RAFTELIS

March 30, 2023

Ms. Jessica Jones
Finance Director
City of Concord

Subject: Water and Sewer System Development Fees for FY 2024 **Via Email**

Dear Ms. Jones:

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 the City of Concord ("City"). 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.

The preparation of this report was developed by Raftelis for the City 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 the City. It is the responsibility of the City to ensure compliance of the system development fees with North Carolina General Statute 162A Article 8 – "System Development Fees.". The scope of work did 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 the City.

In developing the conclusions contained within this report, Raftelis has relied on certain assumptions and information provided by the City, 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 the City. 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 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 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 the City 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:

<u>Capacity Buy-In Method:</u>

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 Buy-In Method was used to calculate both the water and sewer system development fees for the City, since there are no significant capacity-adding projects planned in the City's 5-year capital improvement plan (CIP).

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 the City, 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
Improvements/Buildings
Water/Sewer Lines
Water Plant
Equipment
Vehicles

Assets in categories identified as "Equipment" and "Vehicles" and several office building assets within "Improvements" were excluded from the calculation of system value as these assets were not specifically identified as allowable under Article 8.

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 water and sewer system assets allowable under Article 8 are summarized in Tables 2 and 3, respectively.

Table 2. Water System Value (RCNLD)

Description	RCNLD Value
Improvements/Building/Water Plants	$16,379,023
Waterlines	$165,269,969
Total	**$181,648,992**

Table 3. Sewer System Value (RCNLD)

Description	RCNLD Value
Improvements/Buildings	$1,366,488
Sewer lines	$151,739,888
Total	**$153,106,376**

As shown in Table 2, the RCNLD value of the water system was estimated to be approximately $181.6 million, and, as shown in Table 3, the RCNLD value of the sewer system was estimated to be approximately $153.1 million. Several additional adjustments were made to the estimated water and sewer system RCNLD values in accordance with Article 8, as described below.

Developer Contributed Assets:

The listing of fixed assets was reviewed to identify assets that were contributed, or paid for, by developers. The City tracks assets that were contributed by developers since 1986 and identifies them in the fixed asset information. These assets were subtracted from the RCNLD value, as these assets do not represent an investment in system capacity by the City. The value of contributed assets for water and sewer lines installed prior to 1986 was estimated, though these assets are minimal since the oldest water/sewer line with a net book value had an installation date of 1981. The total estimated RCNLD value of contributed water and sewer system assets was estimated to be approximately $62.8 million and $81.6 million for the water and sewer systems, respectively.

Construction Work in Progress:

The City has several growth-related projects that were completed in fiscal year 2023 or under construction and will be completed by the end of fiscal year 2023 for both the water and sewer systems. These projects have not yet been booked to fixed assets but were added to the total system values. The total construction work in progress for the water and sewer systems is approximately $3.3 million and approximately $0.78 million, respectively.

Debt Credit:

In calculating the system development fees for the City, 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 water and 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. The City is using revenues from system development fees towards cash funding its capital improvement plan. As a result, the full outstanding debt service for both the water and the sewer system was used as the debt credit, which was approximately $14.4 million for the water system and approximately $4.5 million for the sewer system.

The resulting adjustments to the water and sewer RCNLD values are summarized in Table 4.

Table 4. Calculation of Buy-In Water and Sewer System Value

Description	Amount
Water System:	
System Facilities RCNLD	$181,648,992
Less: Developer Contributed Assets	-62,804,711
Less: Credit for Outstanding Debt	-14,391,327
Plus: Construction in Progress	3,289,267
Net Water System Value	**$107,742,221**
Sewer System:	
System Facilities RCNLD	$153,106,376
Less: Developer Contributed Assets	-81,626,995
Less: Credit for Outstanding Debt	-4,512,044
Plus: Construction in Progress	778,780
Net Sewer System Value	**$67,746,118**

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 water and sewer system capacities. The City of Concord owns and operates two treatment plants, the Coddle Creek and the Hillgrove Water Treatment Facilities which have a rated capacity of 24 MGD. However, the raw water safe yields limit the capacity of these two plants to 13.64 MGD. The City also obtains 3 MGD of treated water from the City of Albemarle. The total treated water capacity of the system is 16.64 MGD (13.64 + 3.0). Therefore, the cost per unit of system capacity for the water system was calculated to be $6.47 per gallon, per day ($107.7 million ÷ 16.64 MGD).

The City of Concord conveys all of its sewer flow to the Rocky River Wastewater Treatment plant which is owned and operated by the Water and Sewer Authority of Cabarrus County ("WSACC"). The amount of current treatment capacity reserved by the City is estimated to be 16.4 MGD. [1]

Step 3 – 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."* For the water system, one ERU of peak day capacity was defined to be 252 gallons per day ("GPD"). This amount was estimated based on information using recent US census information and information contained in the City of Concord Water System Master Plan prepared for the City.[2] This report states that the average per capita consumption per day from 2011 to 2019 for residential customers was estimated to be 55.2 GPD. The master plan documented that on average from 2007 to 2019 the system's maximum day level of demand was 1.4 times its average day demand. In addition, the master plan documented the average water loss factor was 9%. The most recent US census information for City of Concord indicates the average number of people per household in the City of Concord is 2.85 people. Therefore, the peak

[1] This data was obtained from a technical memorandum prepared by Willis Engineers on November 17, 2021 regarding a wastewater flow evaluation conducted for the Water and Sewer Authority of Cabarrus County.
[2] City of Concord Water System Master Plan, prepared by Hazen, February,2021.

day capacity requirement associated with one water service unit of new residential development was estimated to be 252 GPD based on the following calculation:

Residential average per capita per day consumption is 55.2 gallons per day

× People per household of 3 (rounded up from 2.85)

× System peak day factor of 1.4

× Water loss factor of 1.09

= Maximum-day water capacity for ***single-family*** residential of 252 GPD

For the sewer system, one ERU of peak day capacity is based on an adjusted minimum daily sewage design flow rate of 160 gallons per day ("GPD") for a 1 or 2-bedroom dwelling (single-family[3] or multi-family[4] dwelling). Each additional bedroom in the dwelling adds 80 gallons per day. 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 for WSACC[5].

Step 4 – Calculate the System Development Fee for One Single-Family Residential ERU

The system development fee for one Single-Family 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 5.

Table 5. Calculation of Water and Sewer System Development Fees for One Single-Family ERU

Description	Amount
Water System:	
Net System Value	$107,742,221
System Capacity (MGD)	16.64
Unit Cost of Capacity ($ / gallon per day)	$6.47
Capacity Required for 1 ERU (gallons per day)	252.0
System Development Fee per Single-Family ERU	**$1,632**
Sewer System:	
Net System Value	$67,746,118
System Capacity (MGD)	16.4
Unit Cost of Capacity ($ / gallon, per day)	$4.14
Capacity Required for 1 ERU (gallons per day)	280.0
System Development Fee per Single-Family ERU	**$1,159**

[3] Residential Flow Approval Letter; North Carolina Department of Environmental Quality; December 20, 2021.
[4] Residential Flow Approval Letter; North Carolina Department of Environmental Quality; February 1, 2022.
[5] WSACC Wastewater Flow Rate Evaluation Technical Memorandum; Willis Engineers; November 17, 2021.

Step 5 – Scale the System Development Fees for Various Categories of Demand

The system development fees for various categories of demand associated with non-residential customers were scaled using water meter capacity ratios. 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 6.[6]

Table 6. 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
2"	160	5.33
4"	500	16.67
6"	1,000	33.33
8"	1,600	53.33
10"	4,200	140.0
12"	5,300	176.67

gpm = Gallons per minute

Maximum Cost Justified System Development Fees by Meter Size

The calculated water system development fee under the Buy-In Approach for a Single-Family water customer is $1,632.00 and the calculated sewer system development fee for Single-Family sewer customer is $1,159.00. The system development fees for various categories of demand for non-residential customers are scaled by applying the water meter capacity ratios shown in Table 6. The resulting water and sewer system development fees shown in Table 7 represent the maximum cost justified level of system development fees that can be assessed by meter size by the City of Concord per Article 8. If the City 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, as shown in Table 6.

Table 7. Water and Sewer System Development Fees by Meter Size

Meter Size	Water Fee	Sewer Fee
3/4"	**$1,632**	**$1,159**
1"	**$2,719**	**$1,931**
2"	**$8,702**	**$6,180**
4"	**$27,195**	**$19,313**
6"	**$54,389**	**$38,625**
8"	**$87,023**	**$61,801**
10"	**$228,434**	**$162,227**
12"	**$288,262**	**$204,714**

[6] 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.

Maximum Cost Justified System Development Fees for Residential Customers

The City of Concord assesses the system development for residential customers on *a per unit* basis. To calculate the system development fee for multi-family customers, the ERU was adjusted to reflect the usage for a multi-family unit with one or two-bedrooms.

As mentioned previously, the average per capita per day water consumption for residential customers is 55.2 gallons per day. For multi-family units with one or two bedrooms, the ERU was estimated to be 168 gallons per day, as follows:

Residential average per capita per day consumption is 55.2 gallons per day

× People per household of 2 (1 or 2-bedroom units)

× System peak day factor of 1.4

× Water loss factor of 1.09

= Maximum-day water capacity for a ***multi-family*** residential unit with one or two bedrooms is 168 GPD

As mentioned previously, for the sewer system, one ERU of peak day capacity is based on an adjusted minimum daily sewage design flow rate of 160 gallons per day ("GPD") for a 1 or 2 single-family **or multi-family dwelling**. The sewer ERU for a ***muti-family dwelling*** with one or two bedrooms was established as 160 gpd.

The maximum sewer system development fees per unit for residential customers is shown below in Table 8.

Table 8. Calculation of Maximum System Development Fees per Residential Unit

Description	Amount
Water System Unit Cost of Capacity ($ / gallon per day)	$6.47
Capacity Required for 1 ERU (gallons per day) – Multi-Family (1 or 2 Bedrooms)	168.0
System Development Fee per ERU – Multi-Family (1 or 2 Bedrooms)	**$1,088**
Capacity Required for 1 ERU (gallons per day) – Single-Family (or Multi-Family > 2 bedrooms)	252.0
System Development Fee per ERU – Single-Family (or Multi-Family > 2 bedrooms)	**$1,632**
Sewer System Unit Cot of Capacity ($ / gallon per day)	$4.14
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)	**$662.00**
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)	**$1,159**

We appreciate the opportunity to assist the City of Concord 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 704-936-4436.

Sincerely,

RAFTELIS FINANCIAL CONSULTANTS, INC.

Elaine Conti
Executive Vice President