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April 5, 2018

Mr. Jay Meyers  
Public Utilities Director  
Town of Fuquay-Varina  
401 Old Honeycutt Road  
Fuquay-Varina, NC 27526

Dear Mr. Meyers:

Raftelis Financial Consultants, Inc. (“RFC”) has completed its assignment to develop cost-justified water and wastewater system development fees for consideration by the Town of Fuquay-Varina (“Town”). 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 receives<sup>1</sup>.

There are three approaches, as described below, for calculating water and wastewater system development fees that are recognized in the industry as cost justified<sup>2</sup> (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 Town staff to complete the system development fee calculation:

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

<sup>2</sup> 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.

When Raftelis was engaged to conduct this study, the Town had completed approximately 83% of the Terrible Creek Wastewater Treatment plant expansion. Since the majority of the expansion was complete, 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 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 contributed by or paid for by developers were deducted from the calculation since these costs were not “paid” by the existing customers.
- ) *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 Town applies revenues from system development fees to offset outstanding debt service, and since the Town'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**

	<b>Water</b>	<b>Wastewater</b>
<b>Adjusted RCNLD</b>	<b>\$29,814,453</b>	<b>\$55,978,652</b>
<b>Total Capacity (gallons per day)</b>	<b>4,250,000</b>	<b>5,720,000</b>
<b>Cost Per Gallon per Day</b>	<b>\$7.02</b>	<b>\$9.79</b>

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 Town has obtained a flow reduction letter for 75 gallons per person per day. Based on construction trends in the Town, the Town advised using a four-bedroom homes which results in a typical residential customer use of 300 gallons per day. The typical residential water use represents average water use. To estimate the peak day water use, daily water production data was obtained. The average max day peaking factor over the past five-year period was 1.65. To be conservative, a peaking factor of only 1.2 was used to adjust the ERU (as shown in Exhibit 2). For calculating the wastewater system development fee, the ERU was adjusted to account for inflow and infiltration (I&I). The Town provided an I&I factor of 1.13.

**Exhibit 2: Water and Wastewater Demand per Residential ERU**

	Water – gallons per day per ERU	Wastewater – gallons per day per ERU
<b>ERU</b>	<b>300</b>	<b>300</b>
<b>Peaking Factor</b>	<b>1.20</b>	
<b>Inflow and Infiltration Factor</b>		<b>1.13</b>
<b>Adjusted ERU</b>	<b>360</b>	<b>339</b>

**Assessment Methodology**

The analysis provides a maximum cost-justified level of system development fees that can be assessed by the Town. 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
<b>Cost per GPD</b>	<b>\$7.02</b>	<b>\$9.79</b>
<b>GPD per ERU</b>	<b>360</b>	<b>339</b>
<b>Total Calculated Capacity Fee per ERU</b>	<b>\$2,525</b>	<b>\$3,318</b>
<b>Existing Capacity Fee per ERU</b>	<b>\$2,000</b>	<b>\$3,250</b>

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 Manual<sup>3</sup>, 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. It should be noted Exhibit 4 also shows the system development fees for fire protection service which have been estimated

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

using the demand factors for fire flow by meter size (but relative to a ¾” meter). For all 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
¾”	\$2,000	\$3,250	\$ 2,525	\$ 3,318
1”			\$ 4,209	\$ 5,529
1.5”			\$ 8,418	\$ 11,059
2”			\$ 13,469	\$ 17,694
4”			\$ 26,938	\$ 35,388
4” fire line			\$ 3,226	
6”			\$ 42,091	\$ 55,294
6” fire line			\$ 9,370	
8”			\$ 84,182	\$ 110,587
8” fire line			\$ 19,969	
10”			\$ 134,691	\$ 176,940
10” fire line			\$ 35,910	
12”			\$ 202,037	\$ 265,409
12” fire line			\$ 58,005	

The Town may elect to charge a cost per gallon that is less than the maximum cost-justified cost documented in this report. If the Town 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 Town of Fuquay-Varina 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

**Town of Fuquay-Varina, NC**  
**Supporting Schedule 1 – Fixed Assets and Adjustments**

<i>Fixed Asset Summary (1)</i>	<b>Water</b>	<b>Sewer</b>
<b>Category</b>	Replacement Cost New Less Depreciation	Replacement Cost New Less Depreciation
Vehicles	126,472	126,472
BLDG	2,845	3,528
Equipment	196,026	291,633
Land	103,492	318,884
Opr. Plant	422,548	19,010,478
Lines	29,421,467	20,711,406
Other (tanks, pump stations, purchased capacity, etc.)	5,896,317	19,890,618
<b>Total</b>	<b>\$ 36,169,167</b>	<b>\$ 60,353,019</b>
<i>Adjustments to Fixed Assets (2)</i>		
Less: Meters	(128,336)	(45,297)
Less: Vehicles	(126,472)	(126,472)
Less: Non-Core Equipment	(152,483)	(210,910)
Less: Other Non-Core Assets	-	-
Less: Easements	(45,699)	(116,259)
Less: Contributed Capital	(5,901,724)	(6,337,112)
<b>Total: Net Assets Eligible for Inclusion</b>	<b>\$ 29,814,453</b>	<b>\$ 53,516,969</b>
<i>Additions/Subtractions to Fixed Assets</i>		
Plus: Construction in Progress (3)	-	32,238,367
Less: Outstanding Principal Debt That is Paid Through Rates (4)	-	(29,776,684)
<b>Net Value</b>	<b>\$ 29,814,453</b>	<b>\$ 55,978,652</b>
<i>Divided by Capacity</i>		
Total Capacity (Gallons per Day) (5)	4,250,000	5,720,000
<b>Net Cost per Gallon per Day</b>	<b>\$ 7.02</b>	<b>\$ 9.79</b>
<i>Calculation of ERU</i>		
Average Daily Consumption per ERU (6)	300	300
Peaking Factor (7)	1.20	
Inflow and Infiltration Factor (8)	-	<u>1.13</u>
Adjusted ERU	360	339
<b>Calculation of Maximum System Development Fee</b>	<b>\$ 2,525</b>	<b>\$ 3,318</b>
<i>Current Capacity Fee per unit for Residential Customers</i>	<i>\$ 2,000</i>	<i>\$ 3,250</i>



**NOTES:**

- (1) Fixed asset information was provided by the Town and the net book value was escalated to 2017 to calculate the replacement cost new less depreciation value (RCNLD).
- (2) The RCNLD is adjusted to exclude meters, vehicles, etc. However, distribution/collection lines (exclusive of contributed lines) are included.
- (3) The Town provided the construction work in progress amount for the terrible creek wastewater plant, of which 83% of the constructions costs had been incurred as of the date of this report.
- (4) The RCNLD is adjusted to exclude the amount of the debt service that will be paid through revenues from user rates and charges as opposed to system development fee revenues.
- (5) The capacity for the wastewater system includes the additional 2 MGD of capacity provided by the terrible creek wastewater plant expansion.
- (6) The Town has obtained a flow reduction letter for 75 gallons per person per day. Based on construction trends, the Town advised using a four-bedroom home which results in a typical residential customer (or equivalent residential unit) use of 300 gallons per day. These results are consistent with state guidelines which specify expected average wastewater usage of 240 GPD for a 2-bedroom single family home and 360 GPD for a 3-bedroom home, the average of which results in an ERU of 300 GPD.
- (7) The average day and max day demand was obtained from a recent capacity study conducted by Freese Nichols. Over the past 5 years system peaking factors have averaged 1.65 but to be conservative, the peaking factor was reduced to only 1.20.
- (8) The inflow and infiltration factor was provided by Town staff based on comparing wastewater flow sent for treatment with actual billable wastewater flow.

## Supporting Schedule 2 – Debt Service Adjustment

	<u>Water</u>	<u>Sewer</u>
Total Outstanding Debt	\$ 3,336,284	40,893,127
Less: % paid through System Development Fees	100%	27%
Net Outstanding Principal Debt Paid through Rates	\$ -	\$ 29,776,684
Average annual SDF revenue collected from 2008-2015	\$ 404,423	\$ 518,988
Average annual principal payment 2018-2028	\$ 309,483	\$ 1,909,158
% of annual debt coverage from SDF revenue	131%	27%

(Total outstanding debt includes debt issued to fund the wastewater treatment plant expansion.)

Fiscal Year	Revenues from Water SDFs	Revenues from Sewer SDFs
2008	\$796,279	\$739,055
2009	\$232,558	\$157,689
2010	\$241,520	\$386,437
2011	\$111,989	\$131,779
2012	\$370,048	\$559,667
2013	\$338,980	\$468,127
2014	\$540,996	\$848,130
2015	\$603,015	\$861,020
<b>Average</b>	<b>\$404,423</b>	<b>\$518,988</b>

(Includes revenues from SDFs *prior* to increase in SDF fees, which occurred after 2015.)

## Supporting Schedule 3 – History of Peaking Factors

Year	Average Day Demand - MGD	Max Day Demand - MGD	Peaking Factor
2012	1.40	2.40	1.71
2013	1.70	2.80	1.65
2014	1.80	3.20	1.78
2015	2.00	3.30	1.65
2016	2.10	3.10	1.48
<b>Average</b>			<b>1.65</b>

Source: Freese Nichols Water Capacity Study page 3-1