TAHSIS

COMMUNITY BROADBAND PLAN

Strathcona
REGIONAL DISTRICT

ABOUT TAHSIS

Located on the stunning West Coast of Vancouver Island, Tahsis sits at the head of the Tahsis Inlet, a fjord-like finger of water running 24 kms to the open Pacific Ocean. Tahsis is surrounded by breathtakingly beautiful wilderness and abundant wildlife offering a variety of nature activities such as sport fishing, hiking, caving, wildlife viewing, diving and all manner of water sports.

Tahsis village is located within the traditional territory of the Mowachaht/Muchalaht First Nation whose people have lived there and in Nootka Sound for over two thousand years.

Tahsis is a small village with a population of 248.[1] At its peak, in the early 1980's, the population of Tahsis was 2,500. The mill closure in the year 2000 caused an immediate exodus – less than 1,000 residents lived there in 2001. The largest age cohort in Tahsis is seniors: people age 60 years and greater which consist of 44.4% of the population and children 14 years and younger comprise 16% of the population. Unsurprisingly, the median age of the population is 58.0 years.[1] The population increases in the summer, as part-time and seasonal residents journey to the community for fishing, boating, and other recreational pursuits.

Like neighbouring communities, Tahsis fits into multiple service delivery areas. It is both a municipality and a member of the Strathcona Regional District (SRD). House prices in Tahsis are significantly more affordable than many other island communities. The median value of a home is $80,125. The median monthly cost of home ownership is $282. Median monthly cost is the total cost for a mortgage, property taxes, and the cost of electricity, heat, water, and other municipal services.[1]

There is no cell phone coverage in Tahsis and most residents rely on landlines which costs $40 per month and includes unlimited local calling.[2] In Tahsis, an individual household can expect to pay between $40 and $100 per month for internet, depending on desired speed and usage.[3] Though not all residents who work from home would utilize home phone and internet, some do. In Tahsis, 13.3% of the labour force work from home.[1]

Tahsis has a low median household income of $34,304, nearly $30,000 less than neighbouring Gold River and less than the Strathcona Regional District median of $55,487.[1] The employment rate in Tahsis is 34.1% and the unemployment rate is 13.3%.[1] Nearly two-thirds of Tahsis residents are not in the labour force. In Tahsis, 73.7% of the community's labour force works part year and/or part time. Employment is highest in the summer, when most businesses are open. While most residents in Tahsis work within the community, 23% of Tahsis' labour force works outside of the community.[1]

The beautiful coastal community of Tahsis is easily reached by road, water or air (float plane), nestled in the heart of Nootka Sound!

[1] Statistics Canada, Census 2016, Tahsis
[2] Telus.com, Home phone plans
[3] FindInternet.ca

CONTENTS

Community Broadband Plan

Telecommunications Infrastructure Assessment

Prepared by:
Elaine Popove - Strathcona Regional District Communications Coordinator (May, 2020)

This project is made possible through funding provided by Island Coastal Economic Trust.

INTRODUCTION

The Strathcona Regional District (SRD) is a partnership of four electoral areas and five municipalities. These communities have relatively small populations and are often separated from each other by undulating landscapes and water.

Of the population of 44,000 residents, most reside within the City of Campbell River. Approximately 12,000 regional district residents live in rural and remote communities spread across a large geographic expanse of approximately 18,500 sq. kms that includes forested hills and alpine areas, islands and remote inlets.

Improved broadband connectivity for rural and remote communities has been a strategic priority of the SRD for several years. There is a significant gap between broadband service levels and affordability in urban areas versus rural areas in British Columbia (Connected Communities in BC, NDIT, 2018). Indeed, many communities within the SRD do not meet basic service levels, if they have any service at all.

Addressing this 'digital divide' will require intensive collaborative effort and multiple funding sources but the benefits are undeniable. It will increase the live-ability of rural and remote communities on Vancouver Island, enabling them to sustain their communities, attract investment and participate directly in social and economic initiatives.

PROJECT METHODOLOGY

The Community Broadband Plans (CBP) project methodology was founded on design principles set-out by Connected Communities BC, weaving together a combination of diverse skill-sets; technical network engineers with community facilitators. 7 communities within the regional district were visited throughout a 2 week block in June of 2019.

Presentations from guest speakers and videos showcasing possibilities for a digital future while gathering ideas from the community about their current state of use as well as plans for housing, economic, environmental and social developments took place.

Information was presented about the SRD's broadband initiatives including the Connected Coast project (V.Smith, SRD), broadband technology and the existing connectivity landscape (D.Sinclair, Driftwood Communications), Innovate BC inspiration (G. Truax, Innovation Island) and the provincial Connected Communities program (C. McCormick and J.Wilkins, Ministry of Citizens' Services). A video produced by Connected Communities, showcasing how improved connectivity has been useful in Haida Gwaii was also shown.

An open discussion followed and participants provided a great deal of information about the current state of connectivity in their community as well as how improved broadband might be utilized to address community challenges and opportunities.

DIGITAL ASPIRATIONS

A Community Broadband Plan forum was held on June 17th from 4:00 – 6:00 pm at the Tahsis Recreation Centre Gym. The forum was promoted as a 'Let's Connect' workshop advertised by posters hung in high traffic locations throughout the community and online via local social media channels and community websites.

The workshop was 2 hours in length with the first hour consisting of presentations, technical info and a Connected Communities video was featured while the second hour included an open forum.

How would improved broadband address community challenges and opportunities in Tahsis?

Improve Family Connections

- Ability to communicate & connect with family afar for free

Improve Safety

- Access to better weather/marine information online

Repatriation of Rural Communities

- It would strengthen communities and increase everyone's lifestyle
- For example, fund services that communities need

Provide Additional Opportunities for Youth

- It's challenging without it

Provide Cell Phone Access

Access to Internet Calling

DIGITAL ASPIRATIONS (cont.)

Improve Community Collaboration
- Creates opportunities & different ways to communicate with other small/nearby communities

Improve Economic Development
- Access to Business Virtual Conferencing

Provide More Educational Opportunities
- Access Agility Training Online
- Access to Online Applications
  - For example, an app that listens to bird calls

Increase Tourism
- Eco-tourism
- Host Wind Sport Events - International level, broadcasted & judged via internet

Improve Entertainment Opportunities
- Access to Online Gaming

Access to VIRL digital resources
- Videos, books, songs, music, etc.

CONCLUSION

The information gathered from the Let's Connect CBP forums has created a unique snapshot of the community's digital readiness and aspirations.

The world is increasingly 'online' bringing opportunities for information exchange, social connection, improved service delivery and income generating opportunities along with it. In the Regional District, improved connectivity will allow residents in rural and remote communities access to essential services, participation in the modern economy and civic life.

New economic development opportunities will allow residents to work remotely and participate on e-commerce and online business development. Access to phone and internet services is necessary for reasons related explicitly to health – including access to health and emergency services and opportunities for telehealth – but also to meet other needs as aforementioned. Improved internet connectivity will also significantly enhance the ability to take part in civic and social participation, education and professional development, improve connection to friends and family, and entertainment, among others.

For some residents, this can mean the difference between staying and improving the capacity in local communities versus having to move or board elsewhere which can be prohibitive.

This snapshot will be provided to last-mile broadband infrastructure solution designers to develop a plan based on the community snapshot along with analysis of the community's topography, climate, housing density, location of key institutions.

In this way, the infrastructure is informed by the community aspirations amongst other important technical considerations.

Strathcona
REGIONAL DISTRICT

STRATHCONA CONNECTED COAST NETWORK

TAHSIS

TELECOMMUNICATIONS INFRASTRUCTURE ASSESSMENT

OCTOBER 2019

Prepared for SRD by:

DRIFTWOOD COMMUNICATIONS LTD.
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SAANICHTON, BC
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Purpose of Study and Methodology

The SRD engaged Driftwood Communications to provide an understanding of the current connectivity landscape in Tahsis and to investigate any improvements required to last-mile infrastructure in order to better serve the community. Suggestions for last-mile improvements must consider the proposed new high-speed capacity link being planned for Tahsis through the Connected Coast project, as well as responding to the community's digital aspirations.

Methodology

A visit to Tahsis was completed on Tuesday, June 17th, 2019

A general survey of the area was conducted to identify:

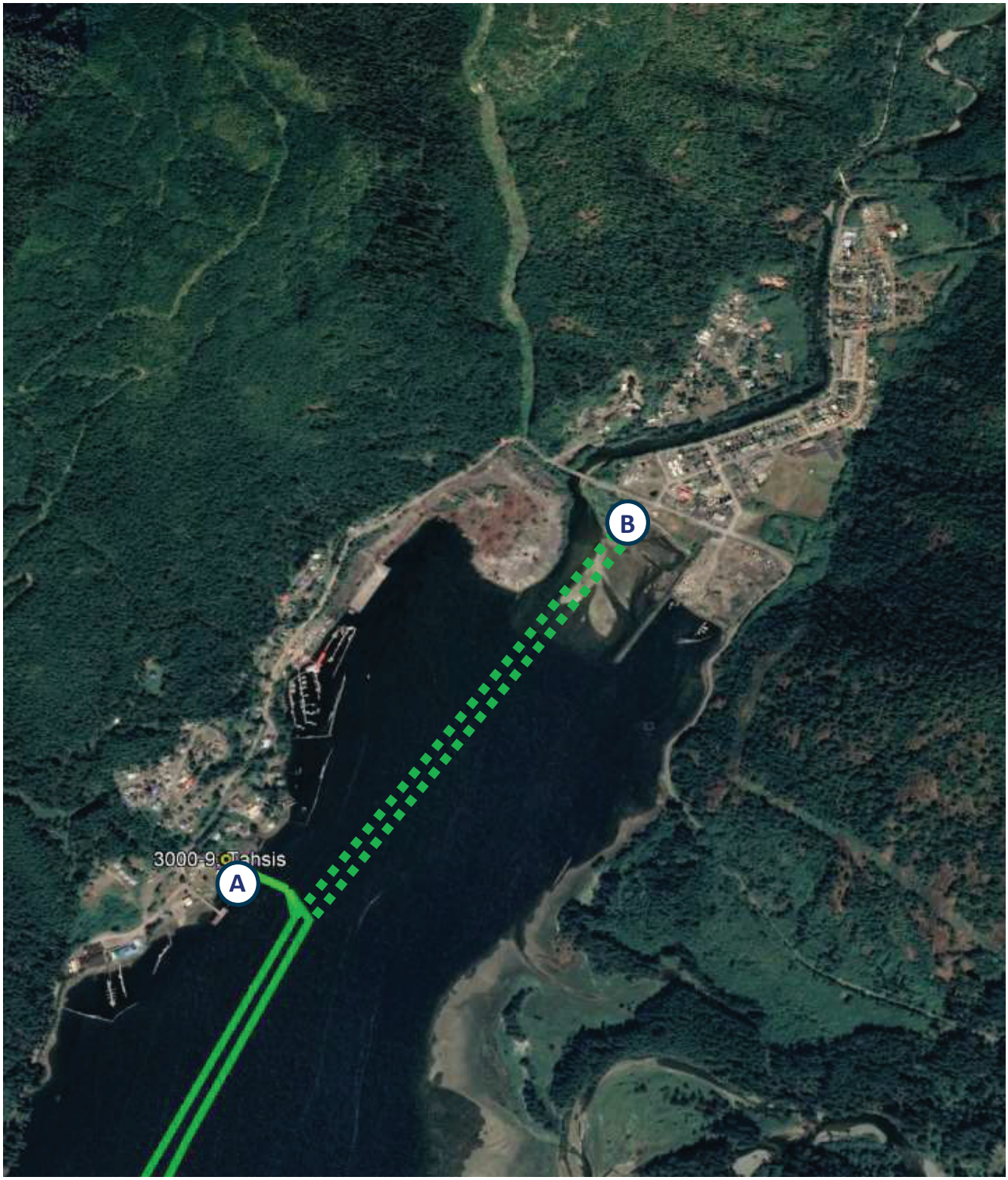
- the proposed fibre landing location
- existing utility infrastructures, conditions and capacities
- existing ISP infrastructure
- potential anchor tenant locations
- potential opportunities

Interviews with the local ISP were undertaken to further understand their existing capabilities and where the gaps exist to achieve the targeted service levels.

A representative from Driftwood participated in a community Let's Connect forum in Tahsis on June 17th. The purpose of the forum was to share the Connected Coast plan and what benefits it could bring to the community. Driftwood delivered a presentation of the various types of technologies that could potentially be deployed to provide these services. The open forum also provided the important opportunity for community members to share any concerns they may have had about any particular delivery method or any specific need within their community.

Observations and information gathered was then analyzed by our staff to determine what potential options could best meet the objectives of providing the desired service levels to the community.

Connected Coast Submarine Fibre Routes



Connected Coast - Proposed backbone submarine fibre path and landing points
(Estimated Completion 2021)
Green = Main Submarine Fibre

Locations A and B are optional submarine landing site locations

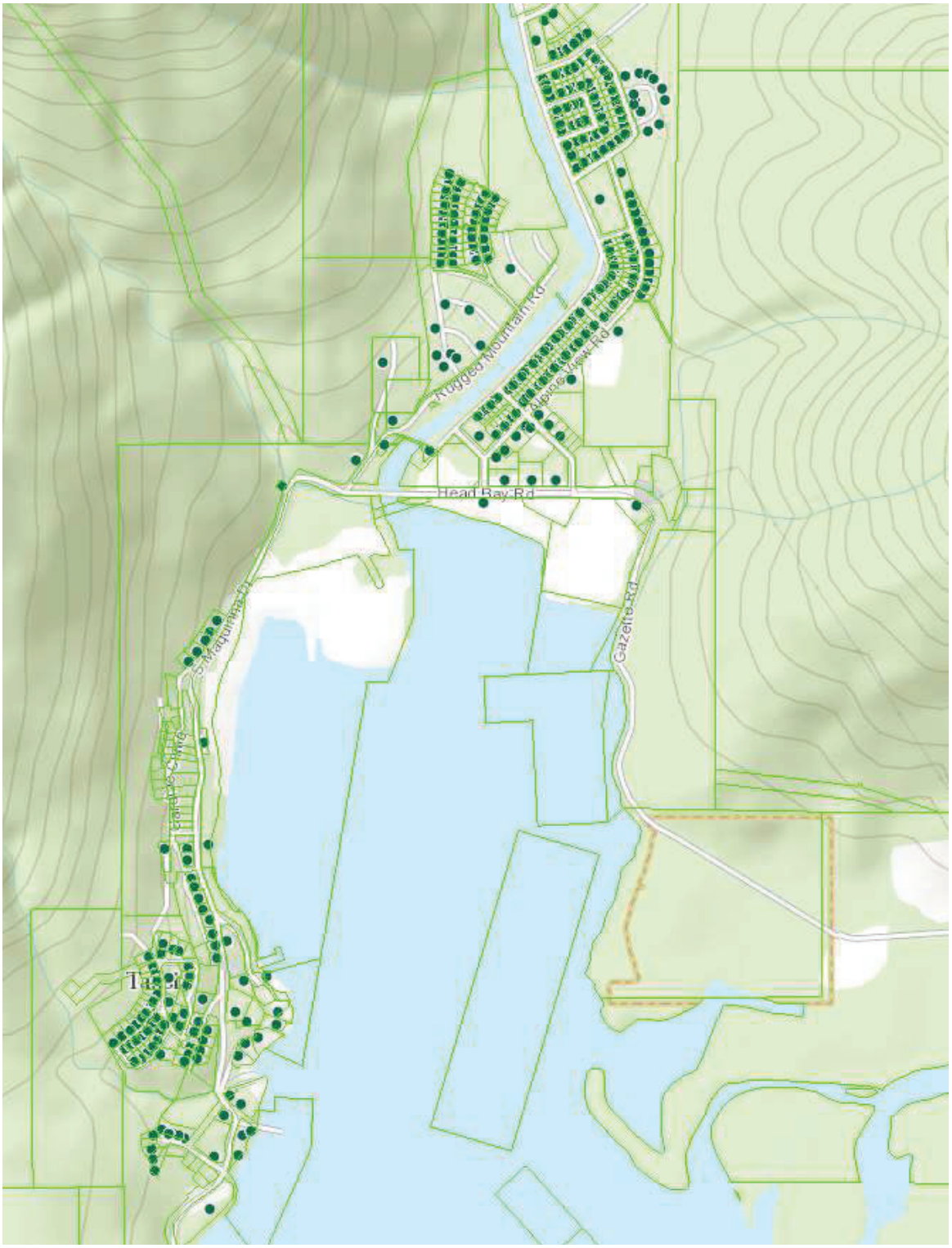
Connected Coast Terrestrial Fibre Routes

Connected Coast submarine fibre landing site at Kyuquot and terrestrial fibre build

Green = Submarine Fibre Yellow Line = Terrestrial Fibre

Option A – Terrestrial fibre route Option B – Terrestrial fibre route

Population & Address Density



Address Locations

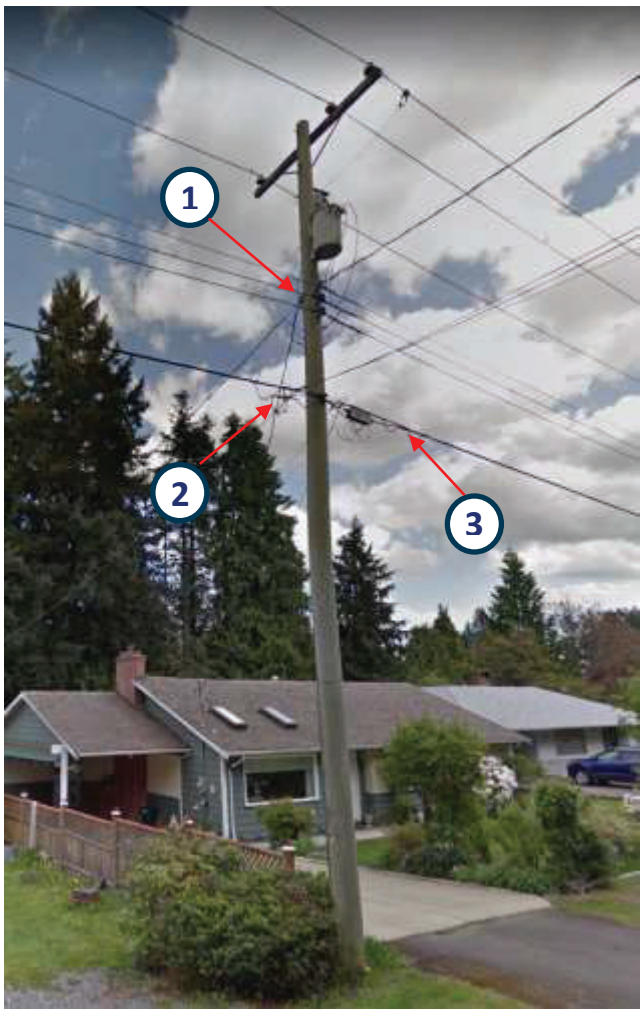
Description	Quantity	Source
Population	316	Village and Islands (2016 Census)
Addresses	383	2019 ICI Society Address BC
Report Number Used	350	Average of above row numbers

Site Visit Observations

Utility Service Provider	Services
Conuma Cable	Television, Internet & Phone
Xplornet	Satellite television and internet services
TELUS	Landline telephone
BCHydro	Electricity

Existing Support Structures

Utilities in the community are provided via a Joint Venture aerial pole network owned by BCHydro and TELUS.



Structure Example

1	BCHydro power
2	Coaxial cable plant
3	TELUS cables

Existing Internet Connectivity

Presently there are two internet service options for the community of Tahsis.

1. Conuma Cable with a 750 MHz Coaxial cable system and DOCSIS 3.0 Internet service provided to the entire community of Tahsis. Conuma Cable receives its internet connectivity via a TELUS microwave feed.

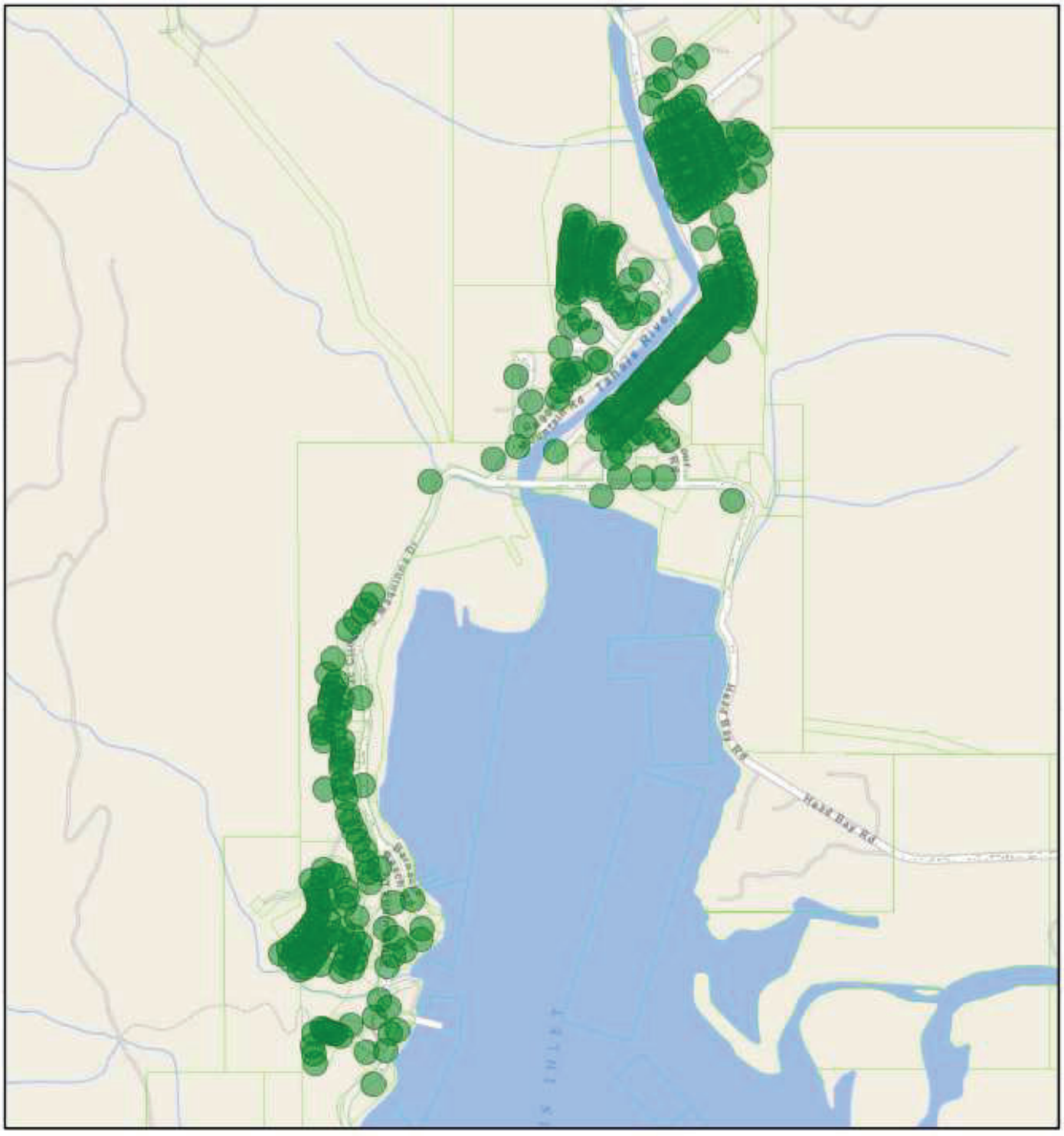
   TELUS currently provides a 30 Mbps input connection.

Packages	D3 Residential	D3 Gamers	D3 Sonic	Extreme
Download	2 Mbps	6 Mbps	10 Mbps	15 Mbps
Upload	1 Mbps	3 Mbps	3 Mbps	2 Mbps

2. Satellite internet through Xplornet[i]

Packages	SAT 5	SAT 10	SAT 25
Download	5 Mbps	10 Mbps	25 Mbps
Upload	1 Mbps	1 Mbps	1 Mbps

   Satellite signals are also subject to weather conditions that will cause periods of degradation in service levels.



September 30, 2019

1:22,000

0 0.175 0.35 0.7 mi

0 0.3 0.6 1.2 km

Up to15 Mbps down / 2 Mbps up

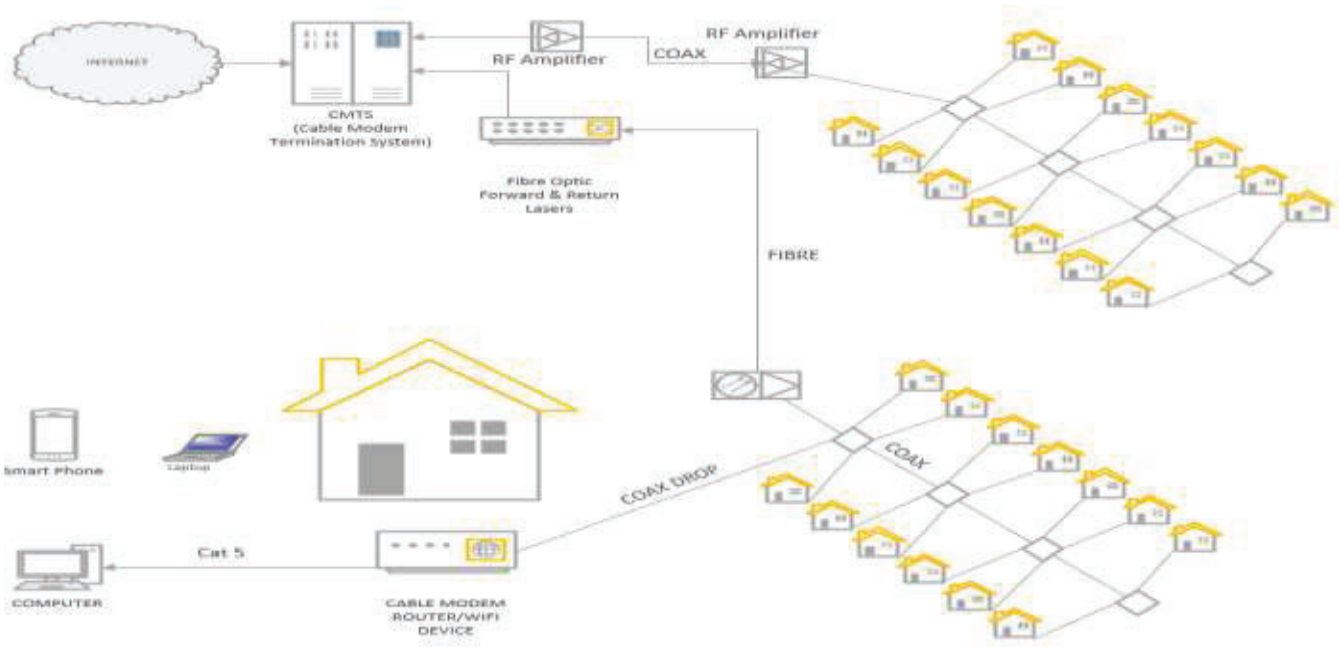
Delivery Methods Comparisons

	F.T.T.H. Fibre to the Home	HFC or Coaxial Cable Network	WIFI Wireless Network	Satellite
Current Industry Offerings	Download/Upload 940 Mbps / 940 Mbps	Download/Upload 1Gbps / 125Mbps	Download/Upload 25 Mbps / 12 Mbps	Download/Upload 25Mbps / 1Mbps
Future Planned Offerings	Virtually Unlimited	10 Gbps/10Gbps	Unknown	Unknown
Build Costs	High	Medium	Low	Low
Construction	Aerial &/or underground fibre placement, splicing, drops to buildings, building wiring and transceiver installation	Aerial &/or underground coax &/or fibre placement, splicing, outdoor active & passive installation, drops to buildings, building wiring and transceiver installation	Single &/or multiple towers &/or building mounted transceiver installation, user building external antenna (if required) building wiring and transceiver installation	Mount dish antenna at a location that provides line of sight to satellite. Could be building, pole or tower. Wiring to building, building wiring and appliance installation
Maintenance	Very Low Typically, once the fibre has been installed there is little to no maintenance other that unpredicted damage or forced relocation.	Medium to High Requires ongoing maintenance of outside active electronics, battery maintenance	Low Requires tower safety maintenance, repairs to unpredicted damage and electronic equipment failures	Low Dish antenna may move or be pushed out of alignment, unpredicted damage or electronic equipment failure
Vulnerabilities	Direct damage from exterior forces such as tree falling, auto accident, cut by excavator etc... water infiltration into a splice	Direct damage, electronics failure, power outages	Direct damage, electronics failure	Direct damage, electronics failure
Service Impacting	Fibre break, electronic device failure, water in splice location	Fibre or coaxial cable break, electronic equipment failure, extended power outage	Anything that impedes the line of sight will impact the service quality i.e. rain, snow, fog, obstructions such as tree and buildings, other WIFI signals interference	Anything that impedes the line of sight will impact the service quality i.e. rain, snow, fog, obstructions such as tree and buildings.

Construction Methods Comparison

	Advantages	Disadvantages
Aerial Leased	• Widely available • Can be several potential leasers • Not responsible for structure or its maintenance costs • Construction costs generally lower than underground	• Open to weather & traffic • More susceptible to service interruption due to damage • Approval to use required • Ongoing lease costs
Aerial Built & Owned	• No leasing cost	• Rarely done as there are usually poles already on both sides of road or little desire by local government to approve if not already there • Expensive to build • Structure maintenance costs • Approval to construct is required • Taxable asset cost
Underground Leased	• Commonly available • Less susceptible to weather • Not responsible for structure maintenance costs • Construction cost comparable or slightly higher than aerial leased	• Available capacity issues more likely • Approval to use required • Ongoing lease costs
Underground Built & Owned	• Less susceptible to weather	• More costly • Approval to construct is required • Structure maintenance costs • Taxable asset cost
Submarine	• Provides connectivity where no other viable or cost-effective option is available	• Expensive • Approval to construct is required
Towers	• Fewer locations • Less infrastructure overall	• Unpopular to public • Land availability challenging • Land leasing cost • High construction cost • Approval to construct is required

Broadband Coaxial Cable Network Example



Coaxial cable system technologies continue to evolve at a rapid pace. With the latest version being developed to provide 1 Gbps up and 1 Gbps down connections. This method requires customers to be serviced via coaxial cables connected to a local area fibre node with no additional amplifiers.

Today there are two basic methods of design.

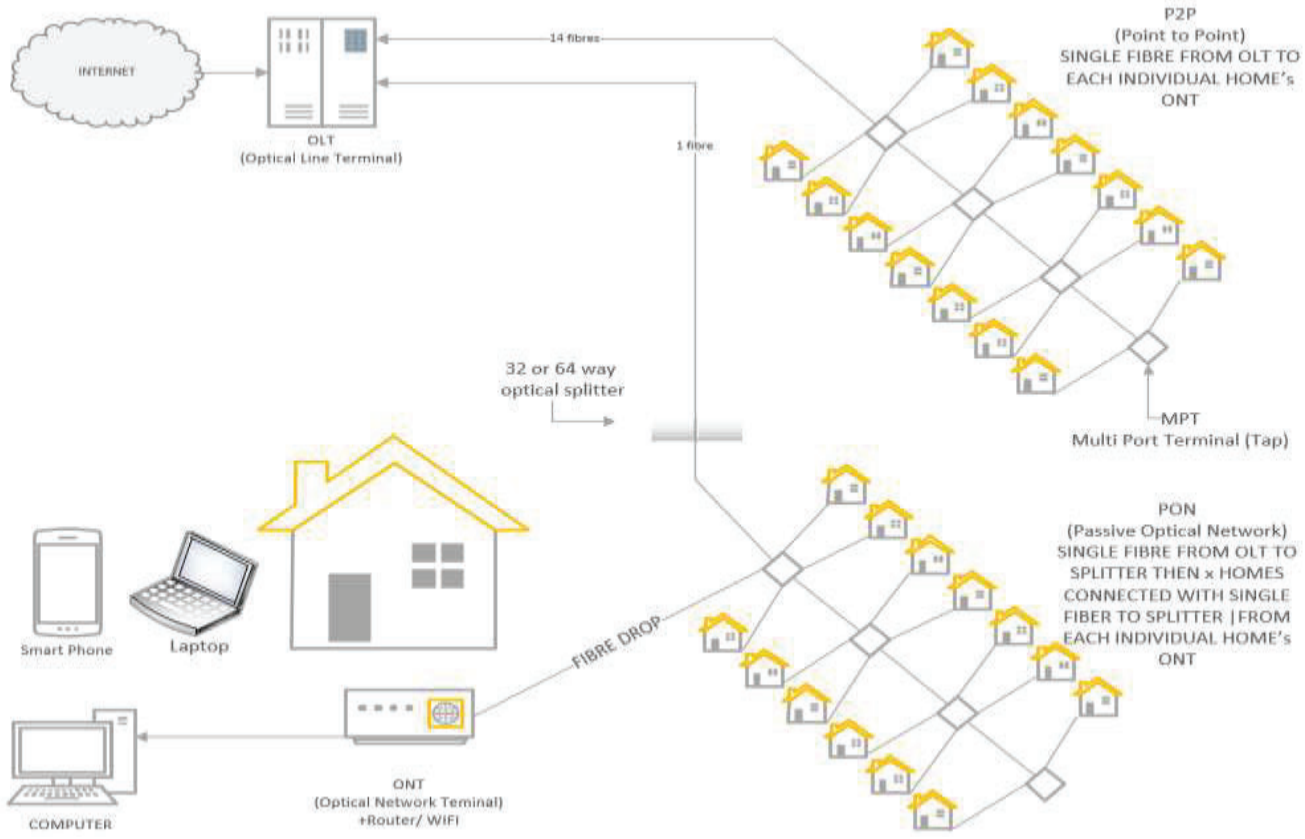
1. A coaxial cable only system with amplifiers placed at intervals to extend the area serviced. For the delivery of internet only services this method would work well in a smaller community with a few hundred customers.

2. With the addition of Fibre optic nodes placed closer to the customers the design now allows for segmentation of groups of customers. In addition to higher quality service and greater reliability it also results in increased internet connection speeds.

F.T.T.H. (Fibre to the Home) Network Example

An Optical Line Terminal (OLT) is the endpoint hardware device in a Passive Optical Network (PON). An OLT has two primary functions: Converting the standard signals used by a FiOS service provider to the frequency and framing used by the PON system.

ONT stands for Optical Network Terminal. The ONT connects to the optical fibre cable.
It connects to your router via a LAN / ethernet cable and translates light signals from the fibre optic line into electronic signals that your router can read.



Potential Solution Option 1 – Conuma Cable Connects to the SRD Service

There are two optional scenarios that depend on the selected location for the Connected Coast landing site. (site A or Site B)

Site A would require Conuma Cable to place an additional ~1500 meters of fibre cable to connect to the proposed SRD terrestrial fibre (see yellow dash line on page 5).

Site B is located at a location where Conuma cable has an existing fibre presence on the road directly passing the proposed site.

The connection of their existing network to the SRD system would result in an immediate improvement in customer internet service levels. Once connected, the existing 750 MHz cable plant and DOCSIS 3.0 system could offer service levels greater than the 50 Mbps down / 10 Mbps up objective.

DOCSIS release	Max download	Max upload
DOCSIS 2	40 Mbps	30 Mbps
DOCSIS 3	**1.2 Gbps**	**200 Mbps**
DOCSIS 3.1	10 Gbps	1 Gbps
DOCSIS 3.1 Full Duplex	10 Gbps	10 Gbps

Potential Solution Option 2 – New ISP Fibre To The Home

This option would involve undertaking a Flex NAP fibre build to all residential, commercial and government buildings in Tahsis.

Corning Cable Systems Flex NAP™ System provides a cost-effective method of deploying optical fiber in outside plant distribution networks at speeds several times faster than traditional field installations. The Flex NAP System utilizes standard optical fiber cables upon which network access points are pre-installed at customer-specified locations along the length of the cable. The cable and network access points are tested and shipped as a complete distribution cable/terminal system.

This option would offer a complete future proof service directly to all members of the community and greatly exceed the Federal Government's internet service objectives.

Cost Estimate

	Customers *(see page 6)*	**Cost Per Address**	**Route Meters**	**Cost Per Meter**	**Total**
Low Make-Ready	350	$3,100.00	15,500	$70.00	$1,085,000.00
Medium Make-Ready	350	$3,653.57	15,500	$82.50	$1,278,750.00
High Make-Ready	350	$4,118.57	15,500	$93.00	$1,441,500.00

There are many variables that will impact the final cost of these types of projects including the condition and capacity of existing infrastructure. A complete engineering and permitting application process and tendering of construction would be required to ascertain a true final cost.

There are several factors that have a direct impact on the construction costs for a specific project and are unpredictable.

I. Make-Ready
   a. Condition of existing poles and need for remediation or replacement
   b. Capacity of existing strand and need for replacement or new additional strand placement
   c. Adequate anchoring and need for replacement or additional anchoring
   d. Easement agreements with landowners for additional anchors that extend into private property
   e. Engineering and application costs

II. Mobilization/demobilization – cost is increased for remote areas relative to the contractor's home base and local per diem rates. Other factors may be transportation costs such as ferry or barge costs to get equipment and materials to the build site.

Access Agreements

An access agreement will need to be signed with either BCHydro or TELUS to build and maintain an aerial network. These access agreements come with annual lease costs and responsibilities including construction standards and maintenance aspects.

BCHydro	Master Service Agreement
TELUS	Support Structure Agreement

BCHydro Support Structure Rental Fees
(These rates were not available at the time of this report)

TELUS Support Structure Annual Lease Fees[ii]

TELUS General Tariff – CRTC-21461			
Structure Type	**Tariff Rate**	**Estimated Usage**	**Annual Fees**
Monthly Pole Rental Rate *(Route Meters/50 Meters avg. span)*	$1.61	310	$ 5,989.20
Monthly Strand Rental Rate (per 30 Meters)	$0.43	15,500	$ 6,200.00
		Total	$ 12,189.20

Additional operating costs would include such items as building space lease, property taxes, plant maintenance, internet connectivity fees etc.

Conclusions

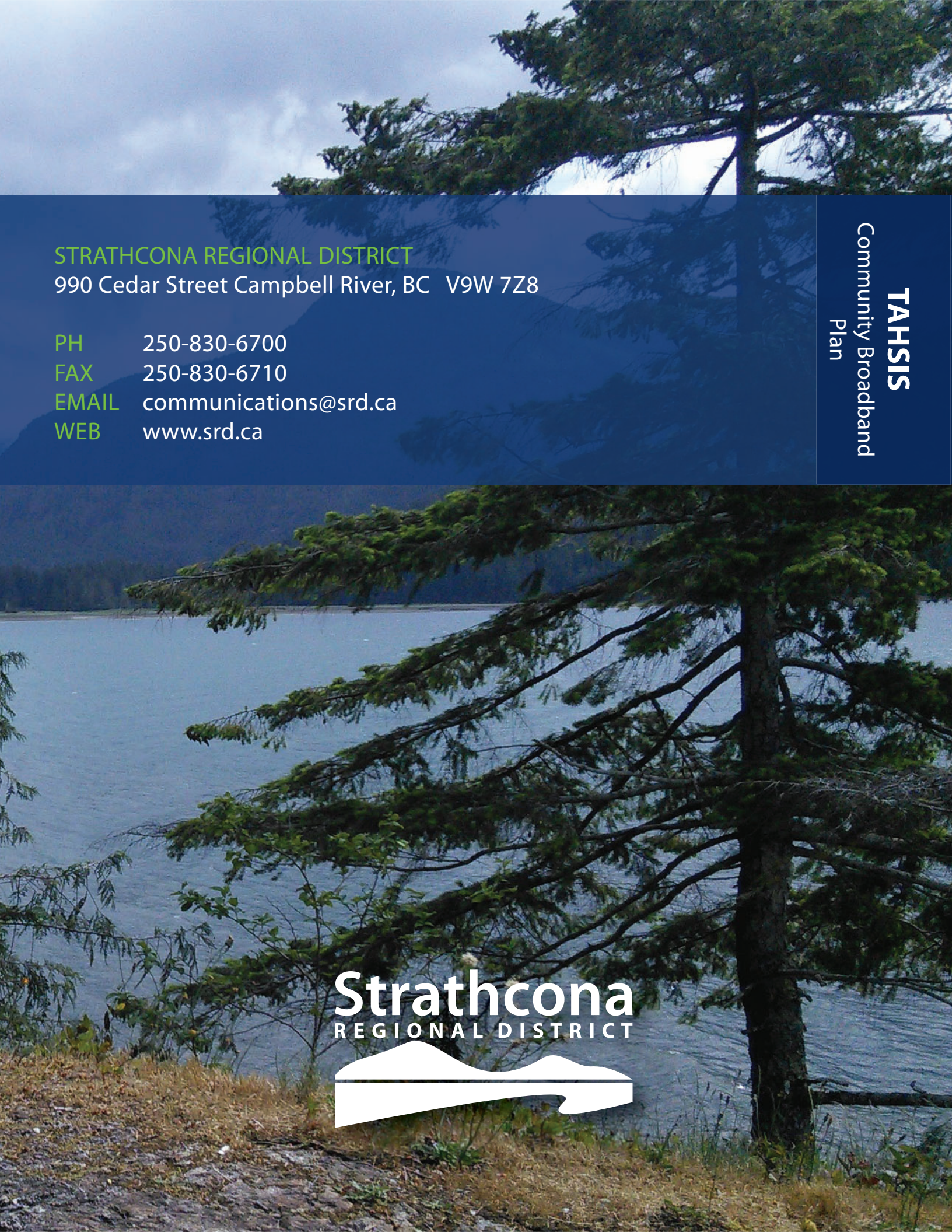
[iii]	OPTION 1	OPTION 2
	Conuma Cable	F.T.T.H. New ISP with Fibre To The Home
Downstream Data	>60 Mbps	> 60 Mbps
Upstream Data	>10 Mbps	>10 Mbps
Reliability	Excellent	Excellent
Maintenance Requirement	Low	Medium
Operating Costs	Medium	Medium
Quality of Service	Excellent	Excellent

Option one would provide a level of service greater than the desired service level objective. Conuma Cable is already operating in the community with established operating and maintenance methods in place.

Option two would require a capital investment to build the fibre network but once completed it would also offer service levels exceeding the desired objective.

References

[i] Extranet Website
[ii] TELUS website September 2019
[iii] WIFI & Data Rates information provided by High Pro Computer Consulting



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