

March 13, 2018

Ms. Courtney Driver
Utilities Director
Winston-Salem/Forsyth County Utilities
PO Box 2511,
Winston-Salem, NC 27102

Dear Ms. Driver:

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 Winston-Salem/Forsyth County Utilities (“Utility”). 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 Utility 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;
-) Approved capital improvement plan;
-) Daily water production data;
-) Inflow and infiltration data; and
-) History of system development fees collected.

When Raftelis was engaged to conduct this study, the existing water and wastewater treatment systems provided adequate capacity for new customers and there were no projects in the Utilities’ capital improvement plan which added additional treatment capacity. Therefore, the Capacity Buy-In Approach was used to calculate the system development fees.

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, 2017. 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 treatment and collection facilities but excludes small equipment and vehicles.

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

-) *Subtraction of contributed assets* - Assets that were contributed, grant funded, or paid for by developers were deducted from the calculation since these costs were not “paid” by the existing customers. In addition, any assets paid through assessments were also deducted.
-) *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 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 Utility applies revenues from system development fees to offset outstanding debt service, and since the Utility'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. This proportion was 2% of the total outstanding debt for water and 3% for sewer.

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. It should be noted that while the rated capacity of the water treatment plan is 91 MGD, the water system can only treat and deliver 83 MGD.

Exhibit 1 – Cost per GPD of Core Utility Assets

	Water	Wastewater
Adjusted RCNLD	\$205,873,360	\$351,394,584
Total Capacity (gallons per day)	83,000,000	51,000,000
Cost Per Gallon per Day	\$2.48	\$6.89

The resulting cost per gallon per day becomes the basic building block or starting point for determining the *maximum cost-justified level* of the water and wastewater system development fees.

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. In 2015, the Utility conducted both a Water System Master Plan and Wastewater System Master Plan. In both documents, the projected average consumption was 80 gallons per person per day and the number of people per ERU was assumed to be three. Therefore, 240 gallons per day was used to represent the average daily consumption per ERU for the system development fee calculation. To estimate peak day water use, daily water production data was obtained. The average max day peaking factor over the past five-year period was 1.34, which was applied to the 240 gallons per day to derive the adjusted ERU for the water system. For calculating the wastewater system development fee, the ERU was adjusted to account for inflow and infiltration (I&I). The Utility provided wastewater data over the past three fiscal years, which was used to calculate the I&I factor of 1.36, which was applied to the 240 gallons per day to derive the adjusted ERU for the sewer system.

Exhibit 2: Water and Wastewater Demand per Residential ERU

	Water – gallons per day per ERU	Wastewater – gallons per day per ERU
ERU	240	240
Peaking Factor	1.34	
Inflow and Infiltration Factor		1.36
Adjusted ERU	320	326

Assessment Methodology

The analysis provides a maximum cost-justified level of system development fees that can be assessed by the Utility. 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	\$2.48	\$6.89
GPD per ERU	320	326
Total Calculated Capacity Fee per ERU	\$795	\$2,246

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 Manual³, 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.

³ See the AWWA M-1 Manual – Appendix B- Equivalent Meter Ratios; pp.326

Exhibit 3 shows the resulting maximum cost-justified system development fees by meter size for meters ranging from 5/8 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	Maximum Cost Justified	
	Water	Wastewater
5/8" or 3/4"	\$795	\$2,246
1"	1,987	5,614
1.5"	3,974	11,229
2"	6,358	17,966
4"	19,868	56,143
6"	39,737	112,286
8"	63,579	179,657
10"	95,368	269,486
12"	210,604	595,114

The Utility may elect to charge a cost per gallon that is less than the maximum cost-justified cost documented in this report. If the Utility 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 Winston-Salem/Forsyth County Utilities 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

Appendix

Supporting Schedules From the System Development Fee Model

City of Winston-Salem/Forsyth County
Supporting Schedule 1 – Fixed Assets and Adjustments

	Replacement Cost New Less Depreciation (RCNLD)		
	<u>Water</u>	<u>Sewer</u>	<u>Total</u>
<u>Fixed Assets (1)</u>			
Land	\$ 6,748,009	\$ 9,612,279	\$ 16,360,288
Land Improvements	294,385,583	484,881,456	779,267,039
Buildings	160,825,344	117,334,717	278,160,061
CIP	15,087,912	148,092,160	163,180,073
Vehicles	1,370,193	1,574,953	2,945,146
Machinery and Equipment	1,602,856	936,332	2,539,188
Office Equipment	-	-	-
Total RCNLD Value of Fixed Assets	\$ 480,019,897	\$ 762,431,897	\$ 1,242,451,794
<u>Less: Adjustments (2)</u>			
Contributed Capital/Grant Funded, Assessments	\$ (55,101,811)	\$ (72,913,070)	\$ (128,014,881)
Outstanding Principal Debt (3)	(215,828,061)	(333,937,725)	(549,765,786)
Vehicles	(1,370,193)	(1,574,953)	(2,945,146)
Machinery, Equipment and Meters	(1,602,856)	(936,332)	(2,539,188)
Easements	(1,726)	(123,885)	(125,611)
Non-Core Assets Part of CIP	(241,891)	(1,551,347)	(1,793,238)
Net RCNLD	\$ 205,873,360	\$ 351,394,584	\$ 557,267,944
<u>Divided by:</u>			
System Capacity (Gallons per Day) (4)	83,000,000	51,000,000	
Net Cost per Gallon per Day	\$ 2.48	\$ 6.89	
<u>Multiplied by:</u>			
Average Daily Consumption (5)	240	240	
Peaking Factor (6)	1.34	-	
Inflow and Infiltration Factor (7)	-	1.36	
Adjusted ERU	320	326	
Maximum System Development Fee per ERU	\$ 795	\$ 2,246	\$ 3,040

- (1) Fixed asset information was provided by the City and the net book value was escalated to 2017 to calculate the replacement cost new less depreciation (RCNLD).
- (2) The RCNLD is adjusted to exclude contributed or grant funded assets, or assets paid by assessments, as well as vehicles, equipment, and meters.
- (3) Revenue from existing system development fees are used to pay to pay off debt service. Thus, the outstanding principal debt is reduced by the portion of annual debt service that is paid with SDC revenue (Water: 2%; Sewer: 3%).
- (4) The rated capacity of the water treatment plant is 91 MGD. However, since the system can only distribute 83 MGD of capacity, 83 MGD serves as the functional capacity used for the calculation.
- (5) The average daily consumption per ERU is based on the City's 2015 Wastewater System Master Plan which uses 80 gallons per person per day and assumes a 3-person household.
- (6) Peaking factor data was provided by the City and was calculated by dividing the maximum day use by average day water use for the past 5 fiscal years.
- (7) Inflow and Infiltration Factor was calculated by dividing the annual treated wastewater by the annual billed wastewater for the last three fiscal years, provided by the City.

Supporting Schedule 2 – Maximum Cost-Justified Fee by Meter Size

Meter Size	Flow gpm	Capacity Ratio	WATER	SEWER	Total
3/4" or 5/8"	20	1.0	\$ 795	\$ 2,246	\$ 3,040
1"	50	2.5	1,987	5,614	7,601
1.5"	100	5.0	3,974	11,229	15,202
2"	160	8.0	6,358	17,966	24,324
4"	500	25.0	19,868	56,143	76,011
6"	1000	50.0	39,737	112,286	152,022
8"	1600	80.0	63,579	179,657	243,236
10"	2400	120.0	95,368	269,486	364,854
12"	5300	265.0	210,604	595,114	805,719

Supporting Schedule 3 – Outstanding Principal Debt Calculation

Total Outstanding Water Principal Debt	\$ 219,634,926
Percent Paid with SDCs	1.73%
Amount of Total Principal Paid with SDCs	\$ 3,806,865

Remaining Outstanding Water Principal - Debt Credit \$ 215,828,061

Total Outstanding Sewer Principal Debt	\$ 343,531,550
Percent Paid with SDCs	2.79%
Amount of Total Principal Paid with SDCs	\$ 9,593,825

Remaining Outstanding Sewer Principal - Debt Credit \$ 333,937,725

Supporting Schedule 4 – Peaking Factor Calculation

Water Treatment Plants: Last 5 Calendar Years of Flow					
YEAR	MIN	MAX	AVERAGE	Peaking Factor	
2013	27.1	45.4	35.9	1.26	
2014	23.6	46	35.3	1.30	
2015	28.9	52.6	36.1	1.46	
2016	26.8	48.4	37.1	1.30	
2017	27.7	47.1	35	1.35	
Average				1.34	

Supporting Schedule 5 – Inflow and Infiltration Calculation

	Treated	Billed	I&I Factor
FY 15	11,664	8,656	1.35
FY 16	12,056	8,618	1.40
FY 17	11,708	8,818	1.33
			1.36