



Village of Tahsis
977 South Maquinna Drive
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WATER CONSERVATION IN TAHISIS

YESTERDAY'S ACTIONS, TODAY'S RESULTS & A PLAN FOR TOMORROW

FEBRUARY 2020

Village of Tahsis

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Introduction/Background

The Village of Tahsis has been proactively managing their Municipal Assets, comprising of over 23 Million dollars in Road, Water, Storm Water, and Sewer infrastructure. Despite having a population of less than 1,000, the Village has recently undertaken a number on asset management projects intended to upgrade and extend the life of their assets, including the following recent year's initiatives:

- 2016-2018: **Asset Management – Wastewater System Condition Assessment and Optimization** (Clean Water and Wastewater Fund);
- 2017-2018: **Community Water Conservation Project** (Clean Water and Wastewater Fund);
- 2018-2019: **Road, Water, Storm, and Sewer Upgrade Project, South Maquinna, Alpine View Dr, Rugged Mountain** (Federal Gas Tax Strategic Priorities Fund);
- 2018-2019: **Floodplain Protection Study** (Community Emergency Preparedness Fund);
- **2018-2019: Wellhead Protection Plan** (Village of Tahsis)

Based on this previous work, and in conjunction with the recent revision of the Village's OCP, the Village is considering moving forward with the following infrastructure initiatives:

- Closure of the North Sewage Treatment Plant, with upgrading of the South Treatment Plant;
- Completion of a Flood Protection Plan, and associated Bylaws;
- Upgrading of the Villages dikes;
- Ongoing asset management improvements;
- Reduction in "system" water losses;
- Continuation of the water metering program.

The Village recognizes the need to repair and replace core assets such as the Village's water system, based on asset condition and the levels of service that the Village's tax base can afford. The Asset Management Study, completed in 2016 has provided the Village with up to date costs which inform the rolling 5 year capital plan, , and will continue to inform the Village of the need to manage the Villages assets in the most cost effective manner.

As part of this work, the Village has recognized the value of water conservation in optimizing the Village's water and sewer assets. This work was initiated in the 2016 though the Village's Asset Management Project, and continued with the Water Conservation Project.

Prior to undertaking this work the average per capita water consumption in Tahsis was about > 1,800 liters per capita, compared to the BC average of around 600 liters/capita (at the time). The leak detection work determined that a large portion of the Village's water consumption was attributed to 'system' losses, i.e., watermain leaks prior to delivery to the customer. A 2016 leak detection study identified 22 major water leaks within the distribution system. Approximately 80 lineal meters of watermains were replaced, along with a number of valves.

Figure One provides an update on the status of the watermain repairs that were identified in the leak detection study. All but 7 of the 22 repairs have been completed, some were undertaken as part of the road upgrade project (South Maquinna, Alpine View, and Rugged Mountain Rd) that was completed in the fall of 2019.

Figure One - Current Status of Watermain Repairs from Leak Detection Program

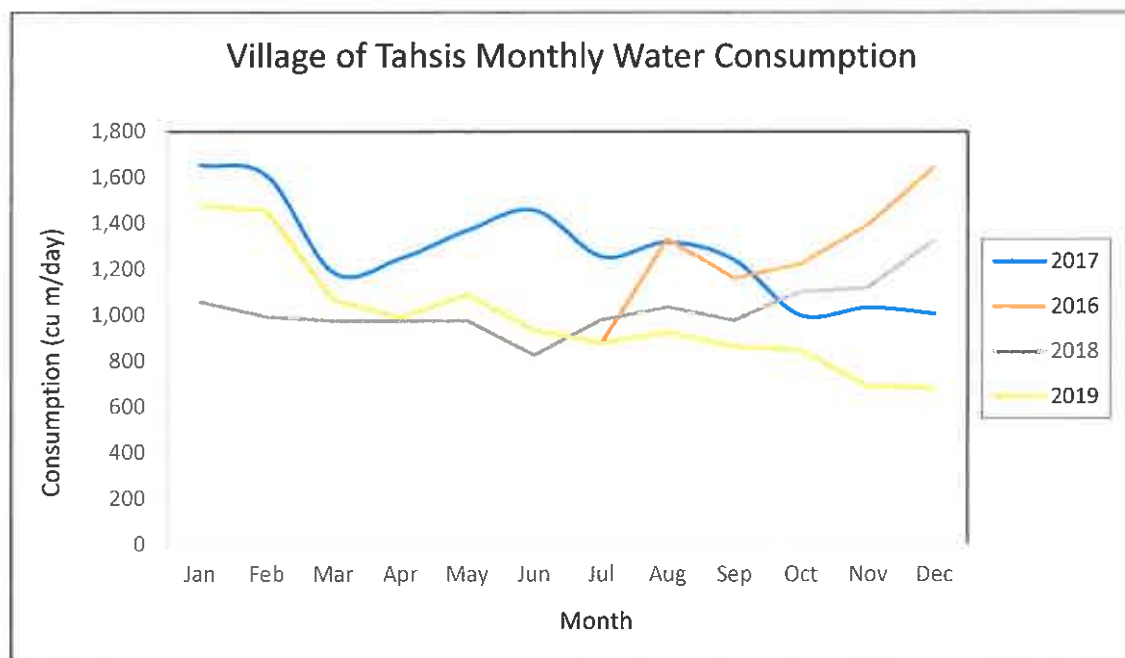
No.	Location & Type (if known)	Priority	Current Status	Infrastructure
1	N. Maquinna @ Strange Rd. Main leak	High	Completed	200 mm Ductile Iron (DI)
2	S. Maquinna Bet. Nootka & Nicolaye Main, Valves, Service lines...	High	Completed	200 mm PVC
3	S. Maquinna @ Nootka St. Hydrant H-310	High	Completed	200mm PVC & 150 mm PVC
4	S. Maquinna @ Tootouch Noisy Valves & Main...??	High	Completed	200 mm DI & 75 mm ST
5	Meares St. Hydrant H-370	High		150 PVC??
6	Alpine View @ N. end of Rec Ctr (332-334) Possible Service line	Medium	Completed	300 mm Steel (ST)
7	Brabrant Cr. (between 40-36) Possible Service line	Medium		150 mm Asbestos Concrete (AC)
8	Harbour View @ N. Maquinna Main Leak, Close to Hydrant	Medium	Completed	150 mm PVC (PVC) & 200 mm DI
9	Head Bay Rd. bet. Heliport & Cedar Mill Main Leak	Medium	Completed	300 mm ST
10	School Hill Rd. Hydrant H-225	Medium	Completed	150 PVC
11	Rugged Mtn Rd. Bet. A & D rd Noisy Main Valves	Medium	Completed	100 mm DI & 150 mmDI
12	Rugged Mtn Rd. @ G rd Noisy Main Valve	Medium	Completed	200 mm ST
13	Meares St. (1155 & 1167) Noisy service line	Medium		20mm - 50 mm??
14	S. Maquinna @ Rugged Mtn Rd. Noisy Main Valve	Low		300 mm DI & 200 mm PVC
15	Wolverton Bldg @ Rugged Mtn Rd. Service line	Low	Completed	200 mm ST & 50 mm
16	Wolverton Bldg @ Rugged Mtn Rd. Noisy Main Valve	Low	Completed	200 mm ST
17	Museum/Info Bldg Service Line	Low	Completed	200 mm ST & 20 - 63.5 mm ?
18	Rugged Mtn Rd. Bet. A & B rd Noisy Main Valve	Low	Completed	200 mm ST 100 mm DI
19	Rugged Mtn Rd. Bet. B & C rd Noisy Main Valve	Low	Completed	100 mm DI
20	Freda Rd Hydrant H-275	Low		150 mm PVC
21	18 Freda Rd Curb Stop Leaking	Low		20 mm (Cu?)
22	Tipperary Park Main or service line	Low		150 PVC & 20mm Cu?

Water Consumption

The Village has been recording water consumption for a number of years. The Village drinking water was drawn from McKelvie Creek but in 2016, the water supply was switched over to a community well located near the Public Works building in the north area of the Village. The Village retains its water licence for McKelvie Creek and maintains its surface water infrastructure. McKelvie Creek serves as the Village's backup source of drinking water. A Wellhead Protection Plan was completed in 2019.

Figure Two shows the total Village water consumption on a monthly basis, starting in July of 2016 when the community well was brought into service.

Figure Two – Chart of Water Consumption 2016-2019



The above figure shows a significant reduction in water consumption over the past 3 years. On an annual basis, the Village's total, and per capita water consumption was, as follows, for the past three years, based on an average population of 700 over the year (population varies from around 250 in the winter to around 900 in the summer):

Figure Three – Consumption Summary by Year

Year	Average Monthly Consumption (cu m/day)	Reduction from previous year (%)	Assumed Average Population	Average Daily Consumption per Capita (lpcd)
2017	1,280	n/a	700	1,800
2018	1,028	20%	700	1,460
2019	990	4%	700	1,400

The 20% drop in consumption from 2017 to 2018 is significant, likely a direct result of the initial repairs undertaken as detailed in Figure One. The reduction in 2019 (4%) is not as significant, but should be noted that the watermain replacements undertaken in 2019 did not come online until later in 2019, so we would expect to see another significant improvement in 2020 based on a full year of data for comparison.

The latter two months of 2019 indicate an average consumption of around 700 cu meters/day, which translates to around 1,000 liters/capita/day at 700 'average' population.

The water consumption data clearly indicates the value of undertaking the most critical component of water conservation in Tahsis, namely leak detection and repair.

Water Metering

As part of the Village's Water Conservation strategy, approximately 14 water meters were installed to assess generally the amount of water consumption. Two of the meters were installed at the Recreation Center, and the remainder were installed in residential and commercial locations in the Village. The Village has meter data starting from July of 2019, and is summarized as follows:

Figure Four - Water Meter Consumption, 2019 (partial)

Residential Meter Location	Jul	Aug*	Sept*	Oct	Nov	Dec	Average	Ave per Cap Consumption at 2.2 pph
Property 1	1,662.0	1,239.0	1,239.0	25.0	31.0	31.0	704.5	1,754.7
Property 2	4.0	4.5	4.5	3.0	4.0	4.0	4.0	10.0
Property 3	7.0	4.5	4.5	4.0	4.0	0.0	4.0	10.0
Property 4	11.0	9.0	9.0	34.0	1.0	2.0	11.0	27.4
Property 5	5.0	22.5	22.5	0.0	0.0	0.0	8.3	20.8
Property 6	9.0	19.5	19.5	7.0	1.0	0.0	9.3	23.2
Property 7	33.0	21.5	21.5	15.0	13.0	34.0	23.0	57.3
Property 8	22.0	22.0	22.0	18.0	25.0	32.0	23.5	58.5
Property 9	23.0	19.5	19.5	8.0	11.0	0.0	13.5	33.6
Property 10	10.0	7.5	7.5	4.0	3.0	7.0	6.5	16.2
Property 11	10.0	6.5	6.5	7.0	9.0	13.0	8.7	21.6
Property 12	41.0	25.5	25.5	18.0	18.0	37.0	27.5	68.5
Average per mo. (cu m)	153.1	116.8	116.8	11.9	10.0	13.3	70.3	175.1
Ave Per Cap at 2.2 pph	160.3	122.3	126.4	12.5	10.8	14.0	73.6	
Recreation Center	384.0	315.5	315.5	313.0	752.0	178.0	376.3	937.3

* Aug and Sept are averaged

Figure Four reinforces the Village’s conclusion that most of the water consumption appears to be related to system leakage. However, there are a number of commercial properties that may have larger rates of consumption that have not been captured in the metering initiative. Consideration should be given to metering all non-residential properties for this reason.

Next Steps

It is recommended that in the short term (3-5 years), the Village continue to concentrate its efforts primarily around leak detection and repair, with a focus on those areas that are known to be leaking, namely the remaining areas already identified in the 2016 Leak Detection Study , as well as additional areas that are known to public works staff from present day observations.

In addition, the Village should repeat the Leak detection survey now that a significant number of initial leaks have been repaired, particularly in those areas known to be suffering from settlement issues, followed by a program of main and service repair. Leaks onto private properties should also be identified where possible, and property owners notified of the need for repair. In cases where property owners are not undertaking the necessary repairs, the Village should consider installing a meter to the property.

It is recommended that the Village allocate \$30,000 per year from the water utility budget, starting in 2020 to provide for a leak detection and repair program, and amend this budget as required based on the progress of the program over the next 3-5 years, subject to Council approval.

It is also recommended that \$5,000 be allocated per year from the water utility budget to fund incremental new water meter installations, and this program initially be targeted to any commercial zoned properties that are not currently metered, with a view to having all commercial zoned properties on water meters and billed on a consumption basis over the next 3-5 years, subject to Council approval.

As a good initial target for future water consumption, it is recommended that the Village target an average annual per capita water consumption of 600 liters/capita/day, to be reached in the next 5-year period. This target will likely require continued upgrading of existing water distribution system as it appears that most of the Village's consumption is through system leakage, not customer usage.

The Village should continue its water conservation program as described, and be prepared to modify the program as new information becomes available.