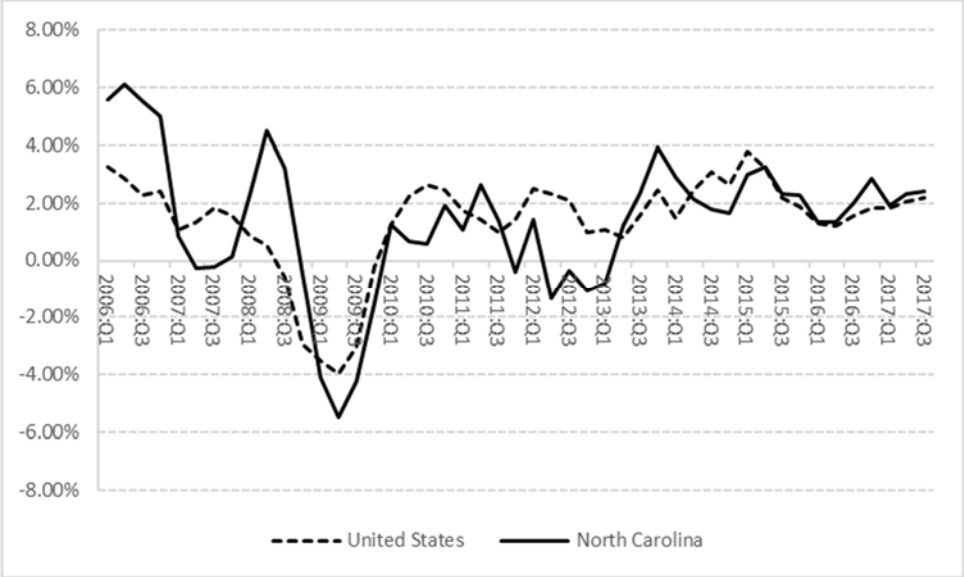
I was also able to review (seasonally unadjusted) unemployment rates in the counties served by CWSNC. At its peak, which occurred in late 2009 into early 2010, the unemployment rate in those counties reached 12.58% (58 basis points higher than the State-wide average); by February 2018 it had fallen to 4.87% (27 basis points higher than the State-wide average). Since the conclusion of the Company's last rate filing in November 2017, the counties' unemployment has also risen slightly, from 4.50% to 4.87%. From 2005 through 2017, the correlation in unemployment rates between the counties served by CWSNC, and the U.S. and North Carolina, respectively, were approximately 97% and 99%, respectively. In summary, although it remains higher than the national and state-wide averages, county-level unemployment has fallen considerably since its peak in early 2010. More broadly, economic growth at the national level is projected to generate 11.5 million new jobs from 2016-2026 (*i.e.*, 7.37% growth over that period).[37]

Looking to real Gross Domestic Product growth, there also has been a relatively strong correlation between North Carolina and the national economy (approximately 69%). Since the financial crisis, the national rate

[37] U.S. Bureau of Labor Statistics, *Employment Projections: 2016-2026 Summary*, October 24, 2017.

of growth at times (during portions of 2010 and 2012) outpaced North Carolina. Since the second quarter of 2015, however, the State has consistently exceeded the national growth rate.

Chart 2: Real Gross Domestic Product Growth Rate[38]

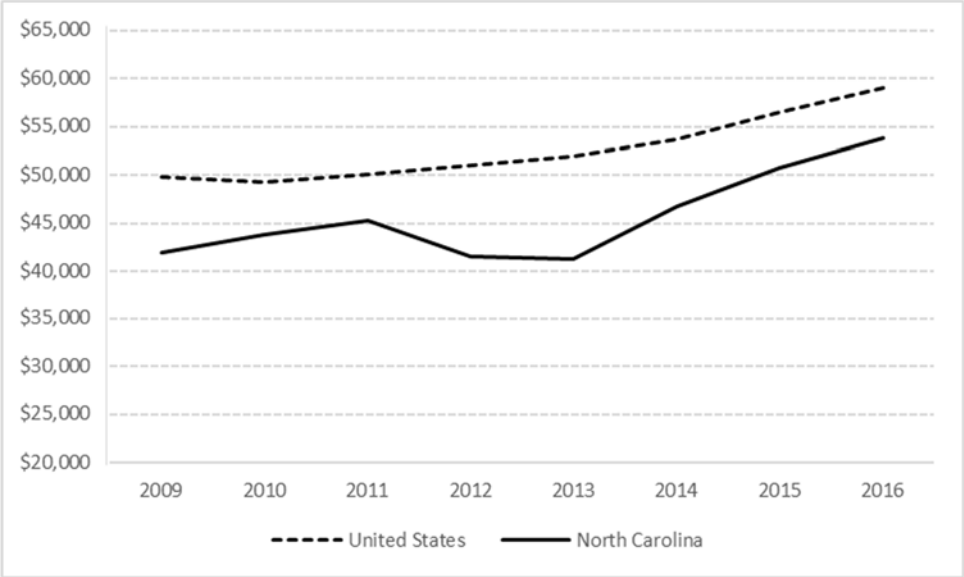


As to median household income, the correlation between North Carolina and the U.S. is relatively strong (approximately 88% from 2005 through 2016). Since 2009 (that is, the years subsequent to the financial crisis), median household income in North Carolina has grown at a faster annual rate than the national median income (3.62% vs. 2.47%; *see* Chart 3, below). To put household income in perspective, the Missouri Economic Research and Information Center reports that in the first quarter of 2018,

[38] Source: Bureau of Economic Analysis.

North Carolina had the 20th lowest cost of living index among the 50 states and the District of Columbia.[39]

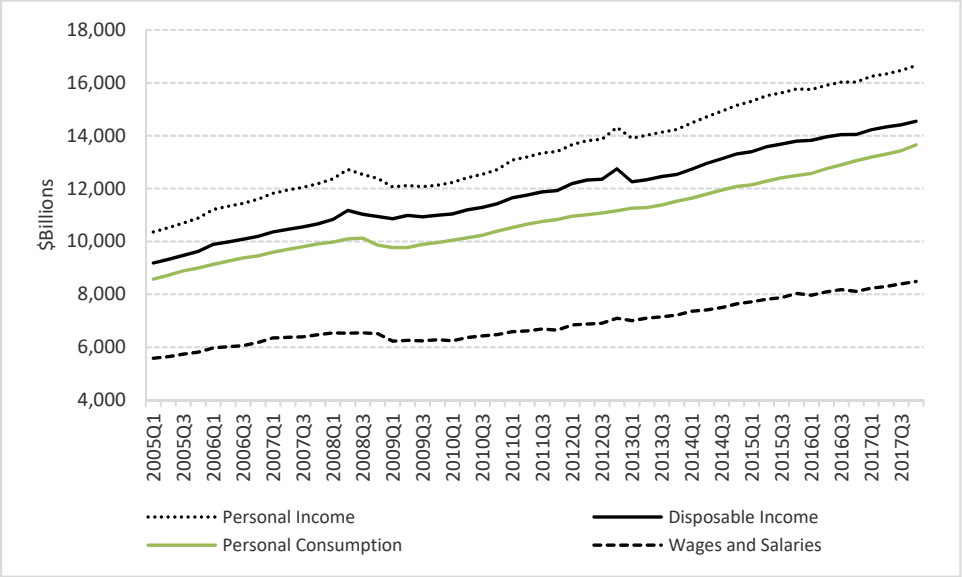
Chart 3: Median Household Income



Similarly, as shown on Chart 4, below, since 2009, total personal income, disposable income, personal consumption, and wages and salaries have generally been on an increasing trend at the national level.

[39] Source: https://www.missourieconomy.org/indicators/cost_of_living/ Accessed 8/3/2018.

Chart 4: USA Income and Consumption



Q. **Please summarize your analyses and conclusions.**

A. In its Order on Remand in Docket No. E-22, Sub 479, the Commission observed that economic conditions in North Carolina were highly correlated with national conditions, such that they were reflected in the analyses used to determine the cost of common equity.[40] As discussed below, those relationships still hold: Economic conditions in North Carolina continue to improve from the recession following the 2008/2009 financial crisis, and they continue to be strongly correlated to conditions in the U.S., generally. In particular, unemployment, at both the State and county level, continues to fall and remains highly correlated with national rates of unemployment; real Gross Domestic Product recently has grown faster in North Carolina than the national rate of growth, although the two remain fairly well

[40] State of North Carolina Utilities Commission, Docket No. E-22, Sub 479, Order on Remand, July 23, 2015, at 39.

correlated; and median household income also has grown faster in North Carolina than the rest of the Country, and remains strongly correlated with national levels. In sum, the correlations between State-wide measures of economic conditions noted by the Commission in Docket No. E-22, Sub 479 remain in place and as such, they continue to be reflected in the models and data used to estimate the cost of common equity.

XI. CONCLUSION OF COMMON EQUITY COST RATE

Q. **What is your recommended cost of common equity for CWSNC?**

A. Given the indicated cost of common equity of 11.50%, and the size-adjusted cost of common equity of 11.90%, I conclude that an appropriate range of cost of common equity cost rates for the Company is between 11.50% and 11.90%.

Q. **In your opinion, is your proposed range of cost of common equity cost rates between 11.50% and 11.90% fair and reasonable to CWSNC, its shareholders, and its customers, considering the above economic conditions?**

A. Yes, it is.

Q. **Does this conclude your direct testimony?**

A. Yes, it does.

scottmadden
MANAGEMENT CONSULTANTS

Appendix A
Professional Qualifications of
Dylan W. D'Ascendis, CRRA, CVA

Summary

Dylan is an experienced consultant and a Certified Rate of Return Analyst (CRRA) and Certified Valuation Analyst (CVA). He has served as a consultant for investor-owned and municipal utilities and authorities for 9 years. Dylan has extensive experience in rate of return analyses, class cost of service, rate design, and valuation for regulated public utilities. He has testified as an expert witness in the subjects of rate of return, cost of service, rate design, and valuation before 13 regulatory commissions in the U.S. and an American Arbitration Association panel.

He also maintains the benchmark index against which the Hennessy Gas Utility Mutual Fund performance is measured. He serves on the Rates and Regulatory Committee of the National Association of Water Companies (NAWC).

Areas of Specialization

- Regulation and Rates
- Utilities
- Mutual Fund Benchmarking
- Capital Market Risk
- Capital Market Risk
- Financial Modeling
- Valuation
- Regulatory Strategy and Rate Case Support
- Rate of Return
- Cost of Service
- Rate Design

Recent Expert Testimony Submission/Appearances

Jurisdiction	***Topic***
Regulatory Commission of Alaska	Return on Common Equity & Capital Structure
New Jersey Board of Public Utilities	Cost of Service, Rate Design
Pennsylvania Public Utility Commission	Return on Common Equity
South Carolina Public Service Commission	Return on Common Equity
American Arbitration Association	Valuation

Recent Assignments

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

Recent Publications and Speeches

- Co-Author of: "The Impact of Decoupling on the Cost of Capital of Public Utilities", co-authored with Richard A. Michelfelder, Ph.D., Rutgers University and Pauline M. Ahern. (Forthcoming)
- "Past is Prologue: Future Test Year", Presentation before the National Association of Water Companies 2017 Southeast Water Infrastructure Summit, May 2, 2017, Savannah, GA.
- Co-author of: "Comparative Evaluation of the Predictive Risk Premium Model™, the Discounted Cash Flow Model and the Capital Asset Pricing Model", co-authored with Richard A. Michelfelder, Ph.D., Rutgers University, Pauline M. Ahern, and Frank J. Hanley, The Electricity Journal, May, 2013.
- "Decoupling: Impact on the Risk and Cost of Common Equity of Public Utility Stocks", before the Society of Utility and Regulatory Financial Analysts: 45th Financial Forum, April 17-18, 2013, Indianapolis, IN.

SPONSOR	DATE	CASE/APPLICANT	DOCKET NO.	SUBJECT
Regulatory Commission of Alaska				
Alaska Power Company	07/16	Alaska Power Company	Docket No. TA857-2	Rate of Return
Colorado Public Utilities Commission				
Summit Utilities, Inc.	04/18	Colorado Natural Gas Company	Docket No. 18AL-0305G	Return on Equity
Atmos Energy Corporation	06/17	Atmos Energy Corporation	Docket No. 17AL-0429G	Return on Equity
Delaware Public Service Commission				
Tidewater Utilities, Inc.	11/13	Tidewater Utilities, Inc.	Docket No. 13-466	Capital Structure
Hawaii Public Utilities Commission				
Kaupulehu Water Company	02/18	Kaupulehu Water Company	Docket No. __	Rate of Return
Aqua Engineers, LLC	05/17	Puhi Sewer & Water Company	Docket No. 2017-0118	Cost of Service / Rate Design
Hawaii Resources, Inc.	09/16	Laie Water Company	Docket No. 2016-0229	Cost of Service / Rate Design
Illinois Commerce Commission				
Utility Services of Illinois, Inc.	11/17	Utility Services of Illinois, Inc.	Docket No. 17-1106	Cost of Service / Rate Design
Aqua Illinois, Inc.	04/17	Aqua Illinois, Inc.	Docket No. 17-0259	Rate of Return
Utility Services of Illinois, Inc.	04/15	Utility Services of Illinois, Inc.	Docket No. 14-0741	Rate of Return
Indiana Utility Regulatory Commission				
Aqua Indiana, Inc.	03/16	Aqua Indiana, Inc. Aboite Wastewater Division	Docket No. 44752	Rate of Return
Twin Lakes, Utilities, Inc.	08/13	Twin Lakes, Utilities, Inc.	Docket No. 44388	Rate of Return
Louisiana Public Service Commission				
Louisiana Water Service, Inc.	06/13	Louisiana Water Service, Inc.	Docket No. U-32848	Rate of Return
Massachusetts Department of Public Utilities				
Liberty Utilities	07/15	Liberty Utilities d/b/a New England Natural Gas Company	Docket No. 15-75	Rate of Return
Mississippi Public Service Commission				
Atmos Energy	07/18	Atmos Energy	Docket No. 2015-UN-049	Capital Structure
Missouri Public Service Commission				
Indian Hills Utility Operating Company, Inc.	10/17	Indian Hills Utility Operating Company, Inc.	Case No. SR-2017-0259	Rate of Return
Raccoon Creek Utility Operating Company, Inc.	09/16	Raccoon Creek Utility Operating Company, Inc.	Docket No. SR-2016-0202	Rate of Return
New Jersey Board of Public Utilities				
Middlesex Water Company	10/17	Middlesex Water Company	Docket No. WR1710xxxx	Rate of Return
Middlesex Water Company	03/15	Middlesex Water Company	Docket No. WR15030391	Rate of Return

SPONSOR	DATE	CASE/APPLICANT	DOCKET NO.	SUBJECT
The Atlantic City Sewerage Company	10/14	The Atlantic City Sewerage Company	Docket No. WR14101263	Cost of Service / Rate Design
Middlesex Water Company	11/13	Middlesex Water Company	Docket No. WR1311059	Capital Structure
Public Utilities Commission of Ohio				
Aqua Ohio, Inc.	05/16	Aqua Ohio, Inc.	Docket No. 16-0907-WW-AIR	Rate of Return
Pennsylvania Public Utility Commission				
SUEZ Water Pennsylvania Inc.	04/18	SUEZ Water Pennsylvania Inc.	Docket No. R-2018-000834	Rate of Return
Columbia Water Company	09/17	Columbia Water Company	Docket No. R-2017-2598203	Rate of Return
Veolia Energy Philadelphia, Inc.	06/17	Veolia Energy Philadelphia, Inc.	Docket No. R-2017-2593142	Rate of Return
Emporium Water Company	07/14	Emporium Water Company	Docket No. R-2014-2402324	Rate of Return
Columbia Water Company	07/13	Columbia Water Company	Docket No. R-2013-2360798	Rate of Return
Penn Estates Utilities, Inc.	12/11	Penn Estates, Utilities, Inc.	Docket No. R-2011-2255159	Capital Structure / Long-Term Debt Cost Rate
South Carolina Public Service Commission				
Carolina Water Service, Inc.	02/18	Carolina Water Service, Inc.	Docket No. 2017-292-WS	Rate of Return
Carolina Water Service, Inc.	06/15	Carolina Water Service, Inc.	Docket No. 2015-199-WS	Rate of Return
Carolina Water Service, Inc.	11/13	Carolina Water Service, Inc.	Docket No. 2013-275-WS	Rate of Return
United Utility Companies, Inc.	09/13	United Utility Companies, Inc.	Docket No. 2013-199-WS	Rate of Return
Utility Services of South Carolina, Inc.	09/13	Utility Services of South Carolina, Inc.	Docket No. 2013-201-WS	Rate of Return
Tega Cay Water Services, Inc.	11/12	Tega Cay Water Services, Inc.	Docket No. 2012-177-WS	Capital Structure
Virginia State Corporation Commission				
WGL Holdings, Inc.	7/18	Washington Gas Light Company	PUR-2018-00080	Rate of Return
Atmos Energy Corporation	5/18	Atmos Energy Corporation	PUR-2018-00014	Rate of Return
Aqua Virginia, Inc.	7/17	Aqua Virginia, Inc.	PUR-2017-00082	Rate of Return
Massanutten Public Service Corp.	08/14	Massanutten Public Service Corp.	PUE-2014-00035	Rate of Return / Rate Design