WATER AND WASTEWATER CAPACITY FEES REPORT "PROPOSED"

B&V PROJECT NO. 197551

PREPARED FOR

Town of Clayton, North Carolina

4 MAY 2018

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1.0 Executive Summary

This report summarizes the methodology utilized to calculate water and wastewater capacity fees for the Town of Clayton (Town), North Carolina. New development creates a demand for additional water and wastewater services. Capacity fees are one-time fees charged to new development to defray some of the costs of providing necessary public facilities. In addition to offering the Town a valuable and timely source of income, capacity fees help ensure that new development contributes to the cost of the public facilities required to provide the necessary services.

The analysis conducted in this study include a number of commonly acceptable approaches for developing capacity fees for the water and wastewater systems:

1. The **buy-in** or reimbursement approach considers the capacity available in existing utility assets;

2. The **incremental** approach identifies the demands that new water and sewer connections place on both utility systems which require the construction of new facilities; and

3. The **combined** systems approach calculates a fee based on the investment in the existing system and the future anticipated investment required to serve new growth.

Moreover, the analysis performed follows industry guidance set forth by the American Water Works Association (AWWA) and the Water Environment Federation (WEF) in each organization's manuals of practice, as well as relevant legal requirements.

Based on the Town's existing and projected needs, the capacity fees calculated follow the combined systems approach. For the methodologies outlined herein, we establish demand units on a per unit-of-service basis and then multiplied these units by the net cost per unit of service for each utility system to determine the Maximum Allowable Capacity Fee (MACF). From this fee, we deduct the appropriate credits from the gross unit cost basis to determine the net unit cost basis of the capacity fee for each utility.

Following this section, the report discusses Black & Veatch Management Consulting, LLC's (Black & Veatch's) recommendations, the general background, the assumptions, and the general findings related to the development of the water and wastewater capacity fees.

In conducting its analyses and in forming an opinion of future costs summarized in this Report, Black & Veatch has made certain assumptions with respect to conditions, events, and circumstances that may occur in the future. This Report summarizes such assumptions and methodologies. While Black & Veatch believes the assumptions are reasonable and the projection methodology valid, actual results may differ materially from those projected, as influenced by the conditions, events, and circumstances that actually occur. The methodology utilized by Black & Veatch in performing the analysis follows generally accepted water and wastewater industry practices for such projections.

2.0 Recommendations

The findings and recommendations of the capacity fees analysis are summarized as follows:

Black & Veatch used the "Combined Systems approach" to calculate the maximum allowable capacity fee because the Town's water and wastewater systems maintain existing and available capacity for new customers and the Town intends to add new water and wastewater capacity to serve new customers.

- The MACF for the water and wastewater systems is calculated to be **$926.00** and **$4,592.00** for a ¾-inch meter connection, respectively.
- **Table 1** summarizes the calculated maximum allowable water and wastewater capacity fees by meter size.

Table 1 Proposed Town of Clayton Water and Sewer Maximum Allowable Capacity Fees

METER SIZE (IN.)	METER EQUIVALENTS	WATER CAPACITY FEE ($)	SEWER CAPACITY FEE ($)
0.75	1.00	$926	$4,592
1	1.67	$1,543	$7,653
1.5	3.33	$3,087	$15,307
2	5.33	$4,939	$24,491
3	10.00	$9,877	$48,981
4	16.67	$15,433	$76,533

- The Town should prepare a Capacity Fee Ordinance and complete the requisite filing notifications to retain the necessary approvals of the MACF.
- The Town should consider implementing the water system capacity fee at 100% of the calculated MACF.
- The Town should consider implementing 100% of the wastewater system MACF over a three-year period based on the schedule provided below:
    - Year 1 - **$2,755.00** (60.0% of the MACF)
    - Year 2 - **$3,674.00** (80.0% of the MACF)
    - Year 3 – **$4,592.00** (100.0% of the MACF)
- Black & Veatch recommends that the Town follow the requirements for water and sewer capacity fees detailed in the North Carolina House Bill 436 "Public Water and Sewer System Development Fee Act" related to implementing and assessing capacity fees.

3.0 Introduction

The Town retained Black & Veatch to calculate and update to the maximum allowable water and wastewater system capacity fees. The analysis detailed herein provides the background, methodology, and calculation to support the proposed MACF for the water and sewer systems.

3.1 PURPOSE OF CAPACITY FEES

Often called by different names (development impact fees, connection fees, system development charges, improvement charges, capacity charges, and full cost connection fees), capacity fees are one-time payments used to contribute the proportional share of the requisite capital investment previously made, or that is expected to be made that result in available capacity for future demand. In general, and as dictated by many state regulations and AWWA and WEF manuals of practice, these contributions should solely be used for capital investments thereby offsetting costs that would otherwise have to be borne by existing water and sewer customers. Capacity fees have limitations and provide one funding element within a utility's financing portfolio.

A capacity fee represents the proportionate share of a utility's backbone infrastructure that new customer pays. Legal principles surrounding capacity fees typically note that capacity fee revenues should only be used for capital improvements, not for operating and maintenance or other related operating costs. In addition, these fees cannot be used to correct or address existing deficiencies within utility systems.

3.2 GENERAL CAPACITY FEE METHODOLOGIES

There is no single established method for determining capacity fees that is both appropriate for all situations. There are, however, various approaches that are currently recognized and utilized within the rate-setting industry, some to a greater extent than others, by government agencies. These methods can be categorized as follows:

- **System Buy-in Approach**. Fees are designed to derive from the new customer an amount per connection equal to the "equity" in the system attributable to similar existing customers. New development would pay for its share of the useful life and remaining capacity of existing facilities from which new development would benefit. The System Buy-In Approach tends to be best suited for application when there is adequate capacity available in existing facilities to serve new customers. (Note: The word "equity" refers to that portion of system value for which there is no offsetting debt. It does not imply ownership of or title to, utility facilities.)
- **Incremental Cost Approach**. Fees are designed to derive from the new customer the marginal, or incremental, cost of system expansion associated with new customer growth. The incremental approach follows the premise that new connections to a utility system should be responsible for those costs that the utility incurs for the most recent or next increment of required system capacity. The Incremental Cost Approach is best suited when capacity in the existing facilities is inadequate to serve new growth, and the planned incremental capacity investment is targeted to serve new customers.
- **Combined Systems Approach.** Fees developed under the combined systems approach recognize two parts. The first part indicates the current investment in existing capacity available for new customers and the second part indicates the incremental cost of any new

capacity available to serve new growth. This Combined Systems Approach is suitable for a system that has unutilized capacity in its existing system to serve new customers but requires additional facilities and/or processes to serve both existing and new customers.

Revenues derived from utility capacity fees are commonly used to offset part or all capital costs to accomplish any of the following objectives:

- To pay the capital costs of future capacity provided for growth.
- To provide rate relief to existing system users by recovering that portion of the annual existing and future capacity capital costs associated with growth, including debt service requirements and direct asset purchases from current revenues.
- To accumulate reserves, generated through funds from Capacity fees, to finance system improvements and expansions required to meet growth.

The study detailed herein utilizes the **Combined Systems Approach** to determine the maximum allowable capacity fees for the water and wastewater systems. The Town maintains existing available capacity for new customers and plans to augment this capacity with additional water and wastewater system capacity over the planning horizon, FY 2019 through FY 2028. As such, Black & Veatch has determined that the **Combined Systems Approach** is appropriate for determining the maximum allowable capacity fees.

3.3 LEGAL FRAMEWORK

The tenets of the analysis detailed herein follow the requirements of the Chapter 162A of the North Carolina General Statutes, as amended by House Bill 436-Article 8 (HB 436). HB 436 was passed on the 20th day of July 2017 to provide uniform authority to implement system development fees for water and wastewater system in North Carolina. The bill outlines specific requirements and a schedule of action steps that require completion before implementing updated or new water and/or wastewater system capacity fees by July 1, 2018.

The legal background presented herein explains the general framework that most utility's use to develop capacity fees throughout the United States.

The legal framework is supported and endorsed by a variety of sources most notably AWWA, the leading water utility organization in the country and WEF, the leading wastewater utility organization. Specifically, each organization has developed a manual of practice for the setting of water and wastewater rates, fees, and charges, AWWA's ***Principles of Water Rates, Fees, and Charges – Manual of Water Supply Practices M1***. and WEF's ***Financing and Charges for Wastewater Systems, Manual of Practice 27.*** Black & Veatch professionals are regularly involved in the update of these manuals, including the most recent version.

There are three reasonable relationship requirements for development fees that are closely related to "rational nexus" or "reasonable relationship" requirements enunciated by a number of state courts throughout the U.S. These three requirements are:

1. Demonstrate the **"need"** for the new service,
2. Outline the **"benefit"** to be received by the system, and

3. Define the nature by which the service provided and related cost will be **"proportionally"** shared on the system.

All new development in a community creates additional demand on some, or all, public facilities provided by local government. If the capacity of the respective facilities is not appropriately adjusted to satisfy that additional demand, the quality or availability of public services for the entire community will deteriorate. Capacity fees may be used to recover the cost of development-related facilities, but only to the extent that the need for these additional facilities is a consequence of new development.

In North Carolina, imposition, collection, and use of impact fees by local governments and authorities are subject to the requirements of HB 436. The salient provisions of this law are as follows:

I. A system development fees shall be calculated based on written analysis, prepared in the following manner:

   a. Prepared by a finance or engineering professional

   b. Document in reasonable detail the facts and data used

   c. Employ generally accepted accounting, engineering and planning methodologies

   d. Identify all assumptions and limiting conditions affecting the analysis

   e. Include an equivalency or conversion table for various categories of demand

   f. Cover a planning horizon of at least 10 years and at most 20 years

   g. Be adopted by resolution or ordinance

II. Amount of fee charged cannot exceed the fee calculated based on the above analysis.

III. Calculation of fee should take into consideration applicable revenue credit and construction or contribution credits.

IV. The analysis must be posted on the utilities' website at least 45 days before considering the adoption and provide means to submit written comments.

V. Revenue from system development fees calculated using the incremental cost method as part of the combined cost method can only be used for construction costs, professional fees and debt service on capital improvement projects.

VI. Revenues from system development fees must be accounted for in a capital reserve fund.

The Town's capacity fees are calculated to reflect a proportionate share of system improvement costs to the new customers benefiting from its past and future investments in water and sewer system facilities.

3.4 CREDITS

A consideration of credits is integral to the implementation of a defensible capacity fee methodology, and HB 436 outlines this consideration as a requirement. The credits outlined in HB 436 can be categorized as follows:

I. Contributed Assets Credits- This type of credit considers the payment of the cost of the new capital improvements by new customers joining the system.

II. Debt Service Credits- This provides credit for the proportionate share of outstanding principal on previous capital improvements, which the new customers will pay through their water and wastewater rates.

III. Grant Funded Assets- The assets which were funded through grant monies received by the utility and for which the utility did not bear any costs.

Black & Veatch has considered these types of credits as a part of the capacity fee calculation, where possible, so that we only recover the associated cost of the asset once, thus reducing the water and wastewater MACF.

4.0 Capacity Fee Analysis

4.1 WATER AND WASTEWATER CAPACITY

4.1.1 Population Growth

The North Carolina Office of State Budget and Management (OSBM) maintain a forecast of population growth for all Cities and Counties within North Carolina. The OSBM has indicated that the Cities of Charlotte and Raleigh have experienced rapid growth and the OSBM anticipates that positive growth will continue over the next 10 years. The Town is a neighboring municipality of Raleigh, located within Johnston County, North Carolina. As detailed in **Table 2**, Johnston County maintains a population of 194,705 as of July 2017. The OSBM's forecasts that the population within Johnston County will grow from 200,102 in July 2018 to 254,362 by July 2028 which aggregates to a compound annual growth rate of 2.43%.

Table 2 Summary of Population Growth

LINE NO.	FISCAL YEAR	POPULATION
	Historical:	
1	FY 2017	194,705
	Forecasted:	
2	FY 2018	200,102
3	FY 2019	205,523
4	FY 2020	210,948
5	FY 2021	216,374
6	FY 2022	221,803
7	FY 2023	227,227
8	FY 2024	232,655
9	FY 2025	238,082
10	FY 2026	243,508
11	FY 2027	248.936
12	FY 2028	254,362

4.1.2 Water and Sewer Customer Information

The Town has experienced increases in the number of customers served which necessitates the need to manage the existing water and wastewater system capacity to serve new growth. Over fiscal years (FY) 2017 through FY 2018, the total water system accounts increased from 9,616 to 9,712, and the sewer system accounts increased from 8,229 to 8,311 respectively. Based on the current level of build out applications and the current increase in the demand for water and wastewater services, Black & Veatch is using a 1.0% growth rate to forecast the growth in water and sewer system accounts over the forecasted period. As such, we project that water and wastewater accounts will grow to 9,809 and 8,394 respectively in FY 2019 and these accounts will experience further growth and reach 10,728 (water) and 9,181 (sewer) by the end of FY 2028.

Table 3 presents the detailed historical and projected customer account information for the water and wastewater systems.

Table 3 Total Water and Wastewater Accounts

LINE NO.	FISCAL YEAR	WATER	WASTEWATER
	Historical:		
3	FY 2017	9,616	8,229
4	FY 2018	9,712	8,311
	Projected:		
5	FY 2019	9,809	8,394
6	FY 2020	9,907	8,478
7	FY 2021	10,006	8,563
8	FY 2022	10,107	8,649
9	FY 2023	10,208	8,735
10	FY 2024	10,310	8,823
11	FY 2025	10,413	8,911
12	FY 2026	10,517	9,000
13	FY 2027	10,622	9,090
14	FY 2028	10,728	9,181

4.1.3 Water and Sewer Flow Information

The Town anticipates that the sale of water and wastewater flow will grow at the same rate as the forecast in customer accounts over the forecast period. Additionally, the Town expects that the use of water and wastewater system flow per account will hold consistent over the forecast period. All water and wastewater flow presented in this section of the Report are in thousands of gallons.

At the end of FY 2017, water and wastewater flow reconciled to be 891,499 and 943,126 respectively. By the end of FY 2018, water flow is anticipated to increase to 900,414, and wastewater flow is anticipated to increase to 952,557. Based on the current level of build out applications and the anticipated increase in the demand for utility services, the Town estimates that water and wastewater flow will increase from 909,418 and 962,083 respectively in FY 2019 and these totals will grow to 994,618 and 1,052,215 respectively by the end of FY 2028.

Table 4 presents the detailed historical and projected sale of water and wastewater system flows.

Table 4 Water and Wastewater Flow

LINE NO.	FISCAL YEAR	WATER FLOW	WASTEWATER FLOW
	Historical:	1,000 gallons	1,000 gallons
1	FY 2017	891,499	943,126
2	FY 2018	900,414	952,557
	Projected:		
3	FY 2019	909,418	962,083
4	FY 2020	918,513	971,703
5	FY 2021	927,698	981,420
6	FY 2022	936,975	991,235
7	FY 2023	946,345	1,001,147
8	FY 2024	955,808	1,011,158
9	FY 2025	965,366	1,021,270
10	FY 2026	975,020	1,031,483
11	FY 2027	984,770	1,041,798
12	FY 2028	994,618	1,052,215

Water and sewer capacity fees for new connections will be charged on a per-meter equivalent basis as shown in Table 5, with a unit fee per unit of capacity assessed to the prospective customer. Table 3 presents the estimate of the number of existing residential water and wastewater accounts, by meter size, as of FY 2018. For the analysis performed herein, water and sewer billing determinant information is based on utility system accounts and billed flow as provided by the Town. We converted the billing determinant information into residential units after applying the AWWA meter cost equivalency factors noted on **Table 5, Line 3**. The AWWA meter cost equivalency factors serve in defining a uniform aggregate of service units. Table 5, Lines 4 and 5 summarized the water and wastewater residential service units respectively.

Table 5 presents the summary of equivalent residential units (ERUs) as of FY 2018.

Table 5 Water and Wastewater System Equivalent Residential Units

LINE NO.	UTILITY SYSTEM	METER SIZE									
	Accounts:	**3/4"**	**1.0"**	**1.5"**	**2.0"**	**3.0"**	**4.0"**	**6.0"**	**8.0"**	**10.0"**	**Total**
1	Water	9,504	115	36	53	1	1	1	0	1	9,712
2	Wastewater	8,155	77	33	43	1	1	0	0	1	8,311
3	**ERU Factors**	**1.00**	**1.67**	**3.33**	**5.33**	**10.67**	**16.67**	**33.33**	**53.33**	**76.67**	
	System ERUs:										
4	Water	9,504	192	121	280	11	17	34	0	77	10,236
5	Wastewater	8,155	128	111	232	11	17	0	0	77	8,731

4.1.4 Water and Sewer System Capacity Requirements

Water facilities are designed to accommodate average day and maximum day (and in some cases maximum hour) demand requirements, while wastewater facilities need to address pollutant loading levels and average and peak flow. These utility system conditions are critical to understanding the actual service demand requirements of the existing systems and serve as a critical component in the development of the capacity fees. Therefore, when calculating capacity fees, demand requirements should be reflected in terms of the understood maximum peaking conditions to reflect the demand requirements of the existing system.

For the Town's water system, the capacity requirements for wells, transmission mains, and other assets are based on maximum day demand requirements, as compared to distribution storage facilities which are based on maximum hour demands. In determining the capacity requirements needed to perform the analysis detailed herein, we used the water system's maximum day permitted capacity. The Town has an interlocal agreement with Johnson County and purchases all the water sold to existing customer from Johnson County. The water system's permitted capacity is 3.09 million gallons per day (MGD) while the actual average day flow is 2.44 MGD which aggregates to an unutilized capacity of 0.65 MGD. The average day flow of 2.44 MGD was calculated based on a review of historical water system billing information from FY 2015 through FY 2017.

The sewer system's current capacity requirements are based on the capacity for components such as the collection and pumping systems. In determining the capacity requirement to develop a wastewater capacity fee, we used the wastewater average day billed flow as the basis to initiate the analysis performed herein. The Town owns the Little Creek Water Reclamation Facility which has a treatment capacity of 2.5 MGD. Additionally, the Town has interlocal agreements with the City of Raleigh and Johnston County to pump untreated wastewater of 1.0 MGD and 1.3 MGD respectively.

The total wastewater treatment capacity available to the Town is 4.8 MGD and the actual average day flows are 2.58 MGD which assumes an unutilized capacity of 2.22 MGD. The average day flow of 2.58 MGD was calculated based on a review of historical wastewater system billing information from FY 2015 through FY 2017.

Table 6 illustrates the utilization of the current water and wastewater system capacity at the end of FY 2017.

Table 6 Water and Wastewater System Existing Capacity Utilization (FY 2017)

LINE NO.	DESCRIPTION	TOTAL CAPACITY (MGD)	UTILIZED CAPACITY (MGD)	UNUTILIZED CAPACITY (MGD)
1	Water System	3.09	2.44	0.65
2	Wastewater System	4.80	2.58	2.22

Black & Veatch utilized the Town's consumption records and number of residential accounts to calculate the average residential water daily flow-per-account of 115 gallons per day. As per the Town's flow records, the maximum day to average day factor of 2.50 was utilized for the system to detail the understood peaking conditions for the typical residential customer. Based on the 2.50 factor, the maximum day-per-service unit requirement is calculated to be 290 gallons per day for water use. The calculated water capacity standard of 290 gallons per day service serves as the typical water service requirement for one residential unit connected to the Town's current water system.

Table 7 illustrates the water capacity standard that is calculated and utilized herein.

Table 7 Water Capacity Standard (FY 2017)

LINE NO.	DESCRIPTION	FLOW	ACCOUNTS
	Customer Class (MGD)		
1	Residential	0.89	7,766
2	Commercial	0.36	661
3	Industrial	0.96	29
4	Institutional	0.05	77
5	Irrigation	0.19	1,083
6	Total	2.44	9,616
7	Total Residential Accounts		7,766
8	Residential Daily Flow (Gallons per Day) (((Line 1 * 365 * 1,000)/Line 1 Accounts)/365)	115	
	Capacity Standard:		
9	Average Day Standard (Gallons per Day) (Line 8)	115	
10	Maximum Day Factor	2.50	
11	Maximum Day Standard (Gallons) (Line 10 X Line 11)	290	

Black & Veatch utilized the Town's consumption records and number of residential accounts to calculate the average wastewater daily flow-per-account of 113 gallons per day. Wastewater flowing to the plant not only includes contributed wastewater flow, but these flows also include inflow and infiltration (I&I) which is recognized in determining the wastewater system capacity standard. The WEF Manual of Practice No. 27 (WEF Manual) provides example guidelines for the allocation of I&I to existing customers. Per the WEF Manual guidelines, we are allocating the provision of I&I as follows:

- 66% based on number of customers (accounts) – allocated based on the proportion of customers in each customer class; and
- 33% based on amount of flow – allocated based on the proportion of billed water usage in each customer class.

Table 8 illustrates the wastewater capacity standard that is calculated and utilized herein.

Table 8 Wastewater Capacity Standard

LINE NO.	DESCRIPTION	FLOWS	ACCOUNTS
	Customer Class (MGD)		
1	Residential	0.85	7,521
2	Commercial	0.35	630
3	Industrial	0.74	17
4	Institutional	0.03	60
5	High Strength Surcharge	0.61	1
6	**Total**	2.58	8,229
7	Total Residential Accounts		7,521
8	Residential Daily Flow (Gallons per Day) (((Line 1 * 365 * 1,000)/Line 1 Accounts)/365)	113	
9	Plant Flow (Max Month/Avg. Day) (MGD)	3.24	
10	Inflow & Infiltration Related Flow (MGD) (Line 10 – Line 6)	0.66	
	I&I Assignment:		
11	Customer - 66.6% (MGD) (Line 11 * 66.6%)	.43	
12	Flow – 33.3% (MGD) (Line 11 * 33.3%)	.23	
	Residential I&I Assignment:		
13	Customer (MGD) ((Line 1 / Line 6) * Line 12)	0.38	
14	Flow (MGD) ((Line 1 / Line 6) * Line 12)	0.07	
15	Total Residential I&I Assignment	0.46	
16	I&I Related Flow (Gallons per Day) (((Line 15 * 365 * 1,000)/Line 1 Accounts)/365)	61	
	Capacity Standard:		
17	Wastewater Flow Standard (Gallons per Day) (Line 8 + Line 16)	174	
18	Maximum Day Design Factor	1.24	
19	Maximum Day Standard (Gallons per Day) (Line 17 * Line 18)	215	

4.2 EXISTING UTILITY SYSTEM INVESTMENT

4.2.1 The Determination of Utility System Investment

As previously outlined, Black & Veatch utilized the Combined System Approach to perform the capacity fee analysis detailed herein upon completing a detailed review of the Town's current water and wastewater services demand and supply requirements. As described by the Town, the current water and wastewater system assets maintain unutilized system capacity, in part, to accommodate future growth anticipated for utility system build-out. To facilitate the construction of these and additional facilities to serve growth, the Town has financed major capital construction projects through a combination of revenue bonds, state revolving fund (SRF) loans, developer contributions, and fund reserves.

Future connections to the utility systems have not paid for the Town's past system investment. Therefore, existing customers and fund revenues have borne this initial cost of existing facilities, including the excess capacity available in the system that can, in turn, serve future connections. Due to this circumstance, new connections are obligated to bear their fair share of the prior carrying cost by paying a fee commensurate with this existing investment along with the new customer's calculated share of future investments. This principle and focus embody the Combined Systems Approach whereby the historical investment and anticipated future investment are utilized to calculate the capacity fees utilized herein.

The Black & Veatch team reviewed the existing investment in the water and wastewater system to determine the original investment and the replacement value of the system. Additionally, Black & Veatch worked with Town staff to understand and appropriately list the investment in existing assets that is applicable for consideration in the development of the water and wastewater system MACF. To avoid double-counting and incorrectly recovering costs that were not paid by the utility in the first place, we deduct such items as past investments in the existing facilities attributable to developer contributions, grant funding, and any other funding source not borne by existing customers through existing water and wastewater user rates and charges from the calculated unit cost of capacity for the water and wastewater systems.

4.2.2 Water and Sewer System Existing Assets and Valuation Approaches

Various methods can be employed to estimate the value of utility facilities required to furnish service to new customers. The two principal methods commonly used to value a utility's properties are original cost and replacement cost, with or without considerations for depreciation.

4.2.2.1 Replacement Cost

Changes in the value of the dollar over time, at least as considered by the impact of inflation, can be recognized by replacement cost (RC) asset valuation. The replacement cost represents the cost of replacing the existing utility facilities with new facilities at current value. Unlike the original cost approach, the replacement cost method recognizes price level changes that may have occurred since plant construction.

The most accurate replacement cost valuation would involve a physical inventory and appraisal of plant components in terms of their replacement costs at the time of valuation. However, with original cost records available, a reasonable approximation of replacement cost plant value can be

ascertained by trending the original historical cost. This approach employs the use of applicable cost indices to express actual capital costs experienced by the utility in terms of current dollars. An advantage of the replacement cost approach is that it considers changes in the value of money over time. In this analysis, Black & Veatch used the annual Handy Whitman Index for Public Utility Construction Costs (Water Utility) for the South Atlantic geographic region for each year from the early 20th century to 2017 to calculate a factor to escalate the original cost figures to estimate current replacement values for each asset.

4.2.2.2 Depreciation

Considerations of the current value of utility facilities may also be materially affected by the effects of age and depreciation. Depreciation takes into account the anticipated losses in plant value caused by wear and tear, decay, inadequacy, and obsolescence. Utilities can also use the valuation measure expressed on a replacement cost less depreciation (RCLD) basis, which provides recognition of the effects of depreciation on assets. This measure is identical to the above valuation method, with the exception that accumulated depreciation is computed for each asset account based upon its age or condition and deducted from the respective total original cost or replacement cost to determine the RCLD measure of plant value.

4.2.2.3 RCLD Method for the Capacity Fees Analysis

The question then becomes, how should an agency value the existing assets and, thus, the excess capacity available to new connections? The first step is to identify a proper basis for determining existing water and wastewater system asset values. To perform this analysis, the Town provided its water and wastewater system fixed asset records, which Black & Veatch then analyzed. These records contain detailed listings of each system asset in use, including asset category, asset name, system function, the initial date of service, original cost, and annual and accumulated depreciation. Upon review of the Town's fixed asset register, many of the Town's existing assets are significantly depreciated, so continuous replacement and updates will be required over the next 10 to 20 years. Consequently, it is unlikely that the existing assets will be able to serve all future growth needs during the study period. The RCLD approach will provide the utility with a return on the money that had been used to build the existing facilities for future customers. This return is often accounted for by the increase in the replacement cost value of the facilities.

In the process of understanding the nature of the existing water and wastewater system assets, Black & Veatch classified the original cost of the existing plant into standard functional categories. The functionally classified assets were utilized to determine the book value of the water and wastewater systems. In addition, existing customers must carry the additional cost of capacity. Therefore, a part of this investment plus a carrying charge applies to new customers. In essence, the capacity must exist for new customers in advance of need.

For analyzing the Town's capacity fees, Black & Veatch only included the "backbone" assets in determining the current value of the existing plant on an RCLD value basis. Backbone assets are those that provide service to all customers. Thus, we excluded specific asset classifications from the valuation, such as maintenance and service assets and general plant assets.

The RCLD provides a basis to understand the cost to reproduce or reconstruct any improvements of existing depreciated facilities based on current designs and materials. The original cost of water

and wastewater asset and the associated accumulated depreciation were utilized as the basis to develop the current value of the utility systems. The Handy Whitman Index factors were applied to the water and wastewater system asset's original cost to determine the current value. The current value of the backbone assets as applicable to the calculation of the capacity fee is shown in **Table 8**.

The Town intends to retire the existing Little Creek Water Reclamation Facility and existing wastewater service contracts with the City of Raleigh by the end of FY 2023. In addition, the Town plans to retire the total existing aggregate 3.50 MGD and replace it with a new 5.0 MGD Wastewater Treatment Plant. Upon completing the retirement of the Little Creek Water Reclamation Facility and the City of Raleigh wastewater service contract, the Town aggregate wastewater system capacity will be 6.30 MGD. Due to the retirement of existing wastewater system capacity, the RCLD of the existing wastewater treatment, and disposal facilities should not be included the in the capacity fee. As such, Black & Veatch has deducted the value of the existing wastewater treatment and disposal facilities as detailed in **Table 9, Line 7**.

Table 9 Replacement Cost less Depreciation

LINE NO.	DESCRIPTION	ORIGINAL ASSET COST	ACCUMULATED DEPRECIATION	ORIGINAL COST LESS DEPRECIATION	REPLACEMENT COST LESS DEPRECIATION
Water System Assets:					
1	Water Trans. & Distribution	6,924,178	2,024,257	4,899,921	8,493,662
2	**Total Water System Assets**	**$6,924,178**	**$2,024,257**	**$4,899,921**	**$8,493,662**
Wastewater System Assets:					
3	Wastewater Collection	$11,851,032	$3,543,504	$8,307,528	$12,781,191
4	Wastewater Pumping System	3,529,242	1,049,849	2,479,393	4,630,678
5	Wastewater Treatment & Disposal	20,223,376	4,716,199	15,507,177	23,529,838
6	**Subtotal Wastewater System Assets**	**$35,603,650**	**$9,309,552**	**$26,294,098**	**$40,941,707**
7	**Total Wastewater System Assets less Water Treatment & Disposal (due to the retirement of the system in FY 2023)**	**$15,380,274**	**$4,593,353**	**$10,786,921**	**$17,411,869**
8	**Total Capacity Fee Related System Assets**	**$22,304,452**	**$6,617,610**	**$15,686,842**	**$25,905,531**

4.2.2.4 Contributed and Grant-Funded Assets

The Town's staff provided information about the current assets that were fully or partially paid for by developers, grants, and sources other than existing water and wastewater rates and charges. The value of these "contributed assets" and "grant funded assets" is not included in the capacity fee calculation. **Table 10** below provides a summary of contributed and grant-funded assets.

Table 10 Contributed and Grant-Funded Assets

LINE NO.	DESCRIPTION	CONTRIBUTED ASSETS	GRANT FUNDED ASSETS
1	Water Dist. & Transmission	0	115,638
2	**Subtotal Water System Assets**	**$0**	**$115,638**
3	Wastewater Collection	$973,055	$281,754
4	Wastewater Pumping System	1,821,195	129,886
5	Wastewater Treatment & Disposal	0	0
6	Wastewater Buildings	0	0
7	**Subtotal Wastewater System Assets**	**$2,794,250**	**$411,640**
8	**Total System Assets**	**$2,794,250**	**$527,278**

4.2.3 Capacity Related Capital Improvement Projects

Black & Veatch used the Capital Improvements Projects (CIP) presented in **Table 11** in the analysis provided herein to obtain information on the upgrade and expansion-related capital projects. The Town's CIP provides a plan to implement water and wastewater capital improvements over the 10-year (2019-2028) planning horizon. Additional water and wastewater facilities are needed to accommodate new customer growth, and the Town has plans to add 1.84 MGD of water treatment capacity in addition to the existing 3.09 MGD. The Town is proposing an additional 5.0 MGD of new capacity for new wastewater system treatment. The Town plans to construct a new 5.0 MGD Wastewater Treatment Plant (WWTP) which is anticipated to come online in FY 2024. After startup of the new WWTP, the Town will retire it existing 2.5 MGD Little Creek Water Reclamation Facility along with discontinuing the existing 1.0 MGD wastewater service contract with the City of Raleigh.

An analysis of the water and wastewater capital improvement plans determined that certain projects and portions of projects are required to serve new connections. Where specific system improvements will benefit existing customers and expand capacity for new connections, we determine the growth share of the capital cost through engineering analysis of the specific

improvement. For this component of the analysis, we exclude projects or portions of projects that only benefit existing connections.

Table 11 summarizes the capital costs related to providing water and wastewater service at the existing levels of service to new customers. The capital costs presented in **Table 11** represent a ten-year forecast period from FY 2019 to FY 2028. Construction Work in Progress (CWIP) projects are included in these costs, as these assets are still under construction and have not yet been placed in-service. The CIP was categorized by utility function in the same manner as the categorization of the Town's water and wastewater system assets.

Table 11 Capital Improvements Projects

LINE NO.	DESCRIPTION		CAPACITY FEE RELATED CIP PROJECTS
	Water System CIP:		
1	Water Treatment		$2,724,177
2	Water Trans. & Distribution		5,931,413
3	CWIP		350,981
4	**Subtotal Water CIP**		**$9,006,530**
	Wastewater System CIP:		
5	Wastewater Collection		$5,799,354
6	Wastewater Pumping System		5,596,000
7	Wastewater Treatment & Disposal		93,267,964
9	CWIP		10,089,742
10	**Subtotal Wastewater CIP**		**$114,505,101**
11	**Total System CIP**		**$123,511,631**

4.2.4 Utility System Credits

Capacity fees for new connections to the Town's water and wastewater systems should not include facilities that are financed by debt through user rates. The existing utility rates service existing debt and other utility system obligations, so new connections will pay their share of servicing existing obligations through existing water and wastewater user rates and charges. Therefore, the capacity fee analysis considers a debt service credit to avoid the potential for double payment. Additionally, we do not consider developer contributions and grant-funded projects in the calculation of the MACF and credits are developed as a part of the analysis detailed herein to prevent the double payment on water and wastewater system assets.

Black & Veatch assessed the aforementioned credit, to the water and wastewater unit cost of capacity, as a part of this analysis by subtracting the proportionate share of the existing outstanding

principal, developer contributions, and grant-funded projects relative to the proportionate share of all the utilized water and wastewater system capacity. Essentially, the method outlined avoids the double payment of existing outstanding principal but allows the new customer to appropriately reserve their required share of the unutilized water and wastewater system capacity. For the capacity fee calculation detailed herein, we determined total water and wastewater system credits of $799,638 and $17,124,761 respectively.

4.3 WATER AND SEWER CAPACITY FEES CALCULATION

4.3.1 Calculation of Water System Capacity Fee

There are specific steps required in the process of calculating the water system capacity fees. Identifying the total capacity fee recoverable costs is essential to recovering the total growth-related investment that has been furnished and will be furnished by the Town. Capacity impact fee recoverable cost consists of two components:

- The current value of the backbone water system assets at $8,493,662; and
- The growth-related water system CIP over the 10-year forecast period at $9,006,530.

The capacity of the water system consists of the capacity of the existing system available for new customers and the proposed capacity addition to service additional growth. When the capacity available to new customers is determined, the associated capacity fee recoverable cost is divided by this capacity to determine a capacity fee recoverable cost per unit of capacity. A system-wide credit per unit of capacity is determined to reduce the potential of double payment by customers related to debt-financed improvements, developer contributions, and grant-funded projects. As provided by the Town staff, the total existing debt service obligations for the water system, beginning in FY 2019, was utilized along with developer contribution and grant funding as the basis to determine the system-wide credit per unit of capacity. To determine the calculated maximum allowable capacity fee, the Capacity Fee recoverable cost per unit of the capacity net of the system-wide credit per unit of capacity is multiplied by the water maximum day capacity standard and the applicable equivalent service unit(s) to determine the calculated Capacity Fee. After that a carrying cost adjustment of 3.50% over three years is applied to the aggregate Capacity Fee calculation to determine the MACF. As shown in **Table 12,** the calculated water system maximum allowable capacity fee is **$926.00**.

Table 12 Water System Capacity Fee Calculation

LINE	DESCRIPTION	AMOUNT ($)
	Water System Assets:	
1	Water System Assets - Existing Customers	$6,703,068
2	Water System Assets - Future Customers	1,790,595
3	**Current Value of Connection Fee Related Water System**	**$8,493,662**
	Capital Improvement Projects:	
4	Applicable to Existing Customers	$3,108,665
5	Applicable to New Customers	3,173,748
6	Expansion Related Projects	2,724,117
7	**Total Capital Improvement Projects**	**$9,006,530**
	Existing Capacity (gallons per day):	
8	Utilized	2,440,948
9	Unutilized	652,052
10	Total Existing Treatment Capacity	3,093,000
11	Proposed Treatment Capacity	1,840,000
12	Investment for New Customer (Line 2+ Line 5+ Line 6)	$7,688,460
13	Capacity Available to New Customers (Line 9+Line 11)	2,492,052
14	**Gross Connection Fee Unit Cost (Line 12 / Line 13)**	**$3.09**
	Credits:	
15	Debt Obligations	$684,000
16	Contributed Assets & Grant Funded	115,638
17	Total Water System Credits	$799,638
18	Unit Debt per Gallons of Existing Capacity (Line 17/ Line	$0.26
19	Debt Credit to Existing Customers (Line 8 / Line 10) x Line	$0.20
20	**Gross Capacity Fee Unit Cost (Line 14 - Line 19)**	**$2.88**
	Applicable Equivalent Capacity Standard (Gallons):	
21	**Maximum Day Standard**	**290**
22	**Equivalent Standard**	**1.00**
23	**Calculated Capacity Fee (Line 20 x Line 21 x Line 22)**	**$836**
24	**Carrying Cost Adjustment Factor (3 years)**	**3.50%**
25	**Maximum Allowable Water Capacity Fee**	**$926**

4.3.2 Calculation of Wastewater System (Sewer) Capacity Fee

There are specific steps required in the calculation of wastewater system capacity fees. Identifying the total capacity fee recoverable costs is essential to recovering the total growth-related investment that has been furnished and will be furnished by the Town. Impact fee recoverable cost consists of two components:

- The current value of the backbone wastewater system assets at $17,411,868; and
- The growth-related wastewater system CIP over the 10-year forecast period at $114,753,060.

The capacity of the wastewater system relates to the existing wastewater treatment capacity. The total capacity fee recoverable cost is divided by the total treatment capacity to determine a Capacity Fee recoverable cost per unit of capacity. A system-wide credit per unit of utilized capacity is determined to reduce the potential of double payment by customers related to debt-financed improvements, developer contributions, and grant funding projects. As provided by Town staff, the total existing debt service obligations for the wastewater system, beginning in FY 2019, was utilized as a part of the system-wide credit per unit of capacity. To determine the calculated capacity fee, the recoverable cost per unit of the capacity net of the system-wide credit per unit of capacity is multiplied by the wastewater maximum day capacity standard and the applicable equivalent service unit(s) to determine the calculated capacity fee. After that, a carrying cost adjustment of 3.5% over three years is applied to determine the aggregate Capacity Fee. As shown in **Table 13**, the calculated maximum allowable wastewater system capacity fee is **$6,241.00**.

Table 13 Wastewater System (Sewer) Capacity Fee Calculation

LINE	DESCRIPTION	AMOUNT ($)
	Wastewater System Assets:	
1	Wastewater System Assets - Existing Customers	$9,372,564
2	Wastewater System Assets - Future Customers	8,039,304
3	**Current Value of Connection Fee Related Water System Assets**	**$17,411,868**
	Capital Improvement Projects:	
4	Applicable to Existing Customers	$42,367,379
5	Applicable to New Customers	60,936,792
6	Expansion Related Projects	11,448,888
7	**Total Capital Improvement Projects**	**$114,753,060**
	Existing Treatment Capacity (Gallons per day):	
8	Utilized	2,583,773
9	Unutilized	2,216,227
10	Total Existing Treatment Capacity ***(3.5 MGD to be retired in FY 2023)***	4,800,000
11	Proposed Treatment Capacity	5,000,000
12	Investment for New Customer (Line 2 + Line 5 + Line 6)	$80,424,985
13	Capacity Available to New Customers (Line 11 - Line 8)	3,716,227
14	**Capacity Fee Unit Cost (Line 12 / Line 13)**	**$21.64**
	Credits:	
15	Debt Obligations	$13,918,870
16	Contributed Assets & Grant Funded	3,205,891
17	Total System Credits	$17,124,761
18	Unit Debt per Gallons of Existing Capacity (Line 17 / Line 10)	$3.57
19	Debt Credit to Existing Customers (Line 8 / Line 10) x Line 18	$1.92
20	**Gross Capacity Fee Unit Cost (Line 14 - Line 19)**	**$19.72**
	Applicable Equivalent Capacity Standard (Gallons):	
21	**Maximum Day Standard**	**210**
22	**Equivalent Standard**	**1.00**
23	**Calculated Connection Fee (Line 20 x Line 21 x Line 22)**	**$4,142**
24	**Carrying Cost Adjustment Factor (3 years)**	**3.50%**
25	**Maximum Allowable Wastewater Capacity Fee**	**$4,592**