

March 17, 2023

Mr. Jonathan Britt  
Manager of Advanced Analytics  
Greenville Utilities Commission  
401 S. Greene Street  
Greenville, NC 27834

**Subject: Calculation of FY 2024 Water and Sewer System Development Fees**

Dear Mr. Britt:

Raftelis Financial Consultants, Inc. (“Raftelis”) has completed an evaluation to develop cost-justified water and sewer system development fees for fiscal year (“FY”) 2024 for consideration by Greenville Utilities Commission (“GUC”). This report documents the results of the analysis, which was based on an approach for establishing system development fees set forth in North Carolina General Statute 162A Article 8 – “System Development Fees.” The purpose of this report is to summarize Raftelis’ conclusion related to cost-justified water and sewer system development fees. It is not intended to address anything else associated with the system development fees, such as the administration of these fees, etc.

The preparation of this report was developed by Raftelis for GUC based on a specific scope of work agreed to by both parties. The scope of Raftelis’ work consisted of completing a calculation of cost-justified water and sewer system development fees using common industry practices and industry standards. We provide no opinion on the legality of the system development fees implemented by GUC. It is the responsibility of GUC to ensure compliance of the system development fees with North Carolina General Statute 162A Article 8 – “System Development Fees.” The scope of work does not include any additional work other than the calculation associated with the system development fees, such as opinions or recommendations on the administration of these fees, the timing and use of revenues from the collection of these fees, etc., as that is the responsibility of GUC.

In developing the conclusions contained within this report, Raftelis has relied on certain assumptions and information provided by GUC, who is most knowledgeable of the water and sewer system, its finances, etc. Raftelis has not independently verified the accuracy of the information provided by GUC. We believe such sources are reliable and the information obtained to be reasonable and appropriate for the analysis undertaken and the conclusions reached. The conclusions contained in this report are as of the stated date, for a specific use and purpose, and made under specific assumptions and limiting conditions. The reader is cautioned and reminded that the conclusions presented in this report apply only as to the effective date indicated. Raftelis makes no warranty, expressed or implied, with respect to the opinions and conclusions contained in this report. Any statement in this report involving estimates or matters of opinion, whether or not specifically designated, are intended as such, and not as representation of fact.

## Background

System development fees are one-time charges assessed to new water and/or sewer customers for their use of system capacity and serve as an equitable method by which to recover up-front system capacity costs from those using the capacity. North Carolina General Statute 162A Article 8 (“Article 8”) provides for the uniform authority to implement system development fees for public water and sewer systems in North Carolina and was passed by the North Carolina General Assembly and signed into law on July 20, 2017, and was modified by Session Law 2021-76 and House Bill 344, which was approved on July 2, 2021. According to the statute, system development fees are required to be adopted in accordance with the conditions and limitations of Article 8, and the fees are required to conform to the requirements set forth in the Article no later than July 1, 2018.<sup>1</sup> In addition, the system development fees must also be prepared by a financial professional or licensed professional engineer, qualified by experience and training or education, who, according to the Article, shall:

- Document in reasonable detail the facts and data used in the analysis and their sufficiency and reliability.
- Employs generally accepted accounting, engineering, and planning methodologies, including the buy-in, incremental cost or marginal cost, and combined methods for each service, setting forth appropriate analysis as to the consideration and selection of a method appropriate to the circumstances and adapted as necessary to satisfy all requirements of Article 8.
- Document and demonstrate the reliable application of the methodologies to the facts and data, including all reasoning, analysis, and interim calculations underlying each identifiable component of the system development fee and the aggregate thereof.
- Identify all assumptions and limiting conditions affecting the analysis and demonstrate that they do not materially undermine the reliability of conclusions reached.
- Calculate a final system development fee per service unit of new development and include an equivalency or conversion table for use in determining the fees applicable for various categories of demand.
- Consider a planning horizon of not less than five years, nor more than 20 years.
- Use the gallons per day per service unit that the local government unit applies to its water or sewer system engineering for planning purposes for water or sewer, as appropriate, in calculating the system development fee.

This letter report documents the results of the calculation of water and sewer system development fees for FY 2024 in accordance with these requirements. In general, system development fees are calculated based on (1) a cost analysis of the existing or planned infrastructure that is in place, or will be constructed, to serve new capacity demands, and (2) the existing or additional capacity associated with these assets. Article 8 is relatively explicit in the identification of infrastructure assets that may be included as part of the system development fee calculation, as the Article defines allowable assets to include the following types, as provided in Section 201:

*“A water supply, treatment, storage, or distribution facility, or a wastewater collection, treatment, or disposal facility providing a general benefit to the area that facility serves and is owned or operated, or to be owned or*

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<sup>1</sup> Raftelis prepared GUC’s system development fees for FY 2019 in accordance with the requirements set forth in Article 8.

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*operated, by a local governmental unit. This shall include facilities for the reuse or reclamation of water and any land associated with the facility.”*

Therefore, the method used to calculate system development fees for GUC included system facility assets that satisfied this definition.

Article 8 references three methodologies that could be used to calculate system development fees. These include the buy-in method, the incremental cost method, and the combined cost method. A description of each of these methods is included in the following paragraphs:

### Capacity Buy-In Method:

Under the Capacity Buy-In Method, a system development fee is calculated based on the proportional cost of each user's share of existing system capacity. This approach is typically used when existing facilities can provide adequate capacity to accommodate future growth. The cost of capacity is derived by dividing the estimated value of existing facilities by the current capacity provided by existing facilities. Adjustments to the value of existing facilities are made for developer contributed assets, grant funds, and outstanding debt.

### Incremental Cost Method:

Under the Incremental Cost (or Marginal Cost) Method, a system development fee is calculated based on a new customer's proportional share of the incremental future cost of system capacity. This approach is typically used when existing facilities have limited or no capacity to accommodate future growth. The cost of capacity is calculated by dividing the total cost of growth-related capital investments by the additional capacity provided as a result of the investments.

### Combined Method:

Under the Combined Method, a system development fee is calculated based on the blended value of both the existing and expanded system capacity. As such, it is a combination of the Capacity Buy-In and Incremental Cost methods. This method is typically used when existing facilities provide adequate capacity to accommodate a portion of the capacity needs of new customers, but where significant investment in new facilities to address a portion of the capacity needs of future growth is also anticipated, or where some capacity is available in parts of the existing system, but incremental capacity will be needed for other parts of the system to serve new customers at some point in the future.

For the water system, the Combined Method was used to calculate the system development fees. Anticipated future growth will be met utilizing existing available capacity as well as the planned additional capacity of 9.5 million gallons daily (“MGD”) for the water treatment plant and distribution systems.

The Buy-In Method was chosen for the sewer system since GUC's existing sewer treatment facilities have adequate capacity to accommodate anticipated future growth over the near term.

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The following steps were completed to calculate the fees discussed in detail in the subsequent sections:

### Capacity Buy-In Method

1. The replacement value of existing system facilities (water and sewer) was calculated, and adjustments were made to derive a net replacement value estimate in accordance with Article 8. Adjustments to the calculated replacement value included deducting accumulated depreciation, developer / grant funded contributions, and outstanding debt principal.
2. The unit cost of system capacity (water and sewer) was estimated by dividing the net replacement value of existing system facilities by the current capacity of the system.

### Incremental Cost Method

3. The capital improvements project costs related to the expansion of GUC's water system was identified and adjusted by a revenue credit according to Article 8.
4. The unit cost of system capacity was estimated by dividing the adjusted capital improvement costs by the capacity to be added to the water system.

### Combined Method

5. The weighted average of the Buy-In Method and the Incremental Method was calculated to determine the average unit cost of capacity for water system.

### Water and Sewer Assessment Methodology

6. The amount of capacity assumed to be demanded by one service unit of new development was identified. One equivalent residential unit ("ERU") was defined as the smallest service unit of new development.
7. The system development fee for one service unit of development was calculated by multiplying the cost per unit of system capacity by the capacity associated with one ERU, as defined below.
8. The calculated system development fee for one ERU was scaled for different categories of demand. Meter capacity ratios were used to scale system development fees from a base meter size, or the smallest unit of new development (one ERU), to different categories of demand, as defined by the different customer meter sizes.

## System Development Fee Calculation

### Capacity Buy-In Method

Using the Buy-In method, Raftelis calculated the estimated cost, or investment in, the current capacity available to provide utility services to existing and new customers. We estimated the replacement value of the system facilities and calculated the unit cost of system capacity, as follows:

1. *Estimate the Replacement Value of System Facilities and Apply Adjustments:*

A listing of fixed assets provided by GUC, as of June 30, 2022, was reviewed and each individual asset was categorized into one of the categories shown in Table 1.

**Table 1. Fixed Asset Categories by System**

<b>Water / Sewer System</b>
Computers
Distribution Systems
Easements
Fiber Optics
Furniture And Office Equipment
General Plant
Land
Land Improvement
Utility Plants

Assets in categories identified as “Computers”, “Easements”, “Furniture and Office Equipment”, “General Plant”, “Vehicles and Equipment”, and “Meters” were excluded from the calculation of system value as these assets were not specifically identified as allowable under Article 8. Excluded assets included those relating to administrative and miscellaneous type buildings, rolling stock, and various types of equipment.

Next, the replacement value of existing assets in allowable categories was estimated. Each asset’s original cost, as contained in the fixed asset listing provided by GUC, was escalated to 2022 dollars based on the year the asset was purchased and the corresponding escalation factor for that year. The asset values were escalated using the Handy Whitman Index of Public Utility Construction Costs (for the South Atlantic Region). Using the Handy Whitman Index to estimate an asset’s current replacement cost is an industry accepted method by which to value system facilities.

The replacement costs of the assets were adjusted by their indexed accumulated depreciation to derive the replacement cost new less accumulated depreciation (“RCNLD”) amounts. The estimated RCNLD values for water and sewer system assets allowable under Article 8 are summarized in Tables 2 and 3, respectively.

**Table 2. Water System Value (RCNLD)**

<b>Description</b>	<b>RCNLD Value</b>
Distribution Systems	\$117,054,859
Fiber Optics	135,208
Land	1,334,669
Land Improvement	2,740,548
Utility Plants	51,872,048
<b>Total</b>	<b>\$173,137,331</b>

**Table 3. Sewer System Value (RCNLD)**

<b>Description</b>	<b>RCNLD Value</b>
Distribution Systems	\$173,555,695
Fiber Optics	135,208
Land	2,423,479
Land Improvement	145,156
Utility Plants	105,278,755
<b>Total</b>	<b>\$281,538,293</b>

As shown in Table 2, the RCNLD value of the water system was estimated to be approximately \$173.1 million, and, as shown in Table 3, the RCNLD value of the sewer system was estimated to be approximately \$281.5 million. Several additional adjustments were made to the estimated water and sewer system RCNLD values in accordance with Article 8, which included adjustments for developer contributed and grant funded assets, and outstanding debt principal, as described below.

#### Developer Contributed/ Grant Funded Assets

The listing of fixed assets was reviewed to identify assets that were contributed, or paid for, by developers, as well as assets that were grant funded. GUC tracks assets that were contributed by developers or funded by grants and identifies them in the fixed asset register as such. These assets were subtracted from the RCNLD value, as these assets do not represent an investment in system capacity by GUC. The total RCNLD value of contributed or grant funded water and sewer system assets was estimated to be approximately \$31.8 million and \$54.7 million, respectively.

#### Debt Credit

Article 8 specifies that the buy-in calculation should be determined using generally accepted methods, including the consideration of debt credits and other generally accepted valuation adjustments. In calculating the system development fees for GUC, a debt credit was included in the calculation as described below. The total outstanding debt principal used to fund qualifying assets was approximately \$21.8 million and \$39.8 million, respectively for water and sewer according to the data provided by GUC staff.

The resulting adjustments to the water and sewer RCNLD values for developer contributions, grant funded assets and outstanding debt principal are shown in Table 4.

**Table 4. Calculation of Buy-In Net Water and Sewer System Values**

Description	Amount
<b>Water System:</b>	
System Facilities RCNLD	\$173,137,331
Less: Developer Contributed and Grant Funded Assets	(31,760,862)
Less: Outstanding Principal Debt	<u>(21,760,494)</u>
Net System Value	\$119,615,975
<b>Sewer System:</b>	
System Facilities RCNLD	\$281,538,293
Less: Developer Contributed and Grant Funded Assets	(54,718,360)
Less: Outstanding Principal Debt	<u>(39,761,960)</u>
Net System Value	\$187,057,973

2. Calculate the Unit Cost of System Capacity (Buy-In):

The cost per unit of system capacity was calculated by dividing the adjusted RCNLD values by the water and sewer system capacities. The total treatment capacity of the water system is currently 24.5 million gallons per day (“MGD”). Therefore, the cost per unit of system capacity for the water system was calculated to be \$4.88 per gallon per day (“GPD”) ( $\$119,615,975 \div 24.5 \text{ MGD}$ ). The total treatment capacity of the sewer system is 17.5 MGD. Therefore, the cost per unit of system capacity for the sewer system was calculated to be \$10.69 per GPD ( $\$187,057,973 \div 17.5 \text{ MGD}$ ).

**Table 5. Cost per Unit of Capacity of Core Utility Assets – Buy-In Method**

	Water	Sewer
Adjusted RCNLD	\$119,615,975	\$187,057,973
Total Capacity [MGD]	24.50	17.50
Unit Cost of Capacity (\$ / GPD)	\$4.88	\$10.69

### Incremental Cost Method (Water Only)

To use the Combined Method to determine the System Development Fees for water, the cost per gallon per day must also be calculated using the Incremental Cost method. For this method, we estimated capital costs necessary for expansion of the water system, applied the appropriate revenue credits and calculated the unit cost of the incremental water system capacity, as follows:

3. Estimate the Capital Project Expansion Costs and Apply Revenue Credit:

The first step is to identify the total project cost in GUC’s capital improvement plan for projects that are related to the expansion of GUC’s water system. These projects are shown below in Table 6.

**Table 6. Capital Projects for the Water System**

<b>Water System Expansion Projects</b>	<b>Projected Cost</b>
WCP-117 - Water Plant Expansion	\$55,000,000
WCP10030 - Water Distribution System Improvements	<u>30,000,000</u>
Total Expansion Costs	\$85,000,000

The aggregate project costs must then be reduced by a revenue credit, according to Article 8. The revenue credit is applied to ensure that new customers are not paying twice for the capacity (once through the System Development Fee and then again through rates which are used to pay debt service issued for the projects that provide capacity). The revenue credit must be at least 25% of the aggregate project costs.

4. *Calculate the Unit Cost of System Capacity (Incremental):*

After subtracting this credit from the total project costs, the adjusted expansion cost is then divided by the future capacity provided by these projects (9.50 MGD) to determine the unit cost per GPD for water capacity as shown in Table 7.

**Table 7. Cost per Unit of Capacity – Incremental Cost**

<b>Incremental Cost</b>	
Total Expansion Costs	\$85,000,000
Less Revenue Credit: 25% of Project Costs	<u>(21,250,000)</u>
Total: Adjusted Expansion Costs	\$63,750,000
Available Capacity from Water Treatment Plant Expansion [MGD]	9.50
Unit Cost of Capacity (\$ / GPD)	\$6.71

### Combined Method (Water Only)

To determine the cost per gallon per day for water system capacity assuming the Combined Method, the weighted average unit cost per GPD from both the Buy-In and Incremental Cost methods must be calculated.

5. *Calculate the Weighted Average Unit Cost of Capacity for the Water System:*

**Table 8. Water Cost per GPD Calculation - Combined Method**

<b>Water Cost per Gallon Calculation</b>	<b>Capacity Provided [MGD]</b>	<b>Percent Capacity Provided</b>	<b>Cost Per GPD</b>
Buy-In	24.50	72%	\$4.88
Incremental Cost	9.50	28%	\$6.71
Weighted Average Unit Cost of Capacity (\$ / GPD)			\$5.40

The unit cost per GPD for sewer assuming the Buy-In Method (\$10.69) and for water assuming the Combined Method (\$5.40) becomes the basic building block or starting point for determining the cost-justified level of the water and sewer System Development Fees. Fees for different types of customers are



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based on this cost of capacity multiplied by the amount of capacity needed to serve each type or class of customer.

### Water and Sewer Assessment Methodology

To assess the water and sewer system development fees, Raftelis determined the capacity for one equivalent residential unit (“ERU”), calculated the system development fee for one ERU, and lastly scaled the system development fee for one ERU for various categories of demand, as follows:

6. *Estimate the Amount of Capacity Per Service Unit of New Development:*

Section 205 of Article 8 states that the system development fee calculation “...use the gallons per day per service unit that the local governmental unit applies to its water or sewer system engineering for planning purposes for water or sewer, as appropriate, in calculating the system development fee.” Therefore, for the water system, one ERU of peak day capacity for the water system was defined to be 195.13 gallons per day (“GPD”). For the sewer system, one ERU of capacity demand was defined as 206.75 GPD.

The average demand for a GUC residential customer, as provided by GUC staff, is 153 gallons per day. To calculate the water ERU, the average demand measured in gallons per day is adjusted to account for peak day water use and water loss. For sewer, the average demand (153 GPD) is adjusted to account for inflow and infiltration.

**Table 9. Water and Sewer Equivalent Residential Units (ERU) <sup>2</sup>**

	<b>Water – GPD per ERU</b>	<b>Sewer – GPD per ERU</b>
GPD per RU	153	153
System Peaking Factor	1.149	n/a
Infiltration and Inflow (I&I)	n/a	1.3513
Loss Factor (Leakage)	1.110	n/a
Equivalent Residential Unit	195.13	206.75

7. *Calculate the System Development Fee for One ERU*

The analysis provides a cost-justified level of System Development Fees that can be assessed by GUC. For residential customers, the calculation of the System Development Fee is based on the cost per gallon per day multiplied by the number of gallons per day required to serve each ERU, as shown below in Table 9.

Note that the cost per gallon for water is the cost determined using the Combined Approach.

<sup>2</sup> Information related to peaking, water loss and inflow and infiltration provided by GUC staff. GUC staff has confirmed the ERUs shown in this report as approved planning numbers.

**Table 10. Calculation of Water and Sewer System Development Fees for One ERU**

<b>System Development Fee Calculation</b>	
<b>Water Calculation</b>	
Unit Cost of Capacity (\$ / GPD) – Combined Approach	\$5.40
GPD per ERU	195.13
Proposed System Development Fee for ¾” meter	\$1,053.72
<b>Sewer Calculation</b>	
Unit Cost of Capacity (\$ / GPD) – Buy-In	\$10.69
GPD per ERU	206.75
Proposed System Development Fee for ¾” meter	\$2,209.96

8. *Scale the System Development Fees for Various Categories of Demand*

For non-residential customers (or customers with larger meters), the fees for the smallest residential meter can be used and then scaled up by the flow ratios for each meter size, as specified in the American Water Works Association in Principles of Water Rates, Fees, and Charges<sup>3</sup>, the results of which are shown in Table 10. This method provides a straightforward approach that is simple to administer and reasonably equitable for most new customers. Table 10 shows the resulting cost-justified System Development Fees by meter size for meters ranging from 3/4 inches to 16 inches. For these calculations, the System Development Fees have been rounded to the nearest dollar.

<sup>3</sup> Manual of Water Supply Practices (M1), Principles of Water Rates, Fees, and Charges, American Water Works Association, 7th Edition, Appendix B, Equivalent Meter Ratios; p.386.

**Table 11. Water and Sewer System Development Fees by Meter Size**

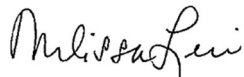
<b>Meter Size</b>	<b>Meter Type</b>	<b>Meter Ratio</b>	<b>Water</b>	<b>Sewer</b>	<b>Both Services</b>
3/4"	Compound	1.00	\$1,054	\$2,210	\$3,264
1"	Compound	1.67	\$1,760	\$3,691	\$5,450
1.5"	Compound	3.33	\$3,509	\$7,359	\$10,868
2"	Compound	5.33	\$5,616	\$11,779	\$17,395
2.5"	Compound	7.30	\$7,692	\$16,133	\$23,825
3"	Compound	10.67	\$11,243	\$23,580	\$34,823
4"	Compound	16.67	\$17,565	\$36,840	\$54,405
6"	Compound	33.33	\$35,120	\$73,658	\$108,778
8"	Compound	53.33	\$56,195	\$117,857	\$174,052
10"	Propeller	80.00	\$84,297	\$176,797	\$261,094
12"	Propeller	112.50	\$118,543	\$248,620	\$367,163
16"	Propeller	190.00	\$200,206	\$419,892	\$620,098
10"	Turbine	140.00	\$147,520	\$309,394	\$456,914
12"	Turbine	176.67	\$186,160	\$390,433	\$576,593
16"	Turbine	260.00	\$273,966	\$574,589	\$848,555
10"	Avg. (Propeller & Turbine)	110.00	\$115,909	\$243,095	\$359,004
12"	Avg. (Propeller & Turbine)	144.58	\$152,346	\$319,516	\$471,862
16"	Avg. (Propeller & Turbine)	225.00	\$237,086	\$497,241	\$734,327

The water and sewer system development fees represent the maximum cost justified level of system development fees that can be assessed by GUC per Article 8. If GUC chooses to assess fees that are less than those shown in the table, the adjusted fee amounts should still reflect the meter ratios by meter size.

We appreciate the opportunity to assist GUC with the calculation of its water and sewer system development fees. Should you have questions or need any additional information, please do not hesitate to contact me at 704-936-4441.

Sincerely,

RAFTELIS FINANCIAL CONSULTANTS, INC.



**Melissa Levin**  
Vice President