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December 6, 2017

Mrs. Pam Hinson
Finance Director
City of Concord
35 Cabarrus Ave W.
Concord, NC 28025

Dear Mrs. Hinson:

Raftelis Financial Consultants, Inc. (“RFC”) has completed its assignment to develop cost-justified water and wastewater system development fees for consideration by the City of Concord (“City”). This letter documents the results of the analysis which is based on a cost justified approach for establishing system development fees as set forth in North Carolina general statute 162A Article 8 “System Development Fees”.

Raftelis is a financial professional firm that has provided rate and financial consulting to public water and wastewater utilities since 1993, has edited or contributed content for the Seventh Edition of the American Water Works Association “Principles of Water Rates, Fees and Charges M-1 Manual” (AWWA M-1 Manual), and has calculated system development fees for utilities in North Carolina and across the country since 1993 using generally accepted methodologies as provided in the AWWA M-1 Manual and other water/sewer industry publications. Raftelis is qualified to perform system development fee calculations for water and wastewater utilities in North Carolina.

Background

System development fees are defined as one-time charges assessed to new water and wastewater customers, or developers and builders, to recover a proportional share of capital costs incurred to provide service availability and capacity for new utility customers. Typically, the cost basis for setting system development fees is based on the major system components, or core system assets, that are necessary to serve, and that provide benefit to, all customers. These components typically include reservoirs, water treatment plants, storage tanks, major water transmission lines, wastewater treatment plants, pumping stations, and major wastewater interceptors.

RFC recommends that system development fees should be consistent with the common legal standard in setting system development fees in the water and wastewater industry – the Rational Nexus Test. The Rational Nexus test requires that: 1) the need for capacity is a result of new development; 2) the costs are identified to accommodate new development; and 3) the appropriate

apportionment of that cost to new development is in relation to the benefit the new development reasonably receives¹.

There are three approaches, as described below, for calculating water and wastewater system development fees that are recognized in the industry as cost-justified² (that meet the requirement of the Rational Nexus standard), and as set forth in North Carolina general statute 162A Article 8 “System Development Fees”.

Buy-In Approach

The Capacity Buy-In Approach calculates a system development fee based upon the proportional cost of each user’s share of existing system capacity, and is most appropriate in cases where the existing system assets provide adequate capacity to provide service to new customers. The cost of the facilities is based on fixed assets records and can include escalation of the depreciated value of those assets to current dollars, or “replacement costs” as identified in the general statute. The general statute also identifies adjustments to be made to the replacement cost such as “debt credits, grants, and other generally accepted valuation adjustments.”

Incremental Cost Approach

The Incremental Cost (or Marginal Cost) Approach calculates a system development fee based upon a new customer’s proportional share of the incremental future cost of system capacity. This approach focuses on the cost of adding additional facilities to serve new customers. It is most appropriate when existing facilities do not have adequate capacity to provide service to new customers, and the cost for new capacity can be tied to an approved capital improvement plan (CIP) that covers at least a 10-year planning period. Per the general statute, a revenue credit must be applied “against the projected aggregate cost of water or sewer capital improvements.”

Combined Approach

The Combined Approach is a combination of the Buy-In and Incremental Cost approaches, and is appropriate to be used when the existing assets provide some capacity to accommodate new customers, but where the capital improvement plan also identifies significant capital investment to add additional infrastructure to address future growth and capacity needs.

Calculation of System Development Fees

RFC requested and was provided with the following data from City staff to complete the system development fee calculation:

¹ See the AWWA M-1 7th Edition Manual –System Development Charges, Chapter VII.2; pp.324.

² See the AWWA M-1 Manual –System Development Charges, Chapter VII.2; pp.329-330.

-) Water and wastewater fixed asset data;
-) Outstanding utility debt and associated debt service;
-) Construction work in progress (“CWIP”)
-) Contributed capital;
-) Capacity in water and sewer systems;
-) Daily water production data;
-) Inflow and infiltration data; and
-) History of system development fees collected.

The Capacity Buy-In Approach was chosen as the method to calculate the system development fees. While the City has identified some future water projects that will expand capacity, the projects were not part of an approved capital improvement plan as of the date of this report.

Using the Capacity Buy-In approach, Raftelis calculated the estimated cost, or investment in, the current capacity available to provide utility services to existing and new customers. This analysis was based on a review of fixed asset records and other information as of June 30, 2016. The depreciated value of the assets was first adjusted to reflect an estimated replacement cost to determine the “replacement cost new less depreciation” (RCNLD) value for the assets. The asset values were escalated using the Handy Whitman Index of Public Utility Construction Costs (for the South Atlantic Region). The RCNLD value of the water assets includes water supply, treatment, storage and distribution facilities but excludes small equipment, vehicles, and meters. The RCNLD value of the sewer assets includes wastewater collection facilities³ but excludes small equipment and vehicles.

Several adjustments were then made to the RCNLD value, which were as follows:

-) *Subtraction of contributed assets* - Assets contributed by or paid for by developers were deducted from the calculation since these costs were not “paid” by the existing customers. It should be noted, the City implemented a new accounting system in 1995. After conversion to this new system, fixed assets records were maintained in more detail, which included documentation of which assets were contributed. Contributed water and sewer lines were determined for assets originating after 1995. The proportion of contributed water and sewer lines to total water/sewer lines was then used and applied to water/sewer lines prior to 1995 to determine the total value of contributed water/sewer line assets.
-) *Debt Service Credit* - Utilities often borrow funds to construct assets, and revenues from retail rates and charges can be used to make the payments on these borrowed funds. To ensure that new customers are not being double charged for these assets, once through the system development fee and again through retail rates and charges, the proportion of the

³ The City transferred ownership of the Rocky River Wastewater Treatment Plant to the Water and Sewer Authority of Cabarrus County on July 1, 1992. Therefore, the City’s remaining sewer system assets are collection facilities.

outstanding debt principal amount that is anticipated to be paid for through retail rates and charges was deducted from the system development fee calculation. This proportional amount was estimated by comparing the historical annual amount of revenues collected from system development fees with the respective annual amount of principal payments. Since the City applies revenues from system development fees to offset outstanding debt service, and since the City's bond ordinance allows the inclusion of system development fees to be used in meeting debt service coverage requirements, the amount of the debt credit was calculated as the principal amount of outstanding debt less the proportion of the principal amount estimated to be paid for with system development fee revenues.

The adjusted RCNLD value was then converted to a unit cost of capacity by dividing the RCNLD value by a basic unit measure of cost per gallon per day (GPD) for water and wastewater capacity, as shown in Exhibit 1.

Exhibit 1 – Cost per GPD of Core Utility Assets

	Water	Wastewater
Adjusted RCNLD	\$90,786,406	\$61,683,660
Total Capacity (gallons per day)⁴	20,100,000	13,235,000
Cost Per Gallon per Day	\$4.52	\$4.66

This measure becomes the basic building block or starting point for determining the *maximum cost-justified level* of the water and wastewater system development fees. Fees for different types of customers are based on this cost of capacity multiplied by the amount of capacity needed to serve each type or class of customer.

The next step is to define the level of demand associated with a typical, or average, residential customer, often referred to as an Equivalent Residential Unit, or ERU. The level of demand associated with a typical residential customer is often estimated using wastewater design flow rates as specified by the North Carolina Administrative Code Title 15A (Department of Environment and Natural Resources) Subchapter 2T, which states that the sewage from dwelling units is 120 gallons per day per bedroom. However, the most recent master plan for the Cabarrus County Water and Sewer Authority (WSACC) defines *average* use for the equivalent residential unit as 200 gallons per day. For calculating the wastewater system development fee, an ERU of 200

⁴ The City's water system has a treatment capacity of 27 MGD. However, City staff indicated that the existing infrastructure can only deliver 20.1 MGD of finished water.

gallons per day was used and adjusted to account for inflow and infiltration (estimated using data for FY 2015 and FY 2016), resulting in an ERU of 244 gallons per day as shown in Exhibit 2. Since the ERU of 200 gallons per day represents average use, to estimate the peak day water use for the City’s customers, a peaking factor (based on daily water production records for FY 2015 and FY 2016) was applied to derive an ERU of 279 gallons per day, as shown below.

Exhibit 2: Water and Wastewater Demand per Residential ERU

	Water – gallons per day per ERU	Wastewater – gallons per day per ERU
ERU Per WSACC master plan	200	200
Peaking Factor	1.4	
Inflow and Infiltration Factor		1.22
Adjusted ERU	279	244

Assessment Methodology

The analysis provides a maximum cost-justified level of system development fees that can be assessed by the City. For residential customers, the calculation of the system development fee is based on the cost per gallon per day multiplied times the number of gallons per day required to serve each ERU, as shown below in Exhibit 3.

Exhibit 3 – Calculated Maximum Residential Capacity Fee

Residential	Water	Wastewater
Cost per GPD	\$4.52	\$4.66
GPD per ERU	279	244
Total Calculated Capacity Fee per ERU	\$1,262	\$1,135
Existing Capacity Fee per ERU	\$1,089	\$800

For non-residential customers, 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 AWWA M-1 Manual⁵, the results of which are shown in Exhibit 4. This method provides a straightforward approach that is simple to administer and reasonably equitable for most new customers.

Exhibit 4 shows the resulting maximum cost-justified system development fees by meter size for meters ranging from 3/4 inches to 12 inches. For these calculations, the system development fees have been rounded to the nearest dollar.

Exhibit 4– Calculated Maximum System Development Fees for Non-Residential Customers

Meter Size	Existing		Maximum Cost Justified	
	Water	Wastewater	Water	Wastewater
3/4"	\$1,089	\$800	\$1,262	\$1,135
1"	\$1,851	\$1,360	\$2,103	\$1,892
2"	\$5,772	\$4,240	\$6,730	\$6,054
4"	\$18,186	\$13,360	\$21,033	\$18,920
6"	\$36,264	\$26,640	\$42,065	\$37,839
8"	\$58,044	\$42,640	\$67,304	\$60,543
10"	\$83,527	\$61,360	\$100,956	\$90,814
12"	\$156,054	\$114,640	\$222,945	\$200,549

The City may elect to charge a cost per gallon that is less than the maximum cost justified cost documented in this report. If the City elects to charge a fee that is less, all customers must be treated equally, meaning the same reduced cost per gallon per day must be used for all customers.

We appreciate the opportunity to assist the City of Concord with this important engagement. Should you have questions, please do not hesitate to contact me at (704) 373-1199.

Very truly yours,
RAFTELIS FINANCIAL CONSULTANTS, INC.



Elaine Conti, Senior Manager

⁵ See the AWWA M-1 Manual – Appendix B- Equivalent Meter Ratios; pp.326

Appendix

Supporting Schedules From the System Development Fee Model

City of Concord, NC
Supporting Schedule 1 – Gross Water Assets

I) GROSS WATER ASSETS

Category	Description	RCNLD
BUILD	Building, including plants	\$ 16,425,405
CIP	Construction Work In Progress	\$ 1,463,836
COMP	Computers/Systems	\$ 30,138
EQUIP	Equipment	\$ 201,120
IMP	Improvements	\$ 4,053,556
LAND	Land	\$ 1,083,514
VEH	Vehicles	\$ 346,170
WAT/LINE	Waterlines/mains/tanks	\$ 121,140,942
WAT/PL	Water plant and lake	\$ 257,508
Albemarle	Main to Albemarle	\$ 8,947,233
TOTALS		\$ 153,949,421

II) WATER ASSETS ELIGIBLE FOR INCLUSION IN SYSTEM DEVELOPMENT FEE CALCULATION

(Removes CONTRIBUTED CAPITAL and Other ASSETS)

Category	RCNLD
Building, including plants	\$ 16,425,405
Excluded	\$ (153,753)
<i>Subtotal</i>	<i>\$ 16,271,652</i>
Construction Work In Progress	\$ 1,463,836
Excluded	\$ -
<i>Subtotal</i>	<i>\$ 1,463,836</i>
Computers/Systems	\$ 30,138
Excluded	\$ (30,138)
<i>Subtotal</i>	<i>\$ -</i>
Equipment	\$ 201,120
Excluded	\$ (201,120)
<i>Subtotal</i>	<i>\$ -</i>
Improvements	\$ 4,053,556
Excluded	
<i>Subtotal</i>	<i>\$ 4,053,556</i>
Land	\$ 1,083,514
Excluded	
<i>Subtotal</i>	<i>\$ 1,083,514</i>
Vehicles	\$ 346,170
Excluded	\$ (346,170)
<i>Subtotal</i>	<i>\$ -</i>
Main to Albemarle (all funded through rates, not debt)	\$ 8,947,233
Excluded	
<i>Subtotal</i>	<i>\$ 8,947,233</i>
Waterlines/mains/tanks	\$ 84,652,870
Waterlines/mains that are actually pumps, intakes, tanks, plant, etc.	36,488,072
<i>Less excluded assets (meters)</i>	<i>(4,649,706)</i>
<i>Less Contributed Lines (1)</i>	<i>(44,147,952)</i>
<i>Subtotal</i>	<i>\$ 72,343,283</i>
Water plant and lake	\$ 257,508
<i>Less Contributed Capital</i>	<i>\$ (12,340)</i>
<i>Subtotal</i>	<i>\$ 245,169</i>
TOTAL ASSETS TO BE INCLUDED	\$ 104,408,242

III) Adjustments	RCNLD
Total Assets to Be Included	\$ 104,408,242
LESS:	
Outstanding Principal	\$ (20,168,392)
% paid through System Development Fees (2)	\$ 6,546,556
Subtotal: Outstanding Principal Paid Through User Rates and Charges	\$ (13,621,836)
 NET ASSETS ELIGIBLE FOR INCLUSION IN SYSTEM DEVELOPMENT FEE CALCULATION:	
	\$ 90,786,406
<hr/>	
IV) Unit Cost of Capacity	
Capacity in Water System (3)	20.1
Net Cost per Unit of Capacity (per gallons per day)	\$ 4.52
Daily Consumption per ERU (gpd) (4)	200
Peaking Factor (5)	1.40
ERU with peak (gpd)	279
Maximum System Development Fee per ERU	\$ 1,262
Current Water System Development Fee per ERU	\$ 1,089

Notes:

(1) Contributed lines are excluded from the analysis.

(2) Revenues from system development fees are used to offset debt service. Annual revenues from system development fees for the past five years was compared to annual debt service (principal only). The ratio of capacity fees to principal (approximately 32%) over the 5-year period was applied to outstanding principal to recognize that a portion of debt is paid by system development fees and not retail rates.

(3) Total treatment capacity of the water system is 27 MGD but the existing infrastructure cannot support obtaining the total 27 MGD of capacity. Per City staff, the existing infrastructure can deliver 20.1 MGD.

(4) Per the master plan for the Cabarrus County Water and Sewer Authority, the ERU per residential unit is 200 gallons per day. However, this represents *average* indoor water use (that is returned to the wastewater system). To estimate water use, the City's peaking information was applied to determine the ERU for residential water use.

(5) The peaking factor is based on daily water production data for FY 2015 and FY 2016.

Supporting Schedule 2 – Removal of Contributed Capital

Water	RCNLD
Oldest Contributed Capital	6/30/1995
Value of contributed lines	\$ 34,788,320
Value of lines after '95	\$ 95,458,330
Ratio	36%
Value of Lines before '95	\$ 25,682,612
Estimated Contributed Lines Pre-'95	\$ 9,359,633
Total Estimated Contributed Lines	\$ 44,147,952

Supporting Schedule 3 – Debt Service Adjustment

WATER DEBT SERVICE	Description of Bond Issue	Include/Exc.	2017
Existing Debt Service			
Revenue Bonds 2012 (Refunded 2002A)			
Principal	Hillgrove WTP renovation, Coddle Crk water plant improvements, Hwy 73 East tank pump station, hwy 49 etc water mains, Hillgrove Peak Shaving generator.	Include	\$ 655,700
Interest			\$ 453,307
			\$ 1,109,007
Revenue Bonds 2008 (2016 Refunding)			
Principal	Meter replacement	<i>Exclude because meters are excluded from assets</i>	\$ 343,650
Interest			\$ 478,223
			\$ 821,873
Revenue Bonds 2009A			
Principal	Public Works Complex, Coddle Creek water pump, Corning, Mills Mall, Hwy 73 Water Tank, Water Plant to Odell School, Branchview Dr extension, etc. Hillgrove WTP renovation, Coddle Crk water plant improvements, Hwy 73 East tank pump station, hwy 49 etc water mains, Hillgrove Peak Shaving generator.	Include	\$ 1,281,520
Interest			\$ 73,544
			\$ 1,355,064
Revenue Bonds 2009B			
Principal	(the SWAP VRD piece of the financing)	Include	\$ 855,708
Interest			\$ 253,864
			\$ 1,109,572
Total Existing Debt For Water			\$ 4,395,516
Total Principal Excluding 2008 Bonds			\$ 2,792,928
Total Interest excluding 2008 Bonds			\$ 780,715
Total Existing and Proposed Debt Service - Water			\$ 3,573,643
Outstanding Principal from 2017- 2036			\$ 20,168,392

Outstanding Principal from 2017-2036	\$ 20,168,392
% of Annual Principal covered by annual revenues from SDFs (1)	32.5%
Outstanding Principal Paid by Revenues from SDFs	\$ 6,546,556

(1) Calculation of % of Principal Debt Paid by SDFs

FY	Revenues from SDFs	Annual Debt Service - Principal	% of principal debt paid by SDFs
2012	\$ 889,838	\$ 3,127,000	28.5%
2013	\$ 710,748	\$ 3,208,186	22.2%
2014	\$ 824,716	\$ 3,299,998	25.0%
2015	\$ 1,059,608	\$ 2,953,092	35.9%
2016	\$ 1,588,272	\$ 3,041,000	52.2%
	\$ 5,073,182	\$ 15,629,276	32.5%

Supporting Schedule 4 – Peaking Factor Data

FY 2015	14-Jul	Aug-14	14-Sep	Oct-14	14-Nov	Dec-14	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	FY 2015
Average - MGD	10.36	10.12	9.86	10.12	9.35	8.69	8.93	9.23	8.99	9.31	11.21	11.42	9.80
Max - MGD	12.04	11.13	11.22	11.53	10.35	9.17	9.90	11.19	9.44	10.30	12.91	12.94	12.94
Peaking Factor													1.32
FY 2016	1-Jul	Aug-15	14-Sep	Oct-15	14-Nov	Dec-15	Jan-16	Feb-16	Mar-16	Apr-16	May-15	Jun-16	FY 2016
Average - MGD	11.48	11.32	10.49	9.50	8.41	7.63	7.78	8.12	8.41	9.79	9.80	10.95	9.48
Max - MGD	12.89	13.97	12.44	10.60	9.40	8.60	9.06	9.56	9.39	11.64	11.73	12.45	13.97
Peaking Factor													1.47
Average peaking factor for FY 2015 and FY 2016													1.40

Supporting Schedule 5 – Gross Sewer Assets

I) GROSS SEWER ASSETS	
Category	RCNLD
BUILD	\$ 2,311,444
EQUIP	\$ 150,436
IMP	\$ 964,938
LAND	\$ 1,102,358
SEW/LINE and pump station	\$ 120,502,596
VEH	\$ 639,449
TOTALS	\$ 125,671,221

II) SEWER ASSETS ELIGIBLE FOR INCLUSION IN SYSTEM DEVELOPMENT FEE CALCULATION

LESS CONTRIBUTED CAPITAL and OTHER ASSETS

Category	RCNLD
BUILD	\$ 2,311,444
Excluded	\$ (55,096)
<i>Subtotal</i>	\$ 2,256,348
EQUIP	\$ 150,436
Excluded	\$ (150,436)
<i>Subtotal</i>	\$ -
IMP	\$ 964,938
Excluded	
<i>Subtotal</i>	\$ 964,938
LAND	\$ 1,102,358
<i>Less Contributed Capital</i>	\$ (76,706)
<i>Subtotal</i>	\$ 1,025,653
VEH	\$ 639,449
Excluded	\$ (639,449)
<i>Subtotal</i>	\$ -
Sewer/LINES only	\$ 119,387,846
Sewer/LINE - pump station only	\$ 1,114,750
<i>Less Contributed Lines (1)</i>	\$ (54,463,857)
<i>Subtotal</i>	\$ 66,038,738
TOTALS	\$ 70,285,678
LESS:	
Outstanding Principal	\$ (16,007,838)
% paid through System Development Fees (2)	\$ 7,405,820
Subtotal: Debt Paid Through Sewer Rates and Charges	\$ (8,602,018)
NET ASSETS ELIGIBLE FOR INCLUSION IN SYSTEM DEVELOPMENT FEE CALCULATION:	\$ 61,683,660
Reserved Capacity (MGD) in Water and Sewer Authority of Cabarrus County (WSACC)	13.235
Net Cost per Unit of Capacity (per gallons per day)	\$ 4.66
Average Consumption per ERU (3)	200
I&I Factor (4)	1.22
ERU with I&I	244
Maximum Sewer System Development Fee per ERU	\$ 1,135
Current Sewer System Development Fee per ERU	\$ 800

Notes:

- (1) Contributed lines are excluded from the analysis.
- (2) Revenues from system development fees are used to offset debt service. Annual revenues from system development fees for the past five years was compared to annual debt service (principal only). The ratio of system development fees to principal debt (approximately 46%) over the five-year period was applied to the value of all outstanding principal to recognize that a portion of debt is paid by system development fees and not retail rates.
- (3) Per the master plan for the Cabarrus County Water and Sewer Authority, the ERU per residential unit is 200 gallons per day.
- (4) The inflow and infiltration factor was estimated based on data provided for FY 2015 and FY 2016.

Supporting Schedule 6 – Removal of Contributed Capital

	Sewer	RCNLD
Oldest contributed capital		6/30/1995
Value of all contributed lines (1995 - present)		\$ 45,080,516
Value of all lines (1995 - present)		\$ 99,741,728
Contributed Ratio (1995 - Present)		45%
Value of all lines Pre- 1995		\$ 20,760,868
Ratio		45%
Estimated value of Contributed Capital Pre-95		\$ 9,383,341
Total Estimated Contributed Lines		\$ 54,463,857

Supporting Schedule 7 – Debt Service Adjustment

WASTEWATER DEBT SERVICE		Description of projects funded	2017
Existing Debt Service			
Revenue Bonds 2008-(2016 Refunding)			
Principal		Reedy Creek	\$ 108,243
Interest			\$ 150,630
			<u>\$ 258,873</u>
Revenue Bonds 2009A			
Principal		Public Works Complex, Woodcreek, Morris Glen, Mills Group, Victory	\$ 348,610
Interest		Lane outfall, Speedway Blvd sewer main, Weddington Road, etc.	\$ 20,006
			<u>\$ 368,616</u>
Revenue Bonds 2009B			
Principal		SWAP VRD piece of financing	\$ 1,653,954
Interest			\$ 490,681
			<u>\$ 2,144,635</u>
Total Existing Debt For Wastewater			<u>\$ 2,772,125</u>
Total Principal			\$ 2,110,807
Total Interest			\$ 661,318
Total Existing and Proposed Debt Service -Sewer			\$ 2,772,125
Outstanding Principal - 2017 - 2036			\$ 16,007,838
Outstanding Principal from 2017 -2036			\$ 16,007,838
% of Annual Principal covered by annual revenues from SDFs (1)			46.3%
Amount of Principal paid by revenues from SDFs			\$ 7,405,820

(1) Calculation of % of Principal Debt Paid by SDFs

FY	Revenues from SDFs	Annual Debt Service - Principal only	% of principal debt paid by SDFs
2012	\$ 634,994	\$ 1,374,177	46.2%
2013	\$ 409,920	\$ 1,409,309	29.1%
2014	\$ 468,701	\$ 1,446,028	32.4%
2015	\$ 777,110	\$ 2,000,212	38.9%
2016	\$ 1,540,709	\$ 2,052,000	75.1%
	<u>\$ 3,831,434</u>	<u>\$ 8,281,726</u>	46.3%

Supporting Schedule 8 – Inflow and Infiltration Factor

	FY 2015	FY 2016	Two-Yr Avg.
Flow sent to WSACC	3,102,774	3,237,594	
Billable sewer flow	2,577,805	2,627,869	
Estimated Inflow & Infiltration Factor	1.20	1.23	1.22