



**Report on the
Fiber Optic Component of the
Proposed Nunavut – Manitoba
Linear Infrastructure Corridor**

**By
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November 19, 2018



EXECUTIVE SUMMARY

This review outlines the importance of including reliable fiber optic line as a component of the Nunavut–Manitoba linear infrastructure corridor. In particular, a fiber optic line could be attached to the structures that will be used to bring hydroelectric power from Manitoba to Nunavut.

Since its invention in the early 1970s, the use of and demand for optical fiber have grown tremendously from initially being used for telephone service to far more numerous applications. With the explosion of information traffic due to the Internet, electronic commerce, computer networks, multimedia, voice, data, and video, the need for a transmission medium with the bandwidth capabilities for handling such vast amounts of information is paramount. The following are the key benefits of fiber optics versus metallic-based systems:

- 1) Comparatively infinite bandwidth.
- 2) Longer intervals of signal transmission.
- 3) Light weight and small diameter.
- 4) No metallic components so fiber optic line can be installed in areas with electromagnetic interference (EMI), such as hydroelectric power lines.
- 5) It is extremely difficult to remotely detect the signal being transmitted by fiber optic cable. The only way to do so is by physically accessing the line, which is easily detectable by security surveillance.
- 6) In many cases, fiber optic solutions are less costly than metallic components, such as copper.

In summary, having reliable fiber optic service to the Kivalliq Region would have very positive impacts to the residents in the areas of access to e-learning, increased access to medical specialists via video-link and expanded cell phone coverage would increase travel safety on the land. The residents and the local business community would both see decreased internet costs.



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Appendix 2: Final Technical Review of the 2016 Draft Nunavut Land Use Plan. Kivalliq Inuit Association. January 12, 2017.



1.0 INTRODUCTION

This review is related to the linear infrastructure related to the proposed Nunavut–Manitoba infrastructure corridor. The content of this report is related to the addition of reliable fiber optic line being added into the proposed transmission infrastructure described in the Appendix 1. This report should be added to section 5 entitled “Linear Infrastructure Corridors” in the original report (see Appendix 2)

Since its invention in the early 1970s, the use of and demand for optical fiber have grown Tremendously from initially being used for telephone service to far more numerous applications. With the explosion of information traffic due to the Internet, electronic commerce, computer networks, multimedia, voice, data, and video, the need for a transmission medium with the bandwidth capabilities for handling such vast amounts of information is paramount. Fiber optics, with its comparatively infinite bandwidth, has proven to be the solution.

2.0 BENEFITS OF FIBER OPTICS

Optical fiber systems have many advantages over metallic-based communication systems. The main advantages are:

2.1 Long-distance signal transmission

The low attenuation and superior signal integrity found in optical systems allow much longer intervals of signal transmission than metallic-based systems. While single-line, voice-grade copper systems longer than a couple of kilometers require in-line signal for satisfactory performance. However, it is not unusual for fiber optic systems to go over 100 kilometers with no active or passive processing.

2.2 Large bandwidth, light weight, and small diameter

Today’s applications require an ever-increasing amount of bandwidth. Consequently, it is important to consider the space constraints of many end users. The relatively small diameter and light weight of optical cable make installations easy and practical.

2.3 Nonconductivity

Another advantage of optical fibers is their dielectric nature. Since optical fiber has no metallic components, it can be installed in areas with electromagnetic interference (EMI) and radio frequency interference (RFI). Areas with high EMI include hydroelectric lines.

2.4 Security



Unlike metallic-based systems, the dielectric nature of optical fiber makes it extremely difficult to remotely detect the signal being transmitted by the cable. The only way to do so is by accessing the optical fiber. Accessing the fiber requires intervention that is easily detectable by security surveillance. These circumstances make fiber an extremely secure system.

2.5 Designed for future applications needs

Fiber optics is affordable today, as electronics prices fall and optical cable pricing remains low. In many cases, fiber solutions are less costly than copper. As bandwidth demands increase rapidly with technological advances, fiber optics will continue to play a vital role in the long-term success of telecommunication.

3.0 RECOMMENDATIONS

Having reliable fiber optic service to the Kivalliq Region would have very positive impacts to the residents (ie. education, medical services and safety) and the business community (ie. lower costs). A fiber optic line could be attached to the structures that will be used to bring hydroelectric power from Manitoba to Nunavut.

In summary, having reliable fiber optic service to the Kivalliq Region would have very positive impacts to the residents in the areas of access to e-learning, increased access to medical specialists via video-link and expanded cell phone coverage would increase travel safety on the land. The residents and the local business community would both see decreased internet costs.

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