DIRECT TESTIMONY

of

SHEENA KIGHT-GARLISCH

Finance Department

Financial Analysis Division

Illinois Commerce Commission

Illinois-American Water Company

Proposed General Increase Rates For Water and Waste Water Service

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WITNESS IDENTIFICATION

Q1. Please state your name and business address.

A1. My name is Sheena Kight-Garlisch. My business address is 527 East Capitol Avenue, Springfield, IL 62701.

Q2. What is your current position with the Illinois Commerce Commission ("Commission")?

A2. I am a Senior Financial Analyst in the Finance Department of the Financial Analysis Division.

Q3. Please describe your qualifications and background.

A3. In May of 1998, I received a Bachelor of Business degree in Finance and Marketing from Western Illinois University in Macomb, Illinois. I earned a Master of Business Administration degree, with a concentration in Finance, also at Western Illinois University, in May of 2001. I have been employed by the Commission since January of 2001. I was promoted to Senior Financial Analyst on October 1, 2004. I have previously testified before the Commission on a variety of financial issues.

Q4. Please state the purpose of your testimony in this proceeding.

A4. The purpose of my testimony is to present my analysis of the cost of common equity for Illinois-American Water Company ("IAWC" or the "Company"). In addition, I will respond to the direct testimony of Company witness Paul R. Moul (IAWC Exhibits 10.00, 10.01 and 10.02) and describe my review to date of rate case expense associated with the testimony of Mr. Paul R. Moul.

COST OF COMMON EQUITY

Q5. What is your estimate of the Company's cost of common equity?

A5. My analysis indicates that IAWC's cost of common equity equals 8.12%, without Rider VBA (volume balancing adjustment). However, if the Commission approves Rider VBA, my analysis indicates that IAWC's cost of common equity is 7.84%.

Q6. How did you measure the investor-required rate of return on common equity for IAWC?

A6. I measured the investor-required rate of return on common equity for IAWC with the Discounted Cash Flow ("DCF") model and the Capital Asset Pricing Model ("CAPM"). Since IAWC does not have market-traded common stock, the DCF and the CAPM cannot be applied directly to IAWC; for this reason, and to minimize measurement error, I applied both models to water utility and public utility samples (hereafter, referred to as "Water Sample" and "Utility Sample," respectively) (collectively "Samples").

Sample Selection

Q7. How did you select your Water Sample?

A7. I selected my Water Sample based on two criteria. First, I began with a list of all domestic corporations assigned an industry number of 4941 (i.e., water utilities) within Standard & Poor's Utility Compustat II that have publicly-traded common stock. Second, I removed any company that did not have the data needed for my cost of capital analysis. The remaining companies, American States Water Company, American Water Works Company, Inc., Aqua America, Inc., California Water Service Group, Connecticut Water Service, Inc., and SJW Corp., compose my Water Sample.

Q8. How did you select a Utility Sample comparable in risk to IAWC?

A8. According to financial theory, the market-required rate of return on common equity is a function of operating and financial risk. Thus, the method used to select a sample should reflect both the operating and financial characteristics of the target firm. I selected a sample using the following twelve financial and operating ratios: (1) common equity to capitalization, (2) funds from operations to capitalization, (3) funds from operations to long-term debt, (4) fixed assets to revenues, (5) free cash flow to capitalization, (6) funds from operations interest coverage, (7) net cash flow to capital expenditures, (8) net plant to capital expenditures, (9) operating profit margin, (10) operating revenue stability, (11) earnings before interest and taxes stability, and (12) earnings stability. Data from

the period 2012-2014 were averaged to normalize the first nine ratios. The last three ratios were measured over the period 2010-2014 with the coefficient of determination of the least-squares regression of the natural logarithm of the respective quarterly data against time.[1] Using those ratios, I compared IAWC to the utility industry.

I began with all market-traded companies within Standard & Poor's Utility Compustat II. Among those utilities, 80 had sufficient data to calculate the aforementioned financial and operating ratios. Next, I conducted a principal components analysis of the financial and operating ratios for those companies and IAWC. Principal components constitute linear combinations of optimally-weighted variable that are uncorrelated with one another.[2, 3] For each utility in the data base, the principal components analysis calculates a value for each component, known as a principal component score, which has a mean of zero and a standard deviation of one.[4] From the principal components analysis, I retained four components ("factors") for risk analysis. After calculating the scores for each principal component, I rank-ordered the utilities in terms of least relative

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[1] Dummy variables were added to the regression model to incorporate seasonality.

[2] A principal component can be described mathematically as follows:

$$c_i = b_{i1} \times x_1 + b_{i2} \times x_2 + \ldots + b_{in} \times x_n$$

where c_i ≡ the utility's score on principal component i;
b_{in} ≡ the weight for ratio x_n to create component c_i; and
x_n ≡ the utility's value on ratio n.

[3] The variables are optimally weighted when the resulting principal components explain the maximum amount of variance in the data base.

[4] The standard deviation is a statistical measure that explains how tightly the observations are clustered around the mean in a set of data.

distance from IAWC's target ratios. Distance was measured by calculating the difference between each principal component score for each firm and IAWC, summing the squared differences, and taking the square root of the summation. Next, I eliminated any non-investment grade utilities.[5] I also removed any company that reduced its dividend or does not consistently pay a dividend. Finally, I eliminated any company that was in the process of being acquired by another company or acquiring a company of similar size and excluded any company that did not have the data needed for my cost of capital analyses. The remaining companies, American Water Works Company, Inc., Aqua America, Inc., Connecticut Water Service, Inc., El Paso Electric Co., Great Plains Energy, Inc., IDACORP, Inc., Pinnacle West Capital Corp., SJW Corp., and Westar Energy, Inc. compose my Utility Sample.

Discounted Cash Flow Analysis

Q9. Please describe the general concept of a DCF analysis.

A9. For a utility to attract common equity capital, it must provide a rate of return on common equity sufficient to meet investor requirements. DCF analysis establishes a rate of return directly from investor requirements. DCF analysis does not include a direct measure of a utility's operating and financial risks since

[5] Subsidiary ratings were used if no rating was available for the utility company.

93 the market price of a utility's stock already embodies the market consensus of
94 those risks.[6]

95 According to DCF theory, a security price equals the present value of the cash
96 flow investors expect the security to generate. Specifically, the market value of
97 common stock equals the cumulative value of the stock's expected stream of
98 future dividends after each is discounted by the investor-required rate of return.

99 **Q10. Please describe the DCF model with which you measured the investor**
100 **required rate of return on common equity.**

101 A10. As it applies to common stocks, DCF analysis is generally employed to
102 determine appropriate stock prices given a specified discount rate. Since a DCF
103 model incorporates time-sensitive valuation factors, it must correctly reflect the
104 frequency of the dividend payments that stock prices embody. As such,
105 incorporating stock prices that the financial market sets on the basis of quarterly
106 dividend payments into a model that ignores the time value of quarterly cash
107 flows constitutes a misapplication of DCF analysis. The companies in my
108 Samples pay dividends quarterly; therefore, I applied a quarterly non-constant
109 discounted cash flow ("NCDCF") model to measure the annual required rate of
110 return on common equity.

[6] All else equal, security prices are inversely related to risk.

Q11. Why did you apply an NCDCF model in this proceeding?

A11. A single-stage, constant growth DCF model employs a single growth rate estimate which is assumed to be sustainable infinitely. Thus, the cost of common equity calculation derived from a constant growth estimate is appropriate if the near-term growth rate forecast for each company in the sample is expected to equal its average long-term dividend growth. However, the 3-5 year growth rates for the Water and Utility Samples as a whole are not sustainable over the long- term. Therefore, I implemented an NCDCF model.

Q12. How did you determine whether the 3-5 year growth rates for your Samples were not sustainable over the long-term?

A12. The average 3-5 year growth rate is 7.6% for my Water Sample and 6.7% for my Utility Sample. As I explain below, the current expectation of long-term growth for the economy is only approximately 4.2%. Thus, the growth rates for my Water Sample are, on average, more than 80% (7.6%/4.2%-1) greater than the expected long-term economic growth rate, and the growth rates for my Utility Sample are, on average, approximately 59% (6.7%/4.2%-1) greater than the expected long-term economic growth rate. Mathematically, no company can sustain into infinity a growth rate any greater than that of the overall economy, or it would eventually grow to become the entire economy. Moreover, since utilities in particular are generally below-average growth companies, it is highly unlikely investors expect the companies in my Samples to be able to sustain above average growth. Given the difference between the growth rates for my Water

and Utility Sample companies and the overall long-term growth expectations for the economy, the continuous sustainability of the near-term growth rates for my Water and Utility Samples is highly unlikely.

As a second test, I also calculated the return on equity ("ROE") implied for both Samples by their average analyst growth rates and their retention ratios.[7, 8] Given their current payout ratios, the average ROE implied by analyst growth rates is 17.6% for my Water Sample and 16.8% for my Utility Sample. That is, using the constant growth DCF to estimate the investor-required rate of return on common equity implies that the Water Sample companies will earn returns in excess of 17% indefinitely and the Utility Sample companies will earn returns in excess of 16% indefinitely. Neither implication is reasonable. For example, since 2004, the average ROE for the Water Sample and the Utility Sample has been only 9.5% and 9.3%, respectively.[9] Thus, I used a non-constant growth DCF model that employs distinct growth rate estimates for each of three discrete time periods.

[7] The average analyst growth rates are the growth rate estimates from Zacks, Reuters, and Morningstar that are used in the NCDCF analysis for the Water Sample and the Utility Sample.
[8] The retention ratio equals one minus the payout ratio. The payout ratio was obtained from Zacks.
[9] Zacks Wizard.

Q13. Why is the long-term GDP growth rate a reasonable estimate for the steady-state stage growth for the Utility Sample?

A13. Ideally, use of company-specific steady-state growth rate estimates would be preferable, but they are not available. Thus, while the long-term GDP growth rate might be biased upward for generally below average growth companies such as utilities, it is much closer to the growth rate that investors could reasonably expect utilities to sustain over the long term than the current 3-5 year growth rate estimates for my Water and Utility Sample companies.

Q14. Please describe how you modeled your NCDCF analysis.

A14. I modeled three stages of dividend growth. The first, a near-term growth stage, is assumed to last five years. The second stage is a transitional growth period lasting from the beginning of the sixth year through the end of the tenth year. Finally, the third, or “steady-state,” growth stage begins at the end of the tenth year and is assumed to last into perpetuity. An expected stream of dividends is estimated by applying these stages of growth to the current dividend. The discount rate that equates the present value of this expected stream of cash flows to the company’s current stock price equals the market-required return on common equity. Schedule 5.01 mathematically presents the relationship between the cash flow stream, stock price, and market- required rate of return on common equity.

Q15. How did you estimate the growth rate parameters?

A15. Determining the market-required rate of return with the NCDCF methodology requires a growth rate that reflects the expectations of investors. Although the current market price reflects aggregate investor expectations, market-consensus expected growth rates cannot be observed directly.

For the first stage, which is assumed to last five years, I used the average of Zacks, Reuters, and Morningstar growth rate estimates as of April 7, 2016. Zacks, Reuters, and Morningstar summarize and publish the 3-5 year earnings growth expectations estimated by financial analysts employed by the research departments of investment brokerage firms. Schedule 5.02 presents the growth rate estimates for the companies in the Water and Utility Samples.

In the intervening five-year transitional stage, the growth rate employed equals the average of the growth rate used for the first stage and the third stage growth rate.

For the third stage, which begins at the end of the tenth year, I calculated forecasted nominal GDP growth beginning in 2026 to estimate the long-term growth expectations of investors. The nominal GDP growth rate is composed of two parts, the expected real growth rate and the expected inflation rate. I estimated the expected real growth rate from the average of the Energy Information Administration ("EIA") and IHS Global Insight's ("IHS") forecasts of

real GDP. EIA forecasts that real GDP will average 2.3% over the 2026-2040 period.[10] Similarly, IHS forecasts that real GDP will average 2.2% over the 2026-2045 period.[11] I averaged the EIA (2.3%) and the IHS (2.2%) real GDP forecasts to calculate my 2.2% long-term estimate of real GDP growth.[12]

I extrapolated an estimate of the expected inflation rate from the difference in yields on U.S. Treasury bonds, which contain a premium for expected inflation, and U.S. Treasury Inflation-Protected Securities ("TIPS"), which do not contain a premium for expected inflation. The formula for this calculation is:

Expected inflation = (1+UST) / (1+TIPS) – 1

Where UST = yield on U.S. Treasury bonds; and

TIPS = yield on U.S. Treasury Inflation-Protected Securities.

An implied 20-year forward TIPS yield in ten years of 1.11% was derived from the 0.12% 10-year and 0.78% 30-year TIPS rates as of April 7, 2016. An implied 20-year forward U.S. Treasury rate in ten years of 2.93% was derived from the

[10] Energy Information Administration, *Annual Energy Outlook 2015, Table 20, Macroeconomic Indicators, www.eia.doe.gov/oiaf/aeo/,* April 2015.
[11] IHS Global Insight, *The U.S. Economy: The 30-Year Focus, Fourth Quarter 2015*, Table 1: Summary of the U.S. Economy, November 2015.
[12] The 2.2% real GDP growth rate estimate is within the 2.2% - 2.5% range of the annual average percentage growth rates published by the Interindustry Forecasting Project at the University of Maryland ("INFORUM"), the Social Security Administration, International Energy Agency ("IEA"), ExxonMobil, and Oxford Economics Group ("OEG") for the 2025 – 2040 measurement period. *See* U.S. Energy Information Administration, "Annual Energy Outlook 2014," CP-2.

1.70% 10-year and 2.52% 30-year U.S. Treasury rates as of April 7, 2016. [13]

The implied 20-year forward rates were calculated using the following formula:

$$_{20}f_{10} = [(1+{}_{30}r_0)^{30} / (1+{}_{10}r_0)^{10}]^{1/20} - 1$$

Where $_{20}f_{10}$ = the implied 20-year forward rate in ten years;

$_{30}r_0$ = the current 30-year rate; and

$_{10}r_0$ = the current 10-year rate.

Therefore, the estimate of long-term expected inflation equals 1.8%:

$$(1+2.93\%) / (1+1.11\%) - 1 = 1.8\%$$

The two components of nominal overall economic growth were then combined to estimate the long-term growth rate for the third stage, using the following formula:

$$\text{Nominal overall economic growth} = [(1+\text{Real GDP}) * (1+\text{Inflation})] - 1$$

Therefore, from the long-term estimates of real GDP growth of 2.2% and expected inflation of 1.8%, the long-term estimate of overall economic growth equals 4.1%:

$$\text{Nominal overall economic growth} = (1+2.2\%) * (1+1.8\%) - 1 = 4.1\%$$

[13] The Federal Reserve Board, *Federal Reserve Statistical Release: Selected Interest Rates, H.15 Daily Update*, www.federalreserve.gov/releases/H15/update, April 7, 2016.

217 I also calculated the nominal economic growth EIA forecasted for the 2026-2040
218 period (4.2%) and IHS forecasted for the 2026-2045 period (4.4%). Finally, I
219 combined the 4.3% average of the EIA and IHS forecasts with the 4.1% nominal
220 economic growth estimate described above to derive my long-term estimate of
221 overall economic growth of 4.2%.[14]

222 **Q16. How did you measure the stock price?**

223 A16. A current stock price reflects all information that is available and relevant to the
224 market; thus, it represents the market's assessment of the common stock's
225 current value. I measured each company's current stock price with its closing
226 market price from April 7, 2016.[15] Those stock prices appear on Schedule 5.03.

227 Since current stock prices reflect the market's current expectation of both the
228 cash flows the securities will produce and the rate at which those cash flows are
229 discounted, an observed change in the market price does not necessarily
230 indicate a change in the required rate of return on common equity. Rather, a
231 price change may reflect investors' re-evaluation of the expected dividend growth
232 rate. In addition, stock prices change with the approach of dividend payment
233 dates. Consequently, when estimating the required return on common equity
234 with a DCF model, one should measure the expected dividend yield and the
235 corresponding expected growth rate concurrently. Using a historical stock price

[14] The numbers presented were rounded to the nearest tenth of a percent.
[15] Prices are from www.wsj.com.

along with current growth expectations or combining an updated stock price with past growth expectations will likely produce an inaccurate estimate of the market-required rate of return on common equity.

Q17. How did you estimate the expected future quarterly dividends?

A17. Most utilities declare and pay the same dividend per share for four consecutive quarters before adjusting the rate. Consequently, I assumed the current declared dividend rate will remain in effect for a minimum of four quarters and then adjust during the same quarter it changed during the preceding year; if the utility did not change its dividend during the last year, I assumed the rate would change during the next quarter. The average expected growth rate was applied to the current declared dividend rate to estimate the expected dividend rate. For each company in the Water and Utility Samples, Schedule 5.03 presents the quarterly dividends for the prior year and Schedule 5.04 presents the expected quarterly dividends for the coming year.

Q18. What is your NCDCF estimate of the required rate of return on common equity for the Water and Utility Samples?

A18. My NCDCF estimates of the required rate of return on common equity for the Water Sample and the Utility Sample are 7.24% and 7.51%, respectively, as shown on Schedule 5.05.

Capital Asset Pricing Model

Q19. Please describe the Capital Asset Pricing Model.

A19. The Capital Asset Pricing Model ("CAPM") is a one-factor risk premium model that mathematically depicts the relationship between risk and return as:

$$R_j = R_f + \beta_j \times (R_m - R_f)$$

where R_j ≡ the required rate of return for security j;

R_f ≡ the risk-free rate;

R_m ≡ the expected rate of return for the market portfolio; and

β_j ≡ the measure of market risk for security j.

In the CAPM, the risk factor is market risk, which is defined as risk that cannot be eliminated through portfolio diversification. To implement the CAPM, one must estimate the risk-free rate of return, the expected rate of return on the market portfolio, and a security or portfolio-specific measure of market risk.

The CAPM is based on the theory that the market-required rate of return for a given risk-bearing security equals the risk-free rate of return[16] plus a risk premium that investors expect in exchange for assuming the risk associated with that security. Mathematically, a risk premium equals the difference between the expected rate of return on a risk factor and the risk-free rate. If the risk of a security is measured

[16] The risk-free rate of return is the rate of return on an investment with zero risk. This represents the absolute minimum return an investor demands as compensation for deferring consumption.

relative to a portfolio, then multiplying that relative measure of risk and the portfolio's risk premium produces a security-specific risk premium for that risk factor.

The CAPM methodology is consistent with the theory that investors are risk-averse. That is, investors require higher returns to accept greater exposure to risk. Thus, if investors had an opportunity to purchase one of two securities with equal expected returns, they would purchase the security with less risk. Conversely, if investors had an opportunity to purchase one of two securities with equal risk, they would purchase the security with the higher expected return. In equilibrium, two securities with equal quantities of risk have equal required rates of return.

Q20. How did you estimate the risk-free rate of return?

A20. I examined the suitability of the yields on four-week U.S. Treasury bills and thirty-year U.S. Treasury bonds as estimates of the risk-free rate of return.

Q21. Why did you examine the yields on U.S. Treasury bills and bonds as measures of the risk-free rate?

A21. The proxy for the nominal risk-free rate should contain no risk premium and reflect similar inflation and real risk-free rate expectations to the security being analyzed through the risk premium methodology.[17] The yields of fixed income

[17] The real risk-free rate and inflation expectations compose the non-risk related portion of a security's rate of return.

securities include premiums for default and interest rate risk. Default risk pertains to the possibility of default on principal or interest payments. The federal government's fiscal and monetary authority makes securities of the United States Treasury virtually free of default risk. Interest rate risk pertains to the effect of unexpected interest rate fluctuations on the value of securities.

Since common equity theoretically has an infinite life, its market-required rate of return reflects the inflation and real risk-free rates anticipated to prevail over the long run. U.S. Treasury bonds, the longest term treasury securities, are issued with terms to maturity of thirty years; U.S. Treasury notes are issued with terms to maturity ranging from two to ten years; U.S. Treasury bills are issued with terms to maturity ranging from four to fifty-two weeks. Therefore, U.S. Treasury bonds are more likely to incorporate within their yields the inflation and real risk-free rate expectations that drive, in part, the prices of common stocks than either U.S. Treasury notes or Treasury bills.

However, due to relatively long terms to maturity, U.S. Treasury bond yields also contain an interest rate risk premium that diminishes their usefulness as measures of the risk-free rate. U.S. Treasury bill yields contain a smaller premium for interest rate risk. Thus, in terms of interest rate risk, U.S. Treasury bill yields more accurately measure the risk-free rate.

Q22. Given the similarity in the inflation and real risk-free rate expectations that are reflected in the yields on U.S. Treasury bonds and the prices of common stocks, does it necessarily follow that the inflation and real risk-free rate expectations that are reflected in the yields on U.S. Treasury bills and the prices of common stocks are dissimilar?

A22. No. To the contrary, short and long-term inflation and real risk-free rate expectations, including those that are reflected in the yields on U.S. Treasury bills, U.S. Treasury bonds, and the prices of common stocks, should equal over time. Any other assumption implausibly implies that the real risk-free rate and inflation are expected to systematically and continuously rise or fall.

Although expectations for short and long-term real risk-free rates and inflation should equal over time, in finite time periods short and long-term expectations may differ. Short-term interest rates tend to be more volatile than long-term interest rates.[18] Consequently, over time U.S. Treasury bill yields are less biased (i.e., more accurate) but less reliable (i.e., more volatile) estimators of the long-term risk-free rate than U.S. Treasury bond yields. In comparison, U.S. Treasury bond yields are more biased (i.e., less accurate) but more reliable (i.e., less volatile) estimators of the long-term risk-free rate. Therefore, an estimator of the long-term nominal risk-free rate should not be chosen mechanistically. Rather, the similarity in current short and long-term nominal risk-free rates should be evaluated. If those risk-free rates are similar, then U.S. Treasury bill yields

[18] Fabozzi, The Handbook of Fixed Income Securities, Fifth Edition, Irwin, 827.

should be used to measure the long-term nominal risk-free rate. If not, some other proxy or combination of proxies should be used.

Q23. What are the yields on four-week U.S. Treasury bills and thirty-year U.S. Treasury bonds?

A23. As of April 7, 2016, the four-week U.S. Treasury bill yield was 0.20% and the thirty-year U.S. Treasury bond yield was 2.54%.[19] Schedule 5.06 presents the published quotes and effective yields.

Q24. Of the U.S. Treasury bill and bond yields, which is currently a better proxy for the long-term risk-free rate?

A24. For a growing economy with inflation, such as that of the U.S., a long-term risk-free rate near zero is implausible; therefore, the U.S. Treasury bond yield of 2.54% currently more closely approximates the long-term risk-free rate than the U.S. Treasury bill yield of 0.20%. It should be noted, however, that the U.S. Treasury bond yield is an upwardly biased estimator of the long-term risk-free rate due to the inclusion of an interest rate risk premium associated with its relatively long term to maturity.

[19] The Federal Reserve Board, *Federal Reserve Statistical Release: H.15, Selected Interest Rates, Daily Update*, www.federalreserve.gov/releases/H15/update/, April 7, 2016.

Q25. How was the expected rate of return on the market portfolio estimated?

A25. The expected rate of return on the market was estimated by conducting a DCF analysis on the firms composing the S&P 500 Index ("S&P 500") as of March 30, 2016. That analysis used dividend information and closing market prices reported by Zacks.[20] Growth rate estimates were obtained primarily from Zacks and secondarily from Reuters on April 1, 2016.[21] Firms not paying a dividend as of March 30, 2016, or for which neither Zacks nor Reuters growth rates were available were eliminated from the analysis. The resulting company-specific estimates of the expected rate of return on common equity were then weighted using market value data from Zacks on April 1, 2016. The estimated weighted average expected rate of return for the remaining 418 firms, composing 81.25% of the market capitalization of the S&P 500, equals 12.03%.

Q26. How did you measure market risk on a security-specific basis?

A26. Beta measures risk in a portfolio context. When multiplied by the market risk premium, a security's beta produces a market risk premium specific to that security. To estimate the beta I used Value Line betas, Zacks betas, Reuters betas, Morningstar betas, and betas calculated using a regression analysis that the Commission has routinely adopted for the CAPM.

[20] Zacks Research Wizard.
[21] Growth rates were obtained from Reuters only if unavailable from Zacks.

Value Line estimates beta for a security with the following model using an ordinary least-squares technique:[22]

$$R_{j,t} = \alpha_j + \beta_j \times R_{m,t} + \varepsilon_{j,t}$$

Where $R_{j,t} \equiv$ the return on security j in period t;

$R_{m,t} \equiv$ the return on the market portfolio in period t;

$\alpha_j \equiv$ the intercept term for security j;

$\beta_j \equiv$ beta, the measure of market risk for security j; and

$\varepsilon_{j,t} \equiv$ the residual term in period t for security j.

A beta can be calculated for firms with market-traded common stock. Value Line calculates its betas in two steps. First, the returns of each company are regressed against the returns of the New York Stock Exchange Composite Index ("NYSE Index") to estimate a raw beta. The Value Line regression employs 259 weekly observations of stock return data. Then, an adjusted beta is estimated through the following equation:

$$\beta_{adjusted} = 0.35 + 0.67 \times \beta_{raw}.$$

The regression analysis applies an ordinary least-squares technique to the following model to estimate beta for a security or portfolio of securities:

[22] Statman, Meir, "Betas Compared: Merrill Lynch vs. Value Line," *The Journal of Portfolio Management*, Winter 1981.

$$R_{j,t} - R_{f,t} = \alpha + \beta\,(R_{m,t} - R_{f,t}) + \varepsilon_t$$

Where $R_{j,t}$ ≡ the return on security *j* in period *t*;

$R_{f,t}$ ≡ the risk-free rate of return in period *t*;

$R_{m,t}$ ≡ the return on the market portfolio in period *t*;

α ≡ the intercept term for security *j*;

β ≡ beta, the measure of market risk for security *j*; and

ε_t ≡ the residual term in period *t* for security *j*.

The regression analysis beta estimates for my Samples were calculated in three steps. First, the U.S. Treasury bill return was subtracted from the average percentage change in the Samples' stock prices and the percentage change in the NYSE Index to estimate each portfolio's return in excess of the risk-free rate. Second, the excess returns of each Sample were regressed against the excess returns of the NYSE Index to estimate a raw beta. The regression analysis employs sixty monthly observations of stock and U.S. Treasury bill return data. Third, an adjusted beta is estimated through the following equation:

$$\beta_{adjusted} = 0.33743 + 0.66257 \times \beta_{raw}.$$

Like Staff's regression beta, Zacks, Reuters, and Morningstar employ 60 monthly observations in their beta estimation. The beta estimates Zacks, Reuters, and Morningstar publish are not adjusted (i.e., they are raw). Thus, I adjusted them using the same formula used to adjust the regression betas.

Q27. Why do you use an adjusted beta estimate?

A27. Some empirical tests of the CAPM suggest that the linear relationship between risk, as measured by raw beta, and return is flatter than the CAPM predicts. That is, securities with raw betas less than one tend to realize higher returns than the CAPM predicts. Conversely, securities with raw betas greater than one tend to realize lower returns than the CAPM predicts. Adjusting the raw beta estimate towards the market mean of 1.0 results in a linear relationship between the beta estimate and realized return that more closely conforms to the CAPM prediction.[23] Securities with betas less than one are adjusted upwards thereby increasing the predicted required rate of return towards observed realized rates of return. Conversely, securities with betas greater than one are adjusted downwards thereby decreasing the predicted rate of return towards observed realized rates of return.

Q28. Why do you rely on several approaches to calculate the beta for your Samples?

A28. True betas are forward-looking measures of investors' expectations of market risk. As such, true betas are not observable. Betas that Staff calculates and betas that Zacks, Value Line, Reuters, Morningstar, and other financial information services publish are proxies for true betas. Therefore, like all proxies, beta estimates are subject to measurement error. No single, definitively

[23] Litzenberger, Ramaswamy and Sosin, "On the CAPM Approach to the Estimation of a Public Utility's Cost of Equity Capital," *Journal of Finance,* May 1980.

"correct" beta for a given company exists. Beta measurements can overstate a security's risk, and consequently its cost, at times and understate it at other times. Indeed, this is true of any cost of common equity estimation methodology. The inevitable presence of measurement error is why I recommend against reliance on any single model to estimate the cost of common equity. Similarly, using multiple approaches to estimate beta mitigates the effect of measurement error in beta estimates on my cost of common equity estimate.

Q29. What is the beta estimate for the Water Sample?

A29. The regression beta estimate for the Water Sample is 0.57. The average Value Line, Zacks, Reuters, and Morningstar beta estimates for the Water Sample are shown in Table 1 below.

Table 1: Water Sample Beta Estimates

Company	Value Line Estimates	Zacks Estimates*	Reuters Estimates*	Morningstar Estimates*
American States Water	0.80	0.58	0.60	0.60
American Water Works	0.70	0.44	0.45	0.49
Aqua America	0.80	0.60	0.61	0.70
California Water Svc.	0.80	0.71	0.72	0.77
Connecticut Water Svc.	0.60	0.49	0.50	0.44
SJW Corp.	0.80	0.59	0.60	0.50
Average	0.75	0.57	0.58	0.58

* After adjustment

Since the Zacks (0.57), Reuters (0.58), Morningstar (0.58), and regression (0.57) beta estimates are calculated using monthly data rather than weekly data (as

Value Line uses), I averaged those results to avoid over-weighting that approach. The average of those four estimates is 0.58. I then averaged that result with the Value Line beta (0.75), which produces a beta for the Water Sample of 0.66.

Q30. What is the beta estimate for the Utility Sample?

A30. The regression beta estimate for the Utility Sample is 0.56. The average Value Line, Zacks, Reuters, and Morningstar beta estimates for the Utility Sample are shown in Table 2 below.

Table 2: Utility Sample Beta Estimates

Company	Value Line Estimates	Zacks Estimates*	Reuters Estimates*	Morningstar Estimates*
American Water Works	0.70	0.44	0.45	0.49
Aqua America	0.80	0.49	0.50	0.44
Connecticut Water Svc.	0.60	0.49	0.50	0.44
El Paso Electric	0.80	0.55	0.56	0.66
Great Plains Energy	0.80	0.64	0.65	0.65
Idacorp	0.80	0.67	0.68	0.70
Pinnacle West Capital	0.80	0.56	0.54	0.59
SJW Corp.	0.80	0.59	0.60	0.50
Westar Energy	0.80	0.56	0.56	0.64
Average	0.77	0.57	0.57	0.60

* After adjustment

The average of the Zacks (0.57), Reuters (0.57), Morningstar (0.60), and regression (0.56) beta estimates is 0.57. I then averaged that result with the Value Line beta (0.77), which produces a beta for the Utility Sample of 0.67.

Q31. What required rate of return on common equity does the CAPM estimate for the Samples?

A31. The CAPM estimates a required rate of return on common equity of 8.80% for the Water Sample and 8.90% for the Utility Sample. The computation of that estimates appears on Schedule 5.06.

Cost of Common Equity Recommendation

Q32. Based on your entire analysis, what is your estimate of IAWC's cost of common equity?

A32. A thorough analysis of the required rate of return on common equity requires both the application of financial models and the analyst's informed judgment. An estimate of the required rate of return on common equity based solely on judgment is inappropriate. Nevertheless, because techniques to measure the required rate of return on common equity necessarily employ proxies for investor expectations, judgment remains necessary to evaluate the results of such analyses. Along with NCDCF and CAPM cost of equity analyses, I considered the observable 3.96% rate of return the market required on less risky A-rated long-term utility debt at the time of time of the analysis.[24, 25] Based on my

[24] Moody's Analytics, Inc., https://credittrends.moodys.com/data/bondyields, April 7, 2016.
[25] The implied credit rating for IAWC is A3 based on Moody's methodology. See discussion on pages 36 to 37.

analyses, IAWC's investor-required rate of return on common equity equals 8.12%.

Q33. How did you minimize measurement error in your cost of common equity analyses?

A33. The models from which the individual company estimates were derived are correctly specified and, thus, contain no source of bias. Moreover, except for the use of U.S. Treasury bond yields as a proxy for the long-term risk-free rate and 3-5 year analyst growth estimates as a proxy for the long-term growth estimates in the market rate of return,[26] I am unaware of bias in my proxy for investor expectations. In addition, measurement error has been minimized through the use of samples, since estimates for a sample as a whole are subject to less measurement error than individual company estimates.

Q34. Did you perform an analysis to assess the relative risk of IAWC and your Samples?

A34. Yes. I performed a principal components analysis for IAWC and my Samples, using the same approach I used to select my Utility Sample, as explained previously. I compared four principal components factor scores for IAWC, my Water Sample, and my Utility Sample to assess their relative risk. Each utility's

[26] The market-weighted average of the analyst three to five year EPS growth estimates used to determine the estimated market return is too high to be sustainable; therefore, my estimate of the required rate of return on the market portfolio is upwardly biased, which in turn, causes my CAPM-derived estimate of the cost of common equity to be upwardly biased.

principal components factor score represents the number of standard deviations (σ) that utility falls from the utility average in terms of that specific risk factor. The standard deviation is a statistic that explains how tightly the observations are clustered around the mean in a set of data. Under a normal distribution, approximately 68% of all observations will fall within one standard deviation of the average; approximately 95% will fall within two standard deviations.

Q35. What did your principal components analysis reveal regarding the risk of IAWC relative to your Water Sample?

A35. Factor 1 measures financial strength, with a higher score indicating less risk. IAWC's score on factor 1 is -0.358σ, while my Water Sample's factor 1 score is -0.014σ. Thus, IAWC is slightly riskier than my Water Sample in terms of financial risk.

Factor 2 measures construction risk, with a higher score again indicating less risk. IAWC's score on factor 2 is -0.393σ, while my Water Sample's factor 2 score is 0.240σ. This indicates that IAWC has more construction risk than my Water Sample.

Factor 3 measures revenue and earnings stability, indicators of sales and cost variability. A higher factor 3 score indicates greater revenue and earnings stability and, thus, lower risk. IAWC's factor 3 score of 1.220σ is slightly higher than my Water Sample's factor 3 score of 0.952σ, which indicates that IAWC has

slightly more stable revenues and earnings, and consequently, slightly less sales risk, than my Water Sample.

Factor 4 measures capital intensity. Capital intensity can insulate a company from competition and, thus reduce risk. However, capital intensity can also indicate higher operating leverage (i.e., fixed costs), which can increase risk through lower earnings stability. IAWC's factor 4 score of 1.052σ is slightly higher than my Water Sample's factor 4 score of 0.880σ, which indicates that IAWC's has more operating leverage, but is exposed to less competitive risk than that of my Water Sample. Since IAWC's earnings stability is greater than that of my Water Sample, IAWC's operating leverage has not led to greater relative operating risk. Thus, I conclude that IAWC's capital intensity lowers its operating risk relative to my Water Sample.

My analysis indicates that IAWC has higher financial risk and construction risk than my Water Sample, but more stable earnings and less competitive risk.

Q36. What did your principal components analysis reveal regarding the risk of IAWC relative to your Utility Sample?

A36. IAWC's score on factor 1 is -0.358σ, while my Utility Sample's factor 1 score is -0.333σ. This indicates that IAWC's level of financial risk is very similar to that of my Utility Sample.

IAWC's score on factor 2 is -0.393σ, while my Utility Sample's factor 2 score is -0.220σ. This indicates that IAWC's level of construction risk is slightly higher than my Utility Sample.

IAWC's factor 3 score of 1.220σ is slightly higher than my Utility Sample's factor 3 score of 1.071σ, which indicates that IAWC has slightly more stable revenues and earnings, and consequently, slightly less sales risk, than my Utility Sample.

IAWC's factor 4 score of 1.052σ, while my Utility Sample's factor 4 score is 0.642σ, which indicates that IAWC has more operating leverage, but may be exposed to less competitive risk. Since IAWC's earnings stability is greater than that of my Utility Sample, IAWC's operating leverage has not led to greater relative operating risk. Thus, I conclude that IAWC's capital intensity lowers its operating risk relative to my Utility Sample.

Overall, my analysis indicates that IAWC has the same financial risk, slightly higher construction risk but slightly less sales and competitive risk than my Utility Sample.

Q37. What do you conclude from your comparison of the riskiness of your Utility Sample and Water Sample relative to IAWC?

A37. Both the Water and Utility Samples reasonably approximate the financial and operating risk level of IAWC. Based on the factor scores described above, IAWC

525 has slightly less risk than my Utility Sample but slightly higher risk than my Water
526 Sample. Therefore, I averaged the cost of equity results for my two Samples.
527 My recommended cost of common equity for IAWC, 8.12%, is the result of that
528 calculation.

529 **Q38. Please summarize how you determined that the investor-required rate of**
530 **return on common equity for IAWC equals 8.12%.**

531 A38. The average investor-required rate of return on common equity of 8.12% is
532 based on the average of the NCDCF and the CAPM for the Water and Utility
533 Samples. The average investor-required rate of return on common equity for the
534 Water Sample, 7.98%, is based on the average of its NCDCF-derived results
535 (7.24%) and risk-premium-derived results (8.80%). The average investor-
536 required rate of return on common equity for the Utility Sample, 8.16%, is based
537 on the average of its NCDCF-derived results (7.51%) and risk-premium-derived
538 results (8.90%).

539 **Q39. Does your cost of common equity recommendation take into account the**
540 **riders that the Company is proposing in this case?**

541 A39. No. Although some of the companies in my Samples already have some of the
542 proposed tariff mechanisms in place, my principal components risk assessment
543 and my cost of common equity recommendation reflect IAWC's current risk,
544 which does not reflect the reduction in operating risk that would result from
545 Commission approval of the Company's proposed riders. Therefore, if the

Commission approves the Company's proposed riders, then a downward adjustment to my cost of common equity recommendation would be necessary.

Q40. The Company is proposing Rider VBA (volume balancing adjustment) to de-couple revenue from sales volume. Are you recommending an adjustment to your cost of common equity estimate to account for Rider VBA?

A40. Yes. The closer a company's pattern of revenue matches its pattern of cost incurrence, the lower the operating risk. Thus, the greater the extent to which a company's costs that do not vary with sales volume (i.e., "fixed costs") are recovered through a fixed charge, the lower that company's operating risk will be.[27] Rider VBA reduces the volatility in the Company's cash flows by decoupling the recovery of fixed costs from its volume of water sales. This cost recovery provides the utility greater assurance that the authorized rate of return will be earned. Since Rider VBA reduces volatility and uncertainty of cash flows, it reduces the risk of the water utility. Therefore, if the Commission adopts a Rider VBA for the Company, a downward adjustment of 28 basis points to the Company's rates of return on common equity is necessary to recognize the reduction in risk associated with the adoption of Rider VBA.

[27] Conversely, a fixed revenue stream would *increase* the risk of a company whose costs entirely vary with sales volume. That is, the operating risk of such a company would be lower if all its revenue also varied with sales volume.

564 **Q41. How did you calculate the cost of common equity adjustment necessary to**
565 **reflect the effect Rider VBA will have on IAWC?**

566 A41. I examined the individual factors Moody's focuses on for its ratings analysis.
567 Moody's ratings analysis assesses the overall risk of a company. Overall risk is
568 composed of operating risk, also referred to as business risk, and financial risk.
569 Moody's analysis of regulated water utilities focuses on three core rating factors:
570 business profile, financial policy, and leverage and coverage.[28]

571 **Q42. Please describe the three core Moody's rating factors.**

572 A42. The first core factor, business profile, is composed of five sub-factors. The first
573 sub-factor, stability and predictability of regulatory environment, focuses on the
574 general regulatory framework under which a utility operates. Moody's assigns a
575 15% weight to regulatory environment in the overall credit rating score. The
576 second sub-factor, asset ownership model, assesses on how the assets are
577 owned and any restrictions on those assets. Moody's assigns a 5% weight to the
578 asset ownership model. The third sub-factor, cost and investment recovery
579 (sufficiency and timeliness), evaluates a utility's timeliness and stability in
580 recovering its costs and investments. Moody's assigns a 15% weight to cost and
581 investment recovery. The fourth sub-factor, revenue risk, focuses on the volatility
582 of revenues. Moody's assigns a 5% weight to revenue risk. The fifth sub-factor,
583 scale and complexity of the capital program and asset condition risk, assesses

[28] Moody's Investors Service, Rating Methodology: Regulated Water Utilities, December 22, 2015.

584 operational, technical, and financial risk of complex investment projects.
585 Moody's assigns a 10% weight to scale and complexity of the capital program
586 and asset condition risk. The business profile factor is based on the weights
587 assigned to its five sub-factors and accounts for 50% weight in determining
588 Moody's overall credit rating score.[29]

589 The second core factor, financial policy, evaluates the balance of risk between
590 common equity holders and creditors and the uncertainty of cash flows from
591 those financial policy decisions. Moody's assigns a 10% weight to the financial
592 policy factor when determining the overall credit rating score.

593 The third core factor, leverage and coverage, is assessed using four sub-factors.
594 The four sub-factors are financial ratios used to evaluate a company's credit
595 strength: (1) adjusted interest coverage ratio or funds from operation ("FFO")
596 interest coverage; (2) net debt to regulated asset base ("RAB") or debt to
597 capitalization; (3) FFO to net debt coverage; and (4) retained cash flow ("RCF")
598 to net debt. Moody's assigns a 12.5% weight to each of the adjusted interest
599 coverage ratio or FFO interest coverage ratio and the FFO to net debt ratio.
600 Moody's assigns a 10% weight to the net debt to RAB or debt to capitalization
601 ratio and a 5% weight to the RCF to net debt ratio. Although Moody's does not
602 rigidly adhere to a formula for assigning credit ratings, Moody's provides ranges
603 for these four ratios that may generally be seen at different rating levels for

[29] Moody's Investors Service, Rating Methodology: Regulated Water Utilities, December 22, 2015, 9-17.

604 regulated water utilities. Moody's assigns a 40% weight to the leverage and
605 coverage factor.[30]

606 **Q43. Please describe how Moody's uses the factors and sub-factors to**
607 **determine a rating for a water utility.**

608 A43. To determine the ratings of water utilities, Moody's first applies a standard weight
609 to each core factor (and sub-factor) based on relative importance, as discussed
610 above. Next, each core factor or sub-factor is assigned to a Moody's rating
611 category (i.e., Aaa, Aa, A, Baa, Ba, B, Caa.), which is translated into a
612 corresponding numeric value (i.e., 1, 3, 6, 9, 12, 15, 18). Additionally, Moody's
613 adjusts the standard weight of each core factor or sub-factor to over-weight lower
614 rating scores (Baa=1.15, Ba=2, B=3, and Caa=5) relative to the higher rating
615 scores (Aaa, Aa, and A are all weighted 1).[31] Next, Moody's adjusts the standard
616 weight of each core factor or sub-factor for its over-weighting to get the actual
617 weighting to apply. Then, each core factor's or sub-factor's actual weighting is
618 multiplied by its numeric rating value to get its weighted core factor or sub-factor

[30] Moody's Investors Service, Rating Methodology: Regulated Water Utilities, December 22, 2015, 20-23 and 26.
[31] Moody's Investors Service, Rating Methodology: Regulated Water Utilities, December 22, 2015, 8.

score.[32] Finally, the weighted factor and sub-factor scores are summed to get an overall score, which is translated into an indicated rating.[33]

Q44. Please describe how Rider VBA would impact IAWC's credit risk.

A44. Rider VBA stabilizes revenues while also ensuring IAWC will collect the revenues authorized in this rate case.[34] This increased certainty of revenues through Rider VBA will reduce the risk of IAWC. Rider VBA would have a positive effect on both the cost and investment recovery sub-factor and the revenue risk sub-factor of Moody's business profile factor. Moody's provides guidelines for assessing both of those sub-factors. The guidelines are presented in Attachment A. After reviewing the guidelines and Moody's credit favorable assessment of tariff mechanisms, I concluded that the credit ratings assigned to both of these sub-factors would improve by one credit rating (i.e., 3 points on the numeric scale).

I then determined the effect of that conclusion on a Moody's credit score. First, I determined IAWC's current indicated rating (no Rider VBA). Since IAWC is not rated by Moody's, I started with the same ratings Moody's assigns IAWC's parent, American Water Works, for all sub-factors under the business profile core factor, except for the revenue risk sub-factor. The revenue risk sub-factor was assigned a score one credit rating lower than American Water Works. The

[32] Moody's Investors Service, *Rating Methodology: Regulated Water Utilities*, December 22, 2015, 7-8.
[33] 80% of the companies presented by Moody's map to within 1 notch of their assigned rating. Moody's Investors Service, *Rating Methodology: Regulated Water Utilities,* December 22, 2015, 30.
[34] IAWC Exhibit 7.00, 4-8.

637 financial policy factor was assigned a score one credit rating higher than
638 American Water Works. Both the revenue risk and financial policy factor scores
639 are consistent with the scores assigned to other operating subsidiaries of
640 American Water Works.[35] Finally, for the leverage and coverage factor, IAWC's
641 actual ratios were used to determine the sub-factor scores. Based on my
642 analysis, IAWC's indicated current rating is A2. Next, I determined IAWC's
643 indicated rating with Rider VBA. I adjusted the cost and investment recovery
644 sub-factor and the revenue risk sub-factor one credit rating as discussed above.
645 Rider VBA would result in an improvement in IAWC's indicated rating to A2 from
646 A3. My Moody's factor analysis of IAWC with and without Rider VBA is
647 presented on Schedule 5.07.

648 **Q45. How did you estimate the adjustment to the cost of common equity that will**
649 **be necessary if the Commission approves Rider VBA?**

650 A45. To estimate the appropriate risk adjustment, I began with the spread between
651 long-term utility bonds rated A and Baa by Moody's. According to Moody's, on
652 April 5, 2015, A-rated long-term utility bonds yielded 3.96%, while Baa-rated
653 long-term utility bonds yielded 4.79%, a yield spread of 0.83%. Since Rider VBA
654 reduces the risk of IAWC by the equivalence of one credit rating notch, and each
655 credit rating is subdivided into three ratings notches (e.g., Baa1, Baa2, Baa3), I
656 then divided the 0.83% spread by 3 to estimate the incremental yield for a single

[35] Moody's Investor Service, American Water Works Company Ratings Transparency Meeting, March 2015, 31.

657 ratings notch. This results in a 0.28% yield spread per notch. Reducing my
658 recommended cost of common equity of 8.12% for IAWC by 0.28% results in an
659 investor-required rate of return on common equity for IAWC with Rider VBA of
660 7.84%.

661 **Q46. How would the proposed Pension and OPEB Rider affect the risk and cost**
662 **of equity of IAWC?**

663 A46. The Pension and OPEB Rider would have very little effect on the Company's
664 earnings and would have minimal risk reduction for IAWC. Thus, I am not
665 proposing any risk adjustment to the rate of return on common equity for IAWC if
666 the Commission approves a Pension and OPEB Rider for the Company.

667 **RESPONSE TO MR. MOUL**

668 **Q47. What cost of common equity did Mr. Moul recommend for the Company?**

669 A47. Mr. Moul recommended a 10.75% cost of common equity for IAWC.[36]

670 **Q48. How did Mr. Moul estimate IAWC's cost of common equity?**

671 A48. Mr. Moul presented four models to measure the cost of common equity for the
672 Company: DCF, Risk Premium, CAPM, and Comparable Earnings. He applied

[36] IAWC Ex. 10.00, 2 and 46.

those models using average data for his Water Group and derived the following estimates:

Summary of Mr. Moul's Analyses[37]	
Model	Group Estimate
Constant Growth DCF	9.89%
CAPM	10.93%
Risk Premium Model	11.25%
Comparable Earnings	13.05%

Mr. Moul relied upon the constant growth DCF model and the CAPM to derive his 9.89% to 10.93% range for the cost of common equity for IAWC. Mr. Moul then relied upon his Risk Premium analysis (11.25%) and his Comparable Earnings analysis (13.05%) to select from that range 10.75% as his recommended cost of common equity for IAWC. [38]

Q49. Please evaluate Mr. Moul's analysis of the Company's cost of common equity.

A49. Mr. Moul's analysis contains several errors that lead him to over-estimate the Company's cost of common equity. The most significant flaws in Mr. Moul's analysis of the Company's cost of common equity are the following:

[37] IAWC Ex. 10.00, 2 and 46.
[38] IAWC Ex. 10.00, 4-5.

1) The analyst growth rates he applied in his DCF analysis are unsustainably high, based on current expectations of overall economic growth;
2) Mr. Moul included an unwarranted size premium adjustment in his CAPM estimate of the cost of common equity which the Commission has previously rejected;
3) Mr. Moul included an unwarranted leverage adjustment in deriving his DCF and CAPM estimates of the cost of common equity which the Commission has previously rejected;
4) Mr. Moul's Risk Premium Model ("RPM") or bond yield plus risk premium is based on inappropriate historical estimates of the common equity risk premium for his Water Group which the Commission has previously rejected; and
5) Mr. Moul's Comparable Earnings analysis does not provide valid estimates of the investor-required rate of return on IAWC's common equity and has been previously rejected by the Commission.

Removing Mr. Moul's unwarranted size and leverage adjustments reduces his cost of equity range to 8.89% to 9.00%, as shown below:

Mr. Moul's Analyses Corrected to Remove Size and Leverage Adjustments	
Model	Group Estimate
Constant Growth DCF- No Leverage Adjustment	9.00%
CAPM-No Size or Leverage Adjustment	8.89%

Although I disagree with Mr. Moul's use of a 30-day average stock price, his use of growth estimates from Yahoo! and Value Line, and his methods for calculating a market risk premium for his CAPM, adjusting for those three items does not have a material effect on the estimated ROE. Thus, I will not take further issue with them in this case.

Growth Rates

Q50. Please summarize your concerns with the growth rates Mr. Moul employs.

A50. Mr. Moul's growth rates are not sustainable over the long term. As I discussed previously, the expectations of long-term growth in the overall economy ranges from 4.1% to 4.3%, with a midpoint of 4.2%.[39] In contrast, the 6.0% growth rate Mr. Moul used for his Water Group is 43% greater than the midpoint of the expected long-term growth in the overall economy.[40] Since utilities are generally below average growth companies, it is unlikely investors expect the companies in Mr. Moul's Water Group to be able to sustain such significantly above average growth.

[39] The estimated growth in the overall economy was discussed on pages 8-11.
[40] IAWC Ex. 10.00, 26.

Size-Based Risk Premium

Q51. Mr. Moul adds a risk premium based on firm size to his CAPM analysis. Is this adjustment appropriate?

A51. No. Mr. Moul's size-based risk premium has no theoretical basis. Rather, it is based on an empirical study that is not applicable to the Company. Removing the inappropriate size premium would lower Mr. Moul's CAPM results by 110 basis points to 9.83%.

Q52. Why is Mr. Moul's size premium adjustment inappropriate?

A52. There are two fundamental flaws that render it unsuitable from a conceptual standpoint. First, Mr. Moul's size premium has no theoretical basis. Second, the empirical study of beta on which his adjustment is based is not applicable to IAWC. Recognizing these flaws, the Commission has previously rejected size premium adjustments in the following rate cases: Docket No. 14-0419 Aqua Illinois, Inc. ("Aqua"); Docket Nos. 11-0280/11-0281 (Cons.) North Shore Gas Company ("North Shore") and The Peoples Gas Light and Coke Company ("Peoples Gas"); Docket No. 11-0436 Aqua; Docket No. 09-0319 IAWC; Docket 04-0442 Aqua; and Docket No. 03-0403 Aqua.[41]

[41] Order, Docket No. 14-0419, March 25, 2015, 44; Order, Docket Nos. 11-0280/11-0281 (Cons.), January 10, 2012, 138; Order, Docket No. 11-0436, February 16, 2012, 37; Order, 09-0319, April 13, 2010, 113; Order, Docket No. 04-0442, April 20, 2005, 43-44; Order, Docket No. 03-0403, April 13, 2004, 43.

735 **Q53. Please explain the significance of the absence of a theoretical basis for a**
736 **size premium.**

737 A53. Since a size premium has no theoretical basis, to the extent that a correlation
738 between firm size and return exists, that relationship is likely the result of some
739 other factor or factors that are related to both size and return, such as liquidity or
740 information costs,[42] rather than size, per se. A discussion of the absence of a
741 theoretical basis for a size premium is presented in Schedule 5.08.

742 **Q54. Why do you believe Mr. Moul's size premium is not applicable to IAWC?**

743 A54. Even if one were to accept the existence of a size premium for small companies
744 generally, Mr. Moul has provided no evidence to demonstrate a size premium is
745 warranted for utilities specifically. The empirical study reported in Ibbotson
746 Associates, which forms the basis for Mr. Moul's size premium adjustment, is not
747 restricted to utilities. Rather, it is based on the stocks listed on the New York
748 Stock Exchange ("NYSE"), American Stock Exchange ("AMEX") and National
749 Association of Security Dealers Automated Quotation System ("NASDAQ").[43]
750 Utilities, unlike most stocks listed on the NYSE, AMEX, or NASDAQ, are subject
751 to uniform reporting requirements. Furthermore, their rates and conditions of

[42] Relatively illiquid securities impose costs on investors since they may be unable to sell illiquid securities at a fair price on a timely basis. The securities of smaller companies tend to be less liquid than those of larger companies since the potential breadth of the market for the former tends to be more limited. Additionally, gathering information regarding the expected cash flows and risks of a security imposes costs an investor must recover through the returns that security generates. If fewer sources of information regarding smaller companies exist, then obtaining information might be more expensive.
[43] IAWC Ex. 10.02, Schedule 11, 3.

service are publicly reported. Therefore, the cost of obtaining information regarding smaller utilities in general, and IAWC in particular, is unlikely to be as high as that of unregulated companies that are similar in size; hence, the application of a size premium to a utility is highly questionable. In fact, contrary to Mr. Moul's claims, a study by Annie Wong, reported in the Journal of the Midwest Finance Association, specifically found that there is no justification for a size premium for utilities.[44] Thus, the entire basis of Mr. Moul's size premium is questionable at best.

Leverage Adjustment

Q55. Mr. Moul argues that if the results of the DCF, which are based on the market price of the companies analyzed, are used to compute the weighted average cost of capital based on a book value capital structure used for rate setting purposes, the utility will not recover its risk-adjusted capital cost because market value capital structures generally reflect less risk than book value capital structures.[45] Do you agree?

A55. No. Mr. Moul's argument suggests that when a company's book value exceeds its market value, the risk of a company increases if the capital structure is measured with book values of capital rather than market values of capital. Such a notion is without merit. The intrinsic risk level of a given company does not

[44] Wong, "Utility Stock and the Size Effect: An Empirical Analysis," *Journal of the Midwest Finance Association,* 1993.
[45] IAWC Exhibit 10.00, 27.

change simply because the manner in which risk is measured has changed. Such an assertion is akin to claiming that the ambient temperature changes when the measurement scale is switched from Fahrenheit to Celsius. Mr. Moul has confused the measurement tool with the object to be measured. Specifically, capital structure ratios are merely indicators of financial risk; they are not sources of financial risk. Financial risk arises from fixed, contractually required debt service payments; changing capital structure ratios from a market value basis to a book value basis does not affect a company's debt service requirements; thus, it does not change the company's risk.

As noted in a corporate finance textbook by Brealey, Myers and Allen, there are a variety of ways to define leverage and there is no law stating how it should be defined.[46] In any case, it is not appropriate to compare book value capital structures with market value capital structures.

Q56. Does Mr. Moul also propose a leverage adjustment for his CAPM analysis?

A56. Yes. Mr. Moul argued that the Value Line betas cannot be used directly in the CAPM because they are derived based on market value. Hence, he unlevered and relevered the Value Line beta estimates for each of the companies in his Water Group for the book value common equity ratios using the Hamada formula. However, for the same reasons described above, his leverage

[46] Brealey, Myers and Allen, *Principles of Corporate Finance*, Ninth edition, McGraw-Hill/Irwin, 794.

790 adjustment is simply wrong because it relies on a comparison of two different
791 measures of financial leverage: book value capital structures and market value
792 capital structures.

793 **Q57. Has the Commission previously rejected leverage adjustments to the cost**
794 **of common equity?**

795 A57. Yes. The Commission has properly rejected the use of leverage adjustments in
796 several prior proceeding.[47] In fact, Mr. Moul presented, and the Commission
797 rejected, the exact same leverage adjustment, in the following proceedings:
798 Docket Nos. 14-0224/14-0225 (Cons.) North Shore and Peoples Gas, Docket
799 Nos. 09-0166/09-0167 (Cons.) North Shore and Peoples, and Docket Nos. 07-
800 0241/07-0242 (Cons.) North Shore and Peoples Gas.[48]

801 **Q58. What would Mr. Moul's cost of common equity estimates be if the leverage**
802 **adjustments were eliminated?**

803 A58. Mr. Moul's leverage adjustment inappropriately inflated his DCF result for the
804 Water Group by 89 basis points. Removing the leverage adjustment would
805 decrease his DCF result to 9.00%.

[47] Order, Docket No. 11-0436, February 16, 2012; 38; Order, Docket Nos. 06-0070/06-0071/06-0072 (Cons.), November 21, 2006, 141; 01-0528/01-0628/01-0629 (Cons.), March 28, 2002, 12-13; Order, Docket Nos. 99-0120/99-0134 (Cons.), August 25, 1999, 54; Order, Docket No. 94-0065, January 9, 1995, 92-93.
[48] Order, Docket Nos. 14-0224/14-0225, February 16, 2012, 38; Order, Docket Nos. 09-0166/09-0167 (Cons.), January 21, 2010, 128-129; Order, Docket Nos. 07-0241/07-0242 (Cons.), February 5, 2008, 95-96.

Mr. Moul inappropriately inflated his CAPM result for the Water Group by 94 basis points by adjusting the average Value Line beta estimate for his Water Group (0.71) up to 0.84 to reflect the book value leverage of those companies. Correcting that flaw would decrease his CAPM result to 9.99%. As discussed earlier, removing his inappropriate size premium would further decrease Mr. Moul's CAPM estimate to 8.89%.

Taken together, removing the inappropriate leverage adjustments to Mr. Moul's DCF and the size premium and leverage adjustments to his CAPM analysis, produces a cost of common equity of 8.95% [(9.00% + 8.89%)/2]. This corrected cost of equity estimate is significantly lower than the 10.75% Mr. Moul recommends for IAWC.

Risk Premium Model

Q59. Please describe Mr. Moul's risk premium model.

A59. Mr. Moul relied upon his risk premium model to select his cost of common equity estimate for IAWC from the range he determined with his DCF and CAPM analyses. To estimate a return on common equity with his risk premium model, Mr. Moul starts with a projected yield of 4.75% on A-rated public utility bonds, based on various Blue Chip forecasts of 30-year U.S. Treasury rates plus the historical spreads between A-rated public utility bonds and 30-year U.S.

825 Treasuries.[49] Next, he estimates a 6.50% common equity premium for large
826 common stocks (S&P 500).[50] Finally, he adds the 6.50% premium to the 4.75%
827 A-rated utility bond yield, which results in a cost of common equity estimate of
828 11.25%.

829 **Q60. Please describe the shortcomings of Mr. Moul's risk premium model.**

830 A60. Mr. Moul's methodology for determining a reasonable common equity risk
831 premium for his proxy groups is inappropriate. Mr. Moul's base equity premium
832 estimate is calculated from historical data, which is improper. Historical risk
833 premiums do not adequately measure investors' current return requirements
834 because historical risk premiums are based on realized returns. Due to
835 unpredictable movements in financial markets and the economy, the difference
836 between realized and expected returns can be substantial. Thus, historical
837 premiums are not reliable proxies of current or future risk premiums.

838 Although his risk premium is intended to estimate an investor-required return for
839 the Company, it is based on the average spread between earned returns and
840 interest rates. However, investor-required returns and earned returns are not the
841 same. That is, by adding the historical average earned return premium to a
842 forecasted interest rate, he created an earned return estimate rather than an
843 investor-required return estimate. Since his risk premium does not model

[49] IAWC Exhibit 10.00, 33-35.
[50] IAWC Exhibit 10.00, 35-36. Morningstar, 2014 Ibbotson SBBI Classic Yearbook, 32.

investor-required return on common equity, it could only produce the "correct" investor-required return on common equity by chance.

Mr. Moul added a risk premium measured relative to large corporate bonds to an A-rated bond yield estimate without providing any support that the two are comparable. Specifically, Mr. Moul provides no support that the large corporate bonds have been, and remain, composed of A-rated bonds with similar terms to maturity as reflected in his A-rated bond yield estimate. Both term to maturity and credit rating are important determinants of bond returns.[51]

In addition, rather than utilizing the current A-rated utility yield of 3.96% as the base yield to which his risk premium is added, he relied on a 4.75%[52] forecast of A-rated utility bond yields. This substitution inappropriately inflates his risk premium results by 0.79%. To begin with, the use of forecasted interest rates is unnecessary because current interest rates already reflect investors' current expectations for the future. Thus, there is no need to employ forecasts. Moreover, as difficult as it is to estimate investors' current required rates of return on common equity, the employment of forecasted interest rates essentially attempts to predict investors' future required rates of return, which compounds the difficulty.

[51] IAWC Exhibit 10.00, 35-36.
[52] IAWC Exhibit 10.00, 35.

862 **Q61. Has the Commission previously rejected the use of the risk premium model**
863 **in determining the cost of common equity?**

864 A61. Yes. The Commission has properly rejected the use of the risk premium model
865 to determine the cost of common equity in several prior proceedings.[53] In fact,
866 Mr. Moul presented, and the Commission rejected, the exact same risk premium
867 model in Docket Nos. 14-0224/14-0225 (Cons.) North Shore and Peoples Gas[54]
868 and a very similar risk premium model in Docket Nos. 12-0511/12-0512 (Cons.)
869 North Shore and Peoples Gas, Docket Nos. 11-0280/11-0281 (Cons.) North
870 Shore and Peoples Gas, Docket Nos. 09-0166/09-0167 (Cons.) North Shore and
871 Peoples Gas, and Docket Nos. 07-0241/07-0242 (Cons.) North Shore and
872 Peoples Gas.[55]

873 **Comparable Earnings**

874 **Q62. Please summarize Mr. Moul's Comparable Earnings analysis.**

875 A62. Mr. Moul used historical return on book equity as reported by Value Line for the
876 period 2010 to 2014 and forecasted Value Line estimates of return on book

[53] Order, Docket No. 14-0419, March 25, 2015, 46-47; Order, Docket No. 14-0066, November 6, 2014, 48-49; Order, Docket No. 13-0192, December 18, 2013, 165; Order, Docket No. 11-0282, January 10, 2012, 125; Order, Docket No. 11-0767, September 19, 2012, 110; Order, Docket No. 11-0436, February 16, 2012; 38.
[54] Order, Docket Nos. 14-0224/14-0225(Cons.), January 21, 2015, 134.
[55] Order, Docket Nos. 12-0511/12-0512 (Cons.), June 18, 2013, 207; Order, Docket Nos. 11-0280/11-0281 (Cons.), January 10, 2012, 139; Order, Docket Nos. 09-0166/09-0167 (Cons.), January 21, 2010, 128; Order, Docket Nos. 07-0241/07-0242 (Cons.) 93-94.

877 equity for the years 2018 through 2020 for the companies in his Comparable
878 Earnings group to estimate IAWC's cost of common equity.[56]

879 **Q63. Is the Comparable Earnings methodology appropriate for determining the**
880 **cost of common equity?**

881 A63. No. The comparable earnings approach, which Moul also relied upon to select
882 his cost of common equity estimate for IAWC in this proceeding, is flawed. The
883 cost of common equity is the market-required rate of return demanded by
884 investors. In contrast, comparable earnings analysis is not a market-based
885 methodology. The comparable earnings method incorrectly implies that the
886 earned or expected rates of return on book common equity are equivalent to the
887 current investor-required rate of return. However, there is simply no basis for this
888 implication. Market-based cost of equity methodologies reflect the investor-
889 required rate of return since the market price of a common stock will not reach
890 equilibrium until the expected rate of return on the common stock equals the
891 investor-required rate of return. In contrast, the return on book equity has no
892 such adjustment mechanism since its denominator, book value, is immune to
893 market forces.

[56] IAWC Exhibit 10.02, Schedule 12, 2.

894 **Q64. Has the Commission rejected use of the comparable earnings analysis to**
895 **measure a utility's cost of equity?**

896 A64. Yes. The Commission rejected use of the comparable earnings methodology in
897 Docket Nos. 14-0024/14-0025 (Cons.) North Shore and Peoples Gas, Docket
898 Nos. 06-0070/06-0071/06-0072 (Cons.) Central Illinois Light Company, Central
899 Illinois Public Service Company ("Ameren CIPS"), and Illinois Power Company,
900 Docket No. 04-0442 Aqua, Docket No. 03-0403 Consumers Illinois Water
901 Company, Docket No. 99-0121 Ameren CIPS and Union Electric Company,
902 Docket Nos. 92-0448/93-0239 (Cons.) Illinois Bell Telephone Company ("Illinois
903 Bell"), and Docket No. 89-0033 Illinois Bell.[57]

904 **RATE CASE EXPENSE – PAUL MOUL & ASSOCIATES**

905 **Q65. What documents did you review with regard to rate case expense**
906 **associated with the testimony of Paul Moul?**

907 A65. I reviewed the Company's responses to Staff data requests DGK 2.01, 2.03, and
908 2.04, which included IAWC's request for cost of capital testimony from Mr. Moul.
909 At this time, IAWC has not provided Staff any invoices from Paul Moul and
910 Associates.

[57] Order, Docket Nos. 14-0224/14-0225 (Cons.), January 21, 2015, 134; Order, Docket Nos. 06-0070/06-0071/06-0072 (Cons.), November 21, 2006, 141; Order, Docket No. 04-0442, April 20, 2005, 43-44; Order, Docket No. 03-0403, April 13, 2004, 41.; Order, Docket 99-0121, August 25, 1999, p. 68; Order on Remand, Docket No. 89-0033, November 4, 1991, p. 15; Order, Docket No. 92-0448/93-0239 Consol., October 11, 1994, p. 173.

Q66. Do you propose an adjustment to the rate case expense associated with Mr. Moul's testimony?

A66. I am not proposing an adjustment at this point; however, I will continue to review the rate case expense associated with Mr. Moul's testimony through the rebuttal phase of the proceeding, and if necessary, I will propose an adjustment in rebuttal testimony.

Q67. Does this conclude your direct testimony?

A67. Yes, it does.

Illinois-American Water Company

The Non-Constant Growth Discounted Cash Flow Model

The formula for measuring the cost of common equity, k, when growth, g, does not become constant until period φ, is as follows:

$$k = \left[\frac{D_{1,1}(1+k)^{\varphi-0.25} + D_{1,2}(1+k)^{\varphi-0.50} + D_{1,3}(1+k)^{\varphi-0.75} + \ldots + D_{\varphi,4} + P_{\varphi,4}}{P} \right]^{\left(\frac{1}{x+\varphi-0.25} \right)} - 1.$$

where: P $\equiv$ the current market value;

$D_{\varphi,q}$ $\equiv$ the expected dividend at the end of quarter q in year φ, where q = 1 to 4 and φ = the number of periods until the steady-state growth period;

k $\equiv$ the cost of common equity;

x $\equiv$ the elapsed time between the stock observation and first dividend payment dates, in years; and

$P_{\varphi,4}$, the market value at the beginning of the steady-state growth stage, is calculated from the following equation:

$$P_{\varphi,4} = \frac{\sum_{q=1}^{4} D_{\varphi,q}(1+g_l)(1+k)^{1-[x+0.25(q-1)]}}{k-g_l}$$

where: $D_{\varphi,q}$ $\equiv$ the dividend paid in quarter q during the last year of the transitional growth stage; and

g_l $\equiv$ the steady-state growth rate.

Illinois-American Water Company

Growth Rates

Water Sample

		Stage 1[1]					
	Company	Zacks	Reuters	Morningstar	Stage 1[1]	Stage 2[2]	Stage 3[3]
1	American States Water Co.	3.85%	3.85%		3.85%	4.03%	4.20%
2	American Water Works Co.	7.44%	7.60%	7.10%	7.38%	5.79%	4.20%
3	Aqua America Inc.	6.23%	5.85%		6.04%	5.12%	4.20%
4	California Water Service Gp.	9.05%	9.05%		9.05%	6.63%	4.20%
5	Connecticut Water Service Inc.	5.00%	5.00%		5.00%	4.60%	4.20%
6	SJW Corp .			14.00%	14.00%	9.10%	4.20%

Utility Sample

		Stage 1[1]					
	Company	Zacks	Reuters	Morningstar	Stage 1[1]	Stage 2[2]	Stage 3[3]
1	American Water Works Co.	7.44%	7.60%	7.10%	7.38%	5.79%	4.20%
2	Aqua America Inc.	6.23%	5.85%		6.04%	5.12%	4.20%
3	Connecticut Water Service Inc.	5.00%	5.00%		5.00%	4.60%	4.20%
4	El Paso Electric Co.	6.70%			6.70%	5.45%	4.20%
5	Great Plains Energy Inc.	8.05%	9.07%	7.40%	8.17%	6.19%	4.20%
6	Idacorp Corp.	4.00%	4.00%	5.00%	4.33%	4.27%	4.20%
7	Pinnacle West Capital Corp.	3.95%	3.60%	5.00%	4.18%	4.19%	4.20%
8	SJW Corp.			14.00%	14.00%	9.10%	4.20%
9	Westar Energy Inc.	5.20%	5.27%	3.70%	4.72%	4.46%	4.20%

1 Stage 1 is the simple average of the Zacks, Reuters, and Morninstar 3-5 year EPS estimates

2 Equals the average of Stage 1 and Stage 3 growth rates.

3 My estimate of the long-term overall economic growth.

Illinois American Water Company
Prices and Dividends

Water Sample

Company	Current Dividend $D_{0,1}$	$D_{0,2}$	$D_{0,3}$	$D_{0,4}$	Next Dividend Payment Date	Stock Price
American States Water Co.	$ 0.213	$ 0.224	$ 0.224	$ 0.224	6/1/2016	$ 38.79
American Water Works Co.	0.340	0.340	0.340	0.340	6/1/2016	69.80
Aqua America Inc.	0.165	0.178	0.178	0.178	6/1/2016	31.46
California Water Service Gp.	0.168	0.168	0.168	0.173	5/20/2016	26.72
Connecticut Water Service Inc.	0.258	0.268	0.268	0.268	6/15/2016	43.92
SJW Corp .	0.195	0.195	0.195	0.203	6/1/2016	36.64

Utility Sample

Company	Current Dividend $D_{0,1}$	$D_{0,2}$	$D_{0,3}$	$D_{0,4}$	Next Dividend Payment Date	Stock Price
American Water Works Co.	$ 0.340	$ 0.340	$ 0.340	$ 0.340	6/1/2016	$ 69.80
Aqua America Inc.	0.165	0.178	0.178	0.178	6/1/2016	31.46
Connecticut Water Service Inc.	0.258	0.268	0.268	0.268	6/15/2016	43.92
El Paso Electric Co.	0.295	0.295	0.295	0.295	6/15/2016	44.81
Great Plains Energy Inc.	0.245	0.245	0.263	0.263	6/21/2016	31.73
Idacorp Corp.	0.470	0.470	0.510	0.510	5/29/2016	72.82
Pinnacle West Capital Corp.	0.595	0.595	0.625	0.625	6/1/2016	74.11
SJW Corp.	0.195	0.195	0.195	0.203	6/1/2016	36.64
Westar Energy Inc.	0.360	0.360	0.360	0.380	7/1/2016	49.73

Illinois American Water Company

Expected Quarterly Dividends

Water Sample

Company	$D_{1,1}$	$D_{1,2}$	$D_{1,3}$	$D_{1,4}$
American States Water Co.	$ 0.224	$ 0.233	$ 0.233	$ 0.233
American Water Works Co.	0.365	0.365	0.365	0.365
Aqua America Inc.	0.178	0.189	0.189	0.189
California Water Service Gp.	0.173	0.173	0.173	0.188
Connecticut Water Service Inc.	0.268	0.281	0.281	0.281
SJW Corp .	0.203	0.203	0.203	0.231

Utility Sample

Company	$D_{1,1}$	$D_{1,2}$	$D_{1,3}$	$D_{1,4}$
American Water Works Co.	$ 0.365	$ 0.365	$ 0.365	$ 0.365
Aqua America Inc.	0.178	0.189	0.189	0.189
Connecticut Water Service Inc.	0.268	0.281	0.281	0.281
El Paso Electric Co.	0.315	0.315	0.315	0.315
Great Plains Energy Inc.	0.263	0.263	0.284	0.284
Idacorp Corp.	0.510	0.510	0.532	0.532
Pinnacle West Capital Corp.	0.625	0.625	0.651	0.651
SJW Corp.	0.203	0.203	0.203	0.231
Westar Energy Inc.	0.380	0.380	0.380	0.398

Illinois American Water Company

Water Sample

Company	NCDCF Estimate
American States Water Co.	6.60%
American Water Works Co.	6.78%
Aqua America Inc.	6.92%
California Water Service Gp.	7.86%
Connecticut Water Service Inc.	6.93%
SJW Corp .	8.39%
Average	7.24%

Utility Sample

Company	NCDCF Estimate
American Water Works Co.	6.78%
Aqua America Inc.	6.92%
Connecticut Water Service Inc.	6.93%
El Paso Electric Co.	7.52%
Great Plains Energy Inc.	8.65%
Idacorp Corp.	7.18%
Pinnacle West Capital Corp.	7.76%
SJW Corp.	8.39%
Westar Energy Inc.	7.48%
Average	7.51%

Illinois American Water Company

CAPM Analysis

Interest Rates as of April 7, 2016

U.S. Treasury Bills		U.S. Treasury Bonds	
Discount Rate	Effective Yield	Equivalent Yield	Effective Yield
0.20%	0.20%	2.52%	2.54%

CAPM Cost of Equity Estimates*
Water Sample

Risk-Free Rate		Beta		Risk Premium		Cost of Common Equity
2.54%	+	0.66	*	(12.03% - 2.54%)	=	8.80%

CAPM Cost of Equity Estimates*
Utility Sample

Risk-Free Rate		Beta		Risk Premium		Cost of Common Equity
2.54%	+	0.67	*	(12.03% - 2.54%)	=	8.90%

*Risk-Free Rate Proxy is the 30-year U.S. Treasury Bond Yield.

Illinois American Water Company

Credit Rating Analysis

	Current Risk Without Rider VBA				With Rider VBA			
Moody's Factors	Adjusted Weight	Indicated Rating	Numeric Rating	Overall Score	Adjusted Weight	Indicated Rating	Numeric Rating	Overall Score
Factor 1 - Business Profile	54.0%				51.1%			
Sub-factor								
Stability & Predictability of Regulatory Environment	13.8%	A	6	0.83	14.7%	A	6	0.88
Asset Ownership Model	4.6%	Aa	3	0.14	4.9%	Aa	3	0.15
Cost and Investment Recovery (Sufficiency & Timeliness)	15.9%	Baa	9	1.43	14.7%	A	6	0.88
Revenue Risk	9.2%	Ba	12	1.10	5.6%	Baa	9	0.51
Scale and Complexity of Capital Programme & Asset Condition Risk	10.6%	Baa	9	0.95	11.2%	Baa	9	1.01
Factor 2-Financial Policy	9.2%	A	6	0.55	9.8%	A	6	0.59
Factor 3-Leverage and Coverage	36.8%				39.1%			
Sub-factor								
Adjusted Interest coverage or (FFO interest coverage)	11.5%	A	6	0.69	12.2%	A	6	0.73
Net debt to RAB or debt to capitalization	9.2%	A	6	0.55	9.8%	A	6	0.59
FFO/net debt	11.5%	A	6	0.69	12.2%	A	6	0.73
RCF/net debt	4.6%	A	6	0.28	4.9%	A	6	0.29
Overall Assessment		**A3**		**7.21**		**A2**		**6.36**

Rating	Numeric Rating	Indicated Rating	Overall Score
Aaa	1	A1	4.50 to < 5.50
Aa	3	A2	5.50 to < 6.50
A	6	A3	6.50 to < 7.50
Baa	9	Baa1	7.50 to < 8.50
Ba	12	Baa2	8.50 to < 9.50
B	15	Baa3	9.50 to < 10.50

Theoretical Discussion of Size Premium

Evidence of the existence of a size premium is not very strong. Fernholz found that a statistical property he termed the "crossover effect" was the primary cause of the difference between large and small company stock returns. The "crossover effect" measures the effect on rate of return of those stocks that switch from one size portfolio to another.[1] Fernholz states that as random price changes affect the size of stocks, some stocks cross over from one size portfolio to another. When a stock that starts in the large stock portfolio experiences a random negative price change that moves it into the small stock portfolio, its resulting negative return is assigned to, and therefore reduces, the return on the large stock portfolio. Conversely, when that same stock experiences a random positive price change that moves it back into the large stock portfolio, its resulting positive return is assigned to, and therefore increases, the return on the small stock portfolio.[2] The combination of portfolio construction and <u>random</u> (i.e., non-systematic) price movements creates a <u>biased</u> source of measurement error. Thus, the size premium may be less a market return phenomenon than a modeling problem. That is, the size premium may be nothing more than a statistical anomaly.

In another study of domestic stocks listed on the NYSE and AMEX, Jensen, Johnson, and Mercer ("Jensen") found that size premiums appear to be related to monetary policy. Specifically, changes in monetary policy play a prominent role in determining the magnitude of size premiums. During expansive monetary periods, defined as months following a reduction in the Federal Reserve discount rate, Jensen found that small stock returns were significantly greater than large stock returns. Conversely, during restrictive monetary periods, defined as months following an increase in the discount rate, Jensen found that small stock returns were <u>not</u> significantly greater than large

[1] Fernholz, "Crossovers, Dividends and the Size Effect," *Financial Analysts Journal,* May/June 1998, 73-75.
[2] Fernholz, "Crossovers, Dividends and the Size Effect," *Financial Analysts Journal,* May/June 1998, 73.

stock returns.[3] Nevertheless, the applicability of the Jensen results to small *utility* stocks is doubtful. First, since the Jensen study was based on largely non-utility companies, its findings that small stocks outperformed large stocks during "expansionary" monetary periods is not surprising. During monetary expansions, as the supply of loanable funds increases, investors are more likely to invest in speculative, small company stocks. However, during monetary contractions, as the supply of loanable funds decreases, investors are more likely to switch from speculative investments to safer ones – a phenomenon known as the "flight to quality." It is counter intuitive to claim that investors would consider the smaller firms in the *regulated utility sector* to be speculative investments. Moreover, the Jensen study did not control its measurement of the size premium for risk as measured by beta or other means.[4] Therefore, the study does not support Mr. Moul's size premium adjustment.

[3] Jensen, Johnson and Mercer, "The Inconsistency of Small-Firm and Value Stock Premiums," *Journal of Portfolio Management,* 35.
[4] Jensen, Johnson and Mercer, "The Inconsistency of Small-Firm and Value Stock Premiums," *Journal of Portfolio Management,* 30 and 34.

MOODY'S
INVESTORS SERVICE

RATING METHODOLOGY

Regulated Water Utilities

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Analyst Contacts:

LONDON +44.20.7772.5454

Stefanie Voelz +44.20.7772.5555
Vice President - Senior Analyst
stefanie.voelz@moodys.com

Paul Marty +44.20.7772.1036
Vice President - Senior Credit Officer
paul.marty@moodys.com

Neil Griffiths-Lambeth +44.20.7772.5543
Associate Managing Director
neil.griffiths-lambeth@moodys.com

Monica Merli +44.20.7772.5433
Managing Director - Infrastructure Finance
monica.merli@moodys.com

NEW YORK +1.212.553.1653

Ryan Wobbrock +1.212.553.7104
Assistant Vice President - Analyst
ryan.wobbrock@moodys.com

Jairo Chung +1.212.553.5123
Analyst
jairo.chung@moodys.com

» contacts continued on the last page

Summary

This rating methodology explains Moody's approach to assessing credit risk for rated issuers in the regulated water utilities sector, globally. This document provides general guidance that helps companies, investors, and other interested market participants understand how qualitative and quantitative risk characteristics are likely to affect rating outcomes for regulated water utilities. This document does not include an exhaustive treatment of all factors that are reflected in Moody's ratings but should enable the reader to understand the qualitative considerations and financial information and ratios that are usually most important for ratings in this sector.

This rating methodology replaces[1] the Global Regulated Water Utilities Methodology published in December 2009. While reflecting many of the same core principles as the 2009 methodology, this updated document provides a more transparent presentation of the rating considerations that are usually most important for companies in this sector and incorporates refinements in our analysis that better reflect credit fundamentals of the industry. No rating changes will result from publication of this rating methodology.

This report includes a detailed rating grid and illustrative examples that compare the mapping of publicly rated companies against the factors in the grid. The grid is a reference tool that can be used to approximate credit profiles within the regulated water sector in most cases. The grid provides summarised guidance for the factors that are generally most important in assigning ratings to companies in the regulated water utilities industry. However, the grid is a summary that does not include every rating consideration. The weights shown for each factor in the grid represent an approximation of their importance for rating decisions but actual importance may vary substantially. In addition, the illustrative mapping examples in this document use historical results while ratings are based on our forward-looking expectations. As a result, the grid-indicated rating is not expected to match the actual rating of each company.

[1] This update may not be effective for some regulatory jurisdictions until certain requirements are met, such as local language translation.

The grid contains four factors that are important in our assessments for ratings of regulated water utilities:

1. Business Profile

2. Financial Policy

3. Leverage and Coverage

The scoring for factors 1-3 results in a preliminary grid-indicated outcome. In addition, we apply the following factor 4, which can result in upward notching for issuers that benefit from structural enhancements in their corporate structure, their regulatory licence or their financing arrangements – this has mainly been relevant for highly-leveraged financing structures that apply to an entire corporate group and for project financings.

4. Uplift for Structural Considerations

Some of these factors also encompass a number of sub-factors. Since an issuer's scoring on a particular grid factor or sub-factor often will not match its overall rating, in Appendix B we include a discussion of some of the grid "outliers" – companies whose grid-indicated rating for a specific sub-factor differs significantly from the actual rating – in order to provide additional insights.

This rating methodology is not intended to be an exhaustive discussion of all factors that our analysts consider in assigning ratings in this sector. We note that our analysis for ratings in this sector covers factors that are common across all industries such as ownership, management, liquidity, corporate legal structure, governance and country related risks which are not explained in detail in this document, as well as other factors that can be meaningful on a company-specific basis. Our ratings consider these and other qualitative considerations that do not lend themselves to a transparent presentation in a grid format. The grid used for this methodology reflects a decision to favour a relatively simple and transparent presentation rather than a more complex grid that would map grid-indicated ratings more closely to actual ratings.

Highlights of this report include:

» An overview of the rated universe

» A summary of the rating methodology

» A description of factors that drive rating quality

» Comments on the rating methodology assumptions and limitations, including a discussion of rating considerations that are not included in the grid

This publication does not announce a credit rating action. For any credit ratings referenced in this publication, please see the ratings tab on the issuer/entity page on www.moodys.com for the most updated credit rating action information and rating history.

The Appendices show (1) the full rating grid (Appendix A); (2) tables that illustrate the application of the grid to a sample of covered issuers, with explanatory comments on some of the more significant differences between the grid-implied rating for each sub-factor and our actual rating (Appendix B);[2] and (3) a more

[2] In general, the rating utilised for comparison to the grid-implied rating is the Corporate Family Rating (CFR) for speculative-grade issuers and the senior unsecured rating for investment-grade issuers. For issuers that benefit from rating uplift from parental support, government ownership or other institutional support, we consider the underlying credit strength or baseline credit assessment for comparison to the grid-indicated rating. For an explanation of baseline credit assessment please refer to Moody's Rating Methodology entitled "Government-Related Issuers". Individual debt instrument ratings also factor in decisions on notching for seniority level and collateral. The documents that provide broad guidance for such notching decisions are the rating methodology on loss given default for speculative grade non-financial companies and the methodology for aligning corporate instrument ratings based on differences in security and priority of claim. These two cross-sector methodologies can be found here.

detailed description of the water and wastewater industry, including different operational models, and certain regional differences (Appendix C).

This methodology describes the analytical framework used in determining credit ratings. In some instances our analysis is also guided by additional publications that describe our approach for analytical considerations that are not specific to any single sector. Examples of such considerations include but are not limited to: the assignment of short-term ratings, the relative ranking of different classes of debt and hybrid securities, how sovereign credit quality affects non-sovereign issuers, and the assessment of credit support from other entities. Documents that describe our approach to such cross-sector methodological considerations can be found here.

About the Rated Universe

This methodology is applicable to regulated utilities whose principal line of business is the provision of water and/or wastewater (also referred to as sanitation or sewerage) services. Many companies provide services along the entire value chain of the process, from resources/collection, transport, via distribution through to supplying the end consumer. However, the methodology also applies to pure wholesalers, or single asset providers (e.g., water desalination plants, water reservoirs, or sewage interceptor tunnels), where revenues are earned under a regulated licensing, concession or similar arrangement. Services may be provided under contract or concession agreements or direct licensing arrangements with the relevant governmental authority, and the assets may be owned outright by the issuer or operated under the terms of a concession or licence.

Companies rated under this methodology are primarily rate-regulated monopolies or, where companies are not outright monopolies, their ability to freely set tariffs is typically restricted through government policy or other regulations.

Independently-regulated water utilities are in the minority in the broader universe of global water utilities. Given the public importance of water supply and the health risks related to its service provision, most water services globally are provided by government entities that are not subject to independent regulation for the rates or tariffs they charge. Even where privatised, the sector maintains strong links to national, regional or local government bodies that ensure compliance with environmental and health and safety standards.

This methodology is applicable to regulated water utilities that are investor-owned (i.e. private sector) and to those owned by a regional or national government, provided they have an operating and financial profile that is distinct from that of the government administration (they may also be distinct legal entities), with revenues linked to a regulated (or in some cases, self-regulating) tariff-setting model. This methodology is not applicable to water and sanitary sewer utilities that operate as departments, boards, or independent authorities of US states or local governments, which are typically financed with tax-exempt revenue bonds and are covered under the US Municipal Utility Revenue Debt methodology.

There are a variety of business models in the water sector, with varying degrees of private sector involvement. In the rated universe, companies have also adopted a range of different funding models. This methodology encompasses different types of financing for water utilities, including typical corporate funding with limited financial covenants, as well as more highly-structured arrangements with credit enhancing features. The most complex corporate financing structures currently in use were developed in the United Kingdom (UK), where a number of water companies have overlaid structural enhancements on typical long-dated capital market funding, often incorporating comprehensive inter-creditor arrangements with certain project finance-type features. Some single asset financing structures are also rated under this

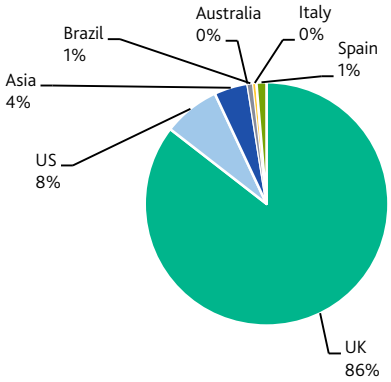
methodology, but privately financed, public infrastructure projects that receive specific availability-based payments sufficient to service their debt from government procurement agencies are rated under Moody's rating methodologies for PPP and PFI transactions: Operational Privately Financed Public Infrastructure (PFI/PPP/P3) Projects and Construction Risk in Privately Financed Public Infrastructure (PFI/PPP/P3) Projects.

Moody's currently rates 33 regulated water utility families, including multi-utilities in France and Italy, whose core business includes regulated water operations.

Publicly-rated regulated water utilities (including their fully-guaranteed finance subsidiaries) currently account for more than US$55 billion of total rated debt (this figure excludes the issuances of multi-utilities). UK issuers represent the vast majority of rated debt in the sector (see Exhibit 1).

EXHIBIT 1

Geographical distribution of rated debt within the regulated water sector (excluding multi-utilities)



Source: Moody's

Utilities rated under this methodology include those in Exhibit 2.

EXHIBIT 2

Regulated water utilities rated under this rating methodology include the following:

Issuer/Family	Issuer or Senior Unsecured Rating / BCA where applicable	Outlook	Jurisdiction
ACEA S.p.A.*	Baa2	Stable	Italy
Acquedotto Pugliese S.p.A.	Baa3/ba1	Stable	Italy
Affinity Water Limited	Baa1 (CFR)	Stable	United Kingdom
Aigues de Barcelona	Baa1	Stable	Spain
Aguas de Valencia S.A.	Baa3	Stable	Spain
American Water Works Company, Inc.	A3	Stable	Unites States
Anglian Water Services Ltd.	Baa1 (CFR)	Stable	United Kingdom
Anglian Water (Osprey) Financing plc	Ba3**	Stable	United Kingdom
Aquarion Company	Baa3	Stable	United States
Aquarion Water Company of Connecticut	Baa1	Stable	United States
Bristol Water plc	Baa1	Stable	United Kingdom

EXHIBIT 2

Regulated water utilities rated under this rating methodology include the following:

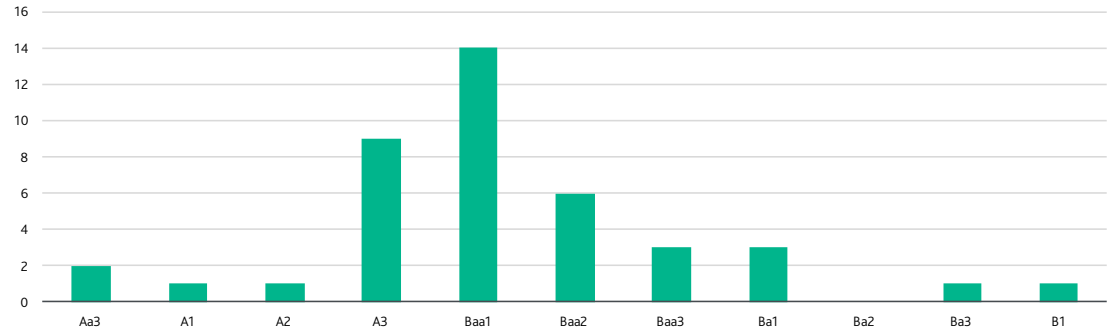
Issuer/Family	Issuer or Senior Unsecured Rating / BCA where applicable	Outlook	Jurisdiction
Canal de Isabel II Gestion, S.A.	Baa2/baa2	Positive	Spain
Companhia de San Bas do Estado de Sao Paulo	Ba1/ba2	Negative	Brazil
Companhia de Saneamento de Minas Gerais	Ba1/ba2	Under Review-Down	Brazil
Companhia de Saneamento do Parana – SANEPAR	Ba1/ba2	Under Review-Down	Brazil
Dee Valley Water PLC	Baa1 (CFR)	Stable	United Kingdom
Dwr Cymru Cyfyngedig	A3 (CFR)	Positive	United Kingdom
Golden State Water Company	A2	Stable	United States
Hera S.p.A.*	Baa1/baa1	Stable	Italy
Hunter Water Corporation	A1/baa2	Stable	Australia
Korea Water Resources Corporation	Aa3/baa2	Positive	South Korea
New Jersey-American Water Company, Inc.	A3	Stable	United States
Northumbrian Water Ltd.	Baa1	Stable	United Kingdom
Pennsylvania-American Water Company	A3	Stable	United States
Portsmouth Water Limited	Baa1 (CFR)	Stable	United Kingdom
Severn Trent Water Limited	A3	Negative	United Kingdom
Severn Trent plc	Baa1	Negative	United Kingdom
South East Water Limited	Baa2	Stable	United Kingdom
South Staffordshire Water Plc	Baa2	Stable	United Kingdom
Southern Water Services Limited	Baa2 (CFR)	Stable	United Kingdom
Suez Environnement Company*	A3	Stable	France
Sutton and East Surrey Water plc	Baa1	Stable	United Kingdom
Sydney Water Corporation	Aa3/baa1	Stable	Australia
Thames Water Utilities Ltd.	Baa1 (CFR)	Stable	United Kingdom
Thames Water (Kemble) Finance PLC	B1**	Stable	United Kingdom
United Utilities Water Limited	A3	Stable	United Kingdom
United Utilities PLC	Baa1	Stable	United Kingdom
Veolia Environnement S.A.*	Baa1	Stable	France
Wessex Water Services Limited	A3	Stable	United Kingdom
Yorkshire Water Services Limited	Baa2 (CFR)	Stable	United Kingdom

Note: * Multi-utilities with significant operations in the water/wastewater sector. ** Debt ratings reflect deeply subordinated position of the rated instrument in the group structure and cash waterfall.

Source: Moody's

The rating distribution in this sector ranges from Aa3 to B1, and is summarised in Exhibit 3. The average sector rating is Baa1.

EXHIBIT 3
Summary of ratings in the regulated water utilities sector



Note: Ratings represent issuer ratings (including corporate family ratings for highly-leveraged companies in the UK) or senior unsecured ratings
Source: Moody's

About this Rating Methodology

This report explains the rating methodology for regulated water utilities in seven sections, which are summarised as follows:

1. Identification and Discussion of the Grid Factors

The grid in this rating methodology is comprised of four rating factors. The first three grid factors are comprised of sub-factors that provide further detail. The fourth factor is used to make notching adjustments for structural enhancements where they are incorporated either in the company's corporate structure, its regulatory licence or its financing arrangements.

EXHIBIT 4
Rating Grid for Regulated Water Utilities

Rating Factors	Factor Weighting	Sub-Factors	Sub-Factor Weighting
BUSINESS PROFILE	50%	Stability and Predictability of Regulatory Environment	15%
		Asset Ownership Model	5%
		Cost and Investment Recovery (Ability & Timeliness)	15%
		Revenue Risk	5%
		Scale and Complexity of Capital Programme & Asset Condition Risk	10%
FINANCIAL POLICY	10%	Financial Policy	10%
LEVERAGE AND COVERAGE	40%	Adjusted Interest Coverage OR FFO Interest Coverage	12.5%
		Net Debt / Regulated Asset Base OR Debt/Capitalisation	10%
		FFO / Net Debt	12.5%
		RCF / Net Debt	5%
Total	100%	Total	100%
UPLIFT FOR STRUCTURAL CONSIDERATIONS		Up to 3 notches	

2. Measurement or Estimation of Factors in the Grid

We explain our general approach for scoring each grid factor and show the weights used in the grid. We also provide a rationale for why each of these grid components is meaningful as a credit indicator. The information used in assessing the sub-factors is generally found in or calculated from information in company financial statements, derived from other observations or estimated by Moody's analysts.

Our ratings are forward-looking and reflect our expectations for future financial and operating performance. However, historical results are helpful in understanding patterns and trends in a company's performance as well as for peer comparisons. We utilise an average of historical data over the last three years in this document to illustrate the application of the rating grid. However, the factors in the grid can be assessed using various time periods. For example, rating committees may find it analytically useful to examine both historic and expected future performance for periods of one year, several years or more.

All of the quantitative credit metrics incorporate Moody's standard adjustments to the income statement, cash flow statement and balance sheet amounts for restructuring, impairment, off-balance sheet accounts, receivable securitisation programmes, under-funded pension obligations, and recurring operating leases. Moody's may also make other analytical adjustments that are specific to a particular company.

For definitions of Moody's most common ratio terms, please see 'Moody's Basic Definitions for Credit Statistics, User's Guide'. For a description of Moody's standard adjustments, please see 'Financial Statement Adjustments in the Analysis of Non-Financial Corporations'. These documents can be found on the methodologies page at www.moodys.com.

3. Mapping Grid Factors to the Rating Categories

After estimating or calculating each sub-factor, the outcomes for each of the sub-factors are mapped to a broad Moody's rating category (Aaa, Aa, A, Baa, Ba, B, Caa, or Ca).

4. Mapping Issuers to the Grid and Discussion of Grid Outliers

In Appendix B, we provide a table showing grid-indicated ratings for each sub-factor and factor for a representative sample of companies. We highlight companies whose grid-indicated performance on a specific sub-factor is two or more broad rating categories higher or lower than its actual rating and discuss some general reasons for such positive and negative outliers for a particular sub-factor.

5. Assumptions and Limitations and Rating Considerations Not Included in the Grid

This section discusses limitations in the use of the grid to map against actual ratings, some of the additional factors that are not included in the grid but can be important in determining ratings, and limitations and assumptions that pertain to the overall rating methodology.

6. Determining the Overall Grid-Indicated Rating

To determine the overall grid-indicated rating, we convert each of the sub-factor scores into a numeric value based upon the scale below.

Aaa	Aa	A	Baa	Ba	B	Caa
1	3	6	9	12	15	18

A further weighting is applied by rating category as shown in the table below.

Aaa	Aa	A	Baa	Ba	B	Caa
1	1	1	1.15	2	3	5

We weight lower rating scores more heavily than higher scores for two reasons. In the first instance, we need to adjust for those situations where an issuer exhibits weak characteristics across the first two factors, which are not typically encountered within the rated universe and which would require more demanding thresholds for the credit metrics. Secondly, we recognise that a serious weakness in one area often cannot be completely offset by a strength in another area and that the lack of flexibility normally associated with high degrees of leverage can heighten risk.

The actual weighting applied to each sub-factor is the product of that sub-factor's standard weighting and its over-weighting, divided by the sum of these products for all the sub-factors (an adjustment that brings the sum of all the sub-factor weightings back to 100%).

The numerical score for each sub-factor is multiplied by the adjusted weight for that sub-factor with the results then summed to produce a composite weighted-factor score. The composite weighted-factor score is then mapped back to an alphanumeric rating based on the ranges in the table below.

Indicated Rating	Overall Score
Aaa	$x < 1.50$
Aa1	$1.50 \leq x < 2.50$
Aa2	$2.50 \leq x < 3.50$
Aa3	$3.50 \leq x < 4.50$
A1	$4.50 \leq x < 5.50$
A2	$5.50 \leq x < 6.50$
A3	$6.50 \leq x < 7.50$
Baa1	$7.50 \leq x < 8.50$
Baa2	$8.50 \leq x < 9.50$
Baa3	$9.50 \leq x < 10.50$
Ba1	$10.50 \leq x < 11.50$
Ba2	$11.50 \leq x < 12.50$
Ba3	$12.50 \leq x < 13.50$
B1	$13.50 \leq x < 14.50$
B2	$14.50 \leq x < 15.50$
B3	$15.50 \leq x < 16.50$
Caa1	$16.50 \leq x < 17.50$
Caa2	$17.50 \leq x < 18.50$
Caa3	$18.50 \leq x < 19.50$

For example, an issuer with a composite weighted factor score of 11.7 would have a Ba2 preliminary grid-indicated rating.

Finally, we consider whether the grid-indicated rating should be adjusted to incorporate uplift from structural enhancements that may be included in the company's financial arrangements. The effectiveness of any such enhancements is graded to determine the appropriate uplift, as described in the section "Structural Considerations and Sources of Rating Uplift from Creditor Protection" below. This allows us to

apply the methodology to regulated water utilities that have adopted certain credit-enhancing structural features typical of highly-geared financing structures.

We used the above described procedure with all four factors to derive the grid indicated ratings shown in the illustrative examples in Appendix B.

7. Appendices

The Appendices provide illustrative examples of grid-indicated ratings based on historical financial information, and also provide additional commentary and insights on different operating models within the industry.

Discussion of the Grid Factors

The grid for regulated water utilities focuses on four broad factors:

1. Business Profile
2. Financial Policy
3. Leverage and Coverage
4. Uplift for Structural Considerations

Factor 1: Business Profile

WHY IT MATTERS

Regulated water utilities typically provide monopoly-type, relatively price-inelastic services that are viewed as a true necessity and are generally highly regulated. The combination of essentiality of service and regulatory frameworks that are typically well established lend themselves to high levels of business visibility and revenue stability for most issuers. As a result, regulated water utilities are likely to have a longer-term strategic and financial horizon than most other corporate sectors. Accordingly, assessing the historical and expected stability of the regulated water utility's business and cash flow generation is a critical component of our analysis. Generally speaking, revenues and cash flows are a function of tariff levels and tariff-setting mechanisms as well as volumes sold. Tariffs are embedded in the broader framework of the applicable regulatory environment and/or a utility's concession agreement or lease contract. As such, 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. We also assess the execution risk associated with a water utility's investment programme and the asset quality of a regulated water utility, which can have a material influence on its ability to provide services that meet regulatory expectations and on its future financial position.

HOW WE ASSESS IT FOR THE GRID

In assessing a water utility's regulatory environment and business model we look at five sub-factors:

» Stability & Predictability of Regulatory Environment

» Asset Ownership Model

» Cost and Investment Recovery (Sufficiency & Timeliness)

» Revenue Risk

» Scale and Complexity of the Capital Programme & Asset Condition Risk

Stability & Predictability of Regulatory Environment

This sub-factor assesses the regulatory and/or concession framework under which the water utility operates.

The provision of water and wastewater services is generally a monopoly or quasi-monopoly regulated on a national or regional basis. Where water services are provided by a private sector company, the monopoly service responsibilities are typically performed under a concession agreement or license. Often the enabling legislation/legal framework sets out common terms and conditions for concessions and lays out the framework under which tariff decisions are made, but there may be meaningful variations in the granularity and transparency of the framework. The stability and predictability of such regulatory regime or concession framework is a key determinant in assessing a water utility's business risk profile, reflected in the grid weighting of 15%.

Issuers operating under regulatory regimes that have a very long track record of clearly defined risk allocation principles, which have been consistently applied and transparently disclosed to the public receive the highest scores under this sub-factor. Issuers operating in a jurisdiction that has not implemented a defined regulatory framework and/or is extremely unpredictable or politically driven receive the lowest scores under this sub-factor. For instance the regulator or government may have a track record of making unilateral changes to the terms and conditions of concessions in water (or similar infrastructure sectors that are relevant precedents) to the detriment of the concession-holder without providing compensation.[3] Concerns about the independence of the regulatory authorities and the risk of politically-motivated intervention in the regulatory process generally also result in a lower score.

In considering whether a regulatory framework is independent and developed, we also take into account the strength of the rule of law within the jurisdiction in which the relevant utility operates, and whether an independent judiciary exists that allows for legal rights (and especially concession rights) to be enforceable in practice. For a water company that is located in a country with generally poor institutional strength, our scoring of the regulatory framework typically reflects that weakness.

Where companies operate in multiple jurisdictions or under regulatory or concession models with differing characteristics, the score for this sub-factor will reflect our assessment of the blended profile of these regulatory frameworks.

[3] Where regulatory or legislative changes do occur, water utilities can still be scored high on this sub-factor if the changes are sufficiently consulted upon, supportive of companies' credit quality and have involved the affected companies within the process. In contrast, water utilities will be scored low on this factor if changes to the regulatory framework have been implemented without consultation, are unclear, or are detrimental to credit quality.

Asset Ownership Model

The rated universe includes companies that own their assets outright in perpetuity or for a defined time horizon under a concession or other contractual agreement.[4]

In those cases where the water and wastewater assets are owned outright, Moody's assesses the implication of ownership rights that are subject to a licence or franchise agreement and the risk of termination thereof. Moody's also considers whether the right to operate the assets is long term in nature or may only be granted over a short-term period. Moody's also considers the recovery mechanism in relation to any residual asset value at the end of a concession or other contractual arrangement when scoring this sub-factor.

A water company that owns all its key water and wastewater assets outright in perpetuity and has ultimate control over them would typically score high on the grid. On the other end of the spectrum, a utility that holds the assets under a concession contract, which may be relatively short term or does not provide clear principles for the recovery of the residual asset value at the termination of the concession, would typically score relatively low (i.e. Ba or lower). In those instances, a track record of concession renewal or compensation arrangements being applied consistently could improve the score.

Most of the rated regulated water utilities own their key assets under a licence regime or long-term concessions. Outright ownership in perpetuity is less common. Operators with multiple concession arrangements are generally assessed based on the average concession life, weighted by each concession's contribution to overall cash flows.

The general rule of law and the value and enforcement of asset property rights and contracts are important considerations in assessing this sub-factor, since they affect the issuer's ability to benefit from its assets or concession/contract and the likelihood that compensation that an issuer expects to receive at the end of the concession or contract's life will be paid. For example, if there is a heightened risk of expropriation of assets for political reasons, we would score a company lower, even though it may own its assets. The expropriation risk may be higher for water and wastewater assets than for other infrastructure assets, given the significance of the services provided.

Cost and Investment Recovery (Sufficiency & Timeliness)

As part of our assessment of the overall regulatory or concession regime, the ability of a regulated water utility to recover the cost of its operations and/or investments in a timely manner is another key determinant for the evaluation of the stability of cash flow generation. In this sub-factor we assess the nature of the tariff regime, including the mechanisms under which the water utility is able to recover its ongoing costs and invested capital and earn a fair return on it, as well as the risk allocation between the water utility and its customers. We assess whether the regulator seeks to insulate consumers from the volatility and the uncertainty associated with operating and financial costs, whether there is risk-sharing between the water utility and its consumers, and whether the water utility is easily able to pass through its incurred costs, including financial costs.

Issuers regulated under frameworks that provide highly flexible arrangements to adjust tariffs as required to reflect the full range of incurred costs and investments score very high in this sub-factor. At the other end of the spectrum are tariff mechanisms that do not adequately cover the operator's costs, for instance due to politically-motivated low tariffs that hinder the utility's viability in the absence of government support.

[4] Please refer to Appendix C for further details on the water industry sector and the different business models applied.

In general, most tariff formulas seek to achieve a balance between reliability and quality of service standards, provide incentives for operational efficiency, protect consumers from monopoly-overcharging and meet certain social objectives, while allowing an adequate return for companies to be able to attract the debt and equity capital required to finance their investments.

In jurisdictions with separate regional regulation, e.g., in the US or Spain, we typically assess each state or region individually to consider the various factors that affect the utilities' profitability, including the type of fixed- versus variable-rate design allowed, historically-authorised tariff decisions, and the existence of mechanisms that permit recovery of operating and capital costs outside of a general tariff setting process. Furthermore, we take into account contractual obligations that restrict a water utility's ability to submit a tariff reset for approval within a defined period of time.

The ability of a water utility to recover its costs will also depend on its performance against regulatory cost allowances and efficiency targets. Companies that have a track record of significant overspending or are unlikely to meet target allowances may score lower. We also consider whether the tariffs can actually be afforded by the users of the water and wastewater services. This could be measured for example through the level of unpaid bills. If the level of unpaid bills is high or increasing materially we would normally score a water utility's ability to recover its costs lower than the theoretical tariff formula may imply.

Revenue Risk

Under this sub-factor we assess the potential volatility of revenues generated by a regulated water utility, including considerations such as a company's exposure to fluctuations in the volume of water used. Volume of usage may be affected by scarcity of supply or decreases in demand. Some utilities are exposed to greater differences in weather patterns from year to year. Others have a more concentrated customer structure or reliance on a particular customer to generate a large proportion of revenues. If this customer chooses a different service provider or closes its operations, a significant portion of revenues could be lost. Similarly, a higher exposure to industrial customers or a tariff plan that assumes increasing revenues will be generated from new customers may have a negative impact on revenues in a recession scenario.

When scoring this sub-factor we also consider whether a regulatory regime provides mechanisms whereby companies may be allowed to adjust tariffs within a regulatory period or at the next price review to reflect a divergence between collected and allowed revenues caused by fluctuating volumes.

Issuers that have no exposure to volume or customer concentration risk and are thus effectively immune from revenue volatility risks typically score Aaa. Water companies that are not immune but benefit from regulatory safeguards that allow them to adjust tariffs to recover lost revenue under a tested and transparent procedure typically score a bit lower but still at the high end of the grid. Water utilities that are subject to greater revenue risks from changes in volume (from droughts, recession, or a material reliance on new customer connections, etc) that are not offset by increases in tariffs, or where the tariff re-set is delayed or uncertain, typically score at the lower end of the grid.

Scale and Complexity of the Capital Programme & Asset Condition Risk

Our assessment of a company's risk exposure captures (1) the general operational risk of dealing with an extensive capex programme and management's ability to deliver without significant delays or cost overruns; (2) the technological challenges of very complex investment projects; and (3) the financing risk that a significant capex programme may pose, if it cannot be funded out of operating cash flows.

To some extent, the size of a water utility's capital expenditure plans can be representative of the complexity of the programme. Thus, we consider the size of the annual capital expenditure plan[5] as a percentage of Regulated Asset Base (RAB – where applicable, it is typically obtained from regulatory filings) or the Fixed Assets (tangible and intangible)[6] as reported in a company's financial statements. However, this percentage may not directly correlate to risk in all scenarios, and replacement programmes that are large in scope may nevertheless present only limited execution risk. For example, a large capital expenditure programme could reflect a significant number of individual projects where overall execution risk is reduced through diversification, the repetitive nature of the programme, or the ability to reduce/modify the plan in light of changing circumstances. The experience of the utility in taking on expansion projects and delivering them within budget is also a relevant consideration in assessing the level of risk.

Capex programmes that are very large relative to existing asses base have a greater potential to create significant tariff increases for the end-consumer or disallowance or delay of cost and investment recovery by a regulator seeking to avoid such increases. For example, the asset value of companies that have been privatised may not reflect the actual replacement costs of such assets (essentially a form of subsidy to consumers to keep tariffs low). These companies may be required to undertake very large capital investment programmes to maintain and upgrade their infrastructure compared with a relatively small regulatory asset base, with the attendant execution and cost recovery risks. Expansionary programmes may not deliver expected revenue increases if new demand does not materialise, and even when the utility can adjust tariffs in light of lower-than-expected volumes, customer dissatisfaction and regulatory pressures may result.

Some regulatory frameworks or concession regimes may incentivise investment, either generally or for a particular project, in a manner that limits a company's exposure to capex-related risks, such as cost overruns. When this dynamic reduces the issuers risk in the capex programme, it is considered in our scoring of this sub- factor. Some incentive programmes simply provide capital that reduces the regulatory asset base (essentially a subsidy for consumers) without reducing the water utility's exposure to construction risks.

When scoring this factor, we also take into account the underlying asset condition and the related risk of potential asset failure. A functioning asset base is paramount for the water and wastewater utilities to comply with their regulatory duties and ensure stability of future cash flow generation. Deferred maintenance and under-investment may lead to the need for rapidly increasing capex in future years.

Issuers with large, modern asset bases requiring a limited amount of simple maintenance (with capital expenditure representing a low percentage of fixed assets) will likely have very high scores for this sub-factor. In contrast, water utilities that are engaging in highly complex, concentrated programs (and where annual capex represents a high percentage of fixed assets) will likely have very low scores for this factor. Furthermore, if a water utility has a history of serious asset failures or exhibits a significant deterioration in asset performance, it will typically have a score of Ba or lower under this sub-factor, depending on the severity of failures.

[5] Capital expenditure is considered before any government grants, construction subsidies or developers' contributions, to assess the full scale of the investment programme and potential execution risk.

[6] We include intangible assets in the denominator as companies may report their concession assets as intangibles. However, we do not include Goodwill as part of Fixed Assets.

Factor 1: Business Profile (50%)

The following tables show the grid-scoring categories for each Business Profile sub-factor and the weighting thereof.

Sub-Factor	Weight	Aaa	Aa	A	Baa	Ba	B	Caa
Stability and Predictability of Regulatory Environment	15%	Regulation is and expected to remain independent, well established (>15 years of being predictable and stable) and transparent. Well-established, published regulatory principles clearly define risk allocation between companies and customers and are consistently applied, with public or shared financial model.	Regulation is independent, reasonably well established (>10 years of being predictable and stable) and transparent. Well-established, published regulatory principles clearly define risk allocation between companies and customers and are generally consistently applied. Regulatory or concession framework has in recent years been (and is expected to remain) highly predictable, stable and supportive of utilities.	Regulation is generally independent and developed (e.g. published regulatory principles of risk allocation between companies and customers, based on established precedents in the same jurisdiction), and has above average predictability and reliability, although regulatory or concession regime may be sometimes less supportive of utilities.	Regulatory framework is well developed, with evidence of some inconsistency or unpredictability in the framework's application. OR Regulatory framework is relatively new and untested, but regulatory principles are based on established precedents and jurisdiction has history of independent and transparent regulation for other utility services. Regulatory environment or concession framework may sometimes be challenging or politically charged.	Regulatory or concession framework is defined but there is a high degree of inconsistency or unpredictability in its application. Tariff setting may be subject to negotiation and political interference; there has been a history of difficult or less supportive regulatory decisions; however, there are some precedents in the relevant jurisdiction of predictable regulation for other utility services.	Regulatory or concession framework is unclear, untested or undergoing significant change, with a history of political interference. Utility regulatory body lacks a consistent track record and is or is expected to be unsupportive, uncertain or highly unpredictable.	Regulatory or concession framework is not defined, or is expected to be extremely unsupportive, unpredictable or politically driven.

Sub-Factor	Weight	Aaa	Aa	A	Baa	Ba	B	Caa
Asset Ownership Model	5%	All key water and/or sewerage assets held outright in perpetuity.	All key water and/or sewerage assets held outright subject to a licence that can be terminated only for material underperformance, failure to meet certain financial parameters or insolvency OR held under long-term concession with clearly defined right to timely recovery of residual asset value at termination/end of concession underpinned by highly rated entity; clear track record of consistently applying concession termination / recovery regime.	All key water and/or sewerage assets held under long-term concession with clearly defined right to recover value of residual assets at termination/end of concession underpinned by highly rated entity but with undefined timeframe OR held/operated under medium-/ long-term operating leases or mgmt contract with very substantial portfolio diversification, very established market position and very high renewal rate (>95%).	All key water and/or sewerage assets held under long-term concession with entitlement to recover value of residual assets at termination/end of concession but procedures untested/undefined OR held/operated under medium-/ long-term operating leases or mgmt contract with substantial portfolio diversification, established market position and high renewal rate (>90%). Expropriation possible in case of insolvency or material failure to comply with licence conditions, but with full compensation for asset value.	All key water and/or sewerage assets held under concession with recovery of residual asset value at termination/end of concession subject to negotiation OR held/operated under short-term operating leases or mgmt contract with good degree of portfolio diversification and renewal rate (>80%). Expropriation possible, with some uncertainty in the prospect of full compensation.	All key water and/or sewerage assets held under concession with no recovery of residual asset value at termination/end of concession OR held/operated under short-term operating leases or mgmt contract (limited portfolio diversification). Expropriation likely, with material uncertainty in the prospect of full compensation.	Issuer is in default under its licence, concession or lease/contract, likely to lead to termination. Expropriation highly likely, with little or no prospect of compensation.

Sub-Factor	Weight	Aaa	Aa	A	Baa	Ba	B	Caa
Cost and Investment Recovery (Sufficiency & Timeliness)	15%	No regulatory or contractual impediment to adjust tariffs (no approval or reviews required).	Tariff formula allows for timely recovery of operating expenditure including depreciation and a fair return on all investment. Depreciation allowance fairly reflects asset consumption. All capital expenditure is included in asset base as incurred or fully covered by specific riders/surcharges prior to the next rate case. Minimal challenges by regulators to companies' cost assumptions.	Tariff formula allows for recovery of operating expenditure including depreciation based on allowances set at frequent price reviews (e.g., 5-yearly intervals or shorter) and a fair return on all efficient investment: Depreciation allowance fairly reflects asset consumption; Capital expenditure is included in asset base as incurred or partially covered by specific riders/surcharges prior to the next rate case; Opex and capex can be subject to efficiency tests; Limited instances of regulatory challenges; limited delays to rate or tariff increases or cost recovery Performance is likely to be in line with regulatory expectations.	Tariff formula allows for recovery of operating expenditure including depreciation and return on investment but subject to retrospective regulatory approval or infrequent price reviews (e.g., > 5-yearly intervals): Some instances of revenue back-loading (e.g. depreciation allowance set below asset consumption or operating expenditure is capitalised) OR Rate/tariff reviews and cost recovery outcomes are usually predictable, although application of tariff formula may be unclear; potentially greater tendency for regulatory intervention and/or to disallow or delay costs Performance may be below regulatory expectations.	Tariff formula does not take into account all cost components and depreciation may be set below asset consumption. Revenues allow coverage of operating expenditures; however, investment is not clearly or fairly remunerated OR Rate/tariff reviews are inconsistent, with some history of unwillingness to make timely rate changes OR Operational underperformance likely to significantly impact the returns achieved by the business.	Highly uncertain rate reviews and cost recovery outcomes; regulators may materially delay or deny tariff increases based on more arbitrary questioning of the utility's costs or financing arrangements. Revenues only cover cash operating expenditures OR Tariff formula does not take into account material cost and investment recovery components:	Revenues only partially cover cash operating costs.

Sub-Factor	Weight	Aaa	Aa	A	Baa	Ba	B	Caa
Revenue Risk	5%	No exposure to volume or customer concentration risk.	Minimal exposure to volume risk and timely recovery mechanism in place. AND Very limited customer concentration of volumes and revenues and to a customer/industry viewed as stable.	Some exposure to volume risk; recovery mechanism in place with some delay until next regulatory price review; generally limited revenue volatility expected. May have small concentration of volumes and revenues to a particular customer/industry viewed as stable.	Moderate exposure to volume risk but recovery mechanism in place, with some delay until next regulatory price review; moderate revenue volatility expected. May have a moderate concentration of volumes and revenues to a particular customer/industry.	More material exposure to risk of volumes decreasing or not meeting growth targets embedded in tariff levels; recovery mechanism, may not follow regular intervals. OR Significant concentration of volumes and revenues to a particular customer/industry.	High exposure to risk of volumes decreasing or not meeting growth targets embedded in tariff levels with recovery mechanism unclear or subject to very long delays. OR Very high concentration of volumes and revenues to one particular customer/industry.	Very high exposure to risk of volumes decreasing or not meeting growth targets embedded in tariff levels with no meaningful recovery mechanism in place. OR Very high concentration of volumes and revenues to a particular customer/industry viewed as vulnerable.
Scale and Complexity of Capital Programme & Asset Condition Risk	10%	Capex programme is very limited in scale, with only minimum maintenance requirements (typically, total annual capex ≤ 4% of total fixed assets or regulated asset base). AND No asset condition risk (e.g. full and immediate cost pass-through).	Capex programme is limited in scale, with small maintenance or enhancement requirements (typically, total annual capex 4-6% of total fixed assets or regulated asset base). AND Well-developed asset base under tight regulatory supervision; asset performance is generally stable or improving.	Modest capex programme, including standard maintenance and enhancement expenditures (typically, total annual capex 6-8% of total fixed assets or regulated asset base). Well-developed asset base and no history of serious asset failure; asset performance is generally stable or improving.	Capex programme of manageable scale, including straight-forward maintenance and enhancement expenditure (typically, total annual capex 8-12% of total fixed assets or regulated asset base). Company has a reasonably developed asset base; may have some precedents of serious asset failures but asset performance is now and is expected to remain broadly stable.	Large capex programme (typically, total annual capex 12%-20% of total fixed assets or regulated asset base) or challenging in scope (small number of large and complex projects may account for majority of capital programme). OR Asset base not fully developed; or average asset performance is gradually deteriorating or there is some concern about asset condition.	Very large capex programme (typically, total annual capex 20-30% of total fixed assets or regulated asset base) or highly complex (one large and complex project may account for majority of capital programme). OR Performance of most assets is materially deteriorating, with serious assets failures likely or ongoing, or asset development is seriously below required target.	Extremely large capex programme (typically, total annual capex > 30% of total fixed assets or regulated asset base) or technically highly complex (includes one or more large projects of extreme technical complexity). OR Rapidly deteriorating asset performance or condition could put issuer at risk of termination of licence, concession or lease/contract.

Factor 2: Financial Policy

WHY IT MATTERS

Management and shareholder tolerance for financial risk is an important rating factor as it directly affects debt levels, credit quality and risk in the capital structure (e.g., refinancing risk, counterparty risk or exposure to interest rates or foreign exchange movements).

The generally stable and predictable cash flows of a regulated water utility create significant capacity to incur debt financing and potentially to invest in related businesses. While debt financing may be considered essential to the efficient capital structure of a water utility, a desire to enhance shareholder returns may lead to the pursuit of higher leverage, which increases credit risk. The way in which a water utility's owner uses its debt capacity, therefore, is a key rating consideration.

In this factor we assess the likelihood that financial policy decisions, in their totality, could add uncertainty to future cash flow levels and divert resources away from creditors. In this regard, management's track record and their public commitment to maintaining the issuer's credit quality are key considerations.

HOW WE ASSESS IT FOR THE GRID

We consider the company's approach to financing its activities, in particular the balance it strikes in apportioning risk between shareholders and creditors. We assess both the company's historical track record and its stated objectives with respect to leverage and financing decisions, as well as the investment return requirements of its owners. The behaviour of owners can be a key differentiating credit consideration – where owners' objectives are short-term, opaque or where there is a lack of track record, the regulated water utility will likely be scored lower in this factor than if its shareholders have more long-term return requirements and may be willing to forego near-term distributions to maintain financial flexibility.

Issuers are likely to have a high score on this factor if they have an extended track record of low levels of leverage plus a public commitment to maintaining high levels of credit quality. A water utility that has demonstrated a commitment to maintaining an average level of leverage for the industry (e.g. to a level implied within the regulator's allowed rate return) is likely to be scored in the middle of the range. However, scores of Baa and above would generally only apply where there are no (or only very limited) concerns regarding owners' behaviour – this would be the case, for example, for listed companies, government majority owned companies or those owned by industrial shareholders. Issuers with consistently higher levels of leverage or those with a less transparent financial policy would likely score Ba or lower on this factor.

This factor is scored separately from a notching factor for specific structural enhancements that provide additional creditor protection (Factor 4). However, where they exist, such enhancements will be considered to the extent they define or clarify the issuer's overall financial policy.

Factor 2 – Financial Policy (10%)

Rating Factor	Weight	Aaa	Aa	A	Baa	Ba	B	Caa
Financial Policy	10%	Long track record and expected maintenance of extremely conservative financial policy; very stable metrics; low debt levels for the industry; AND Public commitment to the highest credit quality over the long-term.	Long track record and expected maintenance of a conservative financial policy; stable metrics; lower than average debt levels for the industry; AND Public commitment to a very high credit quality over the long-term.	Extended track record and expected maintenance of a conservative financial policy; moderate debt leverage and a balance between shareholders and creditors; Not likely to increase shareholder distributions and/or make acquisitions which could lead to a weaker credit profile; Solid commitment to high credit quality.	Track record and expected maintenance of a conservative financial policy; an average level of debt for the industry and a balance between shareholders and creditors; Some risk that shareholder distributions and/or acquisitions could lead to a weaker credit profile; Solid commitment to targeted metrics.	Track record or expectation of maintenance of a financial policy that is likely to favour shareholders over creditors; higher than average, but not excessive, level of leverage; Owners are likely to focus on extracting distributions and acquisitions but not at the expense of financial stability.	Track record of aggressive financial policies or expected to have a financial policy that favours shareholders through high levels of leverage with only a modest cushion for creditors; OR High financial risk resulting from shareholder distributions or acquisitions.	Expected to have a financial policy unfavourable to creditors with a track record of or expected policy of maintaining excessively high debt leverage; OR Elevated risk of debt restructuring.

Factor 3: Leverage and Coverage

WHY IT MATTERS

In the first two rating factors we assess the credit strengths and weaknesses afforded by the water utility's fundamental business and its financial policies. However, a company's ultimate credit profile must also incorporate its financial metrics, as a water utility that is substantially weaker than its peers in terms of cash flow generated or debt relative to the value of its asset base will generally have a higher probability of default.

When examining credit metrics, there is no single measure that can predict the likelihood of default. We utilise metrics that measure both the absolute capacity of the issuer to service its debt and the size of its debt burden relative to those of its peers. Leverage ratios aim to capture different measures of how easily an issuer can repay its debt; coverage ratios focus more on the ability to service the debt prior to repayment but may also take into account the necessary maintenance investments that are needed to ensure that the future cash flow generation is not impaired.

HOW WE ASSESS IT FOR THE GRID

We use four financial metrics in the grid when examining a water utility's leverage and coverage.

» Adjusted Interest Coverage Ratio OR FFO Interest Coverage

» Net Debt to Regulated Asset Base (RAB)[7] OR Debt to Capitalisation

» Funds from Operation (FFO) to Net Debt

» Retained Cash Flow (RCF) to Net Debt

Adjusted Interest Coverage Ratio OR FFO Interest Coverage

The Adjusted Interest Coverage Ratio is our preferred metric for water utilities where allowed revenues/tariffs are determined using a 'building block' or equivalent approach and where the components of allowed revenues/tariffs are consistently available from an independent source – in many cases, publications from the regulatory authority itself. Typical components of the revenue building block include: (1) the amount of expenditure recovered on an annual basis and not capitalised into the RAB; (2) the depreciation of the RAB as well as a depreciation or maintenance allowance for assets that may not be fully factored in the RAB; and (3) the return allowed over the invested capital, typically calculated or estimated by applying an industry- or company-specific rate of return on the RAB. The building block generally also includes several other elements, such as taxes and levies, and adjustments for past over or under-recoveries.

The Adjusted Interest Coverage Ratio aims to measure the amount of "headroom" afforded by the company's cash flows in servicing its debt burden after taking into account the cost of maintaining a stable asset base. It thus recognises that the regulatory revenue allowances for a water utility include significant amounts that customers are required to pay to enable the utility to maintain and replenish its assets, both those that are included in the RAB and those that may be operated by the utility but not financed by its investors (e.g. assets built with public grants or assets that were privatised at a value below their replacement cost). As a result the utility's revenues (and thus FFO) can be boosted by significant amounts

[7] The Regulatory Asset Base (RAB) or equivalent regulatory term (e.g. RAV, Rate Base) is the monetary value attributed in the tariff setting regulatory model to the capital invested by the water utility, on which the regulator calculates an allowed return.

that are simply funding required expenditure, which is reported in company's financial statements not as operating expenditure but as capital expenditure.

Where this regulatory dynamic applies, an EBITDA- or FFO-based interest coverage may limit the comparability of companies' interest coverage.[8] Given the amounts of embedded subsidies often inherent in a private water utility model, the amounts of expenditure that the utility needs to manage to provide its services can be very significant in relation to the capital provided by its investors compared to other industries. This results in a high level of operational leverage, which is disguised by the accounting reporting of expenditure and has the illusive effect of boosting FFO and EBITDA-based metrics.[9]

The formula for the Adjusted Interest Coverage ratio is a variation on the typical FFO Interest Coverage ratio. In calculating the Adjusted Interest Coverage, the standard FFO Interest Coverage is adjusted for (1) the Capital Charges, i.e. expenditures recovered in revenues that are not accounted for as operating expenses and are not treated as additional invested capital incrementing the RAB; and (2) Inflation Accretion, a non-cash interest expense.

It is calculated or estimated as follows:

$$\frac{\text{FFO} + (\text{Interest Expense} - \text{Inflation Accretion}^{10}) - \text{Capital Charges}}{(\text{Interest Expense} - \text{Inflation Accretion})}$$

Inflation Accretion typically arises when the regulatory authority sets tariffs for the water utility in real terms, using a real rate of return, and then allows the utility to adjust tariffs annually by an inflation index. In this type of regulatory model, such as used in the UK, the utility's RAB is also revalued annually by inflation. Hence, inflation-linked debt aligns the debt service requirements with the utility's future cash flows, because the utility only pays a real rate of interest on the outstanding principal, which is adjusted annually by an inflation index. With positive inflation, the debt grows annually at the rate of inflation and this non-cash increment, which we define as Inflation Accretion, is typically reported as part of the Interest Expense in the company's income statement. The related increase in debt is captured by the leverage ratio below.

The Capital Charges represent the portion of revenues (and thus FFO) that is needed to replenish the regulated asset base. The maintenance of a stable asset base ensures that the earned return does not fall due to a decline in the asset base. Regulators – or issuers as part of their business plan submissions to the regulator during the price review process – may decide to allow more revenues today to the detriment of a slower growing asset base and, consequently lower revenues in the future, or vice versa. The Capital Charges in the Adjusted Interest Coverage Ratio incorporate these timing differences or other similar adjustments, e.g., regulatory revenue profiling to smooth the impact of tariff increases on customer bills.

In jurisdictions where regulatory revenues/tariffs are not determined with a 'building block approach' or where the regulatory information needed to calculate Capital Charges may not be consistently available, we use the FFO Interest Coverage, calculated (or for forward periods estimated) as (FFO + Interest Expense) / Interest Expense.

[8] For further details, please see Moody's Special Comment: "UK Water Sector: Key Ratios Used by Moody's in Assessing Companies' Credit Strength", March 2006.

[9] This is recognised in slightly more demanding ratio guidance.

[10] For the numerator, Interest net of Inflation Accretion is added back to the extent it was deducted in calculating FFO, i.e. FFO would be after Interest Expense, net of Inflation Accretion.

Net Debt to Regulated Asset Base OR Debt to Capitalisation

As explained above, regulated water utilities service their debt principally through the return they earn on the capital invested for the provision of the regulated services. Hence, we seek to measure leverage as the relationship between their debt and their invested capital.

For the utilities regulated under a RAB-based model where the RAB accurately represents the invested capital on which the water utility will earn a return over time, we measure leverage as Net Debt to RAB.

For water utilities that (1) are regulated under tariff models without a RAB; (2) are regulated under a RAB-based model but where the RAB may not accurately represent the invested capital on which the water utility will earn a return over time (e.g. because of ex-post rate-setting); or (3) where the RAB may not be consistently available, we use Debt to Capitalisation as a measure of balance sheet leverage.

FFO to Net Debt

This ratio is a measure of dynamic leverage. As discussed above, this measure does not take into account the capital expenditures needed to maintain the asset base when comparing cash flows to a company's stock of debt. However, it allows a wider comparison across industries on a global basis and can be a useful indicator of a company's ability to generate cash flows over a period of time.

The numerator for this ratio is FFO. We use net debt owing to the sector's propensity to pre-fund its significant capital investments, which can result in substantial cash amounts held on balance sheet. The use of net debt also recognises the requirements under certain financing structures to maintain liquidity and debt service reserves. Where the debt position of a company may be overstated or understated by the debt figures as reported in the financial statements, we typically make non-standard adjustments for certain derivative transactions subject to the relevant hedge accounting rules for US-GAAP and IFRS accounting.

RCF to Net Debt

This ratio is also an indicator for financial leverage. However, in contrast to FFO to Net Debt, it considers the strength of a water utility's cash flow after dividend payments are made. Dividend obligations can be substantial, quasi-permanent outflows that affect the ability of a water utility to cover its debt obligations, and this ratio can also provide insight into its financial policies. The higher the level of retained cash flow relative to a water utility's debt, the more cash it has to support its capital expenditure programme. The numerator of this ratio is FFO minus dividends, and the denominator is net debt.

Factor 3 – Leverage and Coverage (40%)

The following tables show the grid-scoring categories for each Leverage and Coverage sub-factor and the weighting thereof.

Rating Factor	Weight	Aaa	Aa	A	Baa	Ba	B	Caa
Adjusted Interest Coverage Ratio (1)	12.5%	≥8x	4.5-8x	2.5-4.5x	1.5-2.5x	1.2-1.5x	1-1.2x	<1x
OR		OR	OR	OR	OR	OR	OR	OR
FFO Interest Coverage (2)		≥10x	7-10x	4.5-7x	2.5-4.5x	1.8-2.5x	1.5-1.8x	<1.5x
Net Debt / Regulated Asset Base (3)	10%	<25%	25-40%	40-55%	55-70%	70-85%	85-100%	≥100%
OR								
Debt / Capitalisation								
FFO / Net Debt	12.5%	≥40%	25-40%	15-25%	10-15%	6-10%	4-6%	<4%
RCF / Net Debt	5%	≥30%	20-30%	10-20%	6-10%	4-6%	2-4%	<2%

Notes:

(1) The Adjusted Interest Coverage Ratio is our preferred metric for water utilities where allowed revenues/tariffs are determined using a 'building block' or equivalent approach and where the components of allowed revenues/tariffs are consistently available and can be verified by from an independent source – in many cases, publications from the regulatory authority itself. For the numerator, Interest net of Inflation Accretion is added back to the extent it was deducted in calculating FFO. Capital Charges represent expenditures recovered in revenues that are not accounted for as operating expenses and are not treated as additional invested capital incrementing the RAB, including regulatory revenue profiling to smooth the impact of tariff increases on customer bills.

(2) In jurisdictions where regulatory revenues/tariffs are not determined with a 'building block approach' or where the regulatory information needed to calculate Capital Charges may not be consistently available, we use the FFO Interest Coverage, calculated (or for forward periods estimated) as (FFO + Interest Expense) / Interest Expense.

(3) For the utilities regulated under a RAB-based model where the RAB accurately represents the invested capital on which the water utility will earn a return over time, we measure leverage as Net Debt to RAB. For water utilities that (1) are regulated under tariff models without a RAB; (2) are regulated under a RAB-based model but where the RAB may not accurately represent the invested capital on which the water utility will earn a return over time (e.g. because of ex-post rate-setting); or (3) where RAB may not be consistently available, we use Debt to Capitalisation.

Factor 4: Structural Considerations and Sources of Rating Uplift From Creditor Protection

WHY IT MATTERS

Regulated water utilities are financed under different financing structures. Companies may have entered into complex financing structures that provide additional creditor protection to maintain credit quality while increasing gearing. Such arrangements have been most common in the UK. A transition from a publicly listed model to private ownership by infrastructure, pension and other specialist funds has led to the adoption of financing structures that incorporate structural enhancements similar to those used in project finance transactions in various infrastructure sectors.

We believe that structural enhancements may provide valuable protection to financial creditors in the regulated water utilities sector, and this can result in rating uplift. Such enhancements may be incorporated into the terms and conditions of financing agreements pertaining to essentially all of a utility's securities holders, or they may be a feature within the utility's regulatory licence, and include requirements such as maintaining a certain credit rating and demonstrating sufficient operating and financial resources (as is the case in the UK).

HOW WE ASSESS IT FOR THE GRID

Our determination of the degree of ratings uplift for a regulated water utility provided by debt structural features and/or regulatory provisions that insulate a utility's credit profile from its parent/owners is based primarily on an assessment of the following:

A. Factors that reduce risks that can lead to default, and

B. Factors that give creditors either the right, or ability to influence the taking of corrective action - to stop or reverse credit deterioration.

In order for structural features to provide ratings uplift they typically must benefit all debt creditors, although individual creditors may be subject to different payment priorities.

A. Factors that reduce risks that can lead to default

1. **Restriction on business activities.** Prohibiting an issuer from engaging in new activities or making acquisitions is seen as credit positive because it eliminates the business risk associated with corporate activity and ensures that all critical functionality is subject to the debt structural features.

2. **Restriction on raising additional debt.** Restricting additional indebtedness reduces the risk that a higher debt level can cause a payment default.

3. **Distribution lock-up tests.** Prohibiting distributions to shareholders in a distressed scenario preserves cash within the business, thus reducing the risk of default.

4. **Limits on debt structure.** Requiring the issuer to remove or mitigate certain financial risks, such as interest rate, currency or refinancing risk. The latter can range from restrictions on debt maturity concentration to the implementation of a fully amortizing debt structure, which in itself can achieve a full notch of ratings uplift. Covenants can also restrict the issuer's use of derivative products, thus reducing the likelihood of additional and/or sizeable claims on the business.

5. **Reserves to cover large future or unforeseen costs.** Dedicated timing reserves for large-cost items, e.g., one-off capital expenditure.

B. Factors that give creditors either the right, or ability, to influence the taking of corrective action – to stop or reverse credit deterioration

An important element of leveraged infrastructure debt structures has been the ability of debt creditors to force owners to reduce debt ahead of the point where equity value is lost and debt is impaired, and to take action to repay debt through the enforcement of security if this is not achieved. The debt event of default tests and the consequences of these are key elements of this protection. To provide effective protection to creditors, these features need to work within the context of the business being financed, in most cases to allow the operating businesses to continue as a going concern and to allow debt service to be paid though available liquidity facilities while action is being taken.

The elements of debt structural features that provide control rights are assessed in the following areas:

1. Effectiveness of control rights. The degree to which the exercise of control rights may be impeded (e.g., local jurisdiction laws or certain regulatory restrictions). We assess the proposed terms and conditions in conjunction with legal guidance to ascertain whether the proposed control rights are likely to operate as intended.
2. Length of the control period. The length of time debt creditors have to exercise control rights before the issuer loses the right to generate cash flow from the assets (e.g., before an insolvency process or before a concession/regulatory licence is terminated).
3. Dedicated liquidity support. Dedicated liquidity support facilities to cover ongoing debt service while control rights are exercised. To be considered valuable, such dedicated liquidity would need to be available for use in circumstances where control rights are exercised.

In almost all cases, to be effective and/or to assure the structure has integrity, debt structural features need to include the following elements:

1. The entity subject to the financing and the restrictions would be separated from the wider ownership group and any wider business group. The separation is achieved through legal means related to the creation of the issuer and/or restrictions in the financial structure.
2. All debt creditors must be subject to common terms that ensure that individual creditors or creditors cannot take unilateral action to destabilize the financing.
3. Creditor step-in rights should be specifically permitted under the concession, regulatory licence or legal framework, as well as the finance documents. Note that we give value to security arrangements only as one element, albeit usually a critical element, of a wider package of features designed to improve creditors' ability to detect early potential problems and rectify them if possible (in the first instance by retaining cash surpluses within the company). Further, if remedial action is not possible or fails, the security arrangements are used to maximize recovery prospects.

Structural features that provide a meaningful level of creditor protection would provide a notching uplift to the composite score generated from the grid factors, a final step to arrive at the grid-indicated rating.

When assessing rating uplift we consider the package as a whole (i.e. elements of both A. and B. above) in order to gauge the overall effectiveness. For example, independent validation of compliance with financial ratio covenants may be an important consideration in assessing the ongoing effectiveness of such covenants.

Security is sometimes not allowed or is not enforceable on certain assets, the title of which may be retained by the state or other granting authority, or where the company is restricted from giving security over its assets by a pre-existing statute.

Structural enhancements that we view as very comprehensive and effective can deliver an uplift of up to three notches within the grid. However, across the rated universe, the current typical uplift is in the range of zero to two notches. Due to the broad spectrum of possible financing structures (which can contain a variety of elements in an array of potential combinations), these enhancements are scored in increments of half-a-notch. While debt structural features could in theory be stronger than those we have encountered, more restrictive terms and conditions would constrain management abilities to pursue strategies and policies and may not be suited to certain types of businesses, so they have typically fallen within a moderately narrow range.

Ratings fully incorporate our view of the actual structural or contractual features in a particular transaction. In rare cases contractual features may provide greater uplift to the issuer's credit quality that what is reflected in the scorecard.

Assumptions and Limitations, and Rating Considerations That Are Not Covered in the Grid

The grid in this rating methodology represents a decision to favour simplicity that enhances transparency and to avoid greater complexity that would enable the grid to map more closely to actual ratings. Accordingly, the four rating factors in the grid do not constitute an exhaustive treatment of all of the considerations that are important for ratings of companies in the regulated water utilities sector. In addition, our ratings incorporate expectations for future performance, while the financial information that is used to illustrate the mapping in the grid in this document is mainly historical. In some cases, our expectations for future performance may be informed by confidential information that we cannot disclose. In other cases, we estimate future results based upon past performance, industry trends, competitor actions or other factors. In either case, predicting the future is subject to the risk of substantial inaccuracy.

Assumptions that may cause our forward-looking expectations to be incorrect include unanticipated changes in any of the following factors: the macroeconomic environment and general financial market conditions, industry competition, disruptive technology, regulatory and legal actions.

Key rating assumptions that apply in this sector include our view that sovereign credit risk is strongly correlated with that of other domestic issuers, that legal priority of claim affects average recovery on different classes of debt sufficiently to generally warrant differences in ratings for different debt classes of the same issuer, and the assumption that access to liquidity is a strong driver of credit risk.

In choosing metrics for this rating methodology grid, we did not explicitly include certain important factors that are common to all companies in any industry such as the quality and experience of management, assessments of corporate governance and the quality of financial reporting and information disclosure. Therefore ranking these factors by rating category in a grid would in some cases suggest too much precision in the relative ranking of particular issuers against all other issuers that are rated in various industry sectors.

Ratings may include additional factors that are difficult to quantify or that have a meaningful effect in differentiating credit quality only in some cases, but not all. Such factors include financial controls, exposure to uncertain licensing regimes and possible government interference in some countries. Regulatory, litigation, liquidity, technology and reputational risk as well as changes to consumer and business spending patterns, competitor strategies and macroeconomic trends also affect ratings. While these are important

considerations, it is not possible to precisely express these in the rating methodology grid without making the grid excessively complex and significantly less transparent. Ratings may also reflect circumstances in which the weighting of a particular factor will be substantially different from the weighting suggested by the grid.

This variation in weighting rating considerations can also apply to factors that we choose not to represent in the grid. For example, liquidity is a consideration frequently critical to ratings and which may not, in other circumstances, have a substantial impact in discriminating between two issuers with a similar credit profile. As an example of the limitations, ratings can be heavily affected by extremely weak liquidity that magnifies default risk. However, two identical companies might be rated the same if their only differentiating feature is that one has a good liquidity position while the other has an extremely good liquidity position, unless they are low-rated companies for which liquidity can be a substantial differentiator for relative default risk.

Other Rating Considerations

Ratings consider a number of additional considerations. These include but are not limited to: our assessment of the impact of non-core businesses, the quality of management, corporate governance, financial controls, parental support, liquidity management and event risk.

Impact of Non-Core Businesses / Multi-Utilities

This methodology grid is applied to the assessment of issuers whose primary activity is the ownership and operation of regulated water and wastewater assets. Where the company has or will seek to diversify its operations towards other business types, we consider the impact of such diversification on credit quality. In particular, the ownership of material businesses with higher credit risk than regulated water and wastewater services would likely result in an actual rating that is lower than the grid-indicated rating.

In some cases, it is generally useful to apply this methodology to the monopoly-based water and wastewater business of multi-utilities, but a multi-utility's overall credit quality will reflect a combination of risk factors related to the combined group's activities, which may include regulated electric and gas networks, environmental services, etc. This is the case, for example, for issuers such as Veolia Environnement S.A, Suez Environnement Company, ACEA S.p.A., and Hera S.p.A. , where substantial non-water utility businesses have a meaningful impact on the credit profile and ratings.

Liquidity and Access to Capital Markets

Liquidity analysis is a key element in the financial analysis of water utilities, and it encompasses a company's ability to generate cash from internal sources as well as the availability of external sources of financing to supplement these internal sources. Liquidity and access to financing are of particular importance in this sector. Some water and wastewater assets can often have a very long useful life, even in excess of 50 years, as well as high price tags. Furthermore, the sector has historically experienced prolonged periods of negative free cash flow, such that a portion of capital expenditure must be debt financed. Dividends also represent a quasi-permanent outlay, as companies will only rarely cut their dividend. Liquidity is also important to meet maturing obligations, which often occur in large chunks.

Our assessment of liquidity for regulated water utilities typically involves an analysis of total sources and uses of cash over the next 12 months or more. Using our financial projections and our analysis of its available sources of liquidity (including an assessment of the quality and reliability of alternate liquidity such as committed credit facilities), we evaluate how its projected sources of cash (cash from operations, cash on hand and existing committed multi-year credit facilities) compare to its projected uses (including all or most capital expenditures, dividends, maturities of short and long-term debt, our projection of potential liquidity calls on financial hedges, and important issuer-specific items such as special tax payments). We assume no

access to capital markets or additional liquidity sources, no renewal of existing credit facilities, and no cut to dividends. We examine a company's liquidity profile under this scenario, its ability to make adjustments to improve its liquidity position, and any dependence on liquidity sources with lower quality and reliability.

Management Strategy

The quality of management is an important factor supporting a company's credit strength. Assessing the execution of business plans over time can be helpful in assessing management's business strategies, policies, and philosophies and evaluates management performance relative to performance of competitors and our projections. A record of consistency provides Moody's with insight into management's likely future performance in stressed situations and can be an indicator of management's tendency to depart significantly from its stated plans and guidelines.

Size

The size and scale of a regulated water utility has generally not been a major determinant of its credit strength in the same way that it has been for most other industrial sectors. However, size can still be a very important factor in our assessment of certain risks that impact ratings, including event risk, construction risk and access to external funding. While the grid incorporates some of the execution risk around large or complex projects into the Scale and Complexity of Capital Programme & Asset Condition Risk sub-factor, for some issuers these considerations may be sufficiently important that the rating reflects a greater weight for these risks.

Interaction of Ratings with Government Policies and Sovereign Ratings

Compared with most industrial sectors, regulated water utilities are more likely to be impacted by government actions. Credit impacts can occur directly through regulation, and indirectly through environmental and tax policies. While Factor 1 – Business Profile captures many of these risks, for some issuers a greater weighting may be appropriate in assessing the rating. As purely domestic enterprises (in most cases), water utilities are typically subject to the same macro-economic trends as the sovereign in the country or countries in which they operate. For instance, the ratings of Aigues de Barcelona and Canal de Isabel II Gestion, S.A. are currently constrained by the credit quality of Spain (Baa2 positive).

Ownership

Ownership (by a government or other entity) can also provide ratings lift for a particular water utility if it is owned by a highly rated owner(s) and of strategic importance to those owners. In our analysis of parental support, we consider whether the parent has the financial capacity and strategic incentives to provide support in times of stress or financial need, or has already done so in the past. Conversely, if the parent puts a high dividend burden on the issuer which in turn reduces its flexibility, the ratings would typically reflect this risk.

Corporate Governance

Among the areas of focus in corporate governance are audit committee financial expertise, the incentives created by executive compensation packages, related party transactions, interactions with outside auditors, and ownership structure.

Financial Controls

We rely on the accuracy of audited financial statements to assign and monitor ratings in this sector. The quality of financial statements may be influenced by internal controls, including centralised operations and the proper tone at the top and consistency in accounting policies and procedures. Auditors comments in financial reports and unusual financial statement restatements or delays in regulatory filings may indicate weaknesses in internal controls.

Event Risk

We also recognize the possibility that an unexpected event could cause a sudden and sharp decline in an issuer's fundamental creditworthiness. Typical special events include mergers and acquisitions, asset sales, spin-offs, capital restructuring programs, litigation and shareholder distributions.

Structural Subordination

A utility company can finance itself in many different ways but it may involve a regulated operating company (OpCo) and a holding company (HoldCo) structure with debt located at different levels. Given that creditors of the HoldCo usually have a secondary claim on the group's cash flows and assets after OpCo creditors, this leads to structural subordination. Our ratings of HoldCo debt are usually notched downwards from our assessment of group credit quality (which ignores priority of claim). In addition, our analysis takes into account a number of other factors including, *inter alia*, the following:

» Regulatory or other barriers to cash movement from OpCos to HoldCos

» Specific ring-fencing provisions or financial covenants at the OpCo level

» HoldCo exposure to subsidiaries with high business risk or volatile cash flows

» Strained liquidity at the HoldCo level

Low Inflation & Deflation / High Inflation

In a number of regulatory models, including the UK and Australia, tariffs are designed in real terms (as opposed to nominal terms), where allowed revenues are computed in a fixed price base and subsequently inflated by a retail/consumer or other price index. Some of the stated purpose of indexation are to allocate the cost of the service across different generations of customers and to provide utilities some protection against cost inflation. However, water utilities governed by this type of regulatory model generally need to raise a material, if not predominant portion of their debt on a conventional basis (i.e. debt instruments whose coupon is based on nominal interest rates, which include an assumption of long-term inflation rates within the interest cost). This may cause a timing mismatch of cash flows and debt service, as well as a potentially higher reliance on continued market access to raise debt. Furthermore, subject to a company's dividend policy and tendency to maintain leverage (measured in relation to the regulated asset base) at constant levels close to the guidelines supporting their rating category, lower-than-expected inflation or deflation could lead certain companies to breach such parameters. In such cases, affected utilities have typically taken corrective actions (e.g. in the form of temporary reduction in shareholder distributions) to ensure that such breaches, if any, are of a temporary nature only. In the absence of such actions, ratings pressure may result.

Other regulatory models, including the US, typically set rates in nominal terms based on actual capital costs at the time of rate-setting. Although the framework may have some forward-looking cost components, they are rarely linked to inflation. In such regulatory models, high inflation represents the greater risk, since tariff-setting typically lags well behind incurred expenditures in a rapidly rising cost environment. When deflation or inflation is severe, actual ratings may vary more materially from grid-indicated ratings, especially those based on historical metrics.

Droughts and Potable Water Shortages

Periodic droughts can seriously reduce water available to utilities, and natural and man-made disasters can contaminate or otherwise reduce potable water supplies. Depending on the regulatory framework, there is some regional variation in utilities' cash flow impacts during periods of droughts and water rationing, or stemming from flooding or other disasters that interrupt service. Water shortages have the potential to increase customer dissatisfaction with service and damage regulatory relationships. Droughts may be a

catalyst for large increases in capital spending, to secure water supplies or reduce leakage in the system. Particularly in regulatory frameworks where the utility retains exposure to volumetric changes in usage, severe or long-lasting droughts may impact revenues and cash flows in a manner that causes actual ratings to vary more materially from grid-indicated ratings, especially those based on historical metrics.

Conclusion: Summary of the Grid-Indicated Rating Outcomes

For the 26 regulated water utilities scored in detail under the methodology (see Appendix B), the methodology grid-indicated ratings map to current assigned ratings (or BCAs where relevant) as follows:

» 6 companies map to their assigned rating (or BCA where relevant)

» 15 companies have grid-indicated ratings that are within one alpha-numeric notches of their assigned ratings (or BCAs where relevant)

» 5 companies have grid-indicated ratings that are within two alpha-numeric notches of their assigned ratings (or BCAs where relevant)

Appendix A – Regulated Water Utilities Rating Grid

	Weight	Aaa	Aa	A	Baa	Ba	B	Caa
Factor 1 – Business Profile								
Stability and Predictability of Regulatory Environment	15%	Regulation is and expected to remain independent, well established (>15 years of being predictable and stable) and transparent. Well-established, published regulatory principles clearly define risk allocation between companies and customers and are consistently applied, with public or shared financial model.	Regulation is independent, reasonably well established (>10 years of being predictable and stable) and transparent. Well-established, published regulatory principles clearly define risk allocation between companies and customers and are generally consistently applied. Regulatory or concession framework has in recent years been (and is expected to remain) highly predictable, stable and supportive of utilities.	Regulation is generally independent and developed (e.g. published regulatory principles of risk allocation between companies and customers, based on established precedents in the same jurisdiction), and has above average predictability and reliability, although regulatory or concession regime may be sometimes less supportive of utilities.	Regulatory framework is well developed, with evidence of some inconsistency or unpredictability in the framework's application. OR Regulatory framework is relatively new and untested, but regulatory principles are based on established precedents and jurisdiction has history of independent and transparent regulation for other utility services. Regulatory environment or concession framework may sometimes be challenging or politically charged.	Regulatory or concession framework is defined but there is a high degree of inconsistency or unpredictability in its application. Tariff setting may be subject to negotiation and political interference; there has been a history of difficult or less supportive regulatory decisions; however, there are some precedents in the relevant jurisdiction of predictable regulation for other utility services.	Regulatory or concession framework is unclear, untested or undergoing significant change, with a history of political interference. Utility regulatory body lacks a consistent track record and is or is expected to be unsupportive, uncertain or highly unpredictable.	Regulatory or concession framework is not defined, or is expected to be extremely unsupportive, unpredictable or politically driven.

	Weight	Aaa	Aa	A	Baa	Ba	B	Caa
Asset Ownership Model	5%	All key water and/or sewerage assets held outright in perpetuity.	All key water and/or sewerage assets held outright subject to a licence that can be terminated only for material underperformance, failure to meet certain financial parameters or insolvency OR held under long-term concession with clearly defined right to timely recovery of residual asset value at termination/end of concession underpinned by highly rated entity; clear track record of consistently applying concession termination / recovery regime.	All key water and/or sewerage assets held under long-term concession with clearly defined right to recover value of residual assets at termination/end of concession underpinned by highly rated entity but with undefined timeframe OR held/operated under medium-/ long-term operating leases or mgmt contract with very substantial portfolio diversification, very established market position and very high renewal rate (>95%).	All key water and/or sewerage assets held under long-term concession with entitlement to recover value of residual assets at termination/end of concession but procedures untested/undefined OR held/operated under medium-/ long-term operating leases or mgmt contract with substantial portfolio diversification, established market position and high renewal rate (>90%). Expropriation possible in case of insolvency or material failure to comply with licence conditions, but with full compensation for asset value.	All key water and/or sewerage assets held under concession with recovery of residual asset value at termination/end of concession subject to negotiation OR held/operated under short-term operating leases or mgmt contract with good degree of portfolio diversification and renewal rate (>80%). Expropriation possible, with some uncertainty in the prospect of full compensation.	All key water and/or sewerage assets held under concession with no recovery of residual asset value at termination/end of concession OR held/operated under short-term operating leases or mgmt contract (limited portfolio diversification). Expropriation likely, with material uncertainty in the prospect of full compensation.	Issuer is in default under its licence, concession or lease/contract, likely to lead to termination. Expropriation highly likely, with little or no prospect of compensation.

	Weight	Aaa	Aa	A	Baa	Ba	B	Caa
Cost and Investment Recovery (Sufficiency & Timeliness)	15%	No regulatory or contractual impediment to adjust tariffs (no approval or reviews required).	Tariff formula allows for timely recovery of operating expenditure including depreciation and a fair return on all investment. Depreciation allowance fairly reflects asset consumption. All capital expenditure is included in asset base as incurred or fully covered by specific riders/surcharges prior to the next rate case. Minimal challenges by regulators to companies' cost assumptions.	Tariff formula allows for recovery of operating expenditure including depreciation based on allowances set at frequent price reviews (e.g., 5-yearly intervals or shorter) and a fair return on all efficient investment: Depreciation allowance fairly reflects asset consumption; Capital expenditure is included in asset base as incurred or partially covered by specific riders/surcharges prior to the next rate case; Opex and capex can be subject to efficiency tests; Limited instances of regulatory challenges; limited delays to rate or tariff increases or cost recovery Performance is likely to be in line with regulatory expectations.	Tariff formula allows for recovery of operating expenditure including depreciation and return on investment but subject to retrospective regulatory approval or infrequent price reviews (e.g., > 5-yearly intervals): Some instances of revenue back-loading (e.g. depreciation allowance set below asset consumption or operating expenditure is capitalised) OR Rate/tariff reviews and cost recovery outcomes are usually predictable, although application of tariff formula may be unclear; potentially greater tendency for regulatory intervention and/or to disallow or delay costs Performance may be below regulatory expectations.	Tariff formula does not take into account all cost components and depreciation may be set below asset consumption. Revenues allow coverage of operating expenditures; however, investment is not clearly or fairly remunerated OR Rate/tariff reviews are inconsistent, with some history of unwillingness to make timely rate changes OR Operational underperformance likely to significantly impact the returns achieved by the business.	Highly uncertain rate reviews and cost recovery outcomes; regulators may materially delay or deny tariff increases based on more arbitrary questioning of the utility's costs or financing arrangements. Revenues only cover cash operating expenditures OR Tariff formula does not take into account material cost and investment recovery components:	Revenues only partially cover cash operating costs.

	Weight	Aaa	Aa	A	Baa	Ba	B	Caa
Revenue Risk	5%	No exposure to volume or customer concentration risk.	Minimal exposure to volume risk and timely recovery mechanism in place. AND Very limited customer concentration of volumes and revenues and to a customer/industry viewed as stable.	Some exposure to volume risk; recovery mechanism in place with some delay until next regulatory price review; generally limited revenue volatility expected. May have small concentration of volumes and revenues to a particular customer/industry viewed as stable.	Moderate exposure to volume risk but recovery mechanism in place, with some delay until next regulatory price review; moderate revenue volatility expected. May have a moderate concentration of volumes and revenues to a particular customer/industry.	More material exposure to risk of volumes decreasing or not meeting growth targets embedded in tariff levels; recovery mechanism, may not follow regular intervals. OR Significant concentration of volumes and revenues to a particular customer/industry.	High exposure to risk of volumes decreasing or not meeting growth targets embedded in tariff levels with recovery mechanism unclear or subject to very long delays. OR Very high concentration of volumes and revenues to one particular customer/industry.	Very high exposure to risk of volumes decreasing or not meeting growth targets embedded in tariff levels with no meaningful recovery mechanism in place. OR Very high concentration of volumes and revenues to a particular customer/industry viewed as vulnerable.
Scale and Complexity of Capital Programme & Asset Condition Risk	10%	Capex programme is very limited in scale, with only minimum maintenance requirements (typically, total annual capex ≤ 4% of total fixed assets or regulated asset base). AND No asset condition risk (e.g. full and immediate cost pass-through).	Capex programme is limited in scale, with small maintenance or enhancement requirements (typically, total annual capex 4-6% of total fixed assets or regulated asset base). AND Well-developed asset base under tight regulatory supervision; asset performance is generally stable or improving.	Modest capex programme, including standard maintenance and enhancement expenditures (typically, total annual capex 6-8% of total fixed assets or regulated asset base). Well-developed asset base and no history of serious asset failure; asset performance is generally stable or improving.	Capex programme of manageable scale, including straight-forward maintenance and enhancement expenditure (typically, total annual capex 8-12% of total fixed assets or regulated asset base). Company has a reasonably developed asset base; may have some precedents of serious asset failures but asset performance is now and is expected to remain broadly stable.	Large capex programme (typically, total annual capex 12%-20% of total fixed assets or regulated asset base) or challenging in scope (small number of large and complex projects may account for majority of capital programme). OR Asset base not fully developed; or average asset performance is gradually deteriorating or there is some concern about asset condition.	Very large capex programme (typically, total annual capex 20-30% of total fixed assets or regulated asset base) or highly complex (one large and complex project may account for majority of capital programme). OR Performance of most assets is materially deteriorating, with serious assets failures likely or ongoing, or asset development is seriously below required target.	Extremely large capex programme (typically, total annual capex > 30% of total fixed assets or regulated asset base) or technically highly complex (includes one or more large projects of extreme technical complexity). OR Rapidly deteriorating asset performance or condition could put issuer at risk of termination of licence, concession or lease/contract.

	Weight	Aaa	Aa	A	Baa	Ba	B	Caa
Factor 2 – Financial Policy								
Financial Policy	10%	Long track record and expected maintenance of extremely conservative financial policy; very stable metrics; low debt levels for the industry; AND Public commitment to the highest credit quality over the long-term.	Long track record and expected maintenance of a conservative financial policy; stable metrics; lower than average debt levels for the industry; AND Public commitment to a very high credit quality over the long-term.	Extended track record and expected maintenance of a conservative financial policy; moderate debt leverage and a balance between shareholders and creditors; Not likely to increase shareholder distributions and/or make acquisitions which could lead to a weaker credit profile; Solid commitment to high credit quality.	Track record and expected maintenance of a conservative financial policy; an average level of debt for the industry and a balance between shareholders and creditors; Some risk that shareholder distributions and/or acquisitions could lead to a weaker credit profile; Solid commitment to targeted metrics.	Track record or expectation of maintenance of a financial policy that is likely to favour shareholders over creditors; higher than average, but not excessive, level of leverage; Owners are likely to focus on extracting distributions and acquisitions but not at the expense of financial stability.	Track record of aggressive financial policies or expected to have a financial policy that favours shareholders through high levels of leverage with only a modest cushion for creditors; OR High financial risk resulting from shareholder distributions or acquisitions.	Expected to have a financial policy unfavourable to creditors with a track record of or expected policy of maintaining excessively high debt leverage; OR Elevated risk of debt restructuring.

	Weight	Aaa	Aa	A	Baa	Ba	B	Caa
Factor 3 – Leverage and Coverage								
Adjusted Interest Coverage Ratio (1)	12.5%	≥8x	4.5-8x	2.5-4.5x	1.5-2.5x	1.2-1.5x	1.0-1.2x	<1.0x
OR		OR	OR	OR	OR	OR	OR	OR
FFO Interest Coverage (2)		≥10x	7-10x	4.5-7x	2.5-4.5x	1.8-2.5x	1.5-1.8x	<1.5x
Net Debt / Regulated Asset Base (3)	10%	<25%	25-40%	40-55%	55-70%	70-85%	85-100%	≥100%
OR								
Debt / Capitalisation								
FFO / Net Debt	12.5%	≥40%	25-40%	15-25%	10-15%	6-10%	4-6%	<4%
RCF / Net Debt	5%	≥30%	20-30%	10-20%	6-10%	4-6%	2-4%	<2%

Notes:

(1) The Adjusted Interest Coverage Ratio is our preferred metric for water utilities where allowed revenues/tariffs are determined using a 'building block' or equivalent approach and where the components of allowed revenues/tariffs are consistently available and can be verified by from an independent source – in many cases, publications from the regulatory authority itself. For the numerator, Interest net of Inflation Accretion is added back to the extent it was deducted in calculating FFO. Capital Charges represent expenditures recovered in revenues that are not accounted for as operating expenses and are not treated as additional invested capital incrementing the RAB, including regulatory revenue profiling to smooth the impact of tariff increases on customer bills.

(2) In jurisdictions where regulatory revenues/tariffs are not determined with a 'building block approach' or where the regulatory information needed to calculate Capital Charges may not be consistently available, we use the FFO Interest Coverage, calculated (or for forward periods estimated) as (FFO + Interest Expense) / Interest Expense.

(3) For the utilities regulated under a RAB-based model where the RAB accurately represents the invested capital on which the water utility will earn a return over time, we measure leverage as Net Debt to RAB. For water utilities that (1) are regulated under tariff models without a RAB; (2) are regulated under a RAB-based model but where the RAB may not accurately represent the invested capital on which the water utility will earn a return over time (e.g. because of ex-post rate-setting); or (3) where RAB may not be consistently available, we use Debt to Capitalisation.

Preliminary Grid-Indicated Rating (Factors 1-3)

Factor 4 – Structural Considerations and Sources of Rating Uplift From Creditor Protection

Rating uplift of up to 3 notches provided by structural features to grid-indicated outcome from Factors 1-3 above

Grid-Indicated Rating

Appendix B – Indicated Rating and Results of Mapping

In the table below, we identify positive or negative "outliers" for a given sub-factor, defined as issuers whose grid sub-factor score is at least two broad rating categories higher or lower than a company's rating (e.g. a B-rated company whose rating on a specific sub-factor is in the Baa-rating category is flagged as a positive outlier for that sub-factor). Green is used to denote a positive outlier, whose grid-indicated performance for a sub-factor is two or more broad rating categories higher than Moody's rating. Red is used to denote a negative outlier, whose grid-indicated performance for a sub-factor is two or more broad rating categories lower than Moody's rating.

Company	Moody's Rating / bca / Consolidated Corporate Credit Profile	Outlook	Grid Indicated Rating	Stability and Predictability of Regulatory Environment	Asset Ownership Model	Cost and Investment Recovery (Sufficiency & Timeliness)	Revenue Risk	Scale and Complexity of Capital Programme & Asset Condition Risk	Financial Policy	Adjusted Interest Coverage Ratio OR FFO Interest Coverage	Net Debt / Regulated Asset Base OR Debt / Capitalisation	FFO / Net Debt	RCF / Net Debt	Structural Considerations & Rating Uplift
Acquedotto Pugliese S.p.A.	ba1	Stable	Baa2	Baa	Ba	Baa	Aa	B	A	Aa	Baa	Aa	Aaa	0
Affinity Water Limited	Baa1	Stable	A3	Aaa	Aa	A	A	Ba	Ba	Baa	Ba	A	Baa	1.5
American Water Works Company, Inc.	A3	Stable	A3	Aa	Aa	Baa	Baa	Baa	Baa	Baa	A	A	A	0
Anglian Water Services Ltd.	Baa1	Stable	A3	Aaa	Aa	A	A	A	Ba	Baa	Ba	Ba	Ba	1.5
Aquarion Company	Baa3	Stable	Baa2	Aa	Aa	Baa	Baa	Baa	Baa	Baa	Baa	Ba	Baa	0
Bristol Water plc	Baa1	Stable	A2	Aaa	Aa	A	Baa	Ba	Ba	Baa	Baa	A	A	1.5
Companhia de San Bas do Estado de Sao Paulo	ba2	Negative	Ba1	Ba	Ba	Ba	B	Ba	Baa	Baa	A	A	A	0
Companhia de Saneamento de Minas Gerais	ba2	Under Review - Down	Ba1	B	Ba	Ba	Baa	Ba	Baa	A	A	Aa	Aa	0
Companhia de Saneamento do Parana - SANEPAR	ba2	Under Review - Down	Ba1	B	Ba	B	Baa	Baa	Baa	Aa	Aa	Aaa	Aaa	0
Dee Valley Water PLC	Baa1	Stable	A2	Aaa	Aa	A	Baa	Ba	Ba	Baa	Baa	A	A	1.5
Dwr Cymru Cyfyngedig	A3	Positive	A2	Aaa	Aa	A	A	A	Baa	Baa	Baa	Baa	A	0.5
Golden State Water Company	A2	Stable	A1	Aa	Aa	A	A	Baa	A	A	Aa	Aa	Aa	0

Company	Moody's Rating / bca / Consolidated Corporate Credit Profile	Outlook	Grid Indicated Rating	Stability and Predictability of Regulatory Environment	Asset Ownership Model	Cost and Investment Recovery (Sufficiency & Timeliness)	Revenue Risk	Scale and Complexity of Capital Programme & Asset Condition Risk	Financial Policy	Adjusted Interest Coverage Ratio OR FFO Interest Coverage	Net Debt / Regulated Asset Base OR Debt / Capitalisation	FFO / Net Debt	RCF / Net Debt	Structural Considerations & Rating Uplift
Hunter Water Corporation	baa2	Stable	Baa3	Aa	Aa	A	A	Aa	Baa	Ba	A	B	B	0
Korea Water Resources Corporation	baa2	Positive	Baa3	A	A	Ba	Baa	Ba	Ba	Baa	A	Ba	Baa	0
Northumbrian Water Ltd.	Baa1	Stable	Baa1	Aaa	Aa	A	A	Baa	Ba	Baa	Baa	Baa	Ba	0.5
Portsmouth Water Limited	Baa1	Stable	A3	Aaa	Aa	A	A	Baa	Ba	Baa	Ba	Baa	A	1.5
Severn Trent Water Limited	A3	Negative	A3	Aaa	Aa	A	A	A	Baa	Baa	Baa	Baa	Baa	0
South East Water Limited	Baa2	Stable	A3	Aaa	Aa	A	A	Baa	Ba	Baa	Ba	Baa	Baa	1.0
South Staffordshire Water Plc	Baa2	Stable	A3	Aaa	Aa	A	A	Ba	Ba	Baa	Baa	A	A	1.0
Southern Water Services Limited	Baa2	Stable	Baa1	Aaa	Aa	A	A	Baa	B	Ba	Ba	Baa	A	1.5
Sutton and East Surrey Water plc	Baa1	Stable	A3	Aaa	Aa	A	A	Ba	Ba	Baa	Ba	A	A	1.5
Sydney Water Corporation	baa1	Stable	Baa1	Aa	Aa	A	A	Aa	Baa	Ba	A	Ba	Ba	0
Thames Water Utilities Ltd.	Baa1	Stable	Baa1	Aaa	Aa	A	A	Ba	Ba	Baa	Ba	Ba	Baa	1.5
United Utilities Water Limited	A3	Stable	A2	Aaa	Aa	A	A	Baa	Baa	Baa	Baa	Baa	A	0.5
Wessex Water Services Limited	A3	Stable	A3	Aaa	Aa	A	A	Baa	Baa	A	Ba	Baa	Baa	0.5
Yorkshire Water Services Limited	Baa2	Stable	Baa1	Aaa	Aa	A	A	A	B	Ba	Ba	Ba	Baa	1.5

Outlier Discussion:

Acquedotto Pugliese S.p.A's ba1 bca, which compares to a grid-indicated rating of Baa2, is currently constrained by the uncertainties on future investment financing associated with the limited residual life of its concession and by its operational performance levels, which are weaker than its industry peers and show some sign of macroeconomic pressure on working capital. It is also a positive outlier for Revenue Risk, Financial Policy and several Leverage and Coverage Ratios, as these strengths are not sufficient to offset an untested concession renewal environment and operational underperformance.

For Bristol Water plc and Dee Valley Water plc, due to the small size of the company combined with very large investment requirements, Scale and Complexity of Capital Programme & Asset Condition Risk currently take on a greater than standard weight in the actual Baa1 ratings, which compare to A2 grid-indicated ratings.

For South Staffordshire Water plc., additional holding company debt in combination with permitted leverage at the utility currently constrains the ratings at Baa2, compared to grid-indicated ratings of A3.

The illustrative scoring shown above reflects 3-year average historical financial metrics for the latest available annual account in 2015. For the majority of issuers, primarily in the UK and the US, historical metrics tend to benefit from higher allowed revenues, either through regulatory return assumptions that companies were able to outperform in a low interest rate environment or additional bonus depreciation allowances. We expect a deterioration in the projected financial metrics resulting from reduced regulatory returns that will lead to grid-indicated ratings mapping closer to assigned ratings for the affected issuers.

Stability and Predictability of Regulatory Environment and Asset Ownership Model

Water utilities in the UK benefit from a very stable and predictable regulatory and asset ownership framework that has been tested through many tariff cycles, including the most recent price determination published in 2014. This stability is offsetting relatively high financial leverage. The same dynamic exists for the Australian utilities, Hunter Water Corporation and Sydney Water Corporation.

Scale and Complexity of Capital Programme & Asset Condition Risk

Hunter Water Corporation and Sydney Water Corporation are positive outliers, but the small risk associated with maintaining their systems is offset by low allowed returns that affect the Leverage and Coverage ratios.

Financial Policy

Southern Water Services Limited and Yorkshire Water Services Limited are negative outliers, primarily due to risks in their derivatives portfolios that are sensitive to interest rate movements. These risks are partially offset by strong Business Profiles, as reflected in strong scores in those sub-factors.

Leverage and Coverage

The Brazilian water companies, Companhia de San Bas do Estado de Sao Paulo, Companhia de Saneamento de Minas Gerais and Companhia de Saneamento do Parana – SANEPAR, are positive outliers in certain Leverage and Coverage ratios. Prolonged drought conditions in the country have affected water volumes and revenues, and financial metrics on a forward-looking basis are expected to underperform the three year historical averages.

Structural Considerations and Rating Uplift for Creditor Protections

Certain issuers currently receive additional rating uplift either from creditor protections embedded in these companies' licence conditions that create greater credit insulation from their corporate parents (up to 0.5 notches) and/or through creditor benefits embedded within their financing structures (1.0-1.5 notches).

Appendix C – Industry Overview

Generally, regulated water utilities exhibit significantly lower business risk than many other rated corporate sectors, and one of the lowest business risk profiles even among infrastructure issuers.

Under developed regulatory frameworks, the very low business risk primarily reflects:

» Monopoly-type activities, most commonly supported by long-term licence or concession agreements.

» Characteristically strong visibility in revenues and profit generation, due to (1) importance of water and wastewater services provided, which results in overall low demand volatility and general resilience to economic fluctuations; and (2) clear and predictable mechanisms for tariff increases (embedded in the regulatory framework or concession regime), which will sustain revenues over the long term.

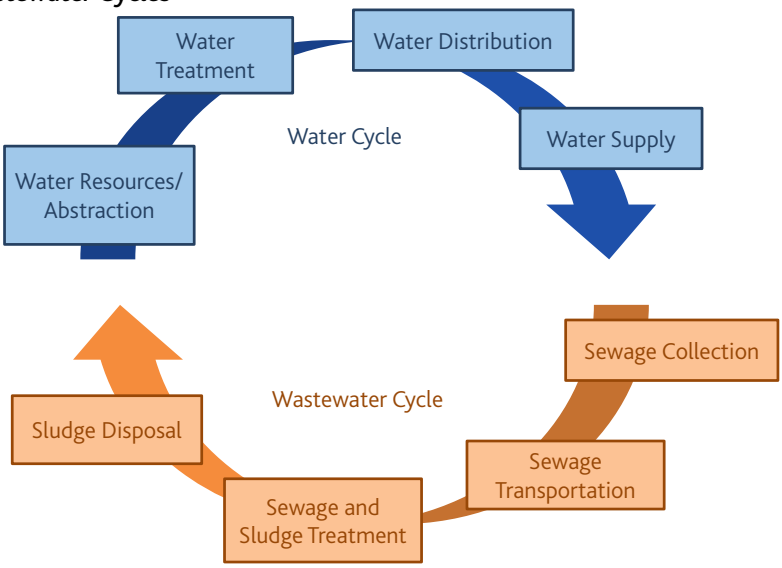
» Strong regulatory supervision due to the critical element of health and environmental implications of the water and wastewater services.

The stable and sustainable levels of cash flows afforded by these characteristics can also translate into a significant capacity to sustain high debt levels over the long term. This is of particular importance as the sector as a whole has massive infrastructure funding needs to enhance existing facilities to improve health and environmental standards. Due to the significant investment requirements issuers will need constant access to external funding as the vast amount of investments cannot be solely covered from internal cash flow generation. Although customer bills continue to rise to cover the additional capital costs of financing the water and wastewater infrastructure (partly offset by efficiency savings in the operations), the industry also remains heavily subsidised in many jurisdictions.

Levels and forms of subsidies differ from jurisdiction to jurisdiction. Most countries provide some form of cross subsidisation between customers through the application of average tariffs across any given water supply area compared to the actual cost of delivery to each respective customer. Furthermore, there are a number of explicit or implicit measures by which governments provide subsidies, such as reduced trade taxes for utilities, or income support and/or targeted assistance for customers in need. Subsidies can also be built directly into the tariff system. For example, when the UK water companies (in England and Wales) were privatised, the value of the regulated asset base was set at the amount achieved through privatisation. The privatisation value, however, was significantly lower than the replacement cost of the regulated assets, as it reflected the historically low charges paid by customers for water and wastewater services. Given that the companies need to incur large amounts of maintenance capex, which has to be spent at the replacement value, water tariffs include a maintenance capex allowance to reflect such higher replacement values, but the return that companies earn is based on the lower regulated asset base. This ensured that customer prices did not rise as much as would otherwise have been the case.

Exhibit 5 illustrated the entire value chain of services in the water and wastewater cycle:

EXHIBIT 5
Water and Wastewater Cycles



Source: Moody's

The combination of water abstraction and treatment is also referred to as bulk supply or upstream wholesale activities. The vertical integration of the water supply chain can stop at this point. This is the case in a number of EU countries, where one large utility may be responsible for the upstream water activities, whilst a number of smaller – usually municipal-owned – suppliers undertake the distribution to the end-consumer. Most of the water utilities rated by Moody's are integrated providers of water and/or wastewater services along the entire value chain, which in addition to the bulk supply also includes the distribution and sale to customers. Among the Moody's rated universe, we only have one rated water wholesaler: Korea Water Resources Group.

Different business models have been adopted globally in managing the water and wastewater activities. In many countries around the world, the supply of water and treatment of wastewater are public services and the legal responsibility of municipalities. In these cases the legal ownership of the assets also lies with the municipalities. However, there exist a variety of operational models that are derived from this set-up.

First, the water and wastewater infrastructure assets can be operated under direct management by the municipality itself. In these cases, the water and wastewater services would be part of the general regional or local administration (such instances are not covered under this rating methodology). Second, the management of the water and wastewater infrastructure can be delegated to another entity. Such entity can be – and in many instances is – partly or wholly owned by the regional or local government that retains the legal responsibility for the provision of water and wastewater services. Third, water services may be completely privatised along the entire value chain of water and/or wastewater provision, which has occurred in relatively few countries. The UK (more specifically England and Wales) is the most notable example of a country that has transferred the responsibility of water and wastewater services entirely to the private sector, albeit under stringent regulatory oversight.

With respect to delegated management, a variety of different forms of contracts, concessions or licence arrangements exists, which can be summarised into the following main business models:

Management Contract: This is usually a short-term (3-5 years) arrangement for the management of operational facilities. The assets remain in the public sector, usually with the relevant municipality, which

also collects the user charges from the customers. The managing entity is remunerated by the municipality through payment of a management fee. Depending on the contract, it may include a number of performance targets against which the managing entity will be measured. Capital expenditure requirements and their funding remain principally the responsibility of the relevant municipality.

Lease Contract: A lease contract is similar to a management contract in that the asset ownership remains with the municipality. However, the relevant service undertaker responsible for the operation of the assets collects the user charges directly from the end customers, and may also be responsible for funding investments in the assets over the life of the contract. Lease contracts commonly apply over periods of 8-15 years.

Concession Contract: This is one of the most wide-ranging options in transferring responsibility for the assets to the relevant service undertaker. Concession arrangements usually cover a period of 25-30 years and transfer the economic benefits and costs of asset ownership to the service undertaker for the time of the concession. The service undertaker therefore also takes responsibility for capital investments and funding requirements. The terms of the concession are negotiated on a bilateral basis, but may be based on a general legislative and/or regulatory framework applied throughout a jurisdiction. Given the length of the contract, a concession also generally includes tariff reviews at specified intervals. Examples of this model include water and wastewater operation in France, Italy, Spain and Brazil.

Licence: The licence approach is usually very similar to a long-term concession. However, the terms of the licence are usually set in law and are commonly applied to all licensed undertakers. Licences may have maturities similar to long-term concession or run in perpetuity, with an option to terminate the licence for severe performance failures. For example, licences apply for water companies operating in England and Wales; for these companies the licences include a condition that allows licence termination subject to a 25 year notice period.

Furthermore, for single asset transactions or projects, a number of specific arrangements can be applied, such as Design, Build, Operate (DBO); Build, Own, Operate (BOO); or Build, Operate, Transfer (BOT). These contractual arrangements are generally used in cases of large investment requirements for a specific asset, which can be transferred to the private sector, for example through project finance arrangements. Such contracts are commonly restricted to one particular asset, such as the construction and operation of a treatment work, and can have similar terms as concessions.

Generally, all contracts and concessions are initially put out to competitive tender, and will usually require re-tendering at their expiry.

Regional Profiles

United Kingdom

Moody's currently rates nine of the ten water and sewerage companies (WaSCs) operating in England and Wales as well as seven of the eight water only companies (WoCs). The WoCs are generally smaller in size and provide only water services within the overall franchise area of the larger WaSCs, which also undertake sewerage services.

The average rating of the UK water sector based on the credit quality of the relevant corporate family is currently around A3-Baa1, with most of the debt rated at A3. This reflects certain regulatory constraints that have tended to restrict the ability of companies to position themselves lower in the rating scale, but also the industry's fundamental characteristics.

Over the last two decades, leverage among the UK rated water utilities has increased significantly. This development largely reflects a combination of shareholders' desire to maximise returns, regulatory constraints that restrict the ability of operating companies to position themselves lower in the rating scale and the way industry has been regulated. As low-risk but highly capital intensive businesses, water companies have sought to optimise their capital structures by balancing the attractions of high leverage in benign debt markets with the need to preserve solid investment-grade ratings to retain good access to the range of debt funding available to infrastructure issuers. As part of this development, regulated water companies that have been acquired have generally been leveraged materially to re-finance acquisition debt. This trend increases event risk for lower-leveraged entities to follow suit, including in other countries.

Overall, Moody's currently regards the regulatory risk profile of the UK regulated water utilities as one of the lowest globally. The framework is transparent and well-established, leading to a high predictability of cash flows for the sector. This has allowed UK water companies to sustain a relatively high level of leverage and maintain an investment-grade profile.

The UK water sector has recently completed the regulatory review process to determine prices for the five-year period 2015-20. The final price determination, published in December 2014, includes challenging assumptions for the UK water companies, including a significant reduction in the allowed return. Whilst the price review has been overall neutral for credit ratings in the sector in light of lower financing costs, we expect that shareholder returns will decline and that dividend policies will reflect the realities of both the new price limits and the size of each company's capital investment programme. Should dividend policies of individual companies become out of sync with earnings, downward rating pressure may result.

Over the long term, the UK water sector faces challenges from the proposed introduction of competition to certain elements of the value chain. Competition for retail water supply to business customers will commence in April 2017. Whilst this part of the business is relatively small and competition in this area is unlikely to result in negative credit implication, government plans to introduce household retail competition and proposals for developing upstream markets, both from 2020, may prove more disruptive for the sector's long term credit quality.

Rest of Western Europe

Water services in the rest of Western Europe remain largely in public hands. In particular, the water and wastewater infrastructure usually remains in the ownership of local or regional governments. The assets and/or their operations could be transferred to a government-related corporate entity. However, very few of these entities have accessed the debt capital markets to date.

In a number of cases, local or regional governments have outsourced the operations of their water and wastewater infrastructure to the private sector, mainly through short-term management contracts, e.g. in France.

United States

The US water industry is highly fragmented, mostly comprised of small municipal water and waste water systems that suffer from underinvestment. Investor-owned utilities are a small minority of companies in the sector. Tariff-setting regulation primarily takes place at the state level, and the regulatory environment can vary meaningfully from state to state. Generally, however, US state regulators have been more interventionist than their UK counterparts in terms of requiring an actual capital structure that matches the regulatory construct (which can act as a limitation on distributions) as well as limitations on loans to and transactions with affiliates, which has led to a greater degree of credit insulation between operating companies and their parents. US water utilities are also subject to federal and state laws and regulations that govern water quality and environmental considerations such as wastewater discharge.

Brazil

Brazilian water utilities are currently challenged by the lack of a consolidated regulatory framework to ensure stable and predictable levels of income and cash flows supportive of their capital-intensive activities. Water and wastewater services in Brazil are subject to several laws at federal, state and municipal levels. In general, they operate pursuant to long-term concession agreements with the various municipalities in their region of service, and the municipalities retain ownership of the underlying concession assets. Concession contracts often lack provisions for tariff adjustments, so rates are set by the state government, leaving ample room for politically driven decisions. The concession contracts often have written provision clauses that entitle the company to the recovery of the assets' residual value at termination; however, because the municipalities lack sufficient financial resources to fund investments or to reimburse past investments themselves, concessions tend to be renewed upon maturity rather than being terminated.

Korea

Korea's water utility sector is tightly controlled by the Korean government (Aa3 positive). The government's policies and regulations towards the country's water utility sector have material impact on the rated water utility's market position and operating performance. The market structure of the county's water utility sector has been very stable, because of the government's policy to ensure stable water supply. However, stability and predictability of the company's cash flows from operations have generally been weak. Tariff adjustments are subject to the government's final approval, and the government has a weak track record in the consistency of tariff decisions and in providing reasonable rates of return. Nevertheless, the government has shown very high willingness to provide on-going financial support that has benefited the credit quality of the rated water utility.

Australia

Australia's water utilities are GRIs owned by state governments, and the high likelihood of support from the states has been a material driver of their ratings. Operations and management of the water and waste water services are outsourced by the states to the water utilities under license agreements. Due to the ownership structure, the water utilities typically have very strong liquidity and funding profiles, because all funding is sourced entirely from state treasury corporations. This arrangement has ensured that the water utilities have ongoing access to liquidity and long-term capital. To-date, the water utilities have disclosed no plans to seek external funding. Water utilities in Australia are regulated by state-based regulators, with regulatory regimes which are considered to be stable and mature. Regulatory frameworks - based on the "building-block" approach - are well established and increasingly transparent, which has provided stability and predictability of revenue outcomes for the water utilities.

Moody's Related Research

The credit ratings assigned in this sector are primarily determined by this credit rating methodology. Certain broad methodological considerations (described in one or more secondary or cross-sector credit rating methodologies) may also be relevant to the determination of credit ratings of issuers and instruments in this sector. Potentially related secondary and cross-sector credit rating methodologies can be found here.

For data summarizing the historical robustness and predictive power of credit ratings assigned using this credit rating methodology, see link.

Please refer to Moody's Rating Symbols & Definitions, which is available here, for further information.

To access any of these reports, click on the entry above. Note that these references are current as of the date of publication of this report and that more recent reports may be available. All research may not be available to all clients.

» contacts continued from page 1

Analyst Contacts:

SYDNEY +612.9270.8199

Mary Anne Low +612.9270.8137
Analyst
maryanne.low@moodys.com

HONG KONG +852.3551.3077

Mic Kang +852.3758.1373
Vice President - Senior Analyst
mic.kang@moodys.com

Kaven Tsang +852.3758.1304
Vice President - Senior Credit Officer
kaiyin.tsang@moodys.com

SINGAPORE +65.6398.8308

Ray Tay +65.6398.8306
Vice President - Senior Analyst
ray.tay@moodys.com

SAO PAULO +55.11.3043.7300

Marcos de Oliveira +55.11.3043.7312
Assistant Vice President - Analyst
marcos.oliveira@moodys.com

Paco Debonnaire +55.11.3043.7341
Analyst
paco.debonnaire@moodys.com

Report Number: 186643

Author
Stefanie Voelz

Production Associate
Miki Takase

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