

Community Connectivity Plan: Thetis and Penelakut Islands



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1. SITUATIONAL OVERVIEW

The Cowichan Valley Regional District (CVRD) has undertaken the development of a connectivity strategy, to address the objectives of extending at least 50 Mbps down/10 Mbps up broadband service to all underserved areas, and to extend cellular coverage along roadways and to premises within those underserved areas.

The strategy involves focusing on the extension of backbone fibre optic infrastructure, working with ISPs to improve their business cases to deliver last-mile infrastructure, interconnecting residential and business premises. To accomplish this, the CVRD will take on the role of connectivity advocate, engaging with service providers, utilities, communities, and senior governments to advocate for funding and encourage/assist with the prioritization of CVRD communities in comparison to others across the province for funding opportunities.

Within the context of the CVRD strategy, this community plan for Thetis and Penelakut Islands provides specific tactics and information for the community, with the support of the CVRD, to advocate and in turn support ISPs with respect to the infrastructure that needs to be constructed under a focused plan to improve connectivity services to residents in the communities.

2. COMMUNITY OVERVIEW

Thetis and Penelakut Islands are part of the southern Gulf Islands, located midway between Gabriola to the north and Salt Spring to the south, in the Strait of Georgia. The closest town is Chemainus, a short 30–50-minute ferry ride away, depending on stops. Thetis Island is 1,129 hectares in size, while Penelakut Island is 866 hectares. The two islands are separated by a narrow canal that was originally dredged in 1905 to allow passage of fishing vessels.

Penelakut Island is inhabited by members of Penelakut Tribe, who have lived in this area since time immemorial. The traditional territory of the Penelakut Tribe generally includes parts of south-eastern Vancouver Island, the southern Gulf Islands, a portion of the Lower Mainland, and the waters of the Salish Sea to the Sunshine Coast. Currently, the Tribe has four reserves totalling 635.7 hectares, the largest of which is the Penelakut Island reserve at 556.7 hectares. Approximately 516 of its 1,122 registered members live on one of its four reserves.¹ On the Penelakut Island reserve, the community is split between the east and west village location.

The median age of those living on the Penelakut Island reserve is 26.8, significantly younger than Cowichan overall at 50.8. 32% of the population on Penelakut Island is under 14 years of age. The median household income of Penelakut Island residents is \$61,200, lower than Cowichan overall at \$79,500. The majority of dwellings are owned by the Tribe, and median monthly shelter costs paid by individuals was \$268 in 2021. This includes utilities, but not the cost of internet or cellphone plans.²

¹ “First Nation Profiles: Penelakut Tribe”, Crown-Indigenous Relations and Northern Affairs Canada, October 2022, https://fnppn.aadnc-aandc.gc.ca/fnp/Main/Search/FNMain.aspx?BAND_NUMBER=650&lang=eng

² “Census Profile, 2021 Census of Population”, Statistics Canada, October 26 2022, <https://www12.statcan.gc.ca/census-recensement/2021/dp-pd/prof/index.cfm?Lang=E>

Penelakut Tribe has a number of active economic development initiatives, including Penelakut Seafoods and the Salish Sea Market in Chemainus. They are also working towards further investments for the community such as a Community Energy Plan, an Agriculture Feasibility Plan, and a Communal Store Feasibility Plan.³

In contrast to Penelakut Island, residents of Thetis Island have a median age of 62, with 42% of the population aged 65 years and over. The median household income on Thetis Island is \$70,500, and a large percentage of people work from home (38.5%, versus 17.8% for Cowichan overall). The median value of dwellings on Thetis Island is \$700,000 (versus \$730,000 for Cowichan overall). Only 26.7% of homeowners on Thetis Island have a mortgage (versus 53.8% for Cowichan overall), which may explain why the median monthly shelter costs is only \$444 (versus \$1,000 for Cowichan overall).⁴

3. CURRENT STATE OF CONNECTIVITY

Within Thetis Island, the Regional Infrastructure and Service Availability Report found that although Telus and Beacon had some infrastructure present, 78.8% of premises (264 of 335), and 83.7% of road segments (25,715 m of 30,734 m) remain underserved. It is understood that CityWest and at least one other community-supported application have been submitted to the federal Universal Broadband Fund (UBF) to deploy broadband services for the island. See Figure 1 for a map of served and underserved road segments and premises.

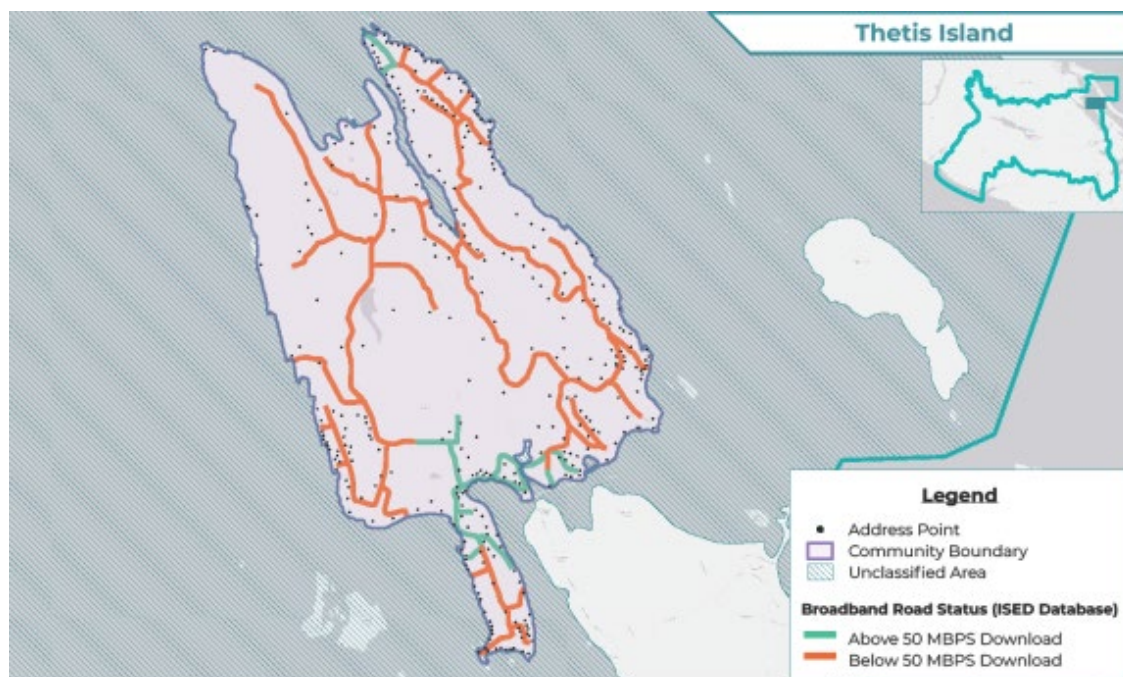


Figure 1: Thetis Island Current State Broadband Coverage

³ “Economic Development”, Penelakut Tribe, <https://penelakut.ca/economic-development/>

⁴ “Census Profile, 2021 Census of Population”, Statistics Canada, October 26 2022, <https://www12.statcan.gc.ca/census-recensement/2021/dp-pd/prof/index.cfm?Lang=E>

Within Penelakut Island, the Regional Infrastructure and Service Availability Report showed that Beacon and Telus had some infrastructure present that served the area, and that only 0.6% of premises (1 of 156), but 48.7% of road segments (7,679m of 15,779m) remain underserved.

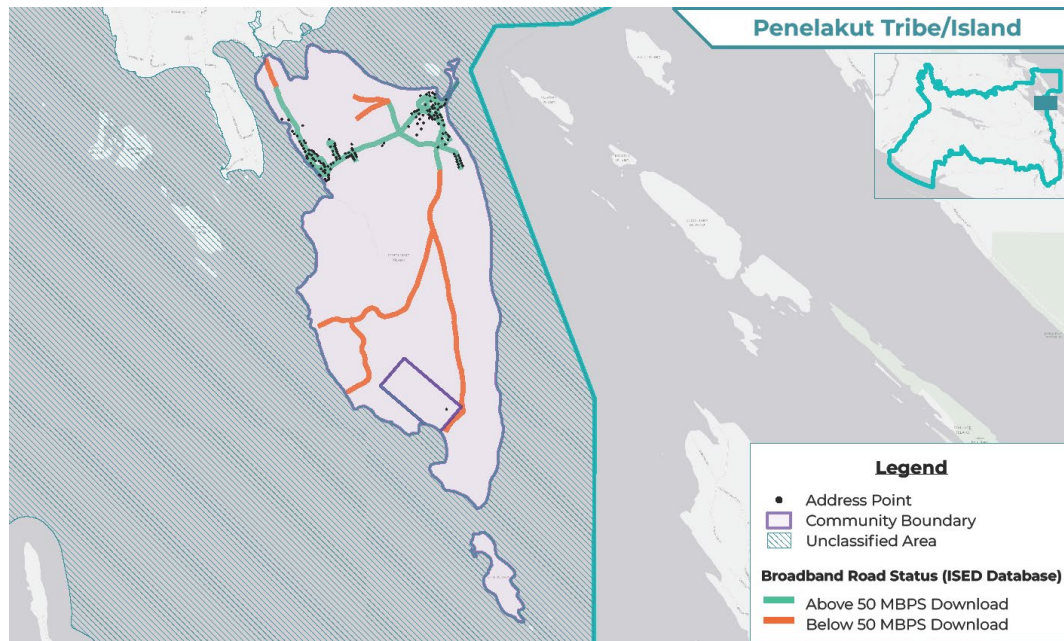


Figure 2: Penelakut Island Current State Broadband Coverage

The Connected Coast project map below identifies a landing point planned for Penelakut Island.

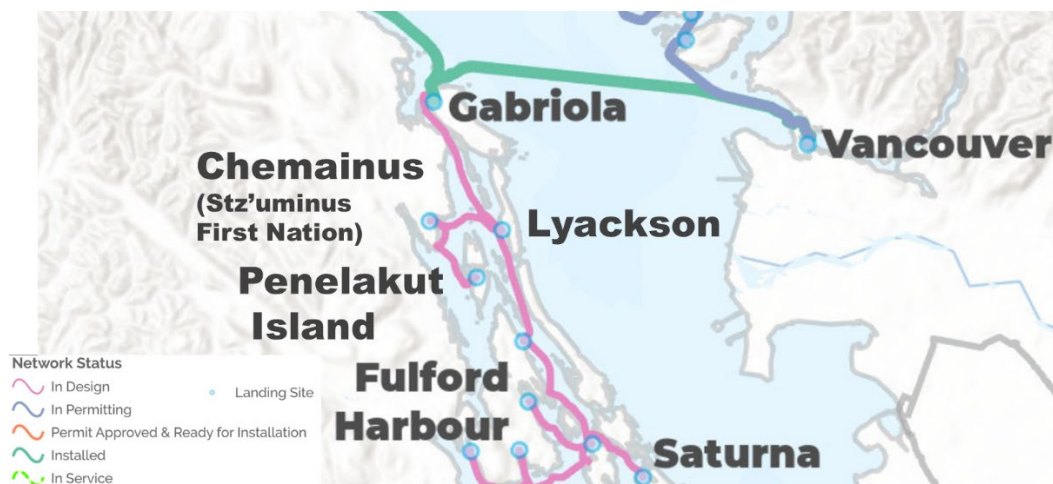


Figure 3: Excerpt from Connected Coast November 2022 Map

In 2019, fibre to the home infrastructure was deployed around Penelakut Island by Telus, through a project funded and facilitated by Pathways to Technology - a project managed by All Nations Trust Company, an initiative to bring affordable and reliable high-speed internet connectivity to all 203 First Nations in BC⁵.

⁵ <https://www.pathwaystotechnology.ca/about>

The fibre network was constructed to the band office, elementary school, adult learning centre, daycare and health centre, enabling those organizations to connect and subscribe to Telus high-speed internet services, with published speeds of up to 750 Mbps. While connections to residential premises had physically been completed, work was ongoing to reconcile address and billing systems with actual physical locations, which when completed, will enable residents to also subscribe to Telus services⁶.

Feedback from surveys seemed to contradict the reported speeds and quality of broadband services over the newly installed fibre infrastructure. It also contradicts the coverage and quality of cellular connectivity, indicating that cellular coverage on Penelakut Island specifically, was sparse, especially along the eastern coast.

- Telus coverage map in Figure 4, shows a mix of 5G, LTE Advanced, and LTE coverage along the eastern shores of both Thetis and Penelakut islands, and
- Rogers coverage map in Figure 5, shows that the vast majority of the eastern shores of both Thetis and Penelakut islands are covered by their 5G network, with a very limited portion covered by 4G LTE.

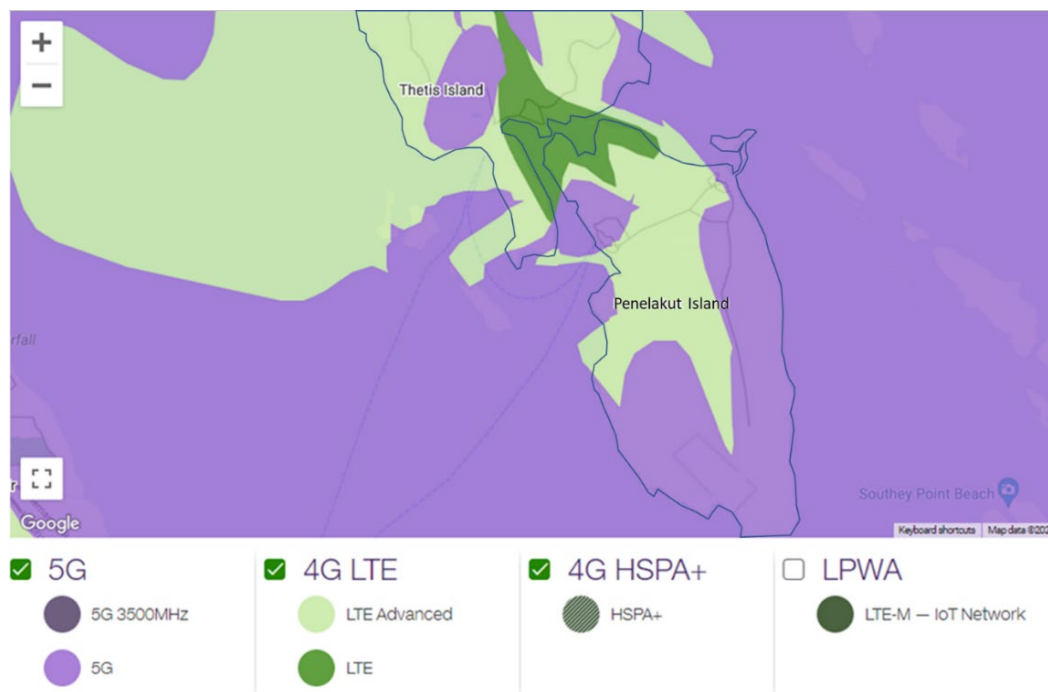


Figure 4: Telus Wireless Coverage

⁶ Pathways to Technology Community Spotlight <https://www.pathwaystotechnology.ca/community-spotlight/penelakut-island>

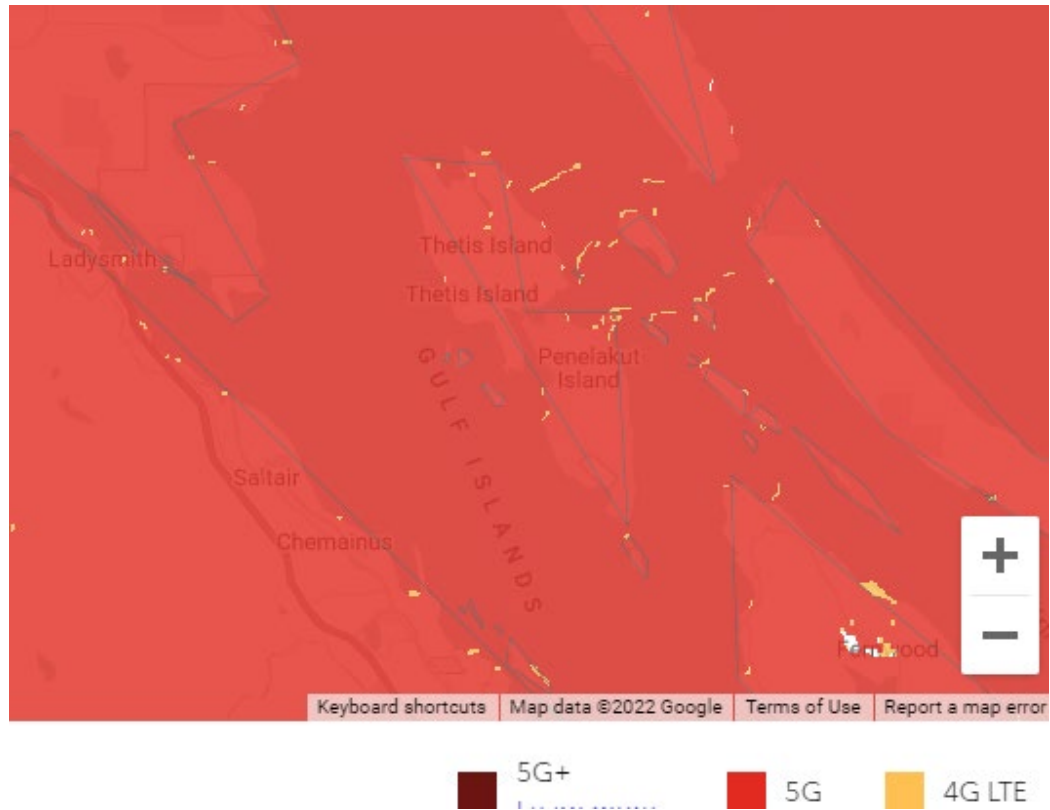


Figure 5: Rogers Wireless Coverage

4. TECHNOLOGIES

Technology Options

	Digital Subscriber Loop (DSL)	Fibre to the Home (FTTH)	Cable (DOCSIS)	Fixed Wireless	Mobile Wireless (Cellular Data)	Satellite
Description	Digital data over telephone lines	Light transmission through glass fibres. Very low maintenance. Virtually unlimited future speeds	Electrical transmission over Cable TV system copper cables	2-way communication from fixed house antenna to tower	Internet delivered to a single mobile device	2-way communications from antenna to space and back

Challenges	Old technology Speed is distance-dependent from Telco Office	Fast, reliable, future-friendly	Ongoing maintenance of distributed batteries and active components	Susceptible to interference Line of sight to tower required	Prices moderate until data cap reached	Susceptible to interference Line of sight to satellite required
	Digital Subscriber Loop (DSL)	Fibre to the Home (FTTH)	Cable (DOCSIS)	Fixed Wireless	Mobile Wireless (Cellular Data)	Satellite
Typical Download	5-35Mbps	50Mbps-5Gbps	1.2Gbps	25-50Mbps	25-100Mbps	25Mbps GEO 50-250Mbps LEO
Typical Upload	0.5-5Mbps	50Mbps-5Gbps	200Mbps	5-10Mbps	0.5-5Mbps	1Mbps GEO 10-20Mbps LEO

Construction Methods

Construction Method	Advantages	Disadvantages
Aerial	<ul style="list-style-type: none"> • Less expensive to install • Readily available infrastructure (BC Hydro, Telus) 	<ul style="list-style-type: none"> • Susceptible to wind and storm and traffic damage • Ongoing pole rental fees
Buried	<ul style="list-style-type: none"> • Less susceptible to damage • Low visual impact on environment 	<ul style="list-style-type: none"> • More expensive to install • Ongoing locate costs • Not appropriate for rocky terrains
Submarine	<ul style="list-style-type: none"> • Provides for connectivity across waterways 	<ul style="list-style-type: none"> • Very expensive
Wireless	<ul style="list-style-type: none"> • Lowest cost to serve an area • Serve multiple premises from a single tower site • Fewer locations required 	<ul style="list-style-type: none"> • Lack of community support • High visual impact on environment • Limited capacity and bandwidth • Ongoing land lease costs

Operating Model Options

Model	Advantages	Disadvantages
Community-Subsidized/ ISP-Owned	<ul style="list-style-type: none"> • Community influence on initial build technologies and configuration • No ongoing network operations or management required 	<ul style="list-style-type: none"> • Limited services based on one ISP • ISP controls assets
Community-Owned	<ul style="list-style-type: none"> • Full control of initial and ongoing technologies and configurations • Open or closed network options 	<ul style="list-style-type: none"> • Responsible for network operations and maintenance
Open Network	<ul style="list-style-type: none"> • All service providers can access all connected premises • Flexibility to attract new service providers for multiple service types (security, telehealth, education) • No high-cost infrastructure investments by service providers 	<ul style="list-style-type: none"> • Resistance in service provider community to deliver services over others' networks • Potential for finger-pointing on trouble resolution
Closed Network	<ul style="list-style-type: none"> • Single point of contact responsible for overall quality 	<ul style="list-style-type: none"> • Only one service provider has access to premises (service monopoly) • Potential for higher prices • Lower community input/involvement
Community-managed/Operated	<ul style="list-style-type: none"> • Full control of network technologies, configuration, and content • Lower variable operating costs 	<ul style="list-style-type: none"> • Must have available management skillsets and resources • Potential for higher cost of operations per home in smaller networks due to lower economies of scale • Potential for lower quality toolsets • Higher fixed operating costs
Outsourced management/operation	<ul style="list-style-type: none"> • Full control of network technologies, configuration, and content • Better economies of scale, due to operator's ability to leverage costs over multiple networks • Higher quality management toolsets • Lower operating capital 	<ul style="list-style-type: none"> • Higher variable operating costs due to "pay-per-use."

5. WHAT WE HEARD

An extensive public engagement was undertaken on Thetis and Penelakut Islands, with a public meeting on Thetis Island on September 17, 2022, and a survey of residents of Penelakut Island.

Penelakut Island

On Penelakut Island, the survey was extensively supported by Nation staff, with 29 responses and additional email responses sent in after the survey closed from people who were unable to attend the open house.

The First Nation residents have strong ancestral ties to the land, and treasure having family, their own schools, health and daycare on the island. They gain a sense of fulfillment from making a difference in their community and enjoy the beautiful island scenery. Connectivity is viewed as important to:

- support e-health and emergency response services,
- enable improved education through virtual programming,
- access to more government support services,
- create more economic development opportunities,
- provide for additional employment opportunities, and
- better connect family and friends to their community through notifications and improved communications.

The community development goals include connected community amenities such as restaurants, pubs, convenience stores, gas stations, grocery stores, recreation centres, pools and gymnasiums, as well as new housing. Community services to be enhanced include recycling and waste management, health care with a focus on elders and youth suicide, drugs and alcohol, as well as traditional medicines, policing, and technical support.

The attendees expressed concern with the affordability of services from the sole service provider on the island, and the need for access to additional service providers. They also identified a need for a reliable way to call 911 and access emergency services.

In light of affordability and issues with experienced cellular coverage/reliability, the attendees were supportive of a cellular tower on Thetis and/or Penelakut islands, the potential for fixed wireless towers, and the deployment of WiFi hot spots across the island on power poles and at public areas such as the band office, health clinic, school, ferry terminal, and new youth centre.

Barriers to connectivity were noted as:

- Affordability of infrastructure and services,
- Geography and topology,
- Isolation from other communities,
- Low population level, negatively impacting the business case for service providers.

Thetis Island

Thetis Island residents appreciate the tranquility and quiet rural nature of the island. They have a strong sense of community and responsibility, and see that connectivity is important to:

- Attract and retain a younger, more diverse and vibrant population,
- Enable work from home and home-based businesses, and
- Reduce traveling off the island on ferries, thus reducing their carbon footprint.

The community development goals include recycling and waste management, community health care, affordable living and local law enforcement presence, as well as the rollout of fibre to the home and construction of cell towers to provide coverage for the whole island, as long as towers could be implemented in a discreet manner. They were generally supportive of WiFi hot spots at community gathering points such as marinas and ferry terminals. Public engagement conducted in early 2021 indicated a preference for fibre connectivity over wireless.

The attendees expressed concern with the impact of power outages on safety and emergency service availability, as well as long maintenance and repair times for existing Telus infrastructure. They were also concerned with the market power of the large ISPs and their influence on federal regulation (CRTC) that is perceived to limit solutions deployed and want to ensure that any infrastructure implemented is supported adequately, with a target mean time to repair downed aerial infrastructure of 24 hours or less.

Barriers to connectivity were noted as:

- Topology and ground cover, with hills and trees interfering with terrestrial and satellite wireless connectivity,
- Infrastructure funding costs
- Fluctuating population levels from summer to winter, and
- Maintenance and repair times, due to being on an island.

6. KEY CHALLENGES

Key challenges across Thetis and Penelakut Islands include:

- Topology and vegetation attenuation of wireless RF signals,
- Cellular service provider coverage reporting inconsistencies with residents' experience
- Broadband affordability on Penelakut Island
- Lack of competition in the following areas:
 - a. High-capacity transport to/from the islands
 - b. Fibre distribution networks
- Maintenance response times

7. OPTIONS

To best meet the stated needs of the residents of Thetis Island, the primary approach would be to support existing grant applications to build sustainable fibre infrastructure, as well as to encourage data gathering and discussions with cellular providers to resolve locally identified coverage issues.

To best meet the stated needs of Penelakut Island, the primary approach would be to work with All Nations Trust and the Pathways to Technology project to advance affordability discussions with the funded service provider. A more detailed description follows.

- 1) Observe, Advocate, and Influence
 - a) Continue to support CityWest and other applicants to build sustainable fibre-based broadband infrastructure on Thetis Island.
 - i) Provide additional letters of support for all applicants that are following the CVRD plan requirements, if requested, and
 - ii) Support all appropriate applications in public meetings or engagements.
 - b) Hold wireless service providers to account for discrepancies in published coverage maps versus community experience.
 - i) On both islands, the CVRD should recommend that the incumbent service providers are asked to document gaps in service through drive testing and other technical means, in order to determine where additional infrastructure is required. If they refuse or do not act on this in a timely fashion the CVRD can engage an engineering company to perform a technical coverage assessment to challenge the reported information and report that data to the appropriate government agencies, such as ISED and the CRTC,
 - ii) Continued facilitated discussions with Telus and Rogers regarding customer experience related to coverage, and
 - iii) Register all deficiencies with the telecommunications industry regulator – CRTC.
 - c) Obtain a third-party assessment of the fibre to the premises infrastructure deployed on Penelakut Island to identify any deficiencies that may be the cause of poor connectivity.
 - d) Engage with Band Council, Pathways to Technology/All Nations Trust, and the community on Penelakut Island to cooperatively work to help address affordability issues, including:
 - i) Educating on Federal Government \$20/month broadband from Telus and others, as well as technology support programs for seniors,
 - ii) Exert influence on Telus to assist with rate adjustments, based on funding provided by All Nations Trust Company for the fibre infrastructure build, and
 - iii) Support the capacity of the Nation to plan and apply for funding to resolve affordability concerns. The Nation could negotiate a single service plan where the Nation is the single customer to the Service Provider and then pass down costs to the residents and businesses at rates that are affordable and acceptable to its residents, to potentially manage affordability issues in the community.
- 2) Build
 - a) Continue to support Connected Coast/CityWest, assisting in securing grant funding, and/or creation of a local area service to extend connectivity from the Penelakut Island Connected Coast landing site to Thetis Island, to improve business cases for last mile distribution across and around Thetis Island. (Encourages competition on both Thetis and Penelakut Islands)
 - b) Facilitate discussions with Telus/Rogers/All Nations Trust/Penelakut Nation staff to support resolving cell service issues and any community concerns regarding health impacts related to technology, which may result in construction of one tower on each of Thetis and Penelakut Islands, or towers on Valdes, Reid or Galiano islands.
 - c) Investigate opportunities for Band to provide internet service as a utility. Options include:
 - Internet service for all members at their homes,
 - Provide free WiFi at community sites, such as band office, etc., and
 - Distributed WiFi network with hotspots throughout the community.

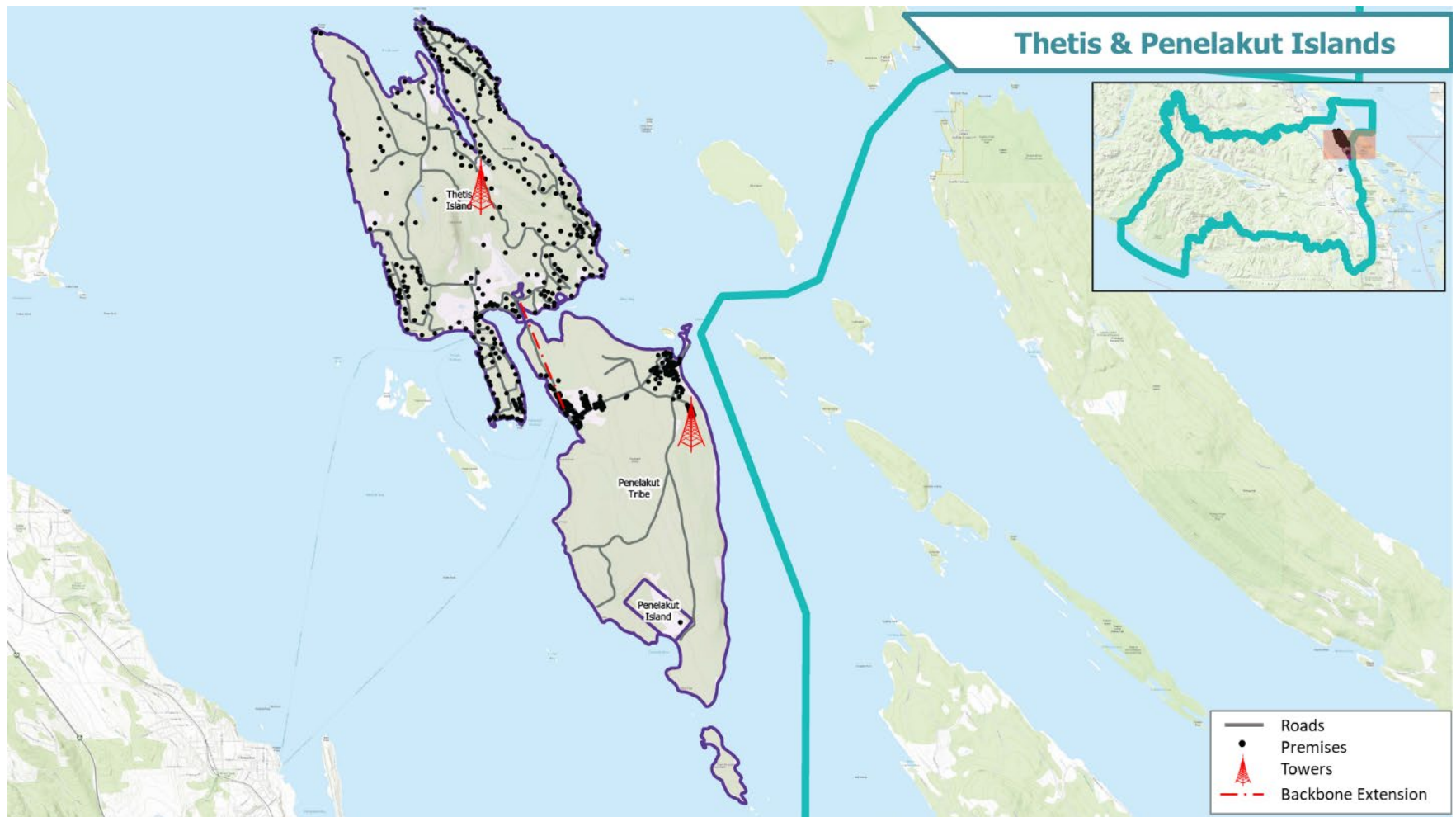


Figure 6: Conceptual Positioning of New Towers and Backbone Extension to Thetis Island

	Thetis Island	Penelakut Island
Underserved Road Segments (m)	25,715	
Underserved Premises	264	
Backbone Extension (m)	2,000	0.1
New Towers	1	1
Cost to Serve Underserved Road Segments	\$1,542,900	
Cost to Connect underserved premises	\$264,000	
Backbone Extension to Area	\$120,000	\$6,000
Towers	\$250,000	\$250,000
Total Estimated Costs	\$2,176,900	\$256,000
Funding Opportunities		
Provincial and Federal Grants (70% construction costs to underserved premises)	\$1,348,830	
Tower Provider Funding		
Unfunded Remainder	\$828,070	
Unfunded Remainder per Premise	\$3,137	
Typical Service Provider Funding per premise	\$2,500	
Potential Community Funding per premise	\$637	
Total Expected Service Provider Total Funding	\$660,000	
Total Community Funding	\$168,070	
Total Funding	\$2,176,900	

Notes:

- Based on the existence of fibre infrastructure to over 99% of homes on Penelakut Island, no additional physical infrastructure should be required on that Island.
- Positioning of cellular towers to be determined through detailed design phase to maximize coverage.
- Due to topology, the eastern shores of each island may be better served by towers on other islands, such as Valdes, Reid or Galiano Islands.
- Depending on the outcome of current applications to build fibre on Thetis Island, community funding may not be required, as it was not required for one of those applications.

8. RECOMMENDATIONS

Based on the needs of the communities, and their openness to accept tower construction, it is recommended to:

- Proceed with advocacy options identified above,
 - Depending on outcomes of cellular coverage advocacy, consider participation in construction of towers; and
 - On Penelakut Island, investigate state of current fibre infrastructure, as well as opportunity for Band to provide internet service as a utility. Conduct additional community engagement to assess support for the presented options:
 - Internet service for all members at their homes
 - Provide free WiFi at community sites, such as band office, etc.
 - Distributed WiFi network with hotspots throughout the community.
-