



March 14, 2023

Mike Wilson
Executive Director
Water & Sewer Authority of Cabarrus County
232 Davidson Hwy
Concord, NC 28027

Subject: Sewer System Development Fees for FY 2024

Dear Mr. Wilson:

Raftelis Financial Consultants, Inc. (“Raftelis”) has completed an evaluation to develop cost-justified sewer system development fees for fiscal year (“FY”) 2024 for consideration by the Water and Sewer Authority of Cabarrus County (“WSACC”). 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 sewer system development fees.

The preparation of this report was developed by Raftelis for WSACC 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 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 WSACC. It is the responsibility of WSACC 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 application of revenues from the collection of these fees, etc., as that is the responsibility of WSACC.

In developing the conclusions contained within this report, Raftelis has relied on certain assumptions and information provided by WSACC, who is most knowledgeable of the sewer system, its finances, etc. Raftelis has not independently verified the accuracy of the information provided by WSACC. 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. 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.
- Employ generally accepted accounting, engineering, and planning methodologies, including the buy-in, incremental cost or marginal cost, and combined cost methods for each service, setting forth appropriate analysis to the consideration and selection of an approach appropriate to the circumstances and adapted as necessary to satisfy all requirements of the Article.
- 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 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 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 WSACC 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.

The Combined Method was used to calculate the sewer fees for WSACC, since although WSACC is in the process of expanding the treatment capacity of the Rocky River Wastewater plant, WSACC is planning additional plant expansions over the next 10 years to continue to serve new sewer customers. The steps used to calculate the system development fees are provided below.

System Development Fee Calculation – Buy-In Approach

Step 1 – Estimate the Replacement Value of System Facilities and Apply Adjustments

A listing of fixed assets provided by WSACC, 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

Water & Sewer System
Building & Improvements
Administrative Buildings
Equipment
Vehicles
Land & Improvements
Software and Office Supplies
Sewer lines
Sewer plants
Sewer pump stations

Assets in categories identified as “Equipment”, “Vehicles”, “Buildings and Improvements”, “Administrative Buildings”, and “Software and Office Supplies” were excluded from the calculation of system value as these assets were not specifically identified as allowable under Article 8. In addition, WSACC owns water assets that are used to provide raw water to the jurisdictions served by WSACC. These assets were also removed as they are not associated with the sewer system.

Next, the replacement value of existing assets in allowable categories was estimated. Each asset's net book value was escalated to 2022 dollars based on the year the asset was purchased and the corresponding escalation factor for that year. Escalation factors for each year were developed using the Handy-Whitman index, which is an industry accepted method by which to value system facilities. The estimated RCNLD values for the sewer system assets allowable under Article 8 are summarized in Tables 2.

Table 2. Sewer System Value (RCNLD)

Description	RCNLD Value
Land & Improvements	\$12,316,636
Sewer lines	\$166,919,799
Sewer plants	\$63,141,022
Sewer pump stations	\$23,970,864
Total	\$266,348,320

As shown in Table 2, the RCNLD value of the sewer system was estimated to be approximately \$266.3 million. Several additional adjustments were made to the estimated sewer system RCNLD value in accordance with Article 8, as described below.

Contributed or Grant Funded Assets:

Typically, assets contributed by or paid for by developers are deducted from the calculation since these costs were not "paid" by the existing customers. Since WSACC provides wholesale wastewater service, there are no assets contributed by developers. However, in 2003, Charlotte Water contributed several assets with an RCNLD value of \$80.4 million in exchange for 6 million gallons per day ("MGD") of WSACC's treatment capacity. Because WSACC did not pay for the asset itself and does not collect system development fees from Charlotte Water customers, and because the 6 MGD of capacity is not available to WSACC customers, both the assets contributed by Charlotte Water and the 6 MGD were excluded from the calculation. In addition, when WSACC was formed in July 1992, the merging members transferred all of their former sewer assets to the Authority. Because WSACC took ownership of these assets and because WSACC assesses system development fees in these areas, these assets were included in the calculation.

Construction Work in Progress:

WSACC is in the process of expanding the Rocky River Wastewater plant from 26.4 MGD to 30 MGD, which is expected to be completed in 2024. This project has not yet been booked to fixed assets but was added to the total system value, along with the additional plant capacity. The total construction work in progress for the sewer system is approximately \$60.6 million.

Debt Credit:

In calculating the system development fees for WSACC, a debt credit was included in the calculation. The debt credit is applied to reflect that a portion of the outstanding debt associated with system facilities could be repaid with sewer user charges and a portion could be repaid with system development fee revenues. The adjustment is made to prevent recovering the cost of the assets twice, once when assessing system development fees to new customers, and then again when these customers pay user charges. Since WSACC's debt service payments are recovered entirely through wholesale rates and charges (and since the retail customers of the wholesale customers are assessed system development fees for these same assets), the entire balance of WSACC's outstanding principal debt was deducted from the calculation. The total debt service for the sewer system was used as the debt credit, which was approximately \$68.5 million for the sewer system, and which includes the debt issued to fund the current plant expansion to the Rocky River Wastewater Treatment plant.

The resulting adjustments to the sewer RCNLD values are summarized in Table 3.

Table 3. Calculation of Buy-In Sewer System Value

Description	Amount
System Facilities RCNLD	\$266,348,320
Less: Contributed Assets	-\$80,387,025
Less: Credit for Outstanding Debt	-\$68,475,754
Plus: Construction in Progress	\$60,615,510
Net Sewer System Value	\$178,101,051

Step 2 – Calculate the Unit Cost of System Capacity

The cost per unit of system capacity was calculated by dividing the adjusted RCNLD values (derived in Step 1) by the sewer system treatment capacity. As mentioned, the Rocky River WWTP is being expanded to 30 MGD. The Muddy Creek WWTP has a capacity of 0.3 MGD. The total sewer treatment capacity of the WSACC system is 30.3 MGD. However, as explained earlier, 6 MGD was paid for by Charlotte Water and the capacity and the assets used to pay for this 6 MGD have been removed from the calculation. The net total sewer treatment capacity used in the calculation is 24.3 MGD. Therefore, the cost per unit of system capacity for the sewer system was calculated to be \$7.33 per gallon, per day (\$178.1 million ÷ 24.3 MGD), as shown in Table 4.

Step 3 – Estimate the Amount of Capacity Per Residential 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.” For the sewer system, one ERU of peak day capacity for the sewer system is based on an adjusted minimum daily sewage design flow rate of 160 gallons per day (“GPD”) for a 1 or 2 single-family¹ or multi-family² dwelling. Each additional bedroom in the dwelling adds 80 gallons per day. The ERU for a *multi-family dwelling* with one or two bedrooms was established as 160 gpd. The ERU for a *single-family dwelling* was established as 280 gpd (3.5 bedrooms), using the adjusted sewer flow gpd and the average number of bedrooms for single-family residences in WSACC’s service area as documented in a technical memorandum prepared by Willis Engineers³.

Step 4 – Calculate the System Development Fee for One ERU

The system development fee for one residential ERU was calculated by multiplying the unit cost of capacity from Step 2 by the capacity demanded by one ERU from Step 3. The calculations are provided in Table 4.

¹ Residential Flow Approval Letter; North Carolina Department of Environmental Quality; December 20, 2021.

² Residential Flow Approval Letter; North Carolina Department of Environmental Quality; February 1, 2022.

³ WSACC Wastewater Flow Rate Evaluation Technical Memorandum; Willis Engineers; November 17, 2021.

Table 4. Calculation of Water and Sewer System Development Fees for One Residential ERU – Buy-In Approach

Description	Amount
Sewer System:	
Net System Value	\$178,101,051
System Capacity (MGD)	24.3
Unit Cost of Capacity (\$ / gallon per day)	\$7.33
Capacity Required for 1 ERU (gallons per day) – Multi-Family (1 or 2 Bedrooms)	160.0
System Development Fee per ERU – Multi-Family (1 or 2 Bedrooms)	\$1,173
Capacity Required for 1 ERU (gallons per day) – Single-Family or Multi-Family > 2 bedrooms	280.0
System Development Fee per ERU – Single-Family or Multi-Family > 2 bedrooms	\$2,054

System Development Fee Calculation – Incremental Cost Approach

Step 1 – Identify Value of System Facilities that will Serve New Growth and Apply Adjustments

WSACC's 10-year capital improvement plan identifies growth related projects that will assist WSACC in serving new sewer customers. The projects include the Rocky River WWTP expansion to 40 MGD and the Muddy Creek WWTP expansion to 1.0 MGD. The CIP also includes expansion to the conveyance system to accommodate this growth. The cost of the sewer projects that will facilitate growth in the next 10 years is \$429.6 million.

Section 207 of Article 8 states *“In applying the incremental cost or marginal cost, or the combined cost, method to calculate a system development fee with respect to capital improvements, the system development fee analysis must include as part of that methodology a credit against the projected aggregate cost of capital improvements. That credit shall be determined based upon generally accepted calculations and shall reflect a deduction of either the outstanding debt principal or the present value of projected water and sewer revenues received by the local governmental unit for the capital improvements necessitated by and attributable to such new development, anticipated over the course of the planning horizon. In no case shall the credit be less than twenty-five percent (25%) of the aggregate cost of capital improvements”*. As mentioned earlier, WSACC uses its system development fees towards capital projects that facilitate growth. However, the identified growth-related projects in the 10-year CIP will also require debt to be issued. As shown in Table 5, the present value of the debt to be issued to fund the growth-related CIP, \$236.7 million, is applied as an additional debt credit which satisfies Section 207, resulting in a net expansion cost of \$192.9 million.

Step 2 – Calculate the Unit Cost of System Capacity

The Incremental Cost Approach is based on the projected treatment capacity of WSACC's sewer system based on the sewer treatment plant expansions identified in the CIP. The total treatment capacity to be added by the projects identified in the CIP is 10.70 MGD. The cost per unit of system capacity was calculated by dividing the net sewer system value by the additional sewer system capacity. Therefore, the cost per unit of system capacity for the sewer system under the Incremental Cost Approach was calculated to be \$18.03 per gallon, per day (\$192.9 million ÷ 10.70 MGD).

Table 5. Calculation of Sewer System Development Fees for One Residential ERU – Incremental Cost Approach

Description	Amount
Sewer System Value of Growth-Related Projects over next 10 years:	\$429,623,818
Less: Additional Debt Credit to Satisfy Section 207	-\$236,733,585
Net Sewer System Value – Incremental Cost Approach	\$192,890,233
Additional Sewer Treatment Capacity (MGD) Added by Capital Projects	10.70
Unit Cost of Capacity (\$ / gallon per day)	\$18.03
Capacity Required for 1 ERU (gallons per day) – Multi-Family (1 or 2 Bedrooms)	160.0
System Development Fee per ERU – Multi-Family (1 or 2 Bedrooms)	\$2,884
Capacity Required for 1 ERU (gallons per day) – Single-Family or Multi-Family > 2 bedrooms	280.0
System Development Fee per ERU – Single-Family or Multi-Family > 2 bedrooms	\$5,048

System Development Fee Calculation – Combined Cost Approach

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. As shown in Table 6, the net sewer system value under the Buy-In Approach is added to the net sewer system value under the Incremental Approach. The cost per unit of sewer system capacity under the Combined Approach was calculated to be \$10.60 per gallon, per day (\$371.0 million ÷ 35 MGD).

Table 6. Calculation of Maximum Sewer System Development Fees for One Residential ERU – Combined Approach

Description	Amount
Net Sewer System Value from Buy-In Approach (which includes outstanding debt credit)	\$178,101,051
Net Sewer System Value from Incremental Approach	\$192,890,233
Net Sewer System Value	\$370,991,284
Total Sewer Treatment Capacity (MGD) (Existing plus capacity added)	35.00
Unit Cost of Capacity (\$ / gallon per day)	\$10.60
Capacity Required for 1 ERU (gallons per day) – Multi-Family (1 or 2 Bedrooms)	160.0
System Development Fee per ERU – Multi-Family (1 or 2 Bedrooms)	\$1,696
Capacity Required for 1 ERU (gallons per day) – Single-Family (or Multi-Family > 2 bedrooms)	280.0
System Development Fee per ERU – Single-Family (or Multi-Family > 2 bedrooms)	\$2,968

Maximum Cost Justified System Development Fees by Meter Size

The final step in the system development fee calculation is to scale the system development fees for various categories of demand for non-residential customers. The scaling factors were based on rated meter capacities for each meter size, as published by the American Water Works Association in Principles of Water Rates, Fees, and Charges, as shown in Table 7.⁴

Table 7. Meter Capacities and Scaling Factors by Meter Size

Meter Size	Rated Meter Capacity (gpm)	Scaling Factor
3/4"	30	1.0
1"	50	1.67
1-1/2"	100	3.33
2"	160	5.33
3"	320	10.67
4"	500	16.67
6"	1,000	33.33
8"	1,600	53.33
10"	4,200	140.00
12"	5,300	176.67

gpm = Gallons per minute

As shown in Table 8, the maximum calculated sewer system development fee under the Combined Approach for a residential Single-Family customer is \$2,968.00. The system development fees for non-residential customers with various categories of demand are scaled by applying the water meter capacity ratios shown in Table 7 to the residential Single-Family system development fee calculated in Table 6. The sewer system development fees shown in Table 8 represent the maximum cost justified level of system development fees by meter size that can be assessed by WSACC per Article 8. If WSACC chooses to assess fees that are less than those shown in the table, the adjusted fee amounts should still reflect the scaling factors by meter size shown in Table 7.

⁴ Manual of Water Supply Practices (M1), Principles of Water Rates, Fees, and Charges, American Water Works Association, 7th Edition, Table VII.2-5 on p. 338.

Table 8. Maximum Sewer System Development Fees by Meter Size

Meter Size	Sewer Fee
3/4"	\$2,968
1"	\$4,947
1-1/2"	\$9,893
2"	\$15,829
3"	\$31,659
4"	\$49,467
6"	\$98,933
8"	\$158,293
10"	\$415,520
12"	\$524,347

We appreciate the opportunity to assist the Water and Sewer Authority of Cabarrus County with the calculation of its sewer system development fees. Should you have questions or need any additional information, please do not hesitate to contact me at 704-936-4436.

Sincerely,

RAFTELIS FINANCIAL CONSULTANTS, INC.



Elaine Conti,
Executive Vice President