

# Village of Pemberton

## Water Rate Study Report

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## 1. EXECUTIVE SUMMARY

The Village of Pemberton has committed to establishing a new water rate structure that embodies the following principles:

- A commitment to utilize full cost recovery in the financial and utility management of the water system
- Water efficiency and stewardship of water resources
- Equity in rates, based on the user pay principle

The Village is also keen to ensure that customers outside the Village boundaries are paying their fair share of the true costs of the water system, rather than only a partial contribution to these costs.

The development of new metered water rates for the Village has followed the guidelines of the Infraguide best practice document “Water and Sewer Rates: Full Cost Recovery”. This process is grounded in the determination of the full costs associated with the operations, maintenance and capital investment of the water system, and the recovery of those costs through water rates where possible. The level of detail for information required to precisely adhere to this process is considerable, and there are some instances where assumptions were made in the absence of available information from the Village. Where appropriate, trends and rate ranges for other communities in BC were used to support these assumptions, as these are continually benchmarked by Earth Tech.

Earth Tech embarked on the process of establishing a new rate structure by:

- Updating the estimated full system costs, through a review of previously completed work and the valuation of the existing system
- Developing a strategy to prioritize the implementation of a metering program through a phased approach, beginning with ICI customers and strata complexes, along with a voluntary metering program for single family residential customers
- Recommending a phase approach to implementing full cost recovery, to facilitate the transition from the existing flat rate system
- Establishing rates for residential, commercial and bulk water customers, in keeping with the best practice approach and the recognized limitations in the available information.

Proposed metered and unmetered rates are summarized in the table below:

**Table 1: Proposed Metered and Unmetered Rates**

Customer Type	Fixed Charge	Volumetric Rate
Metered Customers		
Residential - Single Family	\$45/year	\$0.62 per m <sup>3</sup>
Residential - Single Family with Secondary Suite	\$67.50/year	\$0.62 per m <sup>3</sup>
Institutional, Commercial Industrial	\$45	\$0.62 per m <sup>3</sup>
PNID Bulk Water & Outside Boundary Customers	\$15,917	\$0.95 per m <sup>3</sup>
Unmetered Flat Rate Customers		
Residential - Single Family	\$354	
Residential - Single Family with Secondary Suite	\$531	

As 2008 will be a transition and implementation year for the Village, it is anticipated that the Village will need to work with both the newly proposed rates for early transitioning customers, as well as maintain the existing structure for customers who will not have meters within the first year. Public consultation to build support for this new approach will also be an important aspect of the transition, one that we understand the Village has already begun.

Earth Tech recognizes that Village staff have begun to address some of the information gaps, and once these issues have been addressed, the Village will be able more closely follow best practices. Earth Tech recommends that the Village continue to advance the recommended actions outlined in previous reports, as this will support the evolution of more robust rates over time.

## 2. BACKGROUND

The Village of Pemberton has recognized that recent growth of the community, as well as limited water supply capacity, have the potential to impact the community significantly. Since 2004, the Village has been exploring options for reducing water consumption. Aspects that are being considered by the Village include:

- Business case for a universal metering program.
- Other options for implementing metering
- Water rate review

Earth Tech (Canada) Inc. (Earth Tech) was commissioned by the Village to undertake a cost-benefit analysis of a universal water metering program for the Village. One outcome of that work was the recommendation that the Village review its current water rate structure, with a view to determining a rate structure that would better support the transition to metering.

In November 2007, Earth Tech then proceeded to review the existing rate structure, with an approach that was anchored in the best practices for water rate setting as outlined in the Infraguide document “Water and Sewer Rates: Full Cost Recovery”. At its core, this best practice guide is geared towards ensuring that funding for municipal water infrastructure is based on a full cost recovery approach, in order to provide a funding model that can be sustainable in the long-term.

Council received and reviewed this report in November, and subsequently engaged Earth Tech to review rates in greater detail, with a view to developing a new metered rate structure. This report reflects the outcomes of this stage of the project, and also incorporates some of the recommendations outlined in the earlier reports from October and November 2007.

## 3. PROJECT DIRECTION & SCOPE

The phased nature of this project has provided Village Council and staff with an opportunity to review recommendations in stages, and to endorse particular directions, which in turn have influenced the latter phases of the project. Of particular note were the following actions adopted by Council:

### October 2007

- Implementation of a voluntary residential metering program
- Implementation of a program to meter all ICI customers, and associated review of ICI sector rates to support a metered system for this sector

- Commitment to review and refine both metered and unmetered water rates for implementation in 2008, to support the implementation of the foregoing metering programs

#### November 2007

- Endorsed a commitment to utilize full cost recovery in the financial and utility management of the water system
- Adopted the following goals with respect to the establishment of a new water rate structure - Full cost recovery, Water efficiency, Equity/user pay.
- Support for the establishment of a water rate structure that would:
  - Encourage boundary restructure, by reflecting the true cost of services provided to customers outside the Village, such that outside users who are using selected services only are subject to a rate structure that will encourage them to support a restructuring of the boundaries.
  - Support agricultural uses of water within the Village

Through our discussions with Village staff, and in acknowledgement of these directions from Council, the scope of this phase of the project was determined to consist of the following tasks:

- Estimate the value of the existing water system infrastructure in the Village, and determine what role renewal and rehabilitation of this existing infrastructure should play in a new water rate structure
- Develop a strategy for the voluntary implementation of residential metering, and the targeted (mandatory) metering of the ICI sector
- Develop metered, unmetered and bulk water rates for implementation in 2008

## **4. APPROACH TO THE PROJECT**

As with the previous analysis, the approach outlined in the Infraguide document “Water and Sewer Rates: Full Cost Recovery” was used as a basis for the establishment of the water rates. The Infraguide document outlines a nine-step process for water rate establishment, that encompasses the determination of goals or objectives for the rate setting plan, the identification and estimation of full costs for the water system, the identification of revenue sources and financing, followed by the establishment of appropriate rates.

Information to support some of these steps is readily available; however, in other cases, Earth Tech was required to make assumptions in order to proceed. Where appropriate, we have identified these assumptions, and highlighted future actions for the Village.



## 5. GOALS FOR NEW WATER RATE STRUCTURE

The establishment of goals for the rate setting structure is the first step in the Infraguide process. Based on discussions with Village staff, and the endorsements of Council outlined in the previous section, the following were identified as the goals for the Village:

- Provide sufficient funding for the water system, based on the principles of full cost recovery
- Provide equitable basis for charging customers within groups or categories
- Support boundary expansion by charging customers outside the Village boundaries at the true cost of providing water supply services
- Facilitate transition to metered service by creating a financial incentive for voluntary metering
- Promote water conservation through a water rate structure that is based on consumption

These goals were used to guide decisions throughout the project.

## 6. IDENTIFICATION OF FULL COSTS

For the Village of Pemberton, the full costs of the system were determined to comprise of the following elements:

- Capital costs related to new or existing infrastructure, in terms of:
  - Upgrades – these are costs associated with improvements to the existing system, and would include aspects such as the implementation of the metering program, improvements to water quality, water source protection, or pressure adjustments for fire protection.
  - Expansion – these are costs associated with the expansion of the existing system into new areas, and are typically driven by new development, and financed by the developer. The Village may collect development cost charges to pay for expansions to the existing system in order to meet these new demands.
  - Renewal & Rehabilitation – these costs are to replace components of the existing system that may fail or reach the end of their useful life.
- Operations, Maintenance and Administration costs incurred in the day to day operation of the system
- Debt financing, legal fees or other costs of this nature

If full cost recovery principles are strictly applied, all these costs should be fully funded through water rates or other specifically designated water utility fees (e.g. connection charges, etc.).

Currently the Village funds the operations and maintenance of the system through a combination of water rates, fees and charges, revenue from customers outside the Village boundaries and general tax revenues. The Village's share (non-developer) of capital improvement or expansion costs is typically funded through loans and grant funding. In order to transition to a full cost recovery system, it was therefore necessary to estimate the various component costs, and determine their impact on water rates in a full cost recovery scenario. The following sections outline Earth Tech's approach to estimating these cost components.

### 6.1 Capital Costs

Capital costs considered for the Village included the items as outlined in Table 2 below. This list was based on known capital upgrade and expansion requirements as identified in the Water System Capacity Study (Associated Engineering Ltd., May 2007), as well as our understanding of the existing system.

**Table 2: Classification of Capital Costs**

Item Description	Classification
Groundwater supply conditioning & disinfection	Upgrade
Village Core Water Distribution System Looping	Upgrade
Implementation of Metering Program	Upgrade
Industrial Park Water Supply	Expansion
Benchlands Development	Expansion
Other New Development	Expansion
Repairs and replacement of existing system components over time	Renewal & Rehabilitation

Once these had been identified, the next phase of the project involved the estimation of costs associated with each of these, to determine potential impacts on the water rates.

## 6.2 Future Capital Upgrades and System Expansions

### 6.2.1 System Capacity Infrastructure Costs

The known future expansion and upgrade work related to overall system capacity infrastructure (not including universal metering) is valued at approximately \$3.8 million dollars, based on the Water System Capacity Study conducted by Associated Engineering Ltd. (May 2007). These costs have been classified as upgrades or expansion in Table 3.

**Table 3: Estimated Future Capital Upgrade & Expansion Costs**

Item Description	Estimated Cost	Classification	Estimated Time Frame
Groundwater supply conditioning & disinfection	\$593,600	Upgrade	5 years
Industrial Park Water Supply	\$1,732,640	Expansion	5+ years
Village Core Water Distribution System Looping	\$619,150	Upgrade	5-10 years
Benchlands & Other Development	\$902,460	Expansion	3 – 10+ years
Total Capital Funding Required	\$3,847,850		

Table 3 also provides estimated time frames during which it is expected that this new infrastructure will need to be constructed. Although some portion of the required funding is likely to come from development cost charges, e.g. Benchlands or other new development, it is likely that the Village will finance some or most of this expenditure through loans or grants. In a full cost recovery scenario, funding for this work would be raised through water rates having been paid into a reserve, or borrowed with the expectation that loan repayment costs would be met through water rate revenues.

If these costs were to be incorporated as part of the potential burden on future water rates that would result from the need to secure this capital, this would require some level of borrowing on the part of the Village, to cover those costs not paid for by developers. To determine this cost in annual terms, it was assumed that all of the costs, with the exception of the Benchlands Development costs would be funded by borrowing over a 20-year term at a 6% interest rate. This would result in an annual loan repayment of approximately \$335,500.

However, based on discussions with Village Council and staff, it was decided that these future expansion and upgrade costs are likely to occur at least five years from the present, and that in the interim, these cost should not be included in the determination of capital full costs for the system. In addition, it was acknowledged that the considerable change in the tax base that would result from the increased population resident in the new development would also warrant the revisiting of water rates at that time. Therefore, these costs excluded from consideration of current annual full costs.

### **6.2.2 Metering Program Implementation Costs**

The cost for the implementation of the proposed metering program also would be considered as a capital upgrade. However, estimating a precise cost for this program is not feasible at this time since the number and size of existing water services are unknown and cannot be determined by the available information. In particular, the metering of multi-family units may present a challenge. Some strata complexes may be constructed in such a way that allows for individual metering, whereas others may only necessitate a single bulk meter to the property. A review of the characteristics of the strata complexes within the Village also revealed that there are some which combine commercial and multi-family residential units. The Village will need to confirm on a case-by-case basis the ability to individually meter and the preference for individual vs. bulk metering in order to confirm the costs of the residential metering program.

In keeping with Council's endorsement of a targeted ICI and strata development metering program, and with the absence of detailed meter requirements, Earth Tech elected to estimate metering costs for the these customers as a group, based on 97 service connections estimated from Village records. This resulted in a total estimated capital cost of \$257,000 to meter these three groups, which when amortized over the ten-year expected life of the meters, results in an additional \$35,000 per year.

Given that the Village intends to transition to a metered system for these groups as a priority in 2008, Earth Tech recommends that this cost be incorporated into the metered rate structure, which would allow the cost of the meters to be recouped through rates, in alignment with the full cost recovery policy. However, since 2008 and possibly 2009 may be transition years during which the full complement of meters for these three groups will be installed, it will be necessary for the Village to budget to supplement this \$35,000 from other revenue sources such as grant funding, during the transition period.

It is also important to note that the metering cost is an estimate only. At the point when meters are actually installed, there will be a need to revisit this estimate, and the associated water rate structure, to account for the actual costs of meter installation.

### **6.3 Renewal & Rehabilitation Costs**

Renewal and rehabilitation costs will be directly related to the valuation of the existing system, its condition and age, and the remaining useful life of the various system components. According to the best practice recommendations, the development of an asset management plan is a critical step in determining life cycle capital costs. Asset management plans are typically required for both the facilities (e.g. pumps, wells, reservoirs, and water treatment plants), and the linear infrastructure (water mains, hydrants, connections, valves and manholes). In the absence of a detailed asset inventory, maintenance history and current condition assessment, Earth Tech undertook a high-level valuation of the existing system, in order to determine the capital cost component that should be allocated for renewal and replacement.

A high level “Class D” estimate summary of the Villages existing assets is described in Table 4. This summary was derived by speaking to village staff, researching past reports, scaling drawings, making assumptions, and applying conceptual unit rate estimates. Table 4 shows the estimated component counts for each asset category. These counts have varying levels of accuracy, as some were derived from “guesstimates”, while others were estimated from existing drawings and reports, or confirmed by the Village of Pemberton’s staff. Therefore, it is important to recognize, that this valuation may need adjustment as the Village pursues its asset inventory.

**Table 4: Valuation of Existing Water System Infrastructure**

<b>Asset Description</b>	<b>Estimated Component Count</b>	<b>Average Replacement Cost (\$)</b>	<b>Replacement Total Cost (\$)</b>
Service Connections (count)	276	\$ 6,500	\$1,472,000
Water Meters (various sizes)	28	\$3,807	\$107,000
Fire Hydrants	80	\$ 5,700	\$456,000
Pressure Regulating Stations	1	\$ 75,000	\$75,000
Valves	300	\$ 1,100	\$330,000
Mains (metres)	24,500	\$ 445	\$10,900,000
Groundwater Wells	3	\$ 300,000	\$ 900,000
Reservoir	1	\$ 1,000,000	\$1,000,000
<b>Total Existing Infrastructure Value</b>			<b>\$ 15,240,000</b>

The Village of Pemberton's existing Waterworks infrastructure is valued at approximately \$15.3 million dollars and is relatively new in age. The true value of the system is highly contingent on the existing condition and its past maintenance practices. To determine the condition of the existing system and the adequacy of the maintenance funding a detailed infrastructure asset inventory and condition assessment must be performed.

### **6.3.1 Schedule for Renewal & Rehabilitation Expenditure**

Based on our discussions with Village staff, and our review of the "as-built" drawings of the existing system, it was determined that the majority of the existing infrastructure appears to be relatively new (less than 30 years old), and thus still in its first half of its expected life. While specific replacement needs can only be accurately determined through condition assessments, it is reasonable, based on the age of installation, to assume that the majority of the infrastructure still has 20 years or more remaining useful life. On the other hand, it is also known that some components may be closer to the end of their useful life. In addition, there are certain system components which would result in major service disruption in the event of failure, e.g. the reservoir, and the Village should therefore be prudent in securing reserve funds for the replacement of these system components. For these reasons, an average 80-year replacement life cycle was used to estimate the required amounts for renewal and rehabilitation funding.

This is a conservative estimate for an average water system life cycle as it is based on uncertainties about the existing ground conditions, installation practices, maintenance & repair history, current maintenance programs and asset installation dates. It is possible that with better information, this replacement cost could be spread over a longer period.

Using the \$15.3 million total as the basis of the total replacement estimate, and assuming that 1/80<sup>th</sup> of this amount would need to be applied to a reserve each year, the renewal and rehabilitation component was estimated at an average of \$211,000 per year, over the next five years. This rate would need to be reassessed over time as the value of the system changed.

## **6.4 Operations, Maintenance & Administration Costs**

Operations, maintenance and administration costs include expenditures for the following types of items or activities:

- Staff and contract services
- Supplies, equipment and utilities
- Regulatory compliance, e.g. testing costs, permit fees
- Studies, consulting services, research and site investigation.
- Administration, e.g. billing, accounts management, customer outreach.

The 2007 operations budget was used to estimate the operations, maintenance and administration (OM&A) costs, as summarized in Table 5.

**Table 5: Operations, Maintenance & Administration Costs**

Description	2007 Budget
Direct OM&A	
Water - Administration	\$196,952
Water - Other Services	\$0
Water - Maintenance	\$218,465
Water - Connections O/S Boundaries	\$0
Water - Engineering	\$5,000
Indirect OM&A	
Water Purchase (Industrial Park)	\$7,200
Water Purchases (SLRD)	\$5,000
<b>Total OM&amp;A</b>	<b>\$432,617</b>

It should be noted that the total OM&A costs outlined above are based on budget information provided by the Village, and do not take into account any operations and maintenance activities which may have been deferred and therefore not reflected in the annual budgets.

In the past, the Village has recovered a portion of the total OM&A costs from water rates, and supplemented this with tax revenue. From a full cost recovery perspective, all OM&A costs should be fully recovered through water rates.

## 6.5 Financial Costs

The 2007 annual budget was again the source for determining the financial costs in Table 6. As per best practice, financial costs are those associated with debt financing or other borrowing costs.

**Table 6: Financial Costs**

Description	2007 Budget
Water - Interest Expense	\$39,227
Water - Interim Debt Charge	\$10,000
Water - Principal Payment	\$22,863
<b>Total Financial Costs</b>	<b>\$72,090</b>

In the past, the Village has recovered a portion of these costs from water rates, and supplemented this with tax revenue. From a full cost recovery perspective, all financial costs should be fully recovered through water rates.

## 6.6 Summary of System Full Costs

Table 7 summarizes the estimated annual “full costs” for the Village’s water system in 2008, which should be incorporated into the water rates under a full cost recovery scenario.

**Table 7: Estimated Full Costs for Water System**

Item Description	2008 Full Cost Recovery Estimate
Metering Program Implementation Costs	\$35,000
Capital Reserves – Rehabilitation & Replacement	\$211,000
Total Operating, Maintenance & Administration Costs	\$432,617
Total Financial Costs	\$72,090
<b>Total Annual Full Costs Recoverable</b>	<b>\$750,707</b>

Earth Tech recognizes that recovering this level of funding solely through water rates would represent a major change for the Village. While Council has endorsed the full cost recovery approach that would necessitate the inclusion of these costs in water rates, this will need to be balanced with considerations of affordability and practicality for residents to adjust in the short term.

A phased approach for incorporating full cost recovery over time will be discussed in subsequent sections.



## 7. PROPOSED WATER METERING STRATEGY

The priorities for implementing the water metering strategy for the Village need to reflect the goals adopted by Council. Priorities identified were as follows:

- Implementation of targeted metering for ICI customers, along with a process to support voluntary metering for residential users.
- Give support for boundary expansion by pricing services provided to customers outside the Village boundaries to reflect the full and true cost of service
- Encourage water conservation through an equitable water rate structure

Earth Tech recognizes that the Village does not currently have the resources to undertake the metering program in-house. The overall approach to implementation of the metering program should therefore encompass the procurement of contract services to provide and install meters for the Village. This approach would provide the Village with the required staff and equipment resources to undertake the metering program in a cost-effective and timely manner. Initial installation, along with on-going maintenance, meter reading and billing information generation are typically offered as a bundled service by contractors.

It should also be noted that there are provincial or federal grant and cost-sharing programs that will support metering and other water conservation activities. The Village should explore the option to secure such funding to offset metering program costs, and lessen the cost burden on the customer base.

The following list shows the universal metering installation priority plan:

- Industrial, Commercial, and Industry (ICI)
- Strata – combined Commercial/Multi-Family Residential
- Strata – Multi-family Attached
- Strata – Single Family Dwelling (SFD) detached
- Single Family Dwelling (SFD) and Duplex

Earth Tech's approach is to address the Industrial, Commercial, and Industry (ICI) water meters first, then all combined commercial and residential multi-family strata properties, then residential multi-family strata properties and finally residential single family dwelling (SFD) and duplex properties. The following sections address how the roll-out of the metering program should be prioritized, in keeping with the direction from Council.

## 7.1 Targeted Metering of ICI Customers

ICI water usage within a water system is typically difficult to characterize without metering, and the scale and nature of operations can vary so widely. Some ICI customers may be significant users of water, and therefore specific consumption information about these customers is desirable. Alternatively, other ICI customers may be paying very high flat rates for water, while actual consumption is considerably lower. An example of this type of user would be a storage facility, which would likely only have a few bathrooms contributing to water consumption, but would be charged the high flat rate.

Currently, some ICI customers within the Village, located within the Industrial Park, are already metered. Completing meter installations at the remaining properties would be advantageous to have a clearer understanding of water usage in this area, and allow cost recovery through billing to more accurately reflect water usage. In addition, as the number of ICI customers in other parts of the Village is readily identifiable and relatively small, metering this group is likely to represent an easy first step for the Village.

To maximize the effectiveness of this phase of the metering program implementation, the Village would need to commit to regular reading of all existing customer meters, and the equitable application of metered rates to the billing of these customers.

## 7.2 Metering of Combined Commercial/Residential Strata Complexes

A review of the distribution of strata title properties within the Village revealed that there are some properties with combined commercial and residential units. As these properties represent a “hybrid” of commercial and residential use, Earth Tech recommends that this group be given the next priority for metering, as part of the targeted metering program. Earth Tech estimates that there are four properties which would fall under this classification, covering a total of 19 commercial units and 42 residential units<sup>1</sup>.

Typically, where different units are contained in a single building, e.g. low-rise mixed use building, it may not be feasible to individually identify and monitor water consumption at the unit level. In many communities, such strata title properties are usually billed with one lump sum charge and the strata council then distributes the costs to the strata members.

It has been assumed that for these four properties, such conditions would prevail. Therefore the combined commercial/multi-family residential strata properties will need to be metered with a single, appropriately-sized meter.

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<sup>1</sup> Water Rates & Charges for Strata Units, provided by Village, September 27, 2007

### **7.3 Metering of Multi-Family Attached Strata Properties**

According to Village records, some 528 residential units are considered to be strata-titled, with a total of 17 strata complexes being identified. Although the physical layout of each property is unknown at this time, it is common for most attached strata-titled properties to receive water service via a single large connection to the property. Many are not currently set up to further distribute the water through individual metering. In many communities, such strata title properties are usually billed with one lump sum charge and the strata council then distributes the costs to the strata members.

Earth Tech recommends that strata multi-family attached dwellings be the next group of customers to be metered, and that the Village considers a targeted rather than voluntary approach for this group. The reasons for this approach are as follows:

- The ability to meter individual properties may not be available in some cases. The use of a single service connection means that these connections will be responsible for a large portion of water consumption within the Village. As a result, it will be important to understand consumption for these units, in order to fairly apportion costs to these users.
- The number of residents living in strata-titled properties in the Village appears to represent more than half of all residential dwelling units. The ability to meter all these complexes, at least to the property boundary, would represent a relatively quick and significant step along the path to having customers universally metered.
- This would support greater equity in the rate structure, as currently these customers are being charged at the same rate as detached single-family homes. However, it is likely that the water use of a resident in an attached strata building is lower than the single-family counterpart, since they are not as likely to have high outdoor usage of water, e.g. for watering large gardens or filling swimming pools.

Some of the residential single family dwelling (SFD) and duplex strata properties, such as the Pemberton Plateau development, may be constructed in such away that easily allows for individual metering. However, their strata council will need to confirm their ability to individually meter and their desire to individually meter, instead of bulk metering.

### **7.4 Voluntary Metering of Single Family Dwellings**

The SFD and Duplex properties will be the last to be phased-in. However, a voluntary plan is proposed to encourage the enrollment of these properties from the onset of the program. The incentive to transition early to a metered service will be created through a differential between the estimated costs of a flat rate and metered service, based on an assumed average consumption level. Those residents who are careful and conserving water users will recognize the cost savings potential and opt to have a meter installed under the voluntary program.

While it is expected that the voluntary program will be in place for some time, there will be a need for the Village to determine a target date for full transition, beyond which all remaining flat rate users would be mandated to have meters. Typically, municipalities select transition periods of five to ten years.

## 8. OPTIONS FOR FULL COST RECOVERY IMPLEMENTATION

As shown previously, the table below summarizes the estimated annual “full costs” for the Village’s water system in 2008, which should be incorporated into the water rates under a full cost recovery scenario. It should be noted that these should be considered costs for 2008 only, as future full costs may vary as the cost of operations and other inputs change over time.

**Table 8: Estimated Full Costs for Water System**

Item Description	2008 Full Cost Recovery Estimate
Metering Program Implementation Costs	\$35,000
Capital Reserves – Rehabilitation & Replacement	\$211,000
Total Operating, Maintenance & Administration Costs	\$432,617
Total Financial Costs	\$72,090
<b>Total Annual Full Costs Recoverable</b>	<b>\$750,707</b>

By contrast, it should be noted that, based on the 2007 budget provided by the Village, only about \$435,000 is typically raised from water rates, both from within the Village and from out of boundary customers.

### 8.1 Option 1: Full Cost Recovery Implementation in 2008

Under this option, the total of \$751,000 would be the total amount expected to be raised by water rates only in 2008; no funds from taxes, or other revenue sources would be required to fund the water service. It is important to recognize that this approach would create an expectation for residents that taxes collected to support the water system would be proportionately reduced, since the funding would be expected to come solely from water rates.

Earth Tech recognizes that recovering this level of funding solely through water rates would represent a major change for the Village. While Council has endorsed the full cost recovery approach that would necessitate the inclusion of these costs in water rates, this will need to be balanced with considerations of affordability and practicality for residents to adjust in the short term. In addition, there are still some areas where these cost estimates could be improved, particularly with regard to the cost of residential universal metering program implementation. The rapid changes in construction costs that have been experienced industry-wide in the past few years could also have a significant impact on the expansion, renewal and rehabilitation cost estimates.

In light of these uncertainties, and the recognition that a rapid change to full cost recovery would be an undue financial burden for some residents, a phased approach that would move the Village gradually towards full cost recovery should be employed. As time progresses, annual

reviews of water rates, recovered revenue and system full costs should be conducted to inform the phasing in of full cost recovery practices, so that water rates can be adjusted accordingly.

## 8.2 Option 2: Defer Capital Cost Recovery

As shown in Table 3, approximately \$3.8 million of future capital works is contemplated, which could add an additional \$355,500 to the annual amount of funds needing to be recovered. As outlined previously, Village staff elected to defer the capital cost recovery at this juncture. While this is reasonable at this time, it is important to consider the relative urgency of recovering these costs, given the pace at which the water system infrastructure will be required to grow due to development, and the current condition of the existing infrastructure. However, Earth Tech recommends that this deferral should be mitigated to some extent by:

- The establishment of a Capital Reserve Fund and the initiation of contributions to the reserve to offset the amount to be borrowed
- A commitment to revisit the water rate model within the next five years to review this exclusion.

In terms of renewal and rehabilitation costs, Earth Tech recognizes that the Village has not traditionally funded renewal and rehabilitation from water rates or reserves, although some work in the past may have been funded by loans. In order to minimize undue financial hardship in the short term, Earth Tech recommends that full cost recovery should be phased in over time, such that contributions to renewal and rehabilitation reserves would be gradually increased, and reflected in gradual increases to the water rates.

Based on these considerations, an option for phasing in the full cost recovery would involve deferring the capital elements of the full cost for 5 – 10 years. Table 9 outlines the suggested approach to gradual implementation of full cost recovery.

**Table 9: Cost Recovery under Deferred Capital Option**

Item Description	Recommended Implementation of Full Cost Recovery	Financial Impact on Water Rates
Total Future Expansions & Upgrades	Phase in recovery @ 5+ years	\$0
Metering Program Implementation Costs	Fund through water rates now	\$35,000
Capital Reserves – Rehabilitation & Replacement	Phase in recovery @ 5+ years	\$0
Total Operating, Maintenance & Administration Costs	Fund through water rates now	\$432,617
Total Financial Costs	Fund through water rates now	\$72,090
Deferred Capital Recovery Option Total		\$539,707

It should be noted that this approach would only be feasible over the short term – 3 to 5 years – in order to avoid long term funding shortfalls and the inability to adequately operate and maintain the water system. In addition, because metering costs may differ once more detail has been obtained, the Village would need to carefully adjust these rates to reflect more accurate metering program costs.

### 8.3 Option 3: Phased-In Full Cost Recovery

It is important to recognize that the total full cost of \$750,707 million is an estimate for 2008 only, and the full costs of the system would be expected to change over time due to changes in the cost of operations, materials, construction costs, and so on. In the event that the Village elects to phase in full cost recovery, it would be necessary to estimate future full costs, in order to make sure that the target recovery levels over time provide adequate funds in the future.

To explore this option, Earth Tech made the following assumptions:

- Construction costs associated with capital works would increase at a rate of 5% per year
- Operations and maintenance costs would increase at a rate of 3% per year
- Financing costs would increase at a rate of 1% per year, to account for a reduction in borrowing over time as spending from capital reserves increased, and potential changes in borrowing interest rates
- Phasing in periods of 10, 15 and 20 years were used to see impacts on cost recovery
- Full costs at the end of each period were assumed to be the average of full costs over the length of the period.
- Current recovery levels based on the 2007 budget, were assumed to be \$435,000 as noted previously

Table 10 below shows a summary of the phasing in scenarios, based on these assumptions.

**Table 10: Phased-In Approach to Full Cost Recovery**

	10-Year Period	15-Year Period	20-Year Period
Annual Full Cost at End of Period	\$880,785	\$967,664	\$1,067,308
Current Recovery Level (based on 2007 budget)	\$435,000	\$435,000	\$435,000
Funding Gap	\$445,785	\$532,664	\$632,308
Phasing in Period	10	15	20
Annual Incremental Increase in Recovery	\$44,579	\$35,511	\$31,615

Table 10 shows the annual increase in recovery that would need to be added to the current recovery level in each year of the phasing-in period. For example, if the Village committed to achieving full cost recovery in a 10-year period, an amount of \$44,579 would need to be added each year to the current annual cost recovery of \$435,000, beginning in 2008 to 2017. This approach was applied to the three phasing-in periods as shown in Table 11.

**Table 11: Projected Recovery Levels & Volumetric Rates for Phased Approach**

	<b>10-Year Period</b>	<b>15-Year Period</b>	<b>20-Year Period</b>
	<b>Annual Recovery Amount</b>	<b>Annual Recovery Amount</b>	<b>Annual Recovery Amount</b>
Current (2007)	\$435,000	\$435,000	\$435,000
2008	\$479,579	\$470,511	\$466,615
2009	\$524,157	\$506,022	\$498,231
2010	\$568,736	\$541,533	\$529,846

The Village will need to determine an appropriate phasing in period if this approach is selected. While there may be a desire to reduce short-term cost increases and therefore opt for as long a transition period as possible, it is important to note that as the period for implementation extends further into the future, the full costs will also be changing over time. This could result in more rapid change down the road, if overall full costs were to increase beyond current expectations in the next 10 – 20 years.



## 9. WATER RATE STRUCTURE & RATE SETTING

### 9.1 Implications of Full Cost Recovery for Water Rate Setting

The forgoing examination of how full cost recovery could be incorporated into rate setting for the Village provides a range of options for cost recovery, including suggestions for phased implementation. Table 12 provides a summary of these options.

**Table 12: Options for Full Cost Recovery Implementation**

	Full Cost Recovery in 2008	Deferred Capital Recovery Option	10-Year Phased Approach		
			2008	2009	2010
Annual Cost Recovery Amount	\$750,7007	\$539,707	\$479,579	\$524,157	\$568,736

At this point, the best practice approach to setting water rates would require the selection of a cost recovery option based on the scenarios outlined above, followed by:

- Allocation of the total costs to be recovered among the different groups of customers
- Determination of unit customer rates based on the number of customers in each group

The allocations of costs to different groups of customers would typically be based on an understanding of the water consumption in each of these groups, and an accurate knowledge of the number of service connections being supplied in each customer category. This in turn would allow accurate revenue projections to be made based on the expected recovery from each customer in each category.

In the case of the Village, this step cannot be readily achieved from a full cost recovery perspective, as much of the detailed information required is unknown, as outlined in Table 13.

**Table 13: Customer Categories**

Customer Category	Estimated % Consumption	Expected Recovery Allocation	# of Service Connections in Category
Bulk customers outside Village	15%	To be estimated	2
Single customers outside Village	Unknown	Unknown	25
ICI Customers	Unknown	Unknown	Estimate only
Multi-family (strata) with bulk service	Unknown	Unknown	Unknown
Multi-family (strata) with individual service	Unknown	Unknown	Unknown
Single family residential customers	Estimate only	Unknown	Estimate only

If the Village intends to proceed with full cost recovery for water rates, it is important that the unknowns be identified, or reasonable assumptions made with respect to determining the various allocations. As a first step, the Village should undertake an updated customer count within the Village boundaries, and identify any existing metered service connections which could be used to approximate consumption in different areas. Temporary meters of indicator customers in each category could also be used to provide better estimates as to the allocation of cost recovery. Earth Tech strongly recommends that the Village pursue these and other steps to improve the quality of data available, which in turn will support a more robust cost recovery plan, and the establishment of more accurate water rates.

In addition, the cost recovery plan will need to provide policy direction in terms of:

- An approach to infrastructure reinvestment using capital reserves, capital funding from current reserves and debt in a way that minimizes fluctuations in rate and allows for equitable allocation of costs from current to future users.
- Dedicated operating funds to ensure water revenues are spent only on the water system.
- A dedicated reserve fund (as recommended above) to ensure that water and sewer funds are spent only on the appropriate capital programs.

The Village of Pemberton will need to develop this cost recovery plan in order to fully embrace full cost recovery through water rates.

## **9.2 Alternative Interim Approaches to Water Rate Setting**

The limitations outlined above with regard to the inability to accurately allocate cost recovery to different customers. Despite this, Earth Tech recognizes that the Village is anxious to update water rates, in keeping with the overall goals adopted by Council to:

- Provide equitable basis for charging customers within groups or categories
- Support boundary expansion by charging customers outside the Village boundaries at the true cost of providing water supply services
- Facilitate transition to metered service by creating a financial incentive for voluntary metering
- Promote water conservation through a water rate structure that is based on consumption

Earth Tech also understands that the Village has already made public commitments to improving water rate structures. In light of this, Earth Tech has provided the following alternative approaches to revising water rate structures. These rate structures should be considered as possible short-term options, and communicated as such in any public awareness

or outreach activity undertaken by the Village. They should not be considered as long-term replacements for the current water rate structure, nor do they encompass full cost recovery principles in their optimal form.

In establishing interim user rates, it is important to consider how rates can be structured to support Council's goals. User rates are typically structured to reflect the mix of fixed and variable operating costs associated with the provision of service, such that the fixed component of a water rate should reflect the amount of money needed to cover fixed costs. The variable component of the operating budget is then linked to the volumetric or consumption-based component of the water rate.

In the case of the Village however, the majority of the operating costs are fixed, and will not vary with reduced consumption. Using the typical fixed to variable ratio would therefore not support conservation, as a typical user's water bill would remain fairly constant regardless of any conservation measures. To support the conservation objective for the Village, the water rate structure was selected to achieve a strong weighting towards the volumetric component. The best practice guide suggests that in such a case, no more than 15% of the expected water bill should be based on a fixed charge.

### **9.3 Bulk Water Rates for External Customers**

The Pemberton North Irrigation District (PNID) is the single bulk customer supplied by the Village. The PNID also appears to be the single largest user of the water system consuming approximately 15% of the available capacity through two meters (4" & 6" diameters). This estimate of consumption is based on recently completed work by Earth Tech regarding the accuracy of the existing meters.

Based on the application of full cost recovery principles, the PNID should be responsible to cover its fair share of capital related costs, as well as an appropriate allocation of operations, maintenance and administration costs. The following apportionment of these costs was utilized to determine the amounts that should be recovered through bulk water rates for the PNID:

- Renewal and Rehabilitation costs - the major components of the total system infrastructure identified as required to provide the PNID with service include the reservoir, the groundwater wells and pumps, the pressure regulating station. Based on the layout of the system, 40% of the mains were considered to be required to provide service to the PNID and other outside customers. The pro-rated system value at \$7 million, which was then used to estimate a pro-rated renewal and rehabilitation component at an 5-year average rate of \$97,000, based on the 80-year replacement cycle.
- Future Upgrade Costs – it was determined that the PNID should only bear responsibility for their share of those upgrades that would improve their level of service. Based on the

proposed upgrades identified in Section 6.2, it was determined that the groundwater supply conditioning upgrades, along with the system looping works, should be incorporated into the full cost assessment for the PNID. This represents a total of \$1.2 million, which results in an annualized value of \$105,800. While future upgrades were excluded from full cost determinations for the Village, it is suggested that these costs be included for the PNID to provide a more long-term estimate of future rates, offering more rate stabilization for the PNID.

- **Operations & Maintenance Costs** – the costs of operating and maintaining the system are a necessary component of the Village’s ability to provide service to the PNID. The total OM&A costs should be used to determine the full costs associated with providing the PNID with water.
- **Financing costs** – these costs should also be incorporated into the full costs associated with providing the PNID with service.

Table 14 summarizes the costs that should be considered when assessing PNID bulk water rates.

**Table 14: Pro-rated Full Cost to be Recovered from PNID**

Item Description	2008 Full Cost Recovery Estimate	PNID Allocation	PNID Cost Recovery
Pro-rated Renewal & Rehabilitation Costs	\$97,000	15%	\$14,550
Capital Upgrades	\$105,800	15%	\$15,860
Total Operating, Maintenance & Administration Costs	\$432,617	15%	\$64,893
Total Financial Costs	\$72,090	15%	\$10,814
Total Recoverable Costs from PNID/Outside Customers			\$106,116

A 15% fixed rate component was applied to the total of \$106,116 and a volumetric rate determined based on the known annual consumption by the PNID. Table 15 summarizes the results.

**Table 15: PNID Volumetric Rates**

Item Description	Value
Total Recoverable from PNID	\$106,116
15% Fixed Cost Portion	\$15,917
Portion Recoverable Through Rates	\$90,199
Annual Consumption	95,000 m <sup>3</sup>
Suggested PNID Volumetric Rate	\$0.95 per m <sup>3</sup>

### **9.3.1 Possible Service Agreement Considerations for PNID**

At present, the Village of Pemberton does not have a formal agreement with the Squamish-Lillooet Regional District to provide water service to the PNID. Any new agreement should incorporate the suggested rate structure above if approved by Council, and should also consider other conditions of service such as a requirement to match watering restrictions or other conservation measures that may be implemented by the Village, and the consideration of metering individual customers within the PNID over a set time frame. The Village may also wish to consider requesting updated service connection counts and characterizations of customers, in order to revisit rate structures over time.

### **9.4 Single Outside Boundary Customers**

Actual consumption levels are not available for these customers, although it is known that this customer category represents only a few connections, and likely has a relatively low consumption level. In the absence of more specific information on these customers, it is recommended that the same rate structure as is proposed for the PNID be applied for these customers. This would also support Council's intent to maintain rate structures that encourage consideration of boundary expansions. If these customers are not individually metered, installing meters at each service connection to outside boundary customers should be a first priority for the Village, so that consumption can be more accurately identified.

### **9.5 Residential Metered Rates**

It has been noted previously that there are considerable estimations embedded in the development of full costs for the system. In addition, since the customer category allocations are unknown, and as such full cost recovery is not going to be applied initially, it is not possible to accurately set water rates based on the full costs of the system. In light of this, Earth Tech elected to set rates with the voluntary incentive as the central focus, in order to position residential metered and flat rates at appropriate levels to encourage residents to transition to a metered service.

Currently, a single family residential dwelling pays an annual flat rate of \$295. Based on recent rate reviews conducted by Earth Tech, it is understood that most municipalities create a differential between metered and flat rates of about 20%, i.e. with equal consumption, a metered customer typically pays 20% less than an equivalent flat rate customer. Infraguide best practice also indicates that this 20% differential is appropriate, and seems to be of an order of magnitude that encourages voluntary metering.

Based on this, the following were assumed in the development of a residential metered rate:

- A typical single family residential service consumes 415 m<sup>3</sup> per year. This is based on Earth Tech’s benchmarking of residential metered and non-metered consumption in several municipalities in BC.
- If no conservation measures are adopted, this typical user should expect to pay about the same as the current flat rate, creating an incentive to conserve more water in order to save money. In this case, this was selected to be \$300 per year.
- 15% of the total expected water bill should be a fixed charge to cover the Village’s requirement to provide system access and sufficient capacity, and to cover the costs of meter reading and maintenance. This fixed portion also provides greater security to the Village for a portion of incoming revenue. The fixed portion was therefore set at \$45 per year.
- A volumetric unit rate of \$0.62 per m<sup>3</sup> was therefore calculated, based on the average 415 m<sup>3</sup> per year volumetric consumption being divided by the remaining \$255 to be recovered.

The current 50% surcharge on a single family residential unit with a secondary suite should be maintained, as this should closely align with the expected incremental number of residents over a single family residential unit with no suite. Table 16 summarizes the suggested residential metered rates:

**Table 16: Recommended Residential Metered Rates**

Description of Charges	Single-Family Residential Dwelling	Single-Family Residential with Secondary Suite
Fixed charge	\$45/year	\$67.50/year
Volumetric Charge	\$0.62 per m <sup>3</sup>	\$0.62 per m <sup>3</sup>
Assumed Annual Consumption	415 m <sup>3</sup> /year	622.5 m <sup>3</sup> /year
Total Expected Metered Water Bill with no additional conservation	\$300	\$453
Total Expected Metered Water Bill with 10% reduction in consumption	\$284	\$415
Current Flat Rate	\$295	\$443
Expected New Flat Rate with 20% Differential	\$354	\$531

It should be noted that this rate structure should apply to multi-family or strata developments where individual service connections are in place or can be readily identified.

In developments where it service is provided through a bulk connection, the Village should undertake specific discussion with this customer category to confirm an approach for structuring

the rates. It is suggested that to support fairness and equity, the fixed portion should be maintained at 15%. However, a lower per capita consumption rate per connection could be utilized, to account for the likely reduced levels of water use that would occur in higher-density townhouse developments with less outdoor water usage.

## 9.6 ICI Water Rates

Earth Tech recommends that initially, the metered water rate structure for commercial and institutional customers should follow the same rate structure as the residential metered rates outlined in the previous section. However, since the service connections to provide water to these properties may vary widely, these rates may need to be reviewed at the end of 2008, when the meters have been installed, and a greater understanding of individual commercial customer consumption can be obtained.

It is recognized that there may be a need to adjust the water rate to account for the differences in service connection and meter size. The village could opt to vary the fixed portion of the rate to account for the difference in services, or employ a block rate structure for the volumetric portion of the rates, i.e. consumption up to a set amount is charged at one unit rate per cubic metre, and consumption above that level would be charged a higher unit rate.

The method outlined above offers a simple and defensible approach to calculating external customer rates, and provides a significant differential relative to volumetric rates applied to customers with the boundaries. This approach to volumetric rate setting for the PNID and other outside customers should be revisited in the event that more accurate system knowledge provides a clearer pro-ration methodology.

### Agricultural Water Rates

A brief review of water rates in other municipalities in the Lower Mainland with considerable agricultural activity was undertaken, to determine whether municipalities make particular rate categories to deal with agricultural water users. It was recognized that these are potentially high-volume consumers; however, they also provide significant economic benefit, particularly in small communities like Pemberton, and therefore there is a need to make sure that rates are fair and manageable, and recognize these contributions. Multiple approaches were observed:

- Charge based on meter size – agricultural users not distinguished from other ICI users, and charges are based on size of connection and/or meter size (Surrey)
- Flat charge per hectare – a fixed charge per hectare of land classified as “agricultural” by BC Assessment (Kelowna)
- Tax based payment – property taxes are used to raise all funds from agricultural and other users (Salmon Arm)

- For metered communities, an agricultural volumetric rate (\$/cubic meter) which is set at approximately 25% of the volumetric rate for residential customers. A fixed charge based on meter size also applies (District of Saanich)

It is recommended that the Village consider the following when determining the preferred structure for agricultural water rates:

- Type of agricultural practice, i.e. water intensive vs. low water use
- Size of connection
- Number of agricultural users
- Ease of administration of rate structure
- Compatibility with rate setting policy for other customer classes

These factors should be weighed as part of the overall decision on how agricultural rates are established.



## 10. CONCLUSIONS & NEXT STEPS

According to Infraguide it is also very important to annually review rates to determine their continued adequacy to fund the full cost of the system, based on the parameters in the previous steps. Considerations with respect to the review should include any planned or unplanned changes to operations that have occurred or are proposed, along with adjustments necessary to account for changing priorities with respect to capital investment in the water system.

This report outlines a very high-level approach to rate setting, in keeping with the Infraguide best practices for the full cost recovery for water systems. While the report also provides alternative interim approaches to adjusting water rates, it is important that the Village take the necessary steps to improve the accuracy and availability of the information that will be required to develop water rates that are truly developed based on full cost accounting principles.

The Village should consider the following in advance of pursuing significant long-term changes to the water rates bylaw:

- Confirmation of the desired policies and goals with respect to water rate setting, and the intent to transition to universal metering
- Development of asset inventory and condition assessment for existing infrastructure, including service connections

Earth Tech also recommends that other “Best Next Moves” identified in the previous reports should be considered in the operations and budget planning exercises for 2008 and beyond. Implementation of these steps will provide a more robust information platform for the Village to base decisions on, and serve as an opportunity to revisit the establishment of rates that provide greater ability to recover costs associated with the water system, demonstrate fairness and equity with respect to different types of customers, and support water efficiency where possible.