FINANCIAL MANAGEMENT COMMITTEE

HIS WORSHIP, THE MAYOR
AND COUNCILLORS

SUBJECT: CITY FIBRE NETWORK STRATEGY

RECOMMENDATION:

1. THAT Council approve in principle the strategic direction for the City's long-term fibre communications network, as outlined in this report.

REPORT

The Financial Management Committee, at its meeting held on 2017 September 14, received and adopted the *attached* report seeking Council's approval in principle for the City's long-term strategy to implement a City-owned fibre communications network.

Respectfully submitted,

Councillor D. Johnston
Chair

Councillor C. Jordan
Vice Chair

Copied to:	City Manager Deputy City Manager Chief Information Officer Director Engineering Director Finance Director Parks, Rec. & Cult. Services Director Planning & Building City Solicitor

City of Burnaby

Meeting 2017 September 13

COUNCIL REPORT

TO:	CHAIR AND MEMBERS FINANCIAL MANAGEMENT COMMITTEE	**DATE:**	2017 August 18
FROM:	CHIEF INFORMATION OFFICER	**FILE:** *Reference*	1920-30 *Digital Communications Systems*

SUBJECT: CITY FIBRE NETWORK STRATEGY

PURPOSE: To seek approval in principle for the City's long-term strategy to implement a City-owned fibre communications network.

RECOMMENDATIONS:

1. **THAT** Financial Management Committee recommend Council approve in principle the strategic direction for the City's long term fibre communications network as outlined in this report.

REPORT

1.0 INTRODUCTION

The City provides a wide range of citizen-facing services across Burnaby, in-person at City facilities and on-line. Supporting the delivery of civic functions and services are a number of business systems and a data network that transmit information between sites. This network also supports operations that go largely unseen by citizens such as control and monitoring systems that keep equipment operating safely, and global positioning systems used to assist first responders and manage the City's fleet of vehicles. Given the extent to which departments have come to rely on technology to support core processes, it is important that they have a telecommunications network that is high-speed and highly-available. And that this network can scale to meet anticipated levels of growth in systems use over the next 10 – 15 years.

The current City of Burnaby network is a combination of commercial services and City-owned fibre. The City Hall campus (City Hall, West Building, Deer Lake and Fire Hall 1) is connected by an internal City fibre network ring. Other sites are serviced by external communications companies. In 2015, the City entered into a ten year agreement with Telus for high-speed broadband service for 26 City sites at advantageous rates, in part exchange for Telus' ability to install small cell devices on City street infrastructure – e.g., light poles. This agreement provided substantial savings over equivalent commercial pricing. It was understood that, over time, the City's network requirements would outstrip the speed and bandwidth available under the

agreement, and that future contract renewals at standard commercial rates would become untenable when extrapolated across all City locations and services.

Most local municipalities have elected to build their own network and treat it like a utility; some over-build and sell or share surplus capacity with third parties. City-owned networks carry significant benefits over commercial services:

- IT infrastructure staff have a clear, end-to-end view of the network for optimal performance, security management and incident diagnosis and resolution;
- lower total cost of ownership over commercial services of an equivalent speed and service level;
- faster recovery time in the event of an emergency or disaster as commercial providers restore service based on internal and not municipal priorities.

2.0 CURRENT SITUATION

The City's existing fibre network connecting City Hall, West Building, Deer Lake and Fire Hall 1 was constructed to replace commercial third party services at its highest network traffic locations. In anticipation of future network demand across the remaining City sites, Staff developed a fibre network strategy to assess the feasibility and cost effectiveness of provisioning a City-owned and managed communications network. In 2015, a pilot project was initiated with City Engineering to share the costs of building network conduit between Bill Copeland Sports Complex and Burnaby Sports West Building and Fields. A further pilot was conducted with an external third party to develop an exchange agreement to share existing communications duct in the Boundary/Hastings and Gilmore/Canada Way areas. These shared pilot projects successfully delivered future network connection points at considerable savings over a custom-built IT-only construction project. The pilots also determined that the size and geography of Burnaby, coupled with the dispersed nature of City sites, would require a phased, selective approach to provisioning a network.

The strategic direction arising from the pilot projects and subsequent analysis is that the City should build and manage its own fibre communications network, focusing on the locations with highest bandwidth and service continuity requirements, in the most cost effective manner possible. Subject to location and contractual agreements, surplus network capacity could be made available to third parties.

3.0 PROPOSED IMPLEMENTATION APPROACH

The City has 22 major network sites (e.g., the City Hall campus, Burnaby Public Library – Metrotown branch, Laurel and Still Creek Works Yards); 55 medium sized sites (e.g., Bonsor Recreation Centre and Cameron Library) and numerous network access points (e.g., traffic lights and SCADA). To develop the implementation road map, staff evaluated each City site based on key criteria including: services delivered, impact of outages and cost to provision fibre to that

site. Based on this analysis, priority sites for development were identified as the Laurel and Still Creek Works Yards and Fire Hall 7; Emergency Support Services' locations and the remaining Fire Halls.

Staff will employ the following approaches to reduce implementation costs:

- co-build with existing capital works programs – include fibre communications conduit in upcoming Engineering and Parks capital works projects that traverse City facilities, in the order of priority as outlined in Appendix 1;
- leverage existing city planning procedures and processes – for major new developments, request that City network communications requirements be included in the planning process;
- develop partnerships with 3rd parties – as opportunities arise, form partnerships with 3rd parties to build new fibre conduit, swap excess capacity (conduit, fibre cabling or both) and co-build new fibre communications conduit. Established City processes will be used to manage the relationships and contractual agreements.

Towards the end of the program, there may be a need for some stand-alone IT construction projects to fill in the gaps between network segments that are close in proximity but do not completely connect. It is also expected that some commercial services will be retained for remote sites where fibre network builds cannot be cost justified.

An internal policy document will be developed to define the fundamental goals for the City Fibre Network, along with principles to guide site selection and implementation, and the ongoing operation and management of the assets that comprise an internal fibre communications network. This document will leverage existing City processes and contractual agreements for asset construction and management wherever possible.

4.0 FINANCIALS

If the IT Department were to undertake independent projects to rapidly build a communications network to connect all civic facilities, the estimated cost would be around $37M over an eight year timeframe. The approach outlined in Section 3.0, which leverages cost sharing arrangements with other City departments and external partners, will take longer to execute but will reduce construction costs to approximately $17M over 15 years. Commercial services will be retained for remote sites where the cost of provisioning City-owned fibre proves prohibitive. Construction costs will be offset by retiring existing commercial telecommunications services at an average rate of $13,500/site/year based on current pricing. Over the life of the program, two additional full time equivalent staff will be required to manage the network and provide support to City sites at an estimated cost of $120,000 per employee (one in Year 2 and another approximately mid-way through the construction program). The break-even point for the network build is estimated at Year 11 (1 year after the current Telus agreement ends) with projected annual savings rising to $1.5M per year (after Year 20). Savings are based on the estimated cost of commercial telecommunications services adjusted for projected growth in data

utilization and transmission. Additional commercial services, such as back-up routes for network fail-over, would result in extra ongoing charges. Increased services on an internal network would not incur incremental costs after the City network is in place.

5.0 PHASED IMPLEMENTATION SCHEDULE

Implementation of the City's fibre communications network will be phased over approximately 15 years with incremental improvements made in subsequent years to address emerging needs: e.g., new City facilities. Appendix 1 details the proposed list of City network locations as per the implementation road map. Because the City Fibre Network Program will share costs with other internal and external construction projects, the implementation plan will need to reflect – and adapt to – the schedules of these other groups. Scope and cost estimates may fluctuate from year to year based on the opportunities available. IT staff will bring forward an implementation plan and funding request on an annual basis as part of the capital budgeting process in order to progress the roll-out of the City Fibre Network Program.

6.0 CONCLUSIONS AND PROPOSED WAY FORWARD

The majority of Lower Mainland municipalities have built, or are in the process of building, high capacity, high speed city-owned fibre networks to facilitate strategic service delivery and citizen support objectives at a reduced cost over commercial telecommunications providers. Burnaby will require similar infrastructure to deliver network bandwidth that supports an increasing reliance on systems and data, as well as citizen demand for online services. To optimize the cost of provisioning this network, staff will leverage existing City infrastructure projects, processes and governance, and will partner with third parties to share or acquire additional bandwidth. A strategic road map of the City's planned fibre network will be maintained and sites proposed for development will be included in the annual capital budget review process.

7.0 RECOMMENDATIONS

It is recommended that the Financial Management Committee recommend Council approve in principle the strategic direction for the City's long term fibre communications network and that the City Fibre Network Strategy be used to provide context to annual IT capital budget requests for the interim segments that will ultimately link core City sites into a high speed, high capacity fibre network. Specific fibre network capital projects will be included in future capital programs for consideration and approval by Council.

Shari Wallace
CHIEF INFORMATION OFFICER

SJW:sjw

Copied to: City Manager
Deputy City Manager
Director Engineering
Director Finance
Director Parks, Recreation and Cultural Services
Director Planning & Building
City Solicitor

APPENDIX 1 – Proposed City Site Implementation Plan

1. CITY HALL, CORE LOOP AND HASTINGS CORRIDOR

   The first phase will allow the potential collection of the nodes along the Hastings corridor in preparation for connection to City Hall. The major connections made during this phase are:

   - Hastings Corridor (connects ~35 nodes)
   - Southwest quadrant emergency site (Bonsor)
   - Highest overall network traffic corridor (Norland/Sperling)
   - Firehall 7 (Core Loop continuation)
   - Highest utilized library (Metrotown Library)

2. HASTINGS CORRIDOR AND SOUTHEAST QUADRANT

   The second phase connects up to 37 nodes of the Hastings corridor and the SE Emergency Support Services location to City Hall. The major connections made during this phase are:

   - Southeast quadrant emergency site (Edmonds Community Centre)
   - Northern Hastings Corridor to Core Loop
   - Core Loop back-up route (part 1)

3. NORTH BURNABY AND CORE LOOP REDUNDANCY

   The third phase connects the remaining two Emergency Support Services location to City Hall and completes the core loop redundancy pathway. The major connections made during this phase are:

   - Northeast quadrant emergency site (Cameron Rec Centre)
   - Northwest quadrant emergency site (Brentwood Centre)
   - Northern Hastings Corridor back-up routes
   - Core Loop back-up route (part 2)

4. BALANCE OF REMAINING CIVIC FACILITIES

   The fourth phase connects the remaining Civic sites and all remaining Parks, Recreation and Cultural Services (PRCS) sites. The major connections made during this phase are:

   - Additional remaining Civic & PRCS facilities
   - All Burnaby Mountain Facilities

5. SCADA, TRAFFIC AND RESEARCH SITES

   The fifth phase connects the remaining PRCS, Research and Community Police Office sites.

Note: project details will be included in future annual financial plans for final review and discussion by Council.