Criteria | Governments | U.S. Public Finance:

U.S. Municipal Water, Sewer, And Solid Waste Utilities: Methodology And Assumptions

April 14, 2022

OVERVIEW AND SCOPE

1. These criteria apply to ratings on and refer to all utilities in scope as municipal water and sewer utilities, including waterworks, sanitary sewer, drainage, stormwater, solid waste systems, and irrigation districts. Also included in the scope of these criteria are combined water and sewer systems for which the above-mentioned services predominate. The issuers and issues in scope typically do not benefit from a guarantee from a state or local government nor are they secured by a general obligation (GO) of a state or local government. In-scope utilities may be units of U.S. local and regional governments (LRGs) or comparable political subdivisions provided that they:
   - Maintain discrete operations, and
   - There are ongoing operations to deliver water and sewer services directly to retail customers.
2. The public or municipal enterprises within the scope of these criteria include, generally, those with the following characteristics:
   - The entity is an autonomous political subdivision or a wholly owned department of a political subdivision that may have shared governance and financial reporting, including entities where there is a concession agreement with a private operator;
   - The entity has a public policymaking role, mission, or mandate to deliver an essential service deemed necessary for public health, and is not a commercial entity such as an investor-owned utility or a corporation (whether a bankruptcy-remote or single-purpose entity or not);
   - The entity may receive some contractual payments or appropriations from a related political subdivision such as the general fund of the LRG; and
   - The entity is not registered as a commercial enterprise or public corporation and does not pay dividends (other than to its affiliated general government), establish ownership shares, or access the equity markets.
3. While not an exhaustive list, examples of debt rated under these criteria are bonds issued by a city, utility board, retail raw-water service providers such as irrigation districts, and a regional authority that provides primarily retail water and sewer service or solid waste collection, handling, and removal services. Examples of entities that are not rated under these criteria include development districts, investor-owned utilities, project finance, master limited partnerships, and

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limited liability corporations. Investor-owned utilities and corporations are rated using "Corporate Methodology," published Nov. 19, 2013, and "Key Credit Factors For The Regulated Utilities Industry," published Nov. 19, 2013. Master limited partnerships are rated based on "Methodology: Master Limited Partnerships And General Partnerships," published Sept. 22, 2014.

4. Entities whose revenues are derived entirely from sales for resale to other entities, such as traditional wholesale providers or joint action agencies, continue to be evaluated based on the "Wholesale Utilities" criteria, published May 24, 2005.

5. LRGs often own and/or operate other enterprises such as electric systems, gas distribution utilities, or other utility services. Although many of the themes addressed by these criteria could apply in part to those other enterprises, we typically assess non-water and sewer utility operations using other industry-specific criteria. We believe related governments, while generally not directly linked, can directly influence credit quality. If a municipal utility is receiving or could receive financial support from the LRG or, conversely, if the municipal utility is providing or could provide support to the LRG, we account for this in the financial profile.

6. Many LRGs issue their own GO or other tax-secured debt on behalf of the utility. In those cases, this debt, even if practically paid by water revenues, continue to be evaluated using the applicable LRG criteria.

7. We generally believe that in cases of distress utilities do not benefit from an explicit or implicit level of extraordinary support from the U.S. federal government or state government in which they operate. In cases where we consider a utility to be a GRE, these criteria are used to determine the stand-alone credit profile (SACP), which is used as an input to the GRE criteria (see "Rating Government-Related Entities: Methodology And Assumptions," published March 25, 2015) to arrive at an issuer credit rating (ICR).

8. We consider the strength of lease revenue or certificates of participation issued by utilities as equivalent to a pledge of the same lien of revenues. Therefore, we do not distinguish between these securities. If a utility were to issue appropriation-secured debt that did not meet the above assumptions, we apply "Issue Credit Ratings Linked To U.S. Public Finance Obligors' Creditworthiness," published Nov. 20, 2019.

9. This article is related to "Principles Of Credit Ratings," published Feb. 16, 2011.

KEY PUBLICATION INFORMATION

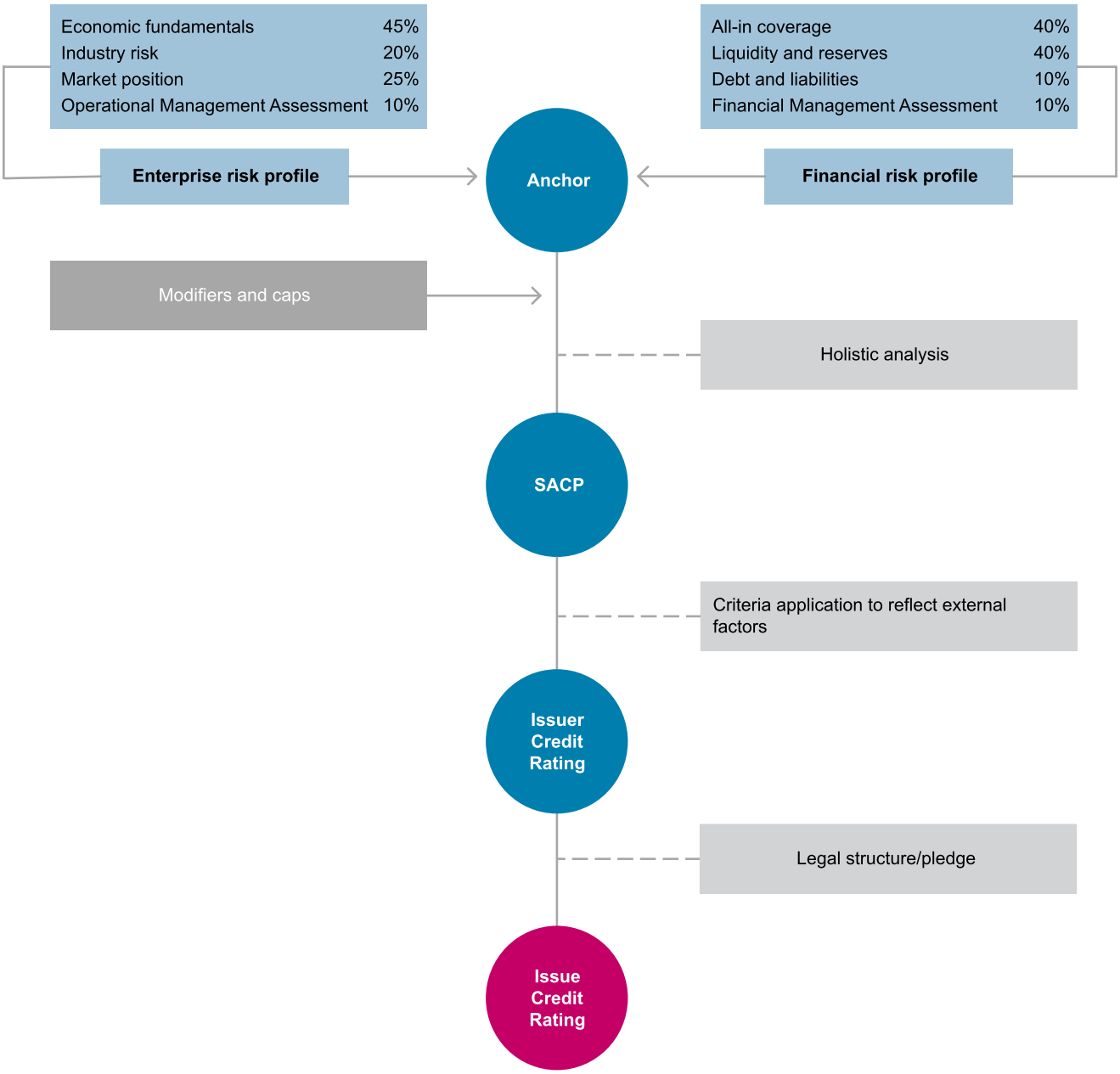
- Effective date: These criteria are effective April 14, 2022, except in jurisdictions that require local registration. In those jurisdictions, the criteria are effective only after the local registration process is completed.
- This updated methodology follows our request for comment, titled "Request for Comment: U.S. Municipal Water And Sewer Utilities: Methodology And Assumptions," published Dec., 14, 2021. For the changes between the RFC and the final criteria, see "U.S. Municipal Water, Sewer, And Solid Waste Utilities: Methodologies And Assumptions," April 14, 2022.
- These criteria supersede the criteria articles listed in the "Fully superseded criteria" section at the end of this article.

METHODOLOGY

10. These criteria use the same general framework as our criteria for other municipal enterprise sectors. Specifically, these criteria assign ratings using a framework that considers enterprise risk (enterprise risk profile) and financial risk (financial risk profile). Chart 1 depicts how the enterprise and financial risk profile assessments interact to arrive at the anchor.

Chart 1

Analytical Framework For Municipal Water And Sewer Utility Ratings



Source: S&P Global Ratings.

11. The anchor results from the combination of the enterprise and financial risk profile assessments in table 1. We use lower-case letters in table 1 to highlight that the anchors are not ratings themselves, but rather initial indicative credit levels suggested by the enterprise and financial risk profile assessments. In cases where table 1 presents two anchors, the choice between the two anchors is based on our view of the future performance of the factors in the enterprise and

financial risk profiles.

12. After we determine the anchor, we use modifiers. Such modifiers can positively or negatively affect the anchor suggested by table 1. Then we apply our holistic analysis to reach an SACP. A holistic analysis is part of determining the SACP because that helps us capture a comprehensive analysis of creditworthiness. The holistic analysis can have a one-notch impact up or down. When we determine an adjustment of one notch up or down is warranted, it may be based on factors including our forward-looking view of an issuer's operating and financial performance. It may also reflect a comparable ratings analysis when relevant, or strengths or weaknesses not fully reflected through application of the criteria framework as it pertains specifically to the issuer.

13. We use the term SACP to reflect the outcome from table 1 plus any relevant modifiers and caps described in the Primary Credit Factors section and the holistic analysis described earlier. For more information about SACPs, see our criteria "Stand-Alone Credit Profiles: One Component Of A Rating," published Oct. 1, 2010. Next, we analyze the influence of external factors such as sovereign risk (i.e., ratings may be constrained by the sovereign rating on the country in which the utility is domiciled) -- see "Ratings Above The Sovereign: Corporate And Government Ratings—Methodology And Assumptions," published Nov. 19, 2013; and the potential for extraordinary support or intervention from a related government or entity -- see "General Criteria: Rating Government-Related Entities: Methodology And Assumptions," published March 25, 2015.

14. Once the effect of any external factors is incorporated, we arrive at the ICR. The ICR reflects the general creditworthiness of the entity and does not incorporate the pledge or covenants provided to bondholders for any particular debt instrument. In the final step of our analysis, if we are rating a specific debt instrument, we review the legal structure of the instrument, including the pledge and covenants, to determine the issue credit rating. This analysis most often results in an issue credit rating that is the same as the ICR. However, the two may differ in some circumstances. For ratings below 'B-', see "Criteria For Assigning 'CCC+', 'CCC', 'CCC-', And 'CC' Ratings," published Oct. 1, 2012, as well as "Timeliness Of Payments: Grace Periods, Guarantees, And Use Of 'D' And 'SD' Ratings," published Oct. 24, 2013.

15. Issue credit ratings, including subordinate-lien debt, are determined based on our view of the ICR and the legal/covenant package, as more fully described in "Assigning Issue Credit Ratings Of Operating Entities," published May 20, 2015. Further information regarding our view of debt security and covenants is provided below.

OVERALL FRAMEWORK FOR RATING MUNICIPAL UTILITIES

16. These criteria are used to assign credit ratings to utilities based on quantitative and qualitative analysis of a range of economic, financial, operational, management, and debt factors, including those related to environmental, social, and governance (ESG). The analytical framework is articulated around two major components: the enterprise risk profile and the financial risk profile. The enterprise and financial risk profile assessments are determined by combining (see chart 1) and then rounding to the whole number the weighted average of the individual factors. The anchor results from the combination of the enterprise and financial risk assessments as shown in table 1.

Table 1

Determining The Anchor

	Financial risk profile					
Enterprise risk profile	**1**	**2**	**3**	**4**	**5**	**6**
	Extremely strong	**Very strong**	**Strong**	**Adequate**	**Vulnerable**	**Highly vulnerable**
1 Extremely strong	aaa	aa+	aa-	a	bbb+/bbb	bb+/bb
2 Very strong	aa+	aa/aa-	a+	a-	bbb/bbb-	bb/bb-
3 Strong	aa-	a+	a	bbb+/bbb	bbb-/bb+	bb-
4 Adequate	a	a/a-	a-/bbb+	bbb/bbb-	bb	b+
5 Vulnerable	bbb+	bbb/bbb-	bbb-/bb+	bb	bb-	b
6 Highly vulnerable	bbb-	bb	bb-	b+	b	b-

1.The anchor results from the interaction between the enterprise and financial risk profile assessments. Potential adjustments to the anchor are noted in tables 31 and 32 including a holistic adjustment. 2. For ratings below 'B-', see "Criteria For Assigning 'CCC+', 'CCC', 'CCC-', And 'CC' Ratings," published Oct. 1, 2012, as well as "S&P Global Ratings Definitions." 3. In certain cases, the anchor in table 1 contains two options for a given combination of enterprise and financial risk profile assessments. In those cases, we would use our expected view of the utility's future performance to determine which of the two anchors to use.

17. Where the enterprise and financial risk profiles contain subfactors, each factor and subfactor will be assessed on a numerical scale, with '1' being the strongest outcome, and '6' the weakest.

18. If the quantitative metric evaluating a particular factor falls at or near a cut-off point, we may assign the stronger assessment if trends are improving or we believe future metrics or attributes will improve, or weaken the assessment if trends are weakening or we believe future metrics or attributes will deteriorate.

19. The initial assessment for each factor may be adjusted based on qualitative factors that may be present or lacking for each characteristic or condition. Tables 4, 17, 19, 21, and 22 describe some of the most common qualitative factors that could adjust each of the respective initial assessments. The maximum net adjustment to the initial assessment is generally two points. For example, if the initial assessment is '3' and there are two favorable adjustments and one unfavorable adjustment identified, the final assessment for that factor would be '2.' The liquidity and reserves assessment, however, can be capped at '5' or worse regardless of the initial assessment.

20. The criteria also include various modifiers and caps (see tables 31 and 32) as well as the ability to raise or lower the anchor by one notch based on our holistic adjustment to establish the SACP. The ICR may be influenced by the rating on the U.S. or its associated country risk, as well as the assignment of issue credit ratings and use of subordinate-lien debt.

ENTERPRISE RISK PROFILE ASSESSMENT

21. The factors that are evaluated for the enterprise risk profile assessment are summarized in table 2. We combine these assessments to determine the initial enterprise risk profile assessment.

Table 2

Description Of Enterprise Risk Profile Factors

Economic fundamentals (45% of enterprise risk profile assessment)
Economic fundamentals measure the strength of the utility's service area economy, including the utility's demographics; trends related to the customer base; and how crucial the utility's principal customers are to operating revenues.
Industry risk (20%)
The industry risk evaluation aims to evaluate the external environment in which municipal utilities operate and its relevant characteristics, including cyclicality, competitive risk, and growth environment.
Market position (25%)
The market position measures the relative affordability of utility rates given the income indicators and relative poverty of the service area, as well as comparability of rates with those of peers in the region or state.
Operational Management Assessment (OMA; 10%)
The OMA evaluates our view of the effectiveness of utility management in ensuring that there is alignment of operational, environmental, strategic, and financial goals to support the system's success.

22. The descriptors of outcomes for the overall enterprise risk profile are based on the scale shown in table 3. The criteria do not round to a whole number until arriving at a final enterprise risk profile.

Table 3

Descriptors For Enterprise Risk Profile Factors

Assessment	Description
1	Extremely strong
2	Very strong
3	Strong
4	Adequate
5	Vulnerable
6	Highly vulnerable

FACTORS THAT AFFECT THE ENTERPRISE RISK PROFILE

Assessing economic fundamentals

23. The assessment of economic fundamentals provides insight into the employment, socioeconomic, and demographic environment in which the utility operates as well as the health of the service area economy relative to that of the U.S. as a whole.

24. The assessment of economic fundamentals is based on two measures: median household effective buying income (MHHEBI) of the service area as a percentage of the U.S. and the trend in economic output of the service area, as measured by its real (inflation-adjusted) gross county product. If the service area spans multiple counties, these criteria pro rate the metrics based on the estimated population in each county as a percent of the total service area population.

25. The two components are combined (see table 4) to determine an initial economic fundamentals assessment. Positive and negative qualitative factors are then evaluated for applicability to achieve the final economic fundamentals assessment. The cumulative net effect of all

adjustments is limited to an improvement or worsening of two points to the initial assessment.

Table 4

Assessment Of Economic Fundamentals

	Real gross county product, relative rate of change last two years, plus projected next two years*		
Current median household effective buying income (% of U.S.)	**Stronger than U.S. rate of GDP annual growth by 1% or more**	**Within +/- 1% of U.S. rate of GDP annual growth**	**Weaker than U.S. rate of GDP annual growth by 1% or more**
125% or more	1	1	2
100%-125%	1	2	3
75%-100%	2	3	4
35%-75%	3	4	5
35% or lower	4	5	6
Examples of qualitative factors positively affecting the initial assessment include:			
Efficiencies and natural economies of scale associated with being a larger utility.			
Broad and diverse employment base, or ratepayers living in the service area have access to such a base.			
Unique key local employer, such as a university or military base, that serves to stabilize the economy, even if skewing income indicators unfavorably.			
Examples of qualitative factors negatively affecting the initial assessment include:			
Unemployment rate of the county of 10% or worse.			
A steadily declining population, or dependent population of more than 55%. These social capital issues typically indicate an outsized percentage of the population that is not part of the labor force and may therefore have heightened sensitivities to utility bill affordability concerns.			
The lack of efficiencies and natural economies of scale because the utility is smaller.			
Employment sector concentration, or inauspicious prospects exist for a key major local employer within the next 36 months.			
The 10 largest customers account for 25% or more of operating revenues, or the top one is 10% or more.			

Each applicable qualitative factor changes the initial assessment by one point (with the exception of the economies of scale adjustor, which can result in a one-half point change), but the net total of all adjustments would generally improve or worsen the initial assessment by no more than two points. *For example, if the base/current year is Y0, the time period examined would be Y0-1 (actual, full-year); Y0 (annualized estimate); Y0+1 (forecast) and Y0+2 (forecast).

26. For service areas in which there are no specific MHHEBI data available, the data from the next-largest measurable geographic unit will be used. For example, if the service area is that of a small unincorporated portion of a county and if those data are not available, the MHHEBI of that county will be used. An exception could be if there is clear evidence that the service area incomes and macroeconomic trends are materially and measurably different from the geographical unit at large, in which case we will use the best available data. Certain natural operating efficiencies and economies of scale are often present in larger utilities. Examples may include physical redundancies or the ability to spread fixed costs over a greater number of gallons sold or solid waste transported, processed, or buried. These criteria define a utility's size based on average

annual gross operating revenues of the three most recent audited fiscal years. In our calculation of operating revenue, we may also include real or potential property tax revenue and the revenue of combined systems, such as electric and water revenues if the water/sewer utility is the predominant entity. Table 5 outlines the applicable adjuster that is combined with the result from table 4. Typically, we apply the simple average of the three years. However, should there be, in our view, a sustained trend indicating a divergence from the average, we will generally assign a stronger assessment if revenues are increasing, or we believe they will increase. A weaker assessment generally is assigned if revenue trends are weakening, or we believe they will decline.

27. Drainage-only utilities are excluded from this adjuster, as we believe they have inherently lower operating risk and usually smaller revenues by their nature. Irrigation districts are addressed separately below.

Table 5

Economies Of Scale Qualitative Factor

Total operating revenues (mil. $)	Change to initial assessment
More than 150	(1.0)
Between 75 and 150	(0.5)
Between 25 and 75	0
Between 5 and 25	0.5
Less than 5	1

28. Solid waste systems tend to be smaller, on average, relative to other utilities. When the negative characteristic associated with smaller size, reflected in relatively lower operating revenue, is offset by comparably better efficiency due to a system's affiliation with a larger family of systems (such as water and sewer), it may partially or fully offset an initial negative assessment but will not result in an assessment better than neutral ('0' in table 5).

29. We assess whether the utility's service area participates in a larger, broad, and diversified economy at the federally defined metropolitan statistical area (MSA) level. The determination is based on an evaluation of employment diversity, employment growth, and the employment base. Participation in a strong MSA would generally lead to a one-point improvement in the initial assessment. Conversely, no adjustment would be applied if we deem the MSA as weak or if the service area is not within a defined MSA. If the MSA is described as moderate, applying the broad and diverse positive adjustment may still be applicable if the macroeconomic trends of the MSA and our expectations for future performance in the next two years are reasonably likely to cause existing metrics to improve.

30. The diversification of the utility's service area's economic structure is important to assess the potential volatility of its employment base and its resilience to stresses. An example of a deep, broad, and well-diversified economy would be employment-sector distribution that closely resembles that of the U.S. at large. This depth and diversity could lessen the impact on the utility's operating revenues better than an economy with more exposure to a single employer or industry, or only a few employment sectors. A small and concentrated, or shallow economic base also tends to be more exposed to external factors and macroeconomic cycles.

31. If employment in an individual sector--excluding education and health; government; and transportation, trade, and utilities--represents more than 30% of the nonfarm employment base, the local economy is deemed to be highly susceptible to that employment sector. Therefore, a one-point weakening of the assessment would be applied. An example would be a small town that does not participate in an MSA and has a major manufacturing component in the local labor force.

32. Regardless of the employment sector or nature of its business, if a major local employer has publicly announced that within the next 36 months it will reduce or completely shutter operations within the service area or we expect it to do so, a one-point unfavorable adjustment would be warranted.

33. If we determine there is not a broad and diverse economy, the presence of a major employer can still sometimes act as a stabilizing force, possibly even adding context to lower income indicators. In such a case, a favorable adjustment of one point may be applied. Examples of major employers include higher education institutions; health care facilities; military installations; or even, more rarely, a large and stable corporate presence. Employment and customer base characteristics typically have a close correlation with a utility's operating revenues. If a small number of customers provide a large amount of revenues, the utility could be exposed to revenue volatility. Therefore, when the top 10 customers contribute 25% or more of total operating revenues, or the top customer accounts for 10% or more of total operating revenues, the assessment is weakened by one point.

34. For irrigation districts and comparable raw-water providers for which the end-use customer is agriculture or agriculture-related--such as ranches or dairy farms--MHHEBI and relative economic performance are less meaningful. These economies commonly have inherent limitations given the dominance of farming in the local economy, and non-municipal consumptive use patterns. Therefore, for these issuers, our default initial economic fundamentals assessment is '3', although negative, but not positive, qualitative factors that adjust the initial assessment could still be applicable.

Assessing industry risk

35. Consistent with "Methodology: Industry Risk," published Nov. 19, 2013, we consider industry risk for water and sewer utilities covered under these criteria based on a scale of '1' to '6' with '1' being the strongest. The industry risk assessment applies to all entities rated under these criteria regardless of the state in which they operate. We generally consider the industry risk for water and sewer utilities, including irrigation districts but excluding solid waste systems, as very low, the most favorable assessment possible. We derive the industry risk assessment based on a (2) low risk cyclicality and a (1) low competitive risk and growth assessment based on the following characteristics of the water and sewer utilities industry as relevant to the industry risk factors:

- Cyclicality risk assessment of '2' based on S&P Global Ratings' review of historical economic cycles and peak-to-trough changes in revenues and margins for regulated utilities. Economic cycles can affect nonrecurring revenues such as impact fees and spur priorities in the capital improvement plan (CIP) but weather, not the economy, is generally the largest single determinant of a favorable or unfavorable variance to budget in any single fiscal year; and
- Very low competitive risk of '1', owing to legal and practical barriers to entry in almost all jurisdictions, and that as an essential service there is no substitution risk.

36. For solid waste systems, we consider the industry risk assessment as low, which equates to '2', or very strong, on the six-point scale we use for these criteria. We derive the industry risk assessment from the (2) low risk cyclicality risk assessment and (2) low competitive risk and growth assessment and characteristic of:

- Cyclicality risk assessment of '2' based on S&P Global Ratings' review of historical economic cycles and peak-to-trough changes in revenues and margins for environmental services;
- Economic cycles can spur priorities in the CIP. Population and business growth are generally the largest determinants of a favorable or unfavorable variance to budget in any single fiscal

year; and

- Low competitive risk of '2', owing to legal and practical barriers to entry in almost all jurisdictions. However, while solid waste systems are an essential service, there is some substitution risk. Solid waste systems' peer industry is environmental services, as described in our industry risk criteria. This reflects both the slightly lower, although still high, essentiality of solid waste services, as well as the breadth of issuers in scope, ranging from traditional carting to recycling services.

37. Although uncommon, limitations on rate autonomy would likely be measured elsewhere, such as in financial performance if the timeliness and magnitude of requested versus granted rate cases leads to deterioration in credit quality.

Assessing market position

38. The relative poverty rate is an important social credit factor because service areas that have not just lower MHHEBI levels, but disproportionately higher percentages of the population located in the lowest quintiles of the MHHEBI distribution curve, may exhibit greater sensitivity to perceived affordability even if adjusted for low inflation or a favorable cost of living. Therefore, it is possible that the impact of utility bills and related rate increases is even more profound in those communities compared with communities with stronger economic fundamentals.

39. For water and sewer utilities, consumption patterns are based mainly on climate, precipitation, use of demand-side management and water conservation measures, and economic factors. In addition, solid waste system disposal activity varies from region to region based mainly on population and business growth, use of demand-side management, recycling measures, and economic factors. The market position assessment is based on the actual average monthly residential water and sewer or solid waste bill. The information generally will be based on the most recent audited fiscal year, unless we believe that historical rates are not indicative of future rates. In those cases, we will base the assessment on projected rates.

40. There could be practical limitations to these calculations such as transparent and timely financial reporting and disclosure details, the sophistication of the utility's customer information system database, and the possibility that the utility may deem this information as competitively sensitive and nonpublic. For water and sewer utilities, if the actual average monthly water or sewer bill is not readily available, the market position assessment assumes a residential customer that in one month has used 6,000 gallons of both treated water and sanitary sewer service, conceptually similar to the Environmental Protection Agency's residential indicator. In cases where the utility's chosen unit of billing is measured in hundred cubic feet (ccf), the closest rounded equivalent of 8 ccf is used. For solid waste systems, a monthly household rate is based on estimates using tipping fees and a combination of available factors such as disposal capacity and house size. Any minimum, or base charge or "lifeline rate" is also included in the calculation, as are any related fees, surcharges, or taxes regardless of who is levying them, since the burden ultimately still lays with the customer to pay it.

41. To gauge the annual utility burden on the household, the assumed monthly bill, as calculated above, is multiplied by 12 to estimate the total annual cost to the household for utility service.

42. Relative rate affordability is calculated by dividing as follows: in the numerator is the annual household utility burden as calculated above, and in the denominator the actual MHHEBI of the service area of the utility (or the closest approximation), then multiplied by 100. This produces the cost to the household of its utility expense as a percentage of total disposable income.

43. For irrigation districts, the customer base is primarily farms in agricultural production rather than

residential customers that rely on the system for essential public health needs, and in this context, poverty rates do not apply. However, the pricing power of many irrigation districts is constrained by the more elastic demand for water from these businesses, and in many cases the availability of alternative supply sources, such as groundwater produced from privately owned wells. Therefore, for these issuers, the default initial market position assessment is '3', although negative, but not positive, qualitative factors that adjust the initial assessment could still be applicable should they, in our view, affect the system's revenue-raising flexibility.

44. For drainage utilities rated under these criteria, rate structures tend to be exclusively either one of two types:

- A flat monthly charge tied to a residential property as the base unit of billing, with larger properties or parcels assessed as if they were equivalent to multiple residential properties. For example, a strip mall may be treated for billing purposes as if it were five equivalent residential units. For those utilities whose charges are based on a flat fee, we assume the fee assessed to a single-family residential property; or
- A fee based on the actual impervious surface area of the property. S&P Global Ratings' assumption for the monthly bill is based on a residential property. For those utilities whose charges are based on impervious surface area rather than a flat fee, we assume 2,000 square feet of impervious surface area.

45. Tables 6, 7, and 8 summarize how the criteria evaluate the market position of the utility, driven by the rate affordability and relative poverty rate. Table 6 applies to water, drainage, or solid waste systems. Table 7 applies to sewer-only utilities. Table 8 applies to water and sewer/drainage utilities. Positive and negative qualitative factors are then evaluated for applicability to achieve the final market position assessment. The cumulative net effect of all adjustments is limited to an improvement or weakening of two points to the initial assessment.

Table 6

Market Position Assessment, Water-Only, Drainage-Only, Or Solid Waste Systems

	Annual utility bill as a percentage of median household effective buying income		
Percentage of county's population living in poverty	**Less than 1%**	**1%-2%**	**More than 2%**
Less than 10%	1	2	3
10%-20%	2	3	4
20%-30%	3	4	5
More than 30%	4	5	6

For utilities with an initial assessment of 5 or 6 that have recently completed or achieved substantial completion of a historically capital-intensive period, the initial assessment may generally improve by one point.

Table 7

Market Position Assessment, Sewer-Only Utilities

	Annual utility bill as a percentage of median household effective buying income		
Percent of county's population living in poverty	**Less than 1.25%**	**1.25%-2.5%**	**More than 2.5%**
Less than 10%	1	2	3
10%-20%	2	3	4
20%-30%	3	4	5
More than 30%	4	5	6

For utilities with an initial assessment of 5 or 6 that have recently completed or achieved substantial completion of a historically capital-intensive period, the initial assessment may generally improve by one point.

Table 8

Market Position Assessment, Water And Sewer/Drainage Utilities

	Annual utility bill as a percentage of median household effective buying income		
Percent of county's population living in poverty	**Less than 2.25%**	**2.25%-4.5%**	**More than 4.5%**
Less than 10%	1	2	3
10%-20%	2	3	4
20%-30%	3	4	5
More than 30%	4	5	6

For utilities with an initial assessment of 5 or 6 that have recently completed or achieved substantial completion of a historically capital-intensive period, the initial assessment may generally improve by one point.

46. Rate affordability without context may under- or over-represent credit strengths. For example, a utility with rates much higher than those of comparable issuers that has already made the capital commitments to address a regulatory mandate driven by past noncompliance with environmental permits would be viewed more favorably than a utility with similarly high rates but that is facing a huge unfunded regulatory mandate. For utilities that have relatively high rates--as defined by an initial assessment of '5' or '6'--but have recently completed or substantially completed an extraordinarily capital-intensive period, the initial market position assessment generally will be improved by one point.

47. The criteria do not establish a preference for a particular water and sewer or solid waste rate structure. For example, management may use a flat or fixed rate, volume-based rates, or some combination thereof. We view positively rate structures that allow for cost recovery and stability. In contrast, for solid waste systems, an example of a negative adjustment of typically one point could be applied when a solid waste system relies on flow control ordinances.

Assessing operational risk management

48. The OMA consists of a review of the following subfactors, assessed from (1) strong; (2) good; (3) standard; to (4) vulnerable and weighted as shown below to calculate the OMA:

- Asset adequacy and identification of operational risks (40%);

- Organizational effectiveness, management expertise, drought management, or volume variation risk plan, as applicable (20%); and
- Rate-setting practices (40%).

49. The OMA refers to risks associated with the operation of the utility; financial policy is covered by the FMA. For combined utilities where retail electric is a significant component of revenues, we also reference the retail electric criteria, "U.S. Municipal Retail Electric and Gas Utilities: Methodology and Assumptions," published Sept. 27, 2018.

50. The results from the observed evaluations are converted to a '1' to '6' scale as shown in table 9.

Table 9

Operational Management Assessment (OMA) Conversion To Six-Point Scale

Observed evaluation	OMA	Characterization
1.0-1.2	1	Strong
1.2-1.8	2	Good
1.8-2.5	3	Good
2.5-3.1	4	Standard
3.1-3.6	5	Standard
3.6-4.0	6	Vulnerable

51. The assessment of all subfactors is based on a preponderance of evidence. A utility receives a neutral assessment of standard for any subfactors for which there is insufficient evidence to assign either a positive or negative assessment. However, some subfactors may receive a negative assessment if a utility has a record of failing to disclose key relevant information.

52. There is no favored governance structure for the utility within the criteria. Some municipal utilities are a department or component unit of the local political subdivision, governed by the same locally elected officials as the LRG. Other utilities are governed by an independent or quasi-independent board. The governance structure will be credit-neutral so long as there is demonstration of the ability for management to operate the utility as an ongoing, viable enterprise, largely independent from politics, with professionals who are capably engaged in risk oversight and can balance interests appropriately.

53. Compliance with environmental regulations to ensure public health and safety is one of the basic purposes of a utility. Asset adequacy and identification of operational risks examines how successfully management is faring by owning and operating a public water, sewer, drainage enterprise, or solid waste system (table 11). Water and sewer utilities are subject to federal, state, and municipal regulations and permitting requirements (table 10). However, all utilities may be in various degrees of compliance or readiness. Examples include a long-term water supply that is appropriate in both quantity and quality to serve the existing and likely future customer base, or treatment capacity that is sufficient to meet average and peak day demand. Maintenance of existing assets, including climate resilience, is also a significant component of asset adequacy. Also assessed in this subfactor is the materiality of nonrevenue water.

Table 10

Asset Adequacy And Identification Of Operational Risks Assessment for Water, Sewer, And Drainage Systems

Strong	The utility has in place or is in the process of securing a raw-water supply that is reasonably projected to be sufficient through the life of the bonds. The integrity of the distribution and/or collection system, meters, and raw-water delivery assets is strong, or efforts are ongoing to rehabilitate them. Treatment capacity to meet average and peak day demand is sufficient in virtually every circumstance. Climate risk assessment is incorporated into planning and operations as a potential risk to the system. Water audits based on industry-accepted performance standards are incorporated into the annual budget such that nonrevenue water physical and economic losses are not material. A thorough vulnerability assessment across all critical assets has been performed to industry standards and been completed and incorporated into operations as much as reasonably possible.
Good	The existing raw-water supply is sufficient for the current customer base. The utility may need to enhance the supply sometime beyond the next 20 years, depending on growth and climatology/hydrology, but management has identified this risk in its long-term plans. Inflow, infiltration, and/or raw-water delivery are generally not problematic, or efforts are ongoing to rehabilitate them. Treatment capacity to meet average and peak day demand or flow is sufficient with only rare exceptions. Climate risk assessment is addressed in some key areas, such as supply planning or flood protection. Water audits based on industry-accepted performance standards are done on a regular, if not annual, basis such that nonrevenue water physical and economic losses are small. A vulnerability assessment has been completed to industry standards in most key areas and incorporated where management most deems relevant.
Standard	The existing raw-water supply will likely need to be enhanced within the next 10-20 years, but options for addressing the need have not yet been identified or, if so, have not been fully priced. Inflow, infiltration, and/or raw-water delivery are pronounced but not yet material or are problematic but will be addressed within the current capital improvement plan. Treatment capacity to meet average day demand is sufficient, but peak day demand or wet weather flows create constraints until ongoing projects are completed. Climate risks are identified, but other priorities preclude any immediate actions. Water audits based on industry-accepted performance standards are done only when management deems them necessary, likely evidenced by nonrevenue water economic and physical losses that are material. A vulnerability assessment has been done, perhaps only partially or perhaps not in accordance with industry standards, and implementation has been either partial or not at all.
Vulnerable	The existing raw-water supply and/or treatment capacity cannot currently and consistently meet peak day demand or flows. The raw-water supply is subject to a high degree of regulation and/or litigation, which can quickly introduce long-term uncertainty. Inflow, infiltration, and/or raw-water delivery are problematic and material, or the utility is highly dependent on or susceptible to another water purveyor. Climate risk is not explicitly addressed either in plans or operations. Water audits based on industry-accepted performance standards are not done and nonrevenue water economic and physical losses are problematic. No vulnerability assessment has been done.

Table 11

Asset Adequacy And Identification Of Operational Risks Assessment For Solid Waste Systems

Strong	The system has in place or is in the process of securing disposal capacity that is reasonably projected to be at least 25 years or more. The integrity of the distribution and/or collection system, transfer station, landfill, materials recovery facility, and/or resource recovery facility assets is strong, or efforts are ongoing to rehabilitate them. Treatment capacity to meet average and peak day demand is sufficient in virtually every circumstance. Climate risk assessment is incorporated into planning and operations as a potential risk to the system. Other potential risks to the system are identified and mitigated, including among others, waste flow diversions. Relationships with private haulers, where necessary, are amendable and nonlitigious. Postclosure costs, if applicable, are already being fully funded or plans are to fund them long before closure of the landfill. A thorough vulnerability assessment across all critical assets has been performed to industry standards and been completed and incorporated into operations.

Table 11

Asset Adequacy And Identification Of Operational Risks Assessment For Solid Waste Systems (cont.)

Good	The existing disposal capacity is sufficient for the current customer base. The system may need to enhance the disposal useful life sometime beyond the next 20-25 years, depending on growth, but management has identified this risk in its long-term plans. Climate risk assessment is addressed in some key areas. Relationships with haulers have had one or more periods of strain; however, waste flow trends tend to be stable. Postclosure costs are being funded as needed with a reserve that is currently being funded from operating revenues. A vulnerability assessment has been completed in most key areas and incorporated where management most deems relevant.
Standard	The existing solid waste system operations will likely need to be enhanced within the next 10-20 years, but options for addressing the need have not yet been identified or, if so, have not been fully priced. Climate risks are identified, but other priorities preclude any immediate actions. Relationship with haulers shows signs of strain and waste flow trends have been erratic. Postclosure costs are not being reserved for but the system has indicated a willingness to fund them before the closure of the landfill. A vulnerability assessment has been done, but perhaps only partially or not in accordance with industry standards, and implementation has been either partial or not at all.
Vulnerable	The existing disposal capacity cannot currently and consistently meet daily demand. The relationship with haulers or other stakeholders is strained and litigious. The system's management relies upon flow control regulations to ensure waste flow trends. The system has no plans to deal with postclosure costs. It is highly dependent on/susceptible to another waste flow purveyor. Climate risk is not explicitly addressed either in plans or operations. No vulnerability assessment has been done. The municipality waste flow has been strained in the past, making it difficult to meet contractual obligations.

54. Organizational effectiveness informs our view of governance, management expertise, and risk mitigation through an assessment of policies and practices of key decision makers and staff. Examples include an evaluation of risks associated with cyber security, emergency preparedness, resource planning, drought management or volume variation, and succession planning (table 12). This subfactor also assesses how well utility leaders are able to convey the needs of the utility to external and internal stakeholders in a manner that is likely to allow the utility to maintain stability.

Table 12

Organizational Effectiveness And Management Expertise

Strong	Management communicates the utility's long-term needs and strategic goals, such as funding requirements, approval of crucial projects, and resource planning, to internal and external key officials on a regular, credible, and transparent basis, putting the utility in the best reasonable position for operational continuity. Examples might include ongoing public education campaigns, town halls, dedicated web sites, and social media. Management has considerable knowledge, experience, or a track record of success in operating all of the utility's key business units in an integrated fashion. Internal mentoring and succession plans are common. Management is able to put its strategic planning into practice; therefore, the utility is successful relative to peers. For water, sewer, and drainage utilities, it has its own drought management plan that details how much conservation it would seek depending on a drought's severity while still ensuring revenue requirements are met. For solid waste systems, there is a clear understanding of the composition of the municipality's waste flows and disposal resources.
Good	Public outreach and transparency is a common part of the organizational culture, even if not comprehensive across all key business units. Management has reasonable expertise and experience and has established pathways for succession and continuity where it can; therefore, operational surprises are rare. Management has a good track record of successfully converting strategic decisions into constructive action. For water, sewer, and drainage utilities, it has its own drought management plan that details how much conservation it would seek depending on a drought's severity although how it might meet its revenue requirements in such a scenario is uncertain.

Table 12

Organizational Effectiveness And Management Expertise (cont.)

Standard	Management depth or breadth is limited in some areas, such that the loss of key personnel would create, only temporarily, a learning curve for the new staff but not likely to measurably affect the utility for long. Public outreach is done generally only when necessary, often associated with a large or controversial project. Operational and financial strategies are generally aligned. For water, sewer, and drainage utilities, there is no drought management plan but does operate in a state with a clearly detailed plan that already exists.
Vulnerable	The utility relies on one or only a few key employees or perhaps relies on external consultants. Negative variances are not uncommon. The utility has a history of regulatory or legal infractions beyond an isolated episode or outside industry norms, which introduced an as-yet-unaddressed challenge. Operational and financial strategies may have had one or more major misalignments, limiting the ability to move forward on something important. For water, sewer, and drainage utilities, neither the utility nor the state in which it operates has an existing drought management plan, making resource sustainability as well as meeting financial obligations uncertain.

55. Most, but not all, utilities are monopolies with autonomy over their own rates. All have a mission of public health and safety, requiring continuously meeting regulatory standards and also implementing corrective actions when deficiencies occur, all of which spur the need to make adjustments to rates. If the utility is rate-regulated, the history of timeliness on rate cases and the magnitude of what was granted versus requested will be examined. The evaluation of rate-setting practices looks beyond magnitude or frequency of rate adjustments. Instead, we evaluate whether management has acted, in our opinion, in a manner generally supportive of credit quality when tough decisions have needed to be made. Such credibility can also aid community support when such increases are needed, and help protect future rate-making decisions from short-term political manipulation and decrease the potential for rate shock (table 13).

Table 13

Rate-Setting Practice Assessment

Strong	When rate increases have been needed, the decision-making body has been supportive and timely, even to the extent that multiyear, preapproved rate increases are common, if not standard. Financial decisions are prudent, in our view, rather than simply politically expedient and that could possibly be to the detriment of the utility's near-term financial health. Periodic rate studies (internal or external) are common.
Good	Rate considerations are done on a year-to-year planning horizon rather than over a long-term time frame, but generally are apolitically approved if and when necessary.
Standard	The rate covenant and/or additional bonds test are the de facto guide as to when rate adjustments are necessary, but that is still enough for the political decision makers to agree to a rate increase.
Vulnerable	Rate increases are often in reaction to a weakened financial position, including a technical default or some other legal covenant violation, even if the recent debt service payments were made on time and in full. There is clear evidence of recent political decisions to defer or downsize needed rate increases.

Adjusting the initial enterprise risk profile assessment

56. Table 14 outlines examples of situations where we would generally adjust the initial enterprise risk profile assessment. On an exceptional basis, there may be additional situations we have not yet observed that could also result in an adjustment to the initial enterprise risk profile assessment.

Table 14

Examples Of Adjustments To The Initial Enterprise Risk Profile Assessment

If	Then
Country risk assessment is '4', '5', or '6'.	Enterprise risk profile assessment generally would be capped at adequate, vulnerable, or highly vulnerable, respectively.

57. The relevant credit risks for utilities are also influenced by country-specific risks (see "Country Risk Assessments Methodology And Assumptions," published Nov. 19, 2013). Country risk is the risk an entity faces by having some of its operations or assets exposed to one or more countries. The country risk assessment is determined on a scale from '1' (very low risk) to '6' (very high risk). If the weighted-average country risk assessment is '3' or better, there is generally no positive or negative impact. However, if the country risk assessment were to weaken to '4' or worse, this could affect the enterprise risk profile assessment. Specifically, if the country risk assessment is '4', '5', or '6', the criteria generally assign an enterprise risk profile assessment of no better than adequate, vulnerable, or highly vulnerable, respectively.

FINANCIAL RISK PROFILE ASSESSMENT

58. The factors that are evaluated for the financial risk profile assessment are summarized in table 15. We combine these factors to determine the initial financial risk profile assessment.

Table 15

Description Of Financial Risk Profile Factors

All-in coverage (40% of financial risk profile assessment)
Analysis includes examination of historical and preferably generally accepted accounting principles (GAAP)-based results, the current financial condition of the utility, and projected scenarios for the next one to three fiscal years. The focus is on total financial capacity versus total revenue requirements.
Liquidity and reserves (40%)
This factor incorporates all lawfully available cash reserves and external working capital or liquidity sources, including bank lines in force within the life of any short-term obligations.
Debt and liabilities (10%)
This factor incorporates mainly quantitative, but also qualitative, analyses about not just the absolute measure of the utility's indebtedness but also the capacity to incur and support additional debt, especially in relation to maintaining any minimum financial metrics as covenanted to bondholders. Measurable liabilities such as pension and other postemployment benefits (OPEB) can lead to adjustments to this initial factor.
Financial Management Assessment (FMA; 10%)
Analysis includes an evaluation of ongoing management practices and policies that can be supportive of financial performance and continuity, as well as internal controls and reporting. Examples include establishing a minimum level of acceptable working capital, predictability of cash transfers from the utility system, and creating and perpetually updating a long-term financial forecast.

59. The descriptors for the overall financial risk profile are based on the scale in table 16.

Table 16

Descriptors For Financial Risk Profile Factors

Description	Corresponding assessment
Extremely strong	1
Very strong	2
Strong	3
Adequate	4
Vulnerable	5
Highly vulnerable	6

60. These criteria use assessments derived from historical and projected financial performance. In most cases, the ratio calculations are based on the three most recent independently audited financial statements. Our analytical assessment of pro forma or projected data will be used for those ratios affected by additional debt issuance or funded from cash reserves, or when we believe that historical financial performance is not representative of expected future performance.

61. For all-in coverage or liquidity and reserve assessments that use multiple years of historical and projected data, each single year receives a preliminary assessment. The preliminary assessments from each applicable year are averaged together to derive one single assessment for that factor.

FACTORS THAT AFFECT THE FINANCIAL RISK PROFILE

Significant additional upcoming debt

62. If a utility has potentially sizable, but as yet unspecified, capital plans that could result in material additional debt and/or the use of reserves--including when there is or will be high levels of nondiscretionary capital funding, and we determine that such plans have a reasonable likelihood of occurrence but are not specific enough yet to determine pro forma or projected financial metrics--we generally will weaken the entire financial profile by one point. Compelling factors that would likely preserve credit quality include preapproved rate adjustments multiple years into the future, or an existing debt service schedule that allows for the new debt to be layered on in a manner that we believe is unlikely to worsen financial performance.

Assessing all-in coverage

63. All-in coverage is our internally adjusted debt service coverage (DSC) metric that we believe best tracks the use of every dollar of utility operating revenues, regardless of lien position, accounting treatment, or ultimate purpose. It also incorporates recognition of fixed charges or costs, which we define as certain long-term recurring items that are debt-like in nature, even if legally treated as an operating expense. Vertically integrated utilities may not have any fixed costs. An example of a fixed cost would be the take-or-pay minimum payment to the utility's wholesale provider of treated water. Other examples of fixed costs would include rental expenses for a sale-leaseback arrangement, GO debt that we consider self-supporting debt, or other situations that reflect support of off-balance-sheet debt. An example of off-balance-sheet debt is when a related government issues GO debt that is supported by the utility's revenue. We will generally include this portion of the debt that is not supported by any alternative source of revenue in the utility's all-in coverage calculation. All-in coverage also excludes adjustments to fixed costs for small or

nonmaterial financing obligations such as a capital equipment lease for a vehicle or copy machine.

64. These criteria also look to total revenues less expenses (but excluding noncash items), even if the pledge to bondholders is based on gross operating revenues. This is because we assume that the utility must be a viable, ongoing, cash flow-positive enterprise.

65. We deem net transfers out that legally or by practice support debt service of another governmental fund as part of the denominator's self-supporting debt. Cash that does not truly leave the utility, such as a set-aside into a rate stabilization reserve or pay-as-you-go fund are not included as transfers out. Similarly, the application of a rate stabilization fund (RSF) or other cash on hand as a transfer in would not be included in the all-in coverage calculation, although we would note the presence and use of the RSF as a qualitative adjustment to the all-in coverage assessment.

66. The accounting treatments and even provisions in the bond documents vary; for example, transfers are usually a use of surplus net revenues, but sometimes may be treated as an operating expense. The criteria would treat recurring transfers as an operating expense. An annual transfer payment that is consistent in nature, such as one based on a percentage of operating revenues or a fixed dollar amount, is more predictable than one that is not defined and therefore could be as big as the general government decides it should be. For example, an all-in coverage calculation of less than 1x might suggest a net cash withdrawal from the utility fund. Table 17 summarizes the all-in coverage evaluation.

67. In cases where an unconditional take-or-pay minimum, capacity payment, or demand charge does not exist or is not explicit, we will impute what we believe to be a logical and reasonable equivalent for the purpose of calculating all-in coverage. We use the utility's relative contribution to its wholesaler provider's total operating revenues as the basis for the fixed-cost imputation. For example, if the utility being rated accounts for 15% of its wholesale provider's total annual operating revenues, and the wholesaler's total annual debt service payments are $10 million, then $1.5 million will be imputed as fixed costs for all-in coverage calculation purposes.

Table 17

Assessment Of All-In Coverage

Initial assessment	All-in coverage
1	1.60x or above
2	1.40x-1.60x
3	1.20x-1.40x
4	1.10x-1.20x
5	1.00x-1.10x
6	Below 1.00x
Examples of qualitative factors positively affecting the initial assessment include:	
A significant portion of operating revenues have a high degree of certainty, such as from wholesale sales with take-or-pay minimums, even if those wholesale sales serve to depress total DSC due to cost-of-service rates.	
The presence of an RSF that tempers revenue variability and helps ensure adequate fiscal resources during unexpected low revenue periods, so long as the use is infrequent and not offsetting structural budget deficiencies.	
Examples of qualitative factors negatively affecting the initial assessment include:	
A debt service schedule with large bullet maturities that introduces refinancing risk, or that makes it extremely likely the utility will need significant growth or large rate increases to meet future requirements, such as a deferral of principal repayment far into the future.	

Table 17

Assessment Of All-In Coverage (cont.)

Initial assessment	All-in coverage
DSC that is reliant on new customer fees or nonrecurring nonoperating cash inflows just to achieve a ratio of at least 1x.	
Exposure to interest-rate sensitivity via variable-rate debt that is enough to lead to a weaker initial assessment.	
A material increase or anticipated increase in required pension or OPEB costs. In making this assessment, we consider risk of acceleration of pension and OPEB payments and likelihood of budgetary stress due to the increase in such payments.	
For solid waste systems, the majority of the waste is delivered by the largest customer, generally measured by revenue or tonnage, and we believe that this level of concentration could negatively affect all-in coverage; the majority of revenues are not from tax assessments or collected as part of a combined utility bill and we believe the collection method has or will significantly affect the revenue collection rate; or there is a significant amount of revenue from spot market waste and recyclable sales.	

Each applicable qualitative factor changes the initial assessment by one point, but the net total of all adjustments would generally improve or worsen the initial assessment by no more than two points.

68. Some utilities provide mostly retail service directly to the consumptive-use customer, but may also generate operating revenues via sales for resale, or wholesale sales. Wholesale sales are often at a cost-recovery rate with much smaller net operating margins, serving to depress total all-in coverage. For utilities that generally have between 20% and 49% of operating revenues coming from firm (contractual) wholesale sales, a one-point improvement in the all-in coverage assessment would be applied to put the depressed all-in coverage into better context.

69. The planned use of RSF or equivalent designated reserves from time to time could, analytically, temper measurable declines from a trend of stronger financial performance. However, recurring reliance on an RSF in lieu of other measures such as rate adjustments to address imbalances among revenues, expenses, and debt service can be evidence of credit weakness. Utilities that perform down to the level of permissive legal covenants, such as allowing the use of certain cash balances toward satisfying a rate covenant or additional bonds test and potentially creating a weak alignment between revenues and expenses, would see the initial assessment lowered by one point. This is especially true when actual performance indicates insufficient pledged revenues without the use of cash.

70. It is not uncommon for utilities to charge a one-time fee as new accounts are added to the customer base (exclusive of any deposit that may be required), often called a connection or impact fee. The all-in coverage ratio will be stressed by hypothetically removing these nonrecurring items from total revenues, to gauge a utility's relative dependence on these fees just to achieve sufficient financial performance. Such fees are strongest during periods of high growth in the number of accounts. While perhaps they are pledged revenues, impact fees can overstate revenues available for debt service. Conversely, a slowdown or cessation of such growth--especially if not expected by management--could create a precipitous drop in the utility's financial performance and expose vulnerability in the financial risk profile. Achieving a ratio of less than 1x solely from recurring revenues on a consistent basis indicates structural budgetary imbalance and generally would weaken the assessment by one point.

71. These criteria do not establish a guideline as to an allocation of variable-rate debt as a percentage of total long-term debt. However, if all-in coverage by our projections would change between one of the initial assessments to another in table 17 as a result of a change in interest rates, the all-in coverage assessment will reflect the lower/weaker of the two possible outcomes.

Assessing liquidity and reserves

72. The liquidity and reserves analysis measure is days' cash available to the utility as well as the available reserves. As noted above in Assessing Economic Fundamentals for the enterprise risk profile assessment, size is also a factor in the utility's financial risk profile. A utility may have available reserves, for example, that are equivalent to a high days' cash number, yet these reserves may be nominally very small. Both days' cash and available reserves are evaluated based on table 18. The resultant preliminary evaluations are applied to table 19 to produce the initial liquidity and reserves assessment.

73. For example, a utility with $1.2 million of cash on hand, which for this example equated to 74 days of operating expenses, would receive a '3' for the days' cash ratio, and a '4' for the available reserve levels, based on table 18. When each preliminary evaluation is applied to the matrix in table 19, the initial liquidity and reserves assessment would be at the intersection of (3, 4), or an assessment result of '4.' Qualitative factors, if any, would then be applied to improve or weaken the '4' to arrive at the final liquidity and reserves assessment.

74. The liquidity and reserves assessment is intended to measure how the utility's internal sources, such as cash reserves and cash flow generation, and external sources--namely undrawn capacity under committed lines of credit--provide the working capital to fund immediate needs on an ongoing basis. The undrawn, available portion of committed bank lines maturing beyond the next 12 months is included in available reserves when applying tables 18 and 19; draws are included as a liability in both long-term debt and, if due within the next 12 months, debt service calculations.

75. The liquidity analysis looks not only to cash and equivalents that are unrestricted or unassigned (that is, unencumbered by legally enforceable agreements and not earmarked for specific purposes) and immediately available, but also gives credit to reserves that are designated, but ultimately available, for any lawful purpose. Examples include renewal and replacement funds, RSF, or other similar set-aside (but not truly restricted) cash. The criteria make no distinction between reserves that can only be appropriated by action of the highest decision-making body, or reserves that can be appropriated by simple administrative action, so long as the reserves are ultimately lawfully available for any purpose regardless of the reporting entity's label on it as determined by GAAP. Issuers that do not use a GAAP basis of presentation, or for which the financial statements do not provide a transparent and explicit breakdown of cash, must provide details of their cash position.

76. Cash that we deem to be restricted--for example, a debt service payment to be made, customer deposits, a fiduciary responsibility like a pension or decommissioning fund, and unspent bond proceeds, or that is related to a posting of collateral, among other restrictions--will generally not be included in the analysis of liquidity. Any debt service reserve fund (DSRF) will also be excluded.

77. Intragovernmental borrowing sometimes occurs between the utility and its associated general government, or sometimes even between one division of the utility and another. Cash in other funds in most cases would not be used to calculate the liquidity ratios, since those other funds likely have their own operating requirements. If a utility pools its cash with other major operating funds or governmental units, only cash that is truly the utility's will be counted in the calculation.

Table 18

Liquidity And Reserves Preliminary Evaluation

Preliminary assessment	Days' cash	Available reserves
1	Greater than 150	More than $75 million
2	90-150	$20 million-$75 million

Table 18

Liquidity And Reserves Preliminary Evaluation (cont.)

Preliminary assessment	Days' cash	Available reserves
3	60-90	$5 million-$20 million
4	30-60	$1 million-$5 million
5	15-30	$500,000-$1 million
6	Less than 15	Less than $500,000

Table 19

Liquidity And Reserves Assessment

Days' cash ratio, preliminary evaluation	Available reserves, preliminary evaluation					
	1	**2**	**3**	**4**	**5**	**6**
1	1	1	2	2	3	4
2	1	2	2	3	3	4
3	2	2	3	4	4	5
4	2	3	4	4	5	5
5	3	3	4	5	5	6
6	4	4	5	5	6	6
Examples of qualitative factors positively affecting the initial assessment include:						
The utility is a distribution- and/or collection-only system with predictable wholesale costs, reducing the level of working capital the utility needs to maintain.						
Examples of qualitative factors negatively affecting the initial assessment include:						
Liquidity is skewed by seasonality or is otherwise not indicative of actual average daily working capital levels.						
High refinancing risk over the next two-three years.						
Exposure to contingent liabilities can cap this assessment at a '5' or a '6'.						
For water, sewer, and drainage utilities, the lack of a "pass-through" component to the rate structure if the utility could face the potential of rapid volatility in operating costs, such as raw-water or commodity costs, implying the utility is using its own cash to subsidize changes in expenses.						
For solid waste systems, those that contract out one or more operational responsibilities and we believe that the systems are at risk for increases in contracts costs.						
For solid waste systems, underfunding of a post-closure care cost fund when, in our view, the cost creates a near-term financial pressure.						

Each applicable qualitative factor changes the initial assessment by one point, but the net total of all adjustments would generally improve or worsen the initial assessment by no more than two points unless an assessment cap of '5' or '6' is applicable.

78. In cases where the utility is a distribution- and/or collection-only system and off-balance-sheet obligations are predictable, the utility's working capital requirements, and therefore liquidity levels, may not need to be as high. In those cases, the liquidity and reserves assessment may be improved by one point.

79. As described in "Contingent Liquidity Risks," published March 5, 2012, contingent liabilities

correspond to explicit or implicit obligations that a utility may incur under certain circumstances. These risks could affect the utility's financial position if they materialize and if not otherwise offset by factors such as available liquidity, undrawn capacity under committed lines of credit, or market access. Furthermore, contingent liabilities might arise from a series of smaller risks that, by themselves, may not otherwise appear material, but could cascade in magnitude as proximity to the trigger or timing becomes less remote. These criteria measure both contingent liabilities as a percentage of total long-term debt, as well as available reserves that generally are legally available to mitigate some or all of the potential claims on the utility's available reserves.

80. For utilities assessed as '5' in our contingent liabilities assessment (table 20), the liquidity and reserves assessment is the lower of a one-point worsening of the initial assessment or a cap of '5'. For utilities whose contingent liabilities initial assessment results in '6', the liquidity and reserves assessment is capped at '6'. Any other result is not impactful to the liquidity and reserves assessment.

Table 20

Contingent Liabilities Assessment

Available reserves/contingent liabilities (%)	Contingent liabilities/total long-term debt (%)					
	Less than 20	20-30	30-40	40-50	50-60	More than 60
Above 250	--	--	--	--	--	--
200-250	--	--	--	--	--	--
150-200	--	--	--	--	--	--
100-150	--	--	--	--	--	5
50-100	--	--	--	--	5	6
Below 50	--	--	--	5	6	6

Assessing debt and liabilities

81. For the debt and liabilities assessment, we use debt to capitalization. In cases where the obligor uses securitization debt that meets S&P Global Ratings' criteria for enterprise securitization, see Appendix III.

82. The debt and liabilities assessment is summarized in table 21.

Table 21

Assessment Of Debt And Liabilities

Initial assessment	Debt to capitalization
1	Up to 20%
2	20%-35%
3	35%-50%
4	50%-65%
5	65%-80%
6	Greater than 80%

Table 21

Assessment Of Debt And Liabilities (cont.)

Initial assessment	Debt to capitalization
Examples of qualitative factors positively affecting the initial assessment include:	
A relatively rapid roll-off of the long-term debt, with 65% or more coming due in 10 years or less, assuming there are no bullet maturities within that schedule that would realistically need to be refinanced. Total debt is not reduced by the presence of a DSRF.	
Examples of qualitative factors negatively affecting the initial assessment include:	
For solid waste systems, underfunding of a post-closure care cost fund when, in our view, the cost creates long-term financial pressure.	
An enterprise has large, unfunded defined-benefit pension plan and OPEB obligations. Our assessment includes a forward-looking view of the funding requirements and management's plans to address such risks. We may make an adjustment if we consider these obligations sizable relative to the overall balance sheet and income statement. We believe a low pension funding ratio could signal elevated risks after incorporating the appropriateness of actuarial assumptions. Similarly, a negative adjustment is more likely to occur when pension contributions are not actuarially determined, based on weak actuarial methods, or when required contributions are not regularly funded. If the enterprise's pension and OPEB are reported as part of a larger general government, we generally assume the enterprise's funded ratio is the same, unless more specific information is available for the enterprise (that is, we may use the city's pension funded ratio when assessing a city-owned and operated system if there is not specific information available).	

Each applicable qualitative factor changes the initial assessment by one point, but the net total of all adjustments would generally improve or worsen the initial assessment by no more than two points.

Assessing financial risk management

83. S&P Global Ratings evaluates established and ongoing management practices and policies in the seven areas under control of management that are most likely to affect credit quality. The FMA, like the OMA, ranges from (1) strong; (2) good; (3) standard; or (4) vulnerable. These areas and their weights are:

- Revenue and expense assumptions (10% of total FMA),
- Budget monitoring and interim reporting (10%),
- Long-term financial planning (15%),
- Long-term capital planning and asset management (20%),
- Investment and liquidity policies (20%),
- Debt management policies (10%),
- Transparency and accountability (15%).

84. To convert the FMA to a '1' to '6' scale, see table 22.

Table 22

Financial Management Assessment (FMA) Conversion To Six-Pont Scale

Observed evaluation	FMA	Characterization
1.0-1.2	1	Strong
1.2-1.8	2	Good

Table 22

Financial Management Assessment (FMA) Conversion To Six-Pont Scale (cont.)

Observed evaluation	FMA	Characterization
1.8-2.5	3	Good
2.5-3.1	4	Standard
3.1-3.6	5	Standard
3.6-4.0	6	Vulnerable
Examples of qualitative factors negatively affecting the initial assessment include:		
Weak legal provisions when assigning issue credit ratings.		

85. The ability of a utility's management team to implement measures on a timely basis that will, in our opinion, proactively shape the utility's financial and operating condition can be crucial to maintaining creditworthiness. The assessment looks at the environment in which financial decisions affecting the utility occur. For example, we would view favorably a utility that exhibits strong risk management aspects including asset management and prioritizing operational needs that are aligned with requisite financial resources and the support of the governing body.

86. This assessment is based on a preponderance of evidence. A utility receives a neutral assessment of standard for any subfactors for which there is insufficient evidence to assign either a positive or negative assessment. However, some subfactors may receive a negative assessment if a utility has a record of failing to disclose key relevant information.

87. By focusing on a utility's policies and practices, the FMA is not an evaluation of the competency or aptitude of individual finance professionals; nor is it an evaluation of management's ability to handle unique challenges. Moreover, the nature of the utility's governing body, the effectiveness of its governance practices, and issues of public policy involved in utility-related decisions are beyond the scope of this analysis. The FMA analyzes the environment in which financial decisions are made, including how both the ordinary and extraordinary are identified and addressed as relevant to the utility's ability to fund them and to what degree those risks are transparently reviewed and reported to ensure ongoing continuity. Financial results are assumed to manifest themselves in other visible ways and are addressed elsewhere in these criteria. The purpose of the focus on policies and practices is to evaluate the potential for credit quality to move away from what the results currently indicate.

88. Transparency and accountability in reporting, regardless of governance structure, is important in order to ascertain key quantitative data. States that require annual audited financial statements increase the likelihood that financial information will be available, and late audits will be noted. The use of GAAP usually enhances reporting detail and consistency across the sector, making it easier to have a sufficiently uniform method of interpretation. States that allow cash accounting tolerate a lower degree of completeness and consistency, and transparency suffers. We believe the review of alternative financings and exposure to contingencies is a key component in understanding the entirety of all the risks and revenue requirements to which the utility is exposed.

89. We believe that creditor security can be weakened without a minimum set of covenants that constrains the utility's behavior. If we view the utility's legal provisions as sufficiently weak, the initial FMA would generally be weakened by one point. We believe that in the municipal utility sector those minimums generally include the following covenants:

- A rate covenant to maintain an annual DSCR of at least 1.0x or higher from recurring or ongoing

revenues. However, where indentures permit the utility to use cash balances to achieve rate covenants, whether the cash is in the form of a rate stabilization account or other available funds, we factor the use of such funds into the rating evaluation as specified above in Assessing All-In Coverage;

- An additional bonds test that places some limits on the amount of increased leverage that will otherwise impair the credit quality of the entity; and
- Provisions establishing remedies for when a rate covenant is violated, such as a review of the current rates.

90. In addition, when the liquidity and reserves assessment for existing rated utilities is '4' or weaker, we generally weaken the FMA by one point if there is no DSRF in an amount equivalent to at least half of the average annual debt service requirements. A DSRF typically provides immediately available supplemental liquidity in the event of pledged revenue insufficiency for the payment on the obligations then due.

- We generally would not recognize the utility as having a DSRF at all if it is only conditionally funded, such as a so-called "springing" DSRF. In such cases, this is, in our view, associated with conditions likely to occur at a time when the utility is least able to afford additional demands on its cash flow.
- A DSRF may be satisfied with an unconditional surety policy or similar arrangement with another financial counterparty. If we believe that the counterparty would be unable to provide funding for the DSRF in a stress scenario, and the counterparty could not be easily replaced on a timely basis, we typically would not recognize the utility as having a DSRF.

91. The following tables detail each of the seven financial practice areas examined by the FMA.

92. The revenue and expense assumptions assessment evaluates if the organization's financial assumptions that support the annual budget and any financial forecast are realistic and well grounded from both long-term and recent trend perspectives.

Table 23

Revenue And Expense Assumptions Assessment

Strong	Weather-normalized, formal historical trend analysis is performed and updated annually for both revenue and expenses; regular effort is made to determine whether one or more factors will cause revenues or expenses to deviate from their long-term trends over the next few years.
Good	Assumptions for most key line items in pro forma reports are analyzed and updated regularly, while others may assume simplistic changes over time such as linear or inflationary growth or flat from year to year.
Standard	Optimistic assumptions exist that, while supportable, add risk; assumptions are based on recent performance, but little evidence of questioning or validating assumptions exists.
Vulnerable	Assumptions neglect likely shortfalls, expense pressures, or other pending issues; assumptions lack prudent validation.

93. The evaluation of budget monitoring and interim reporting examines how, if at all, management reconciles year-to-date progress versus the budget adopted at the beginning of the fiscal year. This component evaluates if there are procedures for reviewing the budget based on updated information and actual-to-date performance to ensure fiscal targets and revenue requirements are met, and to what degree the interim reporting is disclosed.

Table 24

Budget Monitoring And Interim Reporting Assessment

Strong	At least quarterly budget surveillance is maintained to identify problem areas, which are publicly report to the system's governing body.
Good	Semiannual budget reviews exist; management identifies causes for variances between budget and actual performance and reports them to the system's governing body.
Standard	A deviation from the budget is only reported because it has occurred; material variances between budget and actual performance are identified after they have occurred but not captured in projections for the remainder of the fiscal period.
Vulnerable	No formal process exists for regular review and timely updating of budget during the year.

94. The long-term financial planning assessment focuses on whether or not a financial forecast exists, the length of the planning horizon, and if it includes a comprehensive identification of all reasonably likely upcoming revenue requirements to determine how the utility will meet them, such as adjusting rates or implementing cost-containment measures.

Table 25

Long-Term Financial Planning Assessment

Strong	A regularly updated pro forma financial projection exists with a planning horizon of at least three years beyond the current budget year. The forecast includes future impacts onto operating and maintenance (O&M) expenses and total financing obligations--both existing and probable--are identified. Impacts to rates or the ability to generate appropriate levels of pledged revenues through cost containment measures, for example, are clear. Planned use of designated cash reserves may occur infrequently, but structural balance is a clear goal.
Good	Pro forma projections exist and are comprehensive as described for a strong assessment, but are typically over a planning horizon of no more than the upcoming budget year plus one-two years into the future.
Standard	Multiyear projections are done but not updated until the last year of the current forecast. Multiyear projections are done, but with focus only on existing revenue requirements and exclude debt financing that is likely to be issued within the planning horizon, or ignore looming infrastructure investment needs such as growth or regulatory mandates.
Vulnerable	No long-term financial planning exists; O&M planning is done on a year-to-year (or budget-to-budget) basis. Near-term challenges are met with short-term fixes.

95. The asset management and long-term capital planning subfactor assesses if a CIP exists, the length of the planning horizon, how and why projects make the list, and a summary of the most likely funding sources for the identified projects.

Table 26

Asset Management And Long-Term Planning Assessment

Strong	Strategic and comprehensive planning focusing on the utility's infrastructure requirements, physical and other assets, and ability to continue to meet service levels is combined with likely sources of funding for identified projects; the plan and its priorities are regularly updated and transparently communicated. A characterization of strong will include planning not only the current budget year but also for at least five years beyond that.
Good	A comprehensive multiyear capital improvement program exists as described for a strong assessment but the planning horizon is less than five years.
Standard	The current-year capital expenditures are identified in the budget, but any future projects are currently nothing more than a wish list; a multiyear capital plan exists but funding sources are unclear or absent.

Table 26

Asset Management And Long-Term Planning Assessment (cont.)

Vulnerable	Capital planning is done as needs arise, but no more frequently than on a year-to-year (or budget-to-budget) basis.

96. Seasonal cash flow needs, capital requirements, unbudgeted or unanticipated items, and contingency hedges all suggest at least some level of working capital cushion to be maintained. The investments and liquidity policies assessment evaluates if management has identified preferred cash reserves by way of an adopted policy or even a target. Liquidity policies and targets must be grounded in reality; these criteria would not give credit for a liquidity policy if it is set at a level so far above current or recent financial performance that we would not view it as attainable. Furthermore, this subfactor identifies if there are locally adopted permitted investment guidelines, and if management reconciles and reports on cash and investments with any regularity.

Table 27

Investment And Liquidity Policies Assessment

Strong	The utility has embedded policies on the maintenance of minimum reserves, regardless of whether such reserves are deemed by management to be unrestricted or designated yet available for any lawful purpose; the policies are reflective of realistically attainable and sustainable levels. Permitted investments guidelines or policies exist, even if the utility's policies reflect or even mimic the state's policies. Reports on the utility's investment portfolio are prepared and reported to the utility's governing body at least quarterly.
Good	Targets for reserve levels exist by practice, are tied to meaningful levels, and are generally met or exceeded. While the utility's de facto cash management guidelines may defer to the state's permitted investment statutes, no local policy exists. The utility's management reports on its investments at least semiannually to its governing body.
Standard	Management has a target for a preferred level of cash reserves but it seems to be unrealistic given financial performance, or is so newly defined that it may be many years before such reserves are accumulated. Informal or nonpublished investment policies exist, are tracked by administrative staff but only irregularly or at the end of the fiscal year.
Vulnerable	Absence of informal reserve policies; even if they exist, they have been suspended or ignored. Weakness in cash flow adequacy has resulted in a greater appetite for risk in its investments. Investments are monitored irregularly and an external auditor deems there to be weakness or risk in cash handling and monitoring duties.

97. The debt management assessment evaluates if the utility has in place robust guidelines on the use of debt, excluding any covenant already established in its legal provisions. Examples include minimum savings thresholds for refunding bonds; stated preferences regarding final maturity, structure, and overall tenor of its debt, and the use of variable-rate debt, derivative products, floating-rate notes, or direct placement arrangements. If the debt instrument requires a financial institution counterpart, this assessment looks to any policies the utility may have regarding counterparty risk.

Table 28

Debt Management Policies Assessment

Strong	Debt policies exist and are thorough and well-defined, even if they reflect or mimic state statutes. These policies are widely communicated and followed. While management has a general tendency toward risk-aversion, robust policies and sophistication among key finance officials make it likely that debt instruments that may require heightened levels of monitoring will make surprises a remote occurrence.

Table 28

Debt Management Policies Assessment (cont.)

Good	Policies exist but may not address some key areas. In the absence of policies, management defers to state statutes that themselves are strong; some of the utility's financing obligations may be of the type that require a heightened level of monitoring, and management has some reliance on external consultants to help ensure remoteness of risks associated with those particular debt instruments.
Standard	Legal provisions and state laws are the sole guiding influences on management's use of and attitudes toward debt, or any internal guidelines are not meaningful beyond very basic or minimum debt management or are identified as unwritten goals.
Vulnerable	Absence of basic policies or clear evidence that basic policies are not being followed. Nontraditional financing options are utilized but there is no internalized knowledge, or utility management relies very heavily on consultants to monitor or manage the risk.

98. The transparency and accountability subfactor assesses whether or not management has established the independent review of important financial and operational data as well as the quality, regularity, and timeliness of its continuing disclosure practices, even for things that the utility may not be legally required to disclose. Even with annual audited financial statements produced according to GAAP, nonpublic disclosure of an alternative financing such as a direct-placement arrangement would result in an assessment of vulnerable for this subfactor.

Table 29

Transparency And Accountability Assessment

Strong	Management produces annual independently audited financial statements that comply with GAAP. Alternative financings and exposure to contingent risks are voluntarily disclosed as they are entered into, and overall continuing disclosure is deemed as robust and timely.
Good	Management produces annual independently audited financial statements that comply with GAAP. Alternative financings, exposure to contingent risks, and overall continuing disclosure are done, but generally only on an annual basis.
Standard	Management produces independently audited annual financial statements, but on a cash or other non-GAAP basis of presentation. Audits typically are released more than 180 days after fiscal year-end. The disclosure of alternative financings and contingent risk is not always timely but generally updated on an annual basis
Vulnerable	Management produces independently audited financial statements, but cash or other non-GAAP basis of presentation is permitted. Audits typically are late or not produced each year. Regardless of frequency and quality of the audited financial statements, alternative financings and contingent risk are not voluntarily disclosed or overall continuing disclosure is poor and not timely.

Adjusting the initial financial risk profile assessment

99. Table 30 outlines examples of situations where we would generally adjust the initial financial risk profile assessment. On an exceptional basis, there may be situations that haven't yet been observed that could result in an adjustment to the initial financial risk profile assessment.

Table 30

Examples Of Adjustments To The Initial Financial Risk Profile Assessment

If	Then
Total indebtedness is likely to increase substantially, but magnitude, scope, and timing are not fully defined.	Final financial risk profile assessment generally will be weakened by one point.

RATING MODIFIERS AND CAPS

100. In certain conditions, the SACP may move a specified number of notches above or below the anchor. Other conditions place a specific cap on the SACP. Examples of these are outlined in table 31 and table 32. In cases when multiple modifiers and caps exist, we would generally adjust the anchor by the net effect of those conditions. In those cases, we typically consider entity-level modifiers and caps before we consider related government modifiers and caps. However, rating caps are absolute, meaning that positive relative adjustments, other than any holistic adjustment, do not allow ratings to exceed the cap. Depending on the severity of the condition, we could assign a rating below the cap. On an exceptional basis, there may be additional situations we have not yet observed that could also result in rating modifiers or caps.

Table 31

Examples Of Modifiers That Generally Cap The SACP

Modifier/cap* that would generally:	Additional comments
Cap the SACP in the 'a' category	
Either the Operational or the Financial Management Assessment is vulnerable.	
Cap the SACP in the 'bbb' category	
Both the Operational and the Financial Management Assessments are vulnerable.	
There is a going concern opinion.	
Negative extraordinary intervention	SACP is generally capped at the lower of the 'bbb' category and the GO rating of the related government.
Cap the SACP in the 'bb' category	
Utility or its related government is recovering from a financial crisis, emerging out of a recent bankruptcy or receivership, or has significant consultant oversight following an event of default.	
Both the all-in coverage and liquidity and reserve assessments result in a ‘5’ or weaker.	SACP is generally capped in the 'bb' category although if we view liquidity as especially vulnerable, the final rating would generally be capped in the 'b' category.
Either the Operational or the Financial Management Assessment is vulnerable and the liquidity and reserve assessment is a ‘5’ or weaker.	
Cap the SACP in the 'b' category	
Both the Operational and Financial Management Assessment are vulnerable and the liquidity and reserve assessment is a ‘5’ or weaker.	
Management demonstrates a lack of willingness to support financial obligations, or we believe the utility may be considering bankruptcy or receivership filing.	SACP on any rated debt not in default generally is capped at ‘b’ category.

*Depending on the severity of the condition, we could assign a rating below the cap.

EXAMPLES OF MODIFIERS THAT GENERALLY CAP THE SACP

Weak management

101. The decentralized and autonomous nature of U.S. LRGs creates a stronger link between management and credit quality. In cases where either the operational management assessment (OMA) or the financial management assessment (FMA) is characterized as vulnerable, the SACP will generally be no higher than the 'a' category. In cases where both the OMA and FMA are characterized as vulnerable or if an auditor has delivered a going-concern opinion with the most recent review of the utility's or related government's financial position, the SACP will generally be no higher than the 'bbb' category.

Emergence from bankruptcy or receivership

102. A water/sewer utility that has just emerged from bankruptcy or receivership or a period of consultant or governmental oversight, by definition, has just been in a period where the financial risk profile--and possibly the enterprise risk profile as well--is extremely weak. Although an issuer may emerge with an improved financial risk profile after debt forgiveness or other negotiated settlements or restructuring, or under a new management team, the SACP will generally be limited to the 'bb' category until the utility has re-established a two- or three-year record of audited financial performance, at which time we would re-evaluate it using that new financial history as part of the analysis.

Negative extraordinary intervention

103. The line between what may be termed extraordinary and ongoing negative intervention is not always clear. However, examples of negative extraordinary intervention typically occur when the related government exhibits signs of financial weakness or uses various measures to divert resources from the utility. These measures affect the utility's ability to operate as a stand-alone system and may include cash stripping, increased transfers, withholding or delaying payments or appropriations, or adversely changing funding formulas, as a related government's needs rise. In such cases, the utility's SACP will generally be capped at the lower of the 'bbb' category and the GO debt rating of a related government.

Weak total liquidity combined with weak all-in coverage

104. If the utility's all-in coverage as well as liquidity and reserves assessments are both '5' or worse, we will cap the SACP in the 'bb' category, although if we view liquidity as a weakness that cannot be rectified by other available resources, the rating would generally be no higher than the 'b' category. In our view, poor assessments on both these factors imply that the utility has no margin for error in any of its operating, debt service, or capital funds in the event of an unfavorable or unplanned variance to its annual budget.

Weak management of liquidity and reserves

105. Strong management alone can lend itself to operational and fiscal continuity and can serve as a credit stabilizer. In addition, liquidity and reserves provide working capital, funding for unexpected

operational problems, and general budgetary flexibility. In contrast, as when the OMA or FMA is characterized as vulnerable and the liquidity and reserves assessment is '5' or higher, the SACP is generally capped in the 'bb' category. If both management assessments are characterized as vulnerable and the liquidity and reserves assessment is '5' or higher, the indicative and final ratings are generally capped at no higher than the 'b' category.

Weak willingness or capacity to support financial obligations

106. If the utility's or sponsoring governmental entities' representatives take actions that indicate active consideration of bankruptcy in the near term, or if there is a perceived change in the willingness or lack of capacity to honor all long-term, legally binding financial obligations in full and on a timely basis, the indicative and final ratings will generally be capped in the 'b' category. If applicable, we would apply "Criteria For Assigning 'CCC+', 'CCC', 'CCC-', And 'CC' Ratings," published Oct. 1, 2012. Such a condition might be evidenced by way of conversations with management or governance, verifiable reports in the media, public disclosure, or other informational sources we judge to be relevant. The utility's issuer ratings would be 'D' or 'SD' following a default on an actual financial obligation, or in a distressed exchange.

MODIFIERS THAT GENERALLY NOTCH FROM THE ANCHOR

Table 32

Examples Of Modifiers

Modifier/cap* that would generally:	Additional comments
Notch the anchor up	
Median household effective buying income is among the top quintile of the U.S.	SACP generally will be one notch above that suggested by table 1.
Median household effective buying income is among the top 10% of the U.S.	SACP generally will be two notches above that suggested by table 1.
Utility benefits from tax levies.	SACP may be up to four notches higher than that suggested by table 1.
All-in coverage is at or above 3x or days' cash on hand is equivalent to at least 24 months of operating expenses.	SACP generally will be one notch above that suggested by table 1.
Notch the anchor down	
Median household effective buying income is among the lowest quintile of the U.S.	SACP generally will be one notch below that suggested by table 1.
Exceptional operational risk	SACP generally will be one or more notches below that suggested by table 1.
Cap the enterprise risk profile or financial risk profile	
U.S. country risk assessment of '4', '5', or '6'	Final enterprise risk profile assessment is generally capped at '4', '5', or '6'
Total indebtedness is likely to increase substantially, but magnitude, scope, and timing are not fully defined.	Final financial risk profile assessment generally will be weakened by one point.

*Depending on the severity of the condition, we could assign a rating below the cap.

Exceptionally strong or weak income indicators

107. Extremely favorable or unfavorable demographics--measured as well above or below the strongest or weakest initial assessments, respectively--could imply extraordinary flexibility or limitation in a utility's ability to enhance its operating revenues on an ongoing basis. MHHEBI at or above the highest quintile of distribution according to the U.S. Census Bureau's and Bureau of Labor Statistics' joint "Current Population Survey" would generally result in a one-notch rating uplift from the anchor. MHHEBI at or above the top 10% of all households would receive a two-notch rating uplift. MHHEBI in the lowest quintile in the U.S. would generally lower the SACP by one notch.

Benefit from tax levies

108. The number of notches is generally determined by a combination of size and wealth of the district population to the extent that it differs from the economic fundamentals assessment, diversity of the tax base, growth rate of assessment base, significance of tax revenues to total revenues, capacity for increased tax levies (both legally and politically), and durability of the taxing authority. In general, higher notching benefits are applied to those utilities with a strong and growing tax base and where there is a willingness and ability to increase tax levies for operations.

Exceptionally strong financial risk profile

109. We use the term exceptionally strong as defined specifically to mean: all-in coverage at or above 3x or days' cash on hand is equivalent to at least 24 months of operating expenses (without giving favor to an already-existing DSRF, and calculated consistent with our definition of days' cash). In such cases, the SACP will generally be one notch higher.

Exceptional operational risk

110. Generally, the risk associated with value-added processes is captured in our analysis. Should there be, in our view, the presence of exceptional risk associated with the system's activities that is not captured fully in our credit analysis, we generally would lower the indicative rating. The amount of any downward notching would depend upon our assessment of the severity of the operational risk, but would typically be one notch, although in extraordinary cases it could be more.

APPENDIX I: GLOSSARY OF KEY TERMS

111. In our criteria, "utility" refers to a municipally owned utility or other legally authorized political subdivision that provides raw and/or potable water, sanitary sewer, solid waste systems, and/or drainage services at the retail level, or with wholesale (sales for resale) service representing not more than 49% of total operating revenues. The utility is most often, but not always, an enterprise within a larger general government, or an independent utility with its own governing board.

112. "Sewer", "sanitary sewer", and "wastewater" are used as interchangeable terms. "Drainage", "stormwater", and "storm sewer" are used as interchangeable terms.

113. The following terms are based on the definitions provided in "Methodology: Definitions And Related Analytic Practices For Covenant And Payment Provisions In U.S. Public Finance Revenue

Obligations," published on Nov. 29, 2011:

114. **Actual average monthly residential bill.** The total annual residential operating revenues plus any related fees, surcharges and taxes divided by the number of active residential metered accounts. The result is divided by 12 to arrive at the monthly bill.

115. **All-in coverage.** [(revenues – expenses – total net transfers out) + fixed costs]/(all revenue bond debt service + fixed costs + self-supporting debt service). Total net transfers from the utility fund minus transfers into the utility fund, include among other things:

- Transfers that are viewed as general fund resources, such as a payment in lieu of taxes, indirect cost reimbursements, and open-ended transfers;
- Transfers that reimburse the general fund for pension and OPEB payments the general fund made on behalf of utility employees and retirees;
- Transfers that fund pay-as-you-go capital expenditures in another governmental fund; and
- Transfers to support any other governmental operations regardless of the destination fund.

116. **Available reserves.** Unrestricted cash and equivalents plus any working capital that resides on the utility's balance sheet and is lawfully available for any purpose plus any undrawn capacity under committed lines of credit. Examples include emergency and contingency funds, rate stabilization reserves, and other cash that may be designated in purpose but not restricted for debt service, fiduciary purposes, or asset retirement obligations.

117. **Contingent liabilities.** Variable-rate demand bonds, commercial paper, bullet payments due within five years, bonds with mandatory tender dates in five years or less, direct bank debt with acceleration clauses, the potential for a wholesale provider to reallocate its costs to the utility in an unbudgeted or otherwise unpredictable manner or the obligation is not based on an availability payment structure, swap or related termination payments if the current rating is two notches or less from the termination trigger, and other identifiable contingencies.

118. **Days' cash.** A measure of cash, investments, and equivalents, calculated as follows:

- Numerator: Available reserves.
- Denominator: 1/365th of income statement operating expenses. For operating expenses, depreciation, amortization, and other noncash items, such as those that update a fair value on a derivative or pension obligation, are excluded. Transfers are included in operating expenses.

119. **Debt to capitalization.** A measure of the relative leverage of the utility, as follows:

- Numerator: The sum total of all short- and long-term debt both on the utility's balance sheet and that is allocable to the utility, including draws on credit lines, commercial paper notes and other loans, debt or material obligations, even if not rated by S&P Global Ratings.
- Denominator: The total debt as calculated in the numerator plus the utility's net position, which we view as public sector accounting's closest approximation of equity.

120. **Dependent population.** The total population of the service area that is younger than 15 years old plus the total population of the same area older than 65 years old.

121. **GAAP.** Generally accepted accounting principles are the common set of accounting principles, standards, and procedures that most governments and utilities in the U.S. follow.

122. **Nonrevenue water.** The sum total of leaks, water that is incorrectly billed (whether because of an inaccurate meter or human error), theft, unbilled, and unmetered water such as that which is used for fire protection or line flushing, and unbilled-but-metered water such as water provided to schools or churches that because of local policy is provided free of charge.

123. **Off-balance sheet.** An obligation for which the utility is legally responsible, but which may appear only in the rated utility's financial statement notes, or another entity's balance sheet, but not within the long-term debt of the rated utility itself.

124. **Other postemployment benefits.** Health care, along with dental, vision, disability, long-term care, and life insurance benefits offered to qualified retirees of the utility.

125. **Self-supporting debt.** Debt is considered self-supported if the debt issued by the related unit of government on behalf of the utility--such as a city issuing GO or priority-lien debt to fund projects for the betterment of its water system--is fully paid by practice from the utility's surplus net revenues. Full self-support means surplus net revenues must be at least as large as the principal and interest payments then-due on that tax-secured debt.

126. **Solid waste systems.** Municipal enterprises that include, generally, one or more of the following characteristics:

- Collection and transport of solid waste;
- Intermediate handling of solid waste (transfer stations, waste-to-energy systems, material recovery facilities); and
- Providing final disposal of solid waste (landfill services).

APPENDIX II: AN OVERVIEW OF IRRIGATION DISTRICTS

127. Irrigation districts are special districts that share a broad range of common features with other water districts that we rate; however, certain credit characteristics are materially different and therefore affect our evaluation of credit quality. In contrast to water utilities that primarily provide water for municipal and industrial uses, irrigation districts often have operations that are limited to the production and distribution of water supply for agricultural purposes. Customers of these districts are predominantly farms of varying size for which the cost of water supply is one input into the production of agricultural goods ranging from cotton to almonds. In this context, the service area's income levels and unemployment rates are less meaningful, and we focus more broadly on the fact that the customer base is concentrated in a single industry--agriculture--that can be susceptible to unique risks from poor weather conditions such as drought and frost, or pests, which may materially affect the ability of customers to pay their bills on time and in full.

128. Operationally, irrigation districts often provide a supplemental source of supply rather than a primary source of supply for customers. District activity typically focuses on the distribution of raw water with no treatment required because customers use the water for agricultural production rather than potable consumption. Many, although not all, farms have private groundwater wells that serve as a source of supply, and the cost of water from this source is typically calculated based on the depth to groundwater in the aquifer, the electricity cost to operate pumps to extract groundwater, and a nominal allocation of maintenance expense for the pumps. We believe that the availability of an inexpensive alternative water supply materially constrains an irrigation district's

revenue-raising flexibility, since in the short term we expect that businesses will select the lowest cost of supply, all else being equal. Also, while irrigation districts often have some of the oldest established water rights to a given surface water source, others depend on contractual rights or permanent water rights to supply from large-scale water projects--such as the U.S. Bureau of Reclamation's Central Valley Project or the California State Water Project--that may be subject to allocation methodologies that prioritize supply for municipal uses over agricultural uses due to public health concerns.

129. We have observed that limitations on sources of supply during drought periods may result in volatile DSC patterns, including periods of insufficiency, that are generally inconsistent with the vast majority of rated water utilities and we view as a material credit weakness for this portion of the sector. Furthermore, while capital needs for irrigation districts are often limited to renewal and replacement of existing infrastructure, we have observed that irrigation districts may have unexpected and sizable capital needs for the acquisition of additional water rights or development of water banking capabilities--either internal capability development or participation in an external water bank--that make it very difficult to predict future capital spending patterns.

APPENDIX III: METHODOLOGY FOR ASSESSING THE IMPACT OF SECURITIZED DEBT

130. This appendix addresses the financial adjustments we may make when the issuer's debt portfolios include securitization debt. When the securitization financing meets the elements of our securitization criteria, and there is statutory provision for a mandated recovery of the securitization costs, the securitization effectively makes all consumers responsible for principal and interest payments, and the utility is simply a pass-through entity for servicing the debt. As such, we deconsolidate securitization debt. The rating evaluation of the securitization debt is distinct from these criteria, and is addressed exclusively by our securitization criteria, "Global Methodology And Assumptions For Nonfinancial Future Flow Transactions," published Jan. 16, 2020.

131. Segregated securitized debt that securitizes a portion of an enterprise's revenue debt reduces an issuer's exposure to direct debt obligations because securitization financings create a revenue pledge that is legally separate from the revenues that fund utility operations and debt service because of a statutory authorization that mandates recovery, even when securitization and nonsecuritization charges are billed together on customers' billing statements. At the same time, even where utility financial statements consolidate securitization debt, a securitization financing does not have a claim on utility revenues that fund utility operations and unsecuritized debt service.

132. When securitization financings contain the structural features described in this paragraph, we deconsolidate segregated securitized debt from the utility's financial statements, meaning we remove securitization debt, revenues, and expenses from the utility's financial statements, and we remove the securitization-related debt service from our debt service calculations. The securitization financing must be pursuant to statutes enacted by a government entity constitutionally authorized to mandate recovery of securitization financing costs that are segregated for specialized recovery. Also, the securitization financing structure needs to exhibit protective features, including: an irrevocable, non-bypassable charge and an absolute transfer and first-priority security interest in transition property; periodic adjustments ("true-up") of the charge to remediate over- or under-collections compared with the debt service obligation to ensure collections match debt service over time and do not diverge significantly in the short run; and reserve accounts to cover any temporary shortfall in collections.

133. Specifically, S&P Global Ratings makes the following financial adjustments for segregated securitized debt:

- Adjustment to debt: We subtract the securitized debt from total debt.
- Adjustment to revenues: We reduce revenue allocated to securitized debt principal and interest. The adjustment is the sum of securitization interest and principal payments made during the year.
- Adjustment to interest expense: We remove the interest expense of the securitized debt from total interest expense.
- Adjustment to debt service: We reduce debt service by netting out the securitization debt's principal and interest payments.

134. After deconsolidating segregated securitized debt, we assign our ratings to the utility's unsecuritized debt in accordance with these criteria.

135. Utilities generally act as the servicers for segregated securitized debt and collect securitization debt service requirements for the benefit of securitization debt bondholders. Utilities aggregate these charges on customer bills together with ordinary charges covering operating expenses and unsecuritized debt service. It is our view that customers focus on the total amount of a utility bill, rather than its component parts. We believe that customers do not disaggregate securitization charges from traditional utility charges in assessing whether the utility's traditional charges are favorable or onerous following a securitization. Consequently, while we exclude securitization-related revenue collections, debt, and debt service from the analysis of a utility's financial metrics, we do not make any adjustment for securitization in our qualitative assessments of financial and rate-making flexibility. Therefore, the analysis of a utility's capacity to adjust rates, a fundamental element of the qualitative analysis of utility credit quality, takes into consideration the entire amount of the customer bill, including securitization-related charges.

CHANGES FROM PREVIOUS CRITERIA

136. The criteria fully supersede our previous criteria article, "ARCHIVE: U.S. Public Finance Waterworks, Sanitary Sewer, And Drainage Utility Systems: Rating Methodology And Assumptions," Jan. 19, 2016, by restating that criteria in full and incorporating the targeted changes described in "Request for Comment: U.S. Municipal Water and Sewer Utilities: Methodologies and Assumptions," published Dec. 14, 2021.

137. Specifically, we expanded the scope to include all entities with water and sewer operations, including tax-secured debt issuances that were previously rated under "GO Debt," Oct. 12, 2006. We also consolidated solid waste systems previously rated under "ARCHIVE: Solid Waste System Financings," Jan. 29, 2018 (now fully superseded) into the scope of the criteria by incorporating their sector-specific considerations herein. In addition to several editorial changes to aid readability, we increased clarity around the framework used to drive the SACP and ICR and applied a flexible approach to the caps and notching assessments, which better captures the relevant credit factors associated with the sector.

IMPACT ON OUTSTANDING RATINGS

138. S&P Global Ratings maintains approximately 2,100 ratings on water and sewer utilities. This includes approximately 70 water and sewer utilities previously rated under "GO Debt," Oct. 12,

2006, and approximately 50 solid waste systems previously rated under "Solid Waste System Financings," Jan. 29, 2018. Assuming that the providers maintain their current credit characteristics, testing indicates that approximately 98% of the ratings will remain unchanged; approximately 1% will be raised, generally by no more than two notches; and approximately 1% will be lowered, generally by no more than two notches.

Related Publications

Fully superseded criteria

- Solid Waste System Financings, Jan. 29, 2018
- U.S. Public Finance Waterworks, Sanitary Sewer, And Drainage Utility Systems: Rating Methodology And Assumptions, Jan. 19, 2016

Related Criteria

- Environmental, Social, And Governance Principles In Credit Ratings, Oct. 10, 2021
- Global Methodology And Assumptions For Nonfinancial Future Flow Transactions, Jan. 16, 2020
- Issue Credit Ratings Linked To U.S. Public Finance Obligors' Creditworthiness, Nov. 20, 2019
- USPF Criteria: Assigning Issue Credit Ratings Of Operating Entities, May 20, 2015
- General Criteria: Rating Government-Related Entities: Methodology And Assumptions, March 25, 2015
- Methodology: Master Limited Partnerships And General Partnerships, Sept. 22, 2014
- General Criteria: Methodology: Industry Risk, Nov. 19, 2013
- Corporate Methodology, Nov. 19, 2013
- Country Risk Assessment Methodology And Assumptions, Nov. 19, 2013
- Key Credit Factors For The Regulated Utilities Industry, Nov. 19, 2013
- Ratings Above The Sovereign: Corporate And Government Ratings—Methodology And Assumptions, Nov. 19, 2013
- Criteria For Assigning 'CCC+', 'CCC', 'CCC-', And 'CC' Ratings, Oct. 1, 2012
- Contingent Liquidity Risks In U.S. Public Finance Instruments: Methodology And Assumptions, March 5, 2012
- Methodology: Definitions And Related Analytic Practices For Covenant And Payment Provisions In U.S. Public Finance Revenue Obligations, Nov. 29, 2011
- Methodology: Rating Approach To Obligations With Multiple Revenue Streams, Nov. 29, 2011
- Principles Of Credit Ratings, Feb. 16, 2011
- Stand-Alone Credit Profiles: One Component Of A Rating, Oct. 1, 2010
- Wholesale Utilities, May 24, 2005

Related Research

- Credit FAQ: All-In Coverage, Transfer Payments, And Credit Quality, Jan. 19, 2016
- Credit FAQ: An Overview Of Standard & Poor's Updated Methodology For Rating U.S. Public Finance Waterworks, Sanitary Sewer, And Drainage Utility Systems, Jan. 19, 2016
- Management Is Key For U.S. Water Utilities To Align Operations And Finances, Jan. 19, 2016
- The Broad And Diverse Economy Adjustment: 2015 Updated Scores For U.S. Metropolitan Statistical Areas Based On Local Government GO Criteria, Dec. 15, 2015
- Alternative Financing: Disclosure Is Critical To Credit Analysis In Public Finance, Feb. 18, 2014
- Credit FAQ: U.S. Public Finance Ratings And Criteria For Ratings Above The Sovereign, Dec. 19, 2013

This report does not constitute a rating action.

This article is a Criteria article. Criteria are the published analytic framework for determining Credit Ratings. Criteria include fundamental factors, analytical principles, methodologies, and /or key assumptions that we use in the ratings process to produce our Credit Ratings. Criteria, like our Credit Ratings, are forward-looking in nature. Criteria are intended to help users of our Credit Ratings understand how S&P Global Ratings analysts generally approach the analysis of Issuers or Issues in a given sector. Criteria include those material methodological elements identified by S&P Global Ratings as being relevant to credit analysis. However, S&P Global Ratings recognizes that there are many unique factors / facts and circumstances that may potentially apply to the analysis of a given Issuer or Issue. Accordingly, S&P Global Ratings Criteria is not designed to provide an exhaustive list of all factors applied in our rating analyses. Analysts exercise analytic judgement in the application of Criteria through the Rating Committee process to arrive at rating determinations.

MOODY'S INVESTORS SERVICE

RATING METHODOLOGY

7 March 2024

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Rating Methodology

US Municipal Utility Revenue Debt

This rating methodology replaces the *US Municipal Utility Revenue Debt Methodology* published in April 2022. We have revised the title and reformatted the text, exhibits and footnote presentation to align with a new publishing platform. These revisions do not change our methodological approach.

Introduction

In this rating methodology, we explain our general approach to assessing credit risk of essential service US municipal utility revenue bonds, including the qualitative and quantitative factors that are likely to affect rating outcomes in this sector.

The primary factors that drive our credit analysis of revenue bonds issued by municipal utilities that provide essential services are the size and health of the system and its service area, the financial strength of its operations, the legal provisions governing its management, and the strength of its rate management and regulatory compliance.

We discuss the scorecard used for this sector. The scorecard[1] is a relatively simple reference tool that can be used in most cases to approximate credit profiles in this sector and to explain, in summary form, many of the factors that are generally most important in assigning issuer-level ratings to issuers in this sector. The scorecard factors may be evaluated using historical or forward-looking data or both.

We also discuss other considerations, which are factors that are assessed outside the scorecard, usually because the factor's credit importance varies widely among the issuers in the sector or because the factor may be important only under certain circumstances or for a subset of issuers. In addition, some of the methodological considerations described in one or more cross-sector rating methodologies may be relevant to ratings in this sector.[2] Furthermore, since ratings are forward-looking, we often incorporate directional views of risks and mitigants in a qualitative way.

As a result, the scorecard-indicated outcome is not expected to match the actual rating for each issuer.

Our presentation of this rating methodology proceeds with (i) the scope of this methodology; (ii) the sector overview; (iii) the scorecard framework; (iv) a discussion of the scorecard factors; and (v) other considerations not reflected in the scorecard. The appendix shows the full view of the scorecard factors, sub-factors, weights and thresholds.

Scope

This methodology is used to assign ratings to debt instruments where the primary pledge and source of repayment are revenues generated by US municipal utilities providing monopolistic services essential to public health and functional economies. The approach described in this methodology applies to six basic categories of US municipal utilities: water distribution, gas distribution,[3] electric distribution,[4] sanitary sewerage, stormwater disposal, and solid waste disposal.

This methodology does not apply to debt issued by regulated water utilities, regulated electric and gas utilities and networks, electric generation and transmission cooperatives, power generation projects; nor does it apply to other types of public utilities, such as telephone, cable television, or parking. This methodology also does not apply to utility revenue debt whose rating is based on a general promise of a state or local government to pay the debt (e.g., a general obligation pledge or a full faith and credit pledge).[5]

Sector Overview

The pledge and source of repayment for a municipal utility revenue bond is typically defined in a bond resolution or a trust indenture, which acts as a contract between the utility and its bondholders. The resolution or indenture most often includes a lien on the net revenues of the utility system after the payment of regular operating and maintenance expenses.

US municipal utilities provide many different services whose rates or fees are pledged to the repayment of debt. The utilities mostly fall into one or more of six basic categories:

» **Water utilities** take water from the ground, a river, a lake, or in special cases the ocean, treat it to a potable standard, and distribute it to customers for drinking, cleaning, and commercial, industrial, or agricultural use. These utilities can be involved in any or all of the functions of water supply: water treatment, long-distance transmission and retail water distribution. Some water utilities have no treatment capacity and purchase potable water wholesale.

» **Gas utilities** take natural gas from a wholesale pipeline, odorize it for safety detection and pressurize it for delivery to customers through a pipe network for uses such as heating, cooking or commercial and industrial applications.

» **Electric utilities** purchase electricity from wholesale suppliers and deliver it to residential, commercial and industrial customers for a wide range of power uses.

» **Sanitary sewer** utilities collect and treat wastewater, discharging it into a waterway or injecting it underground, and landfilling or incinerating the residual sludge. Some sewer utilities with no treatment capacity gather wastewater and transmit it to another utility that treats it.

» **Stormwater** utilities collect and treat rainwater before discharging it into a body of water such as an ocean or a river. While every city or county addresses stormwater drainage as an integral element of its streets and highways, the stormwater systems that require capital markets financing are typically large in scale and are necessary to avert flooding from heavy seasonal rainfall.

» **Solid waste** utilities collect residential or commercial refuse and dispose of it through landfills, waste-to-energy plants, or other waste-disposal processes. A solid waste system can be complete or collection-only, relying on another municipal or private entity for long-haul removal and disposal through landfill or incineration.

Essential-service utilities typically operate as departments, boards or independent authorities of US states or local governments.

States and subdivisions of states, such as counties and cities, often issue bonds where the primary pledge and source of repayment are the net revenues generated by a utility system operated directly under government auspices, such as a city water department. In other cases, states or state subdivisions create an independent authority or special purpose district that operates the system and issues the bonds.

The credit quality of essential-service utility revenue bonds has generally been strong, based on the fundamental strength of utilities, which include the following characteristics:

» The provision of essential services, usually in a government-protected monopoly;

» Typically unregulated and independent rate-setting authority;

» The ability to discontinue service to delinquent accounts and in many cases to put a lien on the property for nonpayment;

» Utility cost burdens that are typically low relative to household income and to tax burdens;

» A generally strong federal and state regulatory framework that is designed to keep utilities functioning in order to protect public health and achieve environmental goals;

» A "special revenue" designation that may insulate a utility from a parent's bankruptcy.

Scorecard Framework

The scorecard in this rating methodology is composed of four factors. All of the sub-factors comprise a number of sub-factors. The scorecard also includes 20 notching factors, also known as below-the-line adjustments, which may result in upward or downward adjustments in half-notch or whole notch increments to the preliminary scorecard-indicated outcome.

Exhibit 1

US Municipal Utility Revenue Debt Scorecard Overview

Factor	Factor Weighting	Sub-factor	Sub-factor Weighting
System Characteristics	30%	Asset Condition (Remaining Useful Life)	10%
		System Size (O&M)	7.5%
		Service Area Wealth (Median Family Income)	12.5%
Financial Strength	40%	Annual Debt Service Coverage	15%
		Days Cash on Hand	15%
		Debt to Operating Revenues	10%
Management	20%	Rate Management	10%
		Regulatory Compliance and Capital Planning	10%
Legal Provisions	10%	Rate Covenant	5%
		Debt Service Reserve Requirement	5%
Total	100%	Total	100%

Source: Moody's Investors Service

The scorecard does not include or address every factor that a rating committee may consider in assigning ratings in this sector. We may use the scorecard over various historical or forward-looking time periods. Furthermore, in our ratings we often incorporate directional views of risks and mitigants in a qualitative way. Please see the "Other Considerations" section.

Discussion of the Scorecard Factors

In this section, we explain our general approach for scoring each scorecard factor or sub-factor, and we describe why they are meaningful as credit indicators.

To arrive at a scorecard-indicated outcome, we begin by assigning a score for each weighted sub-factor. Based on the scores and weights for each sub-factor, a preliminary scorecard-indicated outcome before notching factors is produced.

We also assess the notching factors. Our assessment of these notching factors may result in upward or downward adjustments to the preliminary outcome that results from the weighted scorecard factors. The most common notching factors related to each of

the weighted scorecard factors are discussed below. In some circumstances, there may be notching for a credit event or trend that is not captured by the weighted scorecard sub-factors or the listed notching factors. We may also choose to make adjustments to the historical inputs to reflect our forward-looking views of how these statistics may change.

Below, we discuss each factor and subfactor, as well as the notching factors that we consider within each category of this methodology.

Factor: System Characteristics (30%)

Exhibit 2

System Characteristics (30%)		Aaa	Aa	A	Baa	Ba	B and Below
Asset Condition (10%)	Net Fixed Assets/Annual Depreciation :	> 75 years	75 years ≥ n > 25 years	25 years ≥ n > 12 years	12 years ≥ n > 9 years	9 Years ≥ n > 6 Years	≤ 6 Years
System Size (7.5%)	Water and/or sewer / Solid Waste:	O&M > $65M	$65M ≥ O&M > $30M	$30M ≥ O&M > $10M	$10M ≥ O&M > $3M	$3M ≥ O&M > $1M	O&M ≤ $1M
	Stormwater:	O&M > $30M	$30M ≥ O&M > $15M	$15M ≥ O&M > $8M	$8M ≥ O&M > $2M	$2M ≥ O&M > $750K	O&M ≤ $750K
	Gas or Electric:	O&M > $100M	$100M ≥ O&M > $50M	$50M ≥ O&M > $20M	$20M ≥ O&M > $8M	$8M ≥ O&M > $3M	O&M ≤ $3M
Service Area Wealth (12.5%)		> 150% of US median	150% ≥ US median > 90%	90% ≥ US median > 75%	75% ≥ US median > 50%	50% ≥ US median > 40%	≤ 40% of US median

Source: Moody's Investors Service

Why It Matters

This factor on the scorecard assesses a utility's capacity to fund its operations and capital needs based on the health of its capital assets, the size and diversity of its operations, and the strength and resources of its service base.

The scope of this factor is broad. Each of the sub-factors contributes to an analysis of what magnitude of expenditures is necessary to keep the system functioning, and how large, diverse, and flexible the available resources are to meet those expenditures.

Sub-factor: Asset Condition (10%)

Input: Net fixed assets divided by most recent year's depreciation, expressed in years

The condition of a utility's capital assets determines its ability to comply with environmental regulations and continue delivering adequate service with existing resources.

Depreciation is an accounting concept that acts as a proxy for the rate at which a utility's plant and equipment are aging. Central to our analysis of capital adequacy is an assessment of how utilities "fund depreciation," meaning make capital replacements and repairs to address aging plant and equipment.

The consequences of failing to fund depreciation can be costly. Implicit in this measure is the concept of deferred capital investment. Utilities that delay investing in their systems, replacing aging plant and equipment, and modernizing their facilities often find it more expensive to do so later. Capital investments are ordinarily more expensive when deferred.

Further, systems whose facilities deteriorate often run afoul of environmental regulations. The failure to fund depreciation, which will manifest as a declining useful remaining life, can lead to sewage overflows, inflow and infiltration problems, or non-compliant wastewater discharges, resulting in civil fines, litigation, or regulatory consent decrees. These are usually more expensive than funding depreciation through a prudent multi-year capital plan that replaces assets as they deteriorate or break down.

The inherent differences between types of utilities are manifested in their component parts, which can have very different useful lives. Because a solid waste utility is largely automotive-based, with collection vehicles and earth-moving equipment at the landfill, the useful life of its assets will be well under 20 years, compared to a water utility whose distribution mains and reservoir have useful lives of 40 to 100 years. We generally acknowledge these differences, which may be reflected in our scoring of notching factors.

For utilities whose asset condition ratios are not determinable, such as utilities that utilize cash accounting and do not report net fixed assets or depreciation, we are likely to assess the sufficiency of capital assets based on other available information.

Sub-factor: Service Area Wealth (12.5%)

Input: Median family income of the service area, expressed as a percentage of the US median

Most of the costs of operating a utility and maintaining its capital assets are borne by ratepayers. The income of the residents of the service base conveys the capacity of its rate-payers to bear higher rates to fund operations and capital upgrades.

Utilities that serve lower-income ratepayers may have more difficulty implementing higher rates, if utility costs consume a considerable share of residents' budgets. The US Environmental Protection Agency (EPA) considers wastewater costs exceeding 2% of median household income to be a heavy burden, for example, a threshold that would be reached more quickly for a utility serving lower-income ratepayers.

We believe MFI is the best proxy for the wealth of a service base, but other indicators such as the poverty rate, unemployment, home foreclosures, per capita income, and median home value supplement our analysis of ratepayer capacity.

Sub-factor: System Size (7.5%)

Input: Most recent year operations and maintenance expenditures, expressed in dollars

Larger systems tend to be more diverse and enjoy economies of scale. The size of a system implies the flexibility and resilience not only of its operations, but also of its service base.

Small systems present a number of risks. They are less likely to have redundancies, which allow a system to shut down some of its operations in an emergency or to make repairs without interrupting service. Small standalone water or sewer systems will typically depend upon a single supply of water or a single sewage treatment plant. They are more likely to be exposed to a concentrated customer base. They are more susceptible to the departure of a single large customer. An unexpected capital need is likely to be more costly relative to its annual budget. The collective engineering and scientific expertise is likely to be less robust than a larger system's.

We use different breakpoints for different types of systems in this subfactor, recognizing that not all types of utilities have the same cost structure. For instance, an electric distribution system is more expensive to run than a stormwater system. A distribution-only water system is likely to have a lower, more predictable cost base, but also depend on an external system for water supply and pay prices largely out of its control.

Utilities that are wholesalers to municipal government customers may exhibit operating stability not captured by size or service area wealth. Many of a utility's risks may be shifted to its municipal customers if their service contracts prevent these customers from switching providers or decreasing payments. If service contracts are so strongly worded and unconditional that municipal customers would have to pay the utility's debt service under any circumstances, then the utility's bonds may effectively represent a claim on the combined credit quality of the municipal governments.

For utilities that are exclusively wholesalers to municipal customers, we typically consider the credit quality of large customers ("participants") and the nature of the participants' pledge to the utility. For bonds secured by a utility's net revenue pledge, we incorporate the strength of the large municipal customers' credit quality as an important factor in the utility's revenue base. For utilities whose pledges are essentially a pass-through of the municipal customers' underlying pledges, we may rate their bonds using our public sector pool programs and financings methodology, recognizing that bondholders enjoy a direct claim on the underlying municipalities' ability and willingness to pay.[6]

Notching Factors Related to System Characteristics

Additional service area economic strength or diversity: We would use this adjustment, upward or downward, if the MFI statistic incompletely or inaccurately depicts that capacity of the service base to bear higher rates.

Significant customer concentration: A large exposure to a single user or industry, or a small number of users, poses substantial risks that might not be captured in MFI. We may notch down if a large share of a utility's revenues comes from one or a small number of customers, or from a single industry. We would be more likely to use this adjustment for volatile, unpredictable, and mobile industries than for longer-standing, more stable ones. We are less likely to consider a wholesale customer as a factor contributing to concentration, as it is purchasing on behalf of end-users.

Revenue per customer greatly over/under regional average: Revenue per customer conveys additional information about users' capacity for higher rates that might not be captured in MFI. We might notch upward or downward if revenue per customer implies higher or lower ability to increase rates than MFI suggests.

Exposure to weather volatility, extreme conditions or market fluctuations: Large amounts of rain that infiltrate pipes or storms that destroy equipment are examples of credit risks that could result in downward notching. Weather can also affect the prices that distribution systems pay third-party providers for electricity or natural gas.

Resource vulnerability: Water, gas, and electric distribution utilities sell a product whose availability can be limited or expensive in some cases. For instance, a water provider in a drought-stricken region may have to purchase expensive third-party water, resulting in declines in billable flow due to conservation efforts. We may notch down if the availability of water, an adequate gas supply, or a dependable source of electricity is vulnerable or in doubt.

Sizeable or insufficient capacity margin: Our useful remaining life calculation is designed to assess the quality of existing capital assets, but it does not measure the adequacy of a system's capacity relative to demand. Areas that are growing need more water, gas, and electricity, and place greater demands on wastewater and trash disposal utilities. Systems that are close to capacity may face greater capital costs to expand in the future, suggesting larger debt burdens and posing additional risks that may result in downward notching. Alternately, systems with ample capacity may be notched up, given the lack of capital spending requirements implied by the excess capacity. Further, excess capacity can sometimes imply a revenue-generating opportunity, since utilities can often sell their product or service to other parties. We are less likely to view excess capacity as a positive if it is caused by a declining user base.

Unusual depreciation practices relative to industry norms: Utilities typically have some flexibility to determine the depreciation schedules of their assets. Utilizing unreasonably long useful lives or employing other practices that distort depreciation schedules would also distort our remaining useful life calculation. We may notch down if an unreasonable depreciation schedule is inflating a utility's remaining useful life. Likewise, we may notch up if an unusually rapid depreciation schedule understates remaining useful life.

Factor: Financial Strength (40%)

Exhibit 3

Financial Strength (40%)	Aaa	Aa	A	Baa	Ba	B and Below
Annual Debt Service Coverage (15%)	> 2.00x	2.00x ≥ n > 1.70x	1.70x ≥ n > 1.25x	1.25x ≥ n > 1.00x	1.00x ≥ n > 0.70x	≤ 0.70x
Days Cash on Hand (15%)	> 250 Days	250 Days ≥ n > 150 Days	150 Days ≥ n > 35 Days	35 Days ≥ n > 15 Days	15 Days ≥ n > 7 Days	≤ 7 Days
Debt to Operating Revenues (10%)	< 2.00x	2.00x < n ≤ 4.00x	4.00x < n ≤ 7.00x	7.00x < n ≤ 8.00x	8.00x < n ≤ 9.00x	≥ 9.00x

Source: Moody's Investors Service

Why It Matters

The financial health of a utility determines its flexibility to respond to contingencies, resilience against potential short-term shocks, and cushion against a long-term unfavorable trend.

We measure or estimate utilities' financial health by looking at cash and other liquid reserves, the burden that debt places on operations, and the magnitude by which revenues are sufficient to meet expenditures.

Sub-factor: Annual Debt Service Coverage (15%)

Input: Most recent year's net revenues divided by most recent year's debt service, expressed as a multiple

Debt service coverage is a core statistic assessing the financial health of a utility revenue system. The magnitude by which net revenues are sufficient to cover debt service shows a utility's margin to tolerate business risks or declines in demand while still assuring repayment of debt. Higher coverage levels indicate greater flexibility to withstand volatile revenues, unexpected outflows, or customer resistance to higher rates.

Utilities usually enter into a rate covenant under which they pledge to achieve a given level of debt service coverage each year. The covenant helps ensure that the utility utilizes its assets to generate sufficient income to pay bondholders.

The analysis of a utility system's debt service coverage demands ample context. If debt service escalates in future years, then the utility's current net revenues may be sufficient to cover debt service this year, but not in the future. Systems with greater revenue stability can operate comfortably at lower coverage levels. Systems with greater capital needs are likely to incur more debt, which will lead to increased debt service and decreased coverage. The debt service coverage calculation is the basis for a comprehensive analysis of a utility's financial flexibility and trend over the long term.

Rate covenants define a calculation method. These calculation methods vary, for example in the inclusion or exclusion of connection fees. Our coverage calculation will frequently differ from the coverage utilities report for purposes of complying with their rate covenants. Frequently, our analysis will consider several types of coverage, including maximum annual debt service (MADS) coverage, annual debt service coverage, coverage with and without connection fees, and coverage as calculated for the rate covenant. For entry on the scorecard, we include connection fees (when pledged) in revenues, recognizing that these are pledged revenues that are usually generated annually and are an important source of funding for expansion. If connection fees are particularly volatile, or if they represent an inordinate share of revenues, we may adjust below the line.

Sub-factor: Days Cash on Hand (15%)

Input: Unrestricted cash and liquid investments times 365 divided by operating and maintenance expenses, expressed in days

Cash is the paramount resource utilities have to meet expenses, cope with emergencies, and navigate business interruptions. Utilities with a lot of cash and cash equivalents are able to survive temporary disruptions and cash flow shortfalls without missing important payments. A large cash balance can also partially compensate for the lack of a debt service reserve fund. A low cash balance indicates poor flexibility to manage contingencies.

We include in this measure any cash or cash-equivalent that is both unrestricted and liquid. The measure does not include cash held in a debt service reserve fund, unspent bond proceeds, or cash that is restricted for capital.

Sub-factor: Debt to Operating Revenues (10%)

Input: Net debt divided by most recent year's operating revenues, expressed as a multiple

A utility's debt profile determines its leverage and fixed costs. Systems that carry a lot of debt have less ability to reduce costs if demand shrinks, and are generally more challenged to achieve higher debt service coverage.

A greater debt burden may also prohibit a utility from funding necessary capital upgrades, if a covenant prevents the issuer from incurring the debt necessary to fund those upgrades.

"Net debt" is a utility's long-term debt minus its debt service reserve funds.

Notching Factors Related to Financial Strength

Debt service coverage (annual or MADS) below key thresholds: A debt service coverage ratio below 1 times is an important threshold, because coverage below 1 times indicates the utility is not fully covering debt service with income generated from operations. If a utility fails to achieve 1 times coverage, we may notch down to reflect the financial imbalance of the utility's operations. Another key threshold that would likely prompt us to notch down is if coverage were to fall below the utility's coverage covenant, even if that

covenant is higher than 1 times. Management's willingness and ability to operate the system for bondholders' benefit is a crucial credit consideration, and a breach of covenant calls that willingness and ability into question. A coverage level that impedes the issuance of additional bonds under the utility's additional bonds covenant could also prompt us to notch score down, if we think it would prevent the utility from funding necessary capital upgrades.

Constrained liquidity position due to oversized transfers: It is common for utilities to transfer cash to their general governments regularly, either to share overhead costs, make payments in lieu of taxes for occupied property, or to help fund shared infrastructure. It is also common for parent governments to tap utilities' cash to fund General Fund operations. We may notch down if these types of transfers are large and begin to strain its own liquidity. We are more likely to make this adjustment if the general government is operationally reliant on utility transfers and has the authority to increase them, particularly if the general government is struggling financially. Even if a utility has never transferred cash to its parent, such transfers remain a possibility,[7] one of the reasons for the relationship between a revenue rating and the GO rating of its general government.

Outsized capital needs: A utility with significant capital needs will likely need to incur additional debt not communicated in the existing debt metric. We may notch downward for utilities under regulatory consent decree, or otherwise with great capital needs, that are likely to increase their debt levels.

Oversized adjusted net pension liability relative to debt, or significant actuarial required contribution underpayment: Employees of public utilities are usually members of a municipal pension plan. Most utilities either sponsor their own plan or participate in another entity's plan and are responsible for funding their share of the plan's pension liabilities. We may notch down if this liability is especially large, or if the utility has underfunded its contributions.[8]

Significant exposure to puttable debt and/or swaps, or other unusual debt structure: The risks of a debt portfolio can be magnified if it is significantly composed of puttable debt. Utilities generally set rates with the intention of covering operating expenses and debt service in the current year. A debt put, accelerated amortization under a term-out, or other unexpected calls on a utility's resources can impose immediate and substantial, unbudgeted cash outflows and upend that intention. We may notch down, potentially by several notches, if the composition of a debt portfolio, or cash-flow demands or unfavorable valuation of a swap, indicates a greater degree of risk than the scorecard debt metric.

Factor: Management (20%)

Exhibit 4

Management (20%)	Aaa	Aa	A	Baa	Ba	B and Below
Rate Management (10%)	Excellent rate-setting record; no material political, practical, or regulatory limits on rate increases	Strong rate-setting record; little political, practical, or regulatory limits on rate increases	Average rate-setting record; some political, practical, or regulatory limits on rate increases	Adequate rate-setting record; political, practical, or regulatory impediments place material limits on rate increases	Below average rate-setting record; political, practical, or regulatory impediments place substantial limits on rate increases	Record of insufficiently adjusting rates; political, practical, or regulatory obstacles prevent implementation of necessary rate increases
Regulatory Compliance and Capital planning (10%)	Fully compliant OR proactively addressing compliance issues; Maintains sophisticated and manageable Capital Improvement Plan that addresses more than a 10-year period	Actively addressing minor compliance issues; Maintains comprehensive and manageable 10-year Capital Improvement Plan	Moderate violations with adopted plan to address issues; Maintains manageable 5-year Capital Improvement Plan	Significant compliance violations with limited solutions adopted; Maintains single year Capital Improvement Plan	Not fully addressing compliance issues; Limited or weak capital planning	Not addressing compliance issues; No capital planning

Source: Moody's Investors Service

Why It Matters

While the legal provisions of the indenture or other bond documents may establish the minimum level of financial margin at which a utility must be run, the utility's management determines the actual level at which it is run.

Utility management refers to the dynamics of setting rates, planning for capital spending, budgeting for annual expenditures, and complying with environmental regulations. All of these factors interplay with one another to determine the credit strength of a utility system.

The scorecard captures two crucial aspects of management: rate-setting and capital planning. These two aspects encompass most of what is important in running a utility: keeping the system in good working order, and paying for it.

Sub-factor: Rate Management (10%)

User rates are the primary, and sometimes only, mechanism utilities employ to pay for their operations.

Ideally, rates increase marginally and steadily, rather than choppily. It is common for utilities to split their rates into a "base" charge (flat rate charged to all users) plus a "volumetric" charge (per unit costs based on flow/usage). Utilities funded to a greater extent by the volumetric charge face greater risks, since volume can be economically sensitive or decline because of a shift in consumption patterns.

Management's track record at setting rates appropriately and increasing them when necessary drives this score. We tend to give higher scores to utilities that set rate structures under which increases are automatic, and do not require annual approval for implementation.

Embedded into this factor is the length of time required to implement a rate increase. Many public utilities enjoy the authority to set their own rates and can enact a rate increase in short order by majority vote of the governing board. Some utilities must give the public a few weeks' or months' notice before increasing rates, or choose to do so by policy or practice. Some utilities require state approval to increase rates. Utilities that need state approval often have to file a rate case subject to public objection, and in some cases the state takes a long time to approve them or denies the full rate increase.

The longer it takes a utility to implement a rate increase, the less flexibility it has to quickly generate new revenues when faced with cash flow shortfalls.

Sub-factor: Regulatory Compliance and Capital Planning (10%)

The public utility sector is heavily regulated. Most public utilities are regulated by federal as well as state agencies.

The EPA enforces the Safe Drinking Water Act for water distribution utilities, the Clean Water Act for sanitary sewer and stormwater utilities, the Resource Conservation and Recovery Act for solid waste disposal systems, and the Clean Air Act for electric utilities. These statutes, and the methods employed to enforce them, are continually evolving, often intensifying over time. Additionally, many states have passed their own environmental regulations and are active enforcers.

This scorecard factor assesses utilities' compliance with relevant regulations and their plans for the capital expenditures required to comply in the future.

In addition to achieving environmental compliance, proper capital planning ensures the continued delivery of the product or service and the ongoing generation of revenues.

In our assessment, we look for indications of potential compliance gaps, such as environmental litigation, a delay in renewing a permit, or a consent decree with a state or federal enforcement body.

Notching Factors Related to Management

Unusually strong or weak capital planning: Continued violations of environmental laws and the associated litigation can impose extraordinary costs on utilities. We may notch down if these costs threaten to overwhelm a system's resources, in the form of a large consent decree, lawsuit, or other costs. Alternately, we may notch up if a utility's capital planning is particularly sophisticated or forward-looking. More sophisticated and forward-looking capital management is more important for systems facing resource vulnerability or extreme weather volatility.

Factor: Legal Provisions (10%)

Exhibit 5

Legal Provisions (10%)	Aaa	Aa	A	Baa	Ba	B and Below
Rate Covenant (5%)	> 1.30x	1.30x ≥ n > 1.20x	1.20x ≥ n > 1.10x	1.10x ≥ n > 1.00x	≤ 1.00x	
Debt Service Reserve Requirement (5%)	DSRF funded at MADS	DSRF funded at lesser of standard 3-prong test	DSRF funded at less than 3-prong test OR springing DSRF	NO explicit DSRF; OR funded with speculative grade surety		

Source: Moody's Investors Service

Why It Matters

The legal provisions of a public utility revenue bond form the backbone of its security.

When a municipality assigns its General Obligation pledge to a bond, it has promised to use any revenues or resources at its disposal to pay debt service.

A utility revenue bond enjoys no such open-ended pledge, making the legal edifice of the bond critical to bondholder security. Most commonly, the pledge for municipal utility revenue bonds is a lien on the net revenues of the system. Occasionally, bondholders

enjoy a lien on the gross revenues of a system. We ordinarily do not consider a gross revenue pledge as materially stronger than a net revenue pledge, because systems need to pay operating and maintenance costs in order to remain functional.

The linchpin of a bond's legal structure is its covenants: the contractual compulsions the municipal utility agrees to when issuing the bonds.

Utilities abide by many different types of covenants. We consider three to be the most important: the rate covenant, the additional bonds test, and the debt service reserve fund. Also crucial in the analysis of a revenue bond's legal structure is whether the flow of funds is open-loop (accessible by another government entity) or closed-loop.

Strong covenants bind the utility to utilize its assets to benefit bondholders by operating with a comfortable financial margin, not taking on too much debt, and maintaining adequate cash available to pay debt service. Weak or nonexistent covenants allow the utility to operate on a thin margin or even at a net loss, incur a lot of leverage, transfer its money to other government entities, or maintain inadequate cash, in ways that are detrimental to bondholders.

Covenants specify the minimum factors management must contractually abide by. Utilities frequently exceed the minimum. Many of our ratings represent the expectation of performance at levels that exceed the covenants.

Sub-factor: Rate Covenant (5%)

Input: Covenant governing net revenues (operating revenues minus operating expenditures net of depreciation) divided by annual debt service, expressed as a multiple

The rate covenant is a pledge to set rates such that net revenues will be sufficient to cover debt service at a prescribed level. For example, a covenant may bind a utility to ensure that net revenues cover debt service by 1.2 times. If net revenues fall short of this covenant in one year, the utility must raise rates to achieve a compliant coverage level the following year.

The rate covenant takes many forms. Some utilities pledge for net revenues to cover current year annual debt service by a given level. Others pledge to cover average annual debt service throughout the life of the bonds at that level. A strong coverage requirement would be for net revenues to cover maximum annual debt service (MADS) by a certain level.

Some rate covenant formats are materially weaker than this. Some utilities allow a "rolling" calculation, which includes outstanding cash from prior years' surpluses as part of the resources available to cover debt service. Many rate covenants allow connection fees to be included in available operating revenues.

The rate covenant coverage thresholds are based on a covenant that is an annual debt service coverage calculation. Using the notching factors described below, we may adjust, upward or downward, for any departures from this format.

Sub-factor: Debt Service Reserve Requirement (5%)

Input: Debt service reserve requirement

Many issuers agree to hold a specified amount of cash or other resources in a debt service reserve fund (DSRF), which the trustee can tap to pay debt service in the event that net revenues are inadequate. The DSRF covenant ordinarily requires the utility to replenish any draws from the DSRF.

The DSRF protects bondholders by assuring the payment of debt service even if net revenues fall short in one year.

DSRF funds can be funded with cash, or with surety policies from an insurer. We generally consider cash to be superior to a surety, although this is unlikely to materially affect the assigned rating as long as the surety provider is rated investment grade.

One commonly used DSRF requirement is known as the "three-pronged test." Under tax law, the Internal Revenue Service limits the earning of interest on proceeds of a tax-exempt bond unless the invested proceeds comply with the three-pronged test. Under that test, the DSRF must be the lesser of 10% of principal, MADS, or 1.25 times average annual debt service. A DSRF set at the three-pronged test is usually weaker than one funded at MADS.

Revenue bonds have been issued without a DSRF in the past. This has resulted in a number of utilities with some bonds secured by a DSRF and other parity bonds secured by the same lien but no DSRF. We have rarely distinguished ratings between these parity bonds.

The DSRF is a last-resort security measure, and most utilities comply with their coverage covenants and never have to tap their DSRF. We are most likely to distinguish between DSRF-secured bonds and bonds with no DSRF if the system holds narrow liquidity. A system operating with abundant liquidity can use its operating cash to meet debt service shortfalls, effectively executing a similar function to the DSRF. The combination of narrow liquidity and no DSRF exposes bondholders to greater risks of interrupted debt service payments and is therefore more likely to be reflected in ratings.

For a utility whose debt is mostly, but not all, secured by a DSRF, we will still enter the DSRF requirement into the scorecard. For a utility whose debt is mostly not secured by a DSRF, we will adjust the DSRF entry downward.[9]

Notching Factors Related to Legal Provisions

Coverage covenant other than annual debt service: The thresholds for the rate covenant sub-factor is based on net revenue coverage of annual debt service. A "rolling" coverage covenant that includes outstanding cash, or some other modification that weakens the meaning of the covenant, may prompt us to notch down. Conversely, a MADS coverage covenant may prompt us to notch up.

Structural enhancements/complexities: The scorecard is designed to capture covenants as they are most commonly constituted but cannot account for the myriad structures and complexities that arise in bond transactions throughout the sector. Enhancements such as a lock-box structure for debt service may lead us to notch up. Other shortcomings, such as a weak additional bonds test or the inclusion of cash in a coverage covenant, may lead us to notch down. Any characteristic of the legal provisions of a bond transaction may lead us to conclude that the scorecard does not adequately capture its risk profile, resulting notching or on a rating that is different from the scorecard-indicated outcome.

Other Considerations

Ratings may reflect consideration of additional factors that are not in the scorecard, usually because the factor's credit importance varies widely among the issuers in the sector or because the factor may be important only under certain circumstances or for a subset of issuers. Such factors include financial controls and the quality of financial reporting; the quality and experience of management; assessments of governance as well as environmental and social considerations; and possible interference from other levels of government. Regulatory, litigation, liquidity and technology risk as well as changes in demographic and macroeconomic trends also affect ratings.

Following are some examples of additional considerations that may be reflected in our ratings and that may cause ratings to be different from scorecard-indicated outcomes.

Environmental, Social and Governance Considerations

Environmental, social and governance (ESG) considerations may affect the ratings of municipal utilities. For information about our approach to assessing ESG issues, please see our methodology that describes our general principles for assessing these risks.[10]

Municipal utilities may be directly exposed to extreme weather events due to climate change, such as flooding or droughts, and this may affect credit quality. Government facilities or investments in physical assets could be affected by physical risks and by other sources of environmental risk. Utility systems providing service to coastal communities or communities that are greatly susceptible to drought are highly exposed to environmental risks. Environmental hazards, such as hurricanes, can result in significant system damage requiring unexpected capital spending for repairs, while longer-term environmental trends, such as rising sea levels or prolonged drought conditions, can cause more prolonged pressure on system budgeting and spending priorities.

Social considerations such as staff turnover, aging workforce, labor shortages or unrest or changes in the demographics of a municipal utility's service area, the income level of its customers and the affordability of housing may influence credit strength.

Some governance considerations are reflected in the Rate Management and Regulatory Compliance and Capital Planning qualitative sub-factors, including revenue-raising flexibility and capital planning. Additional considerations may include debt management, multi-year fiscal planning and the timeliness of information disclosure. Weak or opaque governance can negatively affect a municipal utility's performance, which can reduce customer willingness to support rate increases and can also constrain a municipal utility's access to capital markets. Conversely, very strong governance can lead to high customer satisfaction that reduces public resistance to rate increases and capital investment.

ESG considerations are not always negative, and they can be a source of credit strength in some instances. For example, access to clean water, options for the safe disposal of wastewater, and a strong labor market and generally affordable housing can drive strong revenue trends and foster utility system growth. External support, such as state or federal government funds for natural disaster relief, can help mitigate the credit impact of ESG exposures.

Regulatory Considerations

Issuers in the municipal utility sector are subject to varying degrees of regulatory oversight. Effects of these regulations may entail limitations on operations, higher costs, and higher potential for technology disruptions and demand substitution. Regional differences in regulation, implementation or enforcement may advantage or disadvantage particular issuers.

Our view of future regulations plays an important role in our expectations of future financial metrics as well as our confidence level in the ability of an issuer to generate sufficient cash flows relative to its debt burden over the medium and longer term. Regulatory considerations also play a role in our assessment of an issuer's cost recovery framework, competitiveness and willingness to recover costs with sound financial metrics. In some circumstances, regulatory considerations may also be a rating factor outside the scorecard, for instance when regulatory change is swift.

Likelihood of Receiving Extraordinary or Ongoing Support

Some municipal utilities receive extraordinary support from their component local government or a higher level of government, such as the state, typically to help the municipal utility avoid a default on debt obligations. The circumstances surrounding extraordinary support for a municipal utility are often specific to the situation. In some cases, a state or local government may provide meaningful financial or managerial support to a municipal utility undergoing stress, thereby bolstering a weak fundamental credit profile and materially lowering the risk of a payment default. Conversely, a temporary infusion of funds may bolster financial performance in the short term but leave a municipal utility exposed to rapid financial deterioration if the aid does not continue. We typically assess whether the support will be ongoing and sufficient to stabilize the municipal utility. We also consider the associated benefits or risks of dependence on such support. Alternatively, many municipal utilities receive annual funding or low-interest loans from the federal, state or local government. This type of funding is often earmarked, and we do not consider it to be extraordinary support.

Parent Government Credit Quality

While some public utility systems are independent of a particular municipality,[11] municipally-owned utility systems typically have enduring credit linkages with their parent government. Important linkages often include a legal structure that could draw the utility system into a general government municipal bankruptcy, combined or intermingled financial operations, shared debt or pension obligations, and mutual or affiliated governance or management. Additional linkages that typically pertain to municipally-owned utility systems, including common boundaries, a common economic environment, and common demographics and income levels, may also apply to some independent utilities. As a result of these credit linkages, the credit quality of a municipally-owned utility's parent government and that government's ability to meet its general obligations are important considerations in the rating assigned to a municipally-owned utility.

Shared credit characteristics between a municipality and an owned utility often affect the metrics used to assess scorecard factors, including the notching factors. For example, a utility system's practice of transferring excess funds to its parent government is likely to be reflected in the assessment of its financial strength, especially in the Days Cash on Hand sub-factor. However, there can be credit linkages between a utility and its parent government that are not fully reflected in the scorecard. Based on these linkages, a municipally-owned utility's revenue rating is typically not higher than two notches above the issuer or general obligation rating of the parent government. Scenarios where a utility's revenue rating may exceed the issuer or general obligation rating of the parent government would be in cases where there is clear information indicating a de-linkage of credit profiles, for example in a distress scenario where it is clear that debt service will continue to be paid on the revenue debt despite a default or impending default of the municipality's general obligation debt. An additional potential example could be a case where a utility has a meaningfully larger service territory than the parent government's boundaries and benefits from a more robust economic environment than the parent.

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 the proper tone at the top, centralized oversight of operations, and consistency in

accounting policies and procedures. Auditors' reports on the effectiveness of internal controls, auditors' comments in financial reports and unusual restatements of financial statements or delays in regulatory filings may indicate weaknesses in internal controls.

Additional Metrics

The metrics included in the scorecard are those that are generally most important in assigning ratings to issuers in this sector; however, we may use additional metrics to inform our analysis in specific cases. These additional metrics may be important to our forward view of metrics that are in the scorecard or other rating factors.

Event Risk

We also recognize the possibility that an unexpected event could cause a sudden and sharp decline in a municipal utility's fundamental creditworthiness, which may cause actual ratings to be lower than the scorecard-indicated outcome. Event risks — which are varied and can include natural disasters, sudden changes in state law or regulation, material litigation, pandemics or cybercrime events — can have a material credit impact on even a stable municipal utility.

Treatment of Different Liens on a US Municipal Utility's Net Revenues

It is common for utilities to issue debt secured by different liens on their net revenues. Senior bonds are secured by a first lien on net revenues, and subordinate bonds or loans secured by a subordinate, or junior, lien. Sometimes, utilities will issue debt secured by a third lien or lower.

Our practice is to evaluate the likelihood of default and the expected recovery in the event of default for each lien independently.

This will most commonly result in a rating distinction of one notch for each lien of subordination. In other words, if a municipal utility's senior lien is rated Aa3, its subordinate lien will most likely be rated A1 and the third lien will most likely be rated A2.

The reason for the typical one-notch-per-lien distinction is that subordinate liens are marginally more likely to default than senior liens, and subordinate liens' expected recovery in the event of default would be lower. Senior liens are typically afforded stronger legal protections under utilities' indentures, senior-lien debt service is usually paid earlier in the flow of funds, and the first lien would likely enjoy a better claim in bankruptcy.

For most investment grade municipal utilities, the probability of default for any lien is small, and so the notching distinction is driven primarily by a greater expected loss severity in the unlikely event of a default. This is comparable to our approach for ratings distinctions for different debt classes of investment grade corporations, where ratings distinctions are driven by differences in expected loss severities.[12] In contrast to corporates, however, there often is not an explicit cross-default of senior municipal debt in the event of a subordinate payment default.

In some instances, we may conclude that an investment grade municipal utility's subordinate lien has a default probability and expected loss severity that is nearly as low or just as low as the senior lien (in which case we may not make a ratings distinction), or a default probability and expected loss severity that is materially higher than the senior lien (in which case we may make a ratings distinction of more than one notch).

Such a conclusion would be based on the municipal utility's management of its system with respect to its liens, and the characteristics of the legal framework governing the liens: rate covenants, additional debt provisions, and cross-default and acceleration provisions in a senior lien's variable rate debt resulting from a default on the subordinate lien, for example. If a utility has only a very small amount of senior lien debt, we may choose not to distinguish between liens.

The distinctions among a municipal utility's liens become starker when it faces a material likelihood of default or bankruptcy. For these situations, the different characteristics of the liens are likely to drive greater disparities in default probabilities and expected recoveries for disparate liens. Thus, we are more likely to employ ratings distinctions other than one notch for speculative grade municipal utilities' different liens as the Loss Given Default approach drives more of the analysis.

In nearly all instances, the ratings on the different liens of the same utility will remain closely related. The reason for this is that municipal utilities are actively managed enterprises that continually need to generate net revenues sufficient not only to cover debt service but also to fund capital needs. Even if senior lien coverage is strong, a utility that is unable to pay its junior lien debt service is not generating excess funds for capital investment and does not have capacity for capital borrowing. Thus, while subordinate liens

face greater default probability and higher loss expectations based on their first-loss positions, an increased likelihood of default on a subordinate lien implies an increased likelihood of insolvency for the utility as a whole.

For this reason, we enter the debt-oriented inputs into the scorecard on a consolidated basis. For the debt to revenues factor, we enter total debt (senior and junior). For the debt service coverage factor, we enter total debt service coverage. It is the municipal utility's ability to cover all of its debt service with net revenues that determines its viability as a going concern. Even for a senior lien with a large coverage factor by net revenues, a narrow coverage of all debt service implies pressure to maintain healthy operations and generate funds sufficient for capital reinvestment.

Limitations

In the preceding sections, we have discussed the scorecard factors and many of the other considerations that may be important in assigning ratings. In this section, we discuss limitations that pertain to the scorecard and to the overall rating methodology.

Limitations of the Scorecard

There are various reasons why scorecard-indicated outcomes may not map closely to actual ratings.

The scorecard in this rating methodology is a relatively simple tool focused on indicators for relative credit strength. Credit loss and recovery considerations, which are typically more important as an issuer gets closer to default, may not be fully captured in the scorecard. The scorecard is also limited by its upper and lower bounds, causing scorecard-indicated outcomes to be less likely to align with ratings for issuers at the upper and lower ends of the rating scale.

The weights for each factor and sub-factor in the scorecard represent an approximation of their importance for rating decisions across the sector, but the actual importance of a particular factor may vary substantially based on an individual issuer's circumstances.

Factors that are outside the scorecard, including those discussed above in the "Other Considerations" section, may be important for ratings, and their relative importance may also vary from issuer to issuer or from instrument to instrument. In addition, certain broad methodological considerations described in one or more cross-sector rating methodologies may be relevant to ratings in this sector.[13] Examples of such considerations include the following: how sovereign credit quality affects non-sovereign issuers, the assessment of credit support from other entities, and the assignment of short-term ratings.

We may use the scorecard over various historical or forward-looking time periods. Furthermore, in our ratings we often incorporate directional views of risks and mitigants in a qualitative way.

General Limitations of the Methodology

This methodology document does not include an exhaustive description of all factors that we may consider in assigning ratings in this sector. Municipal utilities may face new risks or new combinations of risks, and they may develop new strategies to mitigate risk. We seek to incorporate all material credit considerations in ratings and to take the most forward-looking perspective that visibility into these risks and mitigants permits.

Ratings reflect our expectations for an issuer's future performance; however, as the forward horizon lengthens, uncertainty increases and the utility of precise estimates, as scorecard inputs or in other considerations, typically diminishes. Our forward-looking opinions are based on assumptions that may prove, in hindsight, to have been incorrect. Reasons for this could include unanticipated changes in any of the following: the macroeconomic environment, general financial market conditions, disruptive technology, or regulatory and legal actions. In any case, predicting the future is subject to substantial uncertainty.

Appendix: US Municipal Utility Revenue Debt Scorecard

Exhibit 6

		Aaa	Aa	A	Baa	Ba	B and Below
Numerical score		**0.5 to 1.5**	**1.5 to 2.5**	**2.5 to 3.5**	**3.5 to 4.5**	**4.5 to 5.5**	**5.5 to 6.5**
System Characteristics (30%)							
Asset Condition (10%)	Net Fixed Assets/Annual Depreciation:	> 75 years	75 years ≥ n > 25 years	25 years ≥ n > 12 years	12 years ≥ n > 9 years	9 Years ≥ n > 6 Years	≤ 6 Years
System Size (7.5%)	Water and/or Sewer/ Solid Waste:	O&M > $65M	$65M ≥ O&M > $30M	$30M ≥ O&M > $10M	$10M ≥ O&M > $3M	$3M ≥ O&M > $1M	O&M ≤ $1M
	Stormwater:	O&M > $30M	$30M ≥ O&M > $15M	$15M ≥ O&M > $8M	$8M ≥ O&M > $2M	$2M ≥ O&M > $750K	O&M ≤ $750K
	Gas or Electric:	O&M > $100M	$100M ≥ O&M > $50M	$50M ≥ O&M > $20M	$20M ≥ O&M > $8M	$8M ≥ O&M > $3M	O&M ≤ $3M
Service Area Wealth (12.5%)		> 150% of US median	150% ≥ US median > 90%	90% ≥ US median > 75%	75% ≥ US median > 50%	50% ≥ US median > 40%	≤ 40% of US median
Financial Strength (40%)							
Annual Debt Service Coverage (15%)		> 2.00x	2.00x ≥ n > 1.70x	1.70x ≥ n > 1.25x	1.25x ≥ n > 1.00x	1.00x ≥ n > 0.70x	≤ 0.70x
Days Cash on Hand (15%)		> 250 Days	250 Days ≥ n > 150 Days	150 Days ≥ n > 35 Days	35 Days ≥ n > 15 Days	15 Days ≥ n > 7 Days	≤ 7 Days
Debt to Operating Revenues (10%)		< 2.00x	2.00x < n ≤ 4.00x	4.00x < n ≤ 7.00x	7.00x < n ≤ 8.00x	8.00x < n ≤ 9.00x	≥ 9.00x
Management (20%)							
Rate Management (10%)		Excellent rate-setting record; no material political, practical, or regulatory limits on rate increases	Strong rate-setting record; little political, practical, or regulatory limits on rate increases	Average rate-setting record; some political, practical, or regulatory limits on rate increases	Adequate rate-setting record; political, practical, or regulatory impediments place material limits on rate increases	Below average rate-setting record; political, practical, or regulatory impediments place substantial limits on rate increases	Record of insufficiently adjusting rates; political, practical, or regulatory obstacles prevent implementation of necessary rate increases
Regulatory Compliance and Capital Planning (10%)		Fully compliant OR proactively addressing compliance issues; Maintains sophisticated and manageable Capital Improvement Plan that addresses more than a 10-year period	Actively addressing minor compliance issues; Maintains comprehensive and manageable 10-year Capital Improvement Plan	Moderate violations with adopted plan to address issues; Maintains manageable 5-year Capital Improvement Plan	Significant compliance violations with limited solutions adopted; Maintains single year Capital Improvement Plan	Not fully addressing compliance issues; Limited or weak capital planning	Not addressing compliance issues; No capital planning
Legal Provisions (10%)							
Rate Covenant (5%)		> 1.30x	1.30x ≥ n > 1.20x	1.20x ≥ n > 1.10x	1.10x ≥ n > 1.00x	≤ 1.00x*	
Debt Service Reserve Requirement (5%)		DSRF funded at MADS	DSRF funded at lesser of standard 3-prong test	DSRF funded at less than 3-prong test OR springing DSRF	NO explicit DSRF; OR funded with speculative grade surety**		

* Scores as a Ba.
** Scores as a Baa.
Source: Moody's Investors Service

Adjustments/Notching Factors

Factor: System Characteristics
Additional service area economic strength or diversity
Significant customer concentration
Revenue-per-Customer greatly over/under regional average
Exposure to weather volatility, extreme conditions or market fluctuations
Resource vulnerability
Sizable or insufficient capacity margin
Unusual depreciation practices relative to industry norms
Other analyst adjustment to System Characteristics (Specify)
Factor: Financial Strength
Debt Service Coverage (Annual or MADS) below key thresholds
Constrained liquidity position due to oversized transfers
Outsized capital needs
Oversized adjusted net pension liability relative to debt, or significant under-payment of actuarial funding requirement
Significant exposure to puttable debt and/or swaps or other unusual debt structure
Other analyst adjustment to Financial Strength factor (Specify)
Factor: Management
Unusually strong or weak capital planning
Other analyst adjustment to Management factor (Specify)
Factor: Legal Provisions
Coverage covenant other than annual debt service
Structural Enhancements/Complexities
Other analyst adjustment to Legal Provisions factor (Specify)
Other
Credit Event/Trend not yet reflected in existing data set

Source: Moody's Investors Service

Exhibit 7

Scorecard-Indicated Outcome

Scorecard-Indicated Outcome	Aggregate Numeric Score
Aaa	0.5 to 1.5
Aa1	1.5 to 1.83
Aa2	1.83 to 2.17
Aa3	2.17 to 2.5
A1	2.5 to 2.83
A2	2.83 to 3.17
A3	3.17 to 3.5
Baa1	3.5 to 3.83
Baa2	3.83 to 4.17
Baa3	4.17 to 4.5
Ba1	4.5 to 4.83
Ba2	4.83 to 5.17
Ba3	5.17 to 5.5
B1	5.5 to 5.83
B2	5.83 to 6.17
B3 and below	6.17 to 6.5

Source: Moody's Investors Service

Moody's Related Publications

Credit ratings are primarily determined through the application of sector credit rating methodologies. Certain broad methodological considerations (described in one or more cross-sector rating methodologies) may also be relevant to the determination of credit ratings of issuers and instruments. A list of sector and cross-sector credit rating methodologies can be found here.

For data summarizing the historical robustness and predictive power of credit ratings, please click here.

For further information, please refer to *Rating Symbols and Definitions*, which is available here.

Endnotes

1 In our methodologies and research, the terms "scorecard" and "grid" are used interchangeably.

2 A link to a list of our sector and cross-sector methodologies can be found in the "Moody's Related Publications" section.

3 This methodology covers municipal gas distribution utilities. These utilities typically purchase their supply from natural gas producers or intermediaries, and the gas is delivered via natural gas pipeline to the municipality's distributions system. A link to a list of our sector and cross-sector methodologies can be found in the "Moody's Related Publications" section.

4 Only those municipal electric utilities that generate less than 20% of their own power are rated using this methodology. We rate public power utilities using different methodologies. For information, see our methodology that discusses US public power electric utilities with generation ownership exposure and also our methodology that discusses US municipal joint action agencies. A link to a list of our sector and cross-sector methodologies can be found in the "Moody's Related Publications" section.

5 A link to a list of our sector and cross-sector methodologies can be found in the "Moody's Related Publications" section.

6 A link to an index of our sector and cross-sector methodologies can be found in the "Moody's Related Publications" section.

7 Unless the utility's flow of funds is closed-loop. A closed-loop flow of funds is stronger than an open one for this reason.

8 For a description of how we calculate or estimate adjusted net pension liability, please see our cross-sector methodology that describes our adjustments to pension data reported by Governmental Accounting Standards Board (GASB) issuers.

9 For example, if 1/3 of a utility's debt is secured by a DSRF funded at MADs and 2/3 is not secured by a DSRF at all, we may enter the DSRF requirement as a Baa.

10 A link to a list of our sector and cross-sector methodologies can be found in the "Moody's Related Publications" section.

11 For example, we typically consider a stand-alone utility authority or special purpose district utility system that is not directly owned by a state or local government to be independent of a municipality.

12 For more information, see our cross-sector methodology that describes the alignment of corporate instrument ratings based on differences in security and priority of claim. A link to a list of our sector and cross-sector methodologies can be found in the "Moody's Related Publications" section.

13 A link to a list of our sector and cross-sector methodologies can be found in the "Moody's Related Publications" section.

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U.S. Water and Sewer Rating Criteria

Sector-Specific

Scope

This criteria report details Fitch Ratings' methodology for assigning Issuer Default Ratings (IDRs), Standalone Credit Profiles (SCPs), and issue- and obligation-specific ratings to U.S. municipal and not-for-profit water and sewer (including wastewater and stormwater) utilities (together, utilities). This rating methodology also applies to certain combined utilities, for which water and sewer activities account for, or are expected to account for, the largest share of total activities on an ongoing basis. The criteria apply to both new and surveillance ratings.

Key Rating Drivers

Fitch does not explicitly weight the assessments of individual key rating drivers (KRDs) in determining its overall rating. There is no standard formula to link the following inputs into an exact rating. The individual assessments inform, but do not dictate, the final rating outcome. The relationship between individual and aggregate qualitative and quantitative factors varies between entities in the sector. As a general guideline, where a material factor is significantly weaker or stronger than others, this factor tends to attract a greater emphasis in the overall analysis.

Revenue Defensibility: This entails an assessment of a utility's exposure to demand volatility and the flexibility within its rate-setting framework to recover costs of service and maintain operating profitability.

Operating Risk: This entails an assessment of a utility system's operating cost burden and operating cost flexibility, as well as its current capital spending and future capital requirements.

Financial Profile: Metrics are used to evaluate the utility's leverage and liquidity profiles in the context of its overall risk profile. These metrics are evaluated on both a historical and forward-looking basis, which considers an individual utility's overall financial flexibility to withstand stress scenarios.

Asymmetric Additive Risk Considerations: Risk factors, such as debt structure, management and governance, legal and regulatory, and information quality are also considered when assigning a rating. These risk factors are not scaled, and only weaker-than-standard characteristics affect the final rating.

General Credit Quality Reflected in IDR or SCP

Fitch will assign an IDR to water and sewer utilities that are determined to be separate municipal entities for purposes of filing bankruptcy under Chapter 9 of the U.S. Bankruptcy Code, as well as an issue-specific rating for each Fitch-rated security. Utilities considered related to municipalities will, instead, be assessed an SCP. Determining IDRs and SCPs aligns default risk ratings in this sector to those assigned by other groups across Fitch's global rating platform. Conduit issuers, including issuers that benefit from balanced, pass-through contractual frameworks, as well as certain entities established solely or primarily for the purpose of financing, or accounting for, infrastructure or facilities, will generally not be assigned an IDR or assessed an SCP.

This report updates and replaces "U.S. Water and Sewer Rating Criteria," dated Feb. 29, 2024.

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Related Criteria

U.S. Public Sector, Revenue-Supported Entities Rating Criteria (January 2025)

U.S. Public Finance Local Government Rating Criteria (April 2024)

State Revolving Fund and Municipal Finance Pool Program Rating Criteria (February 2025)

Government-Related Entities Rating Criteria (July 2024)

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Although rarely applicable, Fitch may assign both an IDR and an SCP to a utility determined to be a separate municipal entity when support from a higher level of government affects the overall credit quality of the rated utility. Where support is factored into a utility's credit analysis, the IDR will be assigned under Fitch's cross-sector "Government-Related Entities Rating Criteria."

For more information on IDRs, SCPs and rating distinctions between specific securities, including circumstances where issue ratings may be capped or constrained by the credit quality of related municipalities, see Fitch's master criteria "U.S. Public Sector, Revenue-Supported Entities Rating Criteria" and "U.S. Public Finance Local Government Rating Criteria."

Sector Risk Profile

Monopoly Providers

The starting point for analysis of water and sewer utilities is recognition that the sector's business model and fundamental credit strengths reduce volatility of financial performance and mitigate the effects of macro events on the underlying utility. These strengths include relatively stable demand, driven by the essentiality of water and sewer services, mandates to serve well-defined areas with monopolistic characteristics, generally strong contractual frameworks and considerable pricing flexibility provided through the sector's largely autonomous rate-setting authority.

Rate-Setting Autonomy

An overwhelming majority of Fitch's rated water and sewer utility systems possess the ability to autonomously determine their rates for service, free from the oversight of state utility regulatory commissions. With such powerful pricing flexibility at hand, the governing body's actual use of its rate-making authority strongly influences revenue, profitability, operating liquidity and overall credit quality.

Although largely exempt from rate regulation, water and sewer utilities remain subject to a myriad of state and federal regulations related to asset and resource planning and environmental standards. Changes in market dynamics, regulatory initiatives or political influence, whether implemented or expected, can affect both revenue defensibility and operating risk throughout the sector as a whole, and may introduce positive or negative rating pressure for specific credits.

Not-for-Profit Business Model

Public water and sewer utilities operate on a not-for-profit basis and with the fundamental mission of providing safe, reliable and affordable water and sewer services. Excess cash flow is typically retained and used to build financial cushion, fund capital investment or reduce borrowings, although a portion of net revenues may be returned to host municipalities through transfers.

Given the balance of these fundamentals, ratings in this sector, in most cases, range from 'AAA' to 'A–', denoting high credit quality. However, individual utilities can be assigned lower, even speculative-grade ratings (BB category and below), due to specific credit features or issues. This sector risk profile range does not establish a rating floor or ceiling, and does not simply replicate the range of existing ratings in the sector. Rather, the range emerges from the core features common to U.S. public water and sewer utilities.

Functional Responsibilities Establish Foundation

Although the water and sewer sector enjoys a strong overall business risk profile, Fitch believes the assessment of utility-specific risks and credit quality begins with a solid understanding of the utility's functional responsibilities. The water and sewer sector is highly segmented. While some utilities are engaged in all aspects of the water supply, treatment and distribution process as well as sewer collection, treatment and disposal process, others may have functional responsibilities that are limited to individual roles. For example, some utilities may be solely responsible for the distribution of water to end users, purchasing their water supply from a third party, while others may only be responsible for procuring and treating wholesale water supply for delivery by other systems. Fitch considers both the statutory and contractual obligations of each utility, as well as the degree to which risks are shared or mitigated, to establish the framework under which rating factors are assessed.

Retail Systems

Fitch generally considers retail water and sewer utilities to be those whose primary purpose is to provide water and sewer service to residential, commercial and industrial (including irrigation) end users, regardless of the amount of revenues generated from wholesale services. While some water and sewer utilities are independent entities, many are owned by the municipalities they serve and operate as closely integrated enterprise funds of the local government. Moreover, water and

sewer utilities may be operated as part of a combined utility system that provides other services, including retail solid waste and hydroelectric, among others.

Key Rating Drivers — Retail Water/Sewer Utilities

Revenue defensibility	**aa**	**a**	**bbb**	**bb**
Revenue source characteristics	Very strong. Nearly all revenue is derived from services or business lines exhibiting monopoly characteristics. Reliance on revenue from competitive sources is insignificant.	Strong. A significant portion of revenue is derived from services or business lines exhibiting monopoly characteristics. Reliance on revenue from competitive sources is manageable.	Midrange. The majority of revenue is derived from services or business lines exhibiting monopoly characteristics. Reliance on revenue from competitive sources is meaningful.	Weak. Less than 50% of revenue is derived from services or business lines exhibiting monopoly characteristics. Reliance on revenue from competitive sources is significant.
Service area characteristics	Very favorable demographic trends generally characterized by strong customer growth, above-average income levels and low unemployment rates.	Favorable demographic trends generally characterized by average customer growth, with average income levels and average unemployment rates.	Midrange demographic trends generally characterized by little or no customer growth, and below-average income or above-average unemployment rates.	Weak demographic trends generally characterized by a declining customer base, well below-average income and high unemployment rates.
Rate flexibility	Independent legal ability to increase service rates without external approval.	Legal ability to increase service rates is subject to approval of external authorities. History and expectation of operating and capital costs being recovered on a timely basis are strong.	Legal ability to increase service rates is subject to approval of external authorities. History and expectation that operating and capital costs may not be recovered on a full or timely basis.	Legal ability to increase service rates is subject to approval of external authorities. History and expectation that operating and capital cost recovery will be neither full nor timely.
	In conjunction with determining rate-setting ability, the rate flexibility assessment will also consider rate affordability, which is characterized as:			
	Utility costs are affordable for the vast majority of the population.	Utility costs are affordable for a significant majority of the population but are high for a meaningful portion of the population.	Utility costs are affordable for the majority of the population but are high for a significant portion of the population.	Utility costs are high for an exceedingly large segment of the population.
Asymmetric rating factor considerations	Concentration of revenues from individual customers above 10% or over 25% for the largest 10 customers, industry concentration, tax revenue volatility or revenue derived from non-essential services.			
Operating risk	**aa**	**a**	**bbb**	**bb**
Operating cost burden	Very low operating cost burden.	Low operating cost burden.	Midrange operating cost burden.	High operating cost burden.
Capital planning and management	Moderate investment needs supported by adequate capital investment.	Elevated investment needs but supported by adequate capital investment.	Elevated investment needs with weak capital investment.	Elevated investment needs with extremely weak capital investment.
Asymmetric rating factor considerations	Meaningful supply or resource-management concerns.			

Financial profile	**aaa**	**aa**	**a**	**bbb**	**bb**
Leverage profile	Exceptionally Strong: Refer to the Rating Positioning table.	Very Strong: Refer to the Rating Positioning table.	Strong: Refer to the Rating Positioning table.	Midrange: Refer to the Rating Positioning table.	Weak: Refer to the Rating Positioning table.
	Financial and leverage profile assessments may be higher or lower, depending on a number of factors as discussed in *Other Considerations Related to Rating Positioning*.				
Liquidity profile	Liquidity profile is based on coverage of full obligations and liquidity cushion. A weaker liquidity profile can constrain the financial profile assessment.				
Asymmetric additive risk considerations	Debt structure and contingent liability, management and governance, legal and regulatory, information quality and characteristics that are significantly outside the norm for the sector are factored into the final rating/SCP.				

Source: Fitch Ratings

When evaluating retail water and sewer utilities, Fitch considers how the utility's water supply and treatment and/or sewer treatment and disposal requirements are met. Some retail utilities manage all aspects of their business through the ownership and operation of facilities. Others receive water supplies and/or services from wholesale utilities. Fitch considers the risks, benefits and financial obligations of both approaches in its analysis.

Wholesale Providers

Fitch generally considers wholesale utilities to be those whose primary purpose is to provide water and sewer service to retail utilities, regardless of the amount of revenues generated from retail services. Fitch also will treat conduit issuers consistent with their obligor(s) for purposes of these criteria. Fitch's evaluation of wholesale water and sewer providers is rooted in its analysis of the contractual responsibilities and obligations of the provider and its purchasers. Most wholesale providers are organized to provide all or a portion of their members' water supply and/or sewer treatment and disposal requirements pursuant to long-term contracts. Fitch considers the terms, tenor and conditionality of the contractual obligations (i.e. take-or-pay; take-and-pay) where contracts are present to understand the risks borne by each party and to determine the context for assessing the rating factors.

Fitch also considers the counterparty risks associated with any contract structure in its evaluation, factoring the operational interdependency and governance relationship between the wholesale provider and its purchasers, in addition to purchaser credit quality. In some contractual frameworks, where revenues and costs are largely balanced via pass-through charges to purchasers and typically exhibit sum-sufficient debt service coverage — particularly single-asset projects — purchaser credit quality may be more of a consideration in the final rating than the wholesaler's financial profile (see *Appendix B*).

Key Rating Drivers

Fitch's KRDs are revenue defensibility, operating risk and financial profile.

For retail public water and sewer utilities, as well as certain other water-related utilities that are not considered wholesalers, the three KRDs are assessed using the following guidance, which outlines general expectations for a given rating category. Guidance related to wholesale utilities is outlined in *Appendix B*. The subfactors composing each rating driver highlight the components most critical to making the assessment. All assessments are grounded in utility-specific historical data and qualitative analysis to support a forward-looking view on the expectation for future performance, rather than at a single point in time. KRD and subfactor assessments may, therefore, reflect the consideration of metrics based on historical averages, estimates and/or trends. Moreover, assessments may on occasion differ from what the metrics imply based on the analyst's knowledge of other facts and circumstances. Where assumptions differ from standard assumptions that result in assessments that differ from implied metrics or the Rating Positioning table's suggested analytical outcome, these will be communicated in Fitch's rating action commentary.

The correspondence of revenue defensibility, operating risk, financial profile and ratings is presented in the Rating Positioning table. The ratings are not formulaic or model driven, but require qualitative judgment to place metrics in an overall context for each utility.

Revenue Defensibility

Fitch considers both demand and pricing characteristics in its assessment of revenue defensibility. Water and sewer utilities have broadly stable demand characteristics, but exhibit some volatility across the typical economic and business cycle. Base demand for water and sewer service is somewhat insensitive to external factors, given the essentiality of service as well as the general absence of a competitive marketplace. However, demand fluctuation on the margin is sensitive to changes in regional economics and demographics, as well as weather conditions.

In its assessment of revenue defensibility, Fitch analyzes the historical patterns of revenue performance through economic and investment cycles, as well as growth trends over time, considering the utility's revenue mix, customer characteristics and contractual framework; the economic underpinnings of its service area; and its capability to preserve revenue generation through rate increases or other measures. While weather is among the most significant factors driving variability in demand for water service, particularly for residential users, fluctuations in temperature and seasonality are considered in the context of a utility's business cycle in Fitch's scenario analysis and are unlikely to affect Fitch's assessment of revenue defensibility.

When evaluating combined utility systems, Fitch's assessment of revenue defensibility may be further informed by the characteristics, subfactor assessments and metrics attributable to the individual business lines contributing minority shares of total revenue.

Revenue Source Characteristics

Retail water and sewer utilities typically exhibit strong revenue source characteristics, as most, if not all, of their revenue (including charges, taxes and assessments) is directly or indirectly derived from monopolistic services: providing water and/or sewer service to end users within defined areas that are subject to little or no competitive pressures. Fitch views revenue derived from monopolistic business lines to be more durable, secure and supportive of strong revenue defensibility than revenue generated by competitive activities.

Combined utility systems may also derive revenues from other essential utility services, including public power and natural gas distribution, which are similarly monopolistic. Wholesale services provided to other retail utilities exhibiting monopolistic characteristics through either long-term contracts or in situations where such purchasing retailer has no perceived viable and/or economic alternative to the wholesale service provided are also considered to exhibit monopolistic characteristics.

Revenue Source Characteristics

Metrics to **Support Assessment**
• Fitch assesses revenue risk through an analysis of a utility's business lines and the related revenue relied on to support both operations and debt service. Generally, retail utility systems that derive more than 95% of operating income from services or business lines exhibiting monopolistic characteristics have revenue source characteristics consistent with a 'aa' factor assessment; over 80% to 95%, 'a'; over 50% to 80%, 'bbb'; and 50% and less, 'bb'.
• Fitch may also consider in its assessment each business line's contribution to income and/or funds available for debt service (FADS) using the thresholds outlined above.

Source: Fitch Ratings

Water and sewer utilities may also derive revenue from non-utility services or less traditional business lines subject to varying degrees of competitive pressures on both demand and price. These services may include agricultural water sales, competitive energy supply and uncontracted or short-term off-system energy sales as well as certain solid waste services. Revenue defensibility risk to a utility can be affected by the degree of competition faced by these business lines as well as the extent to which the utility relies on such revenues and income to meet its covenanted revenue requirements and debt service obligations. In cases where a retail water and sewer utility derives more than 20% of its revenue from competitive or non-utility service/less traditional business lines, revenue defensibility may be lower than suggested, depending on the risks posed by such items as contractual arrangements, competitive environment and counterparty credit quality.

Service Area Characteristics

A water and sewer utility's demand and pricing characteristics, as well as its overall revenue stability, will be highly influenced by its service area characteristics and demographic trends since the essentiality of the enterprises' services provides localities with a de facto ability to charge for their provisions. Retail customer growth, high income levels, a strong and diverse employer base, and low unemployment levels are all positive credit factors that can influence both demand and pricing characteristics. Service areas characterized by strong employment metrics and income levels, or as regional economic centers, are more likely to benefit from stronger demand driven by customer in-migration, as well as organic growth. Moreover, stronger income levels throughout an area are likely to result in more inelastic demand and rate flexibility during periods of economic weakness. Areas experiencing declining customers and employment are more likely to experience lower service demand.

Service Area Characteristics

Metrics to Support Assessment
• Strong economic, customer and demographic trends support strong revenue defensibility. Fitch analyzes representative customer growth rates and service area unemployment rates, and income levels relative to national levels. – Utilities that experience historical compounded annual growth in customers (typically over a five-year period) of more than 1.5% exhibit stronger growth characteristics; 0.0%–1.5%, midrange; and less than 0.0%, weaker. – Service areas that report median household income in excess of 125% of the national median exhibit stronger income characteristics; 125%–75%, midrange; and less than 75%, weaker. – Service areas that report unemployment rates that are less than 75% of the national average exhibit stronger employment characteristics; 75%–125%, midrange; more than 125%, weaker.
• Markets that exhibit midrange retail customer growth and midrange demographic trends are considered favorable and consistent with factor assessments of at least 'a'. Markets that experience a greater number of stronger characteristics than weaker characteristics are typically assessed 'aa'. Markets that exhibit one more weaker characteristic than stronger characteristic are typically assessed as 'bbb'. Markets that exhibit two or more weaker characteristics than stronger characteristics are typically assessed as 'bb'.

Source: Fitch Ratings

Fitch reviews income and employment indices of the representative service territory to help assess not only the prospects for stronger growth and more inelastic demand, but also the capacity of residential users to meet current obligations and absorb future rate increases. While income also provides some indication of an end user's ability to pay utility bills, Fitch has observed that the essential nature of water and sewer service and the remedies available to most utilities (i.e. shutoffs and liens) make payment delinquencies in the sector extremely low, regardless of income levels and other economic indicators.

Rate Flexibility

The final component of the revenue defensibility assessment is a utility's rate flexibility, which considers both the utility's independent legal ability to determine rates for service as well as its relative affordability based on a benchmark of 5% of household income for all water-related services, or, in some cases, its price competitiveness.

Assessing a utility's independent legal ability to determine rates and increase operating revenue involves consideration of any limits on the utility's autonomy in this area, including requirements for approval from local government groups or state regulatory commissions. Fitch considers a utility system to have independent legal rate-raising ability as long as such action is at the discretion of the utility's governing body — be it a board of directors, local government council/commission or both.

Utilities whose rates for service must be approved by an external regulatory authority are viewed as having less rate flexibility. Although utilities operating within a well-established and historically supportive regulatory regime may exhibit strong financial performance and credit quality, their revenues are, nonetheless, subject to scrutiny, regulatory lag and the potential for cost disallowance. Fitch will consider in its assessment historical rate-making decisions, methodologies and recovery mechanisms to determine the likelihood costs will be recovered in a timely manner. Limitations on rate increases that stem from legislative restrictions, self-imposed suspension of increases or similar actions will also likely limit the assessment of rate flexibility, notwithstanding the absence of external regulatory review.

A utility system's ability to independently set rates for service significantly enhances revenue defensibility, allowing the utility to increase revenue as necessary to offset the effects of lower unit sales or meet unanticipated cost increases. However, Fitch believes a governing body's capability to exercise its rate-making authority and sustain strong financial performance may be influenced or limited by the resulting residential cost of service to the most economically vulnerable ratepayers, given the essentiality of water and sewer service to public health and safety.

Using U.S. Census Bureau information for the representative service territory, Fitch assesses affordability by calculating the approximate percentage of the population for which combined utility charges (consisting of water, sewer and stormwater) exceed 5% of household income based on a straight-line interpolation of household income quintiles. Alternatively, Fitch may base its calculation on individual or combined charges where one or more of the costs of service are unknown or not applicable using a threshold of 2.0% for water, 2.5% for sewer and 0.5% for stormwater.

Affordability

Metric to Support Assessment
• Fitch calculates an affordability rate to determine the number of people whose bill accounts for an outsized portion of their income. Generally, a combined water-related bill that is greater than 5% of household income (or individually, 2.0% for water, 2.5% for sewer and 0.5% for stormwater) is considered unaffordable. Utilities with 20% or less of their population whose bills are considered high are deemed to have an affordability assessment factor of 'aa'; over 20% to 30%, 'a'; over 30% to 40%, 'bbb'; and over 40%, 'bb'.

Source: Fitch Ratings

In measuring utility charges, Fitch assumes a monthly residential bill based on 7,500 gallons of water consumption and/or 6,000 gallons of sewer flows. Stormwater charges typically will be based on the monthly charge of either the service area's established equivalent residential unit, average residential charge or a 2,000-square foot calculation of impervious cover, whichever is deemed relevant.

In determining its final assessment of rate flexibility, Fitch will consider the affordability metric in the context of the utility's rate-setting ability. For example, utilities with independent rate-setting ability but whose affordability metric would be consistent with an 'a' assessment may still be assessed at 'aa' if there is a lack of evidence of issues regarding rate increases. Alternatively, under the same situation, if rate actions appear infrequent or subject to opposition, an 'a' assessment would be more likely.

Fitch may also determine the rate flexibility assessment to be higher than the affordability metric if characteristics are present that would tend to support price protection and lead to overall revenue stability. These may include assistance programs, governmental housing, multifamily master meters, etc. that appear to significantly diminish the effect of utility charges on an economically vulnerable population. Likewise, utilities that collect a significant amount of revenues from fixed charges, including revenues from property taxes or assessments, etc., may be assessed higher than the affordability metric may indicate, given the nature of this income would either ensure greater revenue stability and/or shift the direct impact of the utility costs from the most economically sensitive people.

For utilities whose business model is more susceptible to competitive pressures or whose services may not be considered essential in nature, Fitch's measurement of affordability may not be the best reflection of ultimate

revenue-raising flexibility, such as agricultural and non-agricultural irrigation districts. Consequently, Fitch may use other quantitative and/or qualitative information to assess overall affordability in these cases, including relative price burden and importance of available water supplies. In addition, Fitch may use other quantitative and/or qualitative information to assess overall affordability for entities whose demographic information is not frequently reported (e.g. U.S. territories) and/or revenue structure includes a significant amount of income unrelated to operations.

Extraordinarily Weak Assessment — Revenue Defensibility

Revenue defensibility may be assessed at 'b' or below (extraordinarily weak) in circumstances where the utility's demand and pricing characteristics exhibit attributes that are even weaker than those outlined in Appendix F. These instances are expected to be rare and likely the result of an erosion in a utility's revenue base or its fundamental business model over time.

Refer to Fitch's "U.S. Public Sector, Revenue-Supported Entities Rating Criteria" for additional discussion.

Asymmetric Rating Factor Considerations — Revenue Defensibility

In addition to the aforementioned considerations, the assessment of revenue defensibility can be weakened by tax revenue volatility, revenue source concentration or where revenue sources are monopolistic but deemed non-essential. Where applicable, Fitch evaluates tax revenue volatility consistent with the FAST Econometric API - Fitch Analytical Stress Test Model utilized under its "U.S. Public Finance Local Government Rating Criteria," which is separate and distinct from the FAST tool discussed below. Separately, Fitch evaluates a utility's vulnerability to sudden drops in demand and the impact on revenue defensibility by assessing the essentiality of service and the degree to which demand and revenue rely on a particular customer, industry or commercial segment, where available, or services that do not share the same essentiality as potable water and wastewater. Customer concentration may be assessed by reviewing the revenue contribution from a utility's largest customers, while sector or industry concentration may be assessed relative to national norms.

Utilities that derive more than 10% of operating revenue from their largest retail customer or more than 25% of operating revenue from their 10 largest retail customers exhibit meaningful customer concentration. Utilities exhibiting customer concentration will be further evaluated to determine whether such concentration detracts from revenue stability.

In cases where these factors introduce additional operating and/or financial risks, the rating may be further constrained. Fitch may limit commentary on asymmetric rating factors to those that constrain the rating.

Operating Risk

The second KRD is operating risk, which focuses on operating cost burden and capital planning and management. A water and sewer utility's ability to generate adequate margins while preserving affordability or cost competitiveness is largely a function of its ability to effectively manage operating and capital expenses. Long-term investment in property, plant and equipment is necessary to ensure sectorwide resource adequacy, regulatory compliance, accurate revenue recognition, reliability and efficient operations. While capital expenditures (capex) may limit financial flexibility in the near term, investment is essential for ensuring strong utility performance over the long term. In determining the operating risk assessment,

Fitch will generally place more emphasis on the operating cost burden assessment, given the more immediate impact of operating costs on a utility's financial capacity and the limited ability to avoid these costs. Nevertheless, capital planning and management may exert more influence on the operating risk assessment in situations where unit consumption is very low, operations are limited (such as with stormwater utilities), where capital investment needs are viewed as being a constraining factor on the overall KRD or where such capital investment needs are viewed as having a significant impact on operating cost burden going forward.

When evaluating combined utility systems, Fitch's assessment of operating risk may be further informed by the characteristics, subfactor assessments and metrics attributable to the individual business lines contributing minority shares of total revenue.

Operating Cost Burden

Fitch believes water and sewer utilities with a high operating cost burden generally are subject to a higher degree of overall operating risk. The measurement of total operating costs reflects the wide range of individual costs associated with supply, treatment and delivery of water as well as collection, treatment and disposal of wastewater. These include purchased water and/or sewer services (including both the operating and capital portion), labor, administration, maintenance and fixed assets (as measured by depreciation). Should there be a significant contribution to operating expenses from other non-water and sewer utility operations, the operating cost burden assessment may also consider the available data and applicable criteria. Fitch also includes net transfers in its calculation of operating costs. Overall, Fitch believes that the benefits and challenges

related to operating decisions, as well as the effect of regional differences, macroeconomic factors and external restrictions on operations, are most commonly captured in operating costs.

Operating Cost Burden

Metric to Support Assessment
• Generally, utility systems with an operating cost of $7,500/mg or less have an operating cost factor assessment of 'aa'; over $7,500/mg to $11,000/mg, 'a'; over $11,000/mg to $14,500/mg, 'bbb'; and over $14,500/mg, 'bb'. • Stormwater utilities generally have limited operations and lack measured flows, and, thus, are assumed to have an operating cost burden subfactor assessment of 'aa' for standalone utilities unless there is evidence to suggest the assessment should be lower, in which case, the rationale for a lower assessment will be noted.

Source: Fitch Ratings

For the retail utilities that purchase water and/or sewer service from wholesale providers, these costs typically represent a material portion of operating expenses. Contract costs for purchasing utilities will typically encompass all costs borne directly by the provider, including purchased resources, if applicable, and capital costs.

Depreciation expense is highly reflective of asset ownership. While all retail utility systems own distribution or collection assets, higher levels of depreciation are typically associated with utilities that own treatment assets as well.

Other expenses include labor and administrative costs, and taxes or payments in lieu of taxes. Fitch typically includes amounts transferred out as an operating expense because the importance of these payments to the recipients significantly increases the likelihood that payments will be made, even during periods of financial stress. However, Fitch nets transfers out against incoming transfers as utilities may receive support from another fund on an ongoing basis (e.g. repayment of a loan from another fund, reimbursement of billing costs from another fund or support from a host municipality) and these moneys would be available for ongoing operations. Fitch may exclude transfers out in cases where the transfer represents payment of debt issued on behalf of the utility and Fitch has clear evidence as to the nature of the transfer. Labor costs, including pension-related costs, are generally a moderate portion of total utility expenses, given the relatively low labor intensity of water and sewer service compared to other general government operations, but could become increasingly burdensome for utilities with large unfunded pension obligations.

The key metric Fitch uses to measure operating cost burden is the ratio of total annual operating costs to total million gallons of water produced and/or sewer flows treated on an average annual basis or, in the case of non-traditional utilities, the total average annual amount of water where there is an associated cost. Fitch typically assesses these metrics over the most recent five-year period. Specifically, Fitch assesses each utility's ratio against levels it considers to be representative of varying degrees of operating risk. Because stormwater utilities' primary activity revolves around managing the conveyance of intermittent flows (where measurement of flow amounts is largely unknown) and these utilities generally have much more limited operations than other water and sewer utilities, Fitch generally considers standalone stormwater utilities to have an operating cost burden assessment of 'aa', although the assessment could be constrained if average annual growth in operating expenses (typically over the most recent five-year period) significantly exceeds inflationary-type adjustments or unanticipated operating or regulatory risks develop. Additionally, Fitch may assess this factor higher than the operating cost burden metric would imply where utilities operate a water and/or wastewater utility in conjunction with another utility where no production or flows exist (e.g. a combined wastewater and stormwater utility).

Capital Planning and Management

Fitch believes producing and transmitting potable and non-potable water as well as collecting, treating and disposing of sewer flows safely and reliably require significant and consistent capital investment. Ensuring the adequacy of resources to meet current and projected demand and the ability to deliver these essential services reliably are fundamental planning requirements of water and sewer utility systems and central to their missions. Expenditures necessary to add new resources and facilities or comply with environmental regulations often entail sizable and costly multiyear projects that can result in periodic spikes in expenditures. In contrast, the need for continual system investment, particularly to replace depreciating infrastructure, is necessary to maintain operating efficiency and preserve reliability.

Capital Planning and Management

Metrics to Support Assessment
• Fitch calculates a ratio to measure the status of a utility's life cycle based on information from its financial statements and typically over the most recent five-year period. The life cycle ratio is calculated as age of plant as the numerator divided by the sum of age of plant plus remaining useful life. Age of plant is calculated as accumulated depreciation divided by annual

Capital Planning and Management

Metrics to Support Assessment
depreciation expense, while remaining useful life is calculated as net capital assets divided by annual depreciation expense. In cases where accumulated depreciation is not available, Fitch will calculate age of plant as follows: 45 – (remaining useful life). • Low life cycle ratio generally indicates low investment needs. Typically, a utility with a life cycle ratio of 45% or less is considered to have moderate investment needs leading to a capital planning and management assessment of 'aa'. Generally, a life cycle ratio greater than 45% indicates elevated investment needs. A high life cycle ratio (over 45%), combined with moderate average capital spending as a percentage of depreciation expense greater than or equal to 80%, has an assessment of 'a'; where capital spending is between 40% and 80% of depreciation, the assessment is 'bbb', while capital spending below 40% is assessed at 'bb'.

Source: Fitch Ratings

Fitch assesses capital planning and management for public water and sewer utilities through a review of the utility's historical spending practices and relative position within the facilities' life cycle. Fitch will also consider a utility's capital improvement plan (CIP) and projected spending requirements, when available. Where appropriate, Fitch may also review the CIP and projected spending of a utility's wholesale provider. The relative position of utilities within their life cycle is used to provide an indication of the condition of the physical operating plant, while the level of capital spending relative to depreciation helps to inform the sufficiency of infrastructure reinvestment.

Utilities whose cumulative depreciation relative to combined plant age and remaining useful life (i.e. life cycle ratio) is 45% or less are considered to have moderate investment needs, supporting a strong capital planning and management assessment. Utilities that are more than 45% through their life cycle may be susceptible to the effects of historical underinvestment in operating assets, which can include elevated levels of routine maintenance, weak production metrics and poor reliability.

However, capital planning and management can be highly cyclical. Therefore, older utilities that continue to underinvest, as evidenced by historical and projected capital spending that is significantly less than annual depreciation, are deemed to have high capital planning and management needs. Furthermore, consistent material underspending relative to the CIP may be indicative of weak management practices that are risk additive, even if annual investment exceeds depreciation. This may be particularly relevant if future capital plans are intended to address regulatory mandates or supply and/or capacity constraints.

Conversely, CIPs and recent spending aimed at addressing system deficiencies and increasing investment, as evidenced by capital spending near to or well in excess of annual depreciation, generally support a midrange capital planning and management assessment, despite the age of facilities. CIPs that reflect proactive steps to address future system supply and/or capacity needs as well as regulatory requirements may support an assessment that is higher than the relevant metrics indicate.

Nevertheless, where concerns exist regarding a utility's ongoing ability to provide service, where service is susceptible to significant outages (e.g. from weather events) or where the level of water loss rates is viewed as excessively high relative to levels typically seen within the industry, Fitch may deviate from the implied capital planning and management metrics and qualitatively provide a lower assessment.

Fitch's capital planning and management assessment may also include analysis of how planned projects fit with the utility's CIP and its long-term strategies, and the potential implications for operating risk. Operating risk could increase for utilities contemplating major construction projects specifically when plans exhibit weak planning mechanisms or involve complex or new technology judged to be higher risk. The project team's qualifications and experience could also be considerations as well as the availability of construction workers. Guaranteed maximum price contracts, owners' and builders' contingencies, liquidated damages and capitalized interest funding are standard features utilized in most large utility construction projects, and serve to reduce the inherent construction and development risk in any large capital project. Where the completion risk is considered material, it may constrain the overall operating risk assessment and will be considered in the scenario analysis described in the Financial Profile section.

If not included in the CIP, Fitch may request a multiyear capital budget — typically five years — to assess the effect planned or proposed capital investments will have on the financial profile of the utility system. The manner of intended funding, and the near- and longer-term effect on leverage, are particularly taken into account. A utility's expected funding sources can affect the rating outcome, depending on the degree of debt funding versus cash on hand and cash from operations and other non-debt sources. Fitch reviews the timing, availability and assumptions regarding planned debt issuance and the effect on the borrower's balance sheet and cash flow. (See the *Financial Profile* section.)

Extraordinarily Weak Assessment — Operating Risk

Operating risk may be assessed at 'b' or lower (extraordinarily weak) in circumstances where the utility's operating costs and capital planning and management characteristics exhibit attributes that are even weaker than those outlined in *Appendix F*. These instances are expected to be rare and likely the result of an erosion in the utility's ability to manage operating costs, or its fundamental business model over time.

Refer to Fitch's "U.S. Public Sector, Revenue-Supported Entities Rating Criteria" for additional discussion.

Asymmetric Rating Factor Considerations — Operating Risk

The availability of adequate water supplies is critical for a utility to meet its customer demands. While supply or resource-management risk is considered low for most water utilities, given the natural replenishment that typically occurs, a utility's operating risk assessment may be constrained where supplies or existing infrastructure may be insufficient to meet ongoing demands. Shortfalls in resource capacity are expected to be met through either wholesale purchases (where available) or construction of additional infrastructure to enable diversion of such resources. The emphasis of Fitch's operating risk assessment is, therefore, on cost and perceived difficulties in ensuring adequate supply resources or infrastructure reliability, as well as challenges that result from new or revised regulatory or other supply constraints. Geographic or infrastructure isolation may also introduce vulnerability to supply shortages and challenges to reliability, which could also constrain the operating risk assessment.

In cases where these factors introduce additional revenue and/or financial risks, the rating may be further constrained. Fitch may limit commentary on asymmetric rating factors to those that constrain the rating.

Financial Profile

The third KRD is a utility's financial profile. Having evaluated a utility's revenue defensibility and operating risk, Fitch considers the entity's financial flexibility through a range of scenarios intended to assess its relative capacity to repay debt and other liabilities. This analysis will connect the utility's overall business risk profile, through its revenue defensibility and operating risk assessments, with its leverage and liquidity profile, assessed on a forward-looking and through-the-cycle basis, rather than a single point in time. The evolution of the financial profile, its low point and its average through-the-cycle performance, is considered. The assessment considers direct debt liabilities, pension liabilities and capitalized obligations, as described below.

Fitch Scenario Analysis

Fitch will develop cash flow scenarios to frame the financial profile assessment. These scenarios will include a base case and stress scenario(s). The scenario analysis used in the determination of the rating (the rating case) is a key quantitative and qualitative input to the rating decision, and is typically a central point of discussion in rating committees. Consistent with Fitch's through-the-cycle ratings approach, the rating case will typically be a stress scenario, but the base case may on occasion represent the rating case, particularly for issuers already recovering from a severe stress or lower speculative-grade issuers.

Revenue and operating cost assumptions, together with planned capex and additional debt or liability growth, are developed for the scenarios based on Fitch's review of a utility's historical performance and expectations for future performance.

Once established, scenarios may be revised as appropriate to preserve the forward-looking nature of Fitch's analysis, and to reflect unexpected financial results or changes in assumptions if relevant to a utility's performance and rating. Fitch's expectations reflected in the scenario(s) will further be shaped by revenue and operating risk KRD assessments. Peer analysis may be used wherever appropriate and if ratings for a relevant group of peers with similar operating and revenue defensibility profiles can be compiled. For utilities whose ratings are driven by counterparty credit quality and where the leverage profile may be less of a consideration scenario analysis may be unnecessary.

Establishing the Base Case

The development of a base case begins with Fitch's evaluation of a utility's recent historical performance based on a review of its audited financial statements and any unaudited financial information covering at least three years, but typically five years. The base case generally serves as Fitch's expected performance in the current operating environment.

Fitch will consider the level of consistency in recent financial and operating performance of the utility, its management team and its market as one indicator of future performance. Fitch will generally start the base case analysis using assumptions reflecting variability in revenue and expense performance derived from long-term historical performance. However, there may be analytical reasons to diverge from these input assumptions (e.g. nonrecurring events). Fitch will evaluate each utility, and develop and communicate expectations.

Although Fitch will review a utility's annual operating budget or longer-term forecast when presented, the Fitch base case ultimately reflects its criteria and expectations, including macroeconomic assumptions. Fitch will consider the reasonableness of the assumptions that drive projected results if the utility's forecast suggests future performance is expected to track differently from historical results due to items such as significant capital expenditures, changes in rate design or incorporated stresses. Forecasts that rely on aggressive volume growth, non-core revenue, rate increases that are materially different than historical changes or cost reductions will be viewed with analytical caution in the rating process. Conversely, Fitch's base case may rely more on historical trends where utility forecasts reflect stresses applied for planning purposes.

Base Case Informs Stress Scenarios

The base case is the starting point of sensitivity analysis. A standard stress scenario will consist of a through-the-cycle view that incorporates a capital stress as described in *Appendix A*. Fitch may also consider alternate stress scenarios to reflect its view of macroeconomic or issuer-specific issues. The stress scenario analysis will reveal levels and shifts in key operating, leverage and liquidity metrics contrasted with the base case to determine if they are consistent with a stable rating through that stress scenario.

Stress(es) Reflected in Forward-Looking Scenarios

The Fitch Analytical Stress Test (FAST) tool is used to formulate the base case and stress scenario(s). The FAST tool highlights how a utility's financial profile can change through a business cycle and capital stress. While FAST supports Fitch's through-the-cycle analysis, it is not a forecasting tool. FAST should be considered a scenario tool to be used in the rating process to better differentiate between credits.

Fitch's overarching philosophy is that ratings should not change due to normal cyclical variations. Economic downturns are inevitable, and variations in financial performance in many cases can be observed. Fitch believes ratings should account for this. However, broad shifts different from the ebb and flow of a normal business and capital cycle may also occur. Scenario analysis helps make the distinction between the two and helps communicate both rating sensitivities and what is already anticipated in the current rating. See *Appendix A* for additional detail on the FAST tool.

The typical stress assumed for entities rated 'BB' category or above will generally reflect revenue and cost stresses commensurate with those a utility would encounter following an unexpected increase in capital costs based on its specific characteristics and risk attributes. The purpose of the scenario analysis is to establish benchmark measures of liquidity and leverage that are incorporated in the rating through the cycle.

The effect of the unforeseen capital expenses on leverage will be reflected in the scenario, as will Fitch's expectations of the utility's response. The FAST tool will be the source for evaluating the change of leverage and prospects for a utility managing through such capital stress while maintaining its financial profile. In cases where the base case is sensitized to reflect known or anticipated stress, the resulting leverage and financial metrics could be considered as the rating case.

Leverage Profile

Leverage Profile Key Focus of Scenario Analysis

Scenario analysis highlights expected future financial leverage of the utility, considering both through-the-cycle elements and forward-looking expectations. The measure of financial leverage considers the level of debt and other fixed obligations as it relates to the generation of cash flow. The relative strength of balance sheet and available resources to absorb changes in working capital is considered in the context of the ability to adjust revenue to recover expenses and manage operating risks when forming a rating view. Where utilities retain funds on hand intended to pay for capital projects, Fitch may consider these funds as "Available Cash" in its leverage calculation. (See *Appendix A*.)

Future financial leverage is reflected in the net adjusted debt to adjusted FADS, or leverage ratio, which measures a utility's debt and other fixed obligations (net of certain balance sheet resources), relative to its annual cash flows available to service those obligations.

Leverage Ratio — Net Adjusted Debt to Adjusted FADS Ratio

(Total Debt + Capitalized Fixed Charges + Adjusted Net Pension Liability – Available Cash – Funds Restricted for Debt Service) ÷ (FADS + Fixed Services Expense + Net Transfers + Pension Expense)

FADS – Funds available for debt service
Source: Fitch Ratings

The resulting value is expressed as a multiple and may be positive or negative (where a utility holds more cash and investments than the amount of its outstanding debt or reports operating losses). High values, or negative values as a result of operating losses, imply lower flexibility in meeting and managing debt and long-term liability obligations, as well as a lower

capacity for additional debt absent rate increases and improved cash flows (see Rating Positioning table). In calculating net adjusted debt to adjusted FADS, Fitch will employ an alternative calculation that excludes operating expenses where a statutory framework provides a gross lien on revenues of an entity not subject to bankruptcy or other insolvency proceedings while rated debt is outstanding.

Rationale for Capitalization of Fixed Charges

Fitch views fixed obligations related to purchased water and/or sewer services as a debt-equivalent form of funding for operational assets as these situations are often substitutes for asset ownership and long-term on-balance-sheet funding. Consequently, Fitch adjusts its leverage ratios to include the debt-like features of these circumstances. Where purchased services agreements or project financings exist, Fitch will capitalize 35% of a utility's purchased or contracted service expenses using a 7.0x multiple to create a debt-equivalent figure. This figure represents the estimated funding level for a hypothetical purchase of the assets and is included in Fitch's leverage metrics.

A multiple of 7.0x reflects assets with an average remaining economic life of 28 years, consistent with the long-dated infrastructure assets owned by water and sewer utilities, in a 6% interest rate environment. This adjustment enables a broad comparison between rated entities that incur debt to finance supply and treatment assets and those that contract for services or finance infrastructure through a conduit entity. In cases where a utility's actual fixed charges and related off-balance sheet debt are available, or prevailing agreements include no fixed charges, appropriate adjustments may be used in Fitch's analysis. To the extent the utility purchases a significant level of other services, such as power, the relevant fixed charges may also be considered in Fitch's analysis.

Certain operating leases and/or subscription-based information technology arrangements that are long term in nature may also be viewed as a debt-equivalent form of funding in keeping with relevant accounting standards.

Rationale for Pension Treatment in Leverage Metrics

Issuers with defined-benefit (DB) pensions carry a financial obligation that is long term in nature, and uncertain in timing and amounts to be paid. Fitch views unfunded pension liabilities, which broadly represent the accrued liabilities in excess of the invested assets available to meet the obligation, as a debt-equivalent obligation that may be included in the calculation of Fitch's core leverage metrics and its assessment of an issuer's financial profile. Fitch's determination of each issuer's exposure to and level of pension obligations is dependent upon a number of variables, including accounting standards, applicable regulations and funding practices. The methodologies and parameters used in Fitch's analysis are outlined in *Appendix D*.

Other Post-Employment Benefits: In most cases, Fitch does not consider the credit impact of other post-employment benefits (OPEB) in assessing the long-term liabilities of water and sewer utilities. For most governmental entities providing OPEB, the level of benefits has proven much easier to change than pensions, and legal protections appear limited in most cases. In cases where OPEB is exceptionally large and not subject to modification, Fitch may incorporate OPEB as an asymmetric risk factor.

Rationale for Transfer Treatment in Leverage Metrics

Fitch includes net transfers in its calculation of adjusted FADS in its leverage assessments. Amounts regularly transferred or paid to owners, a host municipality or other funds are subtracted and treated as an operating expense in its calculation of adjusted FADS. These transfer payments may be reported as non-operating expenses or explicitly subordinate to debt service payments. However, Fitch believes the importance of these payments to the recipients in most cases significantly increases the likelihood payments will be made, even during periods of financial stress, and particularly during periods of financial stress affecting the host municipality. Moreover, given the timing of remittance, payments are often made prior to debt service. Fitch may exclude transfers out if such transfers reflect payment for debt issued by the host government or other fund on behalf of the utility if Fitch has clear evidence as to the nature of the transfers. Alternatively, amounts regularly paid to the utility by the host municipality or affiliated funds will typically be netted against transfers out and included in the net transfers total. These types of payments are typically repayments for interfund loans made by the water and/or sewer utility or defined arrangements for particular services or commitments. Otherwise, in limited cases and typically based on the presentation of the financial statements, such amounts paid to the utility could be netted against operating expenses.

Nonrecourse Debt

Obligations where collection and repayment risks have effectively been transferred to a third party, and where nonpayment would not result in a cross-default or cross-acceleration to an issuer's other outstanding debt, may be excluded from the calculation of debt metrics and leverage for analytical purposes. Examples may include: separately secured debt whose repayment is provided by third parties or alternative revenue sources; and asset-based financings (including securitizations) that are nonrecurrent in nature and supported by genuine asset sales, wherein creditors only have recourse to the assets bought, with no recourse to the originator.

Liquidity Profile

In addition to the leverage metric analysis described above, Fitch also performs a liquidity assessment. The liquidity profile assessment evaluates the liquidity resources available to a utility to meet expected and unexpected current business obligations relating to both operating and debt expenses. The first resource available to most utilities is periodic excess margin above operating costs that acts as a cushion to changing circumstance. A second source is available cash and investments in reserve, and a third, albeit for relatively few water and sewer utilities, is committed liquidity lines from investment-grade financial institutions.

A weak liquidity profile relative to operations can constrain the overall assessment of the utility's financial profile. Two key metrics used by Fitch to measure liquidity are coverage of full obligations (COFO) and liquidity cushion.

Coverage of Full Obligations

COFO is a measure of operational strength relative to a utility's debt and fixed obligations that come due in any annual period. While Fitch calculates a traditional debt service coverage (DSC) ratio for all public utility issuers, the calculation of COFO facilitates comparability among utilities as it also considers the effect of fixed services expense, as well as net transfers, on a utility's liquidity profile. Fitch takes into consideration growth-sensitive revenues, such as connection/availability fees in the calculation of both COFO and DSC. However, given the potential variability of such revenues, utilities generating COFO or DSC below 1.0x excluding such sources are considered to have a 'weak' liquidity profile.

Coverage of Full Obligations Ratio

(FADS + Fixed Services Expense + Net Transfers) ÷ (Total Annual Debt Service + Fixed Services Expense)

FADS – Funds available for debt service
Source: Fitch Ratings

COFO is used to assess an entity's liquidity profile as follows:

Coverage of Full Obligations

Metrics to Support Assessment
• Coverage of full obligations (COFO) generally less than 1.0x from all available revenues and/or generally less than 1.0x excluding connection/availability fees is weak and risk additive. • COFO below 1.0x may not be considered weak if a borrower maintains current days cash on hand at 120 days or more.

Source: Fitch Ratings

Liquidity Cushion

Liquidity cushion measures a utility's liquidity — current and available cash and investments, and available lines of credit — against average daily cash operating expenses (excluding depreciation and amortization). In addition to assessing a utility's full liquidity cushion, Fitch also assesses the individual components against average daily cash operating expenses, if applicable. Both of the ratios measure the number of days the utility could continue to pay its average daily cash operating expenses using relevant sources of liquidity.

Liquidity Cushion Ratio

(Current Cash Available + Available Borrowing Capacity) ÷ Average Daily Cash Operating Expenses

Source: Fitch Ratings

Available borrowing capacity under committed lines of credit is included in the liquidity cushion ratio if provided by investment-grade financial institutions, or lower-rated institutions if the rating is equivalent to the utility rating. Where necessary information is not available, liquidity will be assessed without explicit credit for borrowing capacity. Similarly, borrowing capacity includes available issuance capacity under commercial paper (CP) programs where the allowable use of proceeds includes payment of scheduled debt service or is unrestricted. Programs rated 'F3' by Fitch will not be included when calculating borrowing capacity. Programs where the use of proceeds is limited to capital investment may also be excluded when calculating borrowing capacity.

Liquidity Cushion

Metric to Support Assessment

- A liquidity cushion at or above 90 days is neutral to ratings, as long as Current Cash Available is at or above 30 days. A liquidity cushion below 90 days or Current Cash Available below 30 days is considered weak and risk additive.
- These metrics have been determined assuming all asymmetric rating factors are neutral. Entities exposed to unusual business risks including customer concentration, outsized market price risk or inadequate cost recovery mechanisms may require higher levels of cash and borrowing capacity to achieve a neutral liquidity cushion assessment.

Source: Fitch Ratings

The liquidity cushion assessment for utility systems organized as enterprise funds may include a separate review of the host municipality when government-wide cash balances are consolidated and held within the general fund. Fitch's review will include an evaluation of the sufficiency of cash on hand, and the utility's access and availability to funds. Government-wide cash on hand equal to 60 days or more is considered neutral; below 60 days is considered weak and is risk additive.

Rating Guidance: Applying Analytical Judgment to Align Key Risk Factors, Financial Profile and Ratings

The results of the scenario analysis are used to assess the impact of change on key liquidity and leverage metrics. Together, these create a financial profile on a forward-looking and through-the-cycle basis aligned with the assessment of KRDs to obtain an indicative rating level. The Rating Positioning table below provides guidance to the analytical outcome, aligning the assessment of the utility's overall business risk profile — through revenue defensibility and operating risk assessments — with its leverage and liquidity profile.

The evaluation and importance of KRDs are specific to the individual credit being considered. However, while both revenue defensibility and operating risk are important in evaluating a utility's financial profile, in some cases, revenue defensibility can have a greater influence in the determination of a utility's financial profile. For example, utilities with a revenue defensibility assessment of 'aa' and operating risk assessment of 'bbb' can operate at a higher degree of financial leverage than utilities with a revenue defensibility assessment of 'bbb' and operating risk assessment of 'aa' and achieve the same financial profile assessment.

Rating Positioning

Revenue Defensibility Assessment	Operating Risk Assessment	Leverage Profile Assessment (Net Adjusted Debt/Adjusted FADS) (x)				
		aaa	aa	a	bbb	bb
aa	aa	<5	5–10	10–14	14–16	16–20
aa	a	<4	4–8	8–12	12–16	16–20
a	aa	<4	4–8	8–12	12–16	16–20
aa	bbb	—	<7	7–11	11–14	14–18
a	a	—	<6	6–11	11–14	14–18
a	bbb	—	<6	6–11	11–14	14–18
aa	bb	—	<5	5–9	9–12	12–16
a	bb	—	<4	4–7	7–12	12–16
bbb	aa	—	<4	4–7	7–12	12–16
bbb	a	—	<4	4–7	7–12	12–16
bbb	bbb	—	<0	0–5	5–6	6–10
bbb	bb	—	<0	0–1	1–4	4–8
bb	aa	—	—	<1	1–4	4–8
bb	a	—	—	<0	0–4	4–8
bb	bbb	—	—	<0	0–2	2–6
bb	bb	—	—	<-3	-3–0	0–4
Suggested Financial Profile Assessment		**aaa (Exceptionally Strong)**	**aa (Very Strong)**	**a (Strong)**	**bbb (Midrange)**	**bb (Weak)**
Suggested Analytical Outcome[a]		**AAA**	**AA**	**A**	**BBB**	**BB or below**

[a] SCPs will be assessed as 'aaa', 'aa', 'a', 'bbb' 'bb' or below. FADS – Funds available for debt service.
Source: Fitch Ratings

The Rating Positioning table is constructed assuming all asymmetric risk-additive features are neutral and the utility does not have a weak liquidity profile. The financial profile assessment could be lowered if the utility has a weak liquidity profile, and ratings/SCPs may be notched lower from the guidance if negative asymmetric factors are present. The degree of notching is qualitatively assessed and reflects a judgment on the relative additional risks to financial capacity that may result. Multiple asymmetric risk factors are likely to result in multiple notches. A single factor may not result in any notching if its effect on financial capacity is considered limited, or is already reflected in a rating sensitivity or a Negative Outlook.

Utilities with leverage higher than the ranges presented in the Rating Positioning table and those with extraordinarily weak revenue defensibility or operating risk assessments -regardless of leverage - are likely to be rated below the 'BB' category.

Notch-specific positioning with the suggested analytical outcome will generally be driven by peer analysis, the relative positioning of ratios within the bandwidths established in the table, the relative strength of KRD metrics and/or the likelihood of migration to a weaker or stronger assessment.

Other Considerations Related to Rating Positioning

The Rating Positioning table is the starting point in assessing a utility's leverage and financial profile, as well as determining the IDR/SCP. Where factors are present that indicate an entity's financial profile may be higher or lower than suggested by the Rating Positioning table, alternative financial and liquidity metrics may be considered in determining the financial profile assessment and rating. Other considerations that could result in a higher or lower assessment of the leverage and/or financial profile, and a different IDR/SCP, than otherwise suggested by the Rating Positioning table include, but are not limited to, the following:

	Rationale	
Consideration	**Higher IDR/SCP or assessment than suggested by Rating Positioning table**	**Lower IDR/SCP or assessment than suggested by Rating Positioning table**
Off-balance sheet debt (contract debt)	Where off-balance sheet debt is meaningfully lower than amounts calculated pursuant to Fitch's analytical approach, assessments and ratings may reflect the issuer's actual contract debt burden.	Where off-balance sheet debt is meaningfully higher than amounts calculated pursuant to Fitch's analytical approach, assessments and ratings may reflect the issuer's actual contract debt burden.
Position in Capital Cycle	Issuers entering, or at the peak of, periods of intense capital spending may report weakened leverage and financial metrics and assessments that are not reflective of the longer-term credit quality and may warrant ratings that are higher than the Rating Positioning table suggests. These circumstances may be particularly present as issuers proactively address unusual growth, as well as supply and/or regulatory projects, that drive leverage higher, but position the utility well for long-term operational stability. Cases where financial stability is achieved outside of Fitch's scenario analysis period may also warrant higher ratings.	Issuers deemed to be under-investing in and/or deferring capital projects may report stronger leverage and financial metric assessments that do not capture longer-term spending requirements and credit quality, and may warrant ratings that are lower than the Rating Positioning table suggests. These circumstances may be particularly present if issuers fail to address supply and/or regulatory projects, which lower leverage, but jeopardize long-term operating stability. Cases where necessary investment is anticipated outside of the Fitch's scenario analysis period may also warrant lower ratings.
Migration of assessments	Enhanced prospects for, or the expected improvement of a revenue defensibility or operating risk assessment.	Enhanced prospects for, or the expected lowering of, a revenue defensibility or operating risk assessment.
Volatility of Financial Performance	Higher than normal volatility of financial performance and related metrics could result in a financial profile assessment and suggested analytical outcome that differ from the Rating Positioning table. In years of unusually weak performance, assessments may be higher than suggested by the Rating Positioning table, but in all cases reflect Fitch's through-the-cycle approach.	Higher than normal volatility of financial performance and related metrics could result in a financial profile assessment and suggested analytical outcome that differ from the Rating Positioning table. During years of unusually strong performance, assessments may be lower than suggested by the Rating Positioning table, but in all cases reflect Fitch's through-the-cycle approach.
Additional Revenue Streams	Tax pledges and/or revenues that have or could have the potential to provide meaningful enhancement to revenues could support higher ratings.	N.A.
No funded debt	For utilities with financial obligations, but de minimis debt levels, no funded debt or no net debt, the leverage profile may be less of a consideration in a rating. In these cases, a utility's revenue defensibility or operating risk assessment may be more relevant in determining the final IDR/SCP outcome.	
Counterparty Focus	The leverage profile may be less of a consideration in a rating where the utility benefits from a contractual framework in which revenues and costs are largely balanced through pass throughs to one or more counterparties. In such cases, protections afforded in the contractual framework to mitigate the loss of one or more counterparties will be more relevant to the rating outcome. Where a utility is exposed to a single counterparty or to the loss of the weakest among a group of counterparties, the rating will generally be no higher than the IDR/SCP of the single or the weakest counterparty unless there are mitigating structural features that allow absorption of that loss without materially altering a utility's financial	

Consideration	Rationale	
	Higher IDR/SCP or assessment than suggested by Rating Positioning table	Lower IDR/SCP or assessment than suggested by Rating Positioning table
	profile. In these situations, the financial profile assessment and/or rating may be the same as the relevant counterparty, or in the case of wholesale systems, the purchaser credit quality (PCQ).	

Source: Fitch Ratings

Asymmetric Additive Risk Considerations

The final rating/SCP will also consider certain additional risk factors. These additional risk factors work asymmetrically, where only below-standard features are factored into the final rating levels, while more credit-positive features are expected to be the rule and are considered credit neutral.

When multiple risk-additive features exist, the rating/SCP will be lower than the indicative rating, possibly by multiple notches, based on the severity of the risks. For example, a utility with a midrange (i.e. bbb) revenue defensibility assessment and operating risk assessment along with leverage consistent with an indicative rating of 'AA' might only achieve a rating of 'A+' if its debt structure was assessed to be weak, reflecting a material exposure to refinance risk or swap risk. It might only achieve a rating of 'A' if debt structure, and management and governance practices were assessed as weak. The final rating/SCP will reflect a qualitative assessment of the extent and impact of the asymmetric risk factors. Fitch may limit commentary on any such asymmetric additive risk considerations to those that impact the final rating/SCP. The asymmetric considerations are discussed fully in Fitch's "U.S. Public Sector, Revenue-Supported Entities Rating Criteria."

Debt Structure and Contingent Liability Exposures

Public water and sewer utility debt structures are typically strong, characterized by long-dated (generally 20–40 years) amortizing debt issues with fixed interest rates and declining or level annual debt service requirements. While some utilities utilize bullet structures, variable-rate demand bonds (both hedged and unhedged), direct placement and renewable bank financing, the par value of these financing vehicles is usually manageable or below the level of cash on hand, thereby eliminating significant interest rate and refinancing risk. Thus, the debt structure attribute for many utility systems is neutral. However, there may be utilities whose debt structures have features that add risk, such as non-amortizing bullet maturities or mandatory put bonds. These will be considered when assessing adjustments to the rating suggested by the Rating Positioning table.

While most variable-rate demand bonds and CP issuance are supported by external dedicated liquidity facilities provided by financial institutions, borrowers sometimes choose to support these obligations using their own internal liquidity, including unrestricted cash and investments, and general lines of credit. In such instances, Fitch's analysis considers the stability and availability of funds sufficient to meet potential purchase requirements, as well as the policies and procedures that would be followed if a failed remarketing occurs (see "U.S. Public Sector, Revenue-Supported Entities Rating Criteria"). Moreover, Fitch may evaluate the potential change in leverage that could result from utilization of cash resources in the financial profile assessment.

A weak debt structure will constrain the overall assessment of the utility's financial profile. Absent unrestricted cash resources sufficient to address structural shortcomings, Fitch considers the following debt characteristics and terms consistent with a weak assessment:

- Material exposure to refinance risk (use of bullet maturities; debt not fully amortized at maturity), which distorts near-term financial metrics and increases the uncertainty of both market access and the cost of debt at a future date.
- Highly sculpted and substantial use of deferred amortization instruments that materially distort near-term financial metrics.
- Material exposure to unhedged floating-rate interest. Fitch considers whether the unhedged portion of exposure, if any, would have a material impact to the utility's financial profile under stressed interest rate assumptions.
- Material exposure to contingent liabilities, including swap and derivative contracts that include collateral posting requirements, and termination events that require a payment of the current marked-to-market value of the swap contract.

For more information on Fitch's global approach to analyzing debt structures, see Fitch's master criteria "U.S. Public Sector, Revenue-Supported Entities Rating Criteria."

Management and Governance

The quality of management and governance is an important consideration when assessing the potential performance of a utility over the life of its debt. However, Fitch considers this attribute to be asymmetric, where weak management and governance may cause the rating to be lower, all else being equal. In contrast, the presence of strong management and governance — as evidenced by comprehensive strategic planning and adherence to financial policies, particularly rate setting — will be considered when evaluating the impact of stress scenarios and the ability of a utility to manage through those stresses.

Weaker characteristics of management and governance that may constrain the rating, when analyzing the ability to execute on organization initiatives and plans, as well as the capacity to manage through the business cycle include:

- Lack of experience and depth at the utility.
- Significant political pressure in the underlying municipality or in the members' service areas that can delay or prevent rate increases and impair its financial profile.
- Political considerations that impose a disproportionate influence or a limitation on utility operations and decision making.
- Repeated failure to adopt budgets in a timely manner due to absence of consensus in governing body or resistance of key stakeholders.
- Failure to maintain open communications between the utility and any relevant governing body, which may reveal itself in unexpected operating changes.
- Weak or lack of forecasts and resource-management plans.
- Limited or lack of policies and procedures.
- Official allegations of substantial corruption, or breach of financial reporting law or regulation.
- Inability to adequately protect cyber and other infrastructure from attack.

Legal and Regulatory

Forming an opinion of the quality of the legal or contractual framework upon which many assumptions rest is a prerequisite to the credit analysis. For instance, the framework may be purely contractual or rely on statute or codified law, or a particular statutory instrument, or the powers of a constitutional or statutory authority. Fitch forms a view on the clarity of the legislation and/or regulation, the scope of regulatory discretion, and any effect this may have on facility performance or dispute resolution. The financing documentation — and if appropriate, any legislation it may depend on — or detailed summary documents, such as offering materials, are reviewed for key commercial elements and contract clarity, especially regarding allocation or transfer of risk.

The water and sewer sector is exposed to a wide range of state and federal regulation. A utility's effective participation in the regulatory and legislative processes and its response to regulatory developments are therefore considered in Fitch's analysis. Fitch combines a review of the current and expected regulatory climate with an assessment of the organization's ability to maintain stable operations in the face of regulatory change. Fitch may review responses to prior regulatory mandates, identifying financial and operational effects. Fitch also examines the potential for future regulatory initiatives and assesses whether the organization, through its systems, practices and resources, will have the ability to manage potential downside risk.

Weaker characteristics of legal and regulatory framework include:

- Contractual, regulatory or statutory framework dependent on untested or temporary legislation or regulation.
- Weak or no legal opinions; contracts not available for inspection.
- Proposed legislation or initiatives that would curtail existing rate-setting authority.
- Less effective participation in regulatory process with negative regulatory outcomes.

Information Quality

The quality of information received by Fitch, both quantitative and qualitative, can be a constraining factor for ratings. Information quality may constrain the rating category to a maximum level or, in extreme cases, preclude the assignment of a rating. Information quality for the initial rating and for surveillance purposes is considered when a rating is first assigned. Fitch must be confident adequate ongoing data will be available to monitor and maintain a rating once assigned. Information quality encompasses such factors as timeliness and frequency, reliability, level of detail and scope.

The information provided to Fitch may contain reports, forecasts or opinions provided to the utility or their agents by various experts. Where these reports contain matters of fact, Fitch will consider the source and reliability. Where the information is a forecast or opinion, Fitch expects these to be based on well-reasoned analysis supported by the facts.

The status of the expert and the materiality of their forecast or opinion will also be considered in determining what weight may be given their forecasts or opinions. Factors such as experience in the jurisdiction, location or terrain; experience with the technology or transaction type; and formal qualification or licensing are often relevant. When forming its rating opinion, Fitch may place less weight on expert reports that lack clarity or contain extensive caveats, or were conducted under less relevant circumstances. Such features may lead to adjustments in Fitch's financial or operational analysis. Fitch expects experts to conduct their reports to professional standards. If possible, reports are compared with similar reports to highlight unusual or optimistic features.

The degree to which Fitch uses expert information will depend partly on the above issues and on the relevance of the information to the identified key risks. Where available, if expert information does not address a material issue, but might be expected to, Fitch may request further information or make an appropriate assumption. Fitch may choose not to provide a rating if it determines the reports are not sufficiently supported, complete or reliable.

Fitch considers this attribute to be negative when information is substantially based on assumptions, extrapolated or subject to material caveats; if the data are often subject to delay, has a history of revisions or errors, or is limited in scope.

Data Sources

The key rating assumptions for the criteria are informed by Fitch's analysis of information provided by obligors, financial advisors, legal advisors, third-party engineers, consultants, underwriters and/or available through public sources. Information includes, but is not limited to, audited and interim financial statements, regulatory filings, operational data and service area demographic information. In certain cases where data specific to particular factors in these criteria are unavailable, Fitch may use other data sources to extrapolate information or may assign a particular credit factor an assessment level Fitch feels is appropriate.

Fitch typically uses both consolidated audited financial statements and segment financial information in its credit analysis. However, there are instances where Fitch is asked to rate a newly formed entity or segment that cannot provide historical audited financial results. In those cases, Fitch may base its analysis on historical pro forma financial statements provided by the entity. Fitch will evaluate the legal, financial, operational and managerial linkage between obligors and affiliated segments. The credit analysis and rating rationale will be based on fully consolidated statements where Fitch deems the dependence or inter-reliance among segments to be significant.

Rating Assumption Sensitivity

Revenue Defensibility: Ratings are sensitive to changes in attributes of revenue defensibility that affect overall assessment. Changes in service area characteristics, rate flexibility or counterparty quality (if applicable) as well as the presence of asymmetric factors can change the final assessment.

Operating Risk: Ratings are sensitive to changes in operating risk attributes, reflecting shifts in operating costs, operating cost flexibility and capital needs as well as the presence of asymmetric factors that affect the overall assessment.

Financial Profile: Ratings are sensitive to changes in leverage profile or liquidity profile assessments as well as other considerations that result in a different analytical outcome than suggested in the Rating Positioning table.

Variations from Criteria

Fitch's criteria are designed to be used in conjunction with experienced analytical judgment exercised through a committee process. The combination of transparent criteria, analytical judgment applied on a transaction-by-transaction or issuer-by-issuer basis, and full disclosure via rating action commentary strengthens Fitch's rating process while assisting market participants in understanding the analysis behind our ratings.

A rating committee may adjust the application of these criteria to reflect the risks of a specific transaction or entity. Such adjustments are called variations. All variations will be disclosed in the respective rating action commentaries, including their impact on the rating where appropriate.

A variation can be approved by a ratings committee where the risk, feature or other factor relevant to the assignment of a rating and the methodology applied to it are both included within the scope of the criteria, but where the analysis described in the criteria requires modification to address factors specific to the particular transaction or entity.

Limitations

Ratings, including Rating Watches and Outlooks, assigned by Fitch are subject to the limitations specified in Fitch's Ratings Definitions and available at www.fitchratings.com/definitions.

Disclosure

Fitch expects to disclose, as part of its rating action commentaries or new issue reports, an entity's functional responsibilities to the extent they serve as the foundation of an assessment and any direct relationship between the general government's credit quality and the related utility's securities. In addition, Fitch will disclose any variation to criteria (as mentioned in the *Variations from Criteria* section).

Appendix A: FAST Water & Sewer — Fitch Analytical Stress Test Tool

Fitch's FAST for U.S. water and sewer utilities highlights the forward-looking performance of a utility, typically over a five-year period, although it is not intended to be a cash flow or operating forecast. FAST assesses the impact of an unanticipated increase in capital spending on operating cash flows and leverage. Unanticipated increases in capital spending can occur as a result of numerous situations, including sequencing of project timing, change of scope or rising labor and commodity costs, as well as unplanned projects arising from regulatory requirements or operating challenges. Given the potential impact these increases can have on financial leverage and liquidity, Fitch believes such changes within reasonably anticipated ranges should be accounted for in its rating.

Scenario Analysis

The starting point for FAST's scenario analysis is a base case that generally follows the last five years (minimum of three) of financial reporting to illustrate anticipated performance. Standard default assumptions as outlined below would generally be expected to be utilized in developing the base case. However, if available and deemed reasonable by Fitch, the base case may also incorporate projections from the utility. The typical FAST stress assumes a uniform capital spending stress specified as a 10% increase over the assumed base case level that is financed by debt. For each case, the scenario analysis will calculate basic financial metrics, including net adjusted debt to adjusted FADS, COFO and DSC.

Once established, Fitch's FAST may be revised as appropriate to preserve the forward-looking nature of Fitch's analysis, and to reflect unexpected financial results or changes in assumptions if relevant to an entity's performance and rating.

FAST Default Assumptions

Assumption	Applies to:
Grown at rate of average inflation (2%)	• Non-operating revenues from taxes, investment income, net transfers and subsidies • Restricted cash and investments (excluding construction funds)
Fixed at most recent historical (typically five-year) average	• Non-operating revenues from miscellaneous cash • Connection fees • Purchased water/sewer services • Capital expenditures (150% of average) • Adjusted net pension liability • Pension expense
Grown at rate of three- or five-year CAGR	• Operating expenses (excluding depreciation and purchased water/sewer services) • Operating revenues (capped at operating expense growth CAGR)
Held constant in nominal terms	• Operating lease expense • Restricted construction funds (unspent balances held constant)
Average interest rate implied by the last five or three years of historical data	• Principal payments (amortization based on the 15th year of a 30-year time horizon, at this interest rate) • Cash interest paid (total debt multiplied by this interest rate)

Source: Fitch Ratings

Appendix B: Wholesale Water/Sewer Utilities Key Rating Drivers

Fitch's KRDs are assessed using the following guidance for wholesale public water and sewer utilities, including joint action agencies and other government-owned utilities. The guidance outlines general expectations for a given rating category, and in some cases, includes operational and financial assessments of both the wholesale provider and its purchasing entities.

Key Rating Drivers — Wholesale Water/Sewer Utilities

Revenue Defensibility	**aa**	**a**	**bbb**	**bb**
Revenue Source Characteristics	Very strong. Wholesale revenues are derived from unconditional contracts, enabling legislation or equivalent that provide for full cost recovery, as well as the unlimited reallocation of costs among contracted purchasers.	Strong. Wholesale revenues are derived from unconditional contracts, enabling legislation or equivalent that provide for full cost recovery, but include limited reallocation of costs among contracted purchasers.	Midrange. Wholesale revenues are derived from contracts, enabling legislation or equivalent that may include some degree of conditionality, no reallocation of costs among contracted purchasers or a sole purchaser.	Not applicable.
Rate Flexibility	Independent legal ability to increase service rates without external approval.	Legal ability to increase service rates is subject to approval of external authorities. History and expectation of operating and capital costs being recovered on a timely basis is strong.	Legal ability to increase service rates is subject to approval of external authorities. History and expectation that operating and capital costs may not be recovered on a full or timely basis.	Legal ability to increase service rates is subject to approval of external authorities. History and expectation that operating and capital cost recovery will be neither full nor timely.
Purchaser Credit Quality (PCQ)[a]	Very strong purchaser credit quality.	Strong purchaser credit quality.	Midrange purchaser credit quality.	Weak purchaser credit quality.
Asymmetric Rating Factor Considerations	Reasonable replacement of service by purchasers with conditional contracts or contracts that do not extend through the maturity of outstanding debt; and/or a large percentage of revenues derived from non-monopoly operations are negative considerations.			
Operating Risk	**aa**	**a**	**bbb**	**bb**
Operating Cost Burden	Very low operating cost burden.	Low operating cost burden.	Midrange operating cost burden.	High operating cost burden.
Capital Planning and Management	Moderate investment needs supported by adequate capital investment.	Elevated investment needs but supported by adequate capital investment.	Elevated investment needs with weak capital investment.	Elevated investment needs with extremely weak capital investment.
Asymmetric Rating Factor Considerations	Meaningful supply or resource-management concerns.			

Financial Profile	**aaa**	**aa**	**a**	**bbb**	**bb**
Leverage Profile	Exceptionally Strong: Refer to the Rating Positioning table.	Very Strong: Refer to the Rating Positioning table.	Strong: Refer to the Rating Positioning table.	Midrange: Refer to the Rating Positioning table.	Weak: Refer to the Rating Positioning table.
Liquidity Profile	Liquidity profile is based on coverage of full obligations and liquidity cushion. A weaker liquidity profile can constrain the financial profile assessment.				
Asymmetric Additive Risk Considerations	Debt structure and contingent liability, management and governance, legal and regulatory, information quality and rating relationship to the host government characteristics that are significantly outside the norm for the sector may constrain the final rating.				

[a] In circumstances where all the relevant purchasers are rated 'AAA' by Fitch the PCQ may be assessed at 'aaa'.
Source: Fitch Ratings

Revenue Defensibility

The assessment of revenue defensibility for wholesale water and sewer providers includes a review of the applicable contractual and/or legislative framework pursuant to which water and/or sewer services are provided, the related obligations of all parties involved, purchaser credit quality (PCQ) and the provider's legal ability to determine rates and/or fully recover debt service costs. For wholesale suppliers that also provide retail service, the assessment may be informed by the revenue defensibility characteristics outlined for retail utilities.

Revenue Source Characteristics

Fitch reviews the contractual and/or legislative framework supporting a wholesale provider focusing specifically on the terms, tenor and conditionality of the payment obligations to assess the defensibility of revenue. Wholesale water and sewer providers generally exhibit very strong revenue defensibility, as revenue is typically derived from retail

utilities pursuant to long-term and/or perpetually effective unconditional service contracts or service agreements (see *Water and Sewer Service Contract Characteristics* table below) that extend through the life of outstanding debt, and that provide for full cost recovery. In addition, there typically are practical limitations of retailers replacing the service provided by the wholesaler.

Moreover, a common feature of water and sewer service contracts and service agreements throughout the sector allows wholesale providers to recover the obligations of a defaulting purchaser by increasing — or stepping up (either explicitly or implicitly) — the obligations of the remaining to non-defaulting purchasers. Fitch factors the ability, timeliness and degree to which a wholesaler can reallocate defaulted obligations among purchasers in its assessment of revenue defensibility.

Water and Sewer Contract Characteristics

Fitch considers the following contracts to be unconditional:
• Take-or-Pay Contracts: Contracts wherein purchasers are obligated to make specified payments to the provider, whether or not the product is delivered or the service provided from a specified project or resource. • Take-and-Pay Contracts: Contracts wherein a purchaser's payment obligation is contingent only upon the delivery of output or service provided. Contract provisions must provide that the service provider may procure output or service from any available source, thereby mitigating operational or performance risk.

Source: Fitch Ratings

Wholesale providers that rely exclusively on sales (whether they be contracted or uncontracted) that are subject to meaningful operating risk, termination or are otherwise highly conditional for the repayment of debt may not be rated using these criteria. These may include providers subject to completion risk, fully or significantly exposed to volume risk, or those providing services pursuant to contracts that may be terminated at the purchaser's option and where the purchaser has the practical ability to replace the service being provided to the extent that it poses significant business risk to the wholesaler. In these cases, Fitch's "Infrastructure & Project Finance Rating Criteria" may be applied instead.

Rate Flexibility

Fitch's analysis of rate flexibility for wholesale providers focuses primarily on the provider's independent legal ability to determine rates of service. While a provider's rate competitiveness is evaluated and may be particularly relevant for wholesalers facing contract renewals or seeking to expand membership, the influence of the wholesale cost of water and/or sewer service on rate competitiveness and affordability is best measured at the retail level. Pressure to moderate or avoid wholesale rate increases is most likely to mount as a result of corresponding retail increases, and is considered a component of Fitch's analysis of PCQ.

Purchaser Credit Quality (PCQ)

The final component of the revenue defensibility assessment for wholesale providers is PCQ. An overwhelming majority of purchasers are expected to be municipally owned retail utilities exhibiting strong operating fundamentals. Where the credit quality of the purchasers is highly sensitive to unanticipated costs at the wholesaler or the purchasers are particularly susceptible to weakness in the underlying economy, the PCQ may be more a consideration in the revenue defensibility assessment, even if revenue source characteristics and rate flexibility are very strong.

Fitch uses a variety of inputs to evaluate PCQ, including both private and public ratings, and internal credit opinions and credit scores. If Fitch does not maintain a rating, credit opinion or credit score on a purchaser, one may be assigned as required. Fitch also reserves the right to use another credit rating agency's publicly monitored rating in place of requiring a credit opinion or credit score when the underlying analytical approach is viewed as largely consistent with Fitch's approach. In such cases, Fitch would first look to an underlying water and/or sewer revenue bond rating. If a revenue bond rating is not available, Fitch may also look to a purchaser's general obligation rating when it retains taxing authority for operations and maintenance, and core operations focus on water and/or sewer services. Alternatively, Fitch will assume purchasers to have weak credit quality (bb).

Fitch's framework for credit scoring retail utilities, as discussed in *Appendix C*, incorporates many of the same factors previously outlined. However, a credit score is subject to different standards than a credit rating or credit opinion. Credit scores assess a limited range of factors and are point-in-time. Specifically, the credit score considers a utility's ability to absorb rate increases, measured by its rate flexibility and service area characteristics as a proxy for revenue defensibility, and net margin and cash cushion ratio as a proxy for financial profile. Operating risk is not considered for credit scoring.

Revenue Source Characteristics — 'aa'

For providers with a revenue source characteristic assessment of 'aa' — because of an unlimited ability to reallocate costs — Fitch will calculate a purchaser credit index (PCI), which numerically reflects the weighted average credit quality of the relevant obligors. Fitch will evaluate purchasers that in aggregate account for approximately 40% or more of the provider's total wholesale revenue or sales when calculating the PCI and determining the PCQ assessment. In certain limited cases, typically when sufficient underlying purchaser information is not publicly available, Fitch may use a known purchaser's data as a representative sample for purchasers with no data available.

Purchaser Credit Index (PCI)

Metric to Support Assessment
• Wholesale utilities whose purchasers have a PCI of less than 1.5 are subject to very strong purchaser credit quality consistent with a 'aa' rating factor assessment; between 1.5 and less than 2.5, strong credit quality or 'a'; between 2.5 and less than 3.4, midrange credit quality or 'bbb'; and 3.4 or higher, weak or 'bb'.

Source: Fitch Ratings

In cases where a provider has a revenue source characteristic assessment of 'aa' but provides only a small portion of purchaser requirements, the PCQ assessment may be higher than the PCI indicates if a single purchaser exhibiting stronger credit quality could easily assume all contractual payment obligations of the other purchasers without affecting its credit quality.

Revenue Source Characteristics — 'a' or 'bbb'

The PCQ factor for wholesale providers with a revenue source characteristics assessment of 'a' or 'bbb' — because of a limited ability or inability to reallocate costs — will reflect the credit quality of the weakest obligor(s), after factoring in mitigating structural features available to the utility that allow for the absorption of loss. These features include applicable step-up provisions, cash reserves, available taxing authority or other credit enhancement provisions. Fitch will only rely on public and private ratings and credit opinions in these cases. Credit scores will not be considered.

Where structural features are insufficient to cover an individual purchaser's obligations in the event of its default, the PCQ factor assessment will be capped by the credit quality of that purchaser. For example, if a wholesaler's step-up provision is limited to 25% of a purchaser's obligation, that wholesaler's ability to meet debt service obligations would be highly reliant on payments from any purchaser with an allocated share higher than 20%. Stepping up the required payments from the non-defaulting purchasers responsible for less than 80% of contractual obligations by 25% would not restore contractual obligations to 100%, resulting in a potential shortfall in revenue. If a wholesaler is highly reliant on more than one purchaser (i.e. each purchaser has an allocated share of more than 20%), the wholesaler's rating will be capped by the credit quality of the weakest of those purchasers who exceed the required step-up percentage. In each case, if the relevant purchasers are not rated by Fitch, a notch-specific private rating will be assigned.

Fitch will evaluate the credit quality of a minimum number of purchasers who collectively account for contractual obligations sufficient to meet the wholesaler's obligations, after factoring in mitigating structural features. For example, in the scenario above where purchaser obligations may be increased up to 25%, purchasers responsible for at least 80% of the total contract obligations in aggregate would be evaluated, because implementing the 25% increase on the pool would restore contract obligations to 100%. The PCQ factor would then be assessed at a level commensurate with the weakest purchaser required to reach the 100% threshold after invoking the step-up protection. In evaluating the requisite purchasers, unrated purchasers will be assigned private ratings or credit opinions, as necessary.

Alternatively, for wholesalers with 10 or more purchasers, Fitch will initially evaluate aggregate credit quality of the purchaser pool using its portfolio stress model (PSM), developed for assigning credit ratings to state revolving fund programs and municipal loan pools. The PSM produces liability stress hurdles based on the aggregate rating, obligation share and term of the purchasers. To capture the risk of large unrated purchasers, Fitch will evaluate the credit quality of all unrated purchasers with shares of more than 5% of the pool's contractual obligations, after factoring in available step-up protections.

The rating stress hurdle produced by the PSM is measured against the structural loss-absorption features of the contractual arrangement. The measurement determines whether or not sufficient resources, including contract payments, are available to the wholesaler to meet timely bond debt service payments while sustaining purchaser payment defaults. Please refer to "State Revolving Fund and Municipal Finance Pool Program Rating Criteria" for more details.

Using the PSM, Fitch calculates the total expected loss — the liability stress hurdle multiplied by (1 minus the assumed recovery rate) — that can be sustained for each rating category. To be eligible for a certain rating category, the structural features and amount of loss absorption must exceed this expected loss. For example, if the characteristics of a pool of purchasers produce 'AAA' and 'AA' liability stress hurdles of 50.5% and 41.9%, respectively, and an assumed recovery of 90% is applied, then enhancement in excess of 5.1% (10% * 50.5%) and 4.2% (10% * 41.9%) would be necessary to achieve the respective rating category. Thus, if a utility was able to increase contractual obligations in amounts sufficient to absorb losses equal to 4.5%, the 'AA' stress hurdle of 4.2% would be met but the 'AAA' stress hurdle of 5.1% would not.

However, the relationship of the expected loss to the rating hurdle does not guarantee the PCQ factor will receive the corresponding assessment. Fitch also considers the effect of large individual purchasers and the leading role these obligors typically assume in managing these issuers. For example, while the wholesaler's PCQ assessment is capped at the credit quality of any single purchaser whose share exceeds the utility's loss protection, the assessment may also ultimately be capped by the credit quality of other rated purchasers.

In these cases, Fitch will begin with the purchaser with the weakest credit quality and aggregate the shares of individual purchasers by improving credit quality to determine the credit quality of the purchaser whose share drives the aggregate share above the available protection. The PCQ factor assessment will be capped at the applicable assessment. In the above scenario, where available support is sufficient to cover losses totaling 5%, and the four weakest purchasers — each accounting for a 2% share — were assessed 'bbb', 'bbb', 'a' and 'a', the PCQ factor assessment would be capped at 'a'. If the shares were instead 4% (bbb), 3% (bbb), 1% (a) and 1% (a), then the assessment would be capped at 'bbb'.

Asymmetric Rating Factor Considerations — Revenue Defensibility

In addition to the aforementioned considerations, the assessment of revenue defensibility can be reduced in cases where a portion of a wholesale provider's revenues is derived pursuant to contracts that provide for conditional payments, including termination provisions, and the purchasers could reasonably be expected to replace such service. Revenue defensibility is also reduced in situations where the contracts do not extend through the maturity of outstanding debt and the purchasers could reasonably be expected to replace such service. Fitch will therefore consider in its analysis the tenor, relevant counterparties and terms of relevant contracts to assess the degree to which replacement funds — either from replacement contracts, uncontracted sales or wholesale rate increases — may be necessary to meet scheduled debt payments.

Fitch also examines wholesale utility revenue derived from non-monopoly operations, and the extent to which the utility relies on these revenues to meet covenanted revenue requirements and debt service obligations. Non-monopoly revenues are subject to higher volatility as a result of competitive pressures on both demand and price, and generally weaken revenue defensibility.

Operating Risk

The relevance of operating risk in Fitch's analysis of wholesale utilities will largely be determined by the degree to which resource performance and the cost of service influence the credit quality of the purchasers and their ability to support provider obligations. Operating risk is expected to be a meaningful factor in Fitch's analysis where wholesale providers are responsible for meeting the majority of purchaser service requirements. The assessment of operating risk for wholesale water and sewer providers focuses on operating cost burden and capital planning and management. Similar to the evaluation of retail utilities that own and manage their own water supply and treatment and/or sewer treatment and disposal facilities, the ability of a wholesale provider to consistently provide low-cost service enables purchasing retail utilities to achieve a strong financial profile, while preserving affordability.

Operating Cost Burden

Metric to Support Assessment
• Fitch measures a provider's ratio of total operating costs from a system's financial statement relative to its million gallons (mg) of water produced and/or sewer flows treated during the year to determine operating cost burden. Generally, wholesale utility systems with an operating cost of $6,500/mg or less have an operating cost factor assessment of 'aa'; over $6,500/mg to $9,500/mg, 'a'; over $9,500/mg to $12,500/mg, 'bbb'; and over $12,500/mg, 'bb'.
• Alternatively, Fitch may evaluate operating cost burden for partial requirement providers or single-asset providers by reviewing the relative magnitude of the cost and/or capacity as a percentage of the purchasers' total resources and related costs, as well as the strategic benefit or importance of the resource. Projects that account for less than 25% of purchaser cost or capacity, or provide significant strategic importance would be deemed to have a very low/low operating cost burden; projects that account for between 25% and 50% of cost or capacity, or provide no extraordinary strategic importance, midrange; and projects that are strategically burdensome, weak.

Source: Fitch Ratings

Fitch will initially assess operating cost burden for wholesale utilities and projects by comparing the ratio of total annual operating costs to total millions gallons of water produced and/or sewer flows treated on an average annual basis, which excludes distribution and collection costs borne by purchasers. When evaluating partial requirement providers and single-asset project providers, Fitch may alternatively assess operating cost burden by comparing the relative magnitude of project costs and capacity to the purchasers' total cost of water and/or sewer service requirements, or by assessing the strategic benefit or importance of the service. A lower ratio indicates a lower operating cost burden.

Fitch assesses capital planning and management for wholesale utilities using the same factors and metrics outlined in the *Capital Planning and Management* section. The *Asymmetric Rating Factor Considerations* outlined for retail systems are also applicable.

Operating risk and cost flexibility risk are lesser considerations for wholesalers that provide only a small portion of purchaser requirements or operate a single asset, and where revenues are derived pursuant to take-or-pay contracts. In these cases, Fitch will evaluate the operating characteristics, but purchaser credit quality will be given greater consideration in the determination of the final rating. A strong/very strong operating risk assessment could potentially enhance the rating above or toward the higher end of the PCQ rating factor assessment (e.g. A+ with a PCQ of A); whereas a weaker operating risk assessment could weigh the rating downward (e.g. A- with a PCQ of A). In either case, however, any influence on the rating would be limited and reflect Fitch's determination of whether the obligations of the weaker purchasers would be assumed upon default given the inherent value of the resources and the incentive of the remaining purchasers to preserve the provider's credit quality.

Financial Profile

Fitch expects to use the same factors, metrics and scenario analysis previously outlined within *Financial Profile* for retail utilities to evaluate the financial profile of most wholesale providers, including those with an unlimited ability to reallocate costs among purchasers to ensure cost recovery and revenue source characteristics assessed as 'aa'.

Focus on Purchaser Credit Quality

For utilities with revenue source characteristic assessments of 'a' and 'bbb' that possess only a limited ability to reallocate costs or provide only a portion of the purchaser's requirements, and benefit from a contractual framework in which revenues and costs are largely balanced and passed through to one or more purchasers, the leverage profile may be less of a consideration in a rating. The PCQ subfactor assessment, supplemented by the operating risk assessment, may serve as the basis for the financial profile assessment and be more relevant to the final rating outcome in these cases.

In unique cases where an issuer possesses a revenue source characteristic assessment of 'aa' and supplies a portfolio of utilities whose credit quality has been assessed by Fitch and where sufficient flexibility existed to enable the wholesaler to reallocate costs prior to a default occurring - considering the full effect of the issuer's operating risk as well as its share of the issuer's obligations - the PCQ subfactor assessment may serve as the basis for the financial profile assessment and be more relevant to the final rating outcome than the issuer's own leverage profile.

Asymmetric Additive Risk Considerations

See the *Asymmetric Additive Risk Considerations* utilized in the analysis of retail utilities that Fitch also considers in its analysis of wholesale water and sewer utilities.

Appendix C: Purchaser Credit Index Scoring Matrix

Credit scores for purchasing utility systems that are unrated by Fitch and not subject to a credit opinion are determined using the *Purchaser Credit Index Scoring Matrix* below, together with evaluations of ability to absorb rate increases, net margin and cash cushion. Utilities that are rated or subject to a credit opinion may be assigned scores based on this information. Scores may also be informed by and assigned based on known facts, including other credit rating agency's publicly monitored ratings, that are not factored in the scoring matrix. In cases where data necessary to meet the assessments outlined below are insufficient, purchasing utilities may be assigned the lowest score.

Purchaser Credit Index Scoring Matrix

	Net Margin and Cash Cushion			
Ability to Absorb Rate Increases	**aa**	**a**	**bbb**	**bb**
aa	1	2	2	3
a	1	2	2	3
bbb	2	3	3	4
bb	3	3	4	4

Source: Fitch Ratings

Net Margin and Cash Cushion

Net margin and cash cushion measures a utility system's overall financial performance and readily available cash, after accounting for its purchased services, as well as any operating or financial obligations the utility may have incurred on its own.

Net Margin and Cash Cushion

Metrics to **Support Assessment**

- Fitch calculates the net margin and cash cushion as: (net margins + unrestricted cash and investments)/(average daily cash operating expenses), where net margin equals operating revenues less operating expenses plus non-operating revenues/(expenses) plus total contributions and transfers.
- Utility systems that have a net margin and cash cushion of 170 days or more have a 'aa' factor assessment; between 70 days and 169 days, 'a'; between 30 days and 69 days, 'bbb'; and less than 30 days, 'bb'. However, systems with debt/FADS in excess of 7.0x cannot be assessed higher than 'a'.

FADS – Funds available for debt service
Source: Fitch Ratings

Ability to Absorb Rate Increases

For credit scoring purposes, the ability to absorb rate increases of a purchasing utility is determined using the following matrices, which assess the utility's service area and rate flexibility, in the context of its legal ability to set rates for service.

Ability to Absorb Rate Increases

Ability to Set Rates:	**Yes**			
	Service Area Characteristics			
Rate Flexibility	**aa**	**a**	**bbb**	**bb**
aa	aa	aa	a	a
a	aa	aa	a	a
bbb	a	a	a	bbb
bb	a	a	bbb	bbb
Ability to Set Rates:	**No**			
	Service Area Characteristics			
Rate Flexibility	**aa**	**a**	**bbb**	**bb**
aa	aa	a	a	a
a	a	a	a	bbb
bbb	a	a	bbb	bbb
bb	a	bbb	bbb	bb

Source: Fitch Ratings

Service Area Characteristics

Fitch's scoring methodology evaluates a utility's service area and the ability of its customers to support purchased services by measuring three characteristics: median household income, unemployment and customer growth. Each of these characteristics is separately assessed against nationwide averages or other thresholds.

Service Area Characteristics

(%, Metrics to Support Assessment)	Stronger	Midrange	Weaker
Median Household Income/U.S. Median Household Income	> 125	125–75	< 75
Unemployment Rate/U.S. Unemployment Rate	< 75	75–125	> 125
Historical Compound Annual Customer Growth Rate[a]	> 1.5	1.5–0.0	< 0.0

- Utilities that exhibit characteristics that are all considered midrange are considered to be consistent with an 'a' assessment; utilities that exhibit a greater number of stronger characteristics than weaker characteristics are considered to be consistent with a 'aa' assessment; utilities that exhibit a greater number of weaker characteristics than stronger characteristic would be assessed as 'bbb' or 'bb'.

[a] Typically over a five-year period
Source: Fitch Ratings

Rate Flexibility

Fitch's scoring methodology evaluates a purchasing utility's rate flexibility and its ability to generate additional revenue to support purchased service requirements by assessing independent rate-setting authority and rate affordability as represented by the percentage of people whose water-related utility charges are considered unaffordable.

Affordability

Metric to Support Assessment
• Fitch calculates an affordability rate to determine the number of people whose bills account for an outsized portion of their income. Generally, a combined water-related bill that is greater than 5% of household income (or individually, 2.0% for water, 2.5% for sewer and 0.5% for stormwater) is considered unaffordable. Utilities with 20% or less of their population whose bills are considered high are deemed to have an affordability assessment factor of 'aa'; over 20% to 30%, 'a'; over 30% to 40%, 'bbb'; and over 40%, 'bb'.

Source: Fitch Ratings

Appendix D: Pension Treatment in Leverage Metrics

Utility systems vary considerably in the types of pension benefits offered to workers, which also affects whether and how Fitch incorporates pensions in its analysis of an entity's financial flexibility. Utilities with defined-benefit (DB) pensions carry a financial obligation that is long term in nature, and uncertain in timing and amounts to be paid. Ongoing employer and employee contributions, which accumulate as invested assets in a trust fund and generate investment returns, are the primary sources for funding benefits and offsetting the pension liability incurred by a utility. Through a series of actuarial calculations that can vary, the present value of the pension obligation accrued to date can be compared to the invested assets available to meet the obligation. An excess of that liability over the invested assets value represents the unfunded portion of the pension obligation that has accrued (generally reported as the net pension liability [NPL] by the utility under GASB pension accounting standards). In some cases, a utility will be a participant in a multi-employer plan, and the employer's share of that calculated liability will be considered in the analysis.

Fitch views the unfunded balance of accrued DB pension liability as a debt-equivalent obligation. The size of the reported liability and the annual payments necessary to amortize it can be subject to a range of institutional decisions regarding benefit levels and actuarial assumptions, economic trends and statutory considerations. Changes in these factors may affect the size of the unfunded liability over time. However, the most important drivers of unfunded liability tend to be the level of actual returns on the investment portfolio supporting the pension when compared to a target return and the adequacy of the employer contribution actually made. Fitch will review the reported unfunded liability over time versus point in time. Material volatility in a plan's asset values due to market movement is less relevant to Fitch's assessment of pension-related risk and leverage than is the plan's longer-term prospects for funding improvement over time.

GASB or FASB: Institutions in the sector include both public-sector enterprises that follow GASB accounting rules and not-for- profit enterprises that follow FASB accounting rules; additionally, the pensions of most not-for-profit enterprises are subject to federal regulation. There are differences in the calculation and reporting of the unfunded pension liability between GASB and FASB. Public-sector (GASB) DB pension plans are unique in using their long-term investment return assumption as the liability discount rate. In contrast, private (FASB) plans use a low, variable, regulated discount rate tied to market rates, with some relief post-2009, distinct from the investment return assumption in calculating their liability. As such, there is a fundamental difference in reported unfunded pension liability between ERISA-regulated FASB plans and public-sector GASB plans that Fitch believes must be reflected in the analysis to support comparability. The calculation of the related pension liability, if any, to be added to an institution's adjusted debt varies as described below. Notwithstanding this difference, the calculations and adjustments made by Fitch are intended to create equivalency to the leverage assessment, regardless of the accounting methodology applied.

Public-Sector DB Pensions: Public-sector DB pensions represent a source of uncertainty given the absence of uniform regulations that compels progress on prefunding, the irrevocable nature of vested benefits and the variability of reported liabilities. These factors in combination have led to the accretion of long-term liabilities and a rising demand for contributions.

Fitch applies the same approach to pension liability of a public-sector enterprise as it does when considering pension obligations of state and local governments. For public enterprises, the primary credit risk of DB pensions is in the accumulation of long-term liabilities. There is no uniform regulation of funding practices and the liability can accrete under multiple circumstances, including due to underperformance of assets, failure to achieve actuarial and economic assumptions, and inadequate annual contributions. Bankruptcy is possible but rare, and liquidation is improbable due to legal constraints. Fitch's baseline assumption is that vested benefits are irrevocable, and that benefits can be changed only for new hires.

The starting point for this analysis is the pension data as disclosed by the institution. To convey more effectively the magnitude of risks associated with public DB plans, and to improve comparability across plans, Fitch adjusts the reported NPL upward to reflect a 6% discount rate, if the NPL is based on a higher discount rate; this approach is identical to the adjustment to NPLs outlined in Fitch's "U.S. Public Finance Local Government Rating Criteria." The resulting adjusted NPL is combined with debt obligations in Fitch's assessment of financial flexibility. In some cases, an enterprise without audited financial statements separate from its primary government may not report detailed pension liability data, as for example when the primary government participates in several pension plans. In such cases, Fitch will adjust the institution's reported NPL for purposes of its analysis based on the primary government's main or general employee plan.

Allocating Multi-Employer Liabilities under GASB 68: Although some public-sector enterprises may directly sponsor and manage a DB pension plan, many provide pension benefits as part of a larger cost-sharing, multi-employer system,

or within a single-employer system that provides benefits to a primary government and its separate enterprises. As such, the ability of water and sewer utilities to influence pensions is often limited, as decisions on benefits, assumptions and contributions are made by a legislature, local government or pension board. In these cases, multi-employer plan assets are not legally separated by employer. A single actuarial valuation is performed and the resulting NPL, expense, and deferred inflows and outflows for all participating entities are allocated proportionally, based on the pension's contribution practices. Each participating employer's audit contains only its proportionate share.

GASB 68's allocation method informs Fitch's approach to assessing liabilities in a cost-sharing plan or a single-employer plan allocated to one or more enterprises. GASB 68's default assumption is that the liability is assigned where the obligation is required to be funded, generally by the participating employers. The standard considers pensions to be deferred compensation for which the direct employer is ultimately obligated. Fitch follows GASB 68 reporting for the liability allocation because the methodology is consistent with our expectations for how pension plans function, including how they resolve funding challenges.

The fact that most cost-sharing, multi-employer plans are state-sponsored does not mean that the unfunded liabilities of the plans are responsibilities of the state or of the pension system itself. In some cases, the state has explicit legal and fiscal responsibility for plan funding, and Fitch allocates a share of the liability to the state accordingly, rather than to other participating employers. However, it is much more common for a state to take responsibility only for liabilities associated with its direct employees. Even in cases where they have historically provided support for related governments in the plans, states generally retain the option to pull back on this support. Fitch does not shift the reported liability away from the institution based on this support where GASB 68 assigns it to an institution. However, as noted below, where there is a longstanding history of direct support and through funding provided to a class of employers from the state, Fitch does account for this in its analysis.

Treatment of State Support of Public-Pension Obligation in the Leverage Assessment: Fitch relies on the pension liability data as reported by the institution when assessing its liability burdens. Some public institutions report special funding situations, under which states assume some or all of an NPL, and Fitch's analysis reflects such support. In rare instances that fall short of a special funding situation, but where consistent, explicit state subsidy of pensions is provided, Fitch may modify its assessment of leverage to reflect the presence of state appropriations supporting all or part of an enterprise's pension liability.

Indicators of explicit state support might include a state making employer contributions on behalf of the utility for the DB plans available to employees, but under a funding mechanism that does not meet the requirement for special funding under GASB's approach. Such mechanisms may include annual appropriation, statute or specific authorizing legislation.

FASB Plans: Some utility systems may offer DB pensions whose pensions are subject to federal regulations, which have shifted considerably in recent years and continue to evolve. Fitch generally expects these issuers to manage their pensions within the existing regulatory framework, which includes provisions for calculating contributions and premiums for mandatory federal pension insurance.

Fitch's starting point for the pension analysis is the projected benefit obligation (PBO) as reported by the issuer, and for purposes of assessing leverage within the FAST analysis, Fitch recalculates the funded status assuming 80% of the PBO. Any resulting adjusted pension deficit is added to debt obligations in Fitch's forward-looking assessment of the financial flexibility. This adjustment to the PBO is intended to serve only as a proxy for capturing the impact of regulations on how pensions are likely to be funded, rather than a precise recalculation of actual liabilities.

The regulatory environment encourages issuers to manage to an 80% funded ratio utilizing generally conservative investment return assumptions. Funding to 80% based on a lower discount rate generally corresponds to nearly fully funded levels using a normalized 6% long-term return assumption. If the regulatory environment shifts, Fitch will modify its approach to take into account the expected impact of these changes on a forward-looking basis. Fitch may also incorporate pension contributions and other pension-related cash outflows in the stress case scenario to fully capture near-term liquidity risks from DB pension plans.

Other utilities participate in multi-employer DB pension plans that, while regulated, are jointly sponsored with organized labor and disclose only limited information. For multi-employer DB pensions, clarity on the status of pensions or their likely impact on finances may be limited. If such pensions represent, in Fitch's view, a material risk in its assessment of a health provider's financial profile, they could be reflected as an asymmetric risk factor (see *Information Quality* section).

Appendix E: Defined Terms and Supporting Calculations

The following terms are applicable for the leverage ratio, COFO and/or the liquidity cushion ratio.

- **Adjusted Net Pension Liability:** Equals the utility's reported net pension liability adjusted upward to reflect Fitch's assumed 6% discount rate, if the plan uses a higher discount rate. See *Rationale for Pension Treatment in Leverage Metrics* for more information.
- **Available Borrowing Capacity:** Amounts remaining and available from lines of credit.
- **Available Cash:** Cash and investments available for short-term liquidity needs with no limitations on use, including funds restricted solely by board or management policy and/or available for general utility purposes (e.g. rate stabilization fund, operating reserve, and renewal and replacement reserve). Funds that are explicitly limited for construction or other capital investment may be considered if expected to be spent down on upcoming capital projects.
- **Average Daily Cash Operating Expenses:** (Operating expenses — depreciation and amortization) / 365.
- **Capitalized Fixed Charges:** Fixed Services Expense * 7. See *Rationale for Capitalization of Fixed Charges* for more information.
- **Current Cash Available:** Current unrestricted cash/investments and current restricted cash/investments that are restricted solely by board or management policy and/or available for general utility purposes (e.g. rate stabilization fund, operating reserve and renewal and replacement reserve).
- **Current Days Cash on Hand:** (Current Cash Available/[operating expenses – depreciation and amortization]) * 365.
- **FADS:** EBITDA plus interest income, taxes, other non-operating cash receipts not restricted as to spending and connection/availability fees. FADS may further reflect adjustments for noncash expenses, nonrecurring items and non-operating expenses paid ahead of debt service as appropriate. With regards to the leverage ratio, FADS will be adjusted to exclude operating expenses where a gross lien is provided and the entity is not subject to bankruptcy or other insolvency proceedings while rated debt is outstanding. However, FADS for purposes of COFO will include operating expenses for all entities, including those where a gross lien is provided and the entity is not subject to bankruptcy or other insolvency proceedings while rated debt is outstanding.
- **Fixed Services Expense:** Purchased water and/or sewer services * 35%. See *Rationale for Capitalization of Fixed Charges* section for more information.
- **Funds Restricted for Debt Service:** Includes amounts deposited in debt service and debt service reserve funds.
- **Net Transfers:** Sum of transfers in less transfers out. See *Rationale for Transfer Treatment in Leverage Metrics* for more information.
- **Pension Expense:** Equals the utility's reported annual pension expense. See *Rationale for Pension Treatment in Leverage Metrics* section for more information.
- **Total Annual Debt Service:** Interest expense plus scheduled long-term principal payments (i.e. prior year's current portion of long-term debt). Voluntary prepayments and principal amounts repaid as part of a refinancing are not included. However, where principal incorporates balloon indebtedness, long-term bank facilities, remarketed debt or bullet maturities, Fitch may adjust scheduled debt service to eliminate amounts successfully refinanced, remarketed or renewed, or to include payments on debt obligations reported as operating expenses. Interest expense may also be adjusted for capitalized interest.
- **Total Debt:** All long-term and short-term debt obligations including capital leases, outstanding commercial paper, notes payable, and current maturities. Nonrecourse and separately secured obligations whose repayment is provided by third parties or alternate revenue sources may be excluded.

A comparison of coverage calculations is provided in the Coverage Ratio Calculations — Example table below to illustrate the effect on coverage of a utility's obligations when purchased water/sewer services are capitalized and net transfers are accounted for.

Coverage Ratio Calculations — Example

($)	DSC Calculation	Coverage of Full Obligations Calculation
Operating Revenue	1,000	1,000
Purchased Water/Sewer Services	-300	-300
Other Operating Expenses (Excluding Depreciation and Amortization)	-500	-500
EBITDA	200	200
Interest Income	10	10
Taxes	50	50
Other Available Revenues	5	5
Connection/Availability Fees	40	40
FADS	305	305
Fixed Services Expense	—	105
Net Transfers	—	-50
Adjusted FADS	305	360
Adjusted FADS without Connection/Availability Fees	265	320
Cash Interest Paid	25	25
Scheduled Principal Payments	25	25
Debt Service	50	50
Fixed Charges (Adjusted for Purchased Water and/or Sewer Services)	—	105
Adjusted Debt Service	50	155
Debt Service Coverage (x)	6.1	—
Debt Service Coverage without Connection/Availability Fees (x)	5.3	—
Coverage of Full Obligations (x)	—	2.3
Coverage of Full Obligations without Connection/Availability Fees (x)	—	2.1

Source: Fitch Ratings

Appendix F: Summary of Expected Range of Ratios Used in the Rating Analysis

Key Rating Drivers — Retail Water/Sewer Utilities

Revenue Defensibility		**aa**	**a**	**bbb**	**bb**
Revenue Source Characteristics	Revenue derived from monopoly business lines	Over 95%	Over 80% to 95%	Over 50% to 80%	50% and less
Service Area Characteristics	Customer growth rate (CAGR)	Over 1.5% is stronger; 1.5% to 0.0% is midrange; less than 0.0% is weaker			
	Median household income	Over 125% national median is stronger; 125%–75% is midrange; less than 75% is weaker			
	Unemployment rate	Less than 75% national average is stronger; 75%–125% is midrange; over 125% is weaker			
Rate Flexibility	Population percentage whose total water-related bill exceeds 5% of household income or individually 2.0% (water), 2.5% (sewer) and 0.5% (stormwater)	20% or less	Over 20% to 30%	Over 30% to 40%	Over 40%
Operating Risk		**aa**	**a**	**bbb**	**bb**
Operating Cost Burden	Average annual mg of water produced and/or sewer flows treated	$7,500/mg or less Stormwater assessed at 'aa' unless evidence to suggest otherwise	Over $7,500/mg to $11,000/mg	Over $11,000/mg to $14,500/mg	Over $14,500/mg
Capital Planning and Management	Life cycle ratio and capital spending relative to depreciation	45% or less	Over 45% and capital spending averages 80% or more	Over 45% and capital spending averages 40% to 80%	Over 45% and capital spending averages 40% or less

Financial Profile		**aaa**	**aa**	**a**	**bbb**	**bb**
Leverage Profile	Net adjusted debt to adjusted FADS	Exceptionally Strong: Refer to the Rating Positioning table.	Very Strong: Refer to the Rating Positioning table.	Strong: Refer to the Rating Positioning table.	Midrange: Refer to the Rating Positioning table.	Weak: Refer to the Rating Positioning table.
Liquidity Profile	COFO ratio	Less than 1.0x from all available revenues and/or generally less than 1.0x excluding connection fees is weak and risk additive unless there is 120 days or more of current cash available.				
	Liquidity cushion ratio	Less than 90 days total or less than 30 days current cash available is a constraining factor.				

CAGR – Compound annual growth rate. COFO – Coverage of full obligations. FADS – Funds available for debt service. mg – Million gallons.
Source: Fitch Ratings

Key Rating Drivers — Wholesale Water/Sewer Utilities

Revenue Defensibility		**aa**	**a**	**bbb**	**bb**
Purchaser Credit Quality (PCQ)	Revenue Source Characteristics – 'aa'	PCI is less than 1.5	PCI equals 1.5 to 2.4	PCI equals 2.5 to 3.4	PCI is over 3.4
	Revenue Source Characteristics – 'a' or 'bbb'	Credit quality of weakest obligor(s) after mitigating structural features.			
Operating Risk		**aa**	**a**	**bbb**	**bb**
Operating Cost Burden		$6,500/mg or less	$6,500/mg to $9,500/mg	$9,500/mg to $12,500/mg	Over $12,500/mg
Capital Planning and Management	Life cycle ratio and capital spending relative to depreciation	45% or less	Over 45% and capital spending averages 80% or more	Over 45% and capital spending averages 40% to 80%	Over 45% and capital spending averages 40% or less

Financial Profile		**aaa**	**aa**	**a**	**bbb**	**bb**
Leverage Profile	Net adjusted debt to adjusted FADS	Exceptionally Strong: Refer to the Rating Positioning table.	Very Strong: Refer to the Rating Positioning table.	Strong: Refer to the Rating Positioning table.	Midrange: Refer to the Rating Positioning table.	Weak: Refer to the Rating Positioning table.
Liquidity Profile	COFO ratio	Less than 1.0x from all available revenues and/or generally less than 1.0x excluding connection fees is weak and risk additive unless there is 120 days or more of current cash available.				
	Liquidity cushion ratio	Less than 90 days total or less than 30 days current cash available is a constraining factor.				

COFO – Coverage of full obligations. FADS – Funds available for debt service. mg – Million gallons. PCI – Purchaser credit index.
Source: Fitch Ratings

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