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COUNTY OF PERQUIMANS WATER SYSTEM
SYSTEM DEVELOPMENT FEE

History

About 2004, the county adopted a fee variously called a Water System Facility Fee or a Water Facility Fee. This fee was to be charged to help pay for the existing water infrastructure used by each new lot.

From the current 2018 Perquimans County Subdivision Regulations:

"306.2(D) A one-time Water System Facility Fee will be charged for each lot and paid before the final plat is recorded in the Register of Deeds' Office in an amount set by the County Board of Commissioners in a separate fee schedule. The Fee Amount for lots approved under the Abbreviated Subdivision process (four lots or less) is generally less than lots approved under the Major Subdivision process…"

Apparently the Subdivision Regulations were modified December 3, 2012 to allow up to 6 lots for an Abbreviated Subdivision depending on the type road on which it was located.

And from the Budget Ordinance FY 2017-2018 Adopted Fee Schedule:

Water Facility Fee

$500 per lot for up to and including four lots on main roads, 6 lots on secondary roads

$2,500 per lot for any lots over 4 on main roads, 6 lots on secondary roads

Water Facility Fee must be paid before the Final Subdivision Plat is recorded in the Register of Deeds' Office.

On June 29, 2017, the NC General Assembly ratified Session Law 2017-138 House Bill 436 (hereinafter HB 436) which made sweeping changes to fees a local government provider of water and sewer services could charge for what is termed a System Development Fee (SDF) by the NC General Statutes. According to this new legislation, local governments had to follow strict guidelines on how these fees were calculated and developed. A financial professional or a Professional Engineer had to prepare the calculations following the guidelines in the HB 436. In response to this requirement, Perquimans County executed a contract with Diehl & Phillips, P.A. Consulting Engineers dated December 20, 2017 to prepare the necessary calculations to help establish a System Development Fee that would comply with HB 436. William C. Diehl, P.E. of Diehl & Phillips, P.A. has provided engineering services to Perquimans County Water System for the past 30 years, so he is completely familiar with the Perquimans County Water System. Sources used for reference in preparing this System Development fee include AWWA Water Rates Manual M1; UNC School of Government article System Development Fees Are The New Impact Fees by Kara Millonzi; and North Carolina Government Finance Officer's conference presentation Update on System Development Fees presented by Willdan Engineers.

There are three methods of calculating the System Development Fee depending on the capacity of the existing system and the growth rate of the system, along with other factors. These three methods are described as:

- *Buy-in Method.* Under this method, new development bears a proportional share of the capital costs previously incurred by the unit that allow for sufficient capacity to serve the new development. The buy-in method is well suited for systems that have a relatively slow growth rate and have sufficient excess capacity that large monetary expenditures are not required to absorb reasonable growth.
- *Incremental/Marginal Cost*. This method requires new development to pay the proportional share of new capital costs that are attributable to the new development. The incremental/marginal cost method is well suited for systems that are growing rapidly and must expand the capabilities of the system to accommodate the new growth.
- *Combined Cost*. This method uses a combination of the buy-in and incremental/marginal cost methods.

The Perquimans County Water System fits the buy-in method quite well. The system has been averaging about 30 new residential water services per year for the past 5 years or more, and the plants have sufficient excess capacity to easily absorb this level of growth for the foreseeable future. Basically the way the buy-in calculation works is that a new customer pays his or her share of the replacement cost of the system less depreciation and less remaining debt on the system. The new customers' share of the cost is calculated by determining the Equivalent Residential Unit (ERU) demand of the new connection and multiplying that by the cost per Equivalent Residential Unit. If a new customer has a typical residential demand, their SDF would be one (1) ERU cost; if it is determined that a new non-residential connection will have the demand of say 2 residential customers, their SDF charge will be 2 ERU's.

WATER SYSTEM CAPACITY

The current capacity of the Perquimans County Water System is:
Winfall WTP Capacity: rated at 500 gpm x 20 hours*/day x 60 min/hr=600,000 gpd
Bethel WTP Capacity: rated at 800 gpm x 20 hour/day x 60 min/hr=960,000 gpd
Pasquotank County RO Connection: contract amount 150,000 gpd
Total Capacity= 600,000 + 960,000 + 150,000=**1,710,000 gallons per day**
*Using 20 hours per day allows time for filter backwash, softener regeneration and maintenance

Water treatment plants must be able to meet max day demands, not just average day demands. Our 2017 daily demands are as follows:
Bethel: 2017 Flow total=121,000,000 gallons
2017 Average Day Demand=332,000 gallons
2017 Max Day Demand=520,000 gallons
Winfall: 2017 Flow Total=86,500,000 gallons
2017 Average Day Demand=237,000 gallons
2017 Max Day Demand=434,000 gallons

Pasquotank County RO Connection: 2017 Flow Total=54,000,000 gallons
2017 Ave and Max Day=148,000 gallons

2017 Grand Totals: Total Annual=261,500,000 gallons
Average Day Demand=717,000 gallons
Max day Demand=1,102,000 gallons
Max Day to Average Day Peaking Factor=1,102,000/717,000=1.54

EQUIVALENT RESIDENTIAL UNIT (ERU) USAGE

The Perquimans County Water System currently has 5,215 active accounts, which are 95% residential. The 5,215 existing customers are a mix of ¾" meters; 1" meters and a few 2" meters. The 2" meters are primarily for commercial/ agriculture operations. For purposes of this System Development Fee computation, all customers will be treated as residential, and ¾" and 1" meters will be considered residential customers.

261,500,000 gallons per year/5,215 customers=50,143 gallons per year per customer=4,200 gallons per month per customer, average

4,200 gallons per month per customer/`30 days per month=140 gallons per day per customer, average
140 gallons per day per month X 1.54=215 gallons per day per customer Max Demand

REPLACEMENT SYSTEM COST ESTIMATE

As stated previously, the buy-in method utilizes the estimated replacement cost of the system less depreciation less debt.
The Perquimans County Water System has ~300 miles of distribution system, varying in size from 12" down to 2". Rather than doing a comprehensive calculation based on the actual linear feet of each pipe size, if we assume a 6" average pipe diameter and we use $25.00 per foot as a current replacement cost:
300 miles x 5,280 ft/mile x $25.00/ft=$39,600,000 say **$40 million pipe cost**
The 800 gpm Bethel WTP has a replacement cost of **~$8 million Bethel Plant Cost**
The 500 gpm Winfall WTP has a replacement cost of **~$6 million Winfall Plant Cost**
There are three (3) 200,000 gallon elevated storage tanks at ~$250k each=**$750,000 Tank Cost**
There are two (2) 300,000 gallon elevated storage tanks at ~$350k each=**$700,000 Tank Cost**
The Pasquotank County RO facility replacement cost is ~$500,000 =**$500,000 RO Cost**
There are 7 single wells at $500,000 each=**$3,500,000 Single Well Cost**
There is one double well at $600,000 each=**$600,000 Double Well Cost**
Total Estimated System Replacement Cost= $60,050,000, say $60 million

EQUIVALENT RESIDENTIAL UNIT COST CALCULATION

The Perquimans County Water system has the following debt as of July 1, 2017:

- Winfall WTP Upgrade=$978,327
- Pasquotank County RO Plant Connection=$1,040,802
- 12" Waterline to New Hope=$916,000

Total debt = $2,935,129, use $3,000,000.
Depreciation from the 2016-2017 audit is $10,746,000, Use $11million

Therefore, $60 million-$11 million-$3 million=**$46 million**
$46 million/1.71 MGD Capacity=$26.90 per GPD of capacity
$26.90 per GPD x 140 GPD/connection=**$3,766 per ERU**
This $3,766 per ERU is on the very low end because it is based on the average daily use and not on the type of demand that is used to size individual components. Various components of the system are sized on average demand, max day demand and even max hour demand, as follows:

- Plants are sized for Max Day Demands (1.54 times Average Day Demand)
- Elevated storage is sized for Max Hour Demands (4 times Average Day Demand)
- Distribution system (pipes) are sized for Max Hour Demands (4 times Average Day Demand)
- Wells are sized for Max Day Demand (1.54 times Average Day Demand)
- RO Facility is sized for Max Day Demand (1.54 times Average Day Demand)

As calculated earlier, the Max Day to Average Day multiplier is 1.54
Max Hour to Average Day is generally assumed to be 4:1 ratio (no way to measure)

Using this method, the cost per ERU becomes:

- Distribution: $40 million x 4=$160 Million
- Plants: $14 million x 1.54=$21,560,000
- Elevated tanks: $1,450,000 x 4=$5,800,000
- Wells: $4,100,000 x 1.54=$6,314,000
- RO Facility: $500,000 x 1.54=$770,000

These total $194,444,000, say $195 million
Therefore, $195 million - $11 million depreciation - $3 million debt=$181 million
ERU=$181 million/1.71 MGD x 140 gpd=**$14,819/ ERU**

It appears that a defendable ERU for a typical ¾" or 1" residential customer would be between $3,766 on the low end and $14,819 on the high end.