
# Fraser Valley Regional District
# Rural Broadband Strategy

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**Contents**

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# 1 EXECUTIVE SUMMARY

The Fraser Valley Regional District is comprised of six member municipalities and eight electoral areas and features a wide range of communities, from small rural communities to the fifth largest city in British Columbia (BC). While reliable, high speed connectivity is seen as critical infrastructure in the region's urban centres, the impact of COVID-19, which shifted education, healthcare and employment on-line, has laid bare significant internet service gaps in many of the region's rural areas.

The Fraser Valley Regional District ("FVRD" or the "Regional District") recognizes the need for improved connectivity broadly in both rural and urban areas. The region's Clean Economy strategy recognizes internet connectivity as critical to the region's economic future, including supporting the increasingly technology-based agricultural sector which is the economic engine for the region. The need to be connected reliably, anywhere, anytime is only increasing and Canadians need the ability to function when faced with external forces impacting our ability to receive education, health care and do our work. This is particularly true in remote and rural parts of Canada.

While the FVRD is situated in close proximity to Metro Vancouver and the more urban areas are well served, there are still areas of the Regional District that lag behind and are not on an even playing field with their more urban counterparts. This lack of connectivity restricts these underserved areas from making the most of the information, applications and opportunities that come from a highly connected region. The FVRD does have a number of high-quality service providers, but for certain FVRD areas, these providers stop short of providing the essential services that every Canadian should expect.

This project has identified and documented the state of connectivity throughout the region, though the focus is on the rural electoral areas broadband connectivity. While an estimated 75% of households and businesses in the rural areas would be considered served at the CRTC Universal Service Objective of 50/10, the remaining 25% still lacks connectivity that is consistent with the FVRD's vision. While there are other areas that require attention in the FVRD, the specific areas of Columbia Valley, McConnell Creek, Hemlock Valley, Northeast Corridor Yale to North Hope and Post Creek make up the majority of the underserved areas. There may also be opportunities in some of these potential project areas to collaborate with First Nations governments to jointly address connectivity issues. These areas represent an excellent starting point in meeting the FVRD's connectivity goals.

The magnitude of underserved areas in the FVRD is manageable and achievable with appropriate financial contributions and senior levels of government have made significant funding available to improve rural broadband connectivity. The FVRD region is blessed with significant infrastructure and the interest of providers, industry and First Nations that support the goal of improved connectivity. The FVRD has an important role to play in advancing connectivity for underserved areas of the region. Local government participation can range from simple advocacy all the way to ownership and provision of connectivity services with alternatives along that spectrum which may include partnerships and participation in funding contributions where possible. FVRD must determine where in the range its participation lies. This combined with prioritizing the potential project areas identified in this report and taking the lead on advancing those priorities will result in the achievement of the FVRD vision from a connectivity perspective.

 

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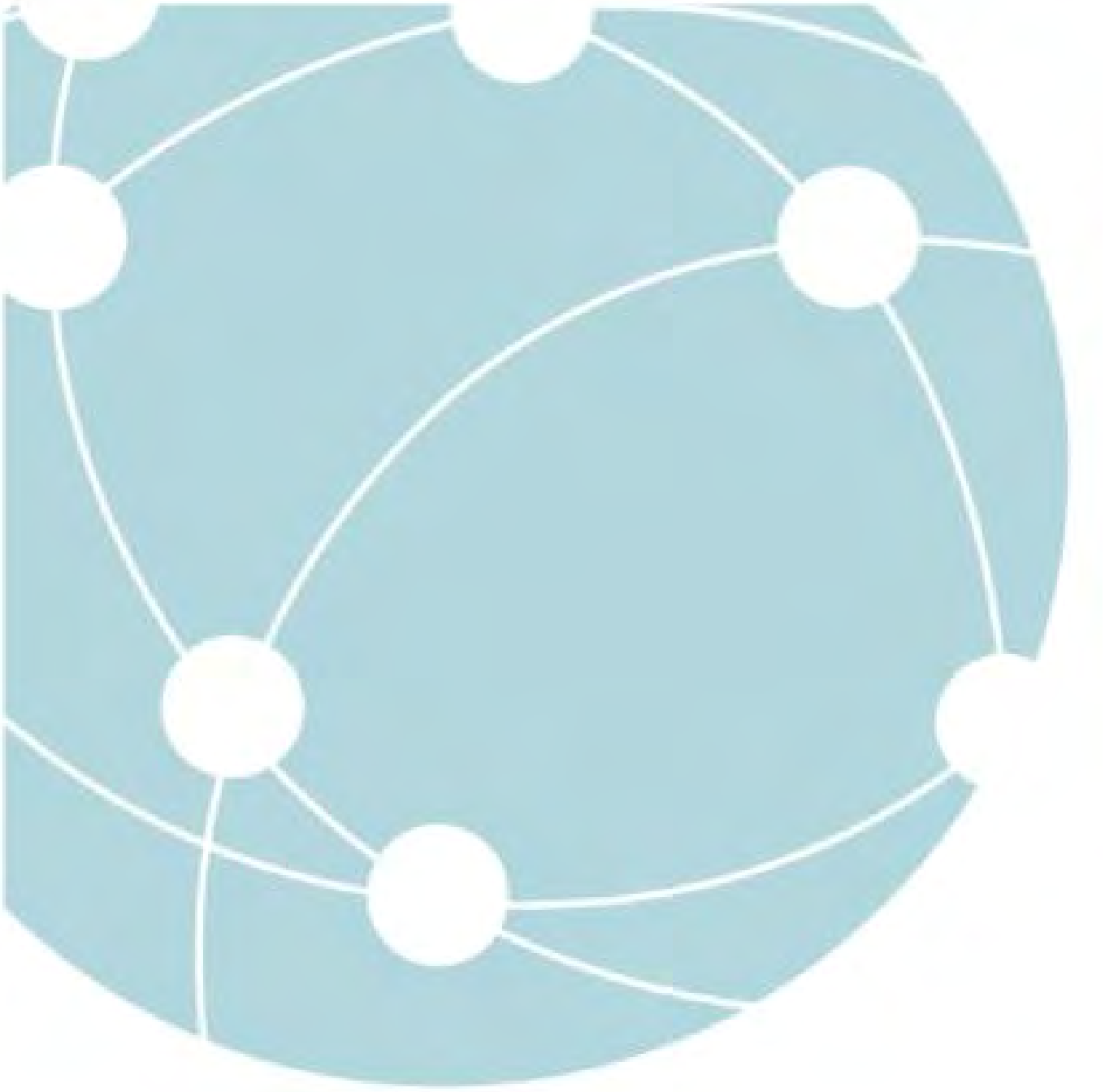

# 2 INTRODUCTION

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## 2.1 Purpose and Organization of Report

This report documents a strategy for the FVRD to improve connectivity in the rural electoral areas in the Regional District that do not have broadband service at the CRTC universal service objective of 50 million bits per second download speed and 10 million bits per second upload speed ("50/10" or the "USO"). The project assesses the existing state of connectivity within the Regional District, identifies the service providers operating in the area, defines the gap between the current state and the Regional District's vision of itself as a fully connected region and then provides a path forward to improve connectivity in the region.

The report has been organized in a manner that steps the reader through relevant background information, vision for the future and expected benefits, and regional analysis including current state and feedback from stakeholders. It then goes on to identify gaps and strategies to fill those gaps with specific potential project areas identified along with high level costs estimated. Finally, a list of next steps were identified to advance connectivity in the rural FVRD.

## 2.2 Intended Audience

This report is intended to be utilized by FVRD staff and its Board of Directors for education, guidance, and planning purposes to support decision making and advocacy efforts to improve access to, and availability of, high speed connectivity throughout the FVRD. This regional connectivity infrastructure strategy has been provided along with ancillary supporting information and documentation to the FVRD for its sole benefit and reference.

## 2.3 Project Scope & Assumptions

The project focused on the rural electoral areas of the FVRD and included an assessment of the existing connectivity in the rural areas of the FVRD along with developing a strategy to improve internet connectivity. The scope of the project did not include an assessment of the member municipalities. It is acknowledged that there are areas within jurisdictional boundaries of the member municipalities which do not have 50/10 service, however an analysis of those areas was beyond the scope of this project. As part of the information gathering on this project, attempts were made to reach out to First Nations to obtain information about connectivity on populated reserve lands, however assessing and creating a strategy for First Nations lands was outside the scope of this project. The report will be shared with interested First Nations as the findings may help support ongoing initiatives to improve internet access in their communities.

## 2.4 General Approach

TANEx and the FVRD worked collaboratively to complete the strategy through various phases of the project. At a high level, developing this strategy included a series of activities including project kickoff, information gathering, public and stakeholder outreach, presentation of draft strategy to the Board of Directors, receiving feedback, and report preparation and finalization.

The current state of internet connectivity in the FVRD was assessed by:

- undertaking public domain research;
- survey of area residents and businesses;
- direct outreach to service providers, stakeholders and community representatives identified as key by the FVRD;
- direct outreach to rural area First Nations.

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An analysis of the difference between the current state of connectivity in the FVRD and the future desired state identified in the FVRD vision was completed. A technical analysis of alternatives to fill those gaps was completed and then a draft strategy was prepared and reviewed with the FVRD staff team. The draft strategy incorporated feedback from the FVRD project team and was then presented to the Board of Directors.

## 2.5 Impact of COVID-19 on the Project

This project kicked off as first wave of the COVID-19 pandemic took hold and ended during the second wave. The pandemic had significant impacts on the project and timeline. COVID-19 created challenges for the project as local government and their First Nation's peers were faced with managing through a once in a generation health crisis. Outreach was delayed and made more challenging.

Of most relevance to this project, the COVID-19 emergency shone a bright light on the critical importance of connectivity for both urban and rural residents as a flood of people tried to work from home, see their doctors remotely, and attend school online. Rural areas with unreliable or non-existent high-speed internet access have faced the greatest challenges. The restart and success of the economy has been driven by the ability to work remotely and be productive. The right to do so and engage in the economy belongs to every Canadian and connecting rural Canadians to broadband service must be of the highest importance as Canada navigates its way through the COVID-19 pandemic.

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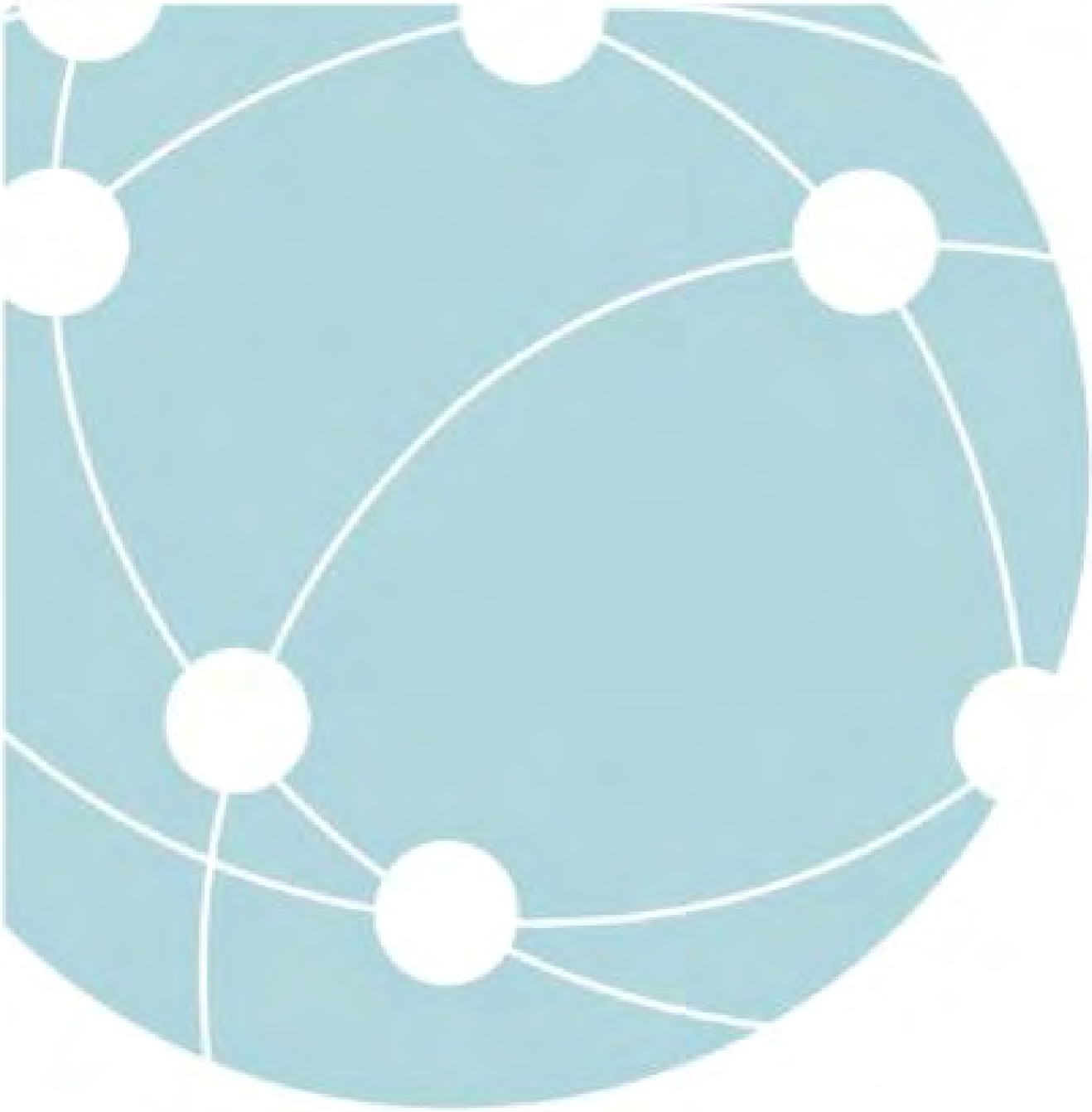


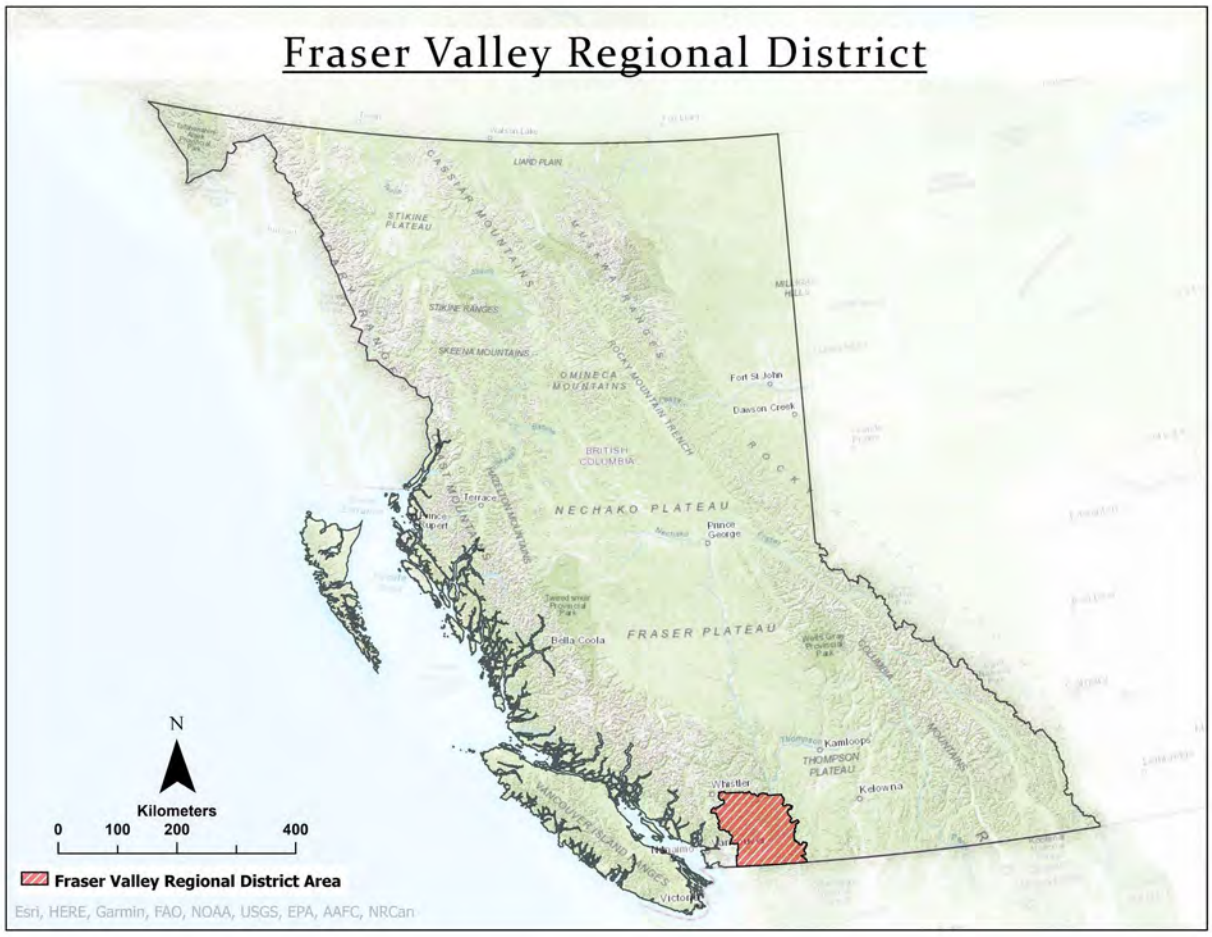
# 3 FVRD SUMMARY

This section provides a background understanding of the Regional District as a whole and a lens through which to view this report, the strategy, and the recommendations.

## 3.1 Geographic Location

The FVRD is situated in southwestern British Columbia just east of Metro Vancouver. The majority of development occurs along the path of the Trans-Canada Highway which runs through the Regional District from Abbotsford in the southwest, to Hope in the southeast, and then up to Boston Bar in the northeast of the Regional District.




## 3.2 Population and Communities

Federal census population numbers at the time of writing are relatively out of date as the most recent census numbers are from the census of 2016 (the "Census"). The Census indicate the population of the entire FVRD is 295,934[1]. Updated estimates from British Columbia for 2019, however, estimate the region's population at approximately 330,000[2] and approaching 500,000 over the next 30 years. The

[1] Statistics Canada, 2016 Census Profile, FVRD Census Profile
[2] B.C. Government, Population Estimates

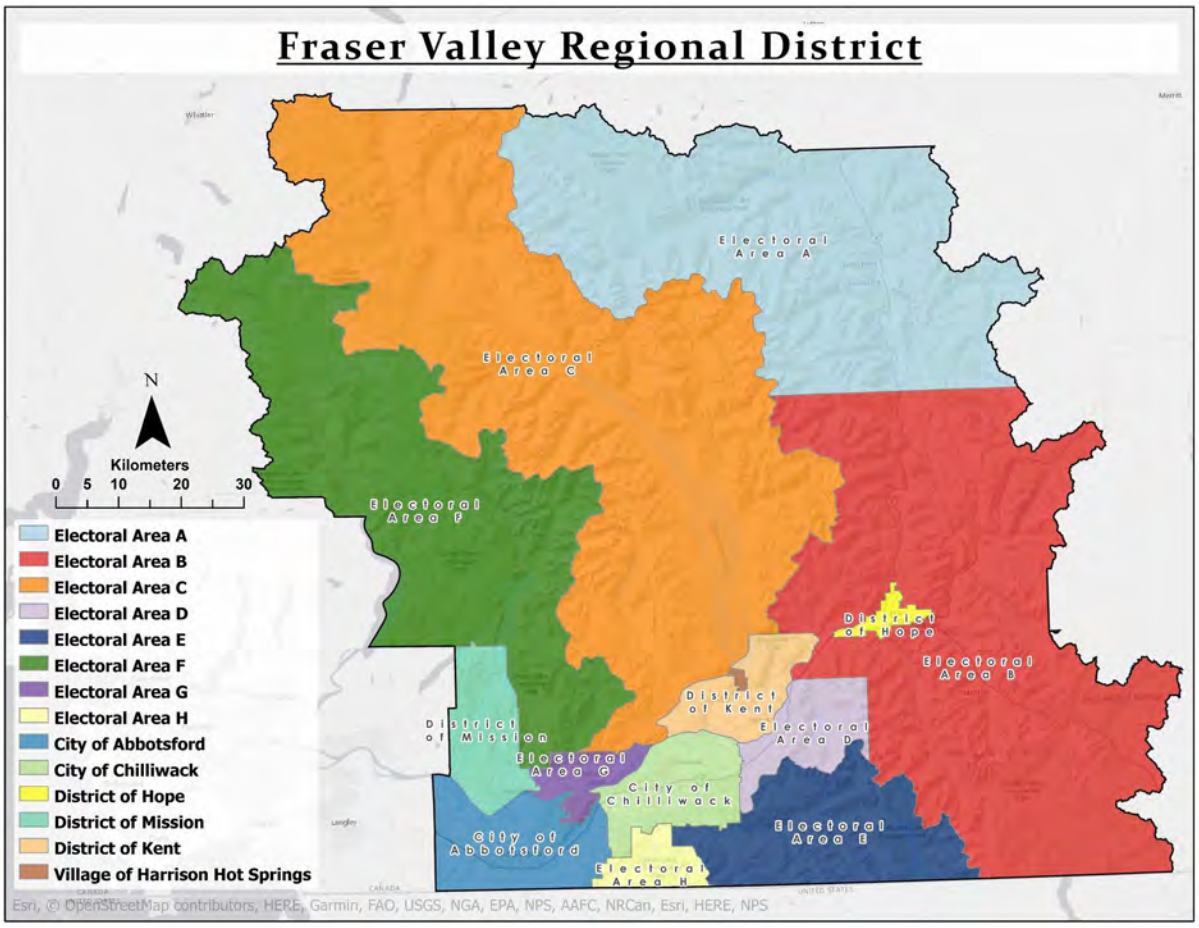
 

FVRD is part of BC's lower mainland area, which is one of the fastest growing areas in Canada[3]. Lying adjacent to Metro Vancouver, FVRD has about 11% of the lower mainland population, which makes the FVRD the third largest region in BC by population[4].

The FVRD is comprised of member municipalities and rural electoral areas. Rural communities are located within electoral areas throughout the region and as noted above, are the focus of this project. All population numbers noted below have been drawn from the Census. Electoral Area population numbers do not include population from within member municipalities or from First Nations' reserve lands.

### 3.2.1 Electoral Areas

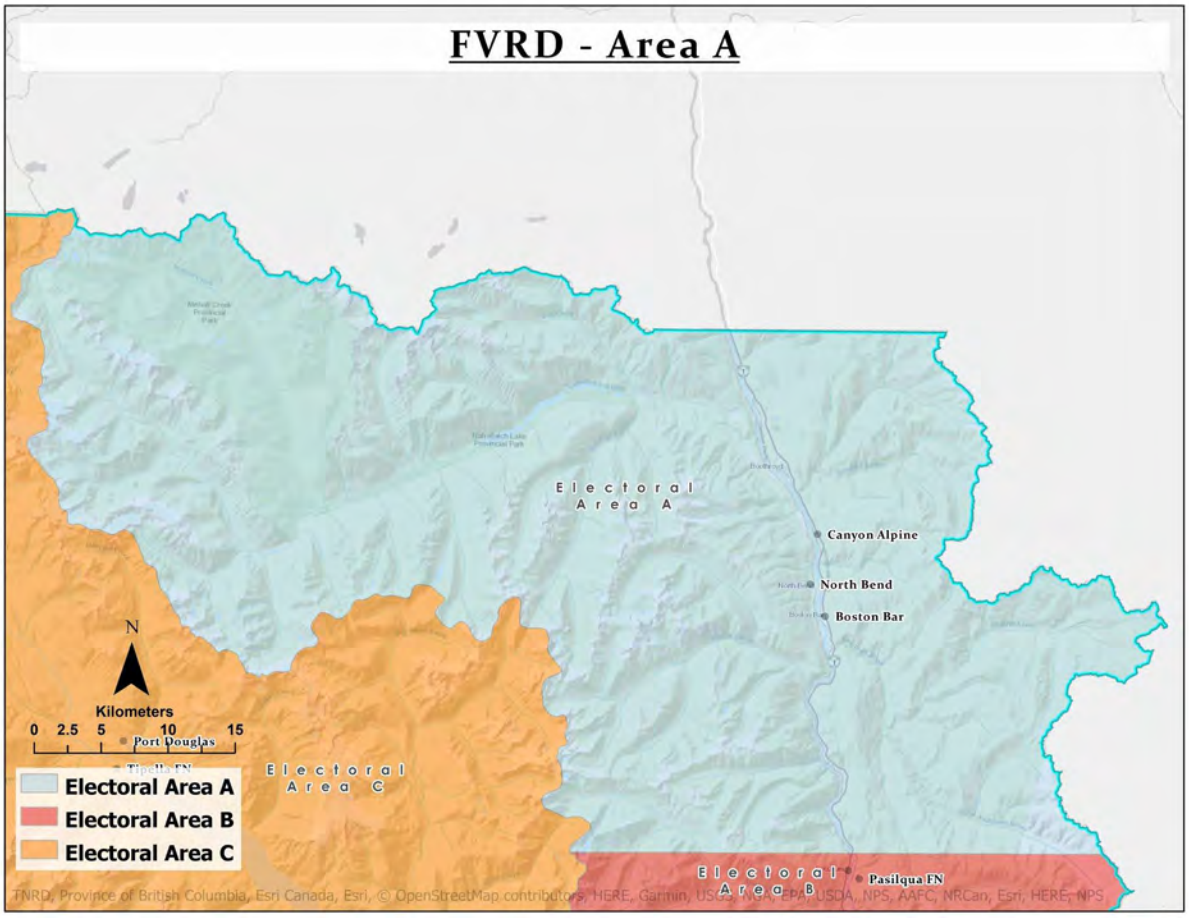
As shown on the map below, the FVRD contains eight electoral areas entitled A through H which were the focus of the connectivity strategy as they are home to the rural communities that the strategy seeks to connect more effectively. Total population for all electoral areas combined is 10,328[5].




[3] FVRD, "Fraser Valley Future 2041" Regional Growth Strategy Monitoring Report - December 2018
[4] FVRD, Fraser Valley Now & In The Future (Regional Growth Strategy Fact Sheet)
[5] Statistics Canada, 2016 Census Profile, Electoral Area Census Subdivisions

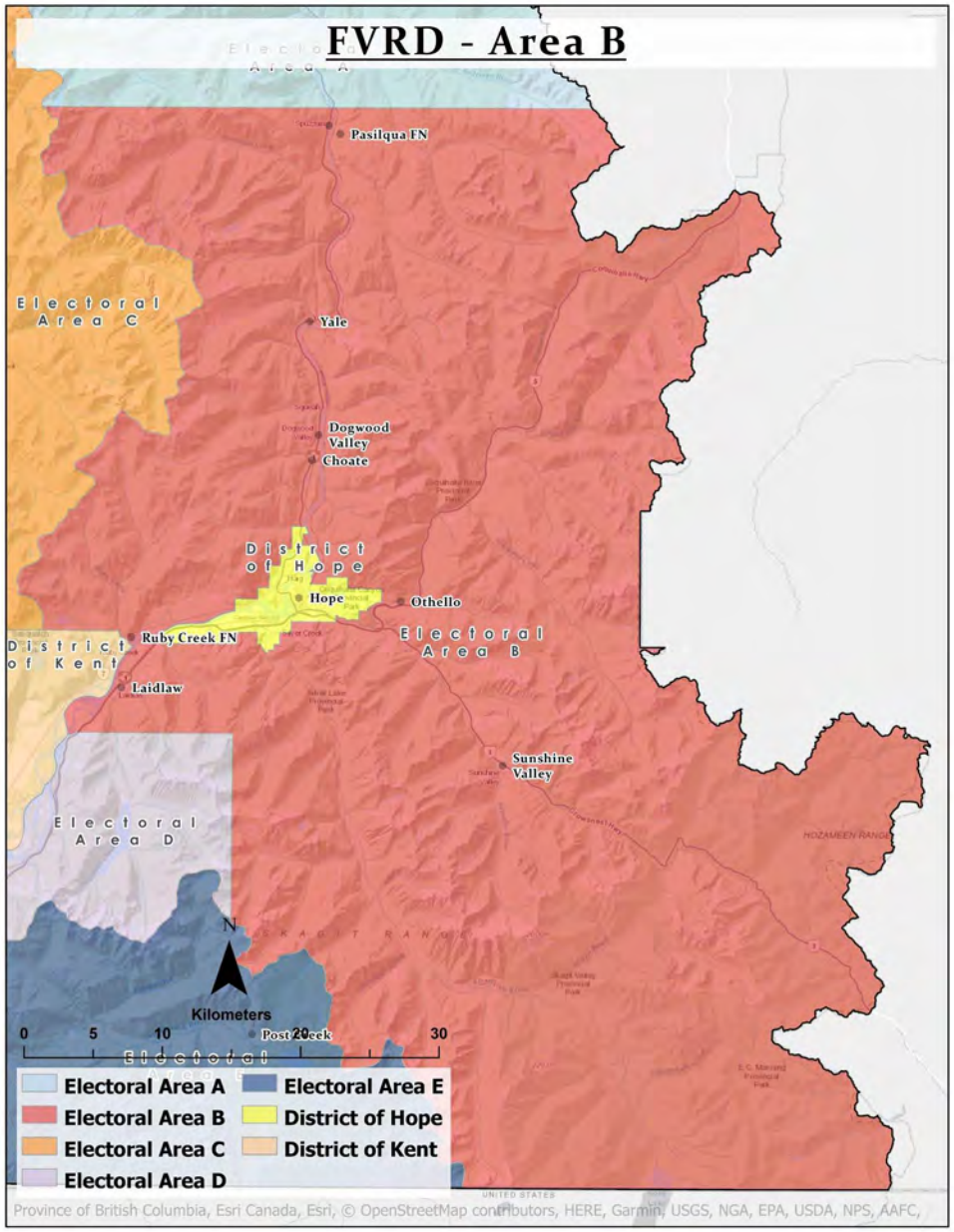
### 3.2.1.1 Area A

Area A is a 2,329 km$^2$ electoral area in the northeastern corner of the Regional District. The small electoral area population of 405 people is clustered along the Trans-Canada Highway which runs through the Fraser Canyon from northern border of the area south through Area A and on into Electoral Area B. The largest communities in Area A are Boston Bar and North Bend. Census states that there are 316 private dwellings in Area A with 234 of those occupied by year-round residents. As noted above, the population and housing numbers do not include the numerous First Nations communities.



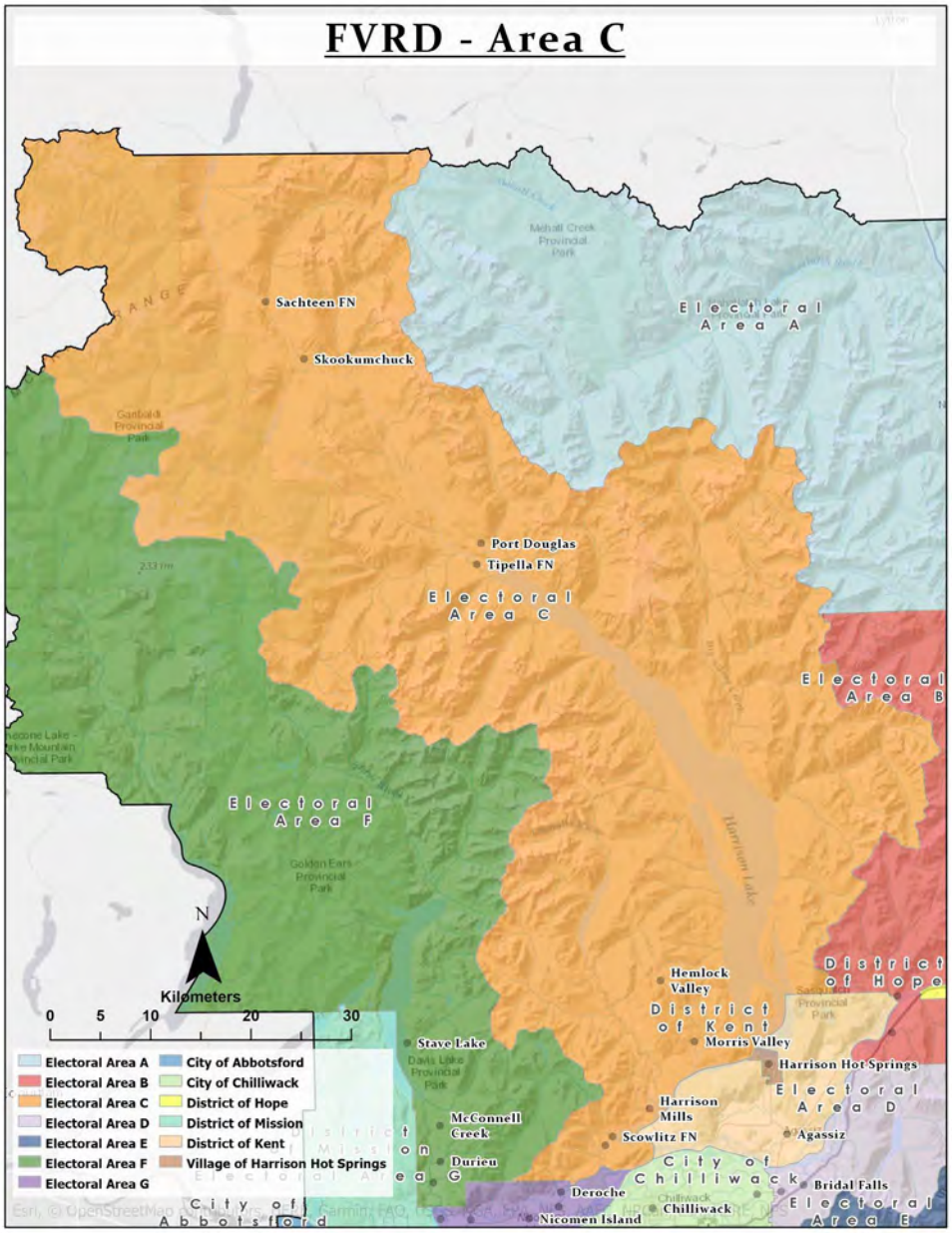
### 3.2.1.2 Area B

Area B is directly south of Area A in the southeastern corner of the Regional District. It is roughly 3,087 km$^2$ and has a population of about 915 people. There are 726 private dwellings of which 392 are occupied by year-round residents. Rural communities in Area B include Choate, Dogwood Valley, and Emory Creek just north of Hope as well as Yale and Spuzzum in the north part of the canyon, Sunshine Valley in the eastern part of the area and Laidlaw in the west. Also in the area are a number of First Nations communities and the District of Hope located in the central western portion of the electoral area at the southern end of the Fraser Canyon.



### 3.2.1.3 Area C

Area C is the largest electoral area in the FVRD, spanning nearly 3,700 km$^2$. A number of First Nations communities such as Skookumchuck and Port Douglas are located at the north end of Harrison Lake which runs through the central part of the region. The primary road access to those communities is from the north from Pemberton in the Squamish-Lillooet Regional District. Near the south end of Harrison Lake is the alpine village of Hemlock Valley and the Sasquatch Mountain Resort. Population in Area C is over 1,000 people with the largest communities in Area C being Lake Errock and Harrison Mills. Hemlock Valley has few permanent residents but swells to several hundred during the ski season. Private dwellings in Area C total 973 with 465 of those occupied by year-round residents.



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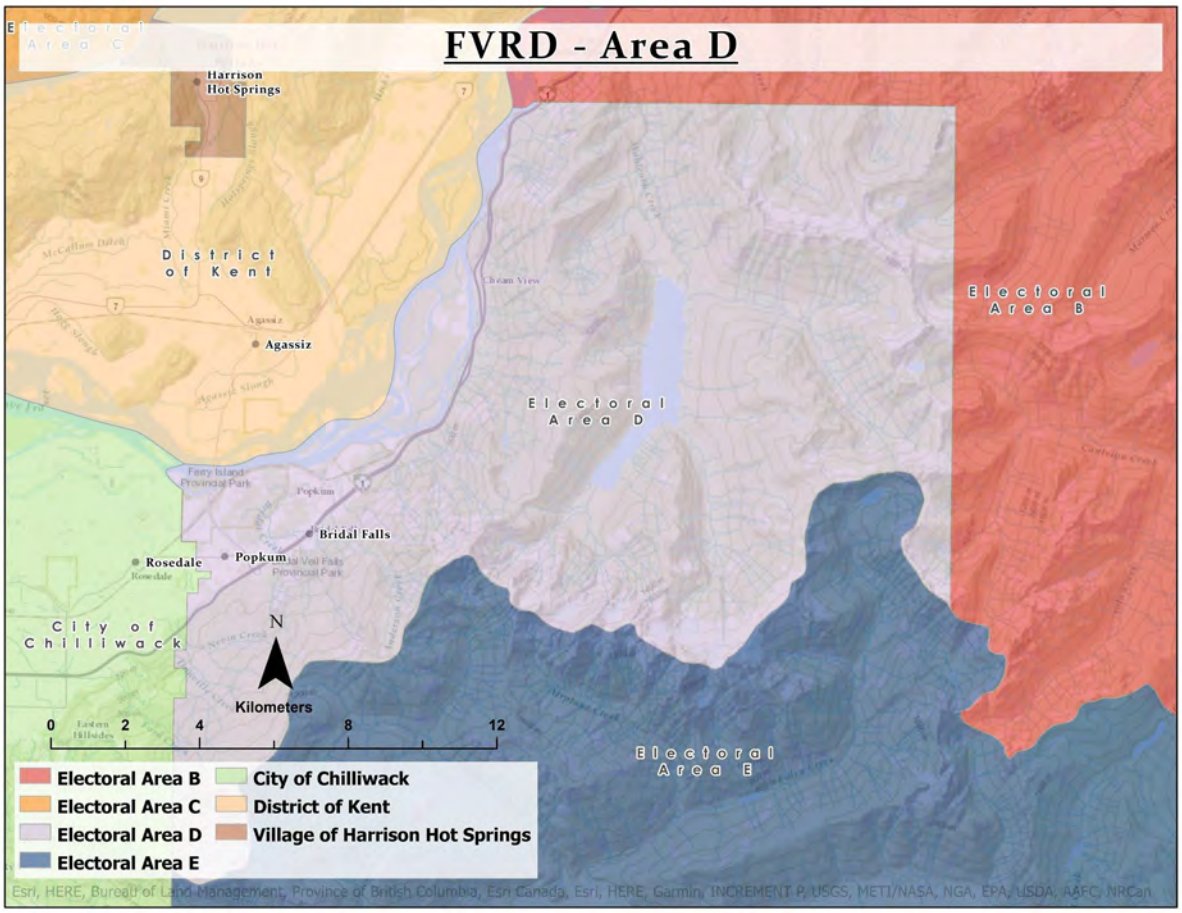
## Area D

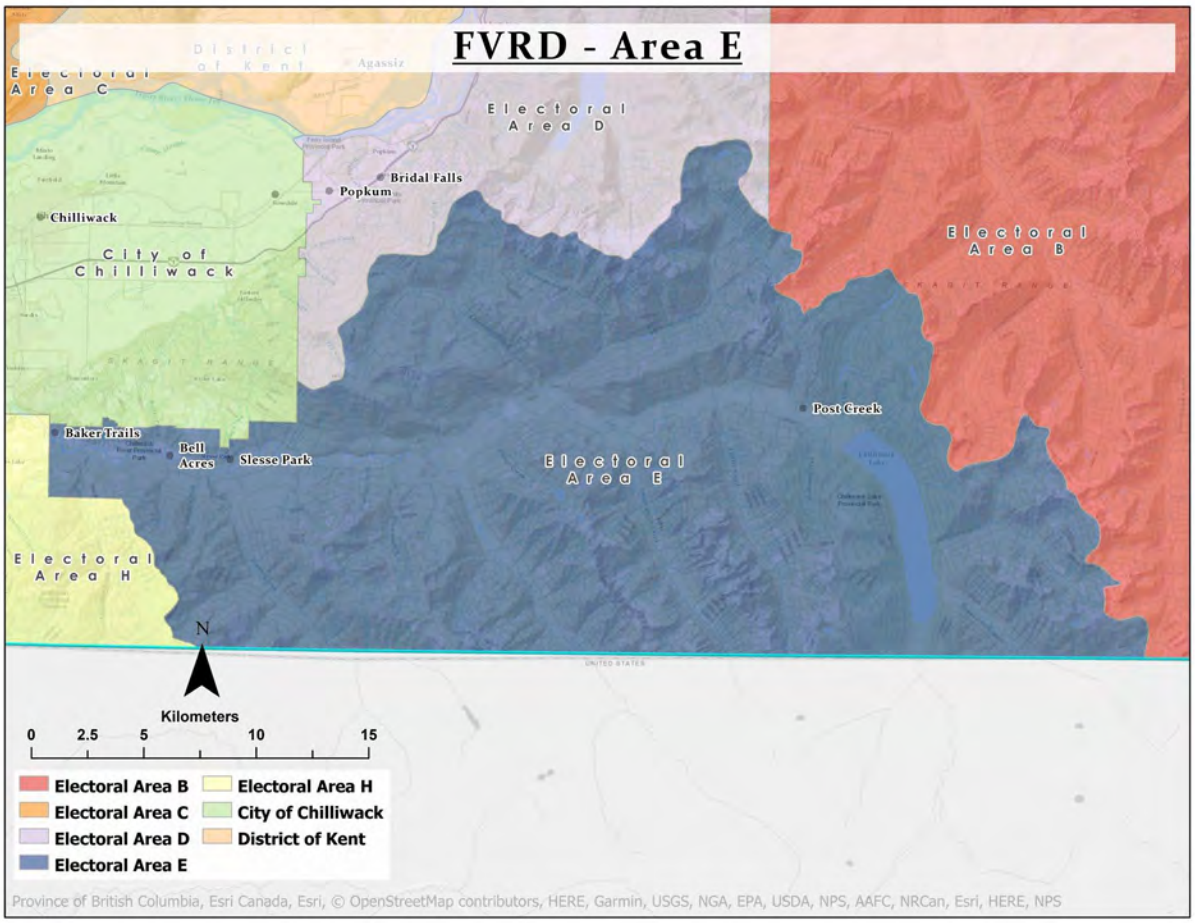
Area D is a smaller electoral area of around 220 km$^2$ centrally located in FVRD. Total rural population is over 1,500 primarily clustered in the Bridal Falls and Popkum areas which translates to higher population density than other electoral areas. The Trans-Canada Highway runs along the western edge of Area D. The Census indicates there are 596 private dwellings in Area D of which most (524) are occupied by year-round residents.



### 3.2.1.4 Area E

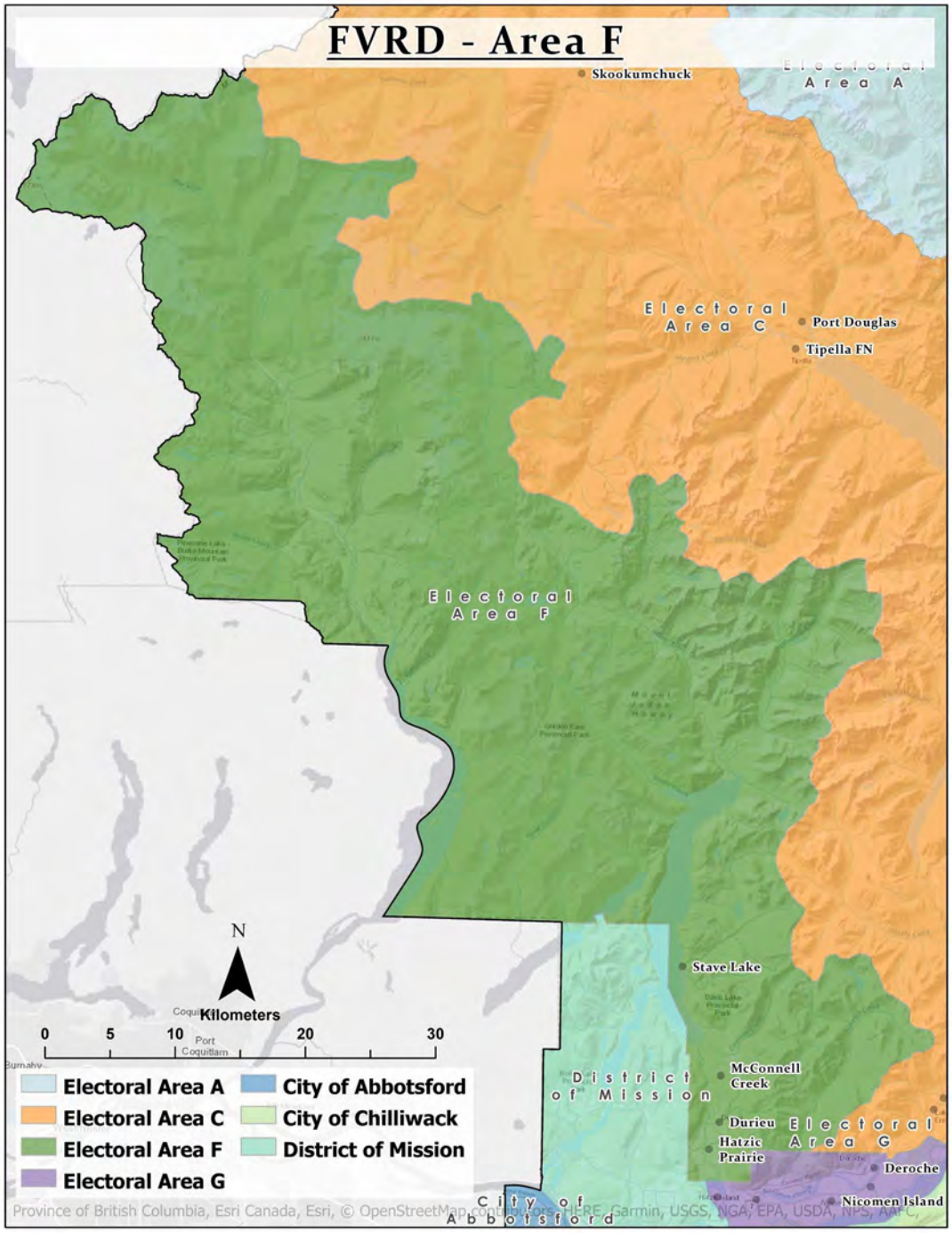
Area E is about 640 km$^2$ in size and is situated in the south-central part of the FVRD bordering the US to the south. The main access route into the area is via the Chilliwack Valley Road that extends from the south side of the City of Chilliwack to Chilliwack Lake Provincial Park. Around 1,500 people live in the rural area and most of those are situated in the western part of the area in and adjacent to the communities of Baker Trails, Bell Acres, and Slesse Park. However, there are also a number of people that live in Post Creek which is located close to Chilliwack Lake in the eastern part of the area. There are 738 dwellings in Area E of which 653 are occupied by year-round residents.



### 3.2.1.5 Area F

Area F is the western most electoral area in the FVRD at just over 2,000 km$^2$. The majority of the nearly 1,300 people live in the communities of Hatzic Prairie, Durieu and McConnell Creek which are located in the southern part of the area near the District of Mission. There are 754 private dwellings and 535 of those are occupied by year-round residents.



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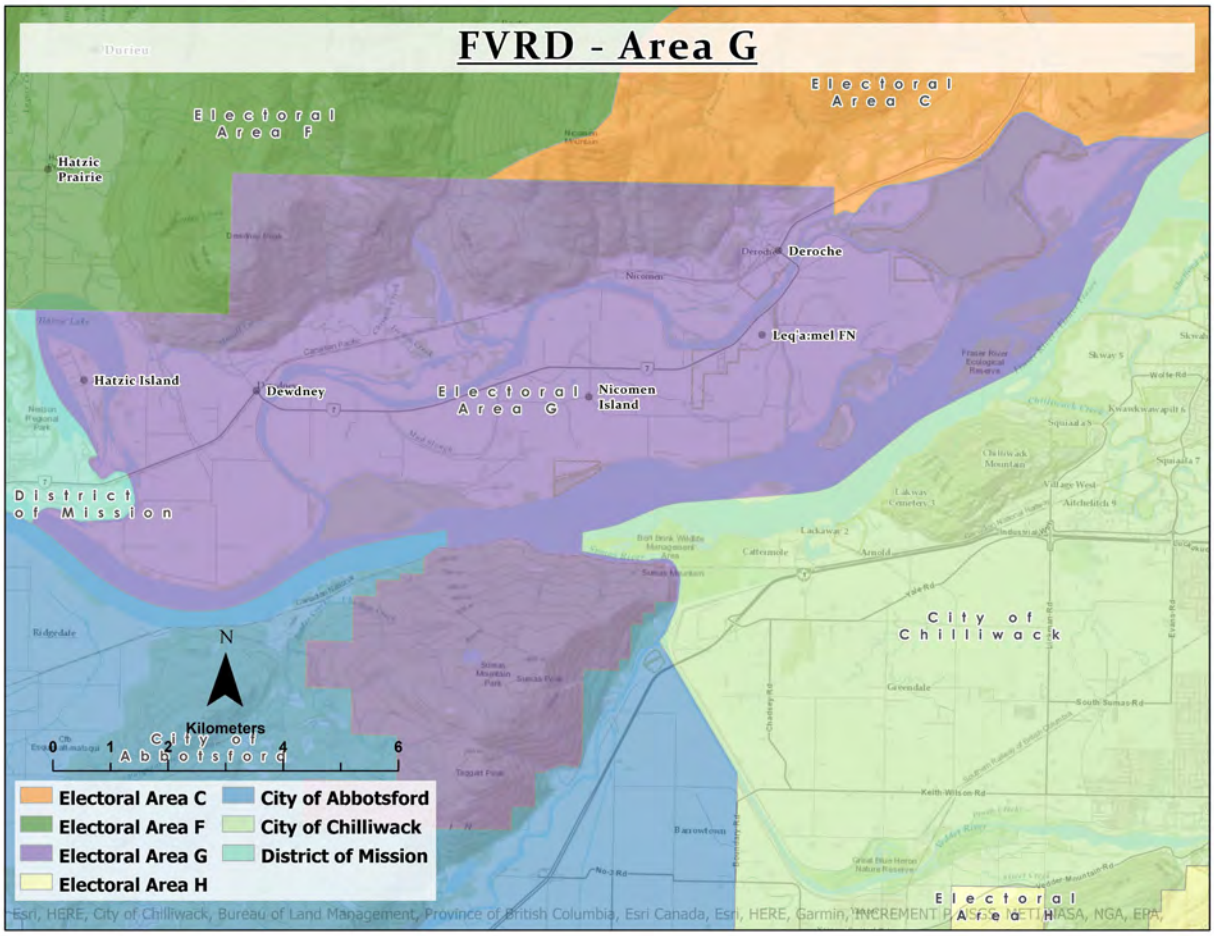
### 3.2.1.6 Area G

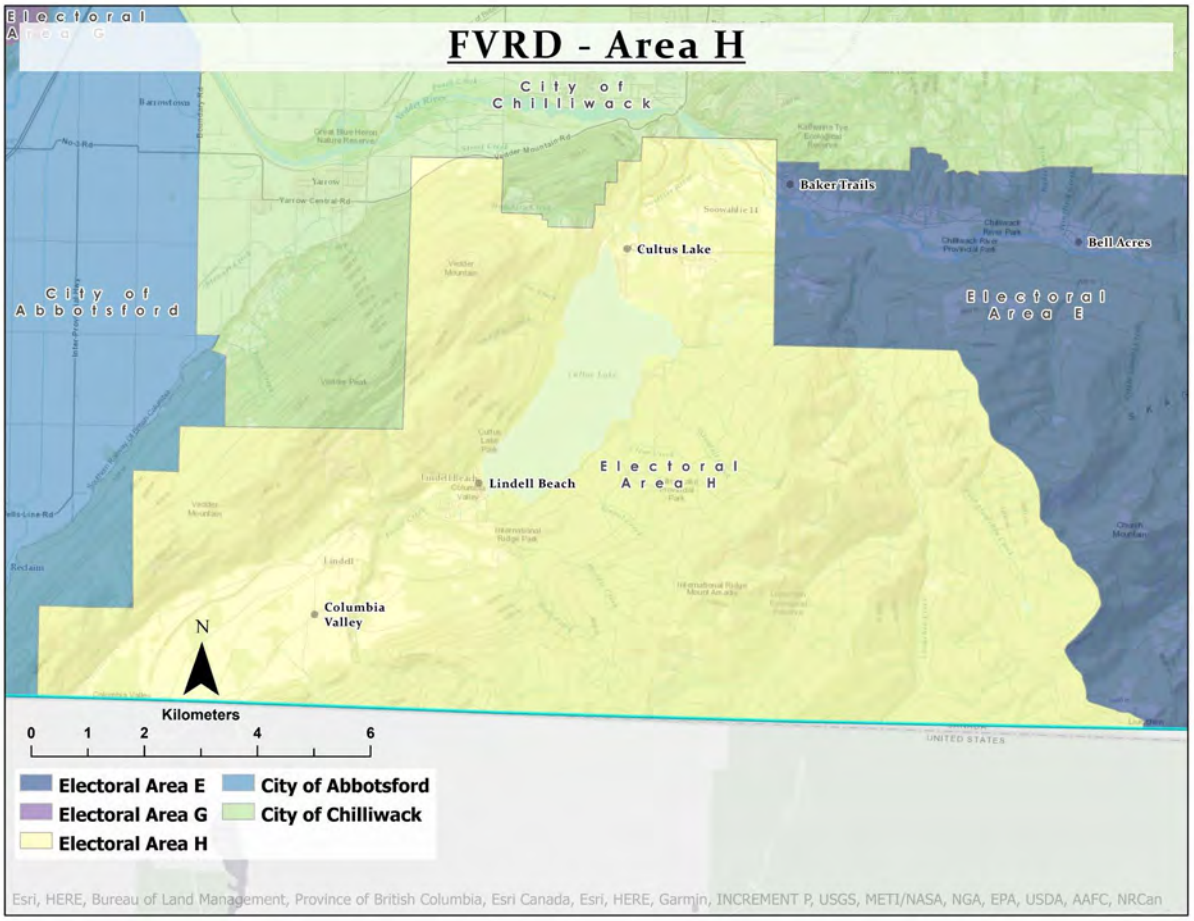
Area G is the smallest electoral area in the FVRD at less than 100 km$^2$. However, it is one of the most populated areas with a population of almost 1,800. There are 991 dwellings of which 733 are occupied by year-round residents. The communities of Dewdney, Deroche, and Hatzic Island are sizable. The populated portion of Area G is on the north banks of the Fraser River east of the District of Mission.



### 3.2.1.7 Area H

Area H is located south of the City of Chilliwack and the site of Cultus Lake Provincial Park, a major tourism destination in the summer months. Like Area E, it borders the United States along its southern edge. Cultus Lake is centrally located within the Area and stands between the two largest communities of Lindell Beach and Cultus Lake. Columbia Valley is to the southwest of Lindell Beach. The area spans only about 110 km$^2$ and has a total rural population of about 1,900. It has 1391 private dwellings but only 862 of those are occupied by year-round residents reflecting the areas's popularity as a seasonal recreation destination. Summer populations are considerably higher.



### 3.2.2 Member Municipalities

Along with the electoral areas noted above, there are six member municipalities within the FVRD:

| Member Municipality | Population 2016 Census (CSD)[6] |
|---|---|
| City of Abbotsford | 141,397 |
| Chilliwack | 83,778 |
| Harrison Hot Springs | 1,468 |
| Hope | 6,181 |
| Kent | 6,067 |
| Mission | 38,833 |

### 3.2.3 First Nations Reserve Lands

There are 30 First Nations Bands in the FVRD in both urban and rural locations. This study focused on rural areas, and within the study area there are 18 bands representing approximately 1,930 residents living within their communities[7]:

| Band/First Nation | Members On/Off Reserve | Land Base (ha) |
|---|---|---|
| Boothroyd | 64/250 | 1131 |
| Boston Bar | 83/193 | 556 |
| Chawathil | 301/337 | 614 |
| Cheam | 193/368 | 463 |
| Leqamel | 126/307 | 481 |
| Peters | 45/124 | 197 |
| Popkum | 1/12 | 150 |
| Samahquam | 71/306 | 177 |
| Scowlitz | 82/197 | 237 |
| Shxw'ow'hamel | 81/120 | 362 |
| Skatin | 60/359 | 677 |
| Skawahlook | 6/88 | 75 |
| Soowahlie | 168/232 | 458 |
| Spuzzum | 46/291 | 648 |
| Sts'ailes | 469/636 | 906 |
| Union Bar | 7/136 | 500 |
| Xa'tsa | 73/283 | 432 |
| Yale | 54/124 | 224 |

Both on and off reserve members are included, as it was noted by some First Nations communities that broadband connectivity was important to attract band members to return to live in their home communities.

[6] Statistics Canada, Census 2016 Profiles
[7] Indigenous and Northern Affairs Canada, First Nations Profiles

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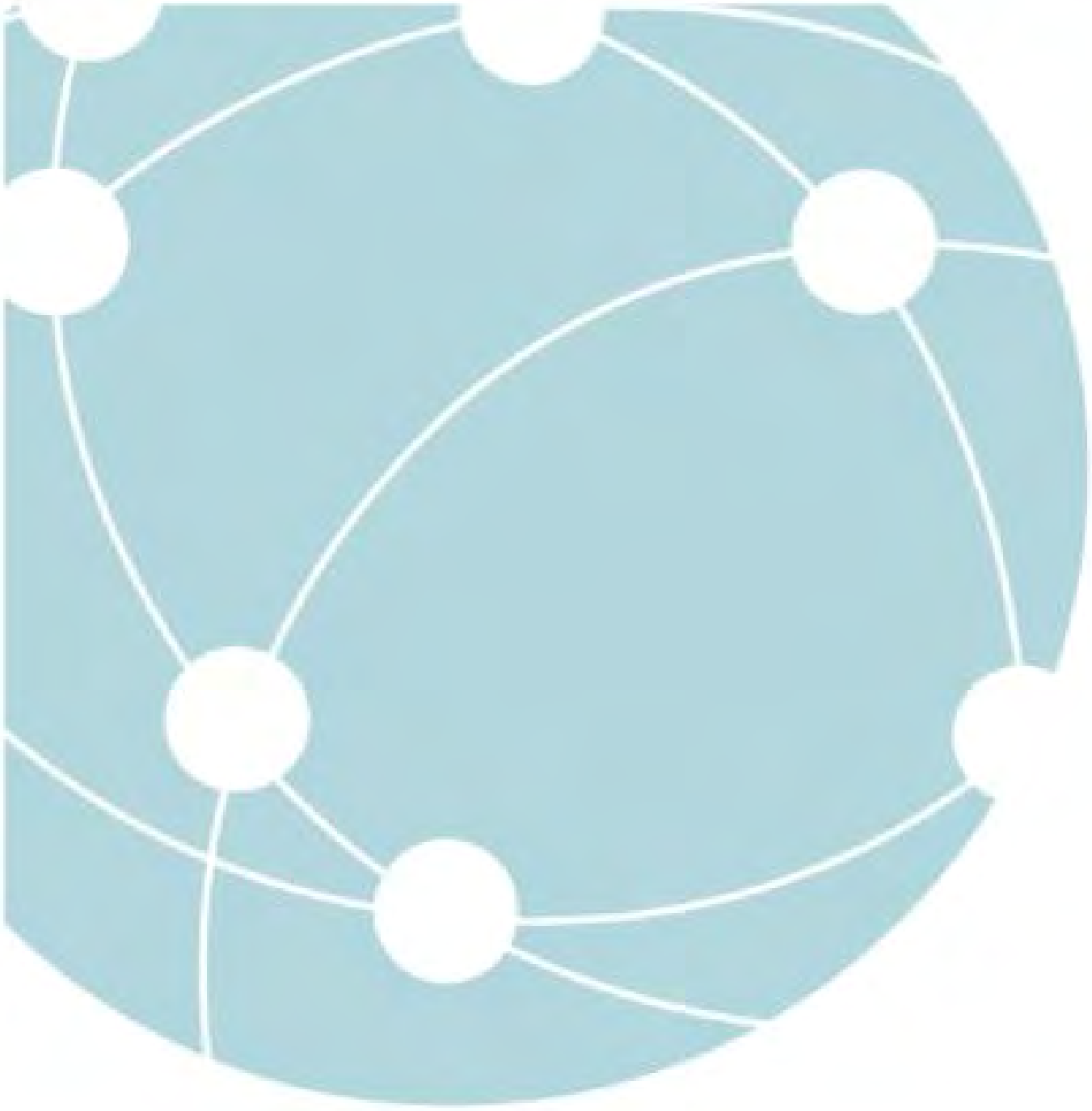

# 4 VISION AND GOALS

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## 4.1 Vision

The FVRD connectivity project team developed its vision of FVRD's future from a connectivity perspective emphasizing ties to the FVRD's *Regional Growth Strategy* and the *Clean Economy Study*. The *Regional Growth Strategy* envisions a network of healthy, vibrant, distinct and sustainable communities that accept responsibly managed growth while being committed to protecting the land resource and the natural environment to ensure that a high quality of life is accessible to all. Connectivity is seen as essential to ensuring that all residents and businesses in the FVRD enjoy the same advantages as more urban communities so that the region can meet its full potential.

> All communities, including remote, rural, and Indigenous communities are **thriving and vibrant**. Residents have access to online education, e-health care, e-finance and the ability to maintain social connections. A highly connected region **provides opportunities for residents** to work from home, be employed with companies in distant cities and to connect to a global marketplace. Reliable connectivity creates **new opportunities** beyond the reach of the local economic base and allows residents to remotely **acquire the skills** necessary to **participate in the knowledge-based and cleantech economy**.

## 4.2 Goals & Benefits

The FVRD connectivity project team also developed a list of the benefits that better connectivity would create for the FVRD to help meet the goals of the *Regional Growth Strategy*. The following summarizes the benefits expected to be realized by improving connectivity in the Regional District's Electoral Areas:

### Collaboration

Goal: To achieve our common goals for the future of the region by encouraging collaboration between jurisdictions, cultures, and neighbours.

Benefit:

- Enhances the ability of remote, rural, and Indigenous communities to collaborate through increased options for communication.

### Economic Strength and Resiliency

Goal: To realize the region's economic potential by providing opportunities in employment and education that will grow the economy by building on the region's strengths.

Benefit:

- Supports online education and remote employment;
- Supports business development by allowing the use of technology in fields such agriculture;
- Facilitates the implementation of the recommendations in the *Clean Economy Study.*

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### Living Well

Goal: To ensure everyone is able to maintain a high quality of life, regardless of age, income, or ability.

Benefit:

- Ensure everyone is able to access the mental, social and physical support they need to live healthy and fulfilling lives.

### Community Building

Goal: To create compact, complete communities that strengthen urban cores, maintain rural character and offer choice and affordability in housing.

Benefit:

- Ensures that rural communities have access to the same opportunities as urban communities; and
- Maximizes the productivity of agricultural lands by facilitating the use of the new technologies.

### Ecosystem Health

Goal: To protect the air, water, and biodiversity on which we depend.

Benefit:

- Provides the opportunity for remote work reducing the need to commute, improving air quality.
- Facilitates the use of new technologies that can reduce human impact on the environment.

### Transportation & Mobility

Goal: To develop an integrated, safe, and efficient transportation system for people and goods that promotes walking and cycling and minimizes the transportation system's impact on air quality.

Benefit:

- Reduces strain on transportation systems by providing the option for some people to work, attend school, access health care, and socialize online.

### Infrastructure and Services

Goal: To provide efficient, sustainable, and cost-effective services that contribute to compact and sustainable growth.

Benefit:

- Improves public safety by supplying the infrastructure to allow communication in emergencies.

### Energy and Climate Change

Goal: To increase energy efficiency and reduce greenhouse gas emissions in order to minimize the region's impact on climate change and to mitigate impacts of climate change on our region.

Benefit:

- Supports the use of new technology outlined in the *Clean Economy Study* that improve energy efficiency and reduce greenhouse gas emissions.

## 4.3 Supporting Identified Goals

### 4.3.1 Clean Economy Study

In 2019, the FVRD completed the *Clean Economy Study*. The Study provided an overview of clean economy sector opportunities that build on the region's existing economic strengths. The report is centered on several key themes:

- Sustainable resource and ecosystem management
- Green and sustainable transportation
- Green and high-performance buildings
- Renewable energy supply and storage
- Knowledge and innovation

Some of the technologies included in the theme areas are precision agriculture and data driven crop farming management, the internet of things, smart transportation systems and technologies, advanced building controls and technologies, distributed energy systems and grid infrastructure, digitization of energy, artificial intelligence, virtual reality, the FinTech-Block chain market, biotechnology, and additive manufacturing such as 3D and 4D printing.

High-speed internet connectivity provides a critical foundation for many of these technologies. Connectivity gaps have been identified as a limitation to expanding the FVRD clean economy and further highlights how important rural connectivity is for the region to take full advantage of clean economy opportunities.

### 4.3.2 The Future of B.C.'s Food System

The Province of B.C. recently completed *The Future of B.C.'s Food System* Report. This report envisions future changes and opportunities for how B.C's food sytems and includes a set of recommendations to increase the competitiveness, efficiency and profitability of the agricultural sector of British Columbia, through technology and innovation[8]. A major part of this includes development of the agritech industry.

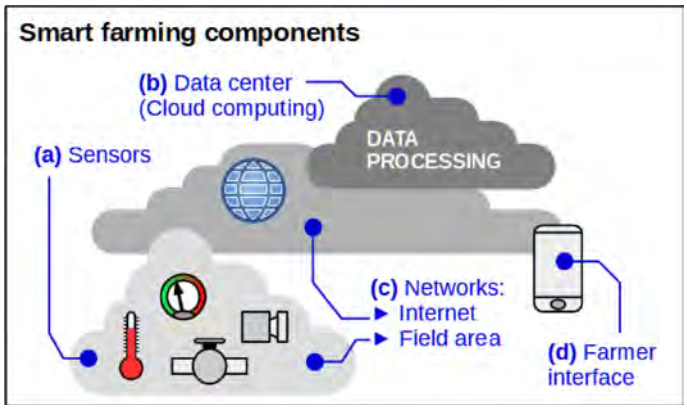
Dr. Lenore Newman was one of the task force members for the *The Future of B.C.'s Food System* report, is Director of the Food and Agriculture Institute at the University of the Fraser Valley and is currently Canada Research Chair in Food Security and Environment. In discussions with Dr. Newman about the state of farm connectivity in the region, it became evident that farmers currently lack access to the networks necessary to utilize existing technology (e.g. field sensors and cloud analytics). Although cell mobile radio is one solution for field network coverage, the service becomes spotty as distance from urban concentrations and major highway corridors increases. Many farms still rely on

[8] The Future of B.C.'s Food System

dial-up internet access, which is slow to the point of being dysfunctional on today's internet and satellite, which is prohibitively expensive for real broadband usage.

In 2015 the FVRD generated 39% of total provincial gross farm receipts, the most of any regional district in B.C. [9] Given the significant proportion of the FVRD's agricultural economy to the broader agricultural economy in B.C., high speed broadband connectivity will be required throughout rural agricultural areas of the Fraser Valley in order for B.C. to enact the vision of *The Future of B.C.'s Food System* report and to take full advantage of opportunities in the agritech sector,

Agritech (also referred to as "smart farming") is important for food security and given the critical nature of agriculture generally, and its importance in the FVRD specifically, smart farming will continually grow with current and future Clean Economy initiatives. Technologies and the way that they are deployed continues to expand, and significant successes are being reported.




Communication networks are essential infrastructure to underpin smart farming. As with many industries, reliable communications are the building blocks for these initiatives and without this solid base, none of these technologies can improve the agricultural sector. As shown in the diagram, smart farming components include: (a) sensors that gather data; (b) data processing to analyze the data and recommend or initiate actions; (c) the communication network that connects everything together; and (d) interface for viewing findings and exercise control.

## 4.4 eHealth

The Province of BC has an eHealth program that is about using information technology to provide healthcare information online[10]. It has eight health projects underway that will bring lab results, x-rays, cat scans and MRIs, medication histories, electronic prescriptions, and electronic medical records to help patients anywhere health care is delivered in B.C. The eHealth program includes Connecting Diagnostic Imaging Project, the Provincial Laboratory Information Solution, Electronic Health Record Service, Public Health Information Project, Telehealth, Registries Project, Physician Information Technology Office Program, and the eDrug Project. For the eHealth program to be delivered across BC, rural broadband will be required.

## 4.5 Connectivity Goals

[9] Regional Snapshot Series: Agriculture - Agricultural Economy in the Fraser Valley Regional District
[10] Province of B.C. – *eHealth Overview*.

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## FVRD Connectivity Goals

**Goal #1:** Provide opportunities for residents and businesses to take full advantage of existing opportunities on a level playing field with their urban counterparts by ensuring that 90% of dwellings and businesses within 250 m of an NBD road[11] in the FVRD electoral areas have access to broadband connectivity at a minimum level of 50/10 by the end of 2026.

**Goal #2:** Support the FVRD agriculture industry by making broadband connectivity available at a minimum level of 50/10 to 75% of dwellings located within 250 m of an NBD road on Agricultural Land Reserve ("ALR") lands. Cover 90% of ALR lands in the electoral areas of FVRD with mobile wireless coverage by the end of 2026 that is sufficient for agricultural applications.

**Goal #3:** Promote FVRD anchor institutions such as libraries, schools, first responders and government offices located in the electoral areas as "best in class" public institutions by connecting a minimum of 90% of them with access to high speed fibre or at a minimum, 50/10 service by the end of 2026.

**Goal #4:** Improve public safety along major/minor roads* in rural FVRD by improving existing access to 911 to 90% coverage within 5 years and providing infrastructure that will support Next-Gen911.
*https://www2.gov.bc.ca/assets/gov/driving-and-transportation/transportation-infrastructure/planning/inventories/bc_numbered_hwy_functional_classes.pdf

**Goal #5:** Advance at least one FVRD priority project to be completed by the end of 2021.

With respect to goals with respect to cellular technology identified in goals 2 and 4 above, it is acknowledged that it is very difficult to accurately pinpoint existing coverage as the nature of the technology is that it can be spotty within an area shown as covered. Further, along roads, it is likely that there may be stretches of that road that do not have cellular coverage. This will make it more difficult to assess the success of the cellular goals. It is likely to be a qualitative assessment only.

[11] 'NBD' – 'National Broadband Data' road from Innovation, Science & Economic Development Canada

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# 5 METHODOLOGY

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## 5.1 Methodology

This section described the methodology used in gathering information used in the report for mapping and outreach. The information obtained will be summarized later in the document.

### 5.1.1 Mapping Methodology

Part of the information gathering process involved obtaining available GIS data from the FVRD along with other sources and using it to create maps. The methodology and discussion of elements used for creating the important layers in these maps is generally laid out below.

**Sources** – The sources used in the analysis include the FVRD, various stakeholders corresponding to the affected areas, the CRTC, Statistics Canada, and BC Open Data. The main dataset of analysis was sourced from the FVRD and included the Points which are discussed in more detail below. The material sourced from the CRTC included the hexagons that indicate which type of service is available in a location[12]. Examples of the types of service include cable, fibre, DSL, wireless among others. Data from Statistics Canada included census data that determined the number of people and the number of dwellings in certain communities within the FVRD. Another important layer sourced from the CRTC/ISED is the National Broadband Road Segments layer which is discussed in more detail below[13]. The existing infrastructure dataset that came from the public sources showed where existing cell towers and fibre lines were located[14]. Contextual information sourced from BC Open Data included anchor institutions such as schools, hospitals, government buildings, etc[15]. Road networks, administrative boundaries, and other layers were also sourced from BC Open Data and the FVRD.

**Potential Subscriber Points** – Potential subscriber points ("Points"), are one of the most important datasets in the analysis. TANEx used FVRD's GIS dataset to create Points as a collection of polygon centroid points derived from property parcel layers. This collection of Points approximates a potential subscriber location which may be a single dwelling or multiple dwellings within one geographic location. The Points were then assigned both density and available internet speed characteristics which are discussed in more detail below. The combination of Point characteristics created the foundation for delineating proposed project areas and the overall characteristics of those project areas as discussed in the project areas section below.

**Density & Density Buffer Areas** – In order to gauge the density of certain areas, six buffer zones around the Points were created. The six buffer distances used were 25m, 50m, 100m, 200m, 1km, and 2km. Individual buffer zones emanating from the Points were then dissolved into contiguous areas. If any of the buffer zones contained only one Point, they were erased. The results are contiguous areas that contain two or more Points. If a Point falls within a buffer zone, it is designated as Type 1 (25m), Type 2 (50m), Type 3 (100m), Type 4 (200m), Type 5 (1km), or Type 6 (2km) density, defaulting to the higher designation if it falls within two or more of the buffer zones. If a Point does not fall within the lowest density buffer zone designation (Type 6), it is designated as Type 7 which means it is outside the 2km buffer area. Such Points are very remote and very rare.

**Speeds & Speed Buffer Areas** – Innovation, Science and Economic Development Canada (ISED) maintains a dataset of national broadband road (NBD) segments which designate the internet speed a person could expect if they lived in the area of that road. ISED notes that the data collected and used

[12] Government of Canada, *National Broadband Data Information*, Hexagonal Grid of Canada
[13] Government of Canada, *National Broadband Data Information*, National Broadband Data Road Segments
[14] Steven Nikkel, 2020, *Canadian Cell Towers Map*
[15] Government of British Columbia, BC Data Catalogue

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internally by ISED is, in most cases, accurate to within 250 metres[16]. This data is based on information provided annually by service providers[17].

Based on the accuracy ISED denotes, as referenced above, a buffer of 250m from the road segments data was created to capture assumed download and upload speeds for a Point located within the buffer. The range of speed combinations (download speed/upload speed in Mbps are as follows: 50/10, 25/5, 10/2, 5/1, Less than 5/1, or No Service. If a Point fell within two or more buffers, then it was designated with the higher speed buffer. If a Point did not fall within a buffer, its speed was undeterminable and was designated "Unknown".

**Project Areas** – Project areas were created from the Points and the density buffers. Minor project areas were delineated 1km around the most dense clusters of Points with a number of things in mind: Point characteristics for density, speed, topography, and distance between clusters. Lower density Points such as those 2km or further away from another Point were omitted from project areas. Large, consistent clusters of Points with speeds of 50/10 Mbps were also omitted since they already have service at the USO. Points and clusters of Points separated by natural boundaries (e.g. cliffs, water bodies, etc.) were either omitted or split into different areas where necessary. Clusters of Points far away from others were not determined to be logical groupings unless absolutely necessary such as when they fall along corridors where existing or future fibre lines may run. Minor project areas were then grouped together into major project areas based on proximity to one another and connecting features such as fibre lines/highways. Priority project areas were selected based on the priority areas of the Regional District, the number of Points within the areas, and/or the feasibility of infrastructure implementation in the project area. For example, project areas along highways and in less remote areas are more feasible to implement.

**Fibre Lines** – The routes of fibre lines were sourced from public domain. Fibre lines and an understanding of where they are situated are important since they form a key element of the network infrastructure needed to serve potential customers.

**Cell Towers** – Cell tower locations and data were also sourced from public domain. Cell towers are another important element in providing existing and potential future internet service to underserved areas and their constituents.

**Service Provider Coverage** – Service provider coverage was sourced from ISED databases and where possible, verified with the service provider. The databases derive their information directly from individual service providers. Some of the information is older and may be out of date but nonetheless gives a sense of which service providers operate in which area and what types of technology they utilize in those areas. Examples of such technology include coaxial cable, DSL, fixed wireless, or Fiber-to-the-Premises/Home.

**UTM Zone 10N** – The geographic coordinate system used for analysis and mapping was the Universal Transverse Mercator Zone 10N. This coordinate system was chosen since it covers and aligns nicely with the entire FVRD and therefore the distances between geographic features are relatively reliable and accurate.

[16] Innovation, Science, & Economic Development Canada
[17] Government of Canada, *National Broadband Data Information*, National Broadband Data Road Segments

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### 5.1.2 Outreach Methodology

#### 5.1.2.1 Public

Public outreach was addressed by developing a survey with the FVRD connectivity team. That survey was available online and in paper form. Public surveys were available to residents, businesses, organizations, First Nations, and institutions and delivered feedback about different aspects of internet and cellular service. A summary of the results of the surveys are available later in this report. Reported results are simply as reported by the participants with it being beyond the scope of this report to undertake any form of validation including with respect to cost and speed of service.

#### 5.1.2.2 Key Stakeholders

Key stakeholders were identified by the FVRD and telephone or email contact was made or attempted to be made with those stakeholders to obtain information and views on the state of connectivity, future goals, benefits and challenges from their perspective. Stakeholders included community leaders, community champions, industry representatives and other parties holding valuable insight into the connectivity challenge. A summary of the feedback obtained from those key stakeholders is contained later in this report.

#### 5.1.2.3 First Nations

First Nations communities located in the electoral areas were contacted via phone, email, and letters and offered the opportunity to conduct interviews to obtain information and views on the state of connectivity, future goals, benefits and challenges from their perspective. Bands were also offered the opportunity to participate in the project survey on internet connectivity in their communities.

#### 5.1.2.4 Internet Service Providers

A list of service providers was created from information provided by the FVRD as well as research of publicly available sources of providers in the area. TANEx attempted to schedule telephone interviews with all known area service providers and almost every service provider participated in a telephone interview along with some providers not currently providing services in the FVRD.

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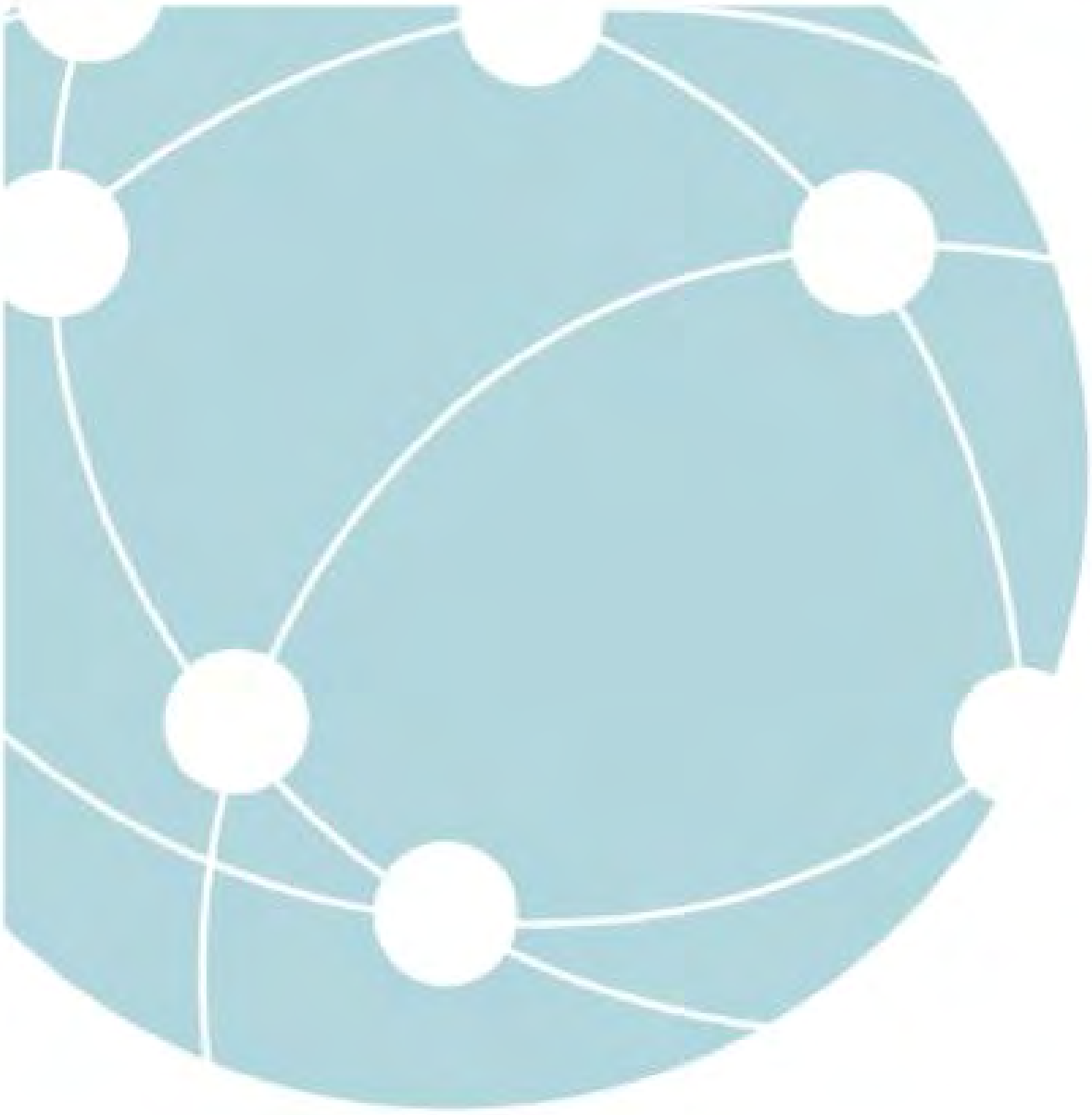
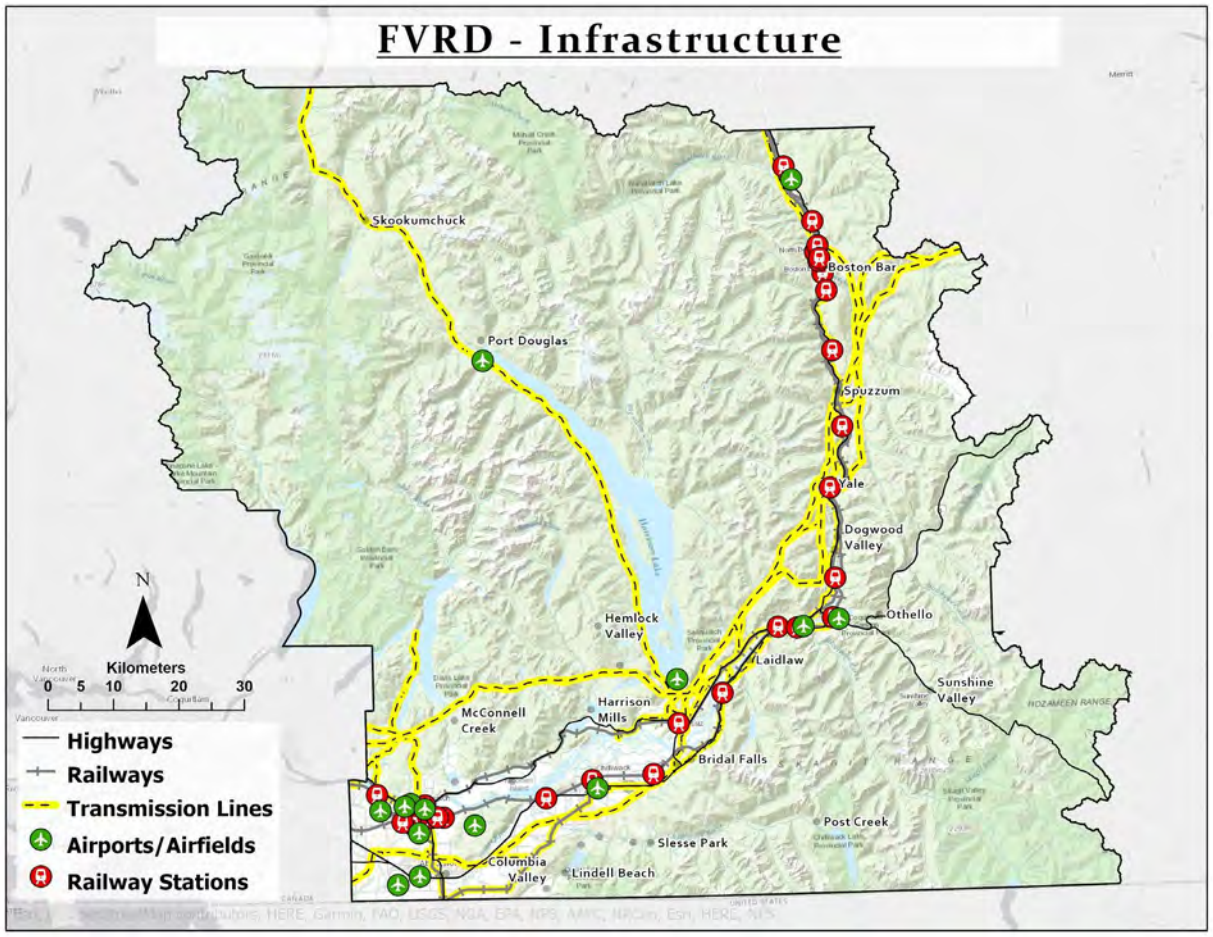


# 6 FVRD CURRENT STATE

In order to formulate a strategy for the Regional District, a thorough understanding of the current state of the region is necessary to form the basis of the analysis, identify the gaps and define the steps that must be taken to improve connectivity to underserved areas.

## 6.1 Infrastructure and Institutions

### 6.1.1 Transportation




#### 6.1.1.1 Road and Rail Transport

A major transportation corridor runs through the region, connecting the main population center of BC's lower mainland to the rest of BC and Canada. The Trans Canada Highway (Highway 1) runs east-west along the Fraser River valley. Near Hope, the transportation corridor splits: Highway 3 goes east; and Highway 1 goes north up the Fraser Canyon and Highway 5 heads northeast up through the Coquihalla pass. Highway 7 (Lougheed Highway) provides an alternate route connecting Hope to Vancouver on the north side of the Fraser River. In 2016, approximately 24,255 FVRD residents commuted into Metro Vancouver versus 9,495 Metro Vancouver residents commuted to the FVRD[18]. The majority of FVRD residents live and work within the Region.

[18] See Footnote 12 Above

Both CN and CP Rail lines transit the region following the Fraser River and terminate in Vancouver (see map above). The CP and CN Rail lines provide a national right of way and many of the national providers have access to fibre optic capacity using the fibre optic infrastructure that has been placed aling these right of ways.

#### 6.1.1.2 Air Transport

The Abbotsford International Airport (YXX) is located in Abbotsford, close to the Trans Canada Highway. Domestic carriers, including Air Canada and WestJest, have regular service as well as several regional airlines. Annual passenger movements through the airport have been increasing since 2015, until 2020, when the COVID-19 pandemic curtailed air travel globally. There is also a well developed airport at Chilliwack, Hope (which is operated by the FVRD) and seaplane bases at Harrison Hot Springs and Mission[19].

### 6.1.2 Industry

Traditionally, the region's economy has centered on agriculture and resource related industries. As resource industries have declined, the region has looked to diversify into other industries to generate employment opportunities. Some of these areas include manufacturing, aerospace, and services. Service-related industries are expected to have the most potential, including high-tech especially as it relates to agriculture and tourism. Further diversification and economic expansion are being actively pursued through a range of "clean economy" initiatives. Nature-based tourism is also an opportunity for growth[20].

#### 6.1.2.1 Agriculture

The FVRD has one of the most intensive and productive agricultural areas in Canada. The relatively mild temperate climate, high annual rainfall and fertile soil in the Fraser River valley is ideal for agriculture. Agriculture is FVRD's primary industry and generates significant economic activity. The agriculture sector is well established and includes farming, greenhouse growing and food processing. Agriculture is a core component of the region's economy and a significant contributor to the province's total agricultural output. As noted earlier, 39% of the provincial farm receipts in 2015 were generated in the FVRD[21]. In 2016 it was estimated that the agriculture sector annually generated $3.1 billion in expenditures and over 18,000 full-time equivalent jobs[22]. The FVRD is key to British Columbia's food security.

Agricultural land within the region that is designated as part of the Agricultural Land Reserve (ALR) is protected and administered by the provincial Agricultural Land Commission (ALC). Agriculture is the priority use for ALR areas. Applications for non-agricultural use are screened by the ALC. In 2011, 67% of the ALR in the FVRD was actively farmed. The ALR covers about 5.4% of the region's total land area[23].

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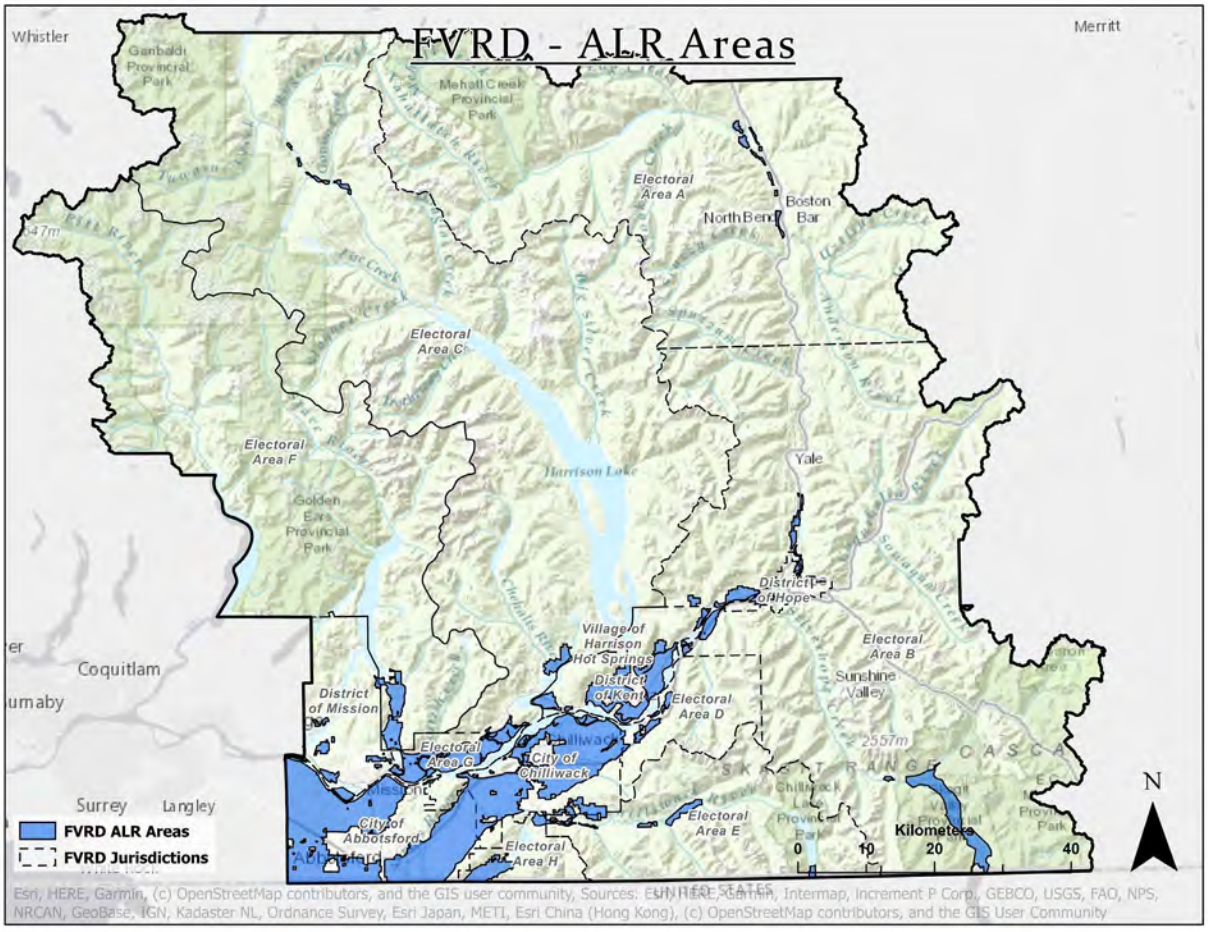
[19] Government of British Columbia, BC Data Catalogue & OurAirports.com
[20] FVRD, "Clean Economy in the Fraser Valley: Resource Guide" & Final Report - Delphi Group - 2019
[21] FVRD, "Fraser Valley Future 2041" Regional Growth Strategy Monitoring Report - December 2018
[21] FVRD, "Fraser Valley Future 2041" Regional Growth Strategy Monitoring Report - December 2018
[22] FVRD , "Agricultural Economy in the Fraser Valley Regional District – December 2017
[23] See Footnote 18 Above




Maps that cross reference ALR lands to Proposed Project Areas in different areas of the FVRD are contained in the Appendix. Agriculture in the FVRD is increasingly technology based, with broadband connectivity critical to support business operations today and in the future.

### 6.1.2.2 Energy

BC Hydro operates two small hydroelectric facilities in the region: Ruskin (105 MW capacity) and Wahleach (65 MW capacity). In addition, there are about ten independent power producers that have or plan to have generating stations in the region[24]. These stations are mostly run-of-river hydroelectric stations, ranging in capacity from a few MW to over 10 MW. The power is purchased by BC Hydro and fed to the integrated BC power grid. Several BC Hydro high voltage transmission lines cut through the region, connecting major generating stations on the Peace River and Columbia River to the lower mainland population load centers.

Several major pipelines traverse the region carrying liquid petroleum and natural gas products from north-east BC and Alberta to the Lower Mainland and international markets including land crossings to the US markets and seaports for other international markets.

[24] BC Hydro, Independent Projects History & Maps

### 6.1.3 Health

FVRD does not have any healthcare facilities in in its electoral areas. It does have 4 hospitals as shown in the table below and multiple walk-in clinics all located in the municipalities of Abbotsford, Mission, Chilliwack and Hope. The hospitals are full service while the clinics provide non-emergency health care services on a walk-in basis during clinic hours which vary by facility. There are also a number of long term care homes in the region, again clustered in the municipalities[25].

| Hospitals in the FVRD | |
|---|---|
| **Hospital Name** | **Location** |
| Abbotsford Regional Hospital and Cancer Centre | Abbotsford |
| Mission Memorial Hospital | Mission |
| Chilliwack General Hospital | Chilliwack |
| Fraser Canyon Hospital | Hope |
| First Nations Health Authority (FNHA) | First Nations Reserves |

As part of the project, a number of discusisons were completed with the First Nations Health Authority and the importance of connectivity in promoting remote health care inititiatives. They indicated success in this program where appropriate connectivity exists but indicated challenges in some locations due to the lack of connectivity.

### 6.1.4 Educational Institutions

There are four school districts in the region as shown in the table below.

| SD# | Name | Number of Schools | Student Population |
|---|---|---|---|
| 33 | Chilliwack | 31 | 14,000+ |
| 34 | Abbotsford | 46 | 19,200+ |
| 75 | Mission | 17 | 6000 |
| 78 | Fraser-Cascade | 9 | 1680 |

As would be expected, the vast majority of the schools are in the municipalities. The following table identifies the schools that are outside, or on the fringe, of the municipalities[26].

[25] Government of British Columbia, BC Data Catalogue - Hospitals
[26] Government of British Columbia, BC Data Catalogue - Schools

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| SD# | School Name | Location | Type |
|---|---|---|---|
| 75 | Khalsa School Mission | 14100 Stave Lake Rd, Mission, BC | Elementary, Jr Secondary |
| 75 | Silverdale Elementary | 29715 Donatelli Ave, Mission, BC | Elementary |
| 75 | Dewdney Elementary | 37151 Hawkins Pickle Rd B107, Dewdney | Elementary |
| 33 | Cultus Lake Community School | 71 Sunnyside Blvd, Cultus Lake, BC | Elementary |
| 75 | Deroche Elementary | 10340 N Deroche Rd, Deroche, BC | Elementary |
| 78 | Boston Bar Elem/Secondary | 47643 Old Boston Bar Rd, Boston Bar, BC | Elementary, Secondary |

The region is also home to a number of post-secondary institutions, including the University of the Fraser Valley. Though physically located in the municipalities many students require access to resources only available through the internet to fully participate in their education programs.

With COVID many educational services are being provided, at least partially by remote learning. All elementary and secondary students in the electoral areas attended school remotely in the spring during the first wave of COVID-19. Post-secondary students in the electoral areas have also mostly attended school remotely since the start of the pandemic. Continuing adult education was also conducted remotely during this time.

### 6.1.5 Emergency Services

Emergency services cover the first-responder public safety agencies including fire, police and ambulance. These agencies require reliable mobile radio communications. Abbotsford public safety agencies subscribe to the E-Comm radio system. Outside of Abbotsford, police and ambulance services use the provincial RCMP and Ambulance Service Very High Frequency (“VHF”) radio systems, respectively. Outside of Abbotsford, fire agencies rely on coverage from four wide area VHF repeater sites: on Sumas Mountain and on high ground near Mission, Chilliwack and Hope. In addition, there is a VHF repeater on the Yale Firehall #2. Radio coverage for fire operations is poor and non-existent in many parts of the region. Coverage issues and measurements have been documented and compiled in a map. Additional VHF repeaters are needed to fill in coverage. Noting that new VHF repeater sites can be backhauled over Internet Protocol (IP) circuits (using Radio over IP or RoIP technology), the region has identified a solution that would use broadband internet access to facilitate the cost-effective deployment of additional in-fill repeater sites.

## 6.2 Telecommunications

### 6.2.1 Service Provider Overview

| Provider | Summary |
|---|---|
| **ABC Communications** | Primarily provides fixed wireless services in the Hope region. ABC was recently acquired by Telus but at this time still operates as ABC Communications. |
| **Bell** | Primary interest in mobile cellular services and has no infrastructure other than some high capacity backbone services. Bell does provide private services to its enterprise customers (eg. national banking organizations). All cellular services are deployed using roaming agreements with other providers. |

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| | |
|---|---|
| **Lookie Loo** | Provides fixed wireless services over unlicensed bands in the region south of Chilliwack, BC. Lookie Loo has recently ceased providing services in some areas due to competitive service offerings. |
| **Lyttonnet** | Non-profit internet society located in Lytton, BC. Provides fixed wireless services over unlicensed bands in the northern region of the Fraser Canyon. Recently obtained funding to deploy fibre from Boston Bar to Lillooet, BC. |
| **Network Integrated Communications** | Provides fixed wireless services over unlicensed bands in the southern part of Regional District covering the communities of Chilliwack, Popkum, Harrison Mills and the Columbia Valley. NIC was not available to provide a direct discussion during the service provider outreach part of this project. |
| **Rogers** | Primary interest in cellular services along the main highway corridor to Hope, BC. Rogers is involved in some fibre backbone projects in the FVRD. |
| **Shaw** | Provides wired connectivity using primarily coaxial cable infrastructure in Hope, Chilliwack, Popkum and the Columbia Valley. Wireless cellular services are available via Freedom Mobile. |
| **Telus** | Provides services in throughout the Regional District deployed using a mix of fixed wireless, fibre optics and DSL infrastructure and is considered the incumbent provider. |

### 6.2.2 Internet Connectivity

The Fraser Valley Regional District is generally well served in its major centers with a choice of providers and technologies. Providers are investing in higher capacity services such as fibre in areas with the highest population and density. However, the rural and remote areas lack sufficient service. The two maps immediately below illustrate areas served by fibre to the premise technology as well as co-axial cable technology. The reader is cautioned that these maps do rely on the National Broadband Internet Service Availability Map produced by ISED which does rely on self-reported data from service providers. ISED does indicate that the data that it relies on is considered accurate within 250m.

Additional detail of the service technology broken down by service provider is contained in the appendix.

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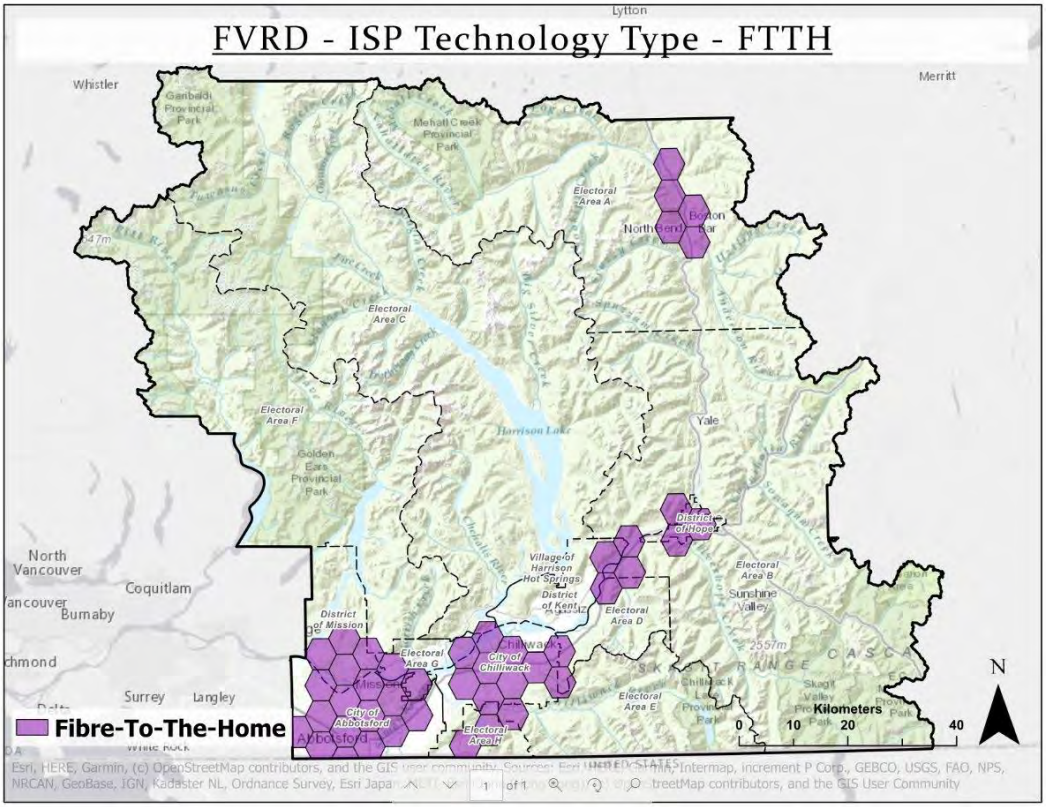


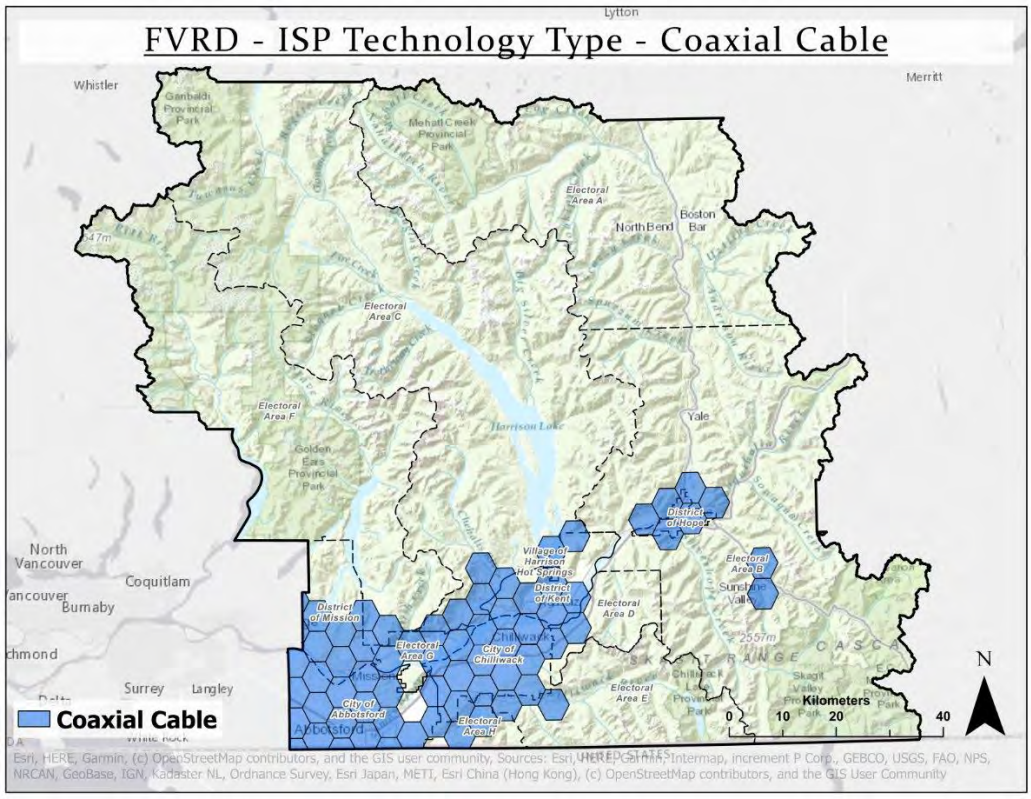

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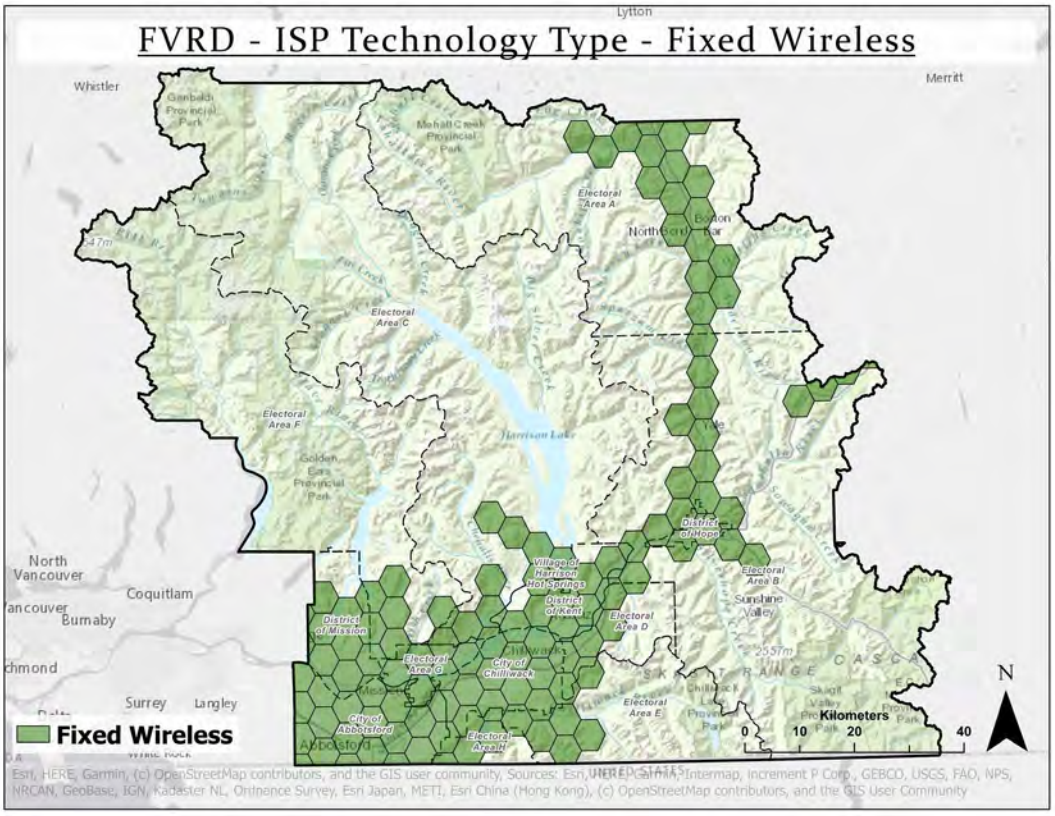


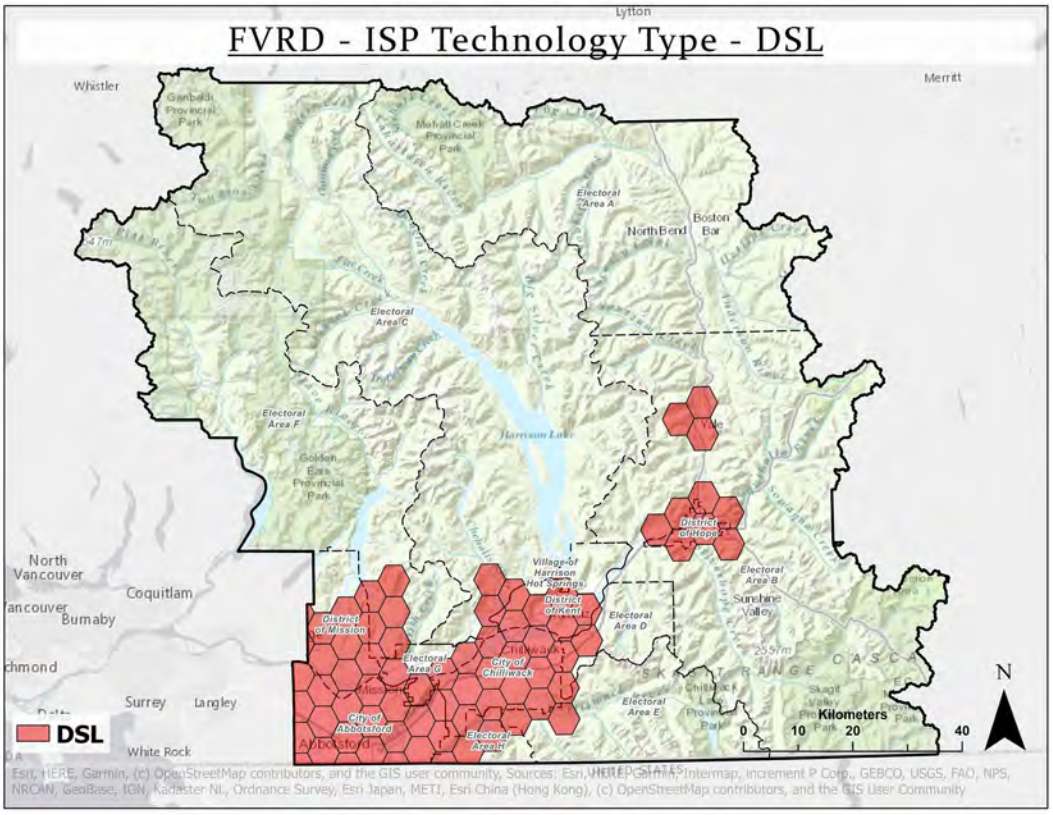

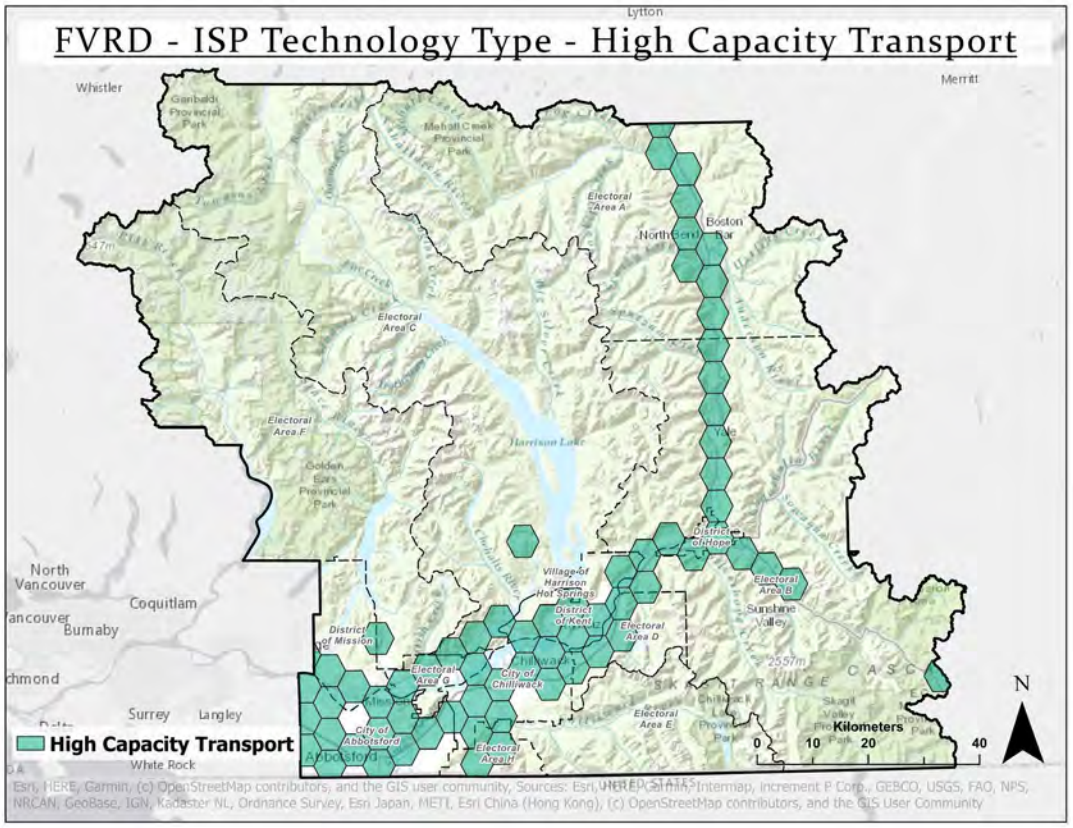


### 6.2.3 Cellular Services

In general, according to the ISED data, cellular coverage along the major corridors in the FVRD is well covered with multiple providers using infrastructure provided by Telus, Rogers and Shaw as shown below.

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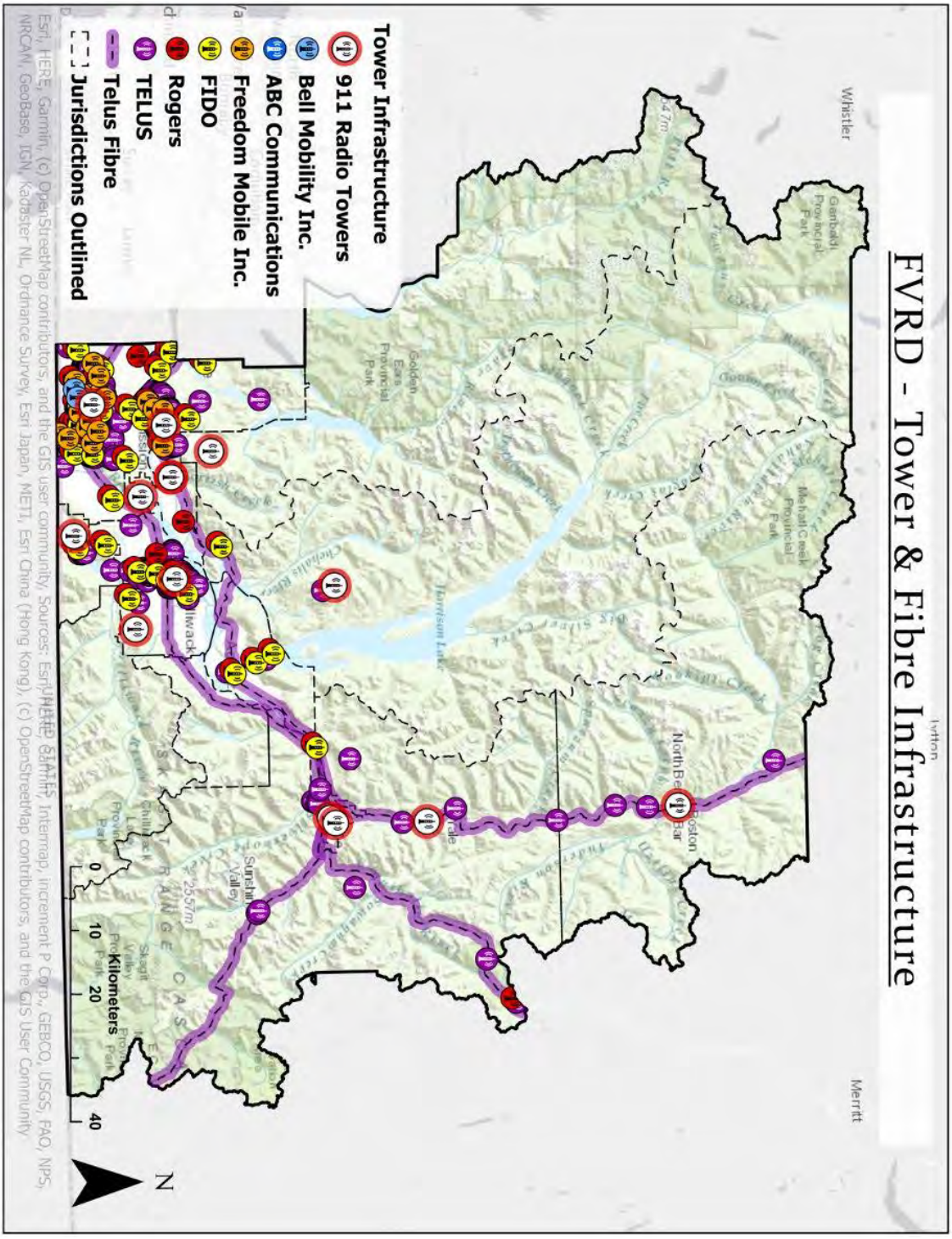

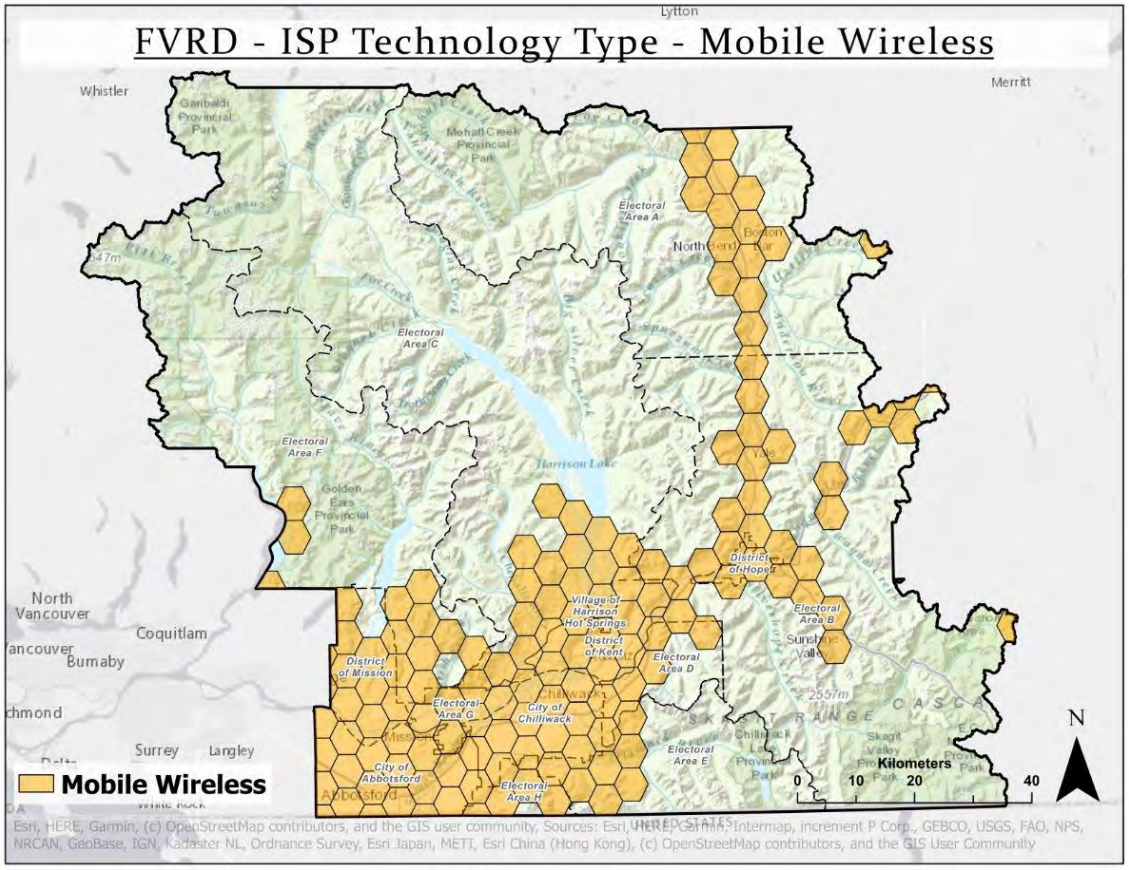


The map above seems to suggest widespread cellular coverage throughout the populated areas of the Regional District but responses to the Regional District's connectivity survey clearly indicated that there are a number of areas of concern where cellular coverage needs improvement, including in particular, Columbia Valley, Sunshine Valley, Area E (Post Creek, Slesse Park) and Area F (McConnell Creek, Durieu, Hatzic Prairie).

### 6.2.4 Announced Projects

While not necessarily a complete list, there are a number of publicly announced telecommunications related projects active in the FVRD that should be highlighted, including:

- In July 2019, Lyttonnet announced successful funding to provide fibre optic connectivity and services to the businesses and residents in the rural communities in the northern Fraser Canyon from Boston Bar to Lillooet, BC[27].

- There have been recent anecdotal reports that Telus is going to provide connectivity to the currently unserved area of Post Creek. Those reports indicate that Post Creek will be serviced with re-deployed DSL equipment.

[27] Government of Canada, *Rural communities in British Columbia will benefit from faster Internet*

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## 6.3 Public Feedback on State of Connectivity

As part of the information gathering, a survey of the residents and businesses located in the FVRD was completed. The survey was intended to gather information from Electoral Area residents and businesses including about available service, costs, satisfaction, and service providers. Municipal residents and businesses were not prevented from completing the survey, but analysis focused on the responses from the Electoral Areas. A paper copy of the survey was available from the FVRD as well as being online through the FVRD website. It remained open for approximately 6 weeks. The survey was promoted to electoral area residents and businesses by:

- Email by Electoral Area directors;
- FVRD publication on its website;
- FVRD social media promotions;
- Posters at central locations in the communities;
- Making paper copes of the surveys available for pick up at central locations in the communities; and,
- Bulk mails outs of the survey based on requests for specified areas.

A complete summary of the survey results has been provided as an ancillary document.

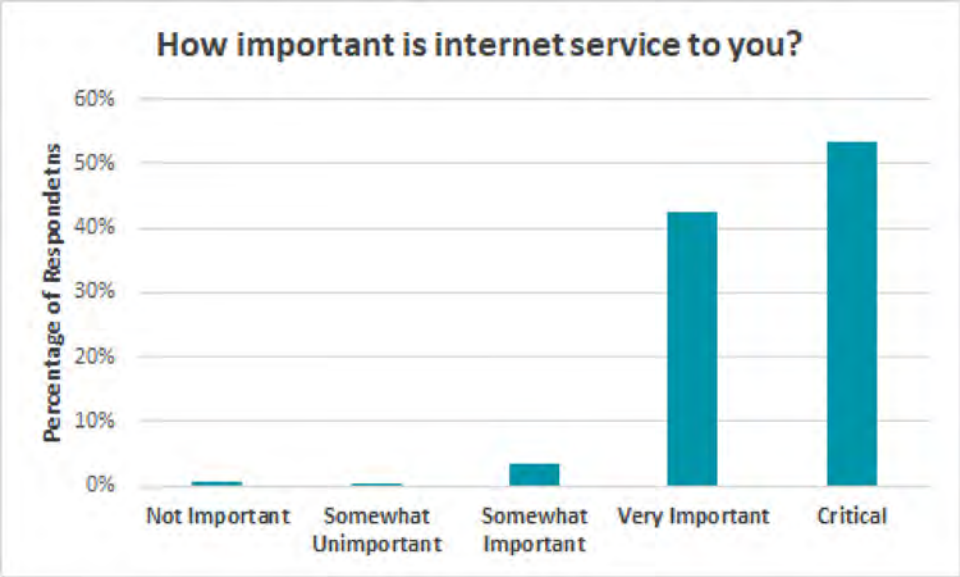
### 6.3.1 Summary of Residential Survey Results

Of the more than 600 respondents to the survey, 80% were from either Area C, E, F, or H. These areas aligned with the findings that communities in those Electoral Areas such as McConnell Creek/Hatzic Prairie Area, Columbia Valley, Post Creek, Hemlock Valley were most in need of improved service.

Before the Covid-19 pandemic hit, 36% of respondents said they were working from home. Since Covid-19, this number has increased significantly with 60% of respondents saying they are now working from home. This has amplified the need for improved connectivity in areas that already had insufficient internet connectivity.

Around 30% of people also said they have children at home who need internet connectivity to participate in their education. The survey showed that not just children but also adults pursuing higher education need improved internet connectivity. Nearly 50% of respondents said that someone in their household need improved internet for this purpose. Tele-health services were also in demand with 65% of respondents indicating an interest in accessing telehealth services. The survey closed before the second COVID wave re-introduced restrictions and so these numbers may well be low compared to the current situation at the time of writing this report.

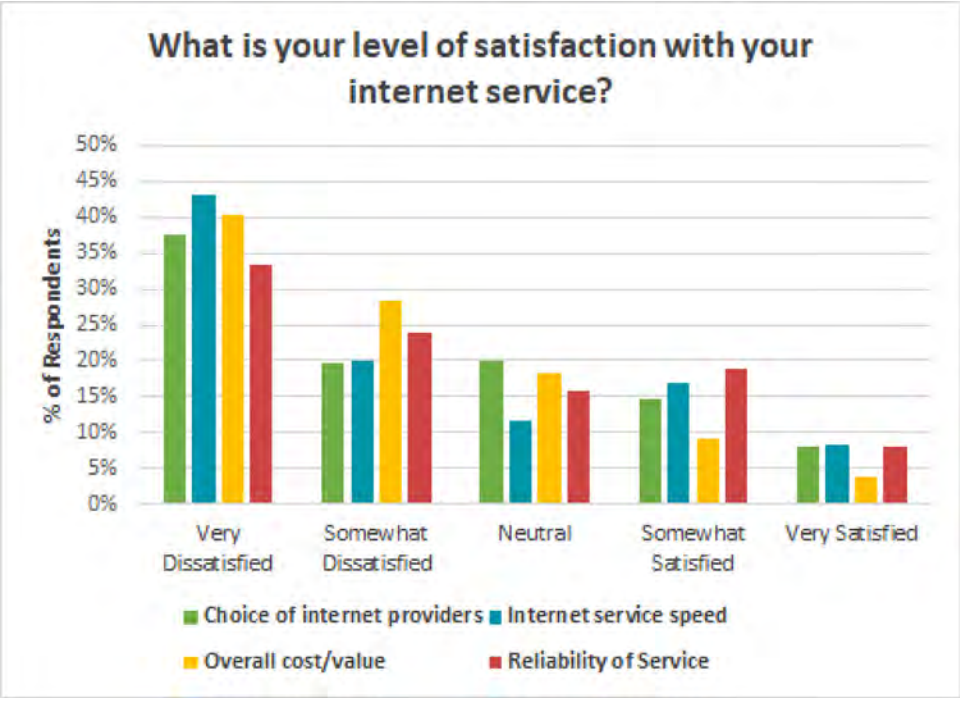
Almost every respondent (96%) stated that internet was Very Important or Critical to them and 91% said they had some internet access in their home currently and for those who did not, 65% had no service options available to them.




Over half of respondents said they pay $100 or more per month for internet services and as much as a quarter of respondents said they pay additional overage charges at least some of the time.

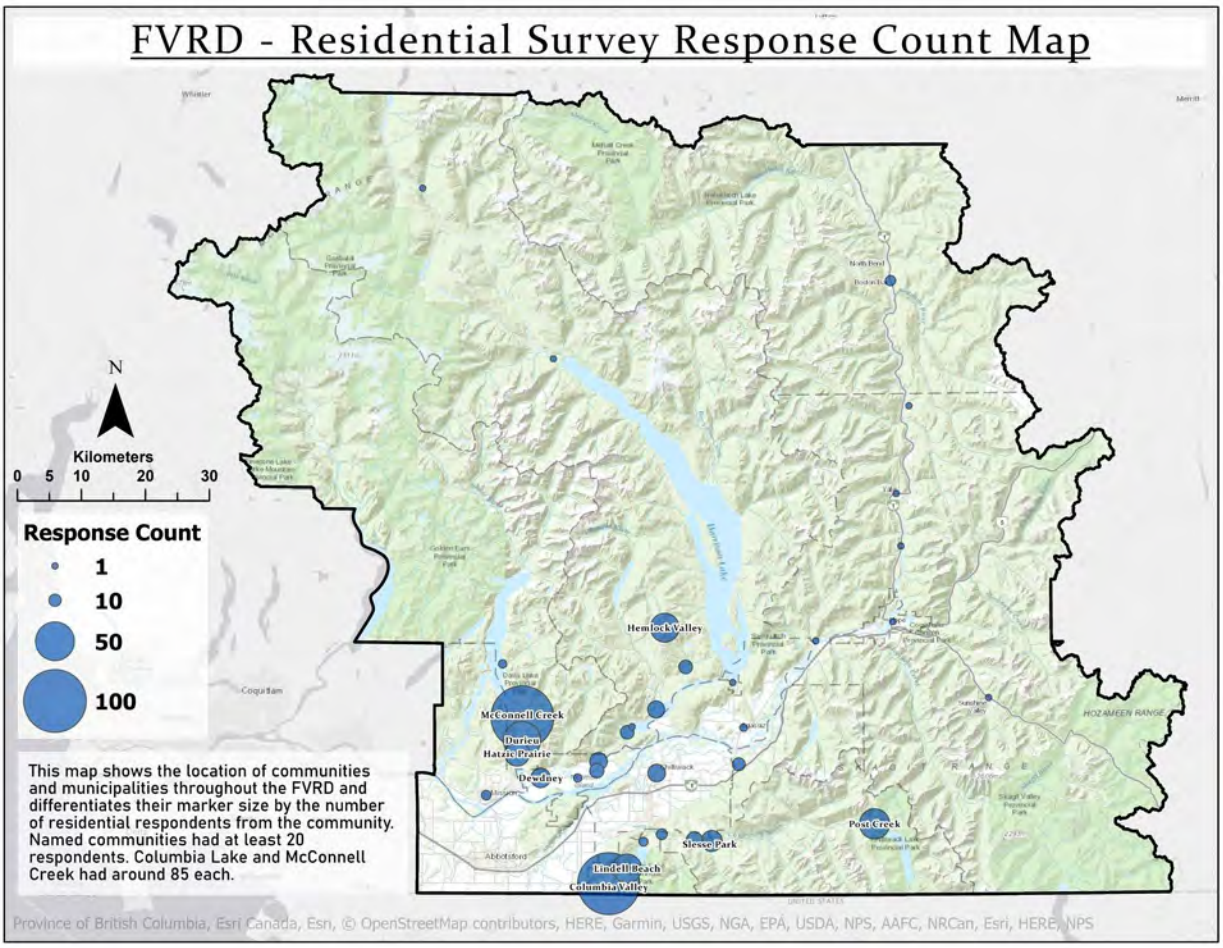
More than half of respondents stated that their speeds are less than the USO and 64% indicated that their speeds were less than they require because higher speeds are simply unavailable.

Around 60% of all respondents said that they were dissatisfied with their current choice of providers, available internet speeds, the overall cost of internet, the reliability of the service they have and the quality of their internet service in general.



Nearly half of respondents indicated that they would be willing to pay more for higher speeds and better reliability.

Competition among providers is limited in some areas with at least 60% of respondents in Areas C, D, F, G and within Indigenous communities saying they do not have a choice of internet providers within their area.




Over 90% of respondents agreed that internet service is an essential service and that there is a need for improved internet service in the FVRD. Nearly as many said that improved internet will increase the attractiveness of the FVRD to potential residents and business, will result in greater economic activity, and will have significant benefits to the region in general.

Although 76% of respondents said they have cellular service, nearly 80% stated that they are concerned about safety due to lack or quality of cellular service. For those that do not have cellular service, 83% said this was due to it being unavailable to them. This may be alarming given that over half of respondents in Areas B, D, E, F, H, and within Indigenous communities said they have found themselves in an emergency situation without the ability to call for help due to a lack of cell phone coverage.

In summary, residential respondents indicated a clear desire and need for improved internet service to the FVRD in multiple areas. The pertinence of internet connectivity is especially on the minds of respondents currently given that many of them noted that they or a member of their household has been

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affected by COVID-19 and its resultant strain on their internet service and usage. The need for better internet in the FVRD has been brought into focus because of this and other factors as seen in the survey.

### 6.3.2 Summary of Business/Organization Survey Results

Of those that responded to the business connectivity survey, over 60% were from Area F and area H. This aligns with the residential survey where most respondents were also from these two areas and the communities of Durieu, McConnell Creek/Hatzic Prairie, and Columbia Valley in particular.

80% of the respondents said they employ 2 or more people and nearly half of these businesses were in farming and agriculture.

Nearly half of respondents stated Telus was their provider while of the others, the majority were with Xplornet or Shaw.

Nearly three quarters of respondents stated they pay $100 or more per month for their internet service and many also stated they pay overage charges many months of the year and that these charges can be from $50 to over $150 per month. Respondents were also asked about their willingness to switch to another service for a higher cost and nearly 50% said they would be willing to pay more money for higher speed and/or more reliable service.

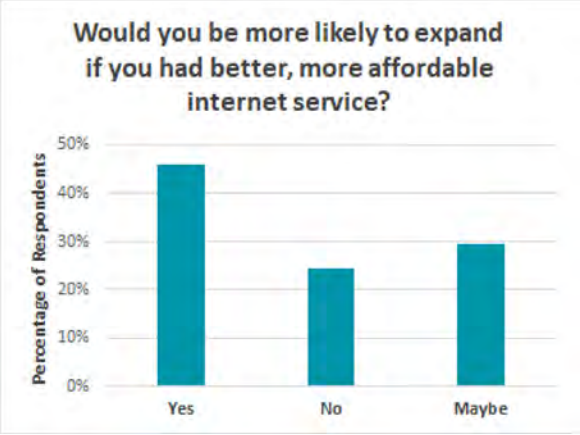
Over 50% of respondents said they have speeds of less than the USO. 68% of respondents said that the higher speeds they require are not available. 30% of respondents believe that they lose business to competitors due to their lack of internet service.

75% of respondents rated the overall quality of their internet service as fair or worse. The overwhelming majority of respondents – 96% – said internet service is very important or critical to their business.

Nearly 70% of respondents said they were dissatisfied with the choice of internet service providers, the speed that is available to them, the overall cost of internet, and the reliability of the service they currently have.

Almost all – 95% – of respondents said they thought internet service is an essential service and over 80% said there is a need to improve internet service in the FVRD. Nearly 90% of respondents agreed that such improved services would: make the FVRD more attractive place to do business, result in greater economic activity in the region, and have significant benefits to the region.

93% of respondents stated that they have internet access at their place of business yet for the few that do not have internet access for their business they cited cost and poor quality as the reason why. 62% of respondents said they do not have a choice of internet providers in their area and around 70% of respondents said that the lack of choice, quality, and reliability of internet service they face has negatively impacted their business. Nearly half of respondents said they would be able to expand their businesses if they had better and more affordable internet services and nearly a quarter said they would be able to hire more employees. The majority of respondents said there are multiple users online at their business at once.



80% of respondents said they do have cellular service for their business, yet most are concerned about safety due to lack or quality of cellular service. That may be because 60% of respondents report that they have been in an emergency situation without the ability to call for help due to a lack of cellular coverage.

80% of respondents also say they are dissatisfied with available cellular coverage and reliability of cellular service. Over half of respondents were dissatisfied by the cost of cellular service.

Overall, the business survey results are aligned with the residential survey and demonstrate that the business respondents confirm a need for better internet service in certain areas of the FVRD, particularly in the Columbia Valley and McConnell Creek areas.

### 6.3.3 Stakeholder Responses

In addition to the survey outreach, key stakeholder information was provided by the FVRD and augmented by TANEx and an attempt was made by TANEx to contact each key stakeholder by direct telephone contact to gather insight and additional detail. The following provides a summary of the themes identified in these discussions where contact was made.

| Stakeholder Summary: Electoral Area Directors |
|---|
| **Summary of Information Reported:**<br>• Electoral Area Directors had diverging views on technology. In particular, some Area Directors had significant concerns about cellular and wireless technologies.<br>• There is widespread agreement that wired service is preferable to wireless albeit for a variety of different reasons.<br>• While there was not strong support, there was some appetite for local government owned infrastructure if a provider would not provide service.<br>• Directors expressed concerns about communications in emergencies such as forest fires, flooding or land slides.<br>• Directors were also united in their belief that better connectivity is necessary to support working from home and the creation of sustainable communities that attract people to move there.<br>• Concerns were raised about connectivity not properly supporting the agriculture industry in FVRD. |

| Stakeholder Summary: Public Safety |
|---|
| **Summary of Information Reported:**<br>• Significant areas are insufficiently served with cellular service. Areas called out include Chilliwack River Valley and Columbia Valley as well as Stave Lake, East side of Harrison Lake, Sunshine Valley, Yale and Boston Bar.<br>• Fire related emergencies in the Agassiz emergency services area have radio but other emergency responders do not. Information delays in an Emergency Operation Center can impact timely response and information sharing. Amateur radio group could perhaps support during an emergency, but it is suggested that that is insufficient.<br>• First Nations emergency services are challenged by the lack of connectivity. Need significant capital invested to improve communications and connectivity services.<br>• Emergency support services program being updated for the emergency management system and evacuee support system but will rely on connectivity. Evacuee registration system will be entirely online which makes it difficult for people in crisis without access to connectivity |

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- The use of Internet Protocol (IP) circuits on a broadband network has the potential to provide cost effective backhaul for new VHF repeater sites using Radio over IP technology to enhance emergency services.

| Stakeholder Summary: Agriculture |
|---|
| **Summary of Information Reported:**<br>• Connectivity is insufficient in the Fraser Canyon as well along Highways 3 and 5 to properly support businesses, including the increasingly tech based agriculture sector.<br>• Agritech initiatives required broadband connectivity and cellular coverage.<br>• FVRD farmers are disadvantaged because of lack of connectivity.<br>• Potential exists to leverage programs supporting agriculture with programs supporting connectivity.<br>• Additional farmland could be available to shore up food supply if that land was connected.<br>• Agriculture related technology is constantly evolving but relies on connectivity to implement.<br>• Farmers in outlying areas only being served with satellite which simply does not provide the service required. |

### 6.3.4 First Nations Responses

| Stakeholder Summary: First Nations Summary |
|---|
| **Summary of Information Reported:**<br>• There are widespread concerns with emergency services communications in light of the lack of sufficient cellular and internet service on reserve.<br>• Many reserves are served with satellite only.<br>• Concerns with having to leave home to access internet connectivity during COVID particularly for vulnerable members.<br>• Some bands have hired outside consultants to help convince Telus to provide service to their populated reserves.<br>• Bands are struggling to attract members home and when there is no connectivity, the difficulty is compounded.<br>• Challenge is not only to get service but to get affordable service.<br>• Some tribal councils have provided internet service to their communities but it is at a loss.<br>• There is a preliminary initiative afoot to get fibre service along Highway 7.<br>• Economic development is very difficult in areas with either no connectivity or weak connectivity.<br>• History of broken promises by the incumbent to get fibre service to communities.<br>• Students lack access to educational resources.<br>• First Nations Health Authority has a health initiative to provide health services remotely, including mental health care services. Sufficient connectivity is required for people to be able to take advantage of the program. Needs sufficient connectivity to support high quality video. |

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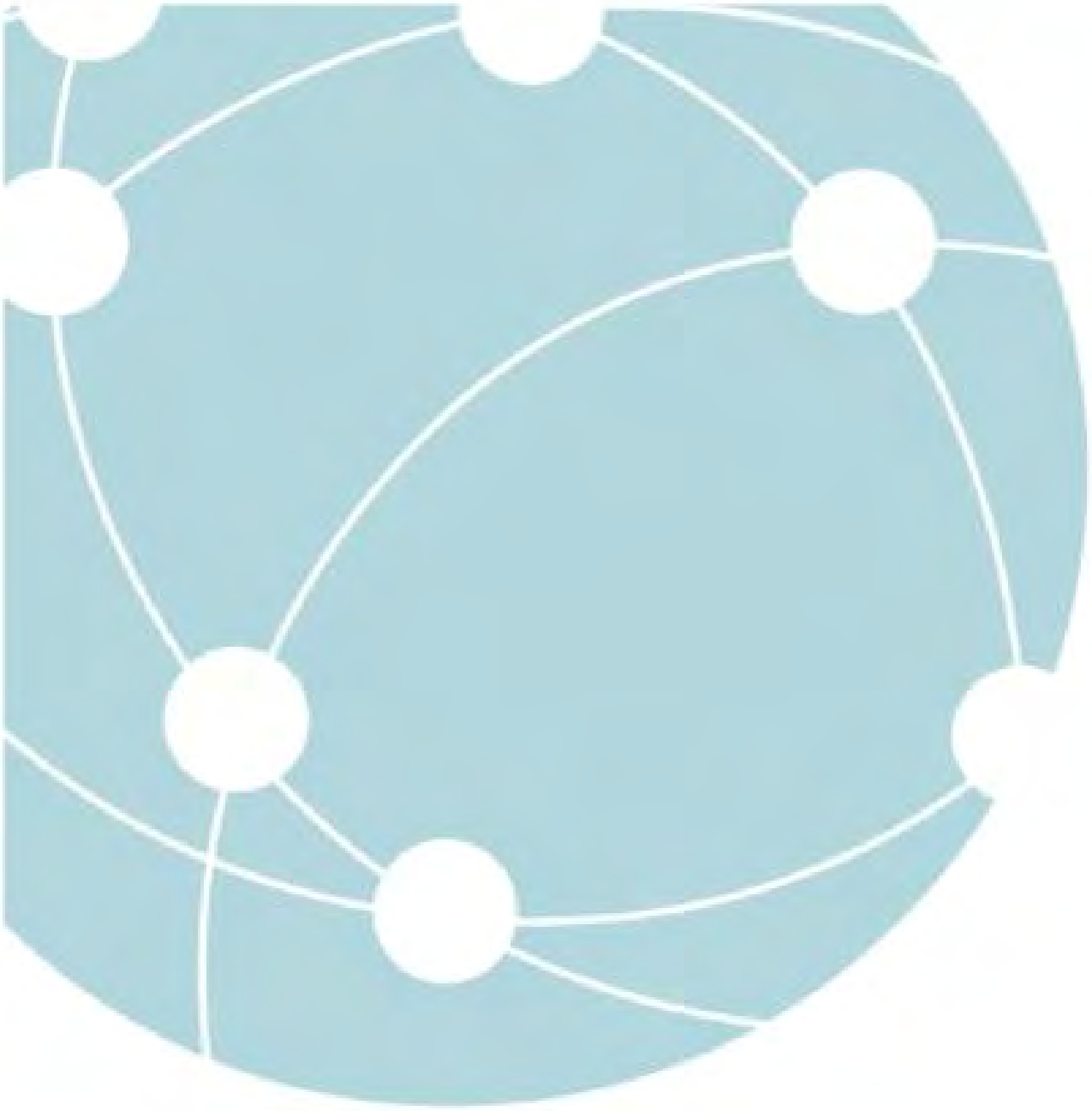

# 7 SITUATIONAL ANALYSIS

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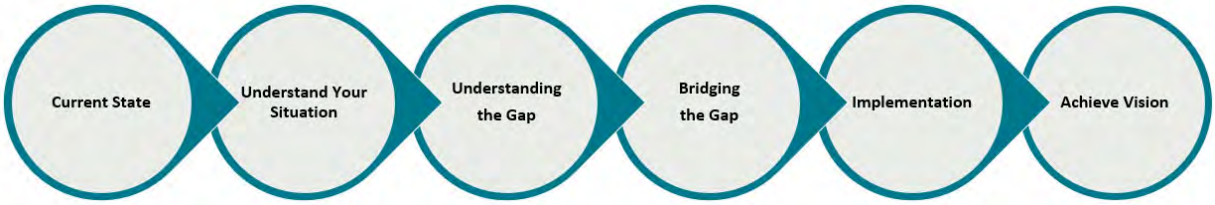
## 7.1 Moving from Current State to Vision

Earlier in the report, the FVRD' vision of itself as a highly connected region was articulated followed by the analysis of its current state. In order to achieve the vision, a number of logical steps must be completed from documenting the current state through to achieving the vision as shown below.




## 7.2 Understanding the Gap

### 7.2.1 FVRD Connectivity Factors

Understanding the FVRD connectivity situation requires identifying the strengths and weaknesses of the region from a connectivity perspective. The FVRD strengths, weakness, opportunities, and threats have been summarized below:

| STRENGTHS |
|---|
| • Proximity to a large population and market – Metro Vancouver.<br>• FVRD's location is powerful as the corridor to Vancouver, the connector to the BC interior and proximity to a major Internet Exchange in Vancouver.<br>• One of the fastest growing regions in BC; demand from the general public and businesses will continue to grow.<br>• Areas that lack connectivity at 50/10 are fewer compared with other regions making the solution more achievable.<br>• The overall density of structures in the electoral areas is relatively high compared to other rural areas and approximately 75% of them are located within 250 m of a road served with 50/10 service.<br>• A regional governance body with a fundamental understanding of what makes the region unique and the importance of broadband connectivity for the future of the region.<br>• Well established agriculture sector that includes food production and processing.<br>• Economic diversification towards light industry and high-tech services for information and communications technology is developing in Chilliwack and Abbotsford.<br>• An innovative and entrepreneurial environment that includes several centers of excellence and related research and development initiatives.<br>• Competitive supply of broadband networks in the municipalities that could play a role in solving the rural connectivity challenge.<br>• Major east-west rail and highway transportation corridor through the FVRD. Existing rail line has existing fibre with numerous carriers already present.<br>• Access to other markets: An international airport and a major rail and highway transportation corridor connecting the main population centers within BC and to the rest of Canada as well as the US. |

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- Access to low cost energy: A major oil and gas transportation corridor and electrical power transmission corridor run through the region, as well as green energy.
- FVRD's geographic location falls within the expected service area to be developed through deployment of new satellite technology (LEO).

## WEAKNESSES

- The areas outside the population centers suffer from lower subscriber density resulting in higher infrastructure build costs and a difficult business case; the issue is particularly acute in the rural areas of the region. This is particularly damaging for progressive agriculture initiatives such as smart farming.
- The highway transportation corridor and associated routes suffer from congestion and public transit through the region struggles to keep up with the needs.
- Lack of large industry with intensive connectivity need to support a solution.
- Primary industry is agriculture which in the Fraser Valley is high-value, highly intensive in some sectors and increasingly technology-based. The nature of agriculture is that it tends to be spread out, which makes it costly to provide increased connectivity.
- Challenging terrain in some areas of FVRD.
- Connectivity initiatives compete for priorities with high numbers of other issues.
- No existing coordinated effort to address connectivity with other Regional Districts, local governments and First Nations in order to aggregate the connectivity problem to a size that attracts industry interest.

## OPPORTUNITIES

- Continue and accelerate initiatives to deliver fixed broadband and cellular mobile service to communities close to existing transport fiber routes.
- Leverage the political will and advanced awareness of the importance of connectivity arising from effects of the COVID-19 pandemic to improve connectivity to rural and remote communities for services like education and medical care.
- Highlight the role that broadband connectivity can play in food security.
- FVRD's proximity to Metro Vancouver and major infrastructure corridors provides the opportunity for potentially swift implementation of projects in problematic areas.
- With better network infrastructure, a host of opportunities will be available as identified in the Fraser Valley Regional District, Clean Economy Study.
- A variety of federal and provincial subsidy funding sources are available for modernizing agriculture and industry sectors as well as for broadband internet infrastructure development.
- Advancing satellite technologies (LEO) are in development and may provide greater support in future for very remote areas that cannot viably be served with wireline or wireless technologies.
- A number of First Nations communities in the FVRD are also in need of improved broadband connectivity, providing the opportunity to partner on projects and access multiple funding streams for mutual benefit.

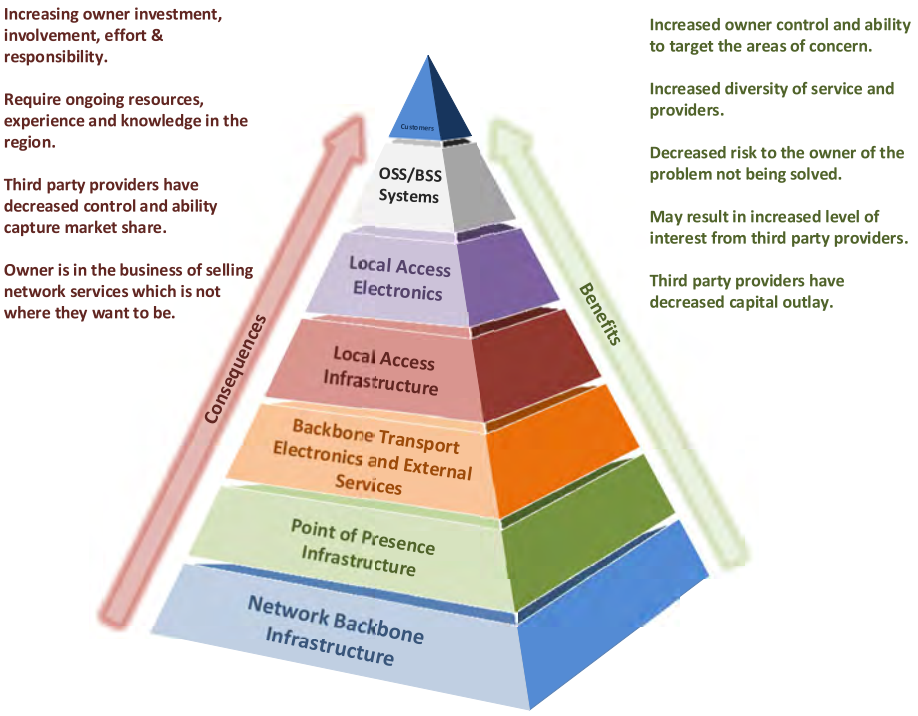
## THREATS

- Economic impact of commodity market weakness in general and COVID-19 related, specifically.

- Incumbents may leverage dominant positions in the market to reduce competition.
- Public's differing views on the suitability of certain technologies such as cellular and wireless. Such resistance may obstruct the ability to improve connectivity for residents in certain areas.
- The COVID-19 pandemic and the closure of the Canada/US border may have significant near-term impact on the regional and global economy.
- Public resistance to change and development that involves infrastructure along with its perceived risk or inconvenience.
- Lack of resources to take full advantage of subsidy funding available. Applications are complex, time consuming and favour larger companies with deeper resources to prepare the applications.
- Complete end to end transport and last mile project planning is required to implement a solution that makes a difference in a timely fashion. In cases where end to end connectivity is not part of the same project, actual benefits are delayed and create frustration and cynicism within network operators and the public at large.
- A minimum level of local operations and maintenance capability and commitment is necessary for community networks to be sustainable long-term. This can be difficult in the outlying communities; particularly if the economic base is small, eroding, or has limited growth potential.

### 7.2.2 Service Delivery Pyramid

From a technical aspect, solving the connectivity challenge for rural and remote areas is the same as an urban environment and requires a service delivery model that encompasses a number of layers that all need to be addressed. The following Service Delivery Pyramid ("SDP") provides a visual depiction of the layers of infrastructure that must be present to solve the connectivity issue:



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The diagram above outlines the SDP and delineates the individual layers that must be provided and the relative levels of responsibility the network owner must address to satisfy the goal of improved services to the residents and businesses. Solving the connectivity problem requires that all layers of the SDP be provided, either by one entity or by the collaborative efforts of numerous parties.

As the network owner commits to, and moves up the layers of the pyramid, increasing levels of complexity and involvement are required. Although this may seem intimidating, the benefit of increased control and influence on improvement of services may outweigh the hurdles.

The layers of the SDP are as follows:

**Backbone Infrastructure:** This is the physical infrastructure required to bring long distance connectivity to a community. For high capacity modern networks, this would typically be fibre optic cable but in some cases, high capacity microwave may also be suitable. The term backbone is also synonymous with "transport infrastructure".

**Points of Presence:** POPs are the infrastructure required in each community (or along the backbone route) used to locate the electronic components required to enable connectivity as well as act as a termination point for the backbone infrastructure. For example, in the case of a fibre optic backbone, the physical cable would be installed inside the POP and the cable connected to the electronic components within the POP. A POP houses sensitive electronic components so suitable environmental controls are including, but not limited to, air conditioning, battery, backup power, and security.

**Backbone Transport Electronics and External Services:** This layer represents the electronic components and services required for the POP to enable connectivity outside of the local area to other POPs and ultimately, the global internet.

**Local Access Infrastructure:** This includes the physical assets required to connect the local POP to the subscriber's home or business. There are numerous choices for technology, but for modern, high capacity, scalable networks, fibre optic connectivity is the preferred option. Different options for local access technology are more detailed in supplementary documentation.

**Local Access Electronics:** This layer of the SDP represents the electronic components required in the POP and in the subscriber's home or business that enable connectivity to underlying layers of the SDP. This is the final physical component required to enable connectivity.

**OSS/BSS Systems:** All the lower levels of the SDP, require management to ensure they are operating correctly and to provide the business operations of the network. These operations include, but are not limited to, network monitoring and management systems, billing, provisioning, technical support, customer service support, maintenance, among others.

**Customers:** The final layer to a successful broadband network is the existence of customers subscribing and paying for services on the network. In the case of rural and remote networks, anchor tenants or institutional customers can be particularly beneficial in supporting the sustainability of the network.

Greater detail on the technical aspects of the Service Delivery Pyramid can be found in Appendix.

### 7.2.3 Potential Project Areas

In order to achieve FVRD's vision, it is necessary to break down the rural FVRD connectivity gap into smaller components so that projects can be prioritized, funded and constructed as time, priorities and

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budget allow. All projects in the table below are assumed to be fibre as a base case. The following table provides summary of projects identified as a result of this project. An ancillary document outlining additional detail for each of the identified project areas will be provided.

Areas outside of higher density communities suffer from a lack of high capacity services. There are some projects being worked on to improve connectivity but the lack of suitable business case for fibre deployment means those areas will lag without intervention from local or other government initiatives.

The main underserved areas in the FVRD are:

- Columbia Valley south of Lindell Beach.
- Post Creek area in the southeast area of the FVRD.
- McConnell Creek and Stave Lake area.
- Small number of locations in the Popkum area.
- Hemlock and Morris Valley.
- Harrison Lake although connectivity to areas that are unserved in this region will be difficult to achieve.
- Pockets of locations surrounding Hope.
- The area north of Hope to Yale along the Fraser Canyon with additional pockets further north along the Fraser Canyon.

The following identified project area map provides a summary of the areas in the region that have been identified.

It is acknowledged that some areas shown are very remote and unlikely to be valid project areas but they have been identified anyway for completeness.

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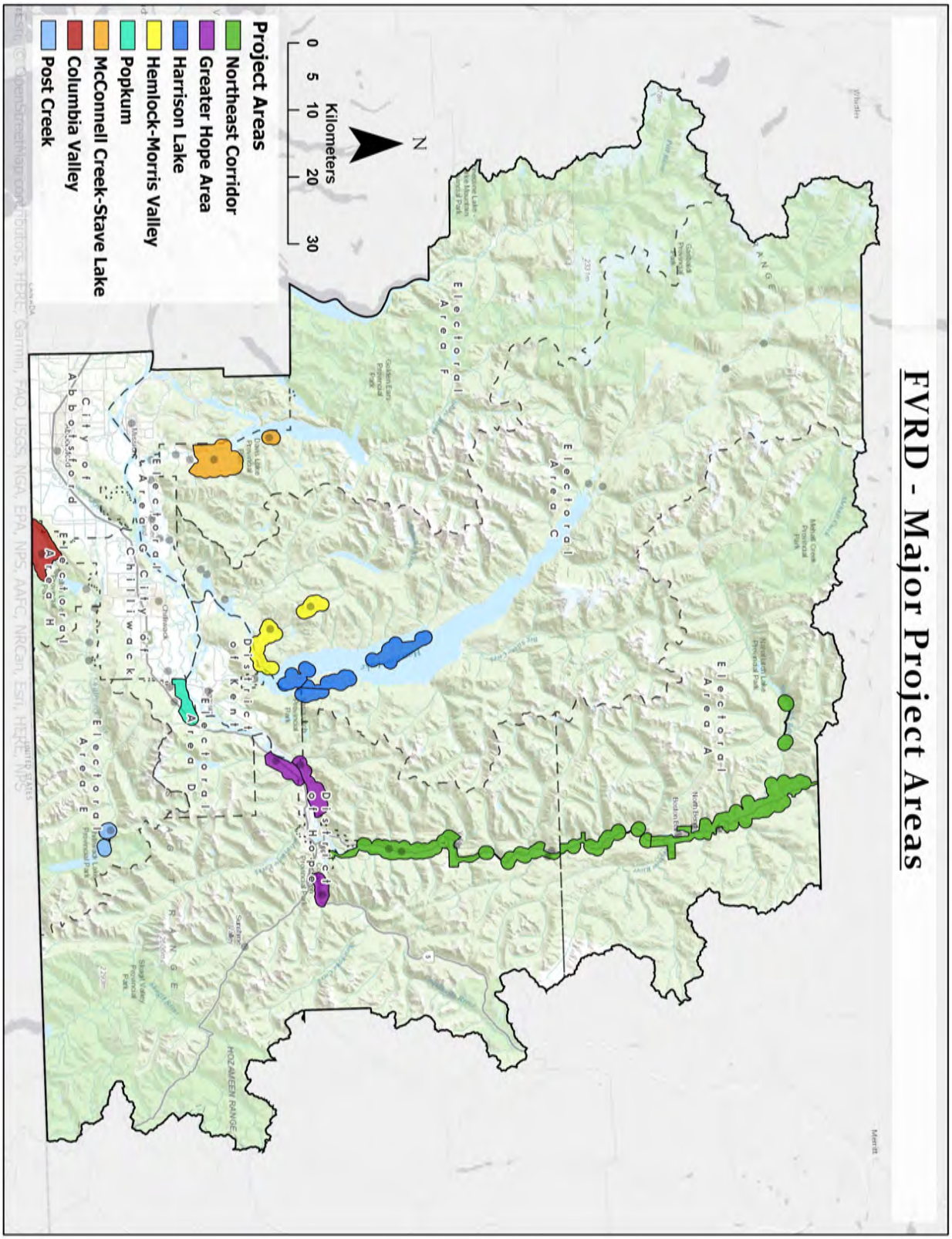

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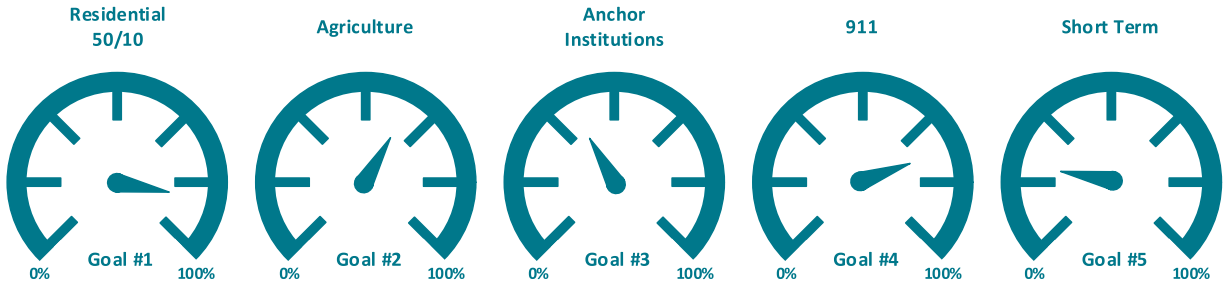
# 8 STRATEGY IMPLEMENTATION

## 8.1 FVRD Role and Areas of Focus

One of the key components to the strategy is understanding the role that the Regional District desires to play in advancing the connectivity initiative. The FVRD connectivity goals were highlighted earlier in this document and in order to understand the recommendations put forward, it is important to understand where the FVRD currently is in relation to those goals. The following graphic provides a snapshot of the estimated progress towards these goals.




## 8.2 Bridging the Gap

The following table provides a breakdown of the major project areas and provides a total of the Points in the FVRD in the project areas identified. Those totals are summarized by electoral area and provide a method to prioritize potential project areas.

It is understood that some Points identified in project areas may be difficult to serve. However, they have been identified on the project maps to ensure they are identified even though they may not be considered viable projects.

Areas identified in the table as “Points (potential subscriber location) at the USO (CRTC’s Universal Service Objective)” are those that are reported to be already served at 50/10Mbps. Points identified as “Remote Points” are points that are very sparse and not easily combined into a suitable project area or Points that may not be a potential subscriber location.

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## Area Summary

Nov 29, 2020

| | | Project Definition | | | | | | Current Service Levels | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Major Project Name | Sub-Project Name | Area | BB | Local Access | Total Subs | % of Total | Primary Svc | 5/1 | 10/2 | 25/5 | 50/10 |
| Northeast Corridor (Area | Nahatlatch | A | Yes | Yes | 30 | 0.43% | 5/1 | 30 | 0 | 0 | 0 |
| Northeast Corridor (Area | North Area A | A | Yes | Yes | 41 | 0.59% | 25/5 | 28 | 0 | 11 | 2 |
| Northeast Corridor (Area | Hells Gate | A | Yes | Yes | 14 | 0.20% | 25/5 | 11 | 0 | 3 | 0 |
| Points at SLO (FVRD) | Electoral Area A | A | No | No | 265 | 3.84% | 50/10 | 0 | 0 | 0 | 265 |
| Remote Points (FVRD) | Electoral Area A | A | No | No | 2 | 0.03% | | 2 | 0 | 0 | 0 |
| | | **Area A SubTotal** | | | **352** | **5%** | | **71** | **0** | **14** | **267** |

## Area Summary

Nov 29, 2020

| | | Project Definition | | | | | | Current Service Levels | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Major Project Name | Sub-Project Name | Area | BB | Local Access | Total Subs | % of Total | Primary Svc | 5/1 | 10/2 | 25/5 | 50/10 |
| Greater Hope | North Laidlaw | B | Yes | Yes | 85 | 1.23% | 25/5 | 3 | 0 | 67 | 15 |
| Greater Hope | Othello | B | Yes | Yes | 15 | 0.22% | 5/1 | 15 | 0 | 0 | 0 |
| Greater Hope | Skawahlook-Chav | B | Yes | Yes | 9 | 0.13% | 5/1 | 8 | 0 | 1 | 0 |
| Northeast Corridor (Area | Spuzzum | B | Yes | Yes | 9 | 0.13% | 25/5 | 9 | 0 | 0 | 0 |
| Northeast Corridor (Area | Yale - North Hope | B | Yes | Yes | 246 | 3.56% | 50/10 | 16 | 0 | 121 | 109 |
| Points at SLO (FVRD) | Electoral Area B | B | No | No | 380 | 5.50% | 50/10 | 0 | 0 | 0 | 380 |
| Remote Points (FVRD) | Electoral Area B | B | No | No | 17 | 0.25% | | 17 | 0 | 0 | 0 |
| | | **Area B SubTotal** | | | **761** | **11%** | | **68** | **0** | **189** | **504** |

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## Area Summary

Nov 29, 2020

| | | Project Definition | | | | | | Current Service Levels | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Major Project Name | Sub-Project Name | Area | BB | Local Access | Total Subs | % of Total | Primary Svc | 5/1 | 10/2 | 25/5 | 50/10 |
| Harrison-Morris Valley | Hemlock Valley | C | Yes | Yes | 251 | 3.63% | 25/5 | 17 | 0 | 234 | |
| Harrison-Morris Valley | Morris Valley | C | Yes | Yes | 43 | 0.62% | 5/1 | 43 | 0 | 0 | 0 |
| Harrison Lake | Rainbow Falls | C | Yes | Yes | 54 | 0.78% | 5/1 | 54 | 0 | 0 | 0 |
| Harrison Lake | Cascade Peninsula | C | Yes | Yes | 62 | 0.90% | 5/1 | 62 | 0 | 0 | 0 |
| Harrison Lake | Echo Island | C | | | 16 | 0.23% | 5/1 | 16 | 0 | 0 | 0 |
| Harrison Lake | Long Island | C | Yes | Yes | 24 | 0.35% | 5/1 | 24 | 0 | 0 | 0 |
| Points at SLO (FVRD) | Electoral Area C | C | No | No | 721 | 10.43% | 50/10 | 0 | 0 | 0 | 721 |
| Remote Points (FVRD) | Electoral Area C | C | No | No | 56 | 0.81% | | 53 | 0 | 3 | 0 |
| | | **Area C SubTotal** | | | **1227** | **18%** | | **269** | **0** | **237** | **721** |

## Area Summary

Nov 29, 2020

| | | Project Definition | | | | | | Current Service Levels | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Major Project Name | Sub-Project Name | Area | BB | Local Access | Total Subs | % of Total | Primary Svc | 5/1 | 10/2 | 25/5 | 50/10 |
| Popkum | Popkum | D | Yes | Yes | 37 | 0.54% | 25/5 | 1 | 0 | 34 | 2 |
| Points at SLO (FVRD) | Electoral Area D | D | No | No | 659 | 9.54% | 50/10 | 0 | 0 | 0 | 659 |
| Remote Points (FVRD) | Electoral Area D | D | No | No | 49 | 0.71% | | 40 | 0 | 9 | 0 |
| | | **Area D SubTotal** | | | **745** | **11%** | | **41** | **0** | **43** | **661** |

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## Area Summary

Nov 29, 2020

| | | Project Definition | | | | | | Current Service Levels | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Major Project Name | Sub-Project Name | Area | BB | Local Access | Total Subs | % of Total | Primary Svc | 5/1 | 10/2 | 25/5 | 50/10 |
| Post Creek | Post Creek | E | Yes | Yes | 86 | 1.24% | 5/1 | 86 | 0 | 0 | 0 |
| Points at SLO (FVRD) | Electoral Area E | E | No | No | 637 | 9.22% | | 0 | 0 | 0 | 637 |
| Remote Points (FVRD) | Electoral Area E | E | No | No | 22 | 0.32% | | 13 | 0 | 9 | 0 |
| | | **Area E SubTotal** | | | **745** | **11%** | | **99** | **0** | **9** | **637** |

## Project Area Summary

Feb 23, 2021

| | | Project Definition | | | | | | Current Service Levels | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Major Project Name | Sub-Project Name | Area | BB | Local Access | Total Subs | % of Total | Primary Svc | 5/1 | 10/2 | 25/5 | 50/10 |
| McConnell Creek-Stave | McConnell Creek | F | No | Yes | 287 | 4.15% | 25/5 | 200 | 0 | 0 | 87 |
| McConnell Creek-Stave | Stave Lake East | F | Yes | Yes | 29 | 0.42% | 5/1 | 29 | 0 | 0 | 0 |
| Points at SLO (FVRD) | Electoral Area F | F | No | No | 321 | 4.65% | 50/10 | 0 | 0 | 0 | 321 |
| Remote Points (FVRD) | Electoral Area F | F | No | No | 57 | 0.82% | | 49 | 0 | 8 | 0 |
| | | **Area F SubTotal** | | | **694** | **10%** | | **278** | **0** | **8** | **408** |

## Area Summary

Nov 29, 2020

| | | Project Definition | | | | | | Current Service Levels | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Major Project Name | Sub-Project Name | Area | BB | Local Access | Total Subs | % of Total | Primary Svc | 5/1 | 10/2 | 25/5 | 50/10 |
| Points at SLO (FVRD) | Electoral Area G | G | No | No | 625 | 9.04% | 50/10 | 0 | 0 | 0 | 625 |
| Remote Points (FVRD) | Electoral Area G | G | No | No | 118 | 1.71% | | 68 | 0 | 50 | 0 |
| | | **Area G SubTotal** | | | **743** | **11%** | | **68** | **0** | **50** | **625** |

## Area Summary

Nov 29, 2020

| | | Project Definition | | | | | | Current Service Levels | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Major Project Name | Sub-Project Name | Area | BB | Local Access | Total Subs | % of Total | Primary Svc | 5/1 | 10/2 | 25/5 | 50/10 |
| Columbia Valley | Columbia Valley | H | Yes | Yes | 174 | 2.52% | 10/2 | 163 | 0 | 1 | 10 |
| Points at SLO (FVRD) | Electoral Area H | H | No | No | 1456 | 21.07% | 50/10 | 0 | 0 | 0 | 1456 |
| Remote Points (FVRD) | Electoral Area H | H | No | No | 13 | 0.19% | | 8 | 0 | 5 | 0 |
| | | **Area H SubTotal** | | | **1643** | **24%** | | **171** | **0** | **6** | **1,466** |

## Area Summary

Nov 29, 2020

| | | Project Definition | | | | | | Current Service Levels | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Major Project Name | Sub-Project Name | Area | BB | Local Access | Total Subs | % of Total | Primary Svc | 5/1 | 10/2 | 25/5 | 50/10 |
| | | | | **Totals** | **6910** | **100%** | | **1,065** | **0** | **556** | **5,289** |
| | | | | | | | | **15%** | **0%** | **8%** | **77%** |

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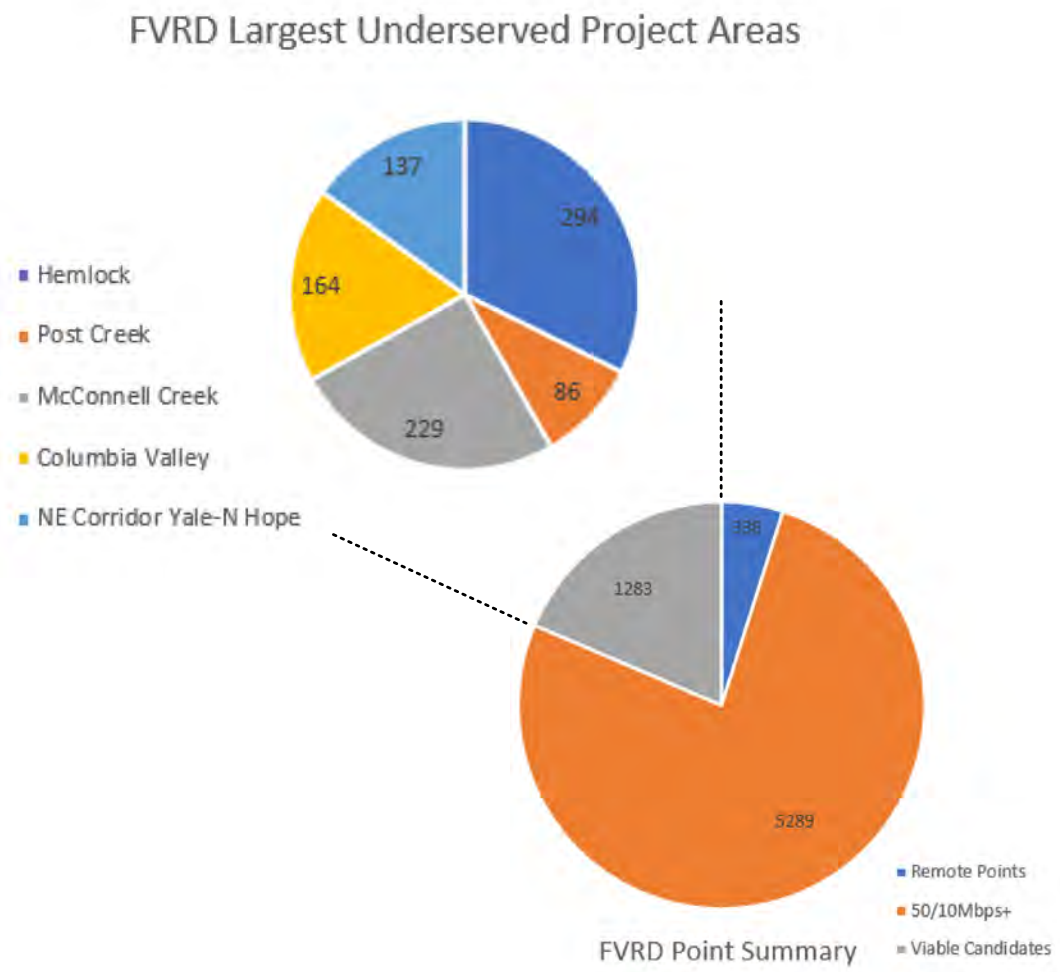
The above tables demonstrate the following:

- There are a total 6910 Points in FVRD Electoral Areas. 5% of those are Remote Points and 77% are reportedly served at the USO or better.
- The remaining Points (approximately 1,300) are considered as candidates in project areas although it is acknowledged that some of those are still remote and difficult to serve.
- The project areas identified below comprise the majority of identified Points served at less than 50/10Mbps.
    - Columbia Valley - 164 points
    - McConnell Creek – Stave - 229 points
    - Hemlock Valley - 294 points
    - Northeast Corridor Yale to North Hope - 137 points
    - Post Creek 86 points
- Those project areas total 910 underserved Points, or about 71% of the underserved Points. By targeting these areas, the FVRD would make substantial progress in meeting or exceeding its connectivity goals.




The other areas of consideration include:

- The north east corridor from Hells Gate north although Lyttonnet has obtained funding for a fibre project from Boston Bar north which is expected to address this area and the First Nations in the area as well. Some Points identified are very remote and likely not a viable project area.

- The Harrison Lake area including projects identified as Rainbow Falls, Cascade Peninsula, Echo and Long Islands but it is highly unlikely these areas will be priority areas for broadband connectivity projects.

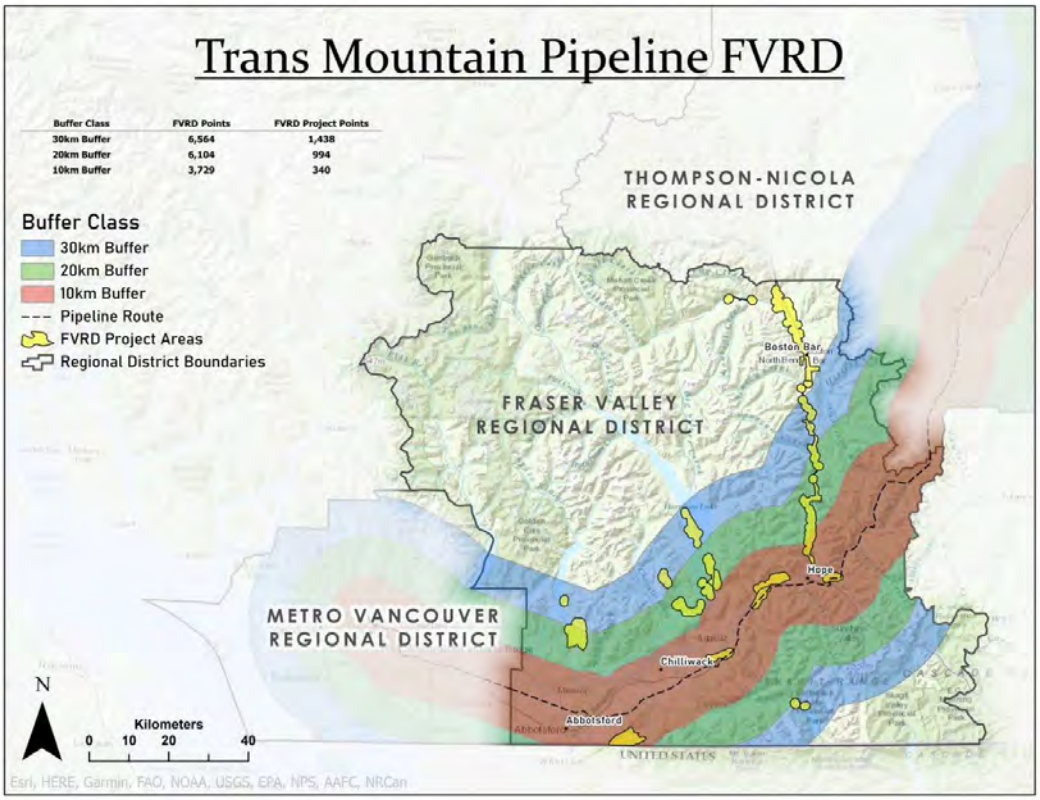
- The Popkum project area has not been included in the list above because of the low subscriber count even though there are some underserved Points.

With lower potential subscriber counts, there is a much higher cost per subscriber and some project areas have higher construction costs due to their remote nature (eg. Harrison Lake).

## 8.3 Trans Mountain Pipeline

As part of the regional connectivity strategy, TANEx views the ability to obtain access to backbone capacity along the Trans Mountain right of way as a major opportunity. Leveraging every opportunity to remove major cost barriers is critical to achieving connectivity for rural and remote areas.

As a preliminary overview, TANEx completed a brief study to understand the potential benefit of obtaining access to backbone capacity along the Trans Mountain Pipeline right of way. To quantify the benefit, potential subscribers were plotted along the pipeline right of way within 10, 20 and 30 km buffer zones. The point count depicted in the map below includes the total points (not including First Nations or municipalities) located within the buffer zones in the FVRD as well as a subtotal of those points that have been included in a potential project area. It is expected that there would be a number of First Nations communities who would benefit from such a project as well.




Additional detail on the Trans Mountain opportunity may be found in the Appendix.

## 8.4 Cost Estimate

The scope of this project is to provide the Regional District a strategy outlining the recommended actions to be completed by the Regional District and an order of magnitude cost to complete the strategy.

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Cost estimates for identified projects are found in the project summary ancillary document and are intended for internal FVRD staff and not intended for sharing with third parties including service providers.

The cost model presented in this section works under the following assumptions:

- Estimates provided are not based on a detailed design or business plan and no site visits have been completed in preparing these cost estimates. Costs are based on an approximation of typical unit costs to complete various aspects of the network.
- Where a Point has been identified as Unknown, it has been assumed that it does not have service at the USO. While this may overstate the Point count for underserved locations, it is not believed to be significant for this level of estimate.
- It is understood in this cost model that many assumptions have been made, including for the density and proximity of subscribers and the accuracy of the ISED map. It is acknowledged that there are inaccuracies with this approach but is suitable for the level of estimate provided.
- Cost estimates are not based on detailed quotations from suppliers or manufacturers.
- Some aspects of the cost estimates may show $0. This can be for a number of reasons including that committed funds are already established for that portion by a third party, that portion already exists, that portion is not applicable for some reason or the ability the provide an estimate is not available at this time due to the inability to obtain some information. The project summary sheets provided a matrix outlining the level of estimates available.
- Each layer of the costing model provides a status ranging from “Estimate” to “Already Exists”. Estimates are based on the best information available and it is acknowledged that these need to be confirmed and depending on the party that completes the project and infrastructure they have available, it can make a substantial difference in the cost estimates. Where the status indicates “Estimate (if required)” a cost has been applied for this layer but it is likely that existing infrastructure is available that can be leveraged depending on what party completes the project.
- The cost model provides a baseline for fibre connectivity to those areas identified as project areas in the FVRD. As highlighted in the technology section of this report, fibre optic connectivity is the preferred technology for high capacity and reliability. It is understood that fibre optic connectivity to all project areas identified will be cost prohibitive and that these areas will require a more detailed review for a cost estimate to more suitable technology. This process however is dependent on many factors and is beyond the scope of this project.

## 8.5 Funding

Funding for rural broadband is an evolving topic for government leadership, especially in light of the COVID-19 pandemic. There is a reality that remote and rural broadband projects are not likely to be implemented by service providers without financial support. Service providers have business requirements that drive where and when they will invest their own funds to construct additional network capacity. Rural and remote capacity simply does not meet those requirements so there will be a financial gap between what a provider is willing to invest and the cost of construction. This gap will

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need to be filled if service is to be provided in these areas that do not support the providers' business case.

Listed below are some potential sources of funding in place at the time of writing which can potentially be accessed by the FVRD or its partners for funding for projects of this nature.

- Universal Broadband Fund (the "UBF") is a $1.75 billion fund through Innovation, Science and Economic Development Canada which has just recently opened for applications. It provides funding for expansion of affordable, reliable, high-speed internet service in areas of Canada that have been identified as not already having access to service at the USO or mobile projects benefitting Indigenous peoples. Funding is available until March 31, 2027. Applicants can request funding for up to 75% (or 90% in the case of highly remote areas or mobile projects benefiting Indigenous peoples) of total eligible costs as defined in the program. There is a Rapid Response Stream under this program for projects that can be started immediately and complete by November 15, 2021. Applications for Rapid Response Stream are due by January 15, 2021 with regular applications due by February 15, 2021.

- Connecting British Columbia is a BC government program administered by NDIT on behalf of Network BC open to local, regional, or national service providers, local governments; First Nations or BC not-for-profits. This program is in its third phase and has, as its objective, the acceleration of the delivery of internet connectivity at minimum target speeds of 50/10 to homes and businesses in rural BC. The program will accept applications through successive intakes until the funds are exhausted. The current intake has a deadline of December 15, 2020 for the next funding review period. Projects that are ready to go will rank more favourably than ones which rely on other steps to be taken first. The projects are to be completed by March 31, 2022. A pre-screening process is required which ensures that an applicant either has the experience requirement for an application or will work with an ISP with the experience requirement (3 years' experience deploying and operating the proposed broadband infrastructure in Canada). In addition, the applicant must agree to own, operate, and maintain the resulting network for 3 years after the project is complete otherwise some repayment of the funds will be required.

    - Eligible projects under the Connecting BC program include:

        - Transport Infrastructure – 50% of eligible costs for new infrastructure projects, upgrades to existing infrastructure or expanding existing transportation infrastructure.
        - Last-Mile Project - 50% of eligible costs to improve last mile connectivity in underserved rural areas in BC but follows a baseline funding level of $250,000 per community.

    - In addition, there is an Economic Recovery Intake arising out of the COVID-19 pandemic. The Connecting BC program received a $90 million infusion to encourage rapid expansion of connectivity to drive regional economic development in rural areas, Indigenous communities and along BC highways. While there is no due date for applications, it is intended to fund connectivity infrastructure projects that will be completed by October 31, 2021. This funding stream prefers projects that deliver 50/10 but considers projects that provide 25/5 as also eligible. Compared to the regular Connecting BC program above, it has increased funding ratios (90% rather than the 50% through the regular Connecting BC

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program) and supports a wider range of technologies as well as highway connectivity projects.

- Gas Tax Fund – funding provided by Infrastructure Canada. The federal government transfers funding to BC who then flows it out to municipalities for investment in local infrastructure priorities, specifically including use for broadband and connectivity.
    - In BC, the Gas Tax Fund is administered through the Community Works Fund. This is a direct annual allocation to assist local government with local priorities. The funds may only be utilized by one of the entities set out in the "Ultimate Recipient" definition within the GTA; the funds must be applied towards the eligible expenditures of an eligible project as set out within an "Eligible Project Category", and the project must meet the definition of "Infrastructure", as defined in the Agreement. "Infrastructure" is defined in Annex A as: "municipal or regional, publicly or privately-owned tangible capital assets in British Columbia primarily for public use or benefit."

- The Broadband Fund (the "BBF"). – In connection with upgrading infrastructure to meet the USO, the BBF was established by the CRTC to provide funding of $750 Million over five years. The first call for applications was announced June 3, 2019 and the second call closed on June 1, 2020. The next call is not expected until 2021. A detailed review of the current guide should be a priority item so that appropriate work is commissioned in time to be ready to go if a decision is made to proceed with a project either through the Regional District itself or through a third-party provider or some combination of the two. This fund provides funding for backbone projects, local access projects and mobile wireless projects.

  FVRD can apply to the BBF directly or as a member of a joint venture, partnership, or consortium with other eligible entities – eligible entities include other regional districts, first nations, municipal governments and private for-profit or not for profit service providers. BBF requires that "**the applicant, or at least one member of a partnership, joint venture, or consortium must have at least three years of experience in deploying and operating broadband infrastructure and must be eligible to operate as a Canadian carrier**." If this criterion is not met by the applicant or a member of the consortium, the applicant must enter contract with an entity that does.

- Trusts or non-profits that have support for FVRD as part of their mandate.

- Private industry partners that may support a P3 infrastructure project. For example, recent discussions with the Plenary Group indicated a possible option for P3 funding with long term financing alternatives[28].

- Lenders such as the Canada Infrastructure Bank which has $2 billion in loans and equity for new broadband infrastructure projects.

[28] PlenaryGroup.com

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# 9 NEXT STEPS

 

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## 9.1 Next Steps

Based on the information gathered during the course of this project, the following provides a summary of the recommended next steps for the Regional District.

### Fundamental Tasks

- Establish an internal broadband working group focused on the connectivity challenge.
- Identify a lead internal staff resource to manage and advance connectivity initiatives.
- Inventory FVRD assets that may lower barriers to service delivery.
- Reach out and collaborate with other local governments, including municipalities, other Regional Districts and First Nations to identify and solve a larger problem for more people.
- Align with other Regional District initiatives that may be ongoing.
- Actively provide intervenor feedback to the CRTC in collaboration with other local governments.
- If not already, become a member of the BC Broadband Association as it represents a small annual cost but can provide valuable insight into connectivity issues in the province.
- Participate in broadband conferences, especially those focused on rural and remote communities to gain an understanding of the challenges and opportunities in connectivity initiatives.

### Determine the Role of the Regional District

- Identify what contribution the Regional District will make to solving the connectivity challenge. Some examples of possible contributions are:
    - Advocate/facilitate/lobby.
    - Partner with other agencies and service providers to deliver projects.
    - Share the broadband strategy with service providers to generate interest and facilitate moving forward with projects.
    - Apply for funding from senior levels of governments where possible.
    - Support service providers in projects that improve connectivity as per the regulations outlined in the *Local Government Act* regarding telecommunications companies.
    - Contribute capital to third party where possible.
    - Partnership with a service provider.
    - Construct and own infrastructure.
- Determine specifics of how that role will be fulfilled
    - If, for example, FVRD decides that its role is to contribute capital, what are the mechanics of that.

### Prioritize the Project Areas

- Create criterion for prioritizing the potential projects identified in this report
    - A list of criteria that identify how each potential project will be assessed which should include identification of projects where collaboration with First Nations, urban municipalities and/or neighbouring Regional Districts is available.
    - Each of the project areas identified and summarized in the ancillary document have an achievability score which provides a starting point for assessing project priorities.
- Complete the prioritization of the potential projects.

The following provides an example of a decision criteria for establishing these priorities.

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| Decision | Weight | Project Area | | | | | |
|---|---|---|---|---|---|---|---|
| | | Columbia Valley | McConnell Creek - Stave | Hemlock Valley | NE Corridor | Post Creek | Other Areas |
| Number of Points served | TBD | | | | | | |
| Demonstrated need | TBD | | | | | | |
| Benefits to the community | TBD | | | | | | |
| Economic / industry benefits | TBD | | | | | | |
| Community support | TBD | | | | | | |
| Involvement required by RD | TBD | | | | | | |
| Cost to the Regional District | TBD | | | | | | |
| Funding availability / eligibility | TBD | | | | | | |
| Feasibility | TBD | | | | | | |
| | **Total** | | | | | | |

### Create an Action Plan

- Identify project specific steps to address each priority area.
- Communicate priorities to service providers.
- Provide specific information about FVRD's priority areas to providers for both internet and cellular.
- Develop a process and minimum service levels for responding to requests for letters of support to ensure that FVRD's priorities are being addressed.
- Identify the specific barriers to service delivery in each priority area and determine whether the FVRD can do anything to lower or remove them.
- Obtain proposals with pricing for priority project areas.

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## 9.2 About TANEx Engineering

TANEx is a professional engineering firm located in British Columbia, Canada focused on providing engineering consulting services specializing in telecommunications and networking. TANEx provides design, commissioning and operational services to its clients from varied industries and has a wide variety of expertise in connectivity technologies, infrastructure and services. For more information, please refer to our website at www.tanexengineering.com.

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# 10 APPENDICES

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## Appendix A - Mapping - Internet Speeds Available

As part of the development of this report, a number of maps were created to provide a visual depiction of various aspects of the FVRD. The following maps depict available speeds in the electoral areas of the FVRD.

## Detailed Project Area Maps

 

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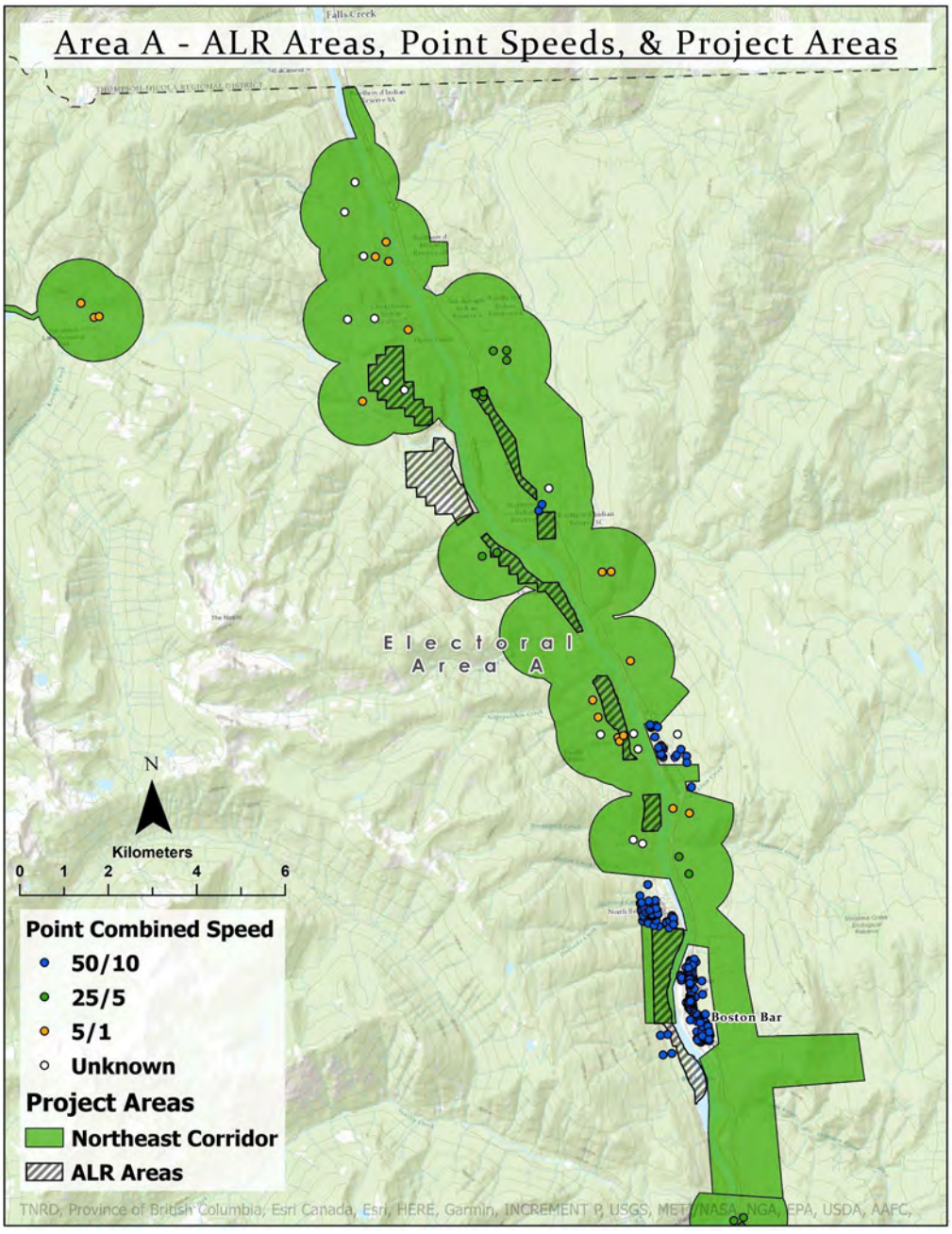


 

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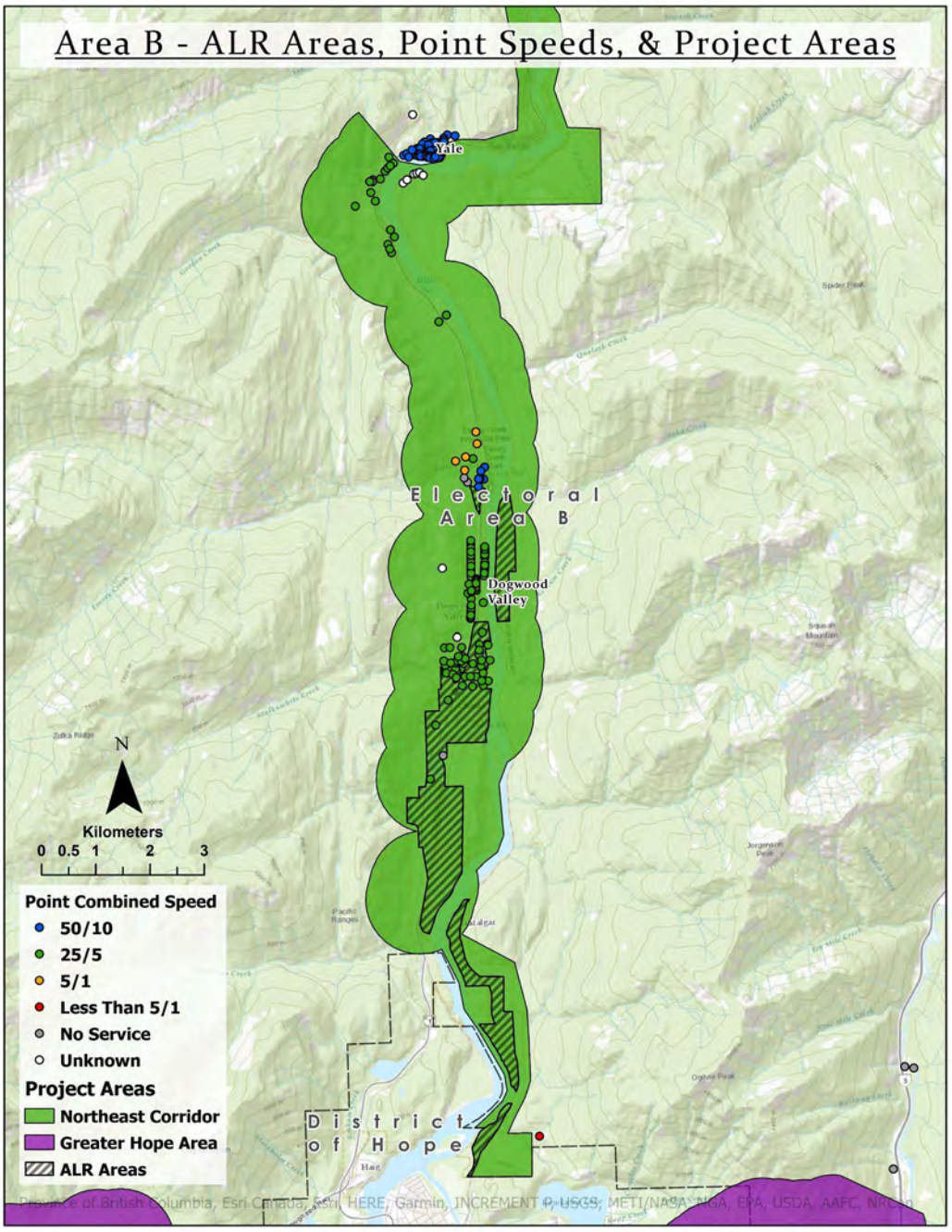

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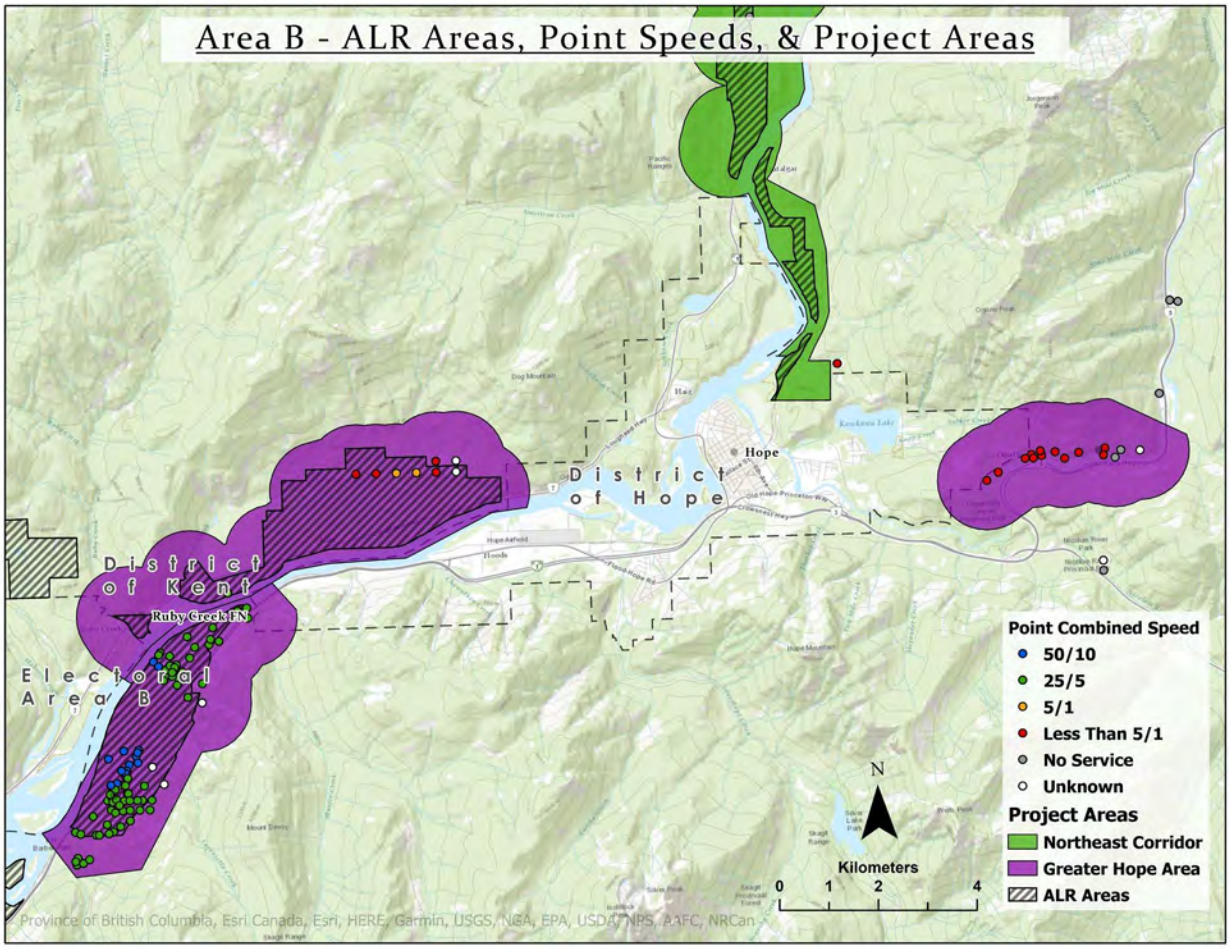


 

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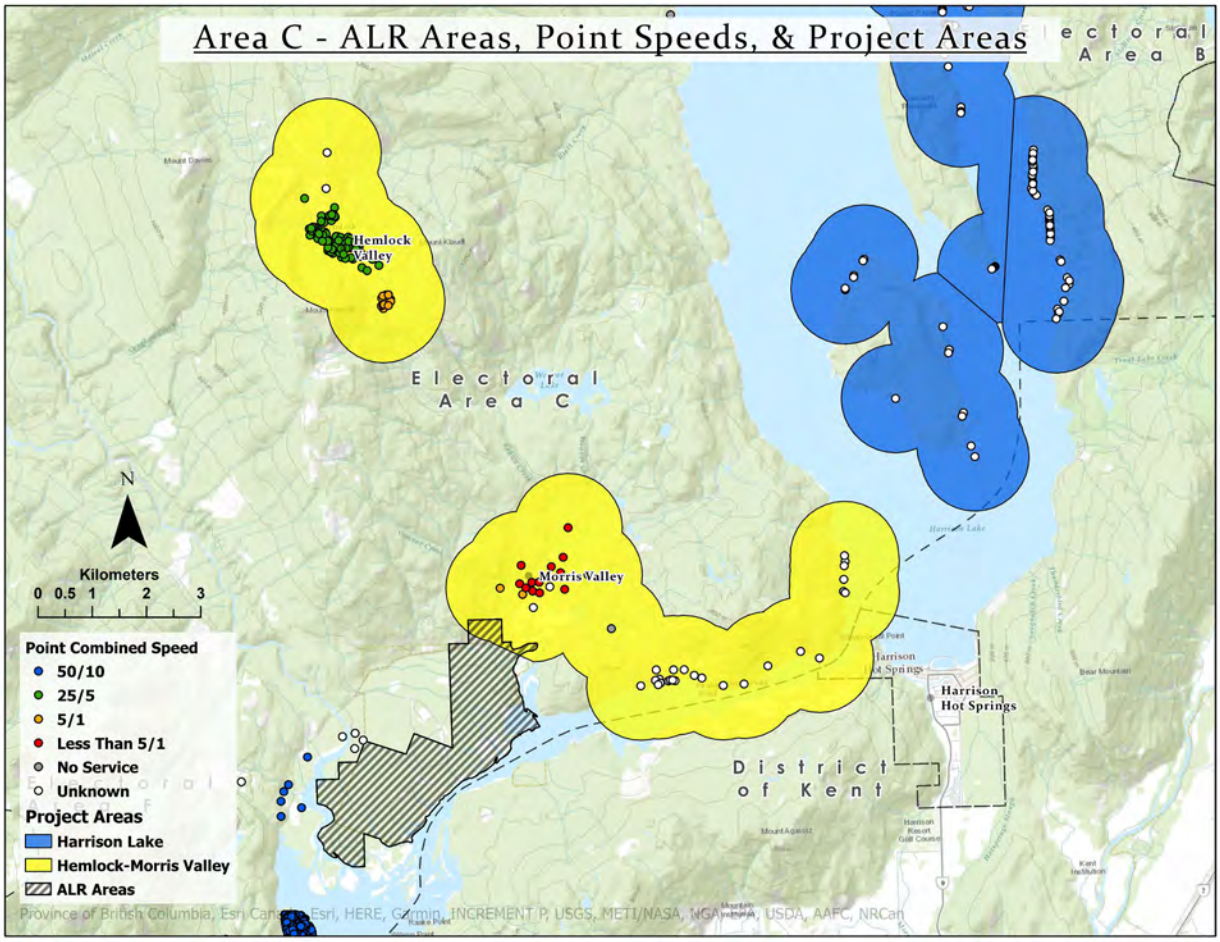


 

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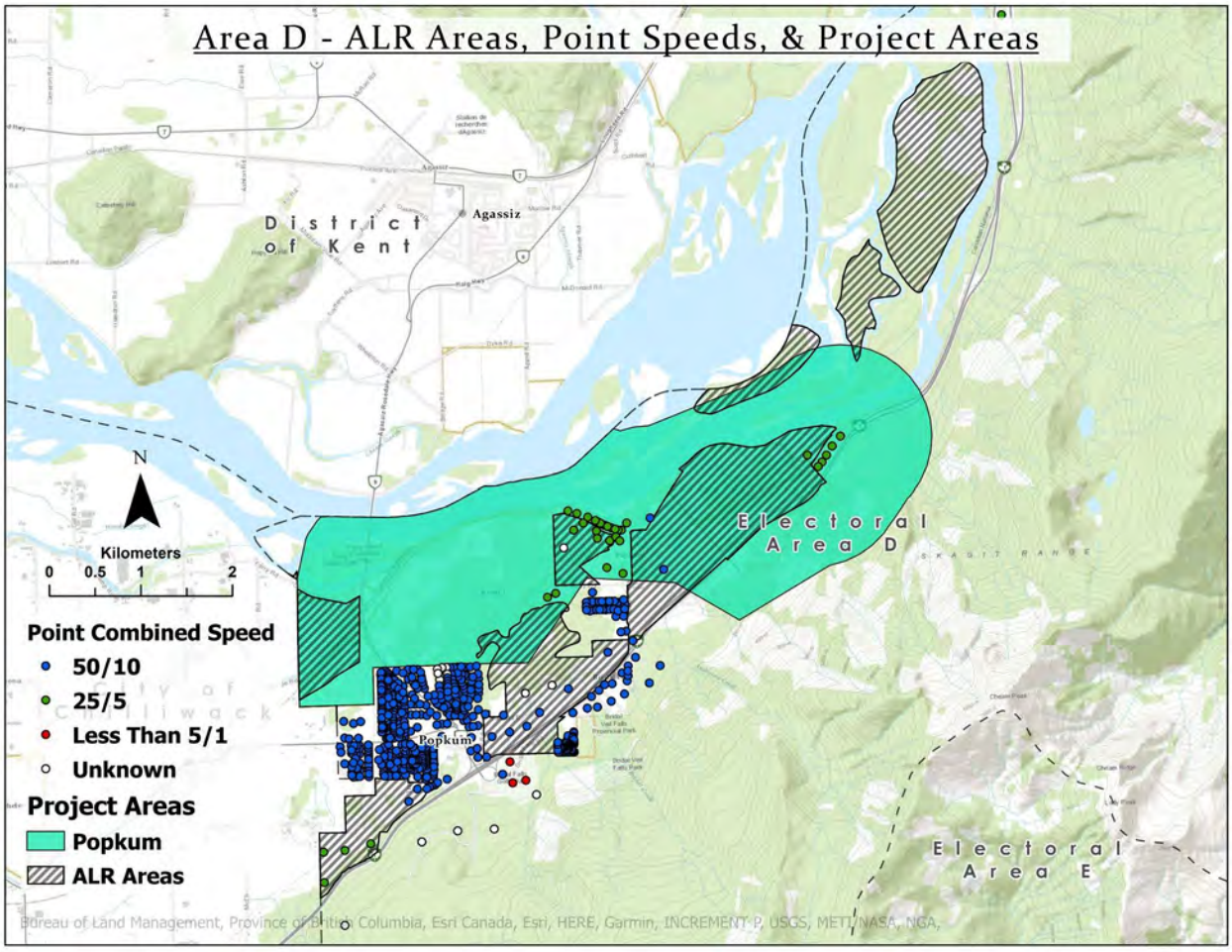


 

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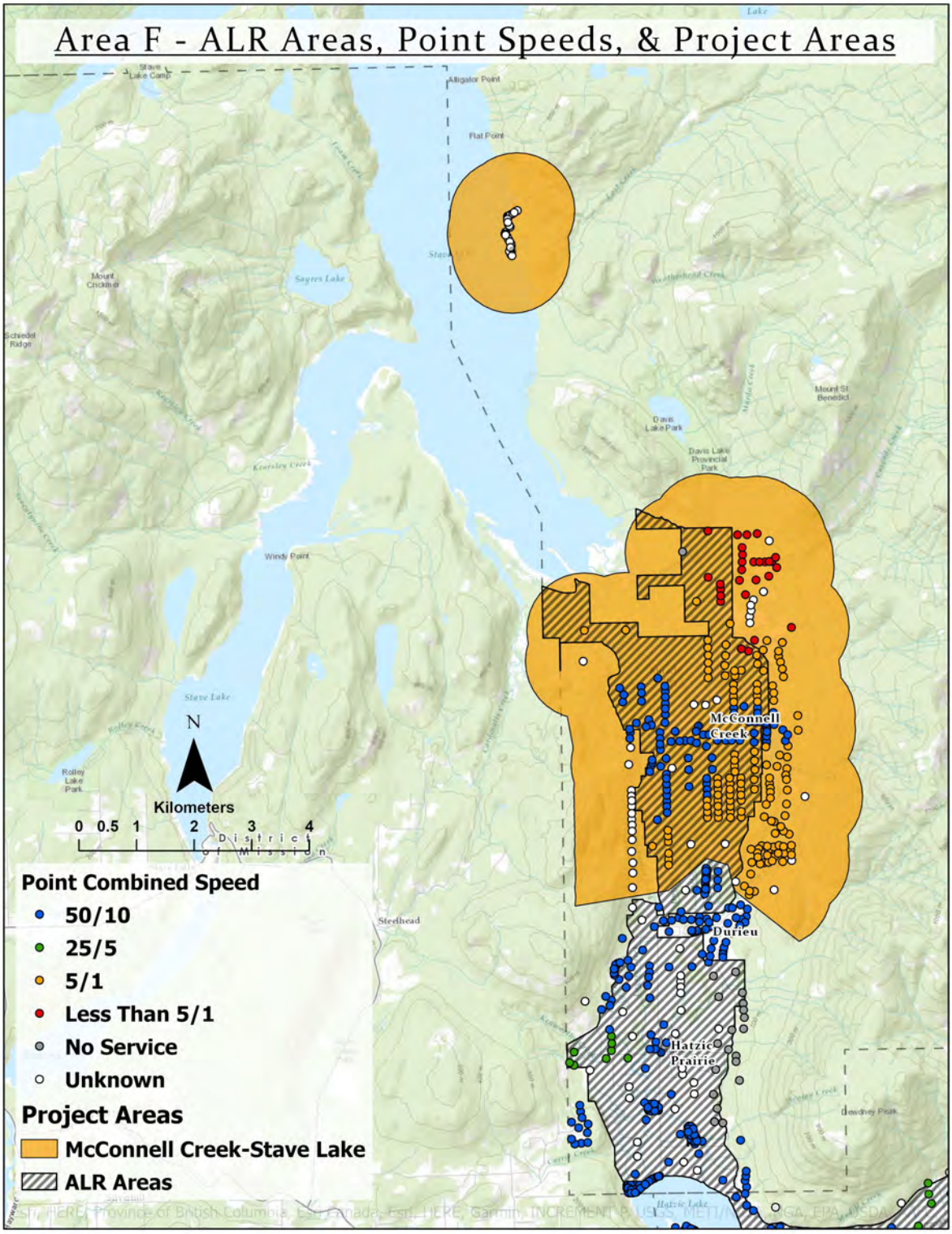


 

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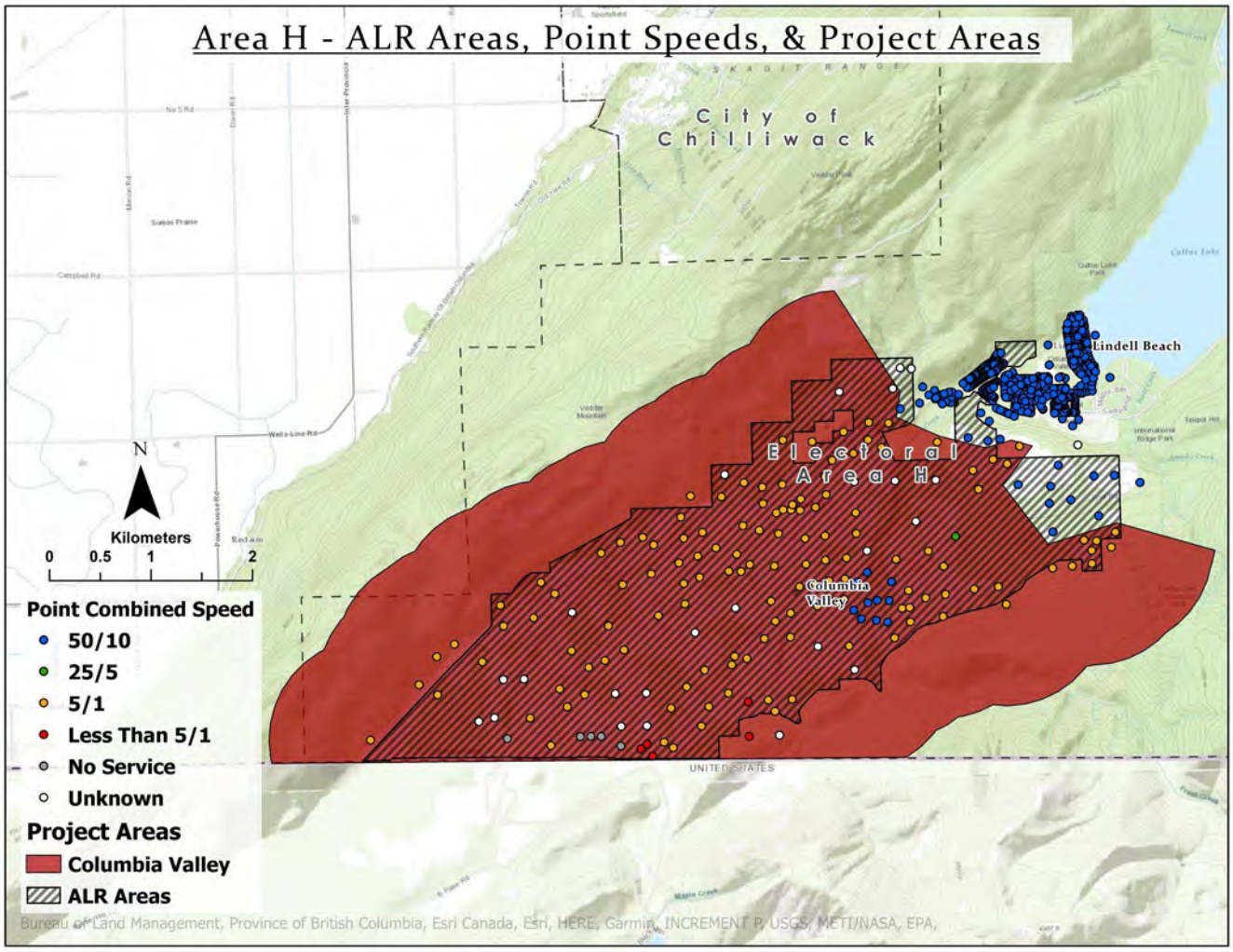


 

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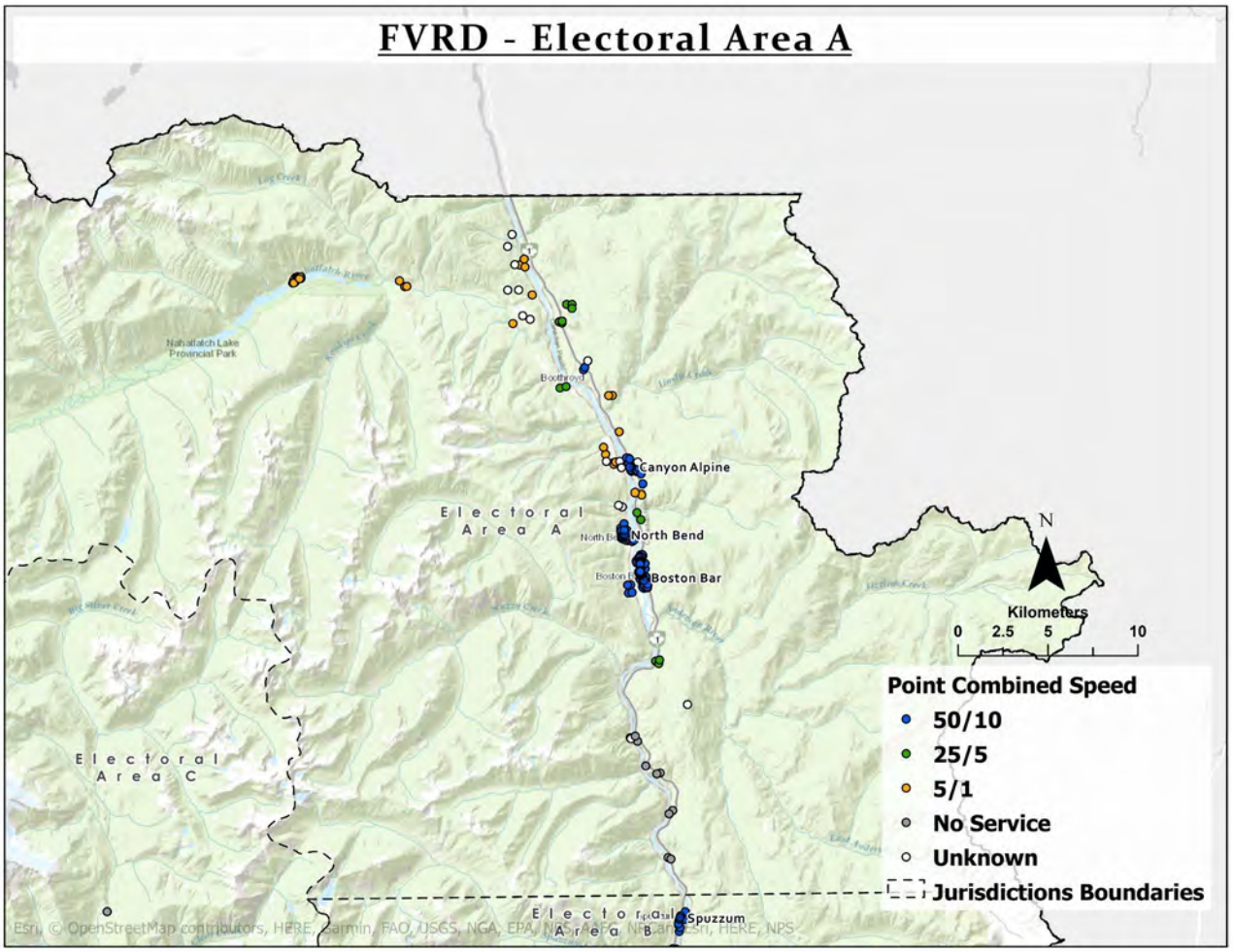
## Electoral Area Points by Speed



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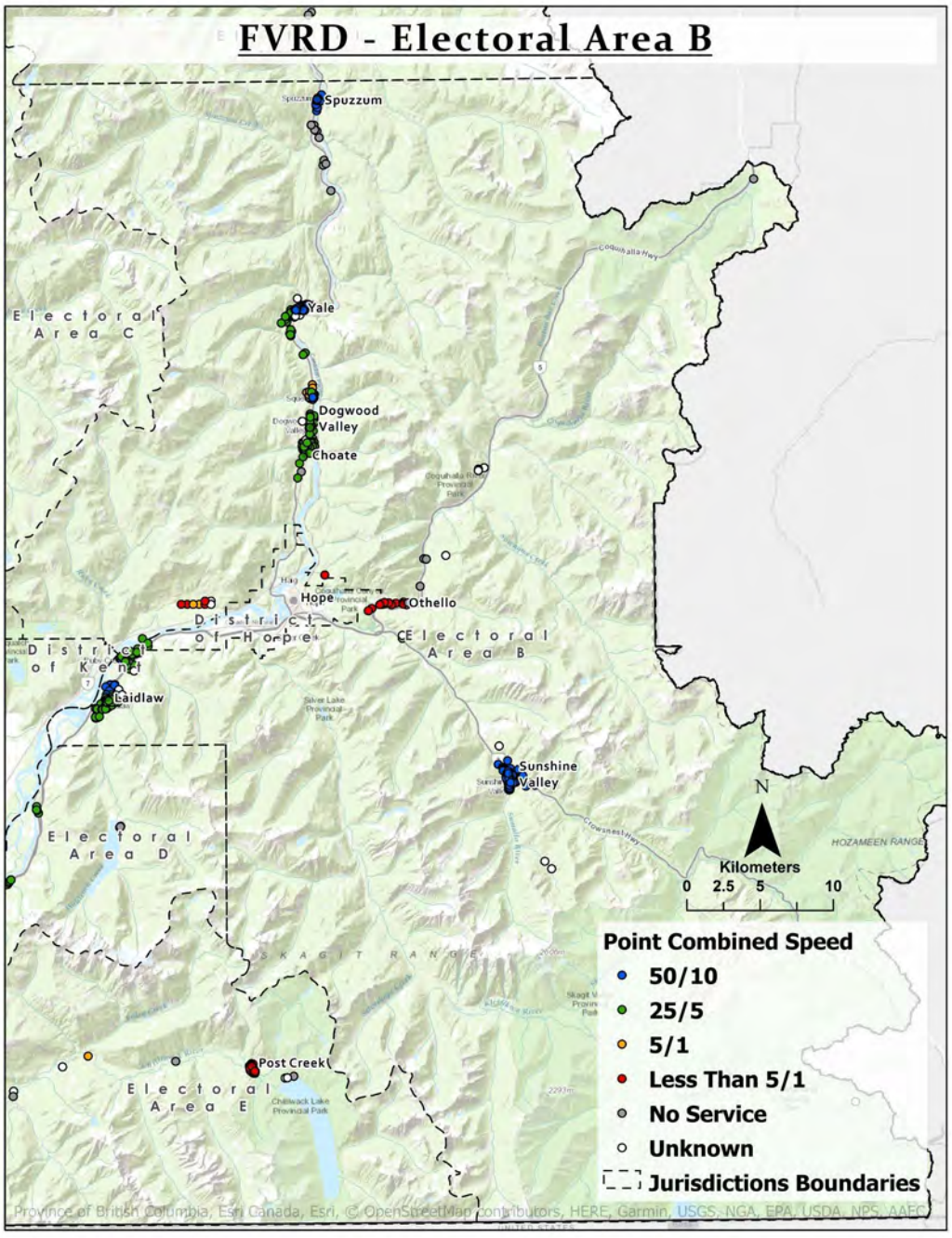


 

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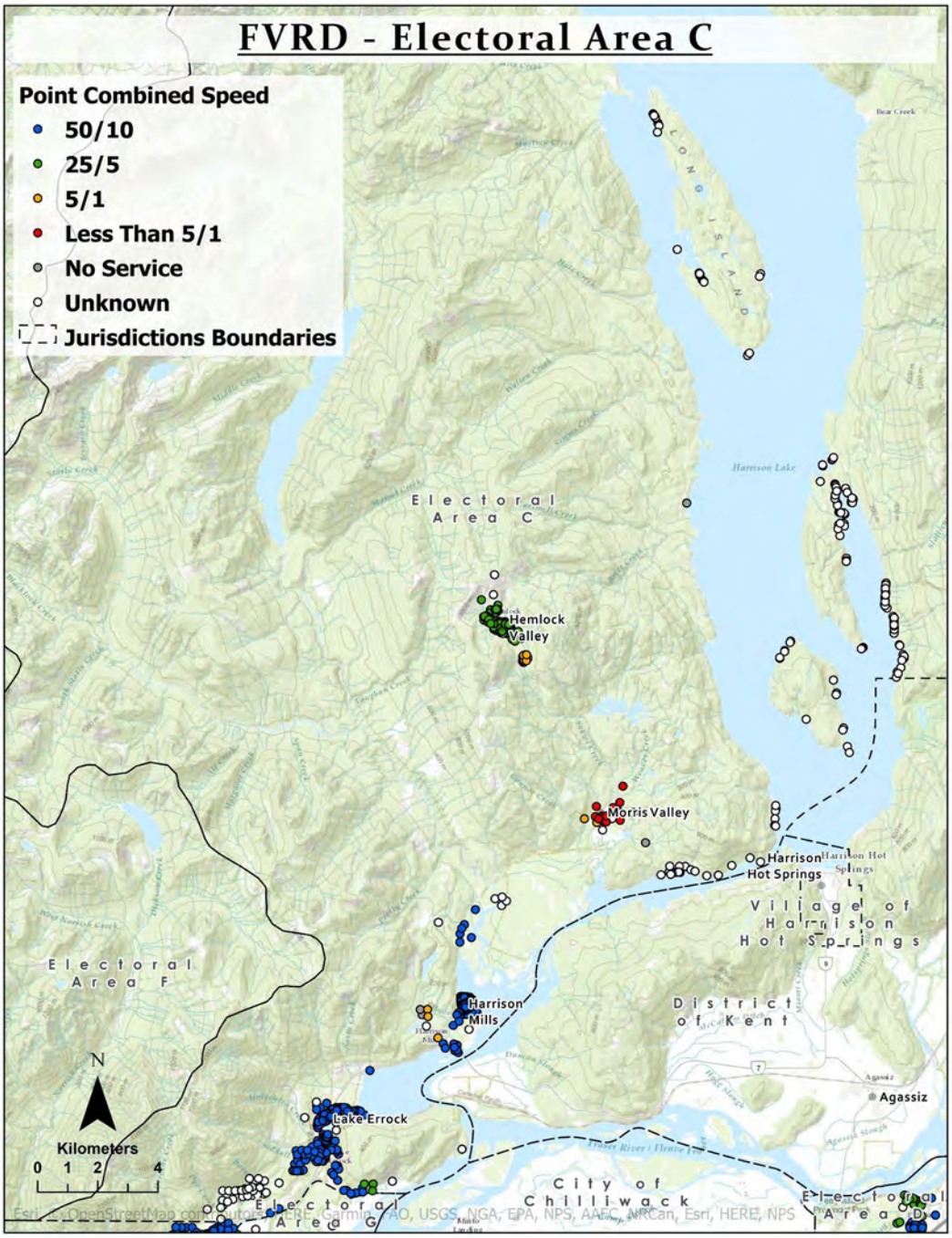

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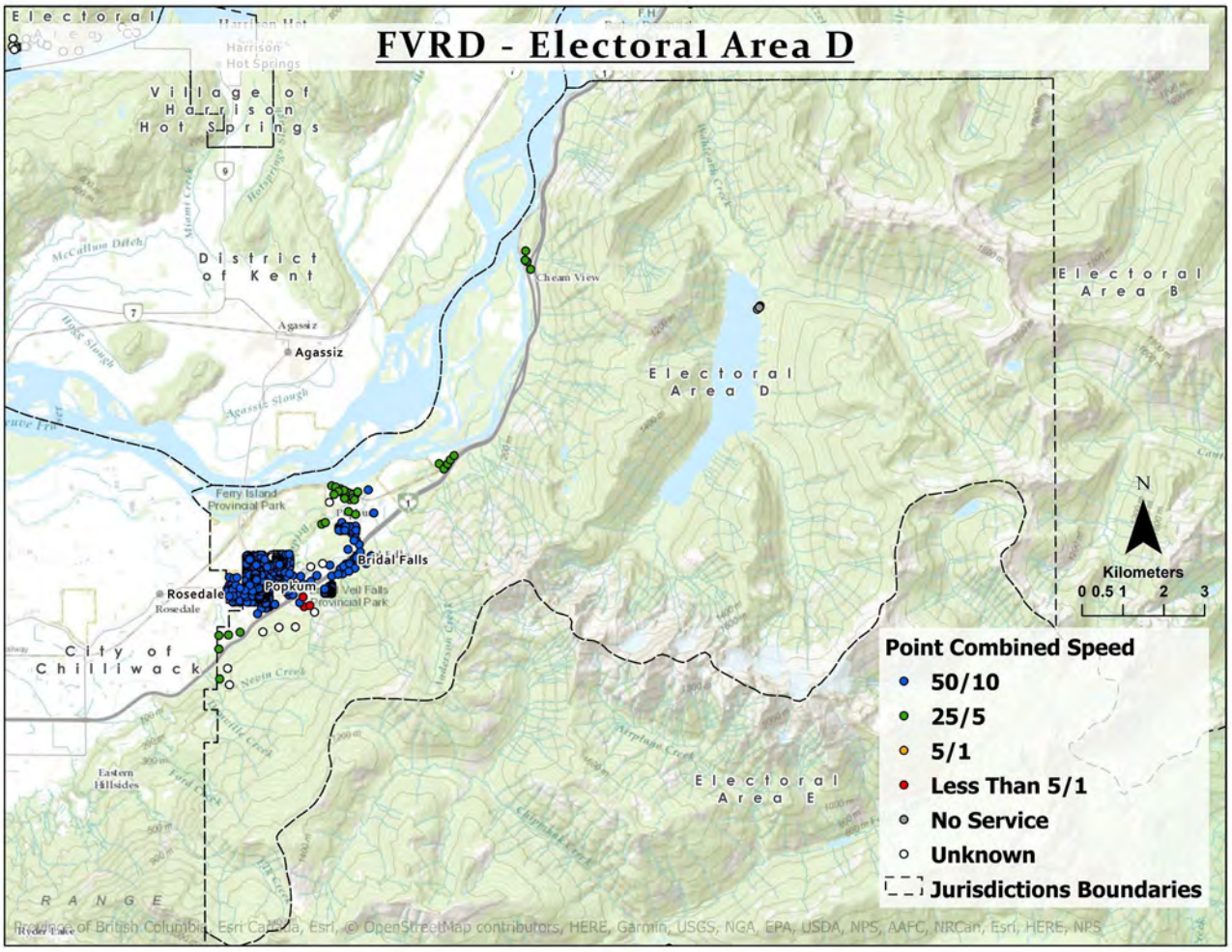


 

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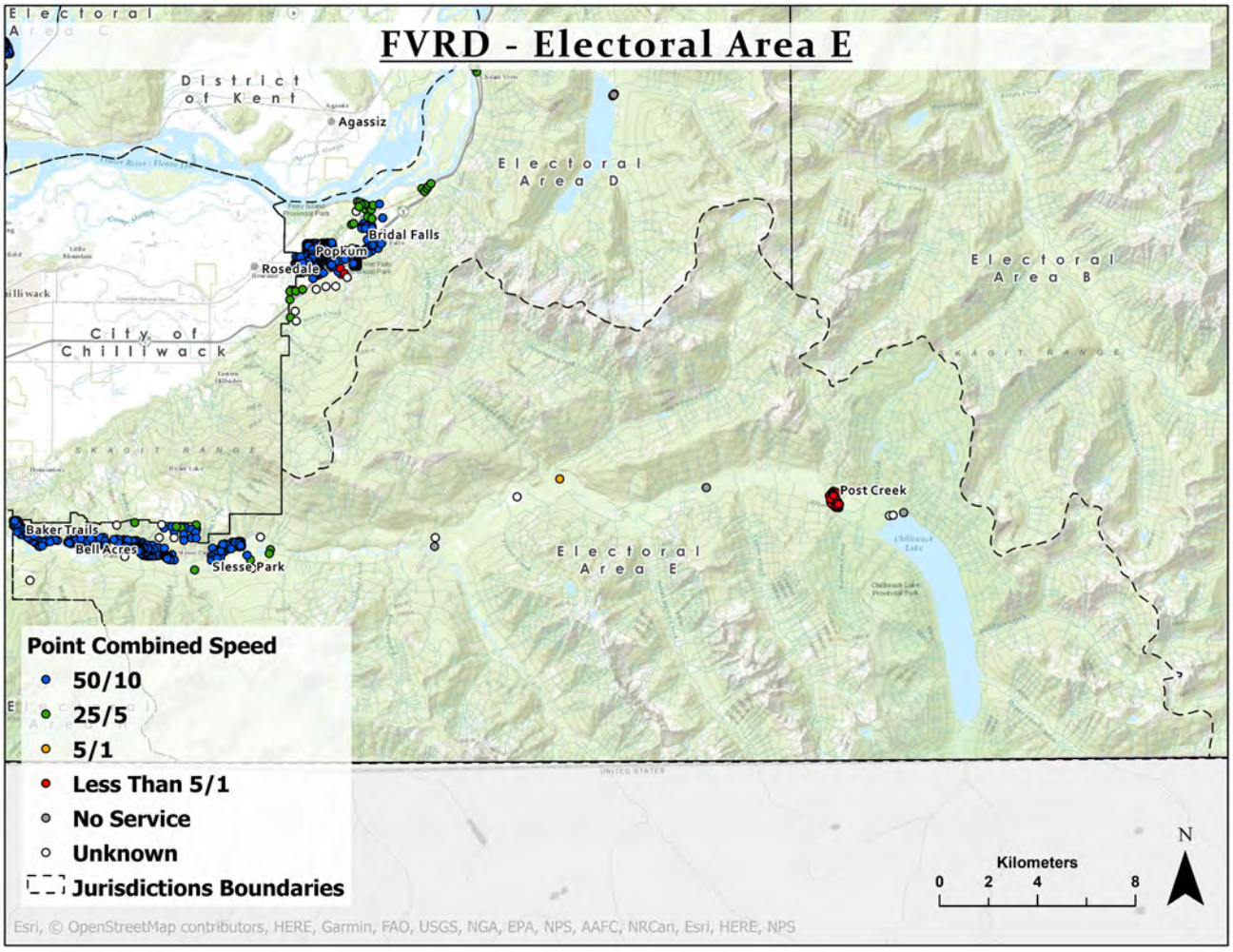


 

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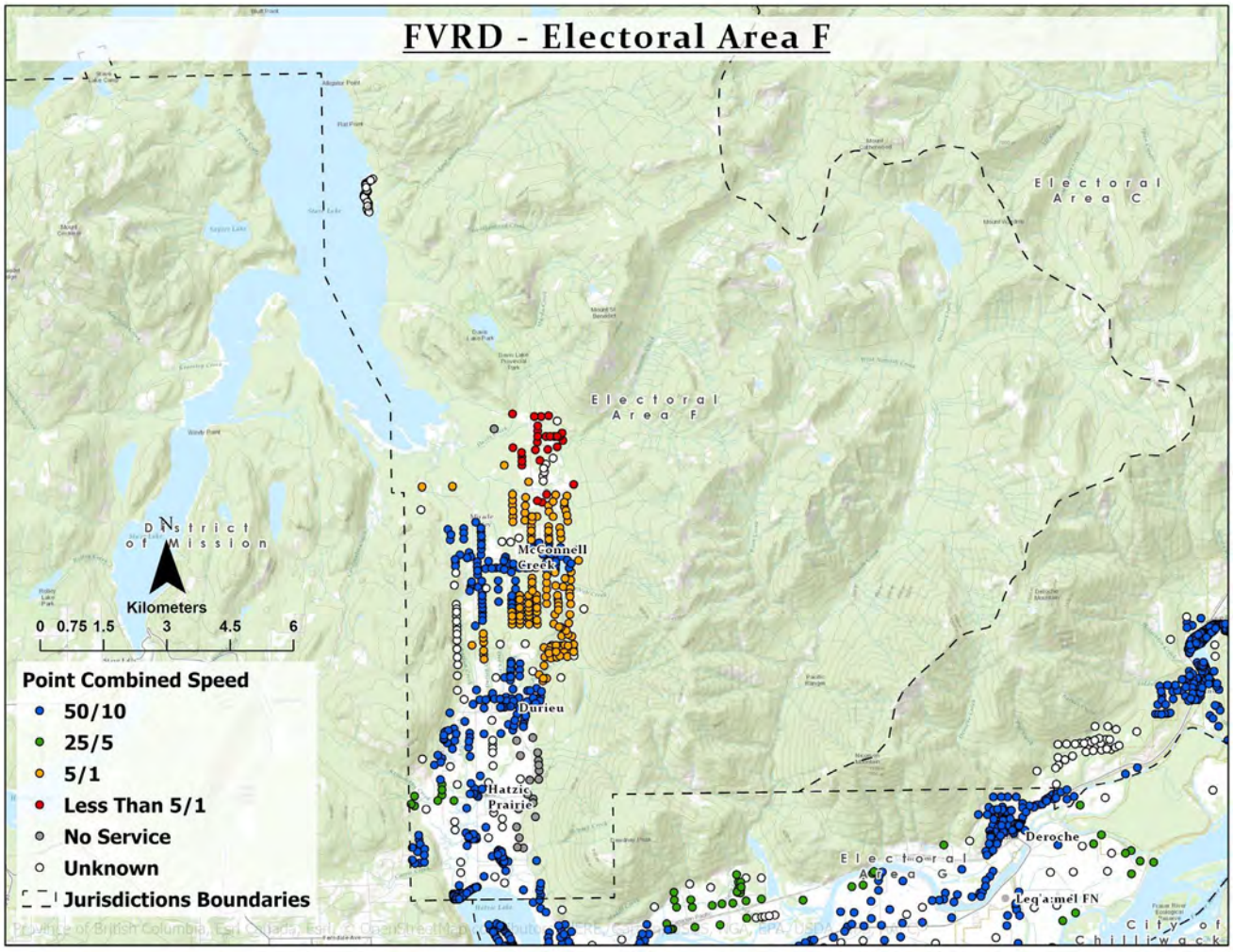


 

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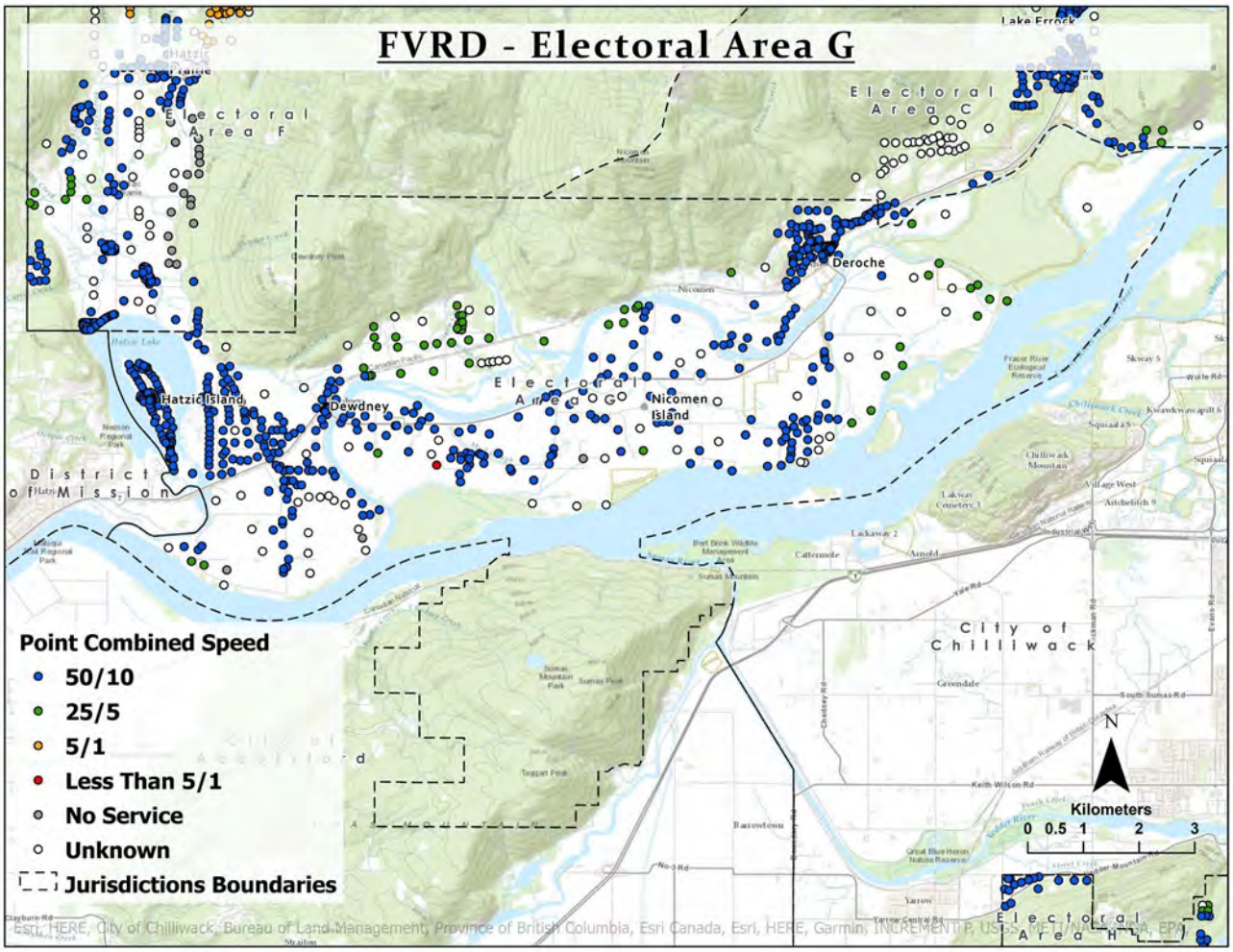


 

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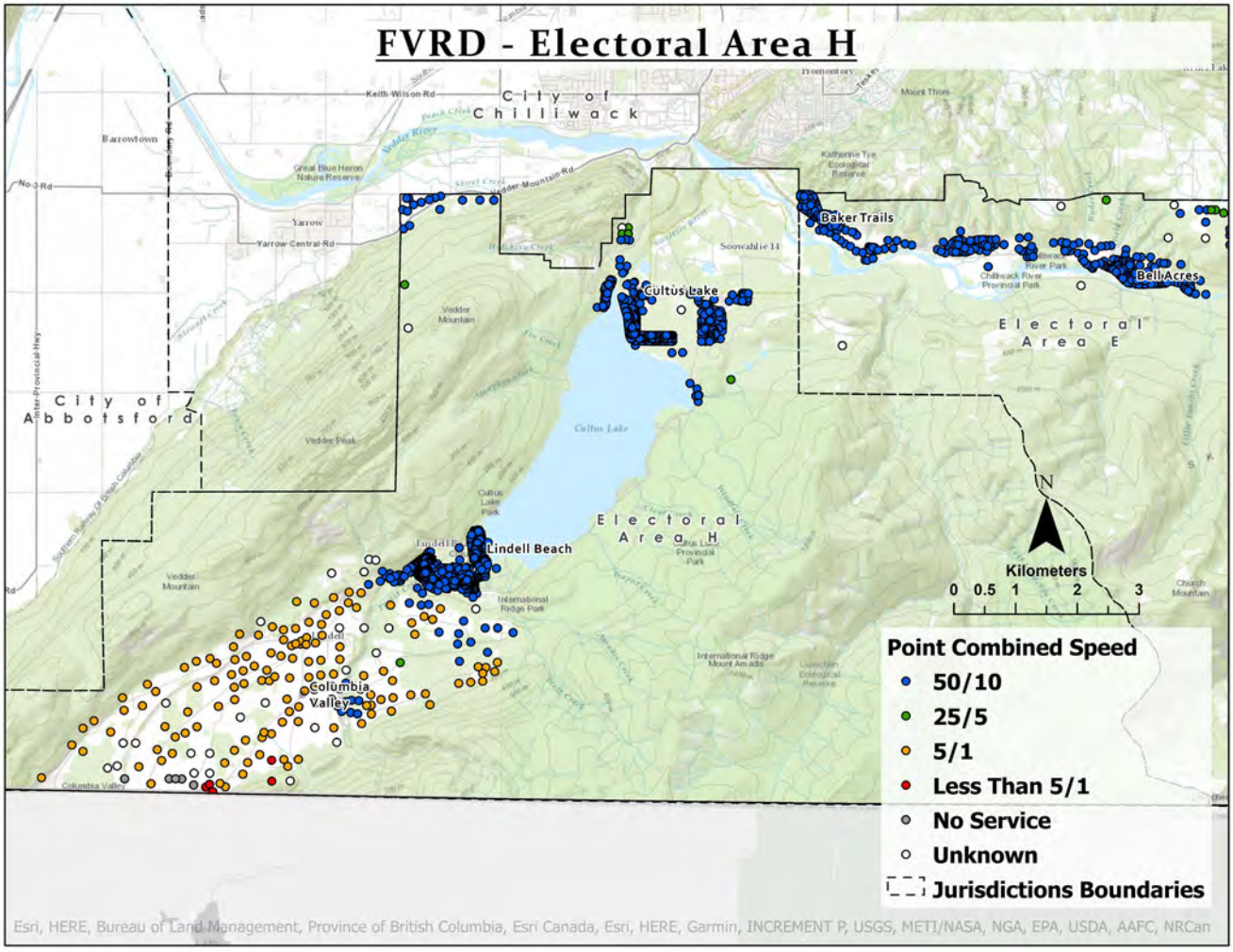


 

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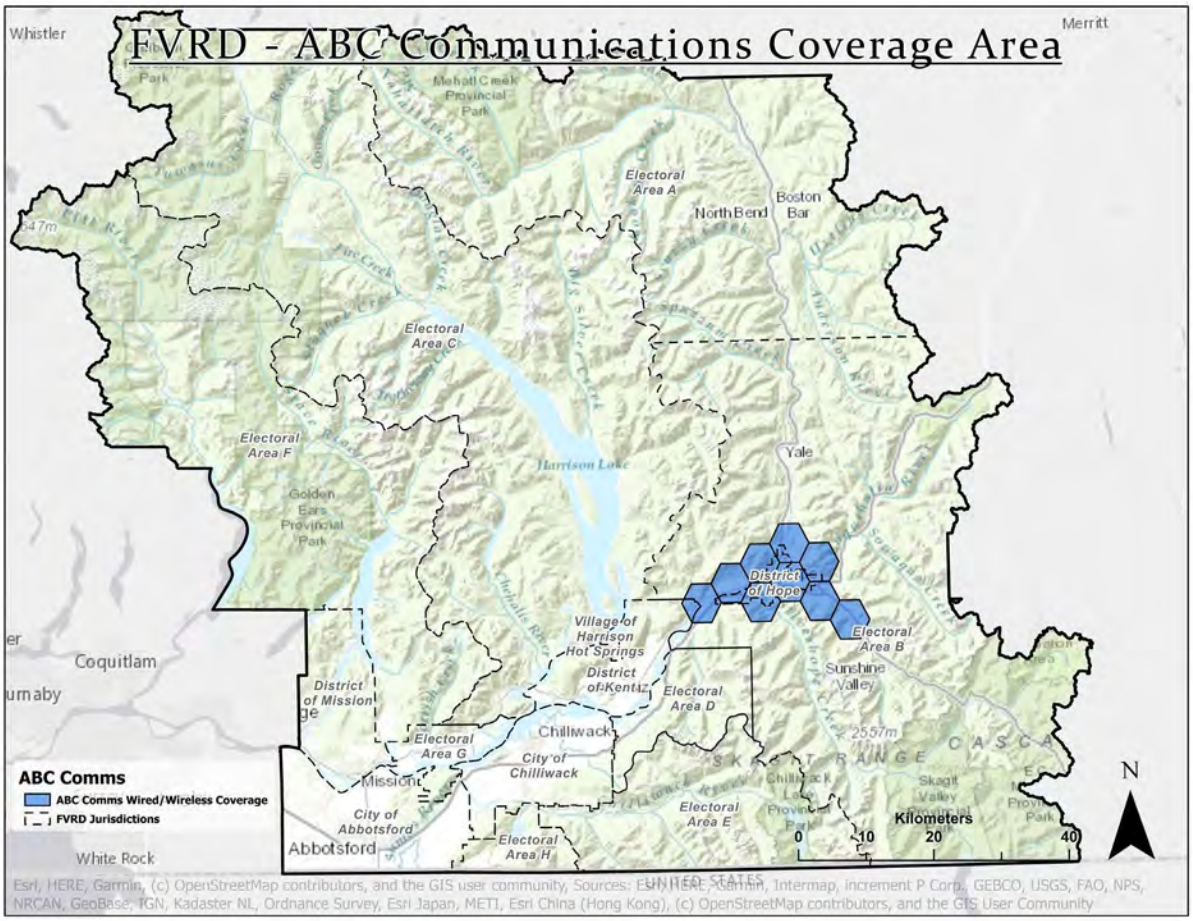
## Appendix B – Service Provider Service Areas

These maps show the areas served by each of the service providers in the FVRD.

## ABC Communications



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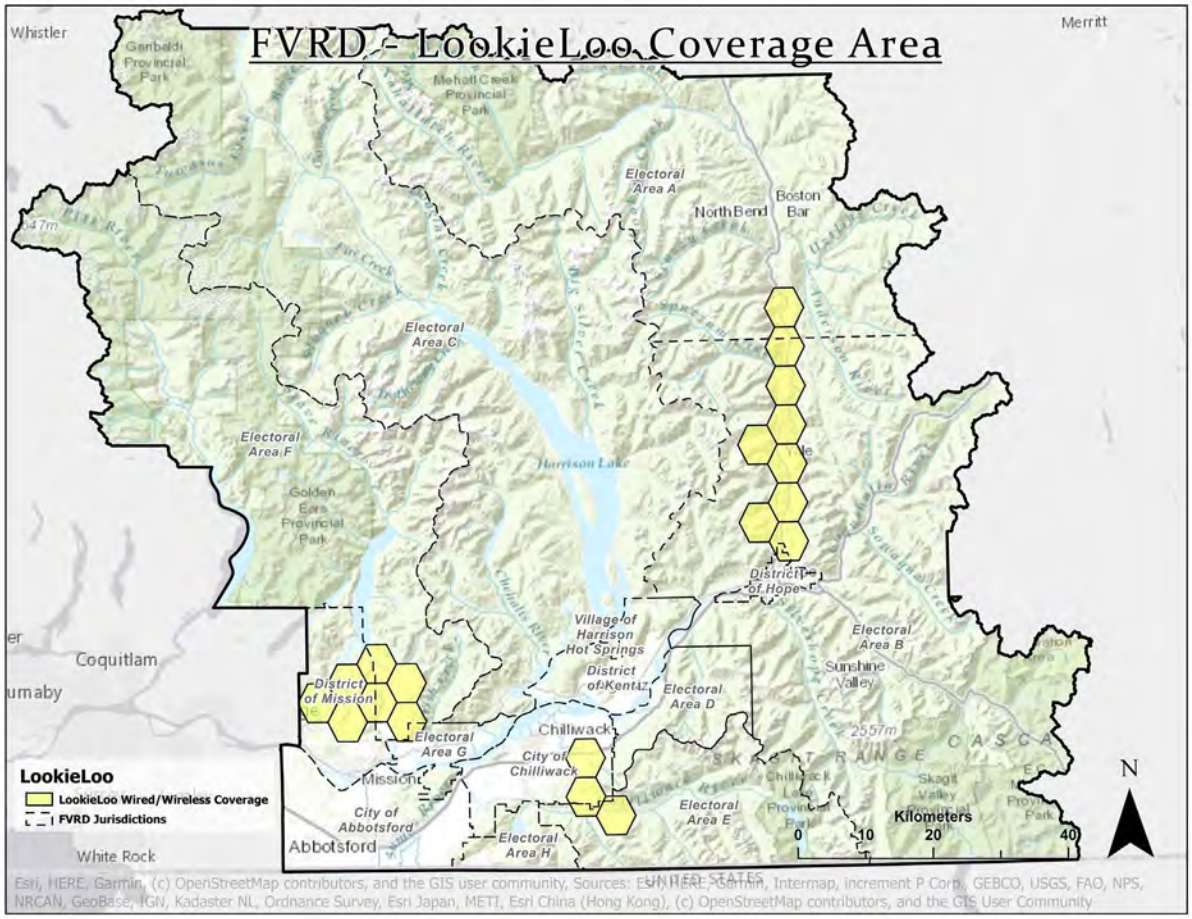


 

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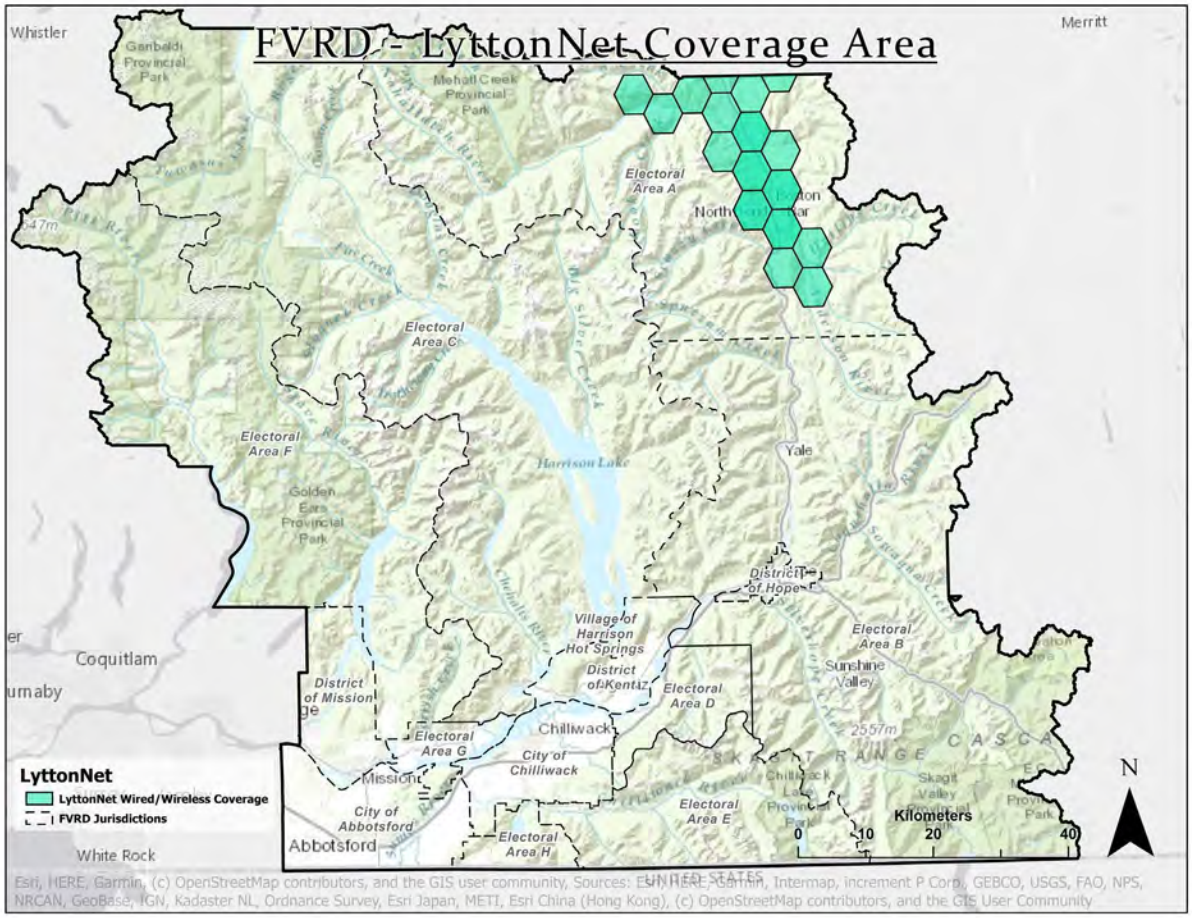


 

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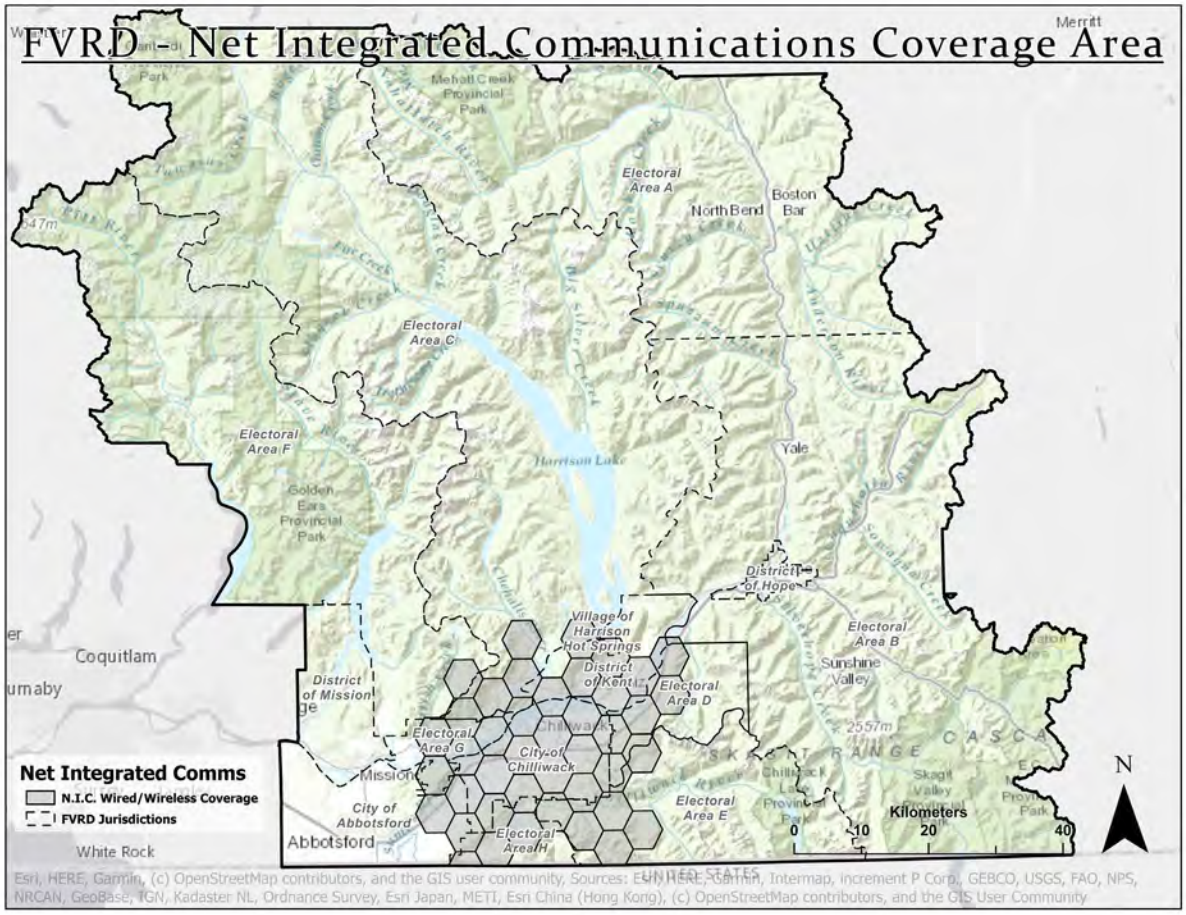

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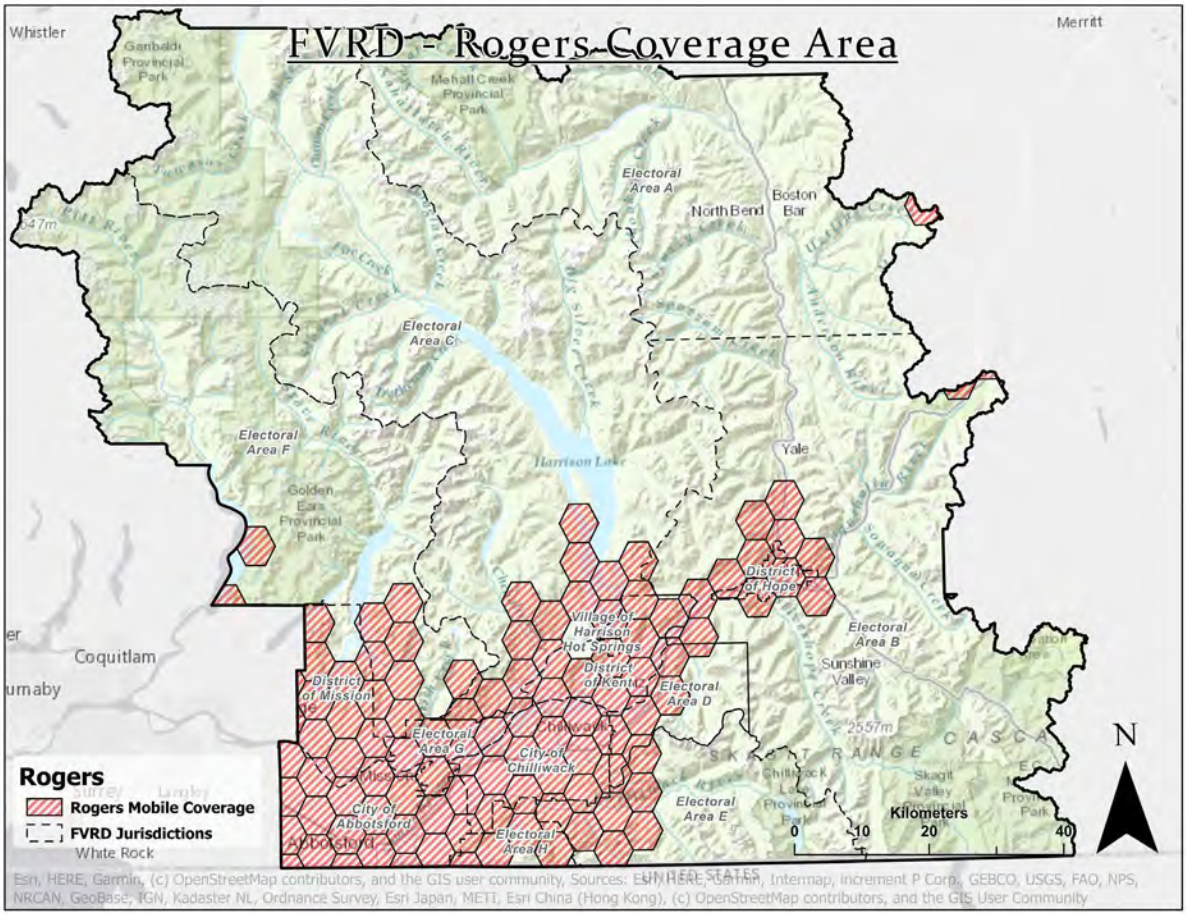


 

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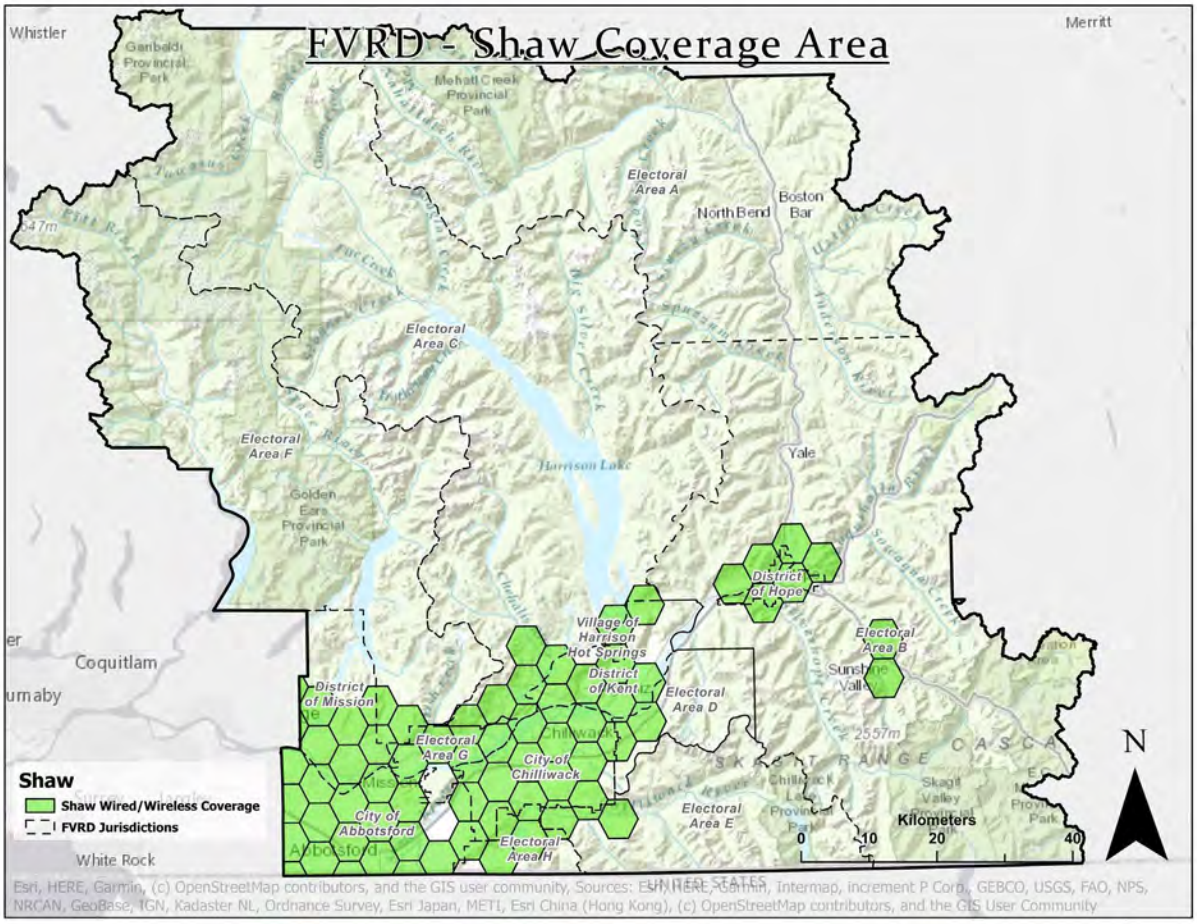
## Shaw



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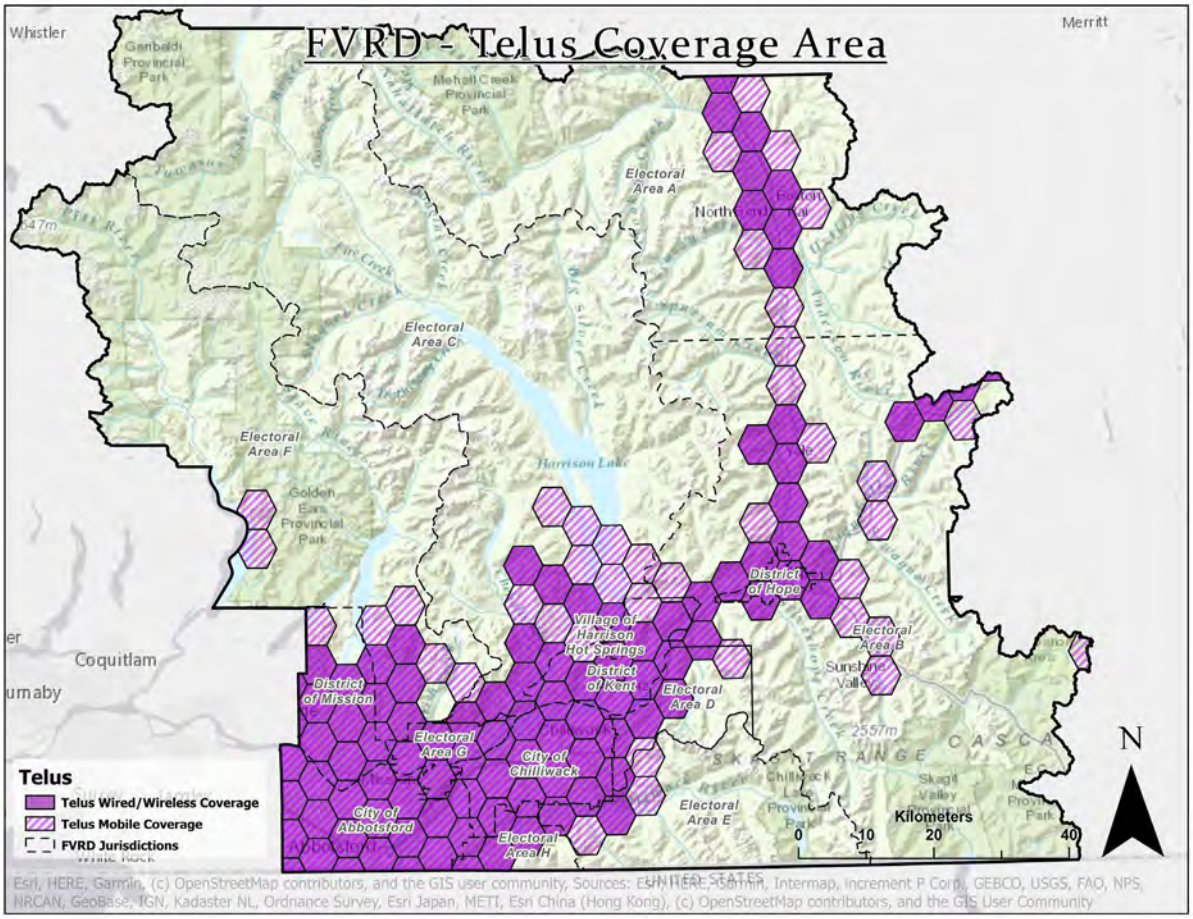
## Telus



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# Appendix C – Technology Overview

## Technology Alternatives

In terms of technology, the primary obstacle for rural broadband is cost. Depending on the most suitable technology, the primary cost consideration may be associated with either the backbone or local access networks. A wide range of options are available and broadband services can be provided through a variety of technologies each with advantage and disadvantages. These technologies trade off high capital and operating costs with capacity, scalability and the ability to support the desired applications. The choice of technology needs to be assessed against the requirements for the particular situation and the cost of providing the services. While some technologies represent higher capital costs, the life expectancy may be factored over a long period of time (ie. 20 – 30 years) so capital costs need to be amortized over the lifetime of the asset when comparing technologies. This section of the document is a high-level introduction to these technologies.

Alternative technologies used to connect locations together are outlined below. Technology choice is dictated by the needs and circumstances of the service area. The challenge is to select technologies and configure them into systems that meet those requirements while minimizing life cycle cost.

As summarized above, **backbone or transport infrastructure** is the technology used to transmit and receive data over long distance to connect towns, cities, provinces and countries. Fibre optic cable (optical fibre), microwave radio, and satellite are the three principal transmission medias but fibre is, by far, the most desirable with very high scalable capacity, long life cycle and low operating cost. The challenge with fibre is the high initial cost and as such high capacity terrestrial microwave radio solutions, or even satellite, may be considered depending on the requirements.

**Local access networks** connect users to the backbone network in order to reach distant locations and applications. In broadband, the term applications, refers the services that people (subscribers) use including things such as the internet, video streaming or broadcast, voice communications, email, access to business services such as Microsoft Office 365, security services, business to business communications. These applications require high capacity, reliable connectivity.

**Fibre to the Premise (FTTP, FTTH, FTTx)** is the gold standard for broadband service to fixed locations such as homes, businesses and institutions, providing very high capacity, reliability and support for almost any application. As with backbone fibre, FTTP can be expensive to deploy as it requires a physical cable (or optical strand) to be connected from a local POP to every subscriber location.

Like fibre, **coaxial cable** service (typically used for Cable TV broadcast) and **Digital Subscriber Line (DSL)** service (over phone lines), share the requirement of installation of a physical cable from a local POP to the subscriber's premises. These technologies would typically be deployed in locations where this cable infrastructure already exists, thus avoiding the cost of construction. It would now be considered uncommon for a provider to construct new DSL or coaxial cable infrastructure rather than a fibre deployment. While coaxial cable can deliver capacity meeting, and exceeding, the CRTC Service Objective, DSL technology is limited in its ability to scale to these capacities. That said, neither technology can approach the capacity of fibre

and as such, will likely not scale to meet the capacity requirements in the long term. Coaxial cable is also a shared technology as described below in Fixed Wireless.

The alternative to wired technology like optical fibre, coaxial cable or DSL is a radio-based "wireless" technology. **Fixed wireless** technology and unlicensed radio spectrum has been used as a low cost means of kick-starting internet service in low density rural markets. Fixed wireless is considered to be infrastructure that is fixed to a specific location, unlike technology used for mobile wireless described later. While no physical connection is required between the local POP and the subscriber's premises, high capacity wireless services typically requires "line of sight" to deliver reliable, high speed services. Any obstructions, including buildings, trees, or hills impair the signal resulting in no or poor service. Wireless technology, like coaxial cable, is a shared technology meaning that all subscribers using the wireless network are "sharing" the available capacity. The more subscribers using the service at one time, the less capacity each gets. The requirements to scale wireless service to high numbers of subscribers and capacities must be considered during the deployment of the network.

**Cellular mobile** technology, a variation of wireless, has become the de facto standard for voice and internet service direct to individual mobile devices. The data communication capability of current 4G (4th generation or LTE for Long-Term Evolution) cellular systems make this a viable broadband technology in appropriate circumstances. The emergence of 5G (5th generation) cellular over the next 5 to 10 years is expected to reinforce this trend (see emerging technologies below). While 5G technology is promising, it will require heavy investment in fibre to connect the local, high density of antennas to the backbone and ultimately globally provided services.

Finally, to reach isolated premises that are beyond terrestrial transport networks, fixed, or mobile wireless, direct to home **satellite** is the only viable choice. While this technology is acceptable when no other choice exists, it suffers from high latency (the time it takes to send or receive information) resulting in some applications not functioning optimally. Satellite can also have a relatively high cost for high capacity and usage.

The following summarizes the key characteristics, advantages and disadvantages of the technologies used for broadband service delivery.

## Backbone and Local Access Technologies

### Fibre optic cable - Backbone & Local Access

Extremely high capacity that is scalable for backbone / transport and local access. 10 Gbps already very common and 100 Gbps emerging.
[+] Long life cycle: 20 - 30+ years. Cost can be amortized over a long period of time.
[+] Low operating cost.
[+] High capacity, low latency, high subscriber counts.
[+] Very reliable.
[+] Very scalable. Upgrades to high capacity for relatively low cost.
[+] Supports a wide variety of applications.
[-] High initial (capital) cost.

[-] Acquiring right of way permits can be challenging
[-] Accessing existing underground and aerial infrastructure can be time consuming and expensive.
[-] Repair time can be long when cables break impacting network if redundant routes are not available.
[-] Not cost effective where low long-term capacity needs and long distances.
[-] Fixed to a specific location.

### High capacity microwave - Backbone

High capacity microwave provides capacity up to approximately 1Gbps.
[+] Long hop distance is possible under optimal conditions (30 - 50 km). Higher distances may require multiple hops.
[+] Can be engineered for high reliability.
[+] Can be cost effective for one or two hops.
[+] Supports a wide variety of applications.
[-] Issues accessing or permitting to construct towers in some locations.
[-] High initial cost if tall tower required.
[-] High initial and recurring cost if remote tower sites are required.
[-] Can be support and power challenges for remote areas such as accessing mountain tops.
[-] Relatively low capacity: scales from under 100 Mbps to over 1 Gbps.
[-] Appropriate spectrum scarcity an increasing issue.
[-] Fixed to a specific location.

### High-throughput satellite (Geostationary) - Backbone & Local Access

Well established technology with a competitive marketplace.
[+] Can be used direct to home (DTH).
[+] Cost does not vary with distance within the coverage footprint.
[+] Good capacity.
[+] Relatively low initial capital costs.
[-] High cost for usage (bytes per month).
[-] Can be susceptible to service impacts with severe weather.
[-] Larger antenna sizes needed at high latitude sites.
[-] Fixed to a specific location.
[-] May not be well suited to some applications.

### Cellular mobile – Local Access

Open standards allowing mobility and connectivity anywhere, anytime.
[+] Huge global market and competitive ecosystem with ongoing evolution.
[+] Low cost for user equipment (competitive market).
[+] Versatile user equipment.
[+] Mobile services.
[-] Relatively high usage costs compared to fixed services (bytes per month).
[-] High initial costs for network build (poor return in low density markets).
[-] Relatively high operating cost (management and evolution).
[-] Limited competition in lower density markets.
[-] Shared technology. Additional subscribers degrade overall performance.
[-] Performance can be inconsistent. Latency can be high.

[-] Higher capacity usually requires significant investment in network upgrades to new technology.
[-] May not be well suited to some applications.

### Fixed wireless– Local Access

Different technology with different coverage and capacity characteristics. A range of proprietary and semi-proprietary products are available.
[+] Can be fast to deploy (if antenna tower permitting is not an issue).
[+] Can have high capacity if high frequency (trade-off with coverage).
[-] Limited spectrum and licensed spectrum can be expensive.
[-] Unlicensed spectrum: performance may degrade from interference.
[-] Susceptible to weather and local weather can cause service issues.
[-] Usually needs fibre for sufficiently high capacity backhaul.
[-] Requires line of sight for high capacity and reliability.
[-] Shared technology. Additional subscribers degrade overall performance.
[-] Fixed to a specific location.
[-] May not be well suited to some applications.

## Emerging Technologies

### Low and medium earth orbit satellite (LEO, MEO)

Market viability is untested; only one system in operation (Company called “O3b by SES”).
[+] High capacity (O3b delivering 10 Gbps channels).
[+] Potential to lower the cost of usage.
[-] Not all early market hopefuls may launch service (OneWeb, Starlink).
[-] Not all market entrants may succeed.
[-] Ground station complexity (at least 2 tracking antennas).
[-] High inclined and polar orbits required for high latitude coverage.
[-] Fixed to a specific location.
[-] Not currently available

### Cellular 5G – Local Access

Next generation 5G cellular
[+] Potential for low usage costs with 5G and mmWave frequencies.
[+] Mobile and fixed services.
[-] Requires a heavy investment in fibre to connect numerous 5G antennas..
[-] Not currently available

## Summary of Technology Alternatives

In summary, rural and remote areas are low density, meaning network links are required over long distance and all else being equal, rural telecom service costs per subscriber will always be higher than urban.

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- Fibre optic infrastructure for both transport and access is the long-term end game for fixed broadband. No other currently available technology can match the speed and reliability of fibre connectivity or scalability for the future.

- Cellular mobile to open global standards is, and will remain, the delivery mechanism of choice for mobile voice and data communications direct to individuals.

- Proprietary radio access systems in license-exempt and licensed bands can have a role to play if they are sufficiently inexpensive that payback is within their expected service life.

- Satellite remains the service of last resort for remote locations. Although the cost per byte per month is high, service is inexpensive to deploy and is easily redeployed. Geostationary earth orbit satellites have long delay (go-return times up to 1 second) but will continue to serve the direct-to-home market.

## Business and Operational Considerations

Infrastructure enables services to subscribers, but it does not provide the resources required to effectively manage, monitor and obtain revenue from the network. When referring to the SDP introduced earlier in this report, the OSS/BSS layer provides all the infrastructure required to perform the operational and business functions required for the network to operate successfully.

The OSS/BSS layer of the SDP includes many components that enable and support service to the customer. In summary:

- Personnel with appropriate knowledge and experience with operating a network.

- Customer support to effectively support subscribers of the network such as technical support and customer service support.

- The infrastructure and software applications required to effectively monitor, manage and operate the network.

- Business operations for the business such as customer service and billing.

- Equipment, tools and assets required to complete onsite activities.

The OSS/BSS layer must include, but is not necessarily limited to:

### Resources:

- The personnel required to:
    - support and provision network services.
    - provide maintenance activities on the network electronics and other infrastructure.
    - manage subscriber requests for adding, removing and changing existing services.
    - Provide the expertise required to enhance services on the network.
- The support system, which includes the personnel, required to effectively support subscribers of the network such as technical support and customer service support.
- The processes and procedures related to the operation of the business.

- The equipment and tools required to complete onsite activities such as vehicles, tools, fibre splicing and testing equipment, network testing equipment, etc.

The personnel required to operate the network need the following skill sets:

- Overall management resources that are familiar with the operation of a network and can provide the overall guidance for the network operations.
- Technical resources that can effectively design, commission and support the electronic components of the network.
- Technical resources that can effectively design, commission and support the infrastructure components of the network such as POPs, power systems, environmental systems, outside plant, fibre, etc.
- Installation and maintenance skills that can provide the onsite support for the infrastructure, electronic components and subscribers.
- Customer service resources that can provide effective assistance to subscribers of the network.
- Sales resources that can manage new opportunities.

### Business Systems:

- Customer database containing customer information.
- Billing systems to issue invoices and accept payments.
- Documentation storage.
- Reporting systems to gather, consolidate and report on customer usage that may be used for customer billing.
- Scheduling systems to book and schedule customer site visits and technician tracking that may be required.
- Remote access systems used to provide key support and business technicians access to the systems 7x24x365.

### Operational Systems:

- Monitoring systems to monitor the network, locate problems, send alerts to support technicians, gather statistics, report on trends, etc.
- Trouble reporting systems to gather and maintain information on problems reported by customers for timely resolution.
- Provisioning systems to add, change and remove services to customers.
- Logging systems to log network and customer events.
- Documentation storage.
- Manufacturer specific software required to operate and maintain network equipment.
- Backup and restore systems to maintain configuration backups and restore when required.
- Network maintenance software.
- Network operation systems that are required to make Internet services function. Eg. Domain Name Service (DNS)
- Network authentication and registration systems such as RADIUS and DHCP that are required to activate subscribers on the network.

The hardware and software systems are typically located in one or more datacenters (or POPs) on the network. The intent is to have a location suitable for the equipment required to run the software applications required to effectively operate the network. As these systems will contain sensitive

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operational and subscriber information, they would typically be implemented in a manner that provides security from external sources such as the internet. These systems contain the infrastructure that provide the daily operational functions for the network.

Along with appropriate resources and software applications the OSS/BSS systems include all the processes and procedures and physical equipment required to perform these functions. An example of a process would include the step by step procedure to install and activate a new subscriber on the network as a number of components need to be considered including the physical installation of the fibre drop, the equipment at the subscriber premises, connection of the subscriber in the POP, the activation of the service on the network, etc. Each of these functions needs to be completed in order for the service to be ready for the subscriber.

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## Appendix D – Trans Mountain Pipeline

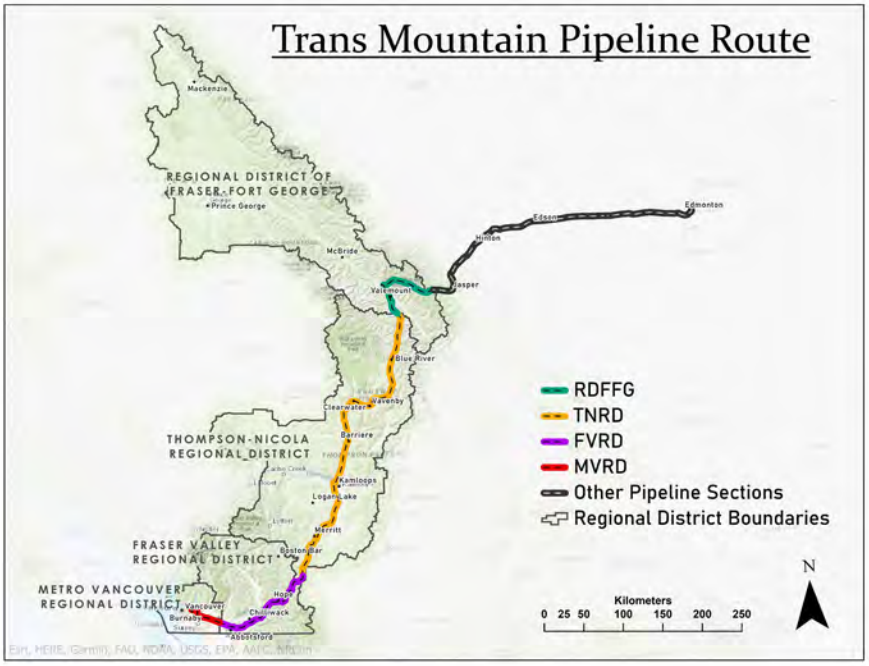
Trans Mountain operates an existing oil pipeline between Strathcona County in Alberta to Burnaby, BC. The 1150 km pipeline has been in existence since 1953. In June, 2019, the federal government approved the expansion of the pipeline which will see 980 km of new pipeline constructed mainly along the existing right of way. The expected in-service date for the pipeline is December, 2022.

As part of the new pipeline construction, Trans Mountain is required to construct infrastructure for monitoring and leak detection as a condition of the Certificate of Public Convenience and Necessity (CPCN) issued by the Canada Energy Regulator (CER)[29]. Fibre optic infrastructure is a logical solution to that requirement, and constructing fibre optic infrastructure for the purpose of serving rural connectivity must be considered at the same time. While, outreach efforts for this report includes outreach with Trans Mountain, specific details of any planned fibre infrastructure were not shared with TANEx at that time. It is expected that Trans Mountain has already had interest from third party network providers and desires to provide benefits for communities along the pipeline route. An immediate expression of interest by a local government collaboration should be considered.

*Map obtained from https://www.transmountain.com/planning-the-route*

As identified in the SDP, "backbone" or "transport" fibre is critical for delivering internet and cellular services to rural areas because it provides high capacity external connectivity to those communities, other communities, the province, Canada and globally. Without reliable, cost effective backbone capacity, a provider is unable to bring service to these communities in a way that makes business

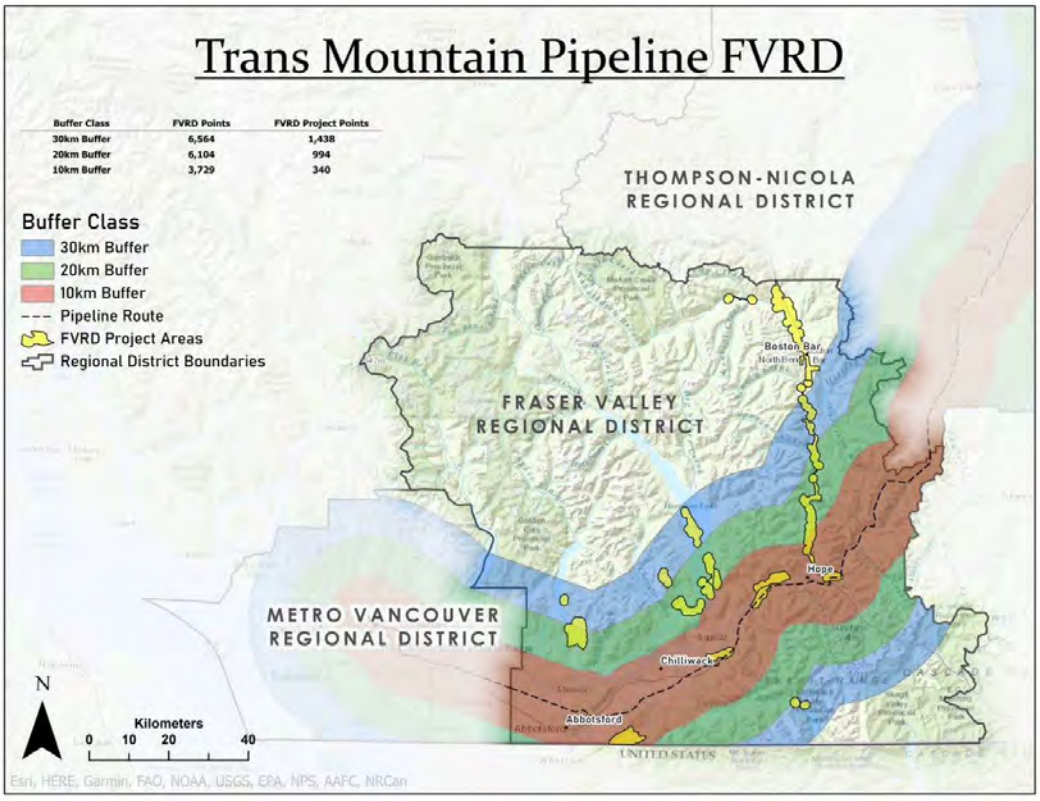
[29] Trans Mountain Corporation, Trans Mountain Pipeline Route Map




sense. When considering the business case for connectivity in rural areas, backbone capacity represents a major capital and operating expense.

As part of the regional connectivity strategy, TANEx views the ability to obtain access to backbone capacity along the Trans Mountain right of way as a major opportunity. Leveraging every opportunity to remove major cost barriers is critical to achieving connectivity for rural and remote areas. Local governments need to organize quickly to speak with a single voice to advocate for a publicly controlled fibre optic communications backbone along the Trans Mountain pipeline. To do this, local government needs to work collaboratively with other stakeholders including neighbouring Regional Districts, interested municipalities, First Nations and industry where possible, to solve a bigger problem for more people. As a federal Crown corporation, Trans Mountain represents an opportunity to leverage the existing project to advance other federal government priorities such as rural and remote connectivity.

As a preliminary overview, TANEx completed a brief study to understand the potential benefit of obtaining access to backbone capacity along the Trans Mountain Pipeline right of way. To quantify the benefit, potential subscribers were plotted along the pipeline right of way within 10, 20 and 30 km buffer zones. The point count depicted in the map below includes the total points (not including First Nations or municipalities) located within the buffer zones in the FVRD as well as a subtotal of those points that have been included in a potential project area. It is expected that there would be a number of First Nations communities who would benefit from such a project as well.




Fibre optic connectivity along the Trans Mountain right of way, **especially** if publicly controlled for the greater good, has the ability to impact a significant number of potential subscribers across a number of regional districts along the pipeline route. Not only does this represent a significant capital and operating cost component to the solution, but it provides an opportunity for rural subscribers and service providers along the pipeline route to obtain connectivity to the major centers of Vancouver and Edmonton that provide access to an Internet Exchange critical to connecting to the global internet and providing cost effective internet connectivity.

Third-party organizations may already be in discussions with Trans Mountain to obtain access to fibre optic capacity along this important route. While this may indicate progress, how, or if, it benefits the FVRD rural and remote connectivity challenge remains to be seen and will be determined by third parties. A fibre backbone through many of these communities already exists through some major providers but that does not mean that those rural communities get appropriate connectivity. Communities along this route continue to suffer from poor to no connectivity. In order to solve the connectivity challenge, the business opportunity must be opened for additional providers to obtain access to the potential market without being encumbered by high cost backbone connectivity.

At a minimum, the opportunity presented by Trans Mountain be explored further at the earliest possible time by the Metro Vancouver, Fraser Valley, Thompson-Nicola, Fraser-Fort George Regional Districts, along with interested municipalities and First Nations along the route. Combined, these government organizations represent a significant presence with a direct interest in the Trans Mountain construction. The opportunity presented with access to the Trans Mountain right of way may benefit not only the local

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governments in their quest to address the rural connectivity challenge but a potential win for all parties including Trans Mountain.

Each participating government could nominate a representative to begin the process of a collaborative, coordinated approach to discussions with Trans Mountain and potentially, service providers that may have secured or wish to secure access to the fibre capacity along the pipeline route. The first step will be for the interested governments to form a working group to lead a joint initiative.

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## Appendix E – The Open Access Alternative

British Columbia and Canada face a problem with connectivity in remote and rural communities of Canada. Many of these communities are faced with absolutely no connectivity or connectivity that is poor or unreliable. The primary challenge is that rural connectivity lacks a business case to invest capital and operational funds. Private enterprises do not provide services in these areas because it simply does not make business sense to do so. As a result, providers position requests for funding to build transport where it creates opportunities for them and local access in areas that may already be served leaving rural areas untouched as a lower priority.

Government funding programs often require that infrastructure constructed using funds from these programs be available for other providers to use at pre-determined rates ("quasi open-access"). The challenge with this approach is that the lack of a business case makes it nearly impossible for one provider to provide services in these areas, let alone more than one. While it may be physically possible for more than one provider to service these areas, the business case dictates that it will likely be a single provider thus excluding any form of competitive services or pricing.

Government support to address the connectivity problem is appropriate but the distribution of funds is typically in the form of grants of funds to an existing (often for-profit incumbents) provider on the basis that it will provide new or enhanced services. Funds are granted to the provider on the basis that they use them to solve connectivity issues in these un/underserved regions. While quasi open-access is a step in the right direction, it doesn't go far enough.

***The connectivity problem in rural BC is not going to fix itself and using public funds to benefit private enterprise that are not motivated to solve the rural challenge is not the right approach. We need to think bigger. We need to think differently. Rural funding programs should support government priorities not the priorities of the service providers. Rural funding should be done as part of much larger vision with affordable choice for consumers.***

In the traditional model, for a service provider to service a customer, they must construct all levels of the Service Delivery Pyramid ("SDP"). While this model may be acceptable in larger centers where there are enough subscribers to make a suitable business case for providers to essentially overbuild each other with different types of technology, in remote and rural communities, there is not enough subscribers to justify one provider building this infrastructure let alone more than one. Once a provider has built the infrastructure, there is virtually no chance that a second provider will provide any competitive services. In the short term, the funding can be considered a success and area residents do get improved services. In the long term though, as service requirements change due to progression in technology and connectivity requirements, these areas will lag behind once again and the problem of second-class connectivity will again be reality. Then government must, again, incent the provider to upgrade the service.

True Open Access ("TOA") networks alleviate the above problem by architecting the solution in a way that addresses the problem at a broader regional level and encourages competition, provides support for government initiatives, choice of services and providers for the consumer. A TOA network leverages technology and a business model to allow multiple providers to share the network and deliver a variety of services to the consumer. In the end, the consumer is the winner with a choice of providers and services in a competitive market forcing providers to deliver innovative services at improved price points and high levels of customer service. In the case of rural connectivity, using this model over a larger number of communities, aggregating the costs under a single entity provides the opportunity to make more attractive business case with the benefit of choice to the consumer.

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## Appendix G – Survey Results Summary

The following provides an overall summary of the survey responses. A summary report of the entire survey has been provided as a separate document.