



REGIONAL DISTRICT OF BULKLEY-NECHAKO
SUPPLEMENTARY AGENDA
Thursday, March 21, 2019

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Regional District of Bulkley-Nechako Board Agenda March 21, 2019 Supplemental

To: Chair Thiessen and Board of Directors
From: John Illes, Chief Financial Officer
Date: March 20, 2019
Re: Request for Feedback on Revised Broadband Outline

Attached to this memo is the updated draft table of contents for the Regional District's next step in its broadband strategy after incorporating director feedback received from the committee meeting on March 7, 2019.

TANEx Engineering Corporation requests that Directors review the updates and provide additional feedback before the research and development into the project begins. This will aid the directors to obtain a product that is useful for the continued connectivity work of the RDBN.

TANEx would also ask that the Directors provide additional feedback on connectivity issues within their municipality or electoral area. They are asking if the Directors know of areas where broadband coverage needs to be improved. This is especially important where those areas that need improvement are currently identified by the federal and/or provincial governments as having sufficient service.

The financial department will roll up all feedback from both staff and Directors on Tuesday March 27th to provide additional direction to TANEx.

I would be pleased to answer any questions.

Recommendation:	(All/Directors/Majority)
"That the Committee receive the Chief Financial Officer's memo dated March 20, 2019 titled 'Request for Feedback Broadband Study' and	
Direction	



TANEX Engineering Corporation
PO Box 1016, Invermere, BC, V0A 1K0
Phone: (250)341-6118 Ext 201
Email: sales@tanexengineering.com

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2 Background

This section provides background material so that parties that may review this report can understand the decisions and process that have been completed to date.

2.1 Background

Provides an overview and summary of the work performed to date to provide an understanding of how we got to the current state.

2.2 Intended Audience

Provides a target audience for the report.

2.3 Purpose of Document

Provides an understanding of what this report is intended to accomplish and the intended output of the document.

2.4 Methodology Review

Provides a review of the proposed methodology in the proposal and description of Part 1 to Part 2. The goal is to get RDBN information to allow them to make decisions about what they should budget and build.

2.5 Project Stakeholders

Provides an understanding of who in the RDBN is a stakeholder in the project.

2.6 Current State of Broadband

Provides a detailed background on the current state of broadband coverage in the RDBN. This section will provide a summarized state of coverage from information provided by representatives from each area of the RDBN. The intent is to solicit feedback from the RDBN in regards to areas of concern that must be addressed as part of this initiative. **This requires input from the RDBN stakeholders.**

2.7 Definitions and Acronyms

3 Service Delivery Concept – Technical

This section is intended to provide an overview of how a fibre network is constructed and the components involved. It is intended to provide a base understanding of the technical components so that the RDBN can be educated in the terminology, construction, operational and business decisions that it will be required to make.

3.1 Service Delivery Alternatives

Each of the service delivery alternatives will be described on a general level from the simplest solution requiring heavy involvement of third party partners (ie. service providers) through to an independent service where RDBN provides service with no dependency on third parties. It is important to understand each model so the RDBN can manage the business risks with third parties outside of their control. The pros, cons and general considerations will be discussed with each option.

3.1.1 Dark Fibre Solutions

Provides an understanding of the various dark fibre options and considerations for:

- Backbone only
- Backbone with POP Infrastructure
- Backbone and Fibre to the Premises (Last Mile)
- Backbone and Fibre to the Premises (Last Mile) with POP Infrastructure

3.1.2 Managed Services

Provides an understanding of the various managed service options that the RDBN may deploy and considerations for:

- Backbone only
- Backbone with POP Infrastructure
- Backbone and Fibre to the Premises (Last Mile)
- Backbone and Fibre to the Premises (Last Mile) with POP Infrastructure

3.1.3 Alternatives to Fibre

Provides an understanding of the alternatives to a fibre backbone and last mile fibre connectivity.

3.1.4 External RDBN Connectivity

Provides an understanding of the requirements for the RDBN to provide full connectivity for the network.

3.1.5 Cost Considerations

Provides an understanding of the relative costs considerations for each of the solution concepts outlined in this section.

4 Service Delivery for RDBN

This section is intended to provide an overview of how the service delivery concepts described earlier relate to the specific needs of the RDBN and how they would be applied in that environment. The intent is to illustrate the various decisions that the RDBN will need to consider for its specific situation.



4.1 Service Delivery Alternatives

Each of the service delivery alternatives outlined will be applied to the specific geography of the RDBN so that the decisions required can be understood.

4.1.1 Dark Fibre Solutions

Provides an understanding of dark fibre options & considerations for the RDBN specifically.

4.1.2 Managed Services

Provides an understanding of managed service options & considerations for the RDBN specifically.

4.1.1 Alternatives to Fibre

Provides an understanding of the alternatives to a fibre backbone and last mile fibre connectivity for the RDBN specifically.

4.1.2 External RDBN Connectivity

Provides an understanding of external connectivity options & considerations for the RDBN specifically.

5 Business and Operational Considerations

Provides a basic understanding of the business and operational considerations that the RDBN will be faced with as it proceeds with the implementation of the broadband strategy. The intent is to outline the main decisions that will need to be made in order to form the basis of the network requirements that will be used to complete the detailed design for the network.

Items to be consider may include, but are not limited to:

- Feasibility
- Certainty and Control
- Revenue Sharing Models
- Risks and Mitigation Strategies
- Funding Availability
- Partnerships & Availability
- Anchor Tenants
- Agreements
- Services and Pricing
- Management and Operations

6 Strategy & Methodology

The intent of this section is to provide an overview of the strategy and methodology for the completion of the broadband network and the order in which decisions and actions

must be completed. It can form the basis of a project plan with a projected order of completion and approximate timelines.

Items to be consider may include, but are not limited to:

- Order of Operations
- Decisions regarding scope
- Public engagement
- Considerations that drive the project
- Partnerships
- Grant Applications & Funding Opportunities
 - What are the potential funding sources?
 - What information is required to apply?
 - What are you required to do if you are awarded funds? (ie are you in a position to do it yet)
- Business Plan
- Assessment of Market and Existing Services
- Decision making and creating a plan
- Scope of Work
- Types of skills and contractors required and potential partners

7 Next Steps

Provide an understanding of the recommended next steps to be completed in the construction of the broadband network.



REGIONAL DISTRICT OF BULKLEY-NECHAKO

Memorandum

TO: Chair Thiessen and the Board of Directors
FROM: Debbie Evans, Agriculture Coordinator
DATE: March 18, 2019
SUBJECT: BC Haskap Association, Haskap 3.0 Workshop

Purpose

The purpose of this memorandum is to allow the RDBN Agriculture Coordinator to attend the Haskap 3.0 Workshop in Salmon Arm on Saturday, April 6th, 2019. The workshop is sponsored by the British Columbia Haskap Association and the BC Ministry of Agriculture, Buy BC program.

The Agriculture Coordinator fields many calls from potential haskap growers throughout the region and is working on building haskap knowledge base. The workshop offers information about flavonoids in this cool climate fruit, value-added processing and also features a researcher who is working on enhancing berry production in BC.

The cost of the workshop is \$50.00 and the funds would come out of the Agriculture budget under Meeting Expenses. Travel cost to and from Salmon Arm would be on own with personal vehicle and no hotel needed as would be at my home base

The flyer for the workshop is attached.

RECOMMENDATION:

(All/Directors/Majority)

“That the Regional District of Bulkley-Nechako Board of Directors approve the RDBN Agriculture Coordinator’s attendance fee of \$50.00 and allow travel to Salmon Arm for the Haskap 3.0 Workshop.”



SATURDAY, APRIL 6TH, 2019

9:00 AM - 3:30 PM

SALMAR CLASSIC THEATRE

360 Alexander St. NE, Salmon Arm, BC

SPONSORED BY



DR. VASANTHA RUPASINGHE

Professor and Chair, University of Dalhousie

Professor in Functional Foods and Nutraceuticals at Dalhousie University, NS. Research focused on unique flavonoids in cool climate fruits such as apples and berries; how these are a major biological component in our diets to reduce the risk of cardiovascular, neurodegenerative disorders and certain cancers. Also researching post-harvest biology, novel and improved value-added processing of cool climate fruits and medicinal plants.

DR. ERIC GERBRANDT

Professor, Researcher, Consultant

Owner of Sky Blue Horticulture, specializing in small fruit crops with extensive published papers on Haskap. Studied Biology and Agriculture with a PhD in Plant Sciences. Serves on the BC Blueberry Council, Raspberry Industry Development Council and BC Strawberry Growers Association as their Research Director, working to build cross-commodity, cross-disciplinary research to enhance berry production in BC. Instructs Agri-Business at U of Fraser Valley, BC

RSVP & Payment to:

bchaskapassociation@gmail.com

eTransfer/Paypal/Cash only at door

BCHA MEMBERS - \$25.00 (per membership)

NON-MEMBERS - \$50.00

**Lunch included for RSVPs. Refreshments available at the concession.*

Parking lot behind the movie theatre building



REGIONAL DISTRICT OF BULKLEY-NECHAKO

SUPPLEMENTARY MEMORANDUM

TO: Chair Thiessen and Board of Directors

**FROM: Cheryl Anderson
Manager of Administrative Services**

DATE: March 18, 2019

**SUBJECT: Fort Fraser Local Community Commission – Request for Grant
in Aid – Electoral Area “D” (Fraser Lake Rural)**

In November, 2016 the Regional District of Bulkley-Nechako Board of Directors passed the following motion:

“That the Fort Fraser Local Community Commission be given \$10,000 grant in aid monies from Electoral Area “D” (Fraser Lake Rural) to assist with the Fort Fraser Infrastructure Improvement Project.”

The intent was to use the money for the Water and Wastewater Infrastructure Project, however it was not utilized due to the completion date of the project being extended.

Due to the amount of time that has lapsed since the motion was passed, and the decrease in the amount required, a new resolution of the RDBN Board is being requested.

Director Parker has indicated that he is supportive.

RECOMMENDATION: (All/Directors/Majority)

“That the Fort Fraser Local Community Commission be given \$2,500 grant in aid monies from Electoral Area “D” (Fraser Lake Rural) for the Fort Fraser Water Infrastructure Project.”



Regional District of Bulkley-Nechako Board Agenda March 21, 2019 Supplemental

To: Chair Thiessen and Board of Directors
From: John Illes, Chief Financial Officer
Date: March 20, 2019
Re: Northern Capital and Planning Grants

Attached to this memo is the "Order in Council" outlining the regulated terms and conditions for the ***Northern Capital and Planning Grants***.

Section 33 (2) states that the grant amounts are fixed. This means that the grant amounts are not variable in nature and do not in an official capacity vary from year to year on the basis of such things as population or economic factors. The Minister may consider these items in her decision but will ultimately decide upon a "fixed amount".

Section 34 (a) outlines the terms of the grant for the Regional District. The most important factor is that the fund must be allocated to the Regional District's "established" services by the end of the calendar year. There is the possibility to establish new services but many of these new services will require consent of the electorate. It is important to note that this grant is for Regional District infrastructure as provided for in a Regional District's service establishment bylaw.

Reference to section 4 (1) (c) of the ***Local Government Grants Act*** suggest that infrastructure refers to large projects such as water, sewer, municipal roads and other similar projects described as other infrastructure" such as solid waste management infrastructure.

Section 4 of the Act is copied below:

Conditional grants

4 (1) Without limiting section 1, conditional grants may be made to municipalities, regional districts and prescribed related organizations for the following purposes:

(a) reviewing, studying, planning or implementing matters relating to local government planning or growth management;

(b) reviewing, studying, planning, organizing or implementing the establishment or other reorganization of local government, including any change in the functions, structures, boundaries or classifications of one or more municipalities and regional districts;

(c) reviewing, studying, planning, or constructing water supply and distribution facilities, sewage collection and disposal facilities, major municipal highways or other infrastructure;



(d) to share the cost of any underground installation of power, telephone or other overhead transmission lines in municipal areas, agreed to among a municipality, a public utility, including the British Columbia Hydro and Power Authority, and the government.

(2) Subject to approval by Treasury Board, money may be paid out of the consolidated revenue fund to satisfy conditional grant liabilities incurred under this Act.

Staff are still studying this **order** and waiting for guidance from the Ministry of Municipal Affairs and Housing. A memo will be brought back outlining options and recommendations in April.

I would be pleased to answer any questions.

Recommendation:

(All/Directors/Majority)

"That the Committee receive the Chief Financial Officer's memo dated March 20, 2019 titled '**Northern Capital and Planning Grants**'"

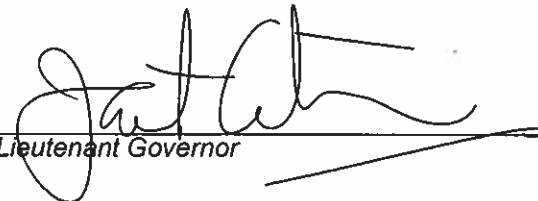
13
PROVINCE OF BRITISH COLUMBIA

ORDER OF THE LIEUTENANT GOVERNOR IN COUNCIL

Order in Council No. 117

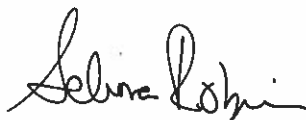
, Approved and Ordered

March 11, 2019


Lieutenant Governor

Executive Council Chambers, Victoria

On the recommendation of the undersigned, the Lieutenant Governor, by and with the advice and consent of the Executive Council, orders that the Local Government Grants Regulations, B.C. Reg. 221/95, are amended as set out in the attached Schedule.



Minister of Municipal Affairs and Housing



Presiding Member of the Executive Council

(This part is for administrative purposes only and is not part of the Order.)

Authority under which Order is made:

Act and section: *Local Government Grants Act, R.S.B.C. 1996, c. 275, s. 7*

Other: *OIC 574/95*

R10301027

SCHEDULE

- 1 The Local Government Grants Regulations, B.C. Reg. 221/95, are amended by adding the following Part:*

PART 5 – NORTHERN CAPITAL AND PLANNING GRANTS

Eligibility

- 32** The following regional districts, and any municipality within those regional districts, are eligible for a conditional grant under this Part in relation to the matters referred to in section 4 (1) (a) and (c) of the Act:
- (a) the Regional District of North Coast;
 - (b) the Regional District of Kitimat-Stikine;
 - (c) the Regional District of Bulkley-Nechako;
 - (d) the Regional District of Fraser-Fort George.

Amount of grants

- 33** (1) The payment of any grant under this Part is subject to an appropriation.
- (2) A grant may be made by the minister for the purposes referred to in section 32 and the amount of a grant is in the discretion of the minister and may be made on the basis of a fixed amount.

Conditions of grants

- 34** In addition to any terms and conditions established by the minister, a grant under this Part may be made on one or more of the following conditions:
- (a) for a grant to a regional district, that the regional district,
 - (i) before the end of the calendar year in which the grant is received,
 - (A) fully allocates the grant funds to one or more regional district services, and
 - (B) places the allocated funds in a reserve fund associated with the service, and
 - (ii) provides a report, in accordance with the direction of the minister, respecting the allocation;
 - (b) for a grant to a municipality, that the municipality,
 - (i) before the end of the calendar year in which the grant is received, places the grant funds in a dedicated reserve fund, and
 - (ii) provides annual reports, in accordance with the direction of the minister, respecting the use of the funds and the balance of the reserve fund until the balance is nil;
 - (c) for a grant to a regional district or municipality, that the regional district or municipality provides to the minister additional information and reports respecting the use of the grant as requested by the minister.

Regional District of Bulkley-Nechako
Federal Gas Tax Funds
Projects Approved in 2018

Electoral Area "A"

- Smithers Curling Club (WCB Compliance Upgrade)	35,000.00	
- RDBN - Recycle Depots (Phase 1 set up)	30,000.00	
- RDBN - Recycle Depots (Phase 2 setup)	108,000.00	
- BV Pool (dehumidifier)	29,679.00	
- BV Pool (VFD's)	16,825.60	
- Smithers Curling Club (WCB Compliance Upgrade) Ph 2	<u>31,235.00</u>	
		250,739.60

Electoral Area "B"

- Tweedsmuir Park Rod & Gun (Floor & Sub Floor Replacemer	10,000.00	
- Lakes District Food Bank	17,770.68	
- Rose Lake Hall (Kitchen Reno)	5,000.00	
- Omineca Ski Club (Ski Trail Lighting Upgrades)	80,000.00	
- LD Film Appreciation Society (Beacon Theatre Upgrades)	50,000.00	
- BL Mountain Biking Association (Bike Trail Extensions)	<u>60,000.00</u>	
		222,770.68

Electoral Area "C"

- FSJ Curling Club (Compressor)	<u>9,752.40</u>	
		9,752.40

Electoral Area "D"

- RDBN - Fort Fraser Water (Backup Generator)	71,500.00	
- Village of Fraser Lake (Arena)	<u>46,710.34</u>	
		118,210.34

Electoral Area "E"

- LD Fair Association (Well Drilling)	25,000.00	
- Omineca Ski Club (Ski Trail Lighting Upgrades)	40,000.00	
- LD Film Appreciation Society (Beacon Theatre Upgrades)	<u>50,000.00</u>	
		115,000.00

Electoral Area "F"

- RDBN - Recycle Depots (Phase 1 set up)	30,000.00	
- District of Vanderhoof (Soccer Fields)	100,000.00	
- District of Vanderhoof (Skatepark)	100,000.00	
- RDBN - Recycle Depots (Phase 2 setup)	<u>108,000.00</u>	
		338,000.00

Electoral Area "G"

- Topley Fire Hall (doors & windows) Phase 4	<u>9,480.00</u>	
		9,480.00

Total Gas Tax Funds Committed in 2018 1,063,953.02



REGIONAL DISTRICT OF BULKLEY-NECHAKO
MEMORANDUM
SUPPLEMENTARY

To: Chairperson Thiessen and Board of Directors (March 21, 2019)

From: Janette Derksen
Deputy Director of Environmental Services

Date: March 20, 2019

Subject: Fort Fraser Local Commission Recommendation to Endorse the Fort Fraser Water Conservation Plan

On March 18, 2019, the Fort Fraser Local Commission approved the Fort Fraser Water Conservation Plan as presented. Plan is attached for Boards review. This Plan was prepared as part of the Clean Water Wastewater Fund as a condition to the contract for the funds that the RDBN received to replace the community's water distribution system. The Commission is recommending that the Board of Directors approve the recommendation as follows:

"That the Regional District of Bulkley-Nechako Board of Directors approve the Water Conservation Plan for the Fort Fraser Local Community Commission and that it be submitted to the province."

RECOMMENDATION

(All/Directors/Majority)

1. That the Board of Directors receive the memorandum titled, "Fort Fraser Local Commission Recommendation to Endorse the Fort Fraser Water Conservation Plan" and dated March 20, 2019.
2. That the Regional District of Bulkley-Nechako Board of Directors approve the Water Conservation Plan for the Fort Fraser Local Community Commission and that it be submitted to the province.

Water Conservation Plan

RDBN – Fort Fraser



December 2018

Project No. 1266-031

ENGINEERING ■ PLANNING ■ URBAN DESIGN

Distribution List

<i># of Hard Copies</i>	<i>PDF Required</i>	<i>Association / Company Name</i>

Revision Log

<i>Revision #</i>	<i>Revised by</i>	<i>Date</i>	<i>Issue / Revision Description</i>

TRUE Signatures

Report Prepared By:

Report Reviewed By:

*Lee Farrington, P. Eng
Project Engineer*

*Scott Wallace, P. Eng.
Project Engineer*

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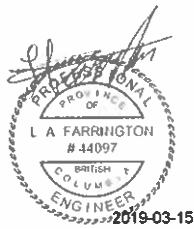
Revision Log

Revision #	Revised by	Date	Issue / Revision Description
1	SW	March 15, 2019	Final Report, Issued for RDBN Approval

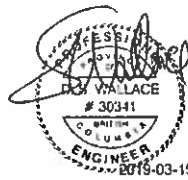
TRUE Signatures

Report Prepared By:

Report Reviewed By:



Lee Farrington, P. Eng.
Project Engineer



Scott Wallace, P. Eng.
Project Manager

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List of Acronyms

TRUE	TRUE Consulting
RDBN	Regional District of Bulkley-Nechako
USEPA	United States Environmental Protection Agency
MOE	Ministry of Environment

Units of Measure

ft	feet
hp	horsepower
lgpm	Imperial gallons per minute
km	kilometre
L/d	Litres per day
L/m	Litres per minute
L/s	Litres per second
l/p/d	Litres per person per day
m	meter
mg/L	milligrams per Litre
mm	millimetre
psi	pounds per square inch
USgpm	US gallons per minute

Referenced Reports

- 1 "BC's Water Conservation Guide", Dec 2013, BC Ministry of Community, Sport and Cultural Development
- 2 "Fort Fraser Water Conservation Plan", March 2009, Regional District of Bulkley-Nechako
- 3 "Living Water Smart", 2008, BC Ministry of Environment
- 4 "Design Guidelines for Rural Residential Community Water Systems", 2012, BC Ministry of Forests, Lands & Natural Resource Operations
- 5 "Fort Fraser Infrastructure Improvement Project Upgrading Pre-Design Report", September 2017, TRUE Consulting
- 6 "Water Conservation Plan Guideline", August 1998, USEPA

1.0 Introduction

Drinking water is increasingly becoming one of the world's most precious resources. In British Columbia, we are fortunate enough to have a relative abundance of drinking water resources. However, many residents of this province take the availability of fresh water for granted and therefore are among the highest water users in the world. Water conservation initiatives benefit each and every community – regardless of size and fresh-water availability – and are vital to ensuring the long-term sustainability of British Columbia's fresh water resources. This Water Conservation Plan was prepared with consideration for BC's *Water Conservation Guide*¹.

TRUE Consulting (TRUE) developed this plan for the Regional District of Bulkley-Nechako (RDBN) to build upon their previous *Fort Fraser Water Conservation Plan*² which provided conservation goals from 2009-2019. This plan proposes to build upon the steps previously taken, and to provide direction for future stewardship of the community's water system. This plan will redefine Fort Fraser's water conservation goals and provide the framework necessary to achieve them.

As described in the BC *Water Conservation Guide*, water conservation plans are now a requirement for local governments who receive capital grants from the province for drinking water and wastewater infrastructure. Further, in 2008 the province created the BC *Living Water Smart Plan*³; this initiative sets out the following conservation goals:

- By 2020, overall water use in British Columbia will be 33% more efficient (compared to 2008)
- By 2020, 50% of new municipal water needs will be acquired through conservation

A water conservation plan can also serve as readily available information to the public to better inform Fort Fraser residents of the current state and operating costs of the water system, as well as the proposed water conservation initiatives. This will allow residents to understand the importance of water conservation and appreciate the potential benefits of actively pursuing a lower individual and community water demand. Decreasing water consumption will help to ensure that future generations continue to have access to clean, sustainably sourced drinking water.

2.0 Description of Water System

The community of Fort Fraser is located in the southeast portion of the RDBN, approximately 135km West of Prince George on the Yellowhead Highway (Highway 16). The RDBN owns and operates the community water system in Fort Fraser, with a service population of approximately 320 people. As with most communities, Fort Fraser is challenged with the ongoing and increasing operation and maintenance costs associated with aging infrastructure.

Fort Fraser currently draws its water from two groundwater wells located northeast of the town (2837 Spiller Road). Water is conveyed through a distribution system consisting of 6.4km of pipes. Fire protection and balancing storage is provided by a 300m³ water tower. The total yearly volume of water pumped from the groundwater wells between 2013 and 2017 varied between 44,500 and 50,500 cubic meters. As noted in the 2009 *Water Conservation Plan*:

- *Well 1-94 is approximately 152.4 meters deep and equipped with a 10hp pump. Based on the performance during step-drawdown and constant-rate pumping tests the theoretical continuous capacity of the well is 6 L/s.*
- *Well 2-04 is approximately 170.7 meters deep and is equipped with a 25hp pump. Based on the performance during step-drawdown and constant-rate pumping tests the theoretical continuous capacity of the well is 10.8 L/s.*

In accordance with best practices and BC *Design Guidelines for Rural Residential Community Water Systems*⁴, the system source reliability is typically factored by considering the capacity with the largest pump out of service. As such, Fort Fraser's reliable design capacity is 6 L/s (518m³/day).

In 2018 much of the ageing distribution system infrastructure (consisting primarily of asbestos cement watermains) was replaced including approximately 4km of new PVC watermain and over 100 new service connections. This major system upgrade should have a significant impact on water usage by reducing watermain leakage and breaks in the future.

3.0 Water System Profile

Paramount to developing a suitable water conservation plan for any community is clearly defining the current state of the system from a water consumption and system operational cost standpoint. In some cases, water conservation initiatives can be partially or fully funded by water system cost savings. An accurate understanding of the existing and future water demands is crucial to assessing the viability and practicality of water conservation options, the corresponding demand reductions and the social, economic and environmental benefits.

3.1 Water Consumption

3.1.1 Annual Water Consumption

Water consumption data for Fort Fraser from 2013 to 2017 has been compiled and assessed to determine the overall annual water consumption, average per capita water demand and maximum day demand. Fort Fraser's monthly water consumption values are shown in Figure 3.1 to establish water consumption trends over the given period.

FIGURE 3-1: FORT FRASER WATER CONSUMPTION

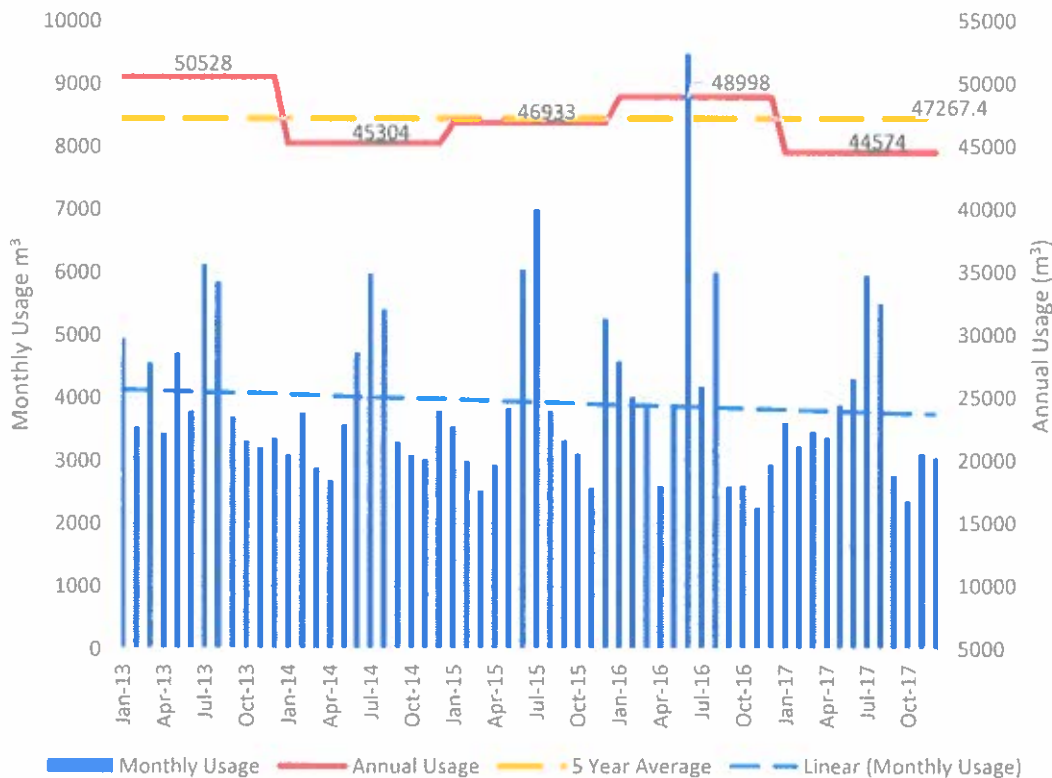
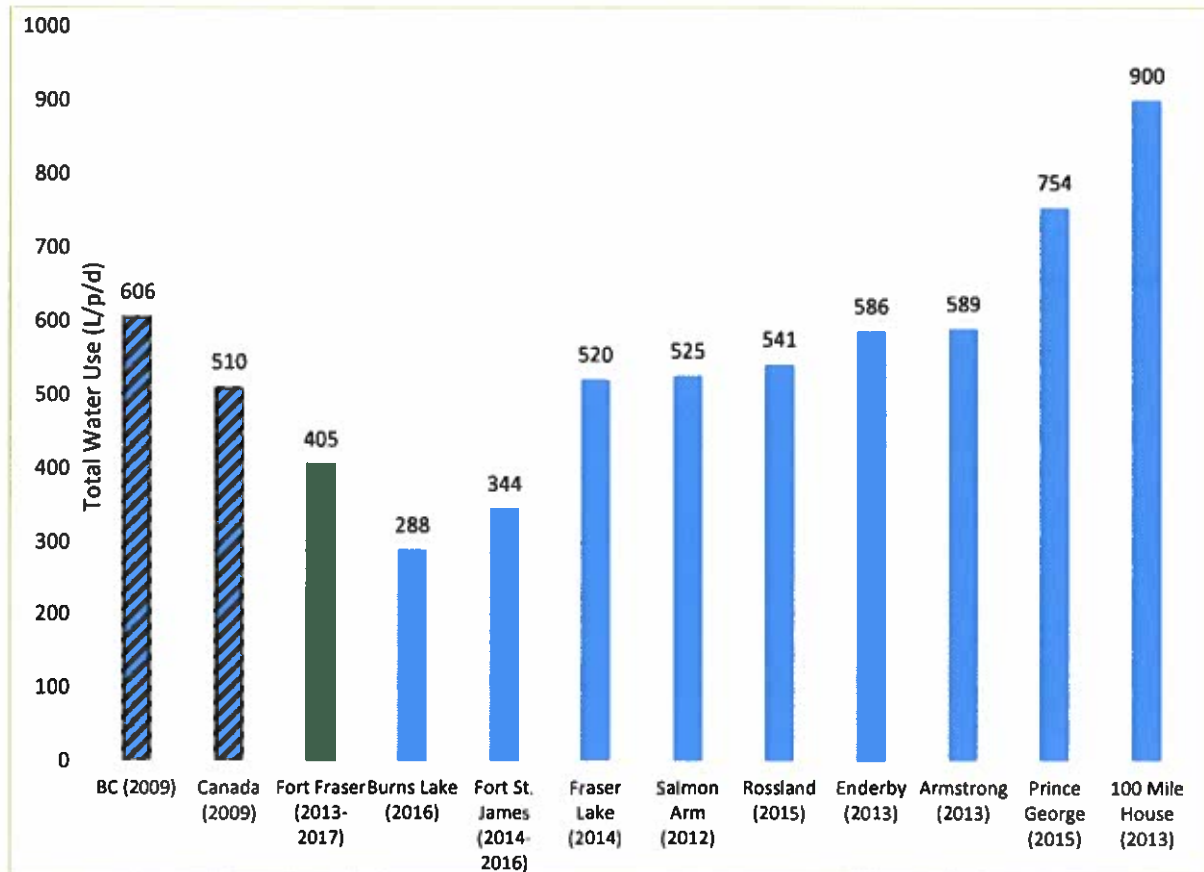


Figure 3.2 presents a comparison between the average water demands in Fort Fraser and other BC communities. Where possible, selected communities are located in a similar geographic area or similar climate to Fort Fraser. Several communities shown utilize watermeters within their community to some extent - including Salmon Arm, Rossland, Enderby, Armstrong, and Prince George. It is important to note that per capita consumption values are calculated on the basis of census data, and therefore include all non-residential water use.

FIGURE 3-2: AVERAGE WATER DEMAND COMPARISON



Based on the data presented in Figure 3.1 and 3.2, the following observations can be made:

- Water use in June 2016 appears to be an anomaly, with approximately 10 days in that month where water use was 3 to 6 times higher than the rest of the month. It is possible that watermain flushing operations occurred in June 2016. Water use in July and August 2016 is more representative of typical maximum water use in recent years.
- The population of Fort Fraser has remained relatively steady. The census results show that between 2011 and 2016 the population decreased by ~ 3% from 284 to 275 people. Note: the water service area includes some properties outside of the census boundary resulting in an estimated service population of 320 people in 2018.

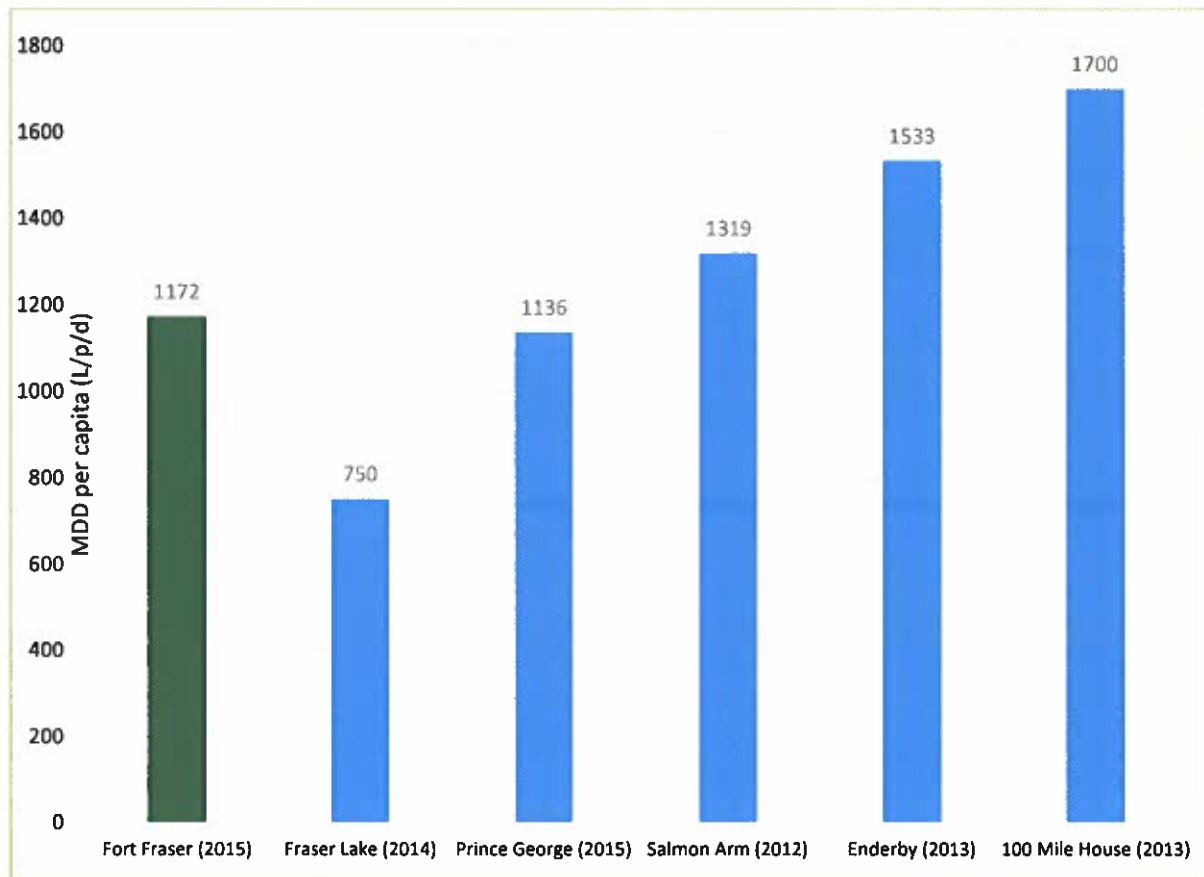
- Monthly water usage in Fort Fraser shows fluctuations due to seasonal demands with an overall downward trend from 2013 to 2017 (represented by the light blue dashed trendline on Figure 3.1).
- Annual water usage in Fort Fraser has varied, with the annual average of 47,267m³/year from 2013 to 2017 (represented by the light orange/yellow dashed line on Figure 3.1).
- During the 2013 to 2017 time period, Fort Fraser's average daily per capita water use is comparable to other 'northern' BC communities including Fraser Lake and Fort St. John, and 'southern' BC communities who utilize watermetering to some extent including Salmon Arm and Rossland.
- Fort Fraser's peak summer months (July and August) are only 50% higher than the annual average use. This helps to explain Fort Fraser's low per capita water usage which is 33% lower than the BC average.
- Water use fluctuations in winter months is likely indicative of residents running their taps to prevent service freezing. The winter water use in December, January and February is approximately 22% (or 22m³/day) higher than March, April, October and November (non-summer irrigation months). This additional water use is equivalent to approximately 4% of the annual total water use.

3.1.2 Maximum Day Water Demand

When designing a water system, the maximum day demand (MDD) is the most critical design element in terms of the system capacity adequacy. The combined capacities of all water sources must exceed the maximum day demand for the water system service area, otherwise water shortages will occur and some system users may experience disruptions to their water service.

The MDD typically occurs during summer months when weather conditions are hot and dry and irrigation use is at its peak. Fort Fraser water use is typically recorded every 2-3 days. Summer flows often approach 300,000 litres/day. The peak period recorded between July 30 and August 1 2015 included daily water use of 375,000 litres, or 1172 L/p/d. **Figure 3.3** shows a comparison of the maximum day demand in similar municipalities in BC, with consideration given to location, size and climate.

FIGURE 3-3: MAXIMUM DAY DEMAND COMPARISON



From Figure 3.3, the following observations can be made:

- When compared to other municipalities in BC, Fort Fraser has a below-average maximum day demand.
- The more northern communities of Fort Fraser, Fraser Lake and Prince George have lower MDD's than the southern communities, due to climate and resulting irrigation demands.

When completing observations and comparisons of water demand statistics, it is important to note several factors:

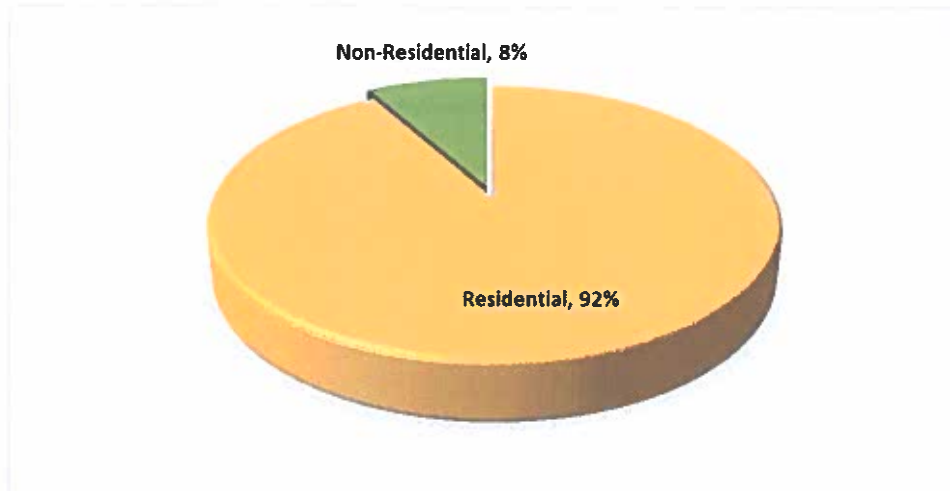
- The water demands recorded for the Fort Fraser include all non-residential water use (irrigation, industrial, commercial, etc.), as well as residential water use. This is the case for many other municipalities as well.

- One of the biggest contributors to maximum day (summer) water consumption is undoubtedly lawn and garden irrigation. The variations in climates within BC lead to vastly different irrigation requirements.
- Due to the fact that only residents are counted as water users, fluctuations in seasonal populations will also influence the water demand statistics for certain communities.

3.1.3 Water Consumption by Sector

Figure 3.4 below illustrates the composition of Fort Fraser's water demand by service type. As can be seen the majority of service connections are residential.

FIGURE 3-4: FORT FRASER WATER SERVICES 2018



3.2 Water and Sewer System Operating Costs

In 2015 and 2016, the total operation and maintenance costs for the Fort Fraser's water and sewer systems was approximately \$189,000. While the majority of the operations and maintenance budgets for both water and sewer are fixed costs (wages, benefits, insurance, maintenance, administrative costs, etc.) approximately \$13,000 of this figure represents costs that vary with the water system demand. These variable costs include power for operating the treatment systems and pumps, materials (chemical use) and some maintenance costs. Based on the total water demand for the Fort Fraser water system for these variable costs work out to approximately \$0.26 per cubic meter of water supplied.

For perspective, each 1% of indoor water use reduction (4.3 litres/day per capita) would equate to an annual cost savings of about \$125. If the sewer operating costs are not included, then each 1% of outdoor water use reduction would equate to an annual cost savings of about \$45. It is important to note, however, that these figures assume the continuation of the status quo for the

water system operation and does not account for any future changes or upgrades to the system or its components. **Figure 3.5** illustrates the water systems costs breakdown in 2015 and 2016.

FIGURE 3-5: FORT FRASER WATER & SEWER COST BREAKDOWN



3.3 Water Storage Costs

In the *Fort Fraser Infrastructure Improvement Project Upgrading Pre-Design Report*⁶ TRUE identified with the system's available Fire Flows and Storage Volume. Fire flows in Fort Fraser have been improved by new watermain installed in 2018. However, the current reservoir storage volume does not meet the Fire Underwriters Survey recommendation. The existing water storage capacity of the Fort Fraser water system is 300m³, and the total theoretical storage requirement of the Fort Fraser water system is 549m³. This equates to a total theoretical storage volume deficiency of approximately 250m³. Construction of an additional 250m³ of storage may cost in the order of \$350,000 or \$1400/m³.

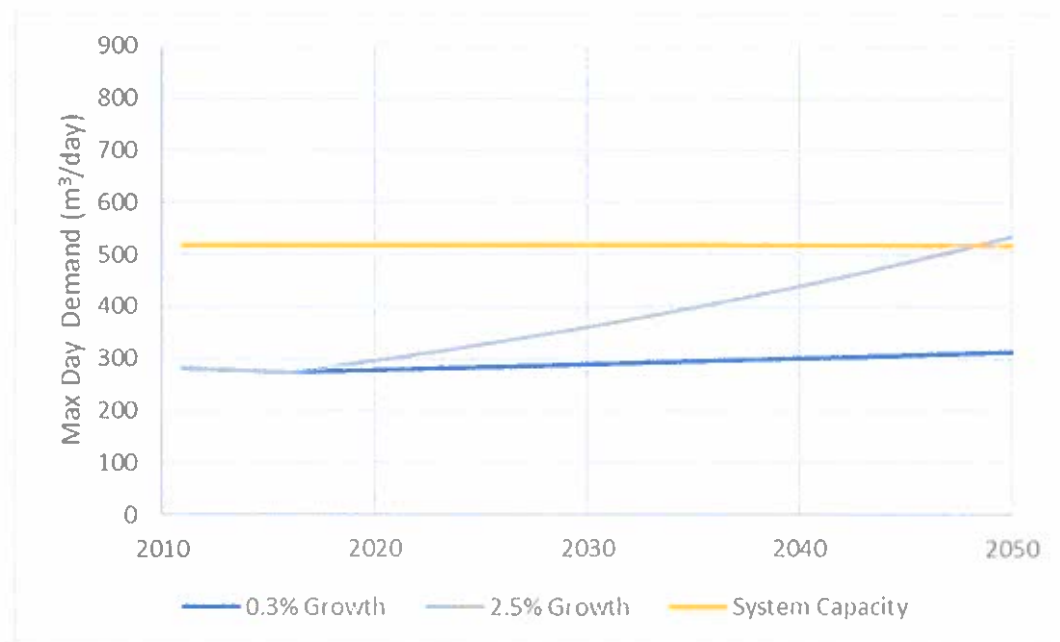
Required water storage for a community water system is comprised of balancing storage, fire storage, and emergency storage. Future water conservation efforts would result in a reduction of the balancing and emergency storage components of the required volume. This would translate into reservoir construction cost savings of around \$1380 for every 1% of annual water use reduction.

4.0 Future Water Supply Capacity Costs

A common benefit of a water conservation program is the deferral and possible elimination of capital improvements having the objective of increasing system capacity. The BC *Living Water Smart Plan* includes the objective of conservation initiatives providing 50% of new municipal water requirements by 2020.

Capital upgrades will be required once the maximum day demand (MDD) exceeds the well or pump production capacity. **Figure 4.1** below shows the estimated MDD's for various population growth scenarios.

FIGURE 4-1: FORT FRASER FUTURE WATER DEMAND SCENARIOS



The 2016 census shows the population of Fort Fraser declining by 3.2% since 2011. However, it is noted that there is common acceptance by Regional District residents that there was a census undercount throughout the region. It is believed that there has been a slight population increase throughout Electoral Area D, and that generally the population has been relatively stable. As a result, scenarios in Figure 4.1 are based on growth rates of 0.3% (BC Stats estimate for Northern BC) and 2.5% (RDBN growth rate from 2006-2011).

Recognizing the trend of decreasing water demands in Fort Fraser since 2011 and that the community growth rate is not anticipated to be above 2.5%, the current water supply infrastructure capacity should be adequate to beyond year 2045. Deferring supply capacity improvements does not, based on the demand projections presented herein, represent an anticipated benefit of water conservation efforts in Fort Fraser.

5.0 Water Conservation Goals

The Province's Water Conservation Guide describes a community consultation process to develop goals and objectives for the Water Conservation Plan. A conservation planning process should consider water savings necessary to ensure:

- streams stay healthy
- fish have adequate habitat
- aquifers are not depleted
- water is available for economic growth
- costs for water service remain affordable

Fort Fraser is in the enviable position that available water quantity is not constrained, and existing water use is relatively low. Assuming that the community operates and maintains its water infrastructure in accordance with accepted best practices, the amount of water used should not directly impact stream health or fish habitat and should not adversely affect local aquifers. As described in Section 3.0, the community's water supply infrastructure has adequate capacity for population horizons more than 45 years into the future therefore water conservation is not critical to providing capacity for population and economic growth.

The Province's *Living Water Smart Plan* describes water conservation goals from a province wide perspective of:

- By 2020, overall water use in British Columbia will be 33% more efficient (compared to 2008)
- By 2020, 50% of new municipal water needs will be acquired through conservation

As Fort Fraser's water consumption is already significantly lower than the provincial average it may not be practical to achieve these goals. However, the community has already taken steps towards reducing water consumption including the recent system-wide watermain upgrades which should help to reduce leakage. Given the current water use patterns in Fort Fraser, it may be reasonable for the community to strive for a 10% reduction in annual water usage over the next 10 years.

Once sufficient water consumption data is available, the water saving achieved by the 2018 watermain upgrades can be determined. Once the "new normal" is confirmed, then the amount of additional water savings needed to meet this 10% reduction goal can be calculated.

6.0 Water Conservation Measures

The BC *Water Conservation Guide* describes a process for identifying and assessing water conservation options. The assessment process includes consideration of:

- past experience; what worked and what didn't
- water savings and the reliability of anticipated savings
- cost effectiveness
- social and political acceptability

The *Water Conservation Guide* suggests that the assessment criteria list be kept short and the process kept as simple as possible. In this section, water conservation options are listed and a commentary provided on applicability to the community of Fort Fraser. The discussion of water conservation options concludes with a summary listed on basis of highest to lowest priority.

6.1 Present Water Conservation Initiatives

Although the community of Fort Fraser is in the enviable position of having an adequate water supply capacity to meet current and future demands, the community recognizes the importance of implementing water conservation measures. Current water conservation strategies are described below.

6.1.1 Residential Water Use Guidelines

Fort Fraser currently implements seasonal sprinkling guidelines limiting residential irrigation during the summer months to:

- The sprinkling of lawns is restricted to every other day.
- Odd numbered houses may water on odd days ONLY.
- Even numbered houses may water on even days ONLY.
- Lawns MUST NOT be watered between the hours of 10:00 am and 5:00 pm.
- Lawns MUST NOT be watered for more than two hours per occasion.
- Residents are also asked to limit the watering of hard surfaces (driveways, etc.), and to use an automatic shutoff nozzle when cleaning cars, trucks, RV's and boats.

These guidelines are distributed to the public via an annual flyer.

6.1.2 Water Loss Management & Leak Repair

As previously discussed prior to 2018 Fort Fraser's water distribution system was heavily deteriorated as the existing asbestos cement pipes were past their service life. Much of the distribution system was replaced in 2018 with PVC watermain. As a result, water savings should

be realised due to a reduction in leakage. The full extent of the resulting water use reduction should be assessed once sufficient data has been obtained in the coming years.

6.1.3 Building and Plumbing Bylaws

The 2015 National Plumbing Code of Canada, and 2018 BC Plumbing Code both require low flow and low flush volumes for faucets, shower heads, and toilets. RDBN's building permit process currently references the BC codes, and takes advantage of these water conservation opportunities.

6.2 Water Conservation Options

In order for Fort Fraser to continue reducing water demand, there are several water conservation initiatives that can be implemented in the future, subject to budget constraints. Implementing these measures could allow the community to save money in operating and maintenance costs, reduce greenhouse gas emissions by reducing energy consumption, and maintain a high level of water quality in the surrounding surface water and ground water that supplies the community. Additionally, implementing such measures will also ensure that the community is eligible for future water infrastructure grant funding for future improvements and upgrades to the system.

The BC *Water Conservation Guide* describes a wide range of water conservation options that warrant consideration by BC communities. It is recognized that all water conservation options will not be universally applicable. Sections below describe water conservation options with a discussion of applicability to Fort Fraser

6.2.1 Continued Public Education

Description

The BC *Water Conservation Guide* indicates that general information in the form of brochures, newsletters, and/or billing insertions tend to be less effective than community or area specific information. A public information and outreach program for is however, highly recommended. This type of program would explain:

- how each measure will promote water conservation
- what are the specific benefits of the measures
- what individuals need to do to participate
- why water conservation is important

Fort Fraser Context

Unless RDBN has ability to partner with surrounding communities, a public outreach program may not be cost effective. Regardless, as described in the *Water Conservation Guide*, communication

of the Water Conservation Plan to the public is essential. A communication plan should be prepared and is likely to include:

- postings on the Regional District's website under a "Water Conservation" heading
- printed material insertions in the user fee annual billings

The Regional District should consider the development of a water conservation related information page that would be included with annual billing. There is a wealth of water conservation related information compiled by other municipalities and agencies that could be used by the RDBN. As an example, the water conservation information pamphlet could include a discussion of rainfall capture using rain barrels. Rain barrels represent a simple conservation strategy that the public can install and gain a firsthand understanding of the benefits.

Water savings achieved by public engagement and communication are difficult to quantify. However, the USEPA *Water Conservation Plan Guideline*⁶ suggests that a 2 to 5 percent reduction in water usage could be expected. There is also significant benefit to increasing the "water conservation awareness" of the public.

As mentioned previously, the higher than normal winter demands in Fort Fraser is likely explained by residents leaving a tap running to prevent their service from freezing. Encouraging residents to reduce the flow of this continually running tap could significantly reduce the community's usage during the winter months. Further investigations such as monitoring night time flows could be carried out to review this issue. Depth of water services would also need to be considered; with time, shallow services should be reconstructed at depth to provide adequate frost protection. Further, those living in mobile homes would be encouraged to install adequate continuous skirting around the base of the structure, and electrical heat tape and insulation for exposed water pipes.

- Cost Estimate: < \$3,000/year
- Estimated Savings: \$250/year (2% water use reduction)
- Potential 'Payback' Period: 12 years

6.2.2 Residential Water Use Bylaw

Description

One of the most commonly used legal measures is *mandatory watering restrictions*, which limit the number of days and/or specify the timing of outdoor water use. These restrictions help to reduce peak day demand and prevent your system from reaching capacity on hot, dry summer days. This strategy must be designed to include public education and enforcement of fines for violations. Many BC communities have watering restrictions in force from May through September, with watering days alternating between buildings with even and odd numbered addresses. Fines can vary depending on how scarce water is in a particular region. For example, in Penticton violators face fines from \$25 to \$400, whereas in Calgary fines run up to \$1,000.

Fort Fraser Context

As discussed in section 6.1.1 Fort Fraser currently utilizes watering guidelines for the summer months. While there is currently limited data on the participation rate, introducing fines and enforcement should help to improve their effectiveness. Depending on bylaw enforcement options/availability, fines could be set to cover the cost of the bylaw enforcement making this a cost neutral initiative.

6.2.3 Community Development Bylaws

Description

Community bylaws that promote water saving technologies or conservation are another common measure to reduce community water demands. To make these easier to enforce, they should be tied to a permit approval process. For example, water offset conditions can be added to building permits, requiring developers to prove any additional water demands for new developments will be offset by conservation improvements in existing homes or businesses. A community can also create landscaping bylaws that promote drought-tolerant landscaping or maintain a certain depth of top soil – both of which reduce the need for outdoor water use. For example, the City of Kelowna requires applicants to develop mandatory landscaping standards that show a reduction in water use for permit approval. Changing the rules can help to literally build a water saving community.

Fort Fraser Context

The volume of future development planned for the Fort Fraser community is not known, but is expected to be low. The benefits of any conservation efforts targeted at future development is therefore also expected to be low. It may be more appropriate to include development related information in the public education program (per section 6.2.1) for homeowners making alterations and improvements to their property.

6.2.4 Plumbing Fixture Replacement Program

Description

Today, there are many water saving technologies available, such as low-flow toilets, shower heads, sprinklers and appliances that use less water without impacting peoples' standard of living. A community can increase the uptake of these technologies through rebate or give away programs. In a rebate program, consumers are given money towards the purchase and/or installation of water saving technologies. In some cases, if the savings benefits are great enough, a community may choose to run a give away program – one in which free water saving technologies are distributed to reduce water demand. Providing installation services (professional or volunteer depending on the technology) are important to ensuring hardware is put to use.

Rebate or give away programs can also be targeted to particular water users, such as irrigators, commercial users or residents.

Fort Fraser Context

As previously discussed, a high proportion of Fort Fraser's water usage is indoor use. Upgrading fixtures is an excellent way to target this type of usage. Providing a rebate will encourage participation which will produce results without ongoing enforcement. In previous studies completed by TRUE of various plumbing fixture replacement options, toilet replacement offered the best return on investment as they make up a large portion of indoor water usage. Literature suggest that conversion from 13L flush toilets to 6L or less toilets represents water savings of about 40L per capita per day. Relative costs and savings are as follows for a toilet rebate program in Fort Fraser of \$100 per toilet, with approximately 2 toilets per household:

- Cost Estimate: \$32,000 capital cost
- Estimated Savings: \$1,200/year (9.5% water use reduction)
- Potential 'Payback' Period: 27 years

6.2.5 Major User Audits

Description

Water utilities can work with major water users to understand their water usage habits and opportunities for reducing their usage. Watermeters would be installed on the anticipated major users, the Regional District would then contact the customers and offer assistance to undertake a comprehensive water audit with the objective of identifying potential water conservation opportunities. This type of program can be quite manageable for communities depending on the number of anticipated audits. Typical major user audit programs can achieve reductions in average day water demands of 3-5%.

Fort Fraser Context

Non-residential services can often be significant water users, and it is common for communities to meter non-residential services. Fort Fraser currently has a relatively low number of non-residential services. These 12 non-residential services could be metered for a much lower capital expenditure than universal water metering. If irregularities are found in a customer's water usage the Regional District could then offer targeted assistance to lower this usage.

- Cost Estimate: \$40,000 capital cost
- Estimated Savings: \$250/year (2% reduction)
- Potential 'Payback' Period: 160 years

6.2.6 Universal Water Metering

Description

The experience in British Columbia is that a universal water metering program can result in significant water use reduction both on an annual average and maximum day demand basis. A water metering program must however be combined with an appropriate volume based rate structure to take full advantage of the opportunities available through a metering program. Some examples:

- Per capita water usage in the City of Vernon during the period 1993 to 1998 (after metering) was 19 percent lower than the period 1985 to 1991 (before metering).
- Since the introduction of universal metering and volume based rates between 1996 and 1998, residential average day water usage in the City of Kelowna has reduced by more than 20 percent compared to consumption prior to metering.

Fort Fraser Context

Given Fort Fraser's climate and existing water use patterns, it is unlikely that watermetering (with rate structure) would result in the same level of water use reduction as has been achieved in Okanagan communities. In addition, there is a substantial capital investment required to introduce a universal metering ranging from \$1000-1500 per meter. There is also an ongoing cost to collect and process the data.

- Cost Estimate: \$250,000 capital cost
- Estimated Savings: \$1250/year (assuming 10% reduction in water use)
- Potential 'Payback' Period: 200 years

7.0 Summary and Recommendations

The population of Fort Fraser been relatively stable from 2011 to 2016 with a slight decrease of 3%. Water usage has decreased more than the population between 2013 and 2017. Fort Fraser's per capita water consumption continues to be substantially less than the national and provincial averages.






Fort Fraser's water supply has capacity for nearly double the existing maximum day demand. This puts Fort Fraser in the unique position of having no foreseeable water demand issues. Nevertheless, there are many benefits to be gained by implementing a water conservation plan. Reducing water use will:

- Extend the service life of existing water and wastewater infrastructure.
- Delay the capital costs of replacing or upgrading system components.
- Reduce annual operating costs.
- Reduce greenhouse gas emissions by reducing overall energy use.
- Preserve existing groundwater resources.

Furthermore, as noted in the *BC Water Conservation Guide*, a water conservation plan is a requirement for any community to receive grants for drinking water and wastewater infrastructure.

Given the factors described throughout this document, it is recommended that the RDBN set a water conservation goal of 10% reduction in annual water use for the community of Fort Fraser. Strategies are listed in Table 7.1 in descending order of priority, based on cost and expected efficiency.

TABLE 7-1: FORT FRASER WATER CONSERVATION STRATEGIES

Strategy	Priority Rating	Estimated Cost	Technology or Behavior Focus	Implementation Schedule
▪ Public Education and Outreach		\$3,000/year	Behavior	2020 through 2029
▪ Residential Water Use Bylaw		Modest	Behavior	2020-2021
▪ Plumbing Fixture Rebates		\$32,000 capital	Technology	2022-2023
▪ Major User Audits (c/w watermeters)		\$40,000 capital	Technology & Behavior	2024-2025
▪ Development Bylaws		Modest	Technology	Dependent on community growth or re-development
▪ Universal Water Metering	Not recommended	\$200,000 capital	Technology & Behavior	n/a