

memo

City of White Rock Water Advisory Committee

To: Committee
From: Jeff Holm, PEng, Committee Member
CC: CoWR Staff
Date: March 15, 2021
Re: DRAFT - Revised Water Fee Structure and Impacts for Discussion

Summary

The underlying principle of water rates charged by the City of White Rock should be based on 2 parts: The system demand should be based on the system capital costs as a function of water meter or service size. The consumption charge is mostly related to the operating costs of the system to deliver a quantity of water. Simply, the water rate model should be built to recover the fixed costs (capital) based on fixed revenue generators (meter size demand) and the variable revenue should be based on variable costs (consumption).

Introduction

This memo has been prepared in response to the CoWR corporate memo dated March 9, 2021 from the Director of Financial Services. The purpose of this memo is to document and inform the members of the committee of alternate views regarding the issue as discussed at the March 9 meeting. As the issue can be somewhat complex, a written document is provided for committee reference.

Proposed Rate Structure

The proposed rate structure for implementation recommends a small flat rate of ~\$22 per quarter per account to only cover the administrative costs of billing. The majority of the cost of water is proposed to be billed on a consumption basis covering both capital and operating expenses.

An alternate rate structure is to base the water usage rate on 2 components; a base charge on meter size plus a constant unit charge based on consumption.

The first component reflects the system demand. This dictates the overall sizing of the system to meet peak demands to supply water for domestic and industrial uses and fire protection. Generally, the fixed capital costs of the water system to supply, treat, store and deliver water to the users are determined by the peak demand as regulated by the water meter or service size.

For example, a larger industrial user requires proportionally larger capital investment to deliver peak flow (larger pipes in the ground). A smaller residential user requires proportionally less capital investment to deliver peak flow requirements. This demand component is usually related directly to water meter or service size. There are other factors such as distance of supply but the underlying principle is to treat all City residents on the same basis regardless of location.

Note that water meter size can be reduced relatively easily if a user determines that they can lower their demand. For example, a large building could reduce water meter size and base charge if it is determined acceptable by a qualified engineer.

Capital Works Cost (Demand)

Capital works can be defined as those components of the water system required to supply (wells), treat, store (reservoirs) and distribute (pipes in the ground) the finished water to the user. This also includes planned system expansions and may include significant planned system replacements (say a new water main).

All users (Single Family Residential, Multi-Family Residential & Commercial) should be billed a demand charge based on the water meter size. MFR and Commercial meters can be resized and replaced as required due to changing occupancy functions to adjust base charges.

Note that water supplied for fire protection (fire hydrants & fire sprinklers) is not metered and does not affect the building meter size. Fire protection system sizing is a general cost for the benefit of all, not specific to any user. Although if any specific user requires a system upgrade, this should be recoverable to the City with a latecomer agreement.

Operating Costs (Consumption)

Operating costs are defined as those expenses required to operate the capital system. These costs include material supply, equipment, operating labour and routine repair and maintenance. Generally, operating costs are proportional to the amount of water supplied although there are some fixed costs as well as an economy of scale.

Revenue Generation

Revenue sufficient for the sustained operation of the water system is generated as a result of these 2 components. The Capital cost component is amortized and recovered from the progressive base meter size charges. This recovers capital revenue proportional to the system demand sizing.

The operating costs are recovered from the consumption charges. There should be no consumption included in the base meter charge. All consumption should be billed at the same constant unit charge to encourage conservation. If the City desires to further encourage conservation, an over consumption rate or increasing block charge can be established.

Demand Charge (based on water meter size)

While there are many factors affecting the capital work required to properly size and build the municipal water system the single most important and quantifiable factor is the service water meter size (diameter). This is effectively the bottle neck for the individual user and limits the instantaneous peak demand of any user and thus the total peak capacity required for the system.

It can easily be demonstrated that a 6" water meter will permit approximately 90 times as much peak demand flow as a 5/8" residential water service. Therefore a 6" meter service requires 90 times more capital system cost to supply peak flow demand. However, typically a smooth meter factor of about 1/3 is applied to recognize the economy of scale of large consumers. A 6" water meter base charge is typically about 30 times larger than a 5/8" water meter.

City of White Rock Current Water Rates

The CoWR currently bills a progressive meter base charge for SFR and commercial but bills MFR on the number of residential units. All base rates include a minimum consumption per quarter. Failing to bill MFR on meter size leads to an unequal billing against the SFR user. The City of WR should adopt

progressive meter rates for all users without including any consumption in the base rate. All consumption should be billed at unit rates for all users.

Proposed Water Rates

The attached spreadsheet shows a model for the 2 part progressive water rates. Assumptions have been made with respect to revenue splits, consumption, meter distribution, etc. but the model should be flexible enough to be relaxed into deriving the required revenue based on the demand and consumption. Note that there was insufficient information to fully model the revenue versus costs. However, these models can be used to fine tune the model with the input of more detailed information.

Model Tab

The model tab shows proposed consumption and meter rates for a projected annual water supply of 2,500,000 m³. The projected consumption rate is \$1.78/m³ (\$5.04/100cf) and the meter rates are as shown. Average annual billing is calculated for each type of meter. Residential rates are projected to decrease by 7.7%, multifamily rates increase by 10.4%, commercial rates increase by 5.3%.

2021 to 2025 Tabs

Actual consumption is likely to increase proportional to the population growth at about 2% per year while the operating costs are projected to increase by about 4% per year. Thus the consumption charge per unit of water should increase about 2% over inflation.

Conclusion

The CoWR should consider a 2 part progressive base charge on meter size demand and constant unit charge consumption model to generate the required revenue for the sustained system operation. The water rates should be equitable to all users and should encourage conservation.