

11 Peace Region Economic Development Alliance (PREDA)

11.1 Current State

11.1.1 Regional Profile

As shown in Table 52, the Peace Region Economic Development Alliance (PREDA) region is made-up of several communities – the City of Grande Prairie, 13 towns, 7 villages, 11 counties or MDs, and 4 First Nations. A map of the PREDA region is shown in Figure 142. Please visit PREDA's website for more information <http://peacecountrycanada.com/>.

Table 52 – PREDA Communities

City	Towns	Villages	Counties/MDs	First Nations
Grande Prairie*	Beaverlodge* Fairview Falher Fox Creek Grande Cache* Grimshaw Manning McLennan Peace River Sexsmith Spirit River Valleyview Wembley*	Berwyn Donnelly* Girouxville* Hines Creek Hythe Nampa Rycroft	Birch Hills Clear Hills Fairview Grande Prairie Greenview Northern Lights Northern Sunrise Peace 135 Saddle Hills Smoky River Spirit River	Duncan's* Horse Lake* Lubicon Lake* Sturgeon Lake Cree* Woodland Cree*

*Community resides within the northern Alberta study area and the NADC region but is not presently a member of a REDA.

Of the communities within PREDA, TELUS has made long-term fibre investments in the City of Grande Prairie and the Town of Peace River. The Town of Fairview selected Axia to construct a fibre optic network for their community. The network is to be completed in the fall 2017 timeframe. An Axia engagement process took place, beginning with community polling, in Grande Cache in November of 2016 – the 30% interest threshold from residents and businesses was not achieved.

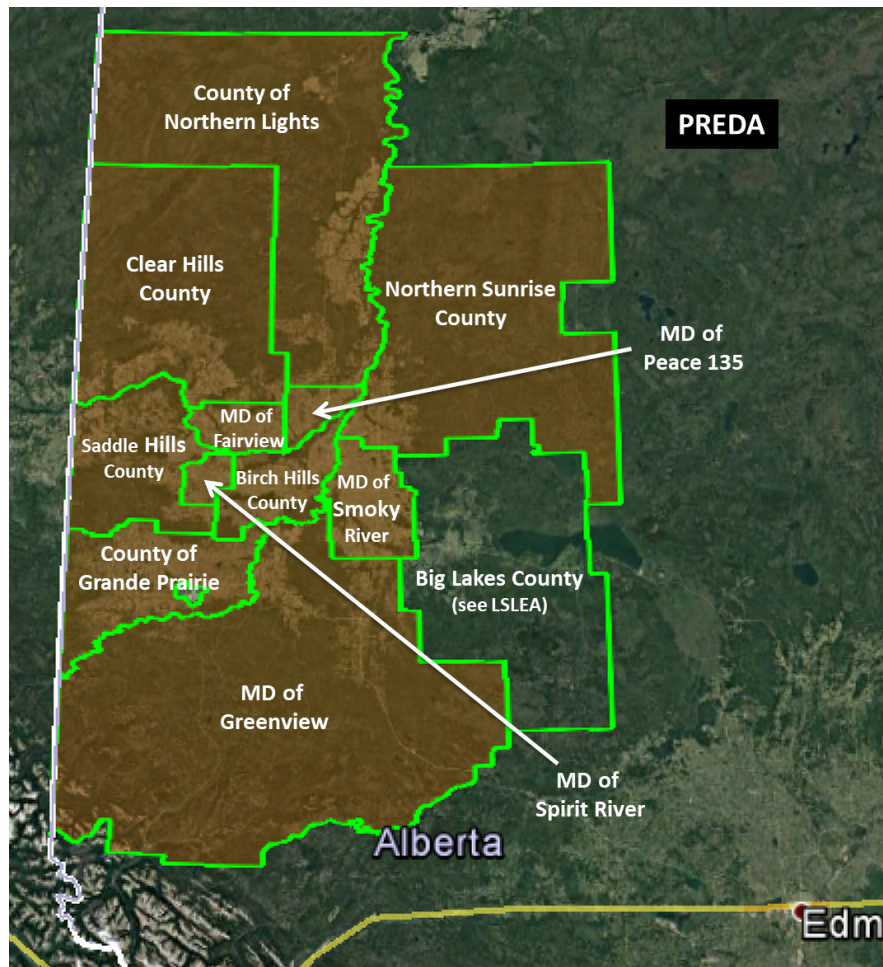


Figure 142 – PREDA region.

The region is home to approximately 147,000 residents.¹⁷⁰ Table 53 provides a breakdown by municipality (rural and urban), First Nation, and Métis Settlement as well as five-year population growth trends and CAGRs. The County of Grande Prairie and City of Grande Prairie are the most populated municipalities in the PREDA region, with populations of 22,303 and 63,166, respectively. Both have grown significantly (approximately 13% each) during the five-year period between 2011 and 2016; however, the population growth of the MD of Peace 135 has outpaced their growth (20.8%). The Town of Grande Cache's population has declined by approximately 17%, largely due to the closing of Grande Cache Coal, which may resume operations in 2017. Grande Cache has requested a viability review. Statistics Canada's 2016 Census of Population data indicate that the Sturgeon Lake First Nation has grown significantly over the five-year period. It should be noted that the villages of Berwyn and Rycroft are currently undergoing viability reviews. A Viability Team was formed in Berwyn in January 2017.

¹⁷⁰ Calculations based on Statistics Canada's 2016 Census of Population.

Table 53 – PREDA Population & Population Growth Trends

Municipality	Rural				Urban					First Nations (FN)/Métis Settlements									
	Population (2016)	CAGR (%) (2011-2016)	5-Year Trend		City/ Town/ Village	Population (2016)	CAGR (%) (2011-2016)	5-Year Trend		Reserve / Settlement	Population (2016)	CAGR (%) (2011-2016)	5-Year Trend						
			(%) & Direction	(%) & Direction				(%) & Direction	(%) & Direction										
Birch Hills, County	1,553	-0.4	-1.8	▼															
Clear Hills, County	3,023	1.5	7.9	▲	Hines Creek	346	-1.9	-8.9	▼										
Fairview, MD	1,604	-0.8	-4.1	▼	Fairview	2,998	-1.1	-5.2	▼										
Grande Prairie, County	22,303	2.5	13.1	▲	Beaverlodge	2,465	0.8	4.2	▲	Horse Lake	469	3.1	16.7	▲					
					Grande Pr.	63,166	2.6	13.5	▲										
					Hythe	827	0.2	0.9	▲										
					Sexsmith	2,620	1.6	8.4	▲										
					Wembley	1,516	1.9	9.6	▲										
Sub-total	70,594																		
Greenview, MD	5,583	1.0	5.4	▲	Fox Creek	1,971	0.0	0.1	▲	Sturgeon Lake	1500	4.8	26.5	▲					
					Grande C.	3,571	-3.7	-17.3	▼										
					Valleyview	1,863	1.1	5.8	▲										
					Sub-total	7,405													
Northern Lights, County	4,200	0.4	2.0	▲	Manning	1,183	0.3	1.6	▲										
Northern Sunrise, County	1,891	1.1	5.6	▲	Nampa	364	0.1	0.6	▲	Lubicon Lake	452	3.2	16.8	▲					
					Peace River	6,842	0.3	1.7	▲						Woodland Cree	873	0.6	2.8	▲
					Sub-total	7,206									Sub Total - FN	1,325			
Peace, MD	1,747	3.9	20.8	▲	Berwyn	538	0.5	2.3	▲	Duncan's	150	-1.8	-8.5	▼					
					Grimshaw	2,718	1.6	8.1	▲										
					Sub-total	3,256													
Saddle Hills, County	2,225	-0.6	-2.8	▼															
Smoky River, MD	2,023	-1.0	-4.8	▼	Donnelly	342	2.3	12.1	▲										
					Falher	1,047	-0.5	-2.6	▼										
					Girouxville	219	-3.8	-17.7	▼										
					McLennan	701	-2.8	-13.3	▼										
					Sub-total	2,309													
Spirit River, MD	700	-0.4	-1.8	▼	Spirit River	995	-0.6	-2.9	▼										
					Rycroft	612	-0.5	-2.5	▼										
					Sub-total	1,607													
Total	46,852					96,904				Total - FN	3,444								

CAGR – Compound Annual Growth Rate

Total Population = **147,200**

Source: Statistics Canada Census 2011 and 2016.

In February 2017, the Heart of the Peace Economic Development Committee, formed between the MD of Fairview and the Town of Fairview, hired an Economic Development Officer.

There are 8,330 businesses (with employees) in the PREDA region. The top 10 industries in which they operate is shown in Table 54 and Figure 143. The industry classification system was the NAICS. The industry mix is diverse with approximately 16% of businesses with employees engaged in the construction industry. As observed in several of the other REDAs in northern Alberta, the second largest industry on a

business count basis is other services (except public administration).¹⁷¹ The three Top sectors makeup approximately 37% of businesses with employees in the region.

Resource extraction, primarily oil and gas, is the primary industry in a region spread over a vast geographic area comprising boreal forest, lakes, and land suitable for agriculture stretching from the Grande Prairie area in the south to the Peace River area in the north. Hydraulic fracturing activity in the Montney and Duvernay plays in the Grande Prairie area is expected to continue to grow (fourth ranked industry sector). Ironstone Resources is developing the Clear Hills Project, an iron and vanadium extraction venture.

Oil and gas activity in Saddle Hills County has started to pick up, and there is still growth in gas plants. Pipeline activity, especially by TransCanada, is expected to draw a significant number of workers to the county. In anticipation of additional pressure on mobility services in the county, Saddle Hills and TELUS have entered into a cost-sharing (50/50) agreement to build new cellular towers in the county.

The 'Other Industries' segment (14.8%) shown in the Figure 143 chart includes industries that individually contribute between 3.9% and 0.3% to the category.¹⁷²

Table 54 – PREDA Number of Businesses (with employees) by Industry

Industry	Businesses	Percent (%)
Construction	1,356	16.3
Other services (except public administration)	910	10.9
Professional, scientific and technical services	851	10.2
Mining, quarrying, and oil and gas extraction	817	9.8
Transportation and warehousing	765	9.2
Retail trade	653	7.8
Agriculture, forestry, fishing, and hunting	609	7.3
Healthcare and social assistance	387	4.6
Administrative and support, waste management and remediation	375	4.5
Real estate and rental and leasing	372	4.5

Source: Calculations based on dataset provided by Alberta Economic Development & Trade, Economic Information & Analytics, Feb. 13, 2017.

¹⁷¹ Comprised of businesses primarily engaged in repairing and maintenance on motor vehicles, machinery, and other products; providing personal care, funeral, and laundry services; organizing and promoting religious activities; and supporting causes such as grant making and advocacy.

¹⁷² Accommodation and food services; wholesale trade; manufacturing; finance and insurance; arts, entertainment and recreation; management of companies and enterprises; information and cultural industries; educational services; public administration; and utilities.

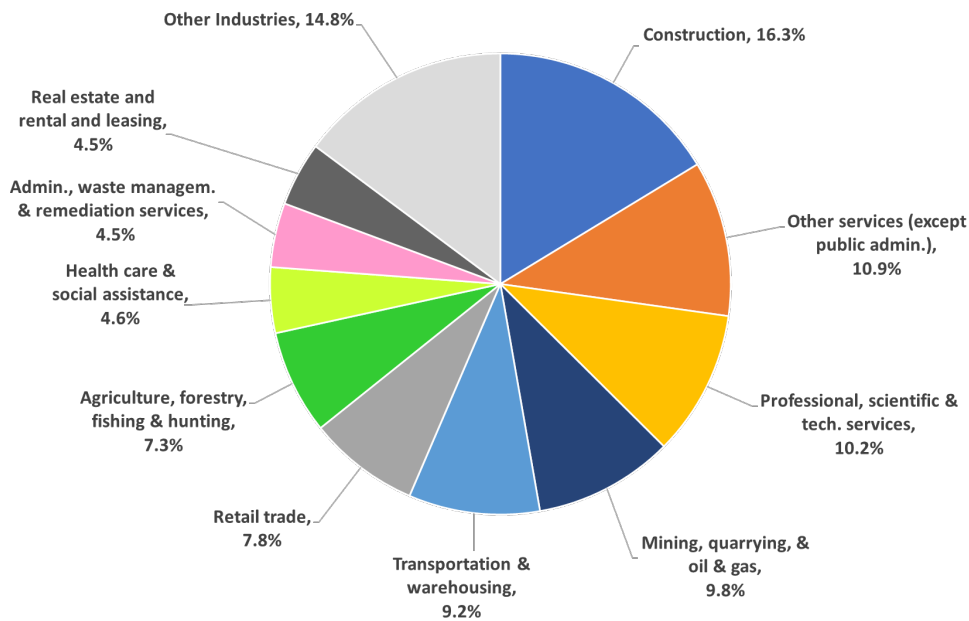


Figure 143 – PREDA mix (based on business counts).

11.1.2 Municipal and First Nations Broadband Interests

Communities within PREDA are at different stages in recognizing the importance of broadband services and connectivity to economic diversification, municipal sustainability, regional competitiveness, public service delivery, and quality of life.¹⁷³

After building over 300 communications towers over the past decade, the County of Grande Prairie is now focused on bringing greatly improved broadband speeds available to its residents and businesses – speeds that fibre-based infrastructure is capable of. Saddle Hills County has undertaken initiatives to address the lack of broadband services within their county by building a communications network (i.e., utility grade communications towers for ISP use).

The councils of five municipalities (Birch Hills County, Saddle Hills County, MD of Spirit River, Town of Spirit River, and Village of Rycroft, also known as the G5) have been working together for a number of years on matters of regional needs and inter-municipal cooperation. Of the projects the G5 municipalities are working on, the most prominent one is the Central Peace Health Centre, which is under construction in Spirit River. The Centre was funded and constructed by the G5 to provide increased medical and dental services as well as certainty about the long-term availability of these services in the Central Peace area. Plans for the building include fibre deployment and, potentially, a point-of-presence (POP). Forward-looking Rycroft is planning to install fibre conduit during its summer 2017 street curb and gutter project. It is proactively positioning for a future deployment of FTTP. Potentially, a community fibre project would see Rycroft and Spirit River leverage the construction of a new water pipeline between the two communities to bring fibre to both communities.

Valleyview is pursuing fibre optic infrastructure in their community. A fibre broadband plan will be part of the Town's next economic development plan.

¹⁷³ The five elements of broadband's importance were identified by the Calgary Regional Partnership, Economic Prosperity Steering Committee, *Request for Decision*; 2016-09-08

Table 55 identifies the awareness and current state of municipal involvement and interest in broadband.

Table 55 – PREDA Involvement & Interest in Broadband¹⁷⁴

Community	Enthusiastic	Interested 'Maybe'	Need Help Too Small	Too Expensive	Status Quo	Don't Know ¹⁷⁵	No Response ¹⁷⁶
City							
Grande Prairie					X		
Towns							
Beaverlodge							X
Fairview, (Axia)					X		
Falher			X	X			
Fox Creek							X
Grande Cache						X	
Grimshaw		X	X				
Manning							X
McLennan							X
Peace River (TELUS Fibre)					X		
Sexsmith			X				
Spirit River							X
Valleyview	X						
Wembley					X		
Villages							
Berwyn							X
Donnelly	X						
Girouxville	X						X
Hines Creek							X
Hythe	Broadband deployment should be left to the private sector						
Nampa							X
Rycroft	X						

¹⁷⁴ Communities were asked to rate their involvement and interest in broadband. Broadband was defined as follows: In telecommunications, broadband is a wide bandwidth data transmission with an ability to simultaneously transport multiple signals and traffic types - the medium can be twisted-pair copper wiring, optical fibre, coaxial cable, or radio. Broadband service is characterized as offering symmetric bandwidth between 50 Mb/s and 1 gigabit (Gb/s)/1,000 Mb/s and higher (really unlimited bit rates) (symmetric meaning the upload bit rate is as fast as the download bit rate).

¹⁷⁵ Don't Know – the respondent was unable to rate their community's interest and involvement in broadband.

¹⁷⁶ No Response – the community did not respond to the inquiries regarding their community's interest and involvement in broadband.

Community	Enthusiastic	Interested 'Maybe'	Need Help Too Small	Too Expensive	Status Quo	Don't Know	No Response
Counties/MDs							
Birch Hills							X
Clear Hills					X		
Fairview				X			
Grande Prairie	X						
Greenview							X
Northern Lights				X			
Northern Sunrise		X	X	X			
Peace 135		X					
Saddle Hills	X						
Smoky River			X	X			
Spirit River							X
First Nations							
Duncan's							X
Horse Lake							X
Lubicon Lake							X
Sturgeon Lake Cree							X
Woodlands Cree							

11.1.3 Current Service Providers, Services, and Infrastructure

11.1.3.1 Fixed Wireless-based

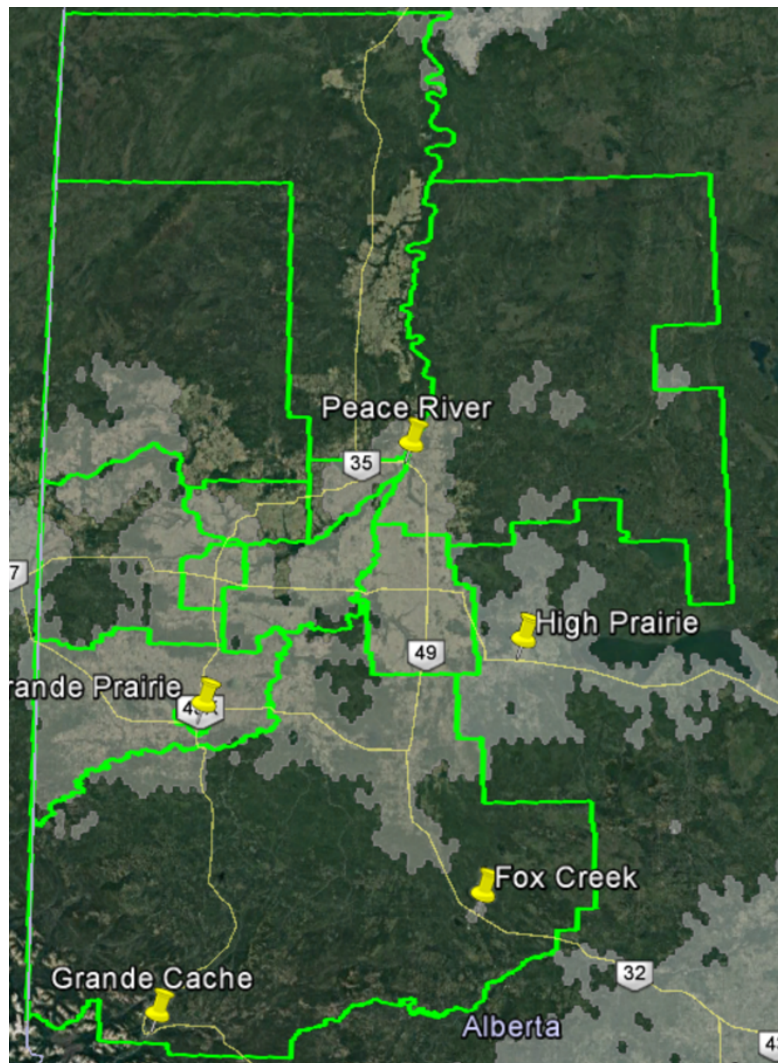
Current Internet Service Providers using fixed wireless technology in the PREDA region include the following. Appendix 16.3 provides the details of their service offerings (Internet only – no bundling unless otherwise stated) and geographic coverage. The coverage maps of the individual service providers are those that were available on their websites at the time of the writing of this report.

- AB North,
- Arrow Technology Group,
- Corridor Communications (CCI) (fixed wireless and wired Digital Subscriber Line (DSL)-based),
- Crossover Networks,
- First Broadband,
- GPNetworks (fixed wireless) and GPOptiX (fibre),
- I Want Wireless,
- Mighty Peace Wireless,
- NexxCom Technologies,
- Peace River Internet Service Society (PRiS),
- Slave Lake Communications,
- Whitecourt Communications,
- Wispernet.ca,
- XplorNet (fixed wireless and satellite-based), and
- Xtremewave Services.

Through its DSL partnership with TELUS, CCI offers wired service in the Village of Nampa. GPNetworks' sister company, GPOptiX, has begun rolling out an FTTP network in the City of Grande Prairie and surrounding area.

The PRiS, a not-for-profit organization, was formed in 1994 to 'bridge the wireless divide' that then existed in the Dawson Creek, British Columbia area. PRiS has placed wireless Internet equipment on three towers in the Saddle Hills Utility Communications Network (UTN) and plans to co-locate on the remaining six towers in the future. In June 2016, PRiS received funding from the Canadian Internet Registration Authority (CIRA) to equip three towers in Saddle Hills County.

According to the CRTC website¹⁷⁷, minimal 5 Mb/s down (toward the end-client) by 1 Mb/s up (from the end-client to the network) service is available north to the Peace River area, in select areas west to the B.C. border, and to the communities along Highway 2. There is not any service in the Grande Cache area and coverage is very limited along Highway 40 to Grande Cache. A combined view of the fixed wireless coverage is shown in Figure 144 (light gray areas).



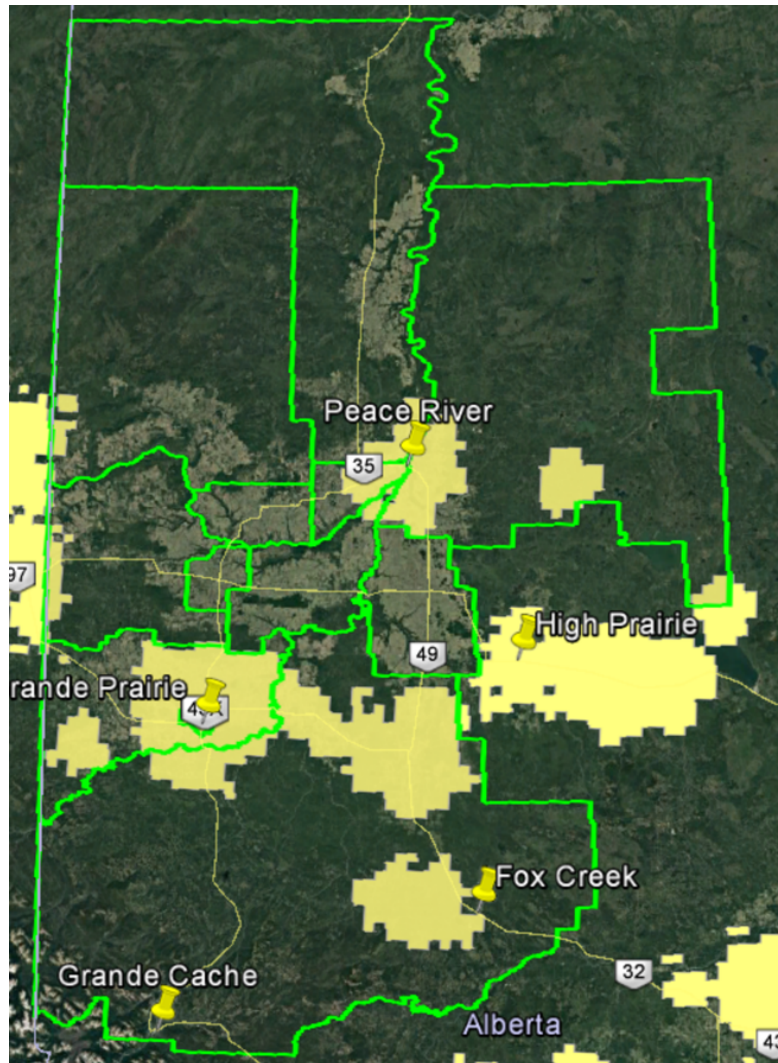
Source: <http://www.crtc.gc.ca/eng/internet/internetcanada.htm>

Figure 144 – PREDA fixed wireless coverage.

¹⁷⁷ <http://crtc.gc.ca/eng/internet/internetcanada.htm>

11.1.3.2 Mobility

Shown as yellow areas in Figure 145, mobility data services are available from TELUS/Bell and Rogers, however, the absence of coverage is noticeable in some areas, especially in the Grande Cache area (along Highway 40) and in the northern portion of PREDA. Appendix 16.4.2 provides the coverage maps for each of the providers of mobility services. As discussed earlier Bell, TELUS, and Rogers are now using cellular towers and SmartHubs to provide at-home Internet services.

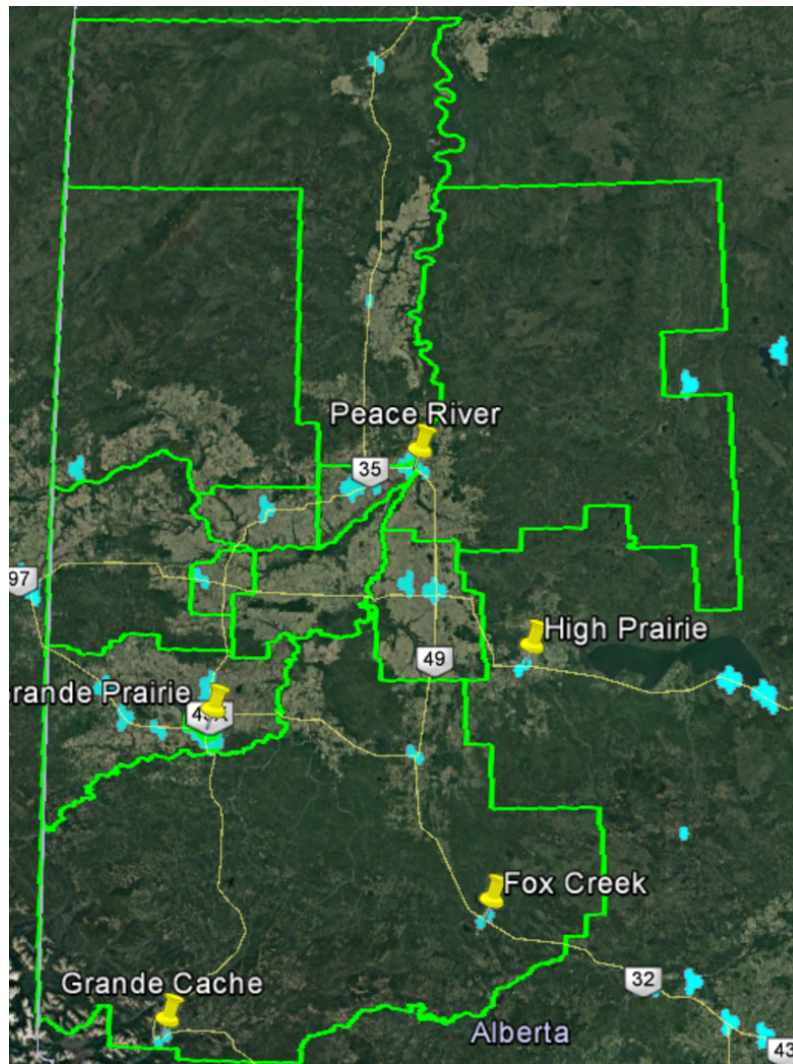


Source: <http://www.crtc.gc.ca/eng/internet/internetcanada.htm>

Figure 145 – PREDA mobility data coverage.

11.1.3.3 Wireline-based – DSL

DSL refers to a group of last mile technologies that are used by wireline-based service providers such as TELUS in Alberta to provide broadband services over twisted-pair copper wiring. The local copper wire loop is a remnant from the days when (and how) the telephone company connected residential and business premises to the telephone company's network for the purposes of providing local and long distance telephone services (and dial-up Internet services). Since DSL's performance degrades with distance, the technology is only deployed in urban areas where access distances are less than about two miles. In Figure 146, areas served via DSL technologies are shown in blue.



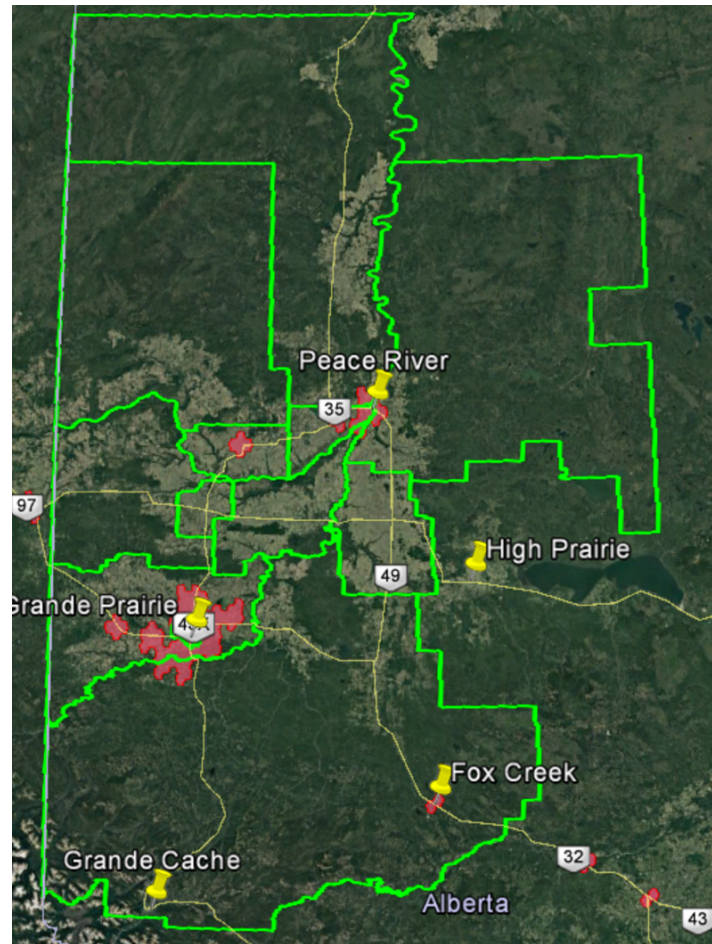
Source: <http://www.crtc.gc.ca/eng/internet/internetcanada.htm>

Figure 146 – PREDA DSL coverage.

11.1.3.4 Wireline-based – Coaxial Cable

Eastlink, originally a television broadcast company, uses coaxial cable and modern cable modem technology to provide broadband services in the PREDA region (red areas in Figure 147). The cable companies currently use the DOCSIS 3.0 standard to achieve broadband speeds of 100 Mb/s or more over coaxial cable. According to the Cybera, *State of Alberta Infrastructure Report*, “The next-generation DOCSIS 3.1 standard is expected to revolutionize hybrid fibre-coaxial cable connections by providing up to 10Gb/s download and 1 Gb/s upload network throughput and significant improvements in latency.”¹⁷⁸

¹⁷⁸ *State of Alberta Digital Infrastructure Report*; Cybera; 2016-09-13.



Source: <http://www.crtc.gc.ca/eng/internet/internetcanada.htm>

Figure 147 – PRED coaxial cable coverage.

Maximum advertised wireline offerings are shown in Appendix 16.3. Since these are 'up to' bit rates, during high usage periods, actual bit rates will be less – Eastlink more so than TELUS due to the way the aggregation is implemented. In both cases, the offerings are highly asymmetric – upload and download bit rates differ significantly.

11.1.3.5 Internet Service Provider Wi-Fi

TELUS and Bell WiFi services are available in the PRED region. As shown in Table 56, TELUS has multiple sites in the City of Grande Prairie and Town of Peace River. WiFi services are **not** available in Grande Cache. As well the City of Grande Prairie provides free public WiFi at public facilities for Grande Prairie residents.

Table 56 – PREDA Wi-Fi Availability

City/Town	TELUS	Bell
Fairview	2	0
Grande Prairie	Multiple	7
Peace River	Multiple	2
Valleyview	0	1

11.1.3.6 Axia Fibre

Axia NetMedia provides retail services to corporate clients and, through AxiaConnect, provides fibre-based retail Internet services in a number of smaller communities. In exchange for access to a community's rights-of-way, Axia will consider investing in fibre-to-the-premise (FTTP) infrastructure in communities that can demonstrate that at least 30% of its residences and businesses are interested in purchasing Internet services from Axia once the 'closed-access' network is built. In January, 2017, Axia announced plans to deploy an FTTP network in Fairview. The build is scheduled to complete this fall.

11.1.4 Backhaul Availability

11.1.4.1 Alberta SuperNet

The extent of the SuperNet within the PREDA region is shown in Figure 148. The green lines represent the Bell-operated BAN portion while the blue lines represent the Axia-operated EAN segments. A more general discussion about the SuperNet is presented in Appendix 16.5. As can be seen on map in Figure 148, an EAN segment serves the community of Grande Cache. This is the only middle mile service for the community, meaning the community does not have resiliency/redundancy, which is critical for emergency services.

11.1.4.2 Shaw Wholesale

Given the uncertainty associated with the next iteration of the SuperNet contract by June 30, 2018, municipalities, First Nations, and Métis Settlements requiring access to fibre transport for backhaul to Edmonton may want to approach Shaw Communications (Shaw), Bell, or TELUS.

11.1.4.3 TELUS Wholesale

Except under a non-disclosure agreement, TELUS does not provide maps of fibre assets.

11.1.5 Existing Infrastructure

11.1.5.1 Towers and Other Tall Structures

When planning a broadband build-out it is important to build on what is already in place. The key inquiry for the current state analysis is what assets does the community have that can be provided at little or no incremental cost that improve the economics of the broadband deployment and operations? Assets include existing towers, fibre and community networks, which the community might be using for communications or asset management. Existing and possible access to tall structures or buildings are also important to inventory for the potential placement of wireless equipment.

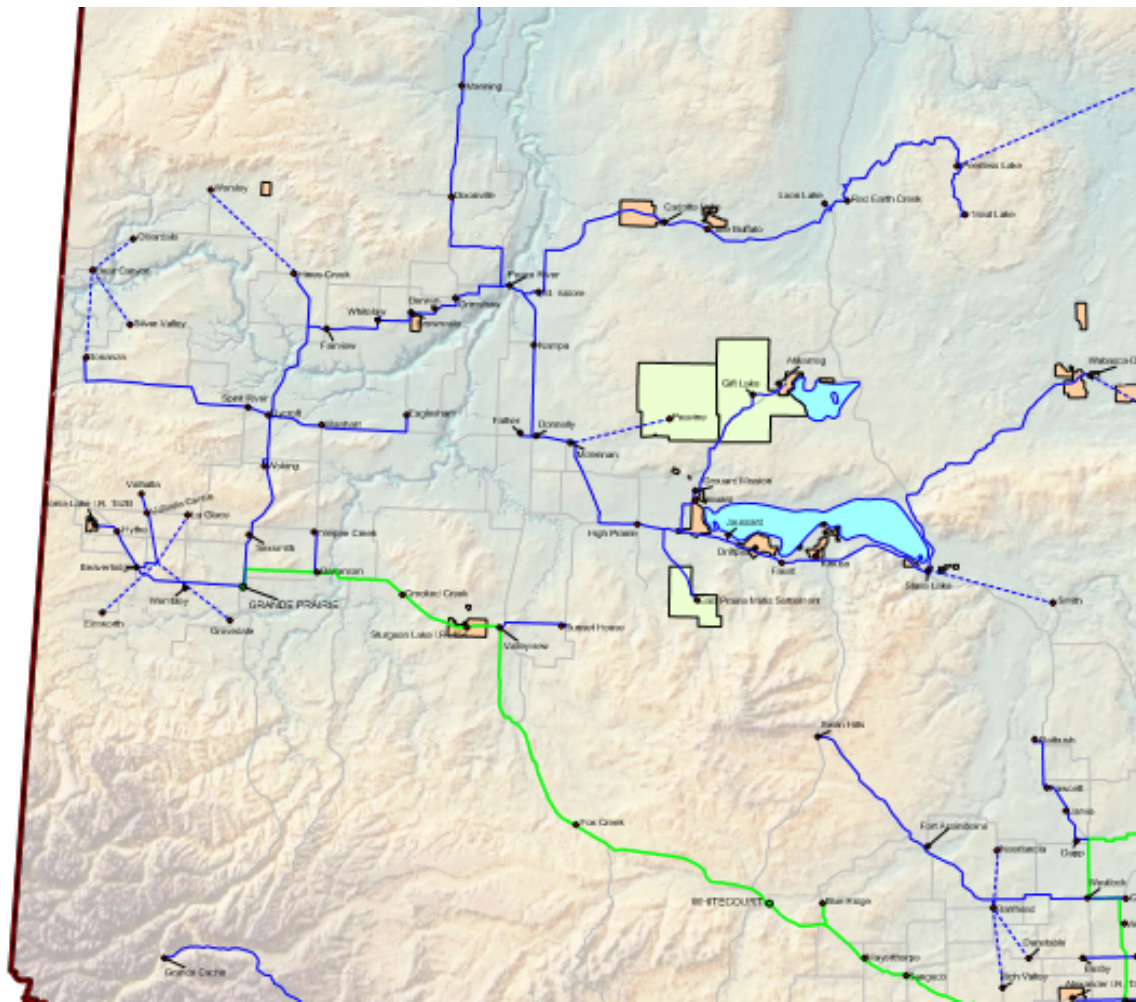


Figure 148 – PREDA SuperNet infrastructure.

Clear Hills County, the MD of Peace 135, and Saddle Hills County received grant funding to expand high-speed Internet access to unserved areas and address gaps in coverage from Alberta Agriculture and Forestry’s *Final Mile Rural Community Program* in the 2012/2013 timeframe. Over the past decade, the County of Grande Prairie built over 300 county-sponsored towers and partnered with GPNetworks and other local ISPs to provide Internet services to its residents and businesses. Table 57 shows existing MD- and county-owned tower infrastructure.

Table 57 – PREDA Existing MD- and County-owned Towers

	Towers	Details
Clear Hills	6	Unconfirmed
Grande Prairie	300+	Majority are 68'
Northern Sunrise	3	At water fill stations, 50'
Peace 135	4	3, 120' 1, 80'
Saddle Hills	9	7, 250' 2, 200' possibly 2 more to be built
Smoky River	1	60' shop tower

Other tall structures that could be leveraged include Northern Sunrise County - St. Isidore Fire Hall hose tower and the Nampa Seed Cleaning Plant (owned by Northern Sunrise), which has 60-foot legs. The County of Spirit River has three grain elevators.

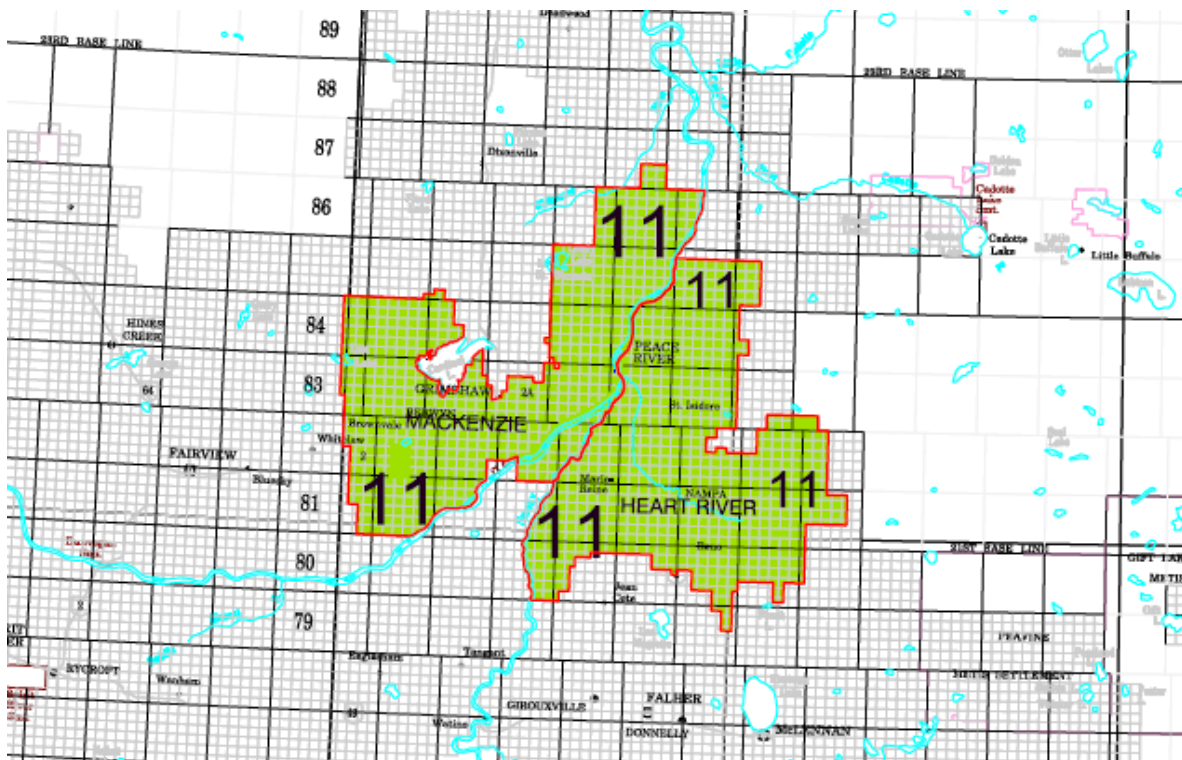
11.1.5.2 Utility Infrastructure

The existing overhead and underground transmission and distribution lines of electric utility companies (ATCO Electric) and natural gas co-operatives (co-ops) present deployment options for community broadband builds - access to and installing fibre cables to travel along utility poles, in ducts and conduit, and along rights-of-way can significantly improve the economics of broadband service expansion projects and network deployments. Inquiries about the availability of communications spaces on utility providers' poles and where multi-party trench agreements exist will be made during the preliminary infrastructure design phase of a broadband network.

11.1.5.3 Rural Electrification Associations (REAs)

REAs are member-owned electric distribution systems that provide electricity service to farm members within a specific geographic boundary. Each REA has an elected board of directors that is responsible for the business operations of the REA. Construction, operations, and maintenance is done by ATCO Electric (through contracts with the REAs) for following REAs within the PREDA region: Figure 149 shows their coverage.

- Heart River REA Ltd. (Peace River)
- MacKenzie REA Ltd. (Grimshaw)



Source: Rural Electrification Associations Service Areas. Accessed Nov. 2016.

Figure 149 – PREDA REA service areas.

Appendix 16.6 shows ATCO Electric's and Fortis Alberta's respective service areas in northern Alberta. REA and distribution company systems are intertwined in the REA service area as shown in Figure 150, and they work together to ensure there is reliable service and no duplication of distribution lines and service.¹⁷⁹ In Alberta, most rural areas are radial networks. A radial distribution line may serve both distribution entity and REA customers and different parts of the same line maybe owned by one or the other party.

11.1.5.4 Gas Co-operatives – Zone 1

In the 1960s, non-profit gas co-ops were formed to supply natural gas to rural Alberta - franchise areas were designated. Several gas co-ops operate in the PREDA region as shown in Figure 151, namely:

- Birch Hills Gas Co-op Ltd (Wanham)
- Central Peace Natural Gas Co-op Ltd. (Spirit River)
- East Peace Gas Co-op Ltd. (Donnelly)
- East Smoky Gas Co-op Ltd. (Crooked Creek – near DeBolt)
- Horse Lake Indian Band (Hythe)
- North Peace Gas Co-op Ltd. (Fairview)
- Paddle Prairie Gas Co-op Ltd.
- Town of Manning
- Town of Valleyview



Source: Federation of Alberta Gas Co-ops, <http://www.fedgas.com/Map>. Accessed Feb. 1, 2017.

Figure 150 – PREDA gas co-operatives.

¹⁷⁹ AUC.

In 2010, the East Smoky Gas Co-op Ltd. received a grant of \$500,000 from the *Rural Connections: Community Broadband Infrastructure Pilot Program* to assist in the deployment of a wireless broadband network and allow for automated meter readings within the co-op's franchise area including the DeBolt, Little Smoky, and Fox Creek areas.

There are several rural water co-operatives operating in the PREDA area, as shown in Table 58.¹⁸⁰ Appendix 16.10 provides their approximate locations.

Table 58 – PREDA Water Co-operatives

Water Co-op	Vicinity/Service Area	Owner/Operator
5 co-ops: East Grimshaw, Griffin Creek, Shaftsbury, Weberville, West Grimshaw	Grimshaw	Members
East Peace River	Peace River (communities of Harmon Valley, St. Isadore, Three Creeks)	Northern Sunrise/NEW Water Ltd.
Fairview Rural Water Project	Fairview	Members
Little Burnt River	Fairview (North of Whitelaw)	Members
Northern Lights	MD of Northern Lights	MD
Smoky River	Smoky River	Members

11.1.5.5 First Nations Fibre Infrastructure

First Nations Technical Services Advisory Group (TSAG) is a non-profit organization established by the Chiefs of Alberta to provide technical support and training to First Nations in the Treaty 6, 7, and 8 regions. In 2008, TSAG partnered with Health Canada to develop the network components (fibre connections) at First Nations health centres to support First Nations' telemedicine. With Health Canada funding and TSAG project management, community fibre networks connections were made to the Alberta SuperNet points-of-presence on each or close to each First Nations in 2011. Upon completion, each First Nations became the owner of its local fibre network. As shown in Figure 151, First Nations' schools, health centres, band administration offices, and water treatment plants are now connected.

TSAG operates a state-of-the-art Network Operations Centre (NOC). The NOC's real time network monitoring ensures availability, network security/SPAM filtering, telehealth bridge management, and support, and applications (high-speed connectivity and remote water monitoring system for water treatment plants, OneHealth.ca, and FirstNationsTH.ca). Onehealth.ca is a national health portal that provides information and services to health care professionals working in First Nations communities. FirstNationsTH.ca – Telehealth provides education and travel-free patient and health care assessments via video-conferencing.

11.1.6 Planned Infrastructure

11.1.6.1 Major Projects

The PREDA region has several private and public sector capital projects planned. Where possible these projects maybe leveraged to reduce the costs associated with the deployment of broadband infrastructure. Figure 152 shows the capital projects in the within the County of Grande Prairie.¹⁸¹ Besides the projects show in this figure, other major projects in the PREDA region include a new regional hospital,

¹⁸⁰ Regula, Doris; *Market Opportunity Analysis*; Regula & Associates Consulting Ltd; 2015-05-15.

¹⁸¹ Alberta Major Projects, Economic Development and Trade; 2016-12. <http://majorprojects.alberta.ca/>.

new schools, a seniors' complex, highway and sewer upgrades, and the Canfor sawmill modernization in the City of Grande Prairie (map in Appendix 16.7).

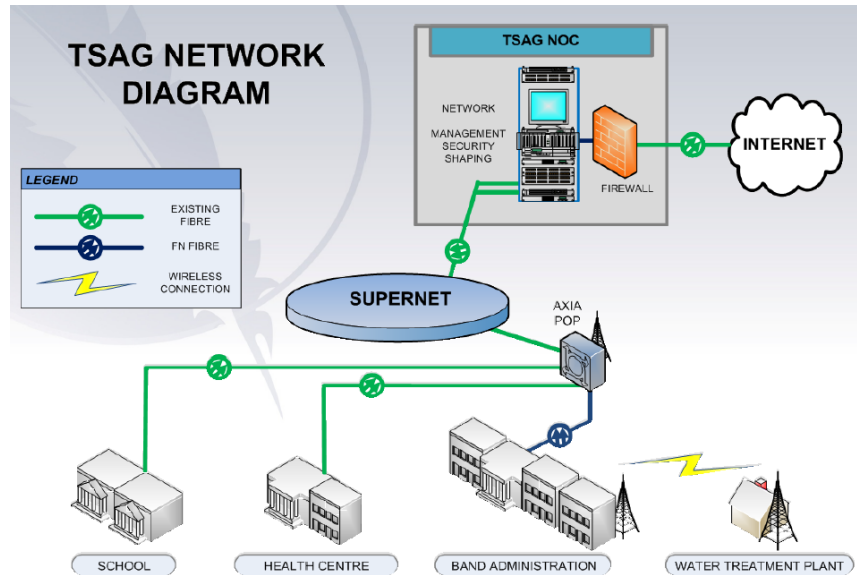
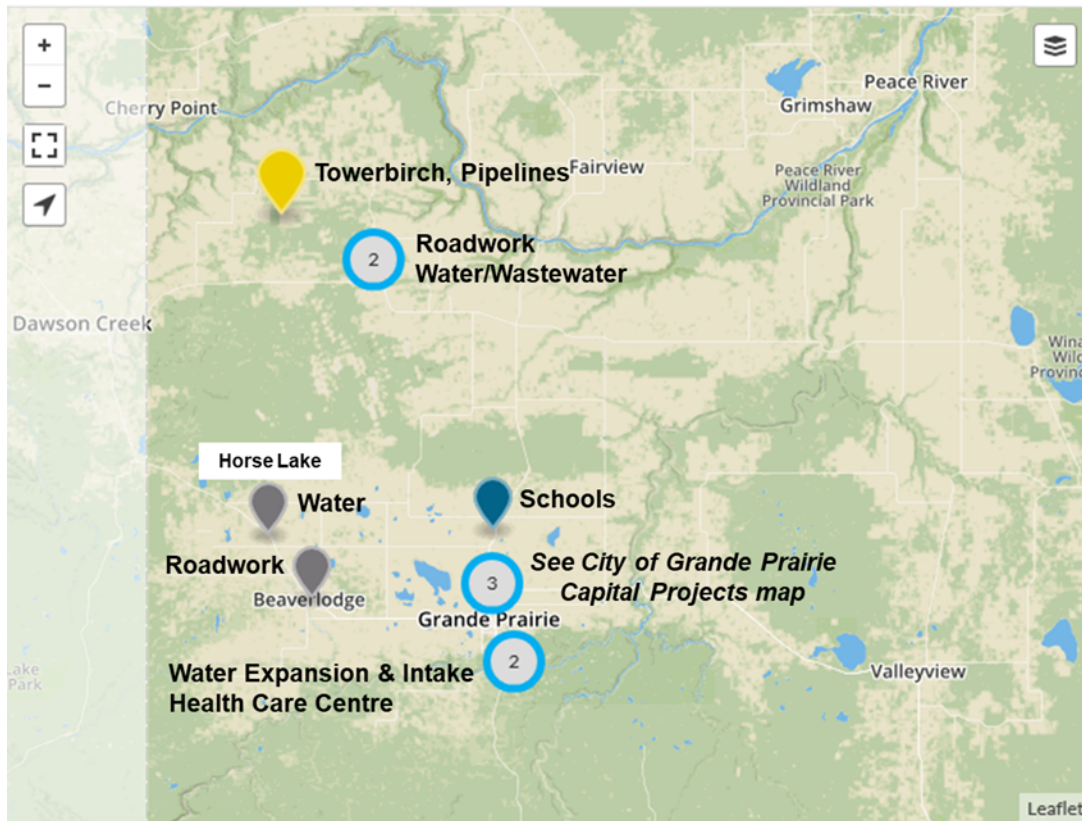


Figure 151 – TSAG network diagram.



Regional Infrastructure Projects over \$5 M.

Figure 152 – PREDA major projects – County of Grande Prairie.

11.1.6.2 Electric Transmission Development Plans

Industrial load in the PREDA region (within the AESO's Northwest Planning region) primarily comes from the forestry industry as well as oil and gas developments, including recent oilsands development in the Peace River area.¹⁸² The Northwest Planning region, which is primarily served by a 240 kV network that moves power into the region from generation in the Wabamun area and from cogeneration in the northeast. Local load is supplied by a 144 kV network from the 240 kV substations while a 69/72 kV network serves some of the load in the Swan Hills, High Prairie and Peace River areas, as seen in Figure 153.

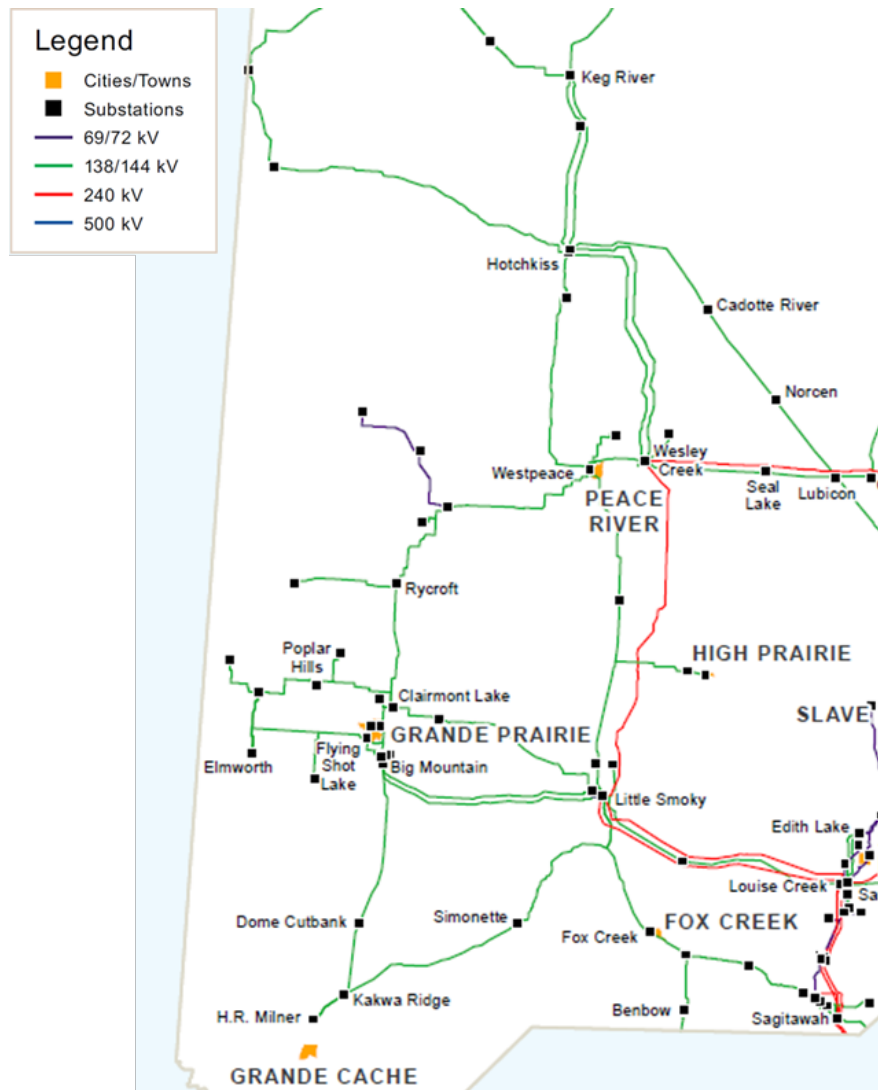


Figure 153 – PREDA existing electricity transmission system.

With large generation development and oilsands load growth near Peace River, 240 kV and 138 kV enhancements will likely be required in the future. Continued strong load growth in and around the Grande Prairie and Fox Creek areas will require the development of a 240 kV supply to those areas. Load

¹⁸² AESO 2015 Long-term Transmission Plan; AESO.

growth and the potential for major generation development in the Grande Cache area is expected to drive 240 kV and 138 kV enhancements in that area. Specific proposed transmission developments relevant to potential fibre deployment include the following, over three planning horizons: near-term (to 2020); medium term (to 2025); or long-term (to 2035) are shown in the Table 59.

Table 59 – Proposed Transmission Developments

Peace River – North	<ul style="list-style-type: none"> • New single-circuit 240 kV line Wesley Creek (east of Peace River) to Little Smoky (near Valleyview) (<i>near-term</i>) • Rebuild 144 kV line from Wesley Creek substation to West Peace River substation to a higher capacity (<i>near-term</i>) • New 144 kV lines east of Peace River: Cranberry Lake to Nipisi; Seal Lake to Norcen (<i>long-term</i>)
Swan Hills – High Prairie	<ul style="list-style-type: none"> • Rebuild 144 kV line from Louise Creek to Sarah Lake to a higher capacity (<i>long-term</i>)
Fox Creek - Valleyview	<ul style="list-style-type: none"> • New 240 kV lines from Little Smoky to Fox Creek (ATCO) (<i>near-term</i>) • New 240 kV lines from Fox Creek to Bickerdike near Edson (<i>near-term</i>) • Additional 240 kV circuit from Little Smoky to Fox Creek and onto Bickerdike (<i>long-term</i>)
Grande Prairie – Grande Cache	<ul style="list-style-type: none"> • New 240 kV line from Little Smoky to Big Mountain south of Grande Prairie (<i>near-term</i>) • New 144 kV line from Big Mountain to Poplar Hill northwest of Grande Prairie (<i>near-term</i>) • Second line 240 kV from Little Smoky to Big Mountain south of Grande Prairie (<i>medium-term</i>) • New 144 kV line from Big Mountain to Clairmont Lake or other suitable location near Clairmont Lake (<i>long-term</i>) • For forecast new generation development at existing H.R. Milner site in the Grande Cache area (<i>long-term</i>): • Single-circuit 240 kV line from H.R. Milner to Big Mountain and from H.R. Milner to Fox Creek • Local 144 kV loop from H.R. Milner by building a new 144 kV line to connect to new substation north of Dome Cutbank substation • 144 kV line from Fox Creek to Simonette

11.1.6.3 Municipal Capital and Civil Works Projects

Leveraging civil infrastructure projects can reduce broadband deployment costs by 75%. Given civil infrastructure costs typically account for 70% of buried deployment costs, this is significant. Capital projects that involve trenching or erecting towers or poles such as during the development of new subdivisions, road construction or the construction of rehabilitation of water or sewer lines are typical projects that can improve the economics of community broadband projects.

The County of Grande Prairie received approximately \$9.1 million from the *Alberta Municipal Water/Wastewater Partnership (AMWWP)* for the sewage discharge construction in the Hamlet of Clairmont. The Ridgevalley water treatment plant in the MD of Greenview will be upgraded, expanded, and a new supply well will be drilled with AMWWP funds (\$2.1 million). With the MD's additional funding the total is now \$4.2M (2016-17 Capital Budget).

Wembley received funding from the *Alberta Community Partnership (APC)* for the preliminary design and \$1.8 million from the *Water for Life Program* for detailed design work for Phase 1 of the West Corridor Water Transmission Line. Phase 1 will link Beaverlodge and Hythe to the City of Grande Prairie's water supply system (total cost of project \$22.6 million).

The Federal *Small Communities Fund* (part of the New Building Canada Fund) for infrastructure projects, now includes a '*Connectivity and Broadband*' category. 2016 approved non-broadband projects within the PREDA region include (figures shown are the Total Eligible Project Cost - Federal, Provincial, and Municipal).

- Beaverlodge – Water treatment plant upgrades \$5.5 million;
- Fox Creek – Water treatment plant upgrades, raw water wells, and raw water pipeline construction \$15.5 million.
- Grande Cache – Water treatment plant upgrade \$12.8 million.
- Town of Peace River – Sanitary upgrades \$11.5.
- County of Grande Prairie – Trunk sewer and Clairmont lagoon discharge piping \$26.3 million; and
- County of Northern Lights – Dixonville water distribution system rehabilitation \$1.5 million.

The County of Grande Prairie successfully applied to the Federal *Clean Water and Wastewater Fund (CWWF)* for the West Corridor Water Transmission Line, Phase 1 – Wembley \$9.1 million. Northern Sunrise County also received funding for its Nampa regional water line, Phase 3, Stage 2, from St. Isidore to Nampa. The amount received was \$3.5 million.

On February 22, 2017, the MD of Greenview, the County of Grande Prairie, and the City of Grande Prairie announced the Tri-Municipal Industrial Project, a large scale industrial development south of Grovedale. Using the Montney-Duvernay shale natural gas play, the project is expected to attract investors interested in processing. Table 60 shows this project as well as other capital and civil works projects that either the municipalities self-reported or were identified by another source.

Table 60 – PREDA Municipal Capital & Civil Works Projects

City	
Grande Prairie	68 Ave. twinning; downtown rehabilitation and streetscape upgrades; road rehabilitation and overlay program ¹⁸³
Towns	
Beaverlodge	Road network upgrades, Phase 1 water treatment plant upgrades ¹⁸⁴
Fairview	<ul style="list-style-type: none"> • Highway 732 (113 street) rehabilitation • 102 Avenue water, sewer, and road updating
Falher	Lift stations with SCADA at the hamlets of Guy and Jean Côté
Fox Creek	<ul style="list-style-type: none"> • Multiplex facility (partners: Fox Creek and MD of Greenview) • Water treatment plant – commencing development
Grande Cache	<ul style="list-style-type: none"> • New water treatment plant under construction • Road asphaltting (Spring 2017)
Grimshaw	Some water service replacement involving individual digs
Manning	Side walks, water main and sewer replacement ¹⁸⁵
McLennan	Road rehabilitation (Spring 2017)
Peace River	<ul style="list-style-type: none"> • Asphalt rehabilitation of streets south of Heart River bridge, to include potential trenchless rehabilitation of water, sewer, and storm infrastructure. All streets will have existing sidewalks, curbs, and gutters reviewed for selective replacement. (project maybe phased over multiple years depending on budget availability)¹⁸⁶ • Replacement sewer lines
Sexsmith	Nothing planned
Spirit River	Street improvements 2017: concrete curbs, sidewalks, asphalt paving, overlays and level course ¹⁸⁷

¹⁸³ City of Grande Prairie; *City of Grande Prairie Long-term Capital Plan Comparison – 2016 – 2018*; 2016-05-18.

¹⁸⁴ *Town of Beaverlodge Council Highlights*; 2017-05-08.

¹⁸⁵ Town of Manning; *2017 Capital Budget*.

¹⁸⁶ Town of Peace River; *Request for Proposals AB-2017-02006, Neighbourhood Infrastructure Renewal Project – 2018, Schedule E.*; 2017-03-25.

¹⁸⁷ *Town of Spirit River Street Improvements – 2017*; Canada's Business Network; July 2017-07.

Valleyview	Did not respond to project inquiry regarding civil and capital projects and no information was available on the town's website
Wembley	Did not respond to project inquiry regarding civil and capital projects and no information was available on the town's website
Villages	
Berwyn	<ul style="list-style-type: none"> • Sewer main repairs • Road surfacing
Donnelly	Nothing planned
Girouxville	Nothing planned
Hines Creek	Upgrade to water meters and repairs to arena
Hythe	Seniors housing facility (complete by March 2018)
Nampa	Did not respond to project inquiries and no information was available on the town's website
Rycroft	Paving, curb, and gutter project (summer 2017)
Counties/MDs	
Birch Hills	Refurbish water and sewer infrastructure
Clear Hills	Nothing planned
Fairview	<ul style="list-style-type: none"> • Possible new water transmission line from Whitelaw to Bluesky (late 2017 – 2018) • Road work: Realignment of road 812; paving a portion of road 820 • Bridge replacement • Asphalt overlay Bluesky (2017)
Grande Prairie	<ul style="list-style-type: none"> • Clairmont Heights, parkway to downtown core (spring 2017) • Water and lift station • West Corridor Regional water transmission line (connecting through County and into Town of Wembley) • Regional Community Cultural Centre to be built by the Bezanson Agricultural Society¹⁸⁸
Greenview	<ul style="list-style-type: none"> • Grovedale – water treatment plant • Ridgevalley – Iosegun Lake road paving and water treatment plant upgrade • Potential Valleyview rural water line, west to Sturgeon Lake Cree Nation boundary • Tri-Municipal large scale industrial development south of Grovedale (partnership among the MD of Greenview, the County of Grande Prairie, and the City of Grande Prairie)
Northern Lights	<ul style="list-style-type: none"> • Rural water line (2017) likely to be bored not trenched • Rebuilding of roads
Northern Sunrise	Water line between St. Isidore and Nampa (tentative)
Peace 135	Nothing planned for 2017 or 2018
Saddle Hills	<ul style="list-style-type: none"> • Construction of 2 communications tower (tentative – spring 2018) • Development of 55 residential lots in the Hamlet of Woking¹⁸⁹
Smoky River	<ul style="list-style-type: none"> • Lift station with SCADA • Road construction and bridge repairs (tentative)
Spirit River	Road reconstruction

11.2 Desired State

The range of interest in broadband varies considerably throughout the region, but even the most enthusiastic of the municipalities are still in the early stages of deciding which options to pursue and how. While a formal 'Desired State' has not yet been agreed to in any of the municipalities, what follows is based on the assumption that, over the next five years, the majority may choose to facilitate the deployment of infrastructure to support a fully scalable broadband network ubiquitously available throughout their municipality and, if possible, the region as a whole. This would typically include a

¹⁸⁸ County of Grande Prairie; Council Highlights; 26 June 2017.

¹⁸⁹ Saddle Hills County; Request for Proposals Saddle Hills County Municipal Development Plan and Land Use Bylaw, Schedule; 1 March 2017. 13.

combination of an underlying fibre infrastructure with upgraded wireless services where fibre is not yet practical. Market-wise, the infrastructure would be available on an open-access basis to all service providers interested in serving municipal and regional businesses and residents. Whereas the municipalities do not wish to interfere with private enterprise in the services marketplace, they will entertain options relative to facilitating the underlying lit open-access fibre utility infrastructure.

Along a continuum of interest, county and community level interest in broadband within the Peace Region Economic Development Alliance (PREDA) can best be described as 'visionary' to 'status quo'. The County of Grande Prairie's vision, a decade ago, led to more than 300 county-sponsored fixed wireless towers being built in the county and through their partnership with GPNetworks, fibre is being deployed to subdivisions, towns, and villages. The County of Grande Prairie is poised to begin its next wave of enhancement to broadband services within their county. Its vision is to have greatly improved broadband speed available to its residents and businesses – speeds that fibre-based infrastructure is capable of. Also, creating an environment that fosters competition (and increases redundancy, meaning having one or more 'backup' systems available in case of a main system failure) is important to the county.

Big Lakes County and its partner communities recently took the initiative to obtain Alberta Community Partnership (ACP) funding for a detailed broadband study for the County, inclusive of the municipalities, First Nations, and Métis settlements within its boundaries – specifically High Prairie, Swan Hills, the hamlets of Enilda, Faust, Grouard, Jousard, and Kinuso, the Kapewe'no First Nation, and the Métis settlement of Gift Lake. The study – *Inter-municipal Broadband Discovery Project* – will leverage the results of this work and then develop more detailed financials to evaluate the options of most interest to the County. As the more detailed financials have already been developed, they will be used in the analyses presented here – thereby increasing both the accuracy and credibility of the financial results presented.

As will be seen, the business case for an inclusive, open-access utility network focused on providing both fibre-to-the-premise (FTTP) networks in each of these communities as well as an inter-community connecting network within Big Lakes County, goes cashflow positive after seven years. Given their average premise density of only 0.2 premises/km², the results are encouraging. Going forward, the model could be expanded to encompass options for other MDs and Counties in the region.

The Town of Valleyview completed Business Case for Broadband in July. Though they are a small community of some 1,000 premises, innovative approaches to both operations and financing have provided them with a positive business case. Valleyview is now moving on to the development of a business/implementation plan.

The councils of the five municipalities of Birch Hills County, Saddle Hills County, MD of Spirit River, Town of Spirit River, and Village of Rycroft are known as the G5 Municipalities. This group works together on matters of regional needs and inter-municipal cooperation, including broadband. Saddle Hills Utility Communications Network and the Peace River Internet Society (PRiS) provide fixed wireless-based Internet services in Saddle Hills County. Rycroft is planning to lay fibre conduit in conjunction with their upcoming curb and gutter project (summer 2017). Potentially, a community fibre project would see Rycroft and the Town of Spirit River leverage the construction of a new water pipeline between the two communities to bring fibre to both communities.

Saddle Hills County has undertaken the building of communications towers for the purposes of ISP co-location and, ultimately, the improvement of the quality of life for its residents and the success of its businesses. The construction of more towers is planned as they work toward their vision of having the county fully served. The county's view is long-term, and it is positioning for today's investments to still be beneficial in 10 to 20 years.

The MD of Smoky River as well as the towns of Falher and McLennan and the villages of Donnelly and Girouxville are poised to initiate a broadband plan.

Figure 154 show the communities within PREDA that have near-term broadband plans. More information is provided in the Appendix 13.11 about each community's issues and challenges; whether fibre/broadband is on their Council's agenda; the factors impacting their community's capability to pursue a fibre/broadband initiative; and their multi-year visions.

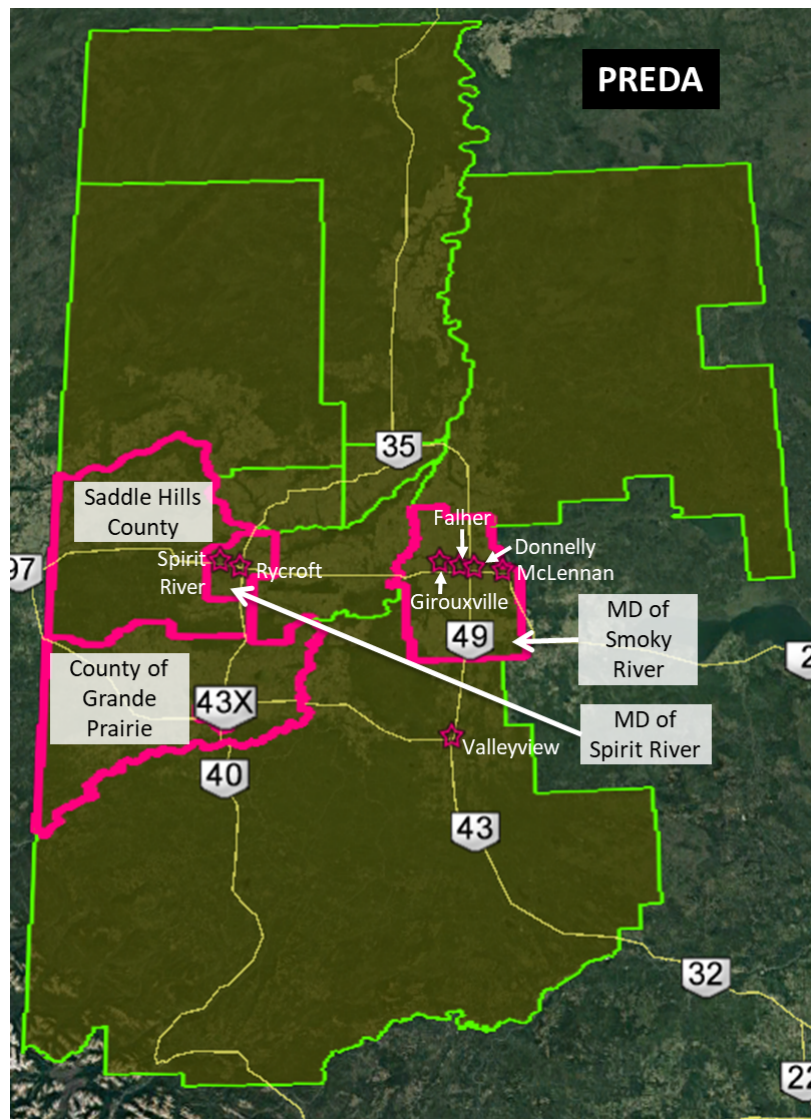


Figure 154 – Communities with near-term broadband plans.

11.3 Big Lakes County – An Inclusive Regional Network

11.3.1 Context

Within the PREDA, Big Lakes County and its partner communities have recognized the importance of broadband and looking for solutions to move forward. Indeed, Big Lakes County took the initiative to obtain Alberta Community Partnership (ACP) funding for a detailed study for the County, inclusive of the municipalities, First Nations, and Métis settlements within its boundaries. The study – *Inter-municipal Broadband Discovery Project* – will leverage the results of this work and then develop more detailed financials to evaluate the options of most interest to the County. As the results represent a sustainable option at the scale of a very rural County, the model presented will likely be replicable to other counties and MDs throughout Northern Alberta.

As will be seen, the business case for an inclusive, open-access utility network focused on providing both fibre-to-the-premise (FTTP) networks in each of these communities as well as an inter-community connecting network within Big Lakes County, goes cashflow positive after seven years. Given their average premise density of only 0.2 premises/km², the results are encouraging. Going forward, the model could be expanded to encompass options for other MDs and Counties in the region.

A map of the County appears in Figure 155. Towns and hamlets are marked with orange and yellow pins. First Nations areas are shaded yellow and Métis Settlements are shaded purple. SuperNet access sites are shown with yellow text and circles. SuperNet access sites enable connections back to Internet exchanges in Edmonton and Calgary without the need for additional fibre deployment. Each community network must at least indirectly connect back to an Internet Exchange.

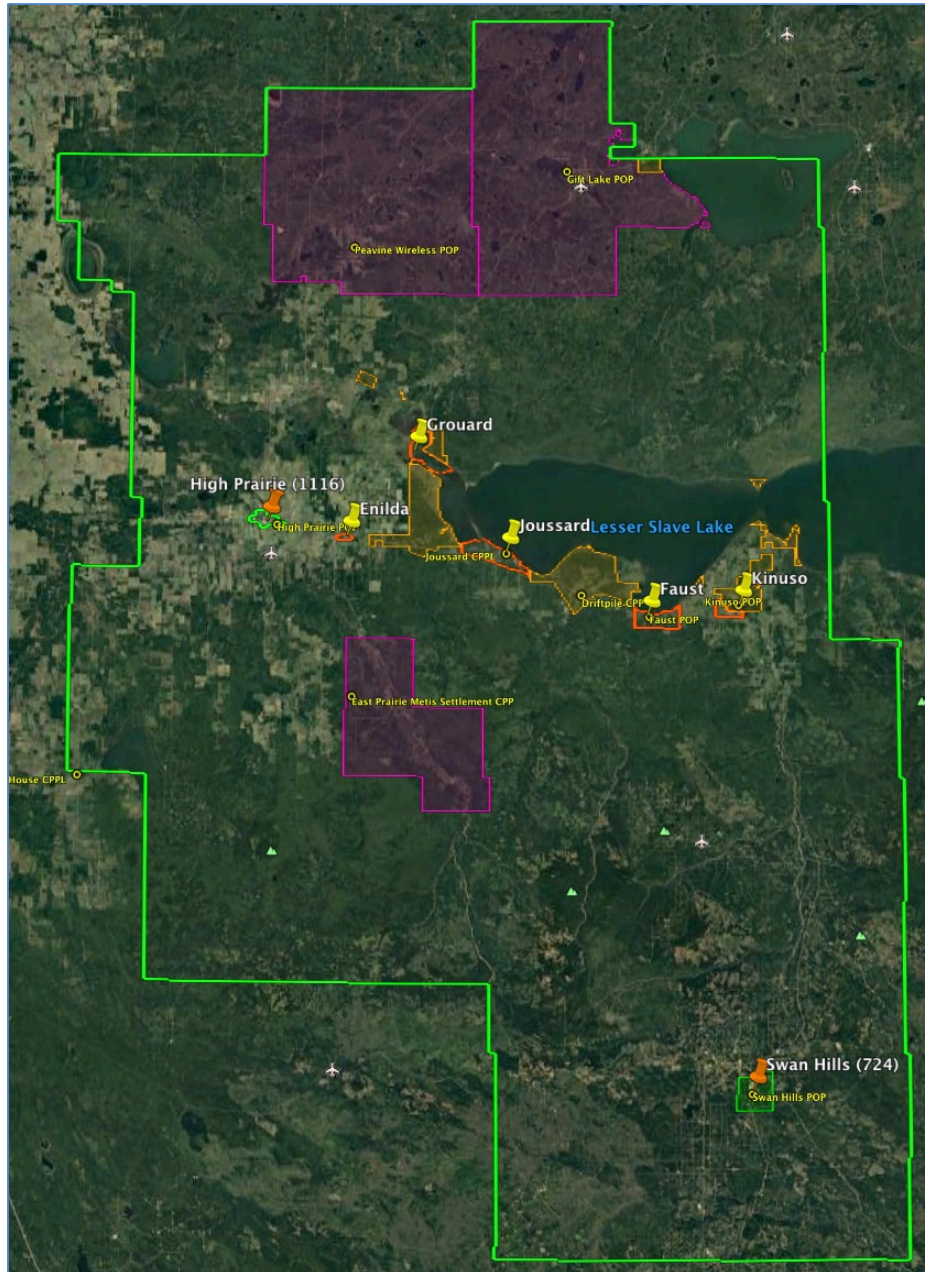


Figure 155 – Big Lakes County.

11.3.2 Business Structure

Assume that Big Lakes County, inclusive of all the municipalities, First Nations, and Métis settlements within its boundaries (hereinafter referred to collectively as 'Big Lakes') deploys an open-access, lit fibre-optic network that will make world-class, fully scalable broadband infrastructure available to every home and business in the towns of High Prairie, Swan Hills, the hamlets of Enilda, Faust, Grouard, Jousard, and Kinuso, the Kapewe'no First Nation, and the Métis settlement of Gift Lake.

In the analysis below, the business structure, opto-electronics and backhaul, operations, drop capital, and markets and revenues assumed are those outlined in the default implementation scenario presented in Section 6.5. In this case, the local network entity established to house the local fibre operation will be referred to as Big-Net.

11.3.3 Deployment Capital

Big Lakes has on and off plans to lay a new waterline from High Prairie to Jousard. Should the build proceed, it could be leveraged to deploy a fibre backbone that could connect to all communities along the way at a small marginal cost. The connection would save operational expenses associated with utilizing several SuperNet access points and also enable fibre connections to farms and ISP towers along the way. The route (yellow), along with the ISP towers (green triangles) is shown in Figure 156. Without the benefit of the waterline build, deployment cost for the fibre/conduit along the routes would run about \$732k.



Figure 156 – Utility fibre network for Big Lakes.

The capital costs to deploy both the connection network and access networks in each community are shown in Table 61. In this context, access refers to laying fibre that passes every premise in a municipality. Later, when a premise orders service, a fibre drop connection from the premise to the fibre running past the premise will be needed. Overall cost, should the entire network be deployed, comes to about \$12.9M. In the financial projections which follow, the year of deployment for each community is shown in the tan coloured row. Overall, the network will be deployed over the four-year period from 2018 to 2021.

Table 61 – Deployment Cost Summary

Network Component	County Backbone	Towns & Villages		Hamlets / First Nations / Métis Settlements						
		High Prairie	Swan Hills	Enilda	Faust	Gift Lake	Grouard	Joussard	Kinuso	County Near Kinuso
Year of Deployment		2018	2019	2019	2020	2020	2020	2021	2021	2021
Feeder	642,135	724,418	484,316	89,516	429,820	1,005,850	339,744	800,219	263,867	376,511
Distribution	-	1,358,445	1,336,975	208,530	453,575	740,340	413,015	578,365	322,930	514,240
Subtotal - civil construction	642,135	2,082,863	1,821,291	298,046	883,395	1,746,190	752,759	1,378,584	586,797	890,751
Mobilization/De-mobilization	12,843	41,657	36,426	5,961	17,668	34,924	15,055	27,572	11,736	17,815
Engineering, Permitting, and Planning	77,056	293,409	247,614	35,766	106,007	209,543	90,331	165,430	70,416	106,890
Activation: Fibre Micro-cabling	-	46,000	36,000	4,000	20,000	38,000	20,000	38,000	12,000	16,000
Grand-total, deployment	732,034	2,463,929	2,141,331	343,772	1,027,070	2,028,657	878,145	1,609,586	680,949	1,031,456
										12,936,929

Using the cumulative capital expenditures over the first five years of operation, a breakdown of the expenditures appears in the pie chart in Figure 157. Excluding the backbone connection¹⁹⁰, the pie chart represents expenditures of \$17.1M and assumes that the ISPs using the network obtain a collective market penetration of 50% of the residential and 70% of the business communities.

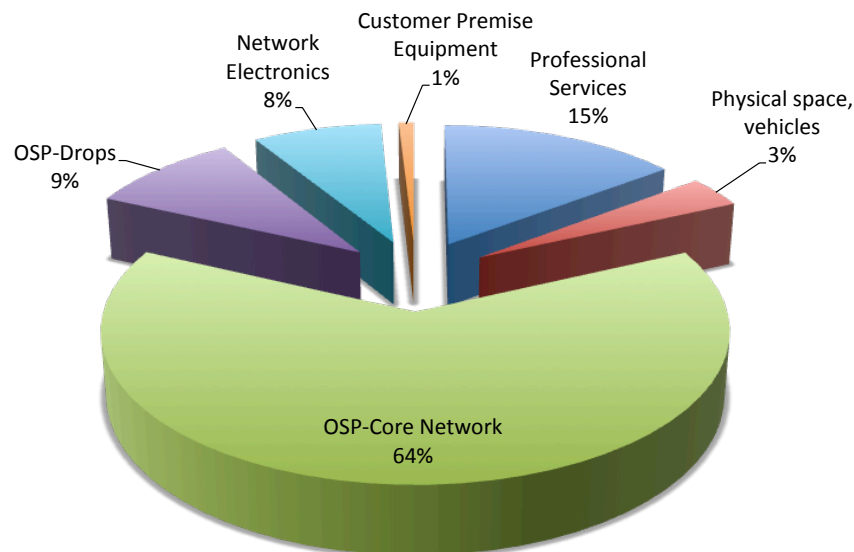


Figure 157 – Cumulative capital expenditures from 2018 to 2022.

11.3.4 Operations

Operational costs include payments to O-Net for network management and monitoring services and for local technical staff required to maintain the network. A breakdown of the expenses, as estimated for the 2022 operating year, appears in Figure 158 for the scenario proposed. In the chart, Admin, ops, o-e, and mktng refer to administration, operations, opto-electronics, and marketing respectively. All service-related costs are zero as responsibility for those remains with the ISPs.

¹⁹⁰ The financial projections assume the use of SuperNet connections in each 'urban' centre.

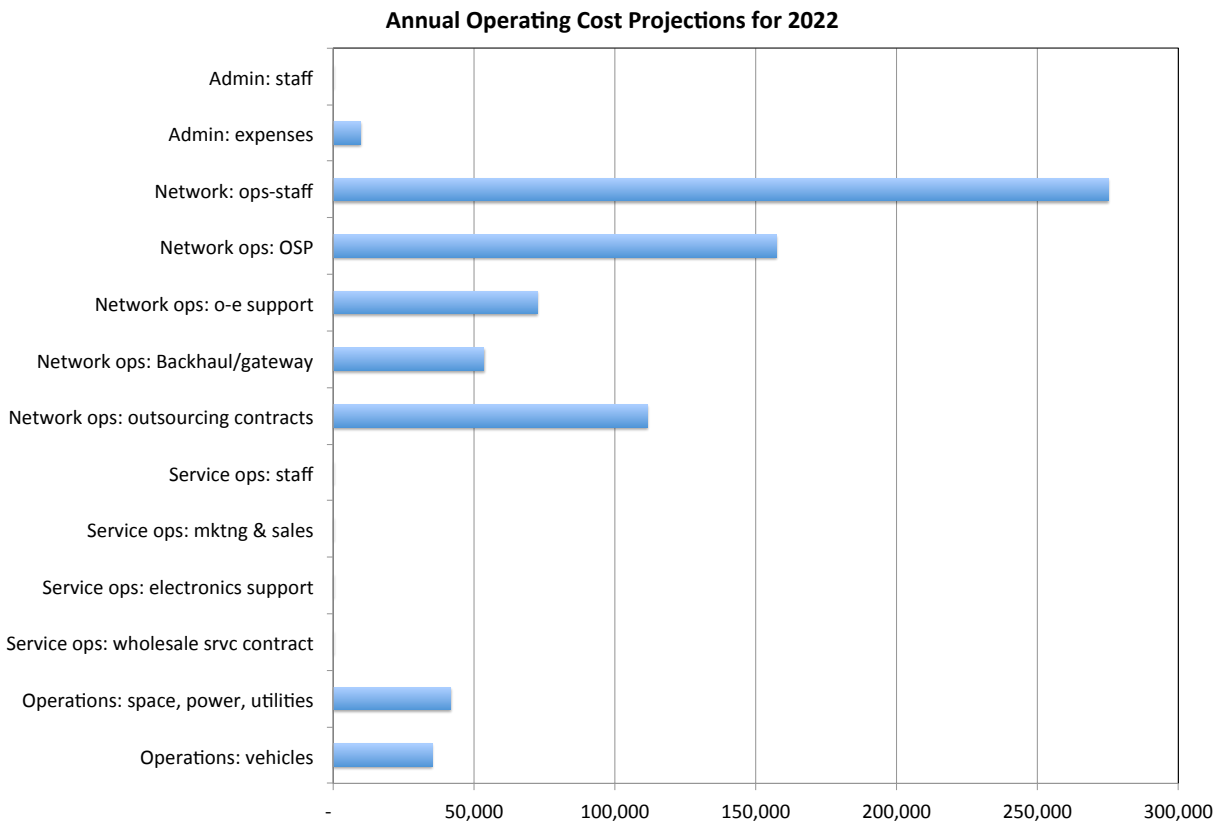


Figure 158 – Projected operational cost projections for the utility fibre network in 2022.

11.3.5 Financial Projections

As can be seen in the summary results shown in Table 62, the wholesale network operation for the County goes cashflow positive in year 6 and, with debt servicing included, year 7. Based on the deployment and operational models assumed, overall capitalization for the project would come to approximately \$17.8M. Without access to grant funding or a cash infusion from either the County or the municipalities to finance the project, Big Lakes would need to arrange for both a short and a long-term loan from the Alberta Capital Finance Authority (ACFA) – an eight-year debenture to cover opto-electronics and a 25- year debenture to cover the longer term (fibre) assets and start-up costs. By year 10, approximately \$277,359 is being returned to the County annually. By year 15, this has grown to \$517,897. Overall, the operation would be both profitable and sustainable.

Table 62 – Utility Model Results Summary for Big Lakes

	Results
Years to positive cashflow	
Operating	5
With debt servicing (p&i)	6
Financing	
Start-up capital required	17,826,835
Net Cashflow - before debt servicing	
Profit - annual at 10 yr	906,529
Profit - annual at 15 yr	1,153,273
Net Cashflow - after debt servicing	
Profit - annual at 10 yr	277,359
Profit - annual at 15 yr	517,897

In graphical form, the non-discounted cashflow chart for the proposed deployment appears in Figure 159.

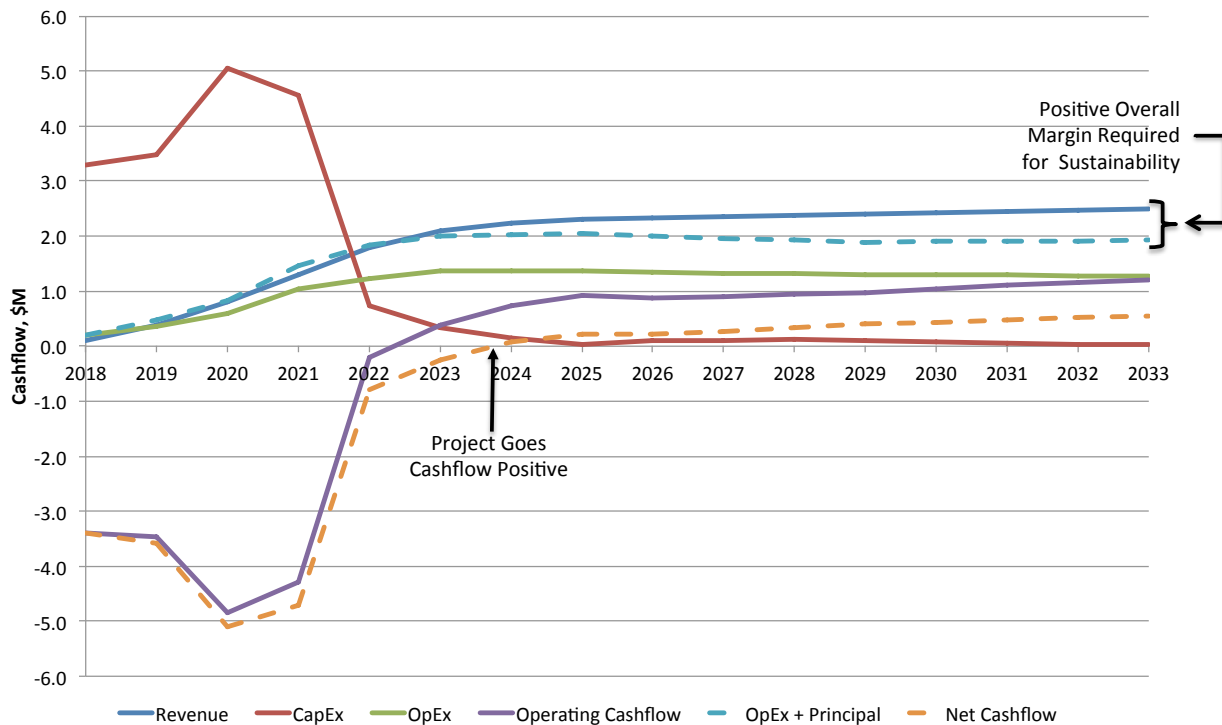


Figure 159 – Non-discounted cashflow projections for Big Lakes County regional network.

As before, the capital (red) required to finance the project is shown to pretty much all be required upfront to cover the deployment costs and initial operating deficits – financing must be sufficient to maintain a net cashflow of at least zero. Operational sustainability is determined by the gap or difference between the revenue (blue) and operational expenditure (green) lines whereas overall sustainability, which includes principal repayment, is the difference between the revenue (blue) and the operational + principal repayment (dotted blue) lines. The bigger the gap, the better. The net overall cashflow line is the dotted orange line.

Interestingly, though more expensive, the regional network represents a more sustainable business model than does that for High Prairie alone. The reason has to do with both scale – with more clients involved, operations of a regional network are more efficient than of a smaller operation such as proposed for High Prairie, and the fact that improved services in the truly rural areas come from enhanced ISP equipment on fibre connected towers as opposed to a fibre network designed to connect individual farms.

11.4 MD of Smoky River – An Inclusive Regional Network

11.4.1 Context

With under a third of the population of Big Lakes County and almost as low a premise density, establishing an inclusive fibre network in the MD of Smoky River is a challenge operationally. However, should the MD partner with Big Lakes, operational efficiencies would improve for both.

A map of the County appears in Figure 160. Towns and villages are shown with orange pins, hamlets with yellow. Fixed wireless towers are represented by green triangles and the proposed backbone fibre route to connect key ISP towers is shown in yellow.

Deploying the backbone fibre route shown would enable connections to the majority of ISP towers in the MD and enable connections to each hamlet. With the low densities, however, justifying the \$3.1M needed to deploy it may be difficult [Table 63]. On the other hand, if the MD were to concentrate on FTTP in their three larger centres of Fahler, McLennan, and Donnelly, they could establish a good base from which to move further into the rural areas. Meanwhile, they could leverage linear civil infrastructure builds such as waterline deployments and road rehabilitation work to decrease the overall cost of deployment.

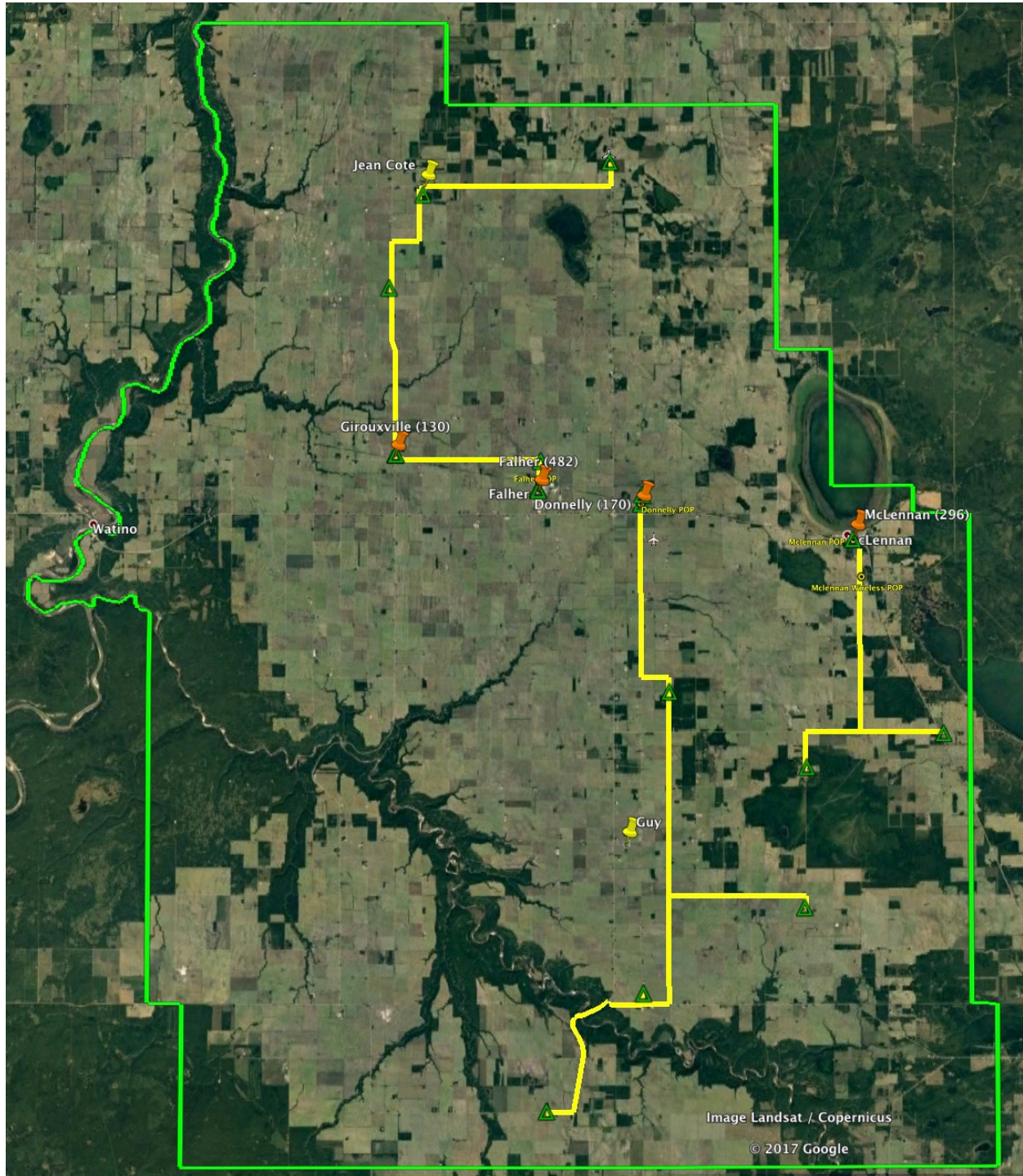


Figure 160 – MD of Smoky River.

11.4.2 Business Structure

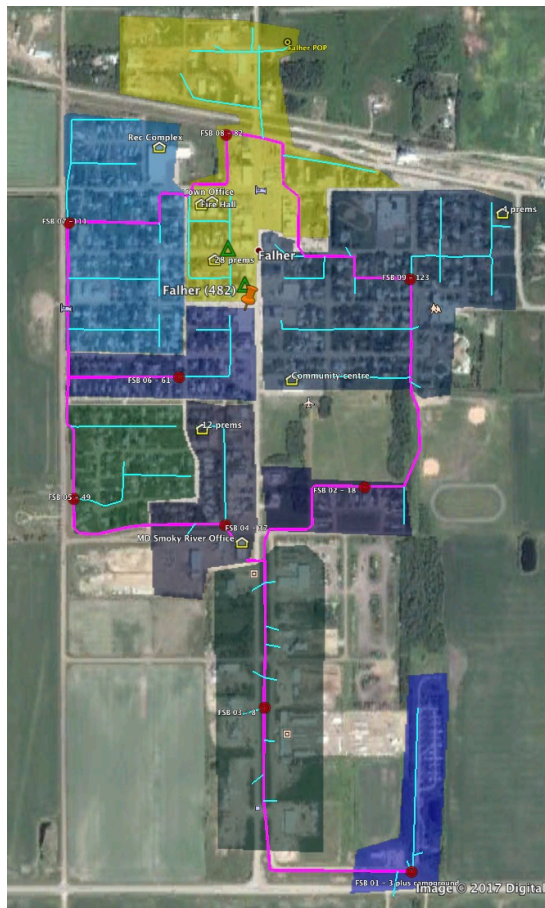
In the analysis below, the business structure, opto-electronics and backhaul, operations, drop capital, and markets and revenues assumed are those outlined in the default implementation scenario presented in Section 6.5. In this case, the local network entity established to house the local fibre operation will be referred to as SR-Net.

11.4.3 Deployment Capital

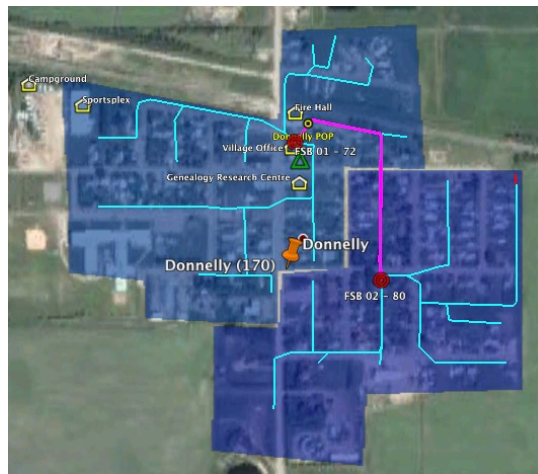
The capital costs to deploy both the connection network and access networks in each community are shown in Table 63. Overall cost, should the entire network be deployed, comes to about \$4.88M. In the financial projections which follow, only the community deployments will be considered – which, based on the high-level designs in Figure 161, reduces the overall deployment cost to \$1.72M. Assume the access networks are all deployed in 2018.

Table 63 – Deployment Cost Summary

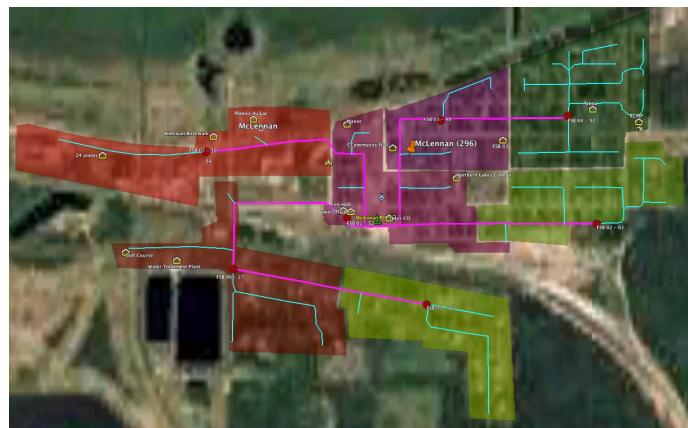
Network Component	County Backbone Routes			Towns & Villages		
	From Fahler SN POP	From McLennan SN POP	From Donnelly SN POP	Fahler	McLennan	Donnelly
Year of Deployment				2018	2018	2018
Feeder Distribution	566,802	320,895	892,794	261,719	214,668	25,670
	-	-	-	366,170	308,350	228,160
Subtotal - civil construction	566,802	320,895	892,794	627,889	523,018	253,830
Mobilization/De-mobilization	8,502	4,813	13,392	12,558	10,460	5,077
Engineering, Permitting, and Planning	85,020	48,134	133,919	105,697	87,976	41,126
Activation: Fibre Micro-cabling	294,624	192,537	491,715	103,598	50,265	6,450
Grand-total, deployment	954,948	566,380	1,531,820	849,741	671,720	306,483
						4,881,092



Falher



Donnelly



McLennan

Figure 161 – FTTP network layouts.

Using the cumulative capital expenditures over the first five years of operation, a breakdown of the expenditures appears in the pie chart in Figure 162. Excluding the backbone connection, the pie chart represents expenditures of \$3.4M and assumes that the ISPs using the network obtain a collective market penetration of 50% of the residential and 70% of the business communities.

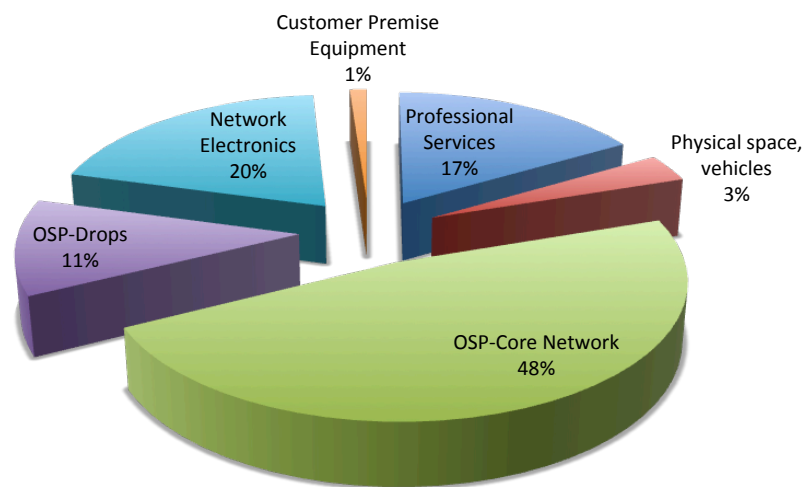


Figure 162 – Cumulative capital expenditures from 2018 to 2022.

11.4.4 Operations

Operational costs include payments to O-Net for network management and monitoring services and for local technical staff required to maintain the network. A breakdown of the expenses, as estimated for the 2022 operating year, appears in Figure 163 for the scenario proposed. In the chart, Admin, ops, o-e, and mktng refer to administration, operations, opto-electronics, and marketing respectively. All service-related costs are zero as responsibility for those remains with the ISPs.

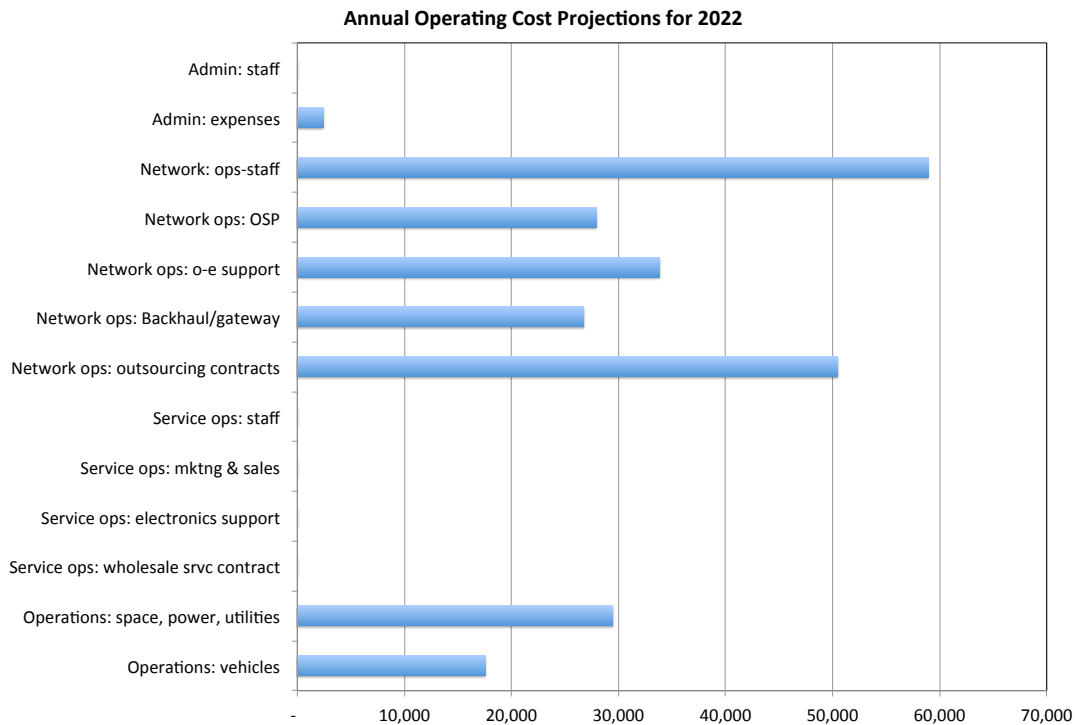


Figure 163 – Projected operational cost projections for the utility fibre network in 2022.

11.4.5 Financial Projections

As can be seen in the summary results shown in Table 64, the wholesale network operation for the MD goes cashflow positive three years after the network deployment completes. Based on the deployment and operational models assumed, overall capitalization for the project would come to approximately \$4.1M – some of which has to do with the need to cover 11 years' worth of operational deficits. Without access to grant funding or a cash infusion to finance the project, the MD would need to arrange for both a short and a long-term loan from the Alberta Capital Finance Authority (ACFA) – an eight-year debenture to cover opto-electronics and a twenty-five-year debenture to cover the longer term (fibre) assets and start-up costs. By year 10, approximately 277k is being returned to the County annually. By year 15, this has grown to \$518k. Overall, the operation would be both profitable and sustainable.

Cashflow results for this scenario are summarized in Table 64. Though the operation goes cashflow positive three years after the network deployment completes, with debt servicing considered, the overall financials do not go cashflow positive until year 12. As the required capital must therefore be sufficient to cover an 11-year deficit, some \$4.1M in capital will be required to fund the operation. By year 15, approximately \$45k is being returned to the Town annually.

Table 64 – Utility Model Results Summary for Big Lakes

	Results
Years to positive cashflow	
Operating	4
With debt servicing (p&i)	11
Financing	
Start-up capital required	4,055,364
Net Cashflow - before debt servicing	
Profit - annual at 10 yr	110,062
Profit - annual at 15 yr	182,934
Net Cashflow - after debt servicing	
Profit - annual at 10 yr	0
Profit - annual at 15 yr	45,846

In graphical form, the non-discounted cashflow chart for the proposed deployment appears in Figure 164. As before, the capital (red) required to finance the project is shown to pretty much all be required upfront to cover the deployment costs and initial operating deficits – financing must be sufficient to maintain a net cashflow of at least zero. Operational sustainability is determined by the gap or difference between the revenue (blue) and operational expenditure (green) lines whereas overall sustainability, which includes principal repayment, is the difference between the revenue (blue) and the operational + principal repayment (dotted blue) lines. The bigger the gap, the better. The net overall cashflow line is the dotted orange line.

The operating margin is positive in year 5 and, with debt service payments, the operation goes cashflow positive in year 12. While technically these numbers work, operationally, the risk is too high due to the negligible margins and resulting deficits. Given the small client base available in the MD and the importance of scale to operational sustainability, these initial results are typical for communities with aggregate populations less than around five thousand people.

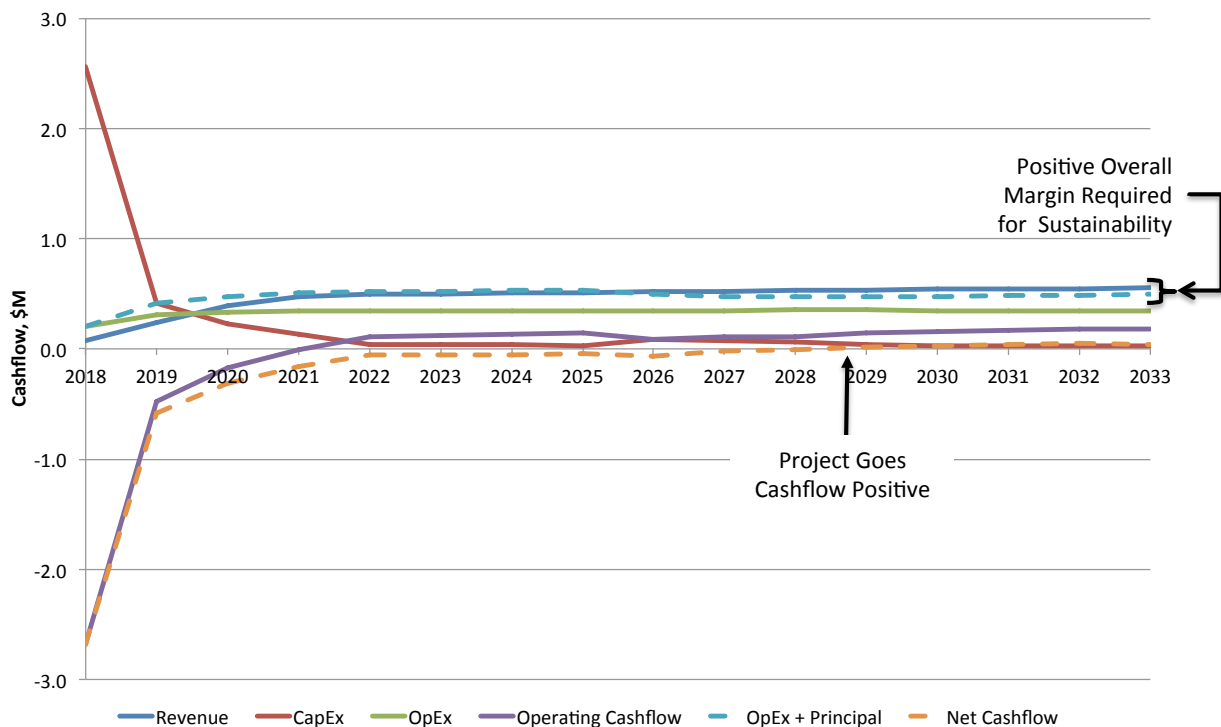


Figure 164 – Non-discounted cashflow projections for the Big Lakes County regional network.

Options to improve margins sufficiently that a community might elect to pursue a deployment are many and varied. With only 900 premises, for example, Valleyview now has a model in which their numbers work. Options to be considered were outlined in Section 6.5.10.

11.5 Extrapolating the Results

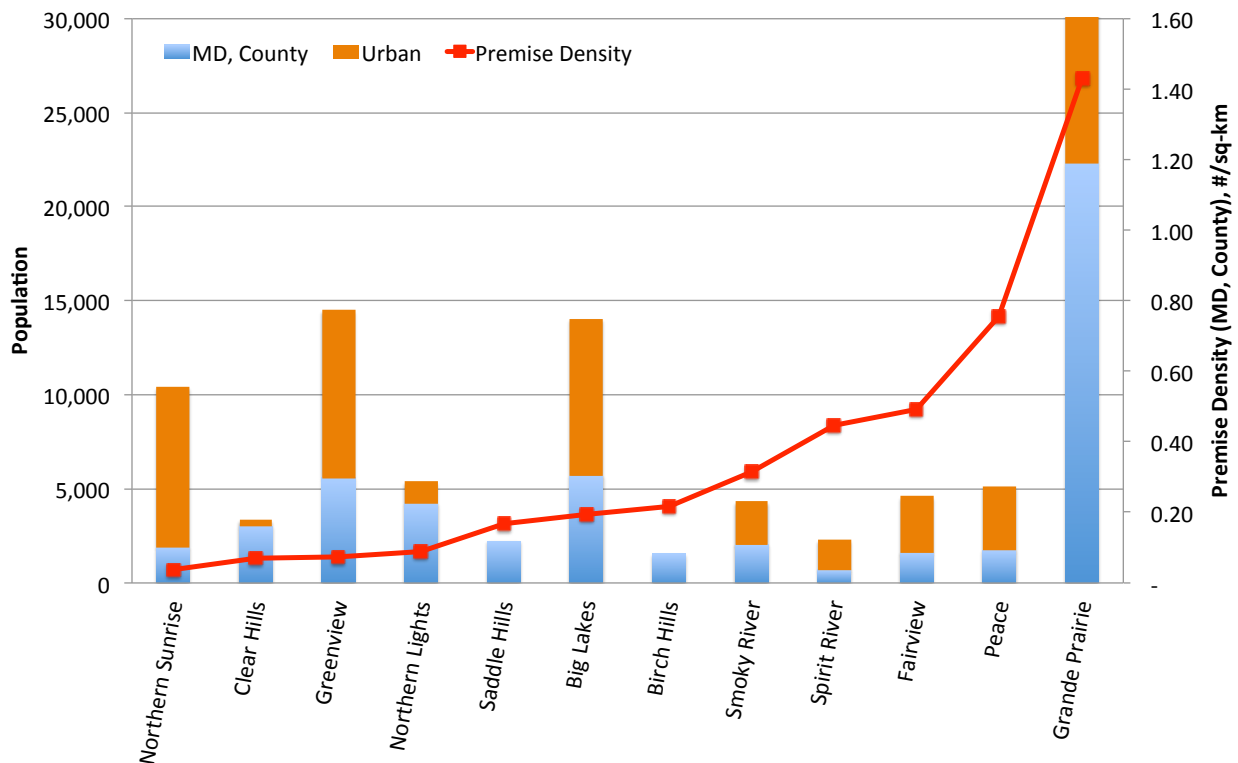
11.5.1 Municipal Networks

The financials presented for High Prairie illustrate the issues communities such as Fairview, Beaver Lodge, Sexsmith, and Grimshaw will face when evaluating a community fibre access options. Financials for smaller communities such as Wembly, Manning, and Fahler can be found in the report for GROWTH Alberta – they are similar in size to Swan Hills. As High Prairie is large relative to most member communities and the financials are marginal, the idea will be to bring together several communities within reasonable proximity together and then leverage the larger client base to improve efficiency and margins. In general, the minimal aggregate size for buried builds is between 2 and 3 thousand premises. Other options to improve the financials for smaller centres were discussed in Sec. 9.2.

11.5.2 Regional Networks

Given the importance of scale, should Big Lakes County proceed to establish a regional network operation, the operation could easily be expanded to encompass both the MD of Smoky River and others within the PREDA footprint – to mutual benefit of all communities involved.

Figure 165 provides a view of the population and densities for each MD and county in PREDA. The blue bars show the population of each MD or county and red squares show the population density. The orange bars bring in the populations of the cities, towns, and villages within each MD or county.



(The orange bar for Grande Prairie extends to a population of 93k.)

Figure 165 – Population and density profile for MDs and counties in PREDA.

The financials developed above for Big Lakes County indicate that a regional utility-based fibre network is possible and would be sustainable over the longer term. Though the county density is low, the population is concentrated along several corridors and with the urban centres involved, the operational scale is sufficient, but not by much.

Given the similarities in population and density, it would seem that a similar regional fibre option would work for Northern Sunrise and Greenview. This is not the case, though, and both will have difficulty making the numbers work. The primary urban centre in Northern Sunrise is Peace River, which has TELUS fibre. Greenview's issue is that Grande Cache is far enough from the other centres that pooling operations with them may not be practical.

With both lower densities and fewer population centres, without grant funding or aerial deployments, wireless will likely remain the dominant option for Clear Hills, Northern Lights, Saddle Hills, and Birch Hills. With a higher density, the numbers for Smoky River are promising. With higher densities, limited fibre networks focused on the urban centres are likely possible for Spirit River, Fairview, and Peace. Many options are available to the County of Grande Prairie.