appendices
appendix a

Charles River Associates

“Enhancing Competition in Canadian Fixed Satellite Services: The Case for a Second Canadian Satellite Provider”
appendix b

PricewaterhouseCoopers

Digital Inclusion: A Consultation
Plan for Bird Satellite Communications Inc.
Digital Inclusion: A Consultation Plan for Bird Satellite Communications Inc.

March 15, 2001
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Purpose of this Report

PricewaterhouseCoopers was commissioned by Bird Satellite Communications Inc. (BSCI) to develop a consultation plan designed to realize the benefits of broadband rapidly and in a manner that best addresses the needs of stakeholders in underserved areas. This report supports the company’s application to Industry Canada for the satellite orbital position at 118.7º W Longitude.

While BSCI will provide the satellite, it is also important to ensure the existence of infrastructure and access “on the ground”. For offices and homes to have broadband access, the initiative needs support and commitment in underserved areas. These stakeholders are intermediaries, connecting public institutions and Canadians with the satellite. [abridged]

The stakeholders are already in place. Through our numerous conversations with representatives from a variety of groups in underserved areas, it is clear that there is commitment on their part to support this endeavor. Using existing networks will not only facilitate the process but will also allow for a more inclusive process.

The consultations are planned to capture the benefits of having partners in place. The stakeholders know their communities and are attuned to the community needs and potential barriers to meeting these needs.

In developing the consultation plan, we have:

- Identified stakeholders in underserved areas and where they are located in Canada;
- Defined the term “underserved” used by Industry Canada in the Call for Applications;
- Profiled demographic and economic realities of underserved areas;
- Profiled public sector institutions in underserved areas;
- Assessed the availability of broadband access to institutions in underserved regions;
- Identified the benefits of high-speed Internet access to these institutions; and
- Identified potential barriers hindering access to broadband Internet services and suggestions of how these barriers can be addressed through the contribution process.

How to Read this Report

The diagram shows how the document has been organized. Particular emphasis has been placed on understanding the range of stakeholders in underserved regions of Canada.

The profiling of Canadians revealed that the population located in underserved regions is typically
older than the rest of Canada. Moreover, this population has both lower levels of education and lower levels of income. While a recent study by Statistics Canada has found the income gap between rural and urban to be shrinking, it may be some time before parity is achieved. These factors combine to limit the number of individuals with computers or Internet access in underserved regions.

Public institutions in underserved regions face barriers related to serving customers in sparsely populated and often large geographic regions. Maps have been provided to show the distribution of various institutions in underserved regions of Canada.

PricewaterhouseCoopers found that the benefits and barriers facing public institutions in underserved regions are relatively consistent. However, the needs facing various stakeholders vary significantly depending on the unique circumstances of each community. It was also found that, in many cases, significant energy has already been put into developing communications and connectivity strategies that capitalize on broadband Internet access.

BSCI emphasized the importance of developing a consultation process that would help them understand the needs of stakeholders in underserved regions and so manage the distribution of the contribution funds in a manner that reflected the needs of underserved regions while benefiting the greatest number of Canadians at the lowest cost.

As the figure above shows, while benefits are likely to stem from the contribution of BSCI to public institutions in underserved regions without any, or with very limited consultation, significantly more benefits could be realized in a shorter period of time if an inclusive and robust consultation process occurred first.

Based on interviews with various thought-leaders and extensive research, PricewaterhouseCoopers has provided an outline of a consultation process designed to meet these objectives.
PART 1: UNDERSTANDING THE STAKEHOLDERS IN UNDERSERVED AREAS

1 Introduction

Canadians are increasingly relying on the Internet to work, communicate and participate in society. In response, the need to access essential infrastructure is growing rapidly. Not only are new communications platforms becoming increasingly important for business, industry, shopping and trade, they are enabling distance learning, telemedicine and telecommuting. As the chart below shows, Canadian Internet users are already seeking information related to, for example, government, medicine and education online.

In the Call for Applications to Develop and Operate Fixed-Satellite Space Stations in the 118.7° W Longitude Orbital Position (Call for Applications), Industry Canada states that the geostationary orbital position “is considered a valuable resource that should be used to provide reliable and affordable telecommunications services to Canadians in all regions of Canada, including the North.” Moreover, Industry Canada states:

“In the past 12 months, have you participated in any of the following activities?”
- Related to trip/vacation
- Gov’t programs/services
- Medical/health-related
- Comparison shopping
- Training/education related
- Searched for work
- Purchased event tickets
- On Canada and Canadians
- On community groups
- From Revenue Canada

“In yes, did you use the Internet or have someone use it for you to do any part of the activity?”
- 66% 4%
- 61% 4%
- 53% 7%
- 77% 8%
- 61% 8%
- 19% 7%
- 78% 7%
- 57% 7%
- 39% 8%

Source: Ralph Heintzman, Citizens Expectations for Electronic Government – A Canadian Perspective; Ekos 2000

In the Call for Applications to Develop and Operate Fixed-Satellite Space Stations in the 118.7° W Longitude Orbital Position (Call for Applications), Industry Canada states that the geostationary orbital position “is considered a valuable resource that should be used to provide reliable and affordable telecommunications services to Canadians in all regions of Canada, including the North.” Moreover, Industry Canada states:

“Ensuring that advanced satellite services and capacity for users and service providers in Canada, and particularly to those in underserved
areas where there is no access to advanced services by other means, will therefore be a very important objective of this licensing process.”

Canadians living in densely populated areas generally have access to the requisite infrastructure. However, in rural, remote and northern regions of the country, wireline and terrestrial wireless technologies are not always able to deliver the services available in urban areas or, if they do, prices are often not comparable.

Consequently, Industry Canada requires successful applicants to “direct a minimum of two percent of the gross adjusted annual revenue resulting from the operation of the satellites, including any revenue resulting from the advanced sale or lease of satellite transponders or capacity, at serving public institutions in these underserved areas.” This contribution requirement fits neatly with the Connecting Canadians initiative, which seeks to ensure that Canada emerges as a leader in building a knowledge-based economy by advancing information and communications technologies.

These initiatives are consistent with the global context wherein there is a concerted effort to bridge the digital divide, that is, ensure everyone has access to the emerging information infrastructure. The anticipated benefits are substantial. In the Okinawa Charter on the Global Information Society (Okinawa), the G8 countries state that the development of information technology and communications infrastructure must:

“[serve] the mutually supportive goals of creating sustainable economic growth, enhancing the public welfare, and fostering social cohesion, and work to fully realise its potential to strengthen democracy, increase transparency and accountability in governance, promote human rights, enhance cultural diversity, and to foster international peace and stability.”

Okinawa continues by stating that “everyone, everywhere should be enabled to participate in and no one should be excluded from the benefits of the global information society.”

1.1 Connectivity is Important for Underserved Regions

The development of advanced communications coupled with increasing globalization is opening new opportunities for all Canadians. Canada has long had one of the most robust communications networks in the world, and is continuing to take the lead as the information age dawns. Among G8 countries, Canada is first in telephone and cable penetration, first in telephone affordability, first in Internet and wireless affordability and first in Internet use.

Increased connectivity promises to bring a range of benefits to Canadian citizens, institutions and business. Short-term benefits include opportunities for life-long learning, more informed citizens, increased capabilities to compete and higher quality Canadian content. Longer-term benefits include a stronger society, healthier economy and more dynamic culture.
In 1997, the government of Canada began stating its intention to equip Canada and Canadians for active participation in the knowledge-based economy. In the 1997 Speech from the Throne, the government committed to making “... the information and knowledge infrastructure accessible to all Canadians by the year 2000.” In the same speech, the government continued by stating that “This [would] provide individuals, schools, libraries, small and large businesses, rural and Aboriginal communities, public institutions, and all levels of government with new opportunities for learning, interacting, transacting business and developing their social and economic potential.”

Despite these commitments, unique challenges exist in providing of advanced communications infrastructure to various stakeholders, in particular, to Canadians in rural, northern or otherwise underserved regions. While these regions are rich in natural resources, opportunity and talent, they are not typically densely populated. Consequently, while their needs for communication, education, health care and government services are the same as those of other Canadians, their ability to have these needs met is sometimes restricted.
The high cost of providing wireline broadband solutions to a dispersed or small number of Canadians makes it uneconomical for many service providers to deploy their technologies in remote or rural areas. Furthermore, when these services are available, the price to the consumer often reflects the higher costs of provision. Ensuring the connectivity of all Canadians involves recognizing the nature of needs in all regions and finding the most appropriate method for addressing these needs.

1.2 Satellite-Based Technologies are Appropriate for Underserved Regions

Satellite-based technologies hold advantages over other solutions for providing broadband connectivity to rural, northern and otherwise underserved regions. A brief assessment of the alternatives demonstrates how satellite broadband solutions can address some of the unique needs of underserved regions. At the moment, four communications technologies are delivering high-speed data services to Canadians: cable modem services, digital subscriber lines (DSL), terrestrial wireless services like multipoint distribution services (MDS) and satellite-based solutions.

Wireline services, like cable modems and DSL, are being rapidly deployed in urban centres across the country. Cable companies have invested heavily in upgrading their plant to enable the delivery of digital services to customers including high-speed access to the Internet. However, the high cost involved in deploying cable networks has limited its distribution to more densely populated regions of the country. Rural and remote areas seldom have the same access to cable services as do their urban counterparts and, when they do, prices can be higher.
Broadband services that use DSL are based on modifications to the telephony infrastructure. Unlike cable infrastructure, the telephone network reaches all Canadians regardless of their location. A variety of last-mile technologies can ensure access, but the vast majority of Canadians are connected to the network via twisted-copper pair wiring. By modifying the equipment in the central office and providing consumers with a unique modem, telephone companies can enable high-speed access to the Internet. However, despite the universality of the network, delivery of the service is limited by the distance between the end-user and the terminating equipment, which is typically located in the central office. As a result, Canadians in underserved areas are not likely to have access to this high-speed solution.

Terrestrial wireless services can also offer broadband connectivity to sparsely populated areas but require line-of-sight between the tower and the receiving antenna. These solutions can be rapidly deployed and are often more economical than wireline alternatives. However, terrestrial wireless solutions are limited by line-of-sight requirements so while they are well-suited to serving suburban or rural communities they are not effective or economical for providing service to Canadians in remote or northern regions.

Many of the restrictions on delivering broadband services imposed by cable modem, DSL and terrestrial wireless solutions are addressed by satellite-based solutions. While it is generally uneconomical to deploy wireline infrastructure to distant communities, satellite solutions are able to deliver signals to broad geographic regions simultaneously with little incremental cost. Furthermore, while terrestrial wireless is limited by line-of-sight restrictions including distance, dense foliage or mountainous terrain, the footprint of a satellite, its area of coverage, can include entire provinces, regions or the entire country.
2 Taking an Inclusive Approach to Underserved Regions

This section develops a working definition of “underserved” within Canada. Because the notion of underserved can take many forms, we have adopted as inclusive approach as possible and assess it in terms of access to technology, geographic location and the ability to use these emerging communications technologies.

The task of “bridging the digital divide”, or of ensuring that all people have access to the technology and the skills that will enable them to participate in the global information economy, has been a subject of debate, analysis and study for some years. Many national papers have been written and many different strategies have been developed. For instance, in the last year, the G8 announced the formation of the Digital Opportunity Task Force, or Dot Force, whose “Charter represents a call to all, in both the public and private sectors to bridge the international information and knowledge divide.” In the United States, Community Access Centres (CACs) have been installed in schools, libraries and other community access points to ensure everyone has some form of access.

Canada has built a variety of programs designed to do more than install computers and connect them to a network. Canadian initiatives like SchoolNet, the Community Access Program (CAP) and Community Learning Networks, have involved a range of stakeholder groups in the design and development of solutions appropriate to each community. Based on this open approach, it is sensible to frame the Canadian approach as one of inclusion rather than of division.

For example, CAP provides individuals affordable access to the Internet and the skills to use it effectively. CAP sites are found in approximately 9,100 public locations like schools, libraries and community centres. About half of the CAP sites are located in rural or underserved communities. The development of a CAP site is based on a partnership model, which can include various government levels, community groups, libraries, schools, volunteers and the business community.

These programs recognize stakeholder needs vary substantially and should be addressed in a flexible and adaptive manner. This inclusive approach recognizes that the digital divide is more than a simple differentiation between those who are connected and those who are not. It recognizes that barriers to access vary among those who are not online and that the provision of access must be framed with an understanding both of these barriers and of the most appropriate means of addressing them.

2.1 Defining “Underserved”

Industry Canada is seeking to ensure that all Canadians have access to advanced and innovative broadband services. In the Call for Applications, Industry Canada states:

“The use of Ka band satellites is emerging as a technology well suited to the delivery of interactive multimedia and broadband Internet access services to Canadians. These satellites will provide a unique opportunity to Canadian satellite carriers and service providers to deliver advanced
and innovative broadband services to Canadian consumers and businesses, including those who may not have access to other forms of connectivity such as cable modems, digital subscriber lines and other wireless services.”

Using this definition as a foundation for understanding the concept of “underserved”, it is possible to see that it operates along two basic dimensions. First, underserved Canadians consumers and businesses are those who are not likely to have access to other broadband infrastructures like cable modems, DSL or terrestrial wireless. Second, these Canadians are not likely to have access because of their geographic location. Specifically, they live in rural, remote or northern regions of the country that are often sparsely populated.

A third dimension is related to this understanding of “underserved”, which involves the capabilities of consumers and institutions to take advantage of these technologies when they are available. This suggests that in addition to providing access to communications infrastructure, there may be a need to provide access to the resources that enable individuals to use these technologies in a manner that is meaningful and appropriate to their particular needs.

2.1.1 Access to Technology

Access to the Internet is becoming critical to participating in the global information infrastructure. As its role in the delivery of government services, health information and educational resources continues to grow, the Internet is becoming an increasingly critical component of the public infrastructure.

In November 2000, PricewaterhouseCoopers released the Consumer Technology Survey, which found that the number of Canadian households with Internet access grew from 43% in 1999 to 48% in 2000. We expect that this percentage has grown and that more than half of Canadian households are now online. In addition to the consumer demand for Internet access, other initiatives are geared towards ensuring that Canada remains the most connected country in the world. For example, the SchoolNet initiative has helped connect every school and library in the country to the Internet.

As basic Internet access becomes prevalent, Industry Canada has initiated a 35-member National Broadband Task Force whose mandate is to advise the Canadian government on how to make high-speed, broadband Internet access service available to all Canadian communities by 2004.

In order to provide the maximum flexibility in the development of connectivity solutions, provision of access should be considered broadly. Specifically, technology infrastructures should include more than transmission facilities like towers, wires and satellites. To ensure the availability of robust solutions, access needs to address the importance of the hardware that connects to the transmission facilities. Access may involve servers, local area networks or desktop computers that enable connection to the transmission facilities. Moreover, consideration must be given to the software and configuration requirements necessary to ensure the entire solution is functional and addresses the needs of its users.
2.1.2 Geographic Location

The high cost of providing service to rural and remote areas has limited many broadband Internet providers from enabling access outside of urban areas. Such economic barriers are common to Canada and other countries. For example, *Advanced Telecommunications in Rural America: The challenge of bringing broadband service to all Americans*, published in April 2000, illustrates how rural areas are lagging behind urban areas in broadband availability. The report also identifies the powerful role satellite-based infrastructure can play in meeting the needs of rural areas.

Deployment in urban and rural areas is not proceeding at a comparable pace. As discussed earlier, cable and DSL providers are concentrating on serving metropolitan urban areas with high population densities. Consequently, the likelihood of receiving broadband Internet access through either technology declines with population density. As a result, it can be expected that residents in rural areas will be the last to receive service.

Nevertheless, it is important to note that rural communities are not being neglected altogether. The size of the service provider and the nature of its service area are significant factors in determining which areas are served. Providers with both rural and non-rural service areas tend to bring broadband to their larger, urban, and more lucrative markets first, whereas rural providers are more likely to serve rural towns before remote, out-of-town areas. The last served tend to be in the sparsely-settled countryside.

It is estimated that cable is available to over 90% of Canadians. Nevertheless, rural areas outside of towns still have less access to cable TV than do their urban counterparts. With the arrival of direct broadcast satellite for the provision of television, it is even less likely that cable systems will extend further into the countryside. Additionally, as with all types of wireline service, the costs of high-speed cable deployment and operation in rural areas are high. Because the subscriber base in rural areas is more dispersed than in more densely populated areas, there is less economic incentive to connect rural areas.

Cable modem and DSL are the two broadband technologies that are being rapidly deployed, permitting a comparison between rural and non-rural areas. The deployment of both technologies declines with population density. As a result, cable modem and DSL services, although increasingly available in rural towns, are more available in larger metropolitan areas.

The map on the following page illustrates the areas of Canada that are underserved.

To identify the underserved regions, Census Sub-Divisions (CSD) as defined by Statistics Canada, were ranked from largest to smallest. Based on the estimate that approximately 75% of Canadians will have access to broadband data services by 2003 (See: *Assessment of the Demand for Satellite Services in C, Ku and Ka Band*, attached) and that the 75% would likely be living in the most densely populated areas, we have indicated where 75% of the Canadian population is located by plotting those regions in blue. The remaining red area serves as a proxy for the underserved regions of the country.

It is important to note that CSDs vary in size. As such, the Wood-Buffalo CSD in Alberta (the large blue area in the northeast), appears as a “served” region although the population of 39,000 is rather dispersed and wireline high-speed services may not be readily available.
Nonetheless, this mapping process, if anything, overstates the regions that are served and understates the underserved regions. As such, it serves to reflect the regions of Canada that are not likely to have ready access to cable modems or DSL services.
Served Vs. Underserved Broadband Access Areas

Underserved Broadband Access:
- Areas representing 25 percent of Canada's total population.

Served Broadband Access:
- Areas representing 75 percent of Canada's total population.
The following table shows the provincial and territorial breakdown of this methodology.

<table>
<thead>
<tr>
<th>Broadband Access Summary For</th>
<th>p</th>
<th>w</th>
<th>c</th>
</tr>
</thead>
<tbody>
<tr>
<td>Served And Underserved Areas</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Population</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Population Underserved</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Population % Underserved</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Population Served</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Population % Served</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Canada</td>
<td>28,603,613</td>
<td>7,160,855</td>
<td>25.03%</td>
</tr>
<tr>
<td>Ontario</td>
<td>10,721,100</td>
<td>1,713,501</td>
<td>15.98%</td>
</tr>
<tr>
<td>Quebec</td>
<td>7,121,602</td>
<td>2,177,134</td>
<td>30.57%</td>
</tr>
<tr>
<td>British Columbia</td>
<td>3,662,943</td>
<td>515,804</td>
<td>14.08%</td>
</tr>
<tr>
<td>Alberta</td>
<td>2,665,480</td>
<td>659,735</td>
<td>24.75%</td>
</tr>
<tr>
<td>Manitoba</td>
<td>1,065,937</td>
<td>358,517</td>
<td>33.63%</td>
</tr>
<tr>
<td>Saskatchewan</td>
<td>951,879</td>
<td>455,235</td>
<td>47.82%</td>
</tr>
<tr>
<td>Nova Scotia</td>
<td>902,013</td>
<td>296,448</td>
<td>32.87%</td>
</tr>
<tr>
<td>New Brunswick</td>
<td>732,544</td>
<td>480,991</td>
<td>65.66%</td>
</tr>
<tr>
<td>Newfoundland</td>
<td>551,099</td>
<td>357,962</td>
<td>64.95%</td>
</tr>
<tr>
<td>Prince Edward Island</td>
<td>134,335</td>
<td>87,279</td>
<td>64.97%</td>
</tr>
<tr>
<td>Northwest Territories</td>
<td>64,138</td>
<td>46,863</td>
<td>73.07%</td>
</tr>
<tr>
<td>Yukon Territory</td>
<td>30,543</td>
<td>11,386</td>
<td>37.28%</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td>28,603,613</td>
<td>7,160,855</td>
<td>21,442,758</td>
</tr>
</tbody>
</table>

Note: Total population does not include Reservations (CSD type R).
Source: Statistics Canada, 1996

2.1.3 Skills Development

In developing robust communications infrastructure solutions, one can neither assume that the skills of stakeholders are already in place nor that only the infrastructure and hardware are wanting. When promoting the sustainability of solutions, consideration also needs to be given to the skill-levels of end-users to. The social infrastructure of technical literacy must be concomitant with the technical infrastructure.

A range of skills is fundamental to ensuring broadband services are meaningful to Canadian inhabitants. These may include publishing, networking, hardware maintenance, server support, graphic design, communication, software familiarity or fundamental computing skills.

Individuals in underserved regions may not have ready access to educational institutions that provide training in these areas. Moreover, small communities have fewer human resources to draw on for these skills. As a result, rural, remote and northern communities face challenges developing the requisite skills for capitalizing on emerging technology opportunities.
3 Profiling Canadians in Underserved Regions

To understand the needs of individuals in underserved regions of Canada, PricewaterhouseCoopers has profiled the demographic characteristics of Canadians in both served and underserved areas and has provided the findings in comparison to one another. This section assesses the characteristics of underserved regions as they related to age, income education and ownership of technology.

3.1 Demographic and Economic Information of Underserved Areas

In order to understand the needs of the population living in underserved areas in terms of broadband services, it is important to compare their demographic make-up and spending patterns with those of the population living in served areas. This section compares elements of demographic and spending patterns between the Canadian population living in underserved Internet broadband access areas and the Canadian population living in Internet broadband served areas. Additional demographic comparisons are included in Appendix A.

The analysis assumes that by 2003, 75% of the Canadian population will reside in an area served by wireline or terrestrial wireless broadband Internet access – these areas are designated as the “Served Population”. The remaining 25% of the population reside in remote or rural regions – these areas are designated as the “Underserved Population”.

The source of the demographic data is Statistics Canada, 1996 Census Data by numeration area. PricewaterhouseCoopers customized the data by grouping separately the census data for the underserved numeration areas and the served numeration areas by province. This customization of the data allows for an accurate analysis of demographic information for the served and underserved regions. Where Statistics Canada data is used, we are adopting their distinctions between rural and urban as opposed to the previously-stated distinctions between served and underserved.

The following table summarizes the demographic differences between populations residing in broadband Internet served regions compared to populations residing in regions that are underserved in terms of broadband Internet regions.

<table>
<thead>
<tr>
<th>Demographic</th>
<th>Broadband Internet Served Region</th>
<th>Broadband Internet Underserved Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>Younger population than underserved region.</td>
<td>Greater percentage of the population over the age of 45 as compared to the served regions.</td>
</tr>
<tr>
<td>Ethnic Diversity</td>
<td>More ethnically diverse than the underserved regions.</td>
<td>Greater percentage of the population speak either official language.</td>
</tr>
<tr>
<td>Employment</td>
<td>Less unemployment than in the underserved region.</td>
<td>Higher unemployment rate than the served region have.</td>
</tr>
<tr>
<td>Education</td>
<td>Higher proportion of the population have postsecondary education.</td>
<td>Less likely to have a post secondary education.</td>
</tr>
<tr>
<td>Income</td>
<td>Higher income</td>
<td>Earn less income</td>
</tr>
</tbody>
</table>
3.2 Population Age

Age is a potent indicator as to who is likely to use Internet-based services. As the following figure illustrates, Internet use is higher among younger portions of the population.

**Internet Usage in Canada by Age Group.**

![Graph showing Internet usage by age group over a series of months from June 1998 to February 2000.]


Source: Ralph Heintzman, Citizens Expectations for Electronic Government – A Canadian Perspective; Ekos, 2000

Overall, the younger population (25 years of age and younger), is the largest user of the Internet – in February 2000, 84% of this population using the Internet. However, Internet is increasing for all age groups, with the exception of the age group 45 to 64, where it is decreasing.

A comparison of age group distribution between served and underserved regions shows that underserved regions represent a greater proportion of people 45 and over as compared to the served region. In every province, with the exception of New Brunswick and Quebec, there is greater percentage of people over the age of 45 in the underserved regions. As the figure above shows, this age group is rapidly adopting the use of the Internet.
3.3 Level of Income

Access to the Internet typically requires purchasing a computer equipped with a modem; it also tends to involve a monthly connection charge for Internet access. Additional costs related to software and hardware peripherals must also be taken into account.

As the following figure illustrates, Internet use is lowest among individuals with lower income. While growth in Internet access continues among all income groups, the likelihood that an individual or household has Internet access seems to increase as income level increases.
The following figure, Total Employment Income for Served and Underserved Regions by Province, illustrates that income for served regions in Canada are consistently higher than underserved regions, suggesting that individuals in underserved regions generally have lower incomes and may be less likely to have Internet access.

Total Employment Income for Served and Underserved Regions by Province
As illustrated in the following figure, *1999 Average Household Expenditure on Internet Services, Urban vs. Rural by Province*, urban households are spending more for Internet services than are rural households. Typically, the price for Internet services in urban centres is less than in rural areas, therefore one can assume that proportionally lower rural households subscribe to Internet services than urban households.

### 3.4 Level of Education

As discussed below, education is a critical factor that determines an individual's likelihood to embrace emerging technologies. Fundamental literacy levels, learning skills and familiarity with new ideas, techniques and tools seem to affect the willingness of people to use computers and the Internet.

As the following figure, *Percentage of the Population Who Have Post Secondary Education* shows, a greater percentage of the population in served regions have a postsecondary education as compared to the population in underserved regions. This data is consistent across all provinces and territories with the exception of the Northwest Territories, suggesting a potential barrier to the adoption of high-speed Internet services in underserved regions as compared to served regions.
3.5 Ownership of Equipment

As the following figure *Computer and Internet Access in Canada, Urban vs. Rural* shows, individuals in rural regions are less likely to own a computer than are individuals in urban communities. Based on previous findings, this is not necessarily unanticipated. With lower income levels, an older population and lower levels of education, many barriers are evident in underserved areas that would limit the ownership of computers and use of the Internet.

<table>
<thead>
<tr>
<th></th>
<th>Urban</th>
<th>Rural</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of Households</td>
<td>% of Total Urban Households</td>
</tr>
<tr>
<td>Home Computer</td>
<td>4,969,000</td>
<td>51.5</td>
</tr>
<tr>
<td>Modem with Computer</td>
<td>3,874,000</td>
<td>40.2</td>
</tr>
<tr>
<td>Internet from Home</td>
<td>3,350,000</td>
<td>34.8</td>
</tr>
</tbody>
</table>
This is consistent with findings related to expenditures on computer equipment and supplies. As the following figure shows, on average urban households spend more or the same on computer equipment and supplies than do rural households. This is consistent across all provinces and territories.

**1999 Average Household Expenditure on Computer Equipment and Supplies, Urban vs. Rural by Province**

### 3.6 Summary

Distinct demographic characteristics define Canadian populations in served regions compared to those in underserved regions. As the analysis above shows, the following differences exist between the populations: age, ethnic diversity, employment rates, education, income, spending on Internet services, and spending on computer equipment and supplies.

Unemployment is higher in underserved regions than in served regions – this is consistent across most provinces and territories. It is an advantage for the unemployed to have access to broadband Internet service, for these service stands to help the unemployed upgrade skills and find employment by plugging them into numerous interactive online training courses offered in various disciplines.
Employment Income is higher than in served regions – this is consistent across all provinces and territories and may indicate that the urban population has more disposable income than does the rural population. Unemployment rates and income levels are likely to have a distinct impact on an individual’s ability to afford the hardware and software needed to access high-speed services.

The population in underserved regions is generally older than is the population in served regions – this is consistent across almost all provinces and territories. Combined with lower education levels in underserved regions, barriers related to fundamental skills and familiarity are likely to limit the participation of individuals in underserved areas.

An understanding of the nature and the needs of underserved regions stand to yield substantial positive benefits. The demographic and socio-economic data presented above represents only one aspect of developing this understanding. In order to further this understanding, one would have to tap into community networks and conduct meaningful consultations geared toward pinpointing the key needs of underserved communities. It will be equally important to build on existing community networks, wherever possible, to conduct meaningful consultation as to the differing needs of underserved communities.
4 Profiling Institutions in Underserved Regions

While Section 3 focuses on building an understanding of the situation of individuals underserved regions, this section profiles the institutions that provide services to these individuals. In particular, it addresses issues related to Education, Health, Government Online and Aboriginal Peoples.

During this assessment, two main distinctions between narrowband and broadband service become evident. The first distinction is the capability of delivering two-way, real-time video conferencing capabilities. As discussed below, this holds potential for educational institutions, for instance, as classes collaborate on projects in different parts of the country or the world. The second distinction is that high-speed enables the transfer of large complex files quickly. The health care sector, for example, needs to move X-rays or other diagnostic images from patients in underserved regions to specialists. As will become evident, virtually all benefits identified in the following analysis stem from these two features of broadband service.

4.1 Education

Through programs like SchoolNet and Computers for Schools, Canada has provided Internet access to every public school and library across the country. With basic connectivity already in place, educational institutions are poised to move toward high-speed access to Canada’s evolving communications infrastructure.

Broadband solutions in the education sector can facilitate the distribution of course materials, interaction between classes across the country, service delivery to remote and northern regions and improved administrative operation of the education system.

The map on the following page illustrates the distribution of educational institutions across Canada.
Call for Applications to Develop and Operate Fixed Satellite Space Stations in the 118.7° Longitude Orbital Position

Served Vs. Underserved Broadband Access
For Educational Institutions

Underserved Broadband Access
- Areas representing 25 percent of Canada's total population.

Served Broadband Access
- Areas representing 75 percent of Canada's total population.

Educational Institutions
- (Point may represent more than one institution.)
The following table provides a breakdown of the number of educational institutions located in both served and underserved regions of Canada. The chart illustrates that for eight of Canada’s thirteen provinces and territories, the majority of educational institutions are located in underserved regions.

### Total Percentage of Educational Institutions Located in Served and Underserved Regions

<table>
<thead>
<tr>
<th>Province</th>
<th>Total % Educational Institutions Underserved</th>
<th>Total % Educational Institutions Served</th>
</tr>
</thead>
<tbody>
<tr>
<td>YK</td>
<td>100%</td>
<td>0%</td>
</tr>
<tr>
<td>NU</td>
<td>100%</td>
<td>0%</td>
</tr>
<tr>
<td>NT</td>
<td>100%</td>
<td>0%</td>
</tr>
<tr>
<td>PE</td>
<td>26%</td>
<td>74%</td>
</tr>
<tr>
<td>NF</td>
<td>15%</td>
<td>85%</td>
</tr>
<tr>
<td>NB</td>
<td>16%</td>
<td>84%</td>
</tr>
<tr>
<td>NS</td>
<td>37%</td>
<td>63%</td>
</tr>
<tr>
<td>SK</td>
<td>25%</td>
<td>75%</td>
</tr>
<tr>
<td>MB</td>
<td>34%</td>
<td>66%</td>
</tr>
<tr>
<td>AB</td>
<td>29%</td>
<td>71%</td>
</tr>
<tr>
<td>BC</td>
<td>44%</td>
<td>56%</td>
</tr>
<tr>
<td>QC</td>
<td>44%</td>
<td>56%</td>
</tr>
<tr>
<td>ON</td>
<td>24%</td>
<td>76%</td>
</tr>
<tr>
<td>CAN</td>
<td>38%</td>
<td>62%</td>
</tr>
</tbody>
</table>

#### 4.1.1 Capitalizing on High-Speed Internet

Canada is a world-leader in the provision of Internet access to educational institutions. One of the most successful programs is SchoolNet, a partnership between the federal government, provincial and territorial governments, the educational community and the private sector, which has connected Canadian schools and libraries to the Internet. The overarching objective of the SchoolNet connectivity goal is to ensure Canada’s future knowledge workers have the skills they need to perform in the knowledge-based economy. SchoolNet achieved its mandate on 30 March 1999, when Canada became the first country in the world to connect all public schools, including First Nations schools, and public libraries to the Internet.

The second phase of SchoolNet involves the extension of Internet access into classrooms and the provision of connectivity to all First Nations communities. On average, phase two has successfully
provided at least one connected computer for every classroom in the country. The third phase, which is still nascent, is to transform basic Internet access into high-speed access for classrooms and libraries.

<table>
<thead>
<tr>
<th>Province/Territory</th>
<th>Tier 1</th>
<th>Tier 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>British Columbia</td>
<td>53</td>
<td>190</td>
</tr>
<tr>
<td>Alberta</td>
<td>36</td>
<td>49</td>
</tr>
<tr>
<td>Saskatchewan</td>
<td>24</td>
<td>85</td>
</tr>
<tr>
<td>Manitoba</td>
<td>30</td>
<td>419</td>
</tr>
<tr>
<td>Ontario</td>
<td>37</td>
<td>1003</td>
</tr>
<tr>
<td>Quebéc</td>
<td>74</td>
<td>464</td>
</tr>
<tr>
<td>Newfoundland</td>
<td>231</td>
<td>0</td>
</tr>
<tr>
<td>New Brunswick</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Nova Scotia</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>P.E.I.</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Yukon</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Northwest Territories</td>
<td>23</td>
<td>24</td>
</tr>
<tr>
<td>Nunavut</td>
<td>42</td>
<td>0</td>
</tr>
<tr>
<td>First Nations Provincial Schools</td>
<td>517</td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>1,068</strong></td>
<td><strong>2,239</strong></td>
</tr>
</tbody>
</table>

In its recent request for information (RFI), *Proposed Two-Way Multimedia Connectivity Service for Remote/Rural Schools and Libraries*, Industry Canada, along with provincial and territorial education and library authorities as well as other connectivity planners are seeking feedback with respect to a two-way multimedia connectivity service for remote and rural schools and libraries across Canada. The RFI estimates that the number of candidate institutions benefiting from these services could total as many as 3,309 schools and 1,100 libraries.

Industry Canada distinguishes between Tier 1 and Tier 2 schools – Tier 1 schools are typically located in remote or isolated communities where satellite service currently the only available option to meet required bandwidth needs; Tier 2 schools are typically located in low-density, high-cost areas and may subscribe to a two-way multimedia service if the pricing is attractive. While all schools could potentially benefit from high-speed services delivered via satellite, the 1,068 Tier 1 schools may realize the greatest benefits from this communications infrastructure.

There are benefits to considering education in a broad sense to include the learning sector in general. This facilitates openness to an inclusive understanding of both the formal and informal training requirements of individuals in underserved regions. This approach is evident in HRDC’s *Community Learning Networks* initiative, which was launched in late 1998, and supports pilot projects that offer access to a
variety of learning resources within and across communities. These projects are either new learning models or enhance existing models that other communities can learn from, adapt on or build on.

While initiatives like SchoolNet and Computers for Schools are largely focused on infrastructure solutions, the Community Learning Networks program emphasizes “soft skills” like technical and social literacy.

4.1.2 Benefits of Advanced Communications

The needs and benefits of stakeholders are in constant flux. Not only do course materials continue to evolve and teaching methods change, so do the delivery needs of students, organizational mechanisms of the education sector and intercommunication requirements of education professionals.

With high-speed Internet access, schools can deliver robust distance learning in the form of two-way video conferencing in addition to including audio and rich graphical content to existing course materials.

However, the benefits of a broadband infrastructure to the learning sector can reach beyond conventional educational institutions. Benefits may extend to individuals interested in parental education, at home learners and disadvantaged youth. These stakeholders many experience barriers accessing requisite content and programs in underserved regions.

Moreover, broadband communications can yield additional benefits, particularly when networked to one another. For example, benefits to the education system may include:

- Staffing and résumé services;
- Timetable and resource planning;
- Library management and related services;
- Access to museums, film archives and curriculum support materials;
- Centralized management of student records;
- On line testing for regional/provincial testing;
- Professional development for all educators; and,
- Shared curriculum /lesson planning.

Broadband Internet services open a range of opportunities for students or “learners” across the country. For example, interactive distributed learning (IDL) techniques, allow a biologist in Thunder Bay to teach genetics to all grade 9 students. IDL allows the education system to leverage the talents of its staff for the benefit of all students, not just local students.

Students could also receive access to project-based learning opportunities with other students learning about similar subjects in different parts of the country. Students could communicate with each other, share research findings, co-author final reports and make presentations all in real-time.
Thinking of education more broadly, learners could access career development tools, job banks and other training content that may not be readily available in their communities. This could provide access to career opportunities otherwise inaccessible to them in their own region. Interactive distance learning will often benefit from local, in-person facilitation or teacher support. This requires new methods of curriculum planning and learning to work together to benefit schools.

4.1.3 Barriers Limiting Educational Initiatives

While satellite-based high-speed services hold the potential to release a range of benefits to educational institutions, barriers still limit the possibilities that are often discussed.

The cost of bringing wireline services to remote areas virtually eliminate DSL or cable modems as an option. Furthermore, the cost of acquiring transponder space on a satellite can also provide barriers to many institutions.

In addition to the costs of communication, there are also costs related to the hardware and software required to connect to the network. This could include satellite dishes, PCs, servers and various types of application software. Moreover, the costs involved in connecting schools to their district operations must be considered in addition to the costs of a single connection.

Appropriate design of both the technology and the content and applications delivered to institutions and students are likely to be fundamental to the success of implementing any solution in the educational sector. The development of media-rich content that maximizes the value of the connection is a complex proposition that ought to take into consideration the unique needs of intended audiences.

In some cases, a substantial barrier may be simply recognizing the value of high-speed services. Institutions that do not recognize the potential benefits may be reluctant to provide the resources necessary for bringing service to the organization. Without the support of key administrators and institutional leaders in the education field it may be difficult to integrate high-speed services in a manner appropriate to the circumstances of the schools or students.

Developing skills necessary for using and adapting high-speed services to the needs of educational institutions are arguably different from those in a narrowband context. The difference appears to be more than throughput; end-user experience can be substantially different on a broadband platform than on a dial-up connection.

4.1.4 Overcoming the Barriers

While educational institutions in Canada already have Internet access, and access is migrating from the school into the classrooms, high-speed connectivity holds the potential to deliver increased benefits related to course materials, professional development and institutional efficiency. Within this context, several possibilities may assist in realizing the benefits of broadband.
Providing technology solutions that meet the infrastructure and throughput requirements of different aspects of the education sector may be necessary to ensure communication between students, schools and boards.

Building on existing initiatives like SchoolNet and Computers for Schools will leverage the resources that have been invested in developing these successful programs. While supporting new programs clearly facilitates the development of innovation within this sector, the energy required to assess and realize new programs may be better applied to addressing the requirements of initiatives already underway.

Working closely with existing social networks can help release the intellectual capital already present in a community. By empowering motivated individuals, it is possible for nascent initiatives that are struggling to develop into potentially valuable contributions to the educational sector. Moreover, it efficiently builds on existing stakeholder groups as opposed to attempting to redefine the range of players.

Remaining open to change is perhaps the most fundamental aspects to releasing the potential of high-speed Internet services. Over the lifespan of the satellite, the needs of stakeholders can be expected to change dramatically. Fifteen years ago, virtually no one anticipated that ubiquitous access to the Internet was a possibility – let alone at a high speed.

Providing training to students, educators and administrators in the education sector may ensure that investments in technology yield maximum results. While schools may ensure basic literacy skills, it may be necessary to contribute to the development of technical literacy among stakeholders.

### 4.2 Enabling Health Care

Access to bandwidth has the potential to be a key enabler to the uptake and equitable access to e-health or telehealth services across Canada. Advanced communications infrastructure has the potential to support the integration of health research, promotion, and delivery while reducing health access barriers, resulting in productivity improvements and lower costs.

The potential of broadband and telehealth services can be illustrated by observing the initiatives underway in Newfoundland, which has been a leader in using technology to improve access and health delivery.

Newfoundland hosts the earliest identifiable telehealth activities in Canada on a production scale involving multiple sites. Beginning as an audio-only teleconference network serving nine communities in Newfoundland and Labrador, Memorial University’s teleconference system (TCS) has grown into a self-sufficient system that is among the most elaborate in North America. Using a combination of terrestrial and satellite systems, it has grown through a series of grants from a variety of funding agencies. Notably, some communities in Newfoundland have benefited from satellite-based delivery of services that would not have otherwise been available.

Examples of the projects undertaken within Newfoundland demonstrate both the breadth and depth of potential for the rest of underserviced areas in Canada:
• **Hibernia Offshore Telemedicine** provides satellite telemedicine to the Hibernia Off-shore Platform. The system allows the medic on the platform to capture still images, video clips, and sound and forward them to the shorebased physician for interpretation. If needed, the patient and on-shore physician can consult via a videoconferencing system at a bandwidth of 128kbps.

• **Labrador Telemedicine** was established in 1997 to link a nurse at a remote Labrador nursing station with a physician at a regional hospital for general teleconsultations. It transmitted only still images and has only experienced limited success. A later phase provided user-friendly and upgraded equipment for both video and audio and is using a store-and-forward system that is now serving many consultations.

• **Distance Health Education** delivered approximately 1,400 hours of distance health education in 1997, almost 4 hours per day, to a wide variety of health professionals. This level of activity has been sustained over a number of years, with health education representing only 20% of the total education programming being delivered. Recent distance health education projects have included:

  • **Diabetes Distance Education**: directed to patients to: (1) increase basic knowledge of diabetes and self-care (2) foster better attitudes towards diabetes and its management (3) promote self-care and improved glycemic control (4) assess the feasibility of using distance techniques to deliver programming to underserviced areas on an ongoing basis. The five-week course was delivered to 85 patients over a period of two years. The program was very successful (with 69% of the patients improved their glycated hemoglobin levels and an additional 21% achieved normal levels) that distance diabetes education is now a routine service.

  • **Emergency Medical Attendants Distance Training Program**: begun as a trial in 1995, the evaluation showed that students taking the course at a distance performed just as well as those who had taken the course face to face.

The success of Newfoundland demonstrates the potential for provision of these services to other underserved regions and for building on these successes to provide new health services that depend on quality two-way, real-time communication.

As the map on the following page illustrates, many health care facilities are located in underserved regions and could benefit from initiatives similar to those underway in Newfoundland.
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4.2.1 E-Health Initiatives are Underway

Canada is on the leading edge of telehealth with expertise that stands to transform telehealth from the pilot-stage to a viable option for mainstream delivery of health care. A snapshot of current initiatives supporting health care at both federal and provincial levels provides a representation of the breadth and depth of current projects. The following examples demonstrate the range of activities underway but represent only a small sample of the total number of initiatives.

- **The Health Infrastructure Support Program** (HISP) was established in March 1998 to support the assessment of new information technologies and application in the health field through pilot projects in areas such as public health, health surveillance, pharmacare, First Nations health, homecare and telehealth. Health Canada received 120 proposals seeking $31M in financial support. The federal government provided $8.7M to partially fund 36 of these submissions.

- Broadband access will benefit Health Canada’s **Electronic Health Records** (EHR) initiative. Its purpose is to strengthen and integrate health services. The concept of EHR entails an online health record for every Canadian. Health professionals will be able to review relevant aspects of a patient’s medical history at any time, from any location through a secure, fully integrated electronic network. Health Canada is currently discussing common policies, data standards, hardware, and software and applications with the provinces/territories.

- **The Canada Health Infrastructure Partnership Program** (CHIPP) is a two-year shared-cost incentive program supporting the implementation of innovative applications of information and communications technologies (ICT) to bring better health services to Canadians. CHIPP supports projects in telehealth (telemedicine and telehomecare) and electronic health records (EHR’s). CHIPP received over 30 proposals from applicants including hospitals, regional health authorities, universities, First Nations and Inuit community associations, provincial and territorial ministries of health, and federal departments and agencies.

- **Canadian Initiatives on Networking Clearing House** (CINCH) is Canada’s contribution to the G7 Global Inventory Project (GIP) aimed at creating an Internet-based multimedia inventory of information on major national and international projects relevant to the promotion and further development of knowledge and understanding of the global information society. CINCH lists 78 ongoing telehealth projects in Canada.

Best estimates to illustrate the extent of videoconferencing currently taking place would suggest that there are approximately 250 video conferencing sites in Canada. Moreover, there are a number of teleradiology sites in operation that are more difficult to identify.¹

Initiatives like those funded by the Office of Health and the Information Highway also represent programs that may be desirable to consider for contribution. For instance, OHIH funded the Keewatinok Lakes Regional Health Authority to establish a satellite communications link between the High Prairie region and hospitals and research centres in Edmonton and Calgary. This is intended to facilitate real-time ultrasound examinations by providing audio, video, image and data capture, storage, management and transmission capabilities.

Based on interviews conducted with subject-matter experts within PricewaterhouseCoopers, analyses of secondary research as well as consultation with the Office of Health and the Information Highway, Analysis and Connectivity Branch of Health Canada, there are a range of needs within the health care system that can be met through satellite-based communications technologies. The needs, benefits, barriers and some solutions are outlined below.

4.2.2 Benefits of Broadband Access to Canada’s Health Care System

Access to advanced communications infrastructure can bring a range of benefits to health care in Canada. For example:

- **Providers** can have access to specialists from whom they can learn, thus pooling their expertise to promote integrated, multidisciplinary care in their communities.
- **Facilities** may no longer be limited to their on-site expertise, with a net impact of improved effectiveness and efficiency of care delivery perhaps reducing the demand on hospital beds.
- **Communities** can have opportunities for increased employment as telehealth may require additional human resources with high-tech skillsets.
- **Patients** may have access to more timely diagnosis and treatment based on state-of-the-art clinical practice guidelines.

E-health has the potential to be a primary agent of change for the health industry in the next decade. The potential for quantitative impact (e.g., cost reduction and avoidance) and for qualitative impact (e.g., reduction of productive years of life lost, improvement in years of self-reliance) is high, although the limits remain unknown. The benefits of broadband connectivity are also expected to affect education, access, delivery of service and cost.

The convergence of health research, promotion and delivery can have a direct impact on the rate of uptake of new knowledge and techniques. Rapid dissemination of knowledge to underserved areas has the potential to affect a range of factors involved in health care.

Central among the benefits to health care, is the capability to educate health care professionals and patients in remote, rural or northern regions. Patients are able to learn more about prevention, while health care professionals can acquire the skills needed to deliver superior care in a cost-effective manner. Educational initiatives in the health care sector also bring the potential for behavioural changes related, for instance, to public health issues, which may place less stress on health care delivery. Educational components to health care also interact with the educational system itself. This may take the form of immunizations of students, monitoring of lice, distribution of public health information and so forth.

Providing health care and health promotion to population groups in underserved areas has faced obstacles due to the great distances, low population density and lack of health care infrastructure. Broadband communications technologies can help overcome geographic and infrastructural barriers that have hindered service delivery in the past and may ultimately enable individuals in underserved areas to receive care that more closely meets their health care requirements.
The removal of access barriers to the delivery of e-health stands to impact the access of individuals in underserved areas to specialists and technologies otherwise unavailable. Furthermore, broadband access has the potential to support the essential nature of a health care interaction – the ability to achieve quality two-way communication in real-time. Because effective health care is typically founded on personal interactions, the effectiveness of the interaction is fundamentally linked to the quality of the communication. A recent study on the effects of telehealth on the Canadian health workforce affirmed findings from literature indicating that telehealth can assist in workforce area such as: 2

- Improved distribution of expertise of health professionals;
- Improved care within the community;
- Improved morale of local providers;
- Expanded access to continuing professional education;
- Increased skills building for local providers;
- Altered and/or enhanced roles for health professionals;
- Newly acquired skill sets and role sharing;
- Positive effects on recruitment and retention of health professionals;
- Multi-disciplinary care provision;
- Increased productivity and proficiency;
- Increased access to clinical support;
- Reduced travel time for providers;
- Increased volume of care provided locally;
- Improved case management; and
- The fostering of innovative approaches.

Given that Canada is currently experiencing a shortage of health care professionals, the potential exists to leverage scarce resources by employing technologies that facilitate increased information exchange over great distances.

The importance of a broadband solution within this context is not negligible. Greater bandwidth can enable the exchange of data that is rich in detail and particularly important to health care. For example, physicians could collaborate with their peers on difficult cases while sharing important information like X-rays or ultrasound images. Moreover, the development of human genomics will present health care providers with complex and precise profiles of individual patients to assist in their diagnosis and treatment. However, these profiles will represent billions of bits of information that can only be transmitted in digital form, making paper-based record keeping obsolete.

To gain access to specialty services, individuals living in underserved areas must pay travel, forfeit loss of income for the duration of travel and suffer the emotional distress of being referred to a centre where they are unknown.

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2 Jennett, P., Person, V., Watson, M., and Watanabe, M., “The Effects of Telehealth on Canadian Health Workforce: Where is the Evidence?” Faculty of Medicine, University of Calgary, First Conference on the Evaluation and Diffusion of Telehealth, Calgary, Alberta, October 1999.
Since, in general, individuals in underserved regions have lower incomes than do individuals in served areas, it is reasonable to assume that many of those individuals cannot afford the cost of access. Access to high-speed connections may lessen financial, time and emotional pressures involved in the necessity of traveling long distances for appropriate care.

Furthermore, operational efficiencies in the overall health care system may also be possible through rapid dissemination of new information, procedures and techniques to professionals in all parts of the country.

4.2.3 Barriers to Broadband

The geographical distances between health care facilities and the patients they serve have hindered access to health care in remote and rural areas. Satellite-based communication helps overcome distance barriers and opens the possibility for health care professionals to deliver service to any part of the country.

In many instances, access to broadband satellite-based services are limited by the availability of essential hardware, like satellite dishes, computer equipment etc. Moreover, the costs associated with the hardware, as well as software operating systems, applications and related peripherals, also pose barriers to some institutions.

Even with the availability of requisite technologies, individuals still need to possess the skills to effectively capitalize on the opportunities and benefits that may be delivered via high-speed services.

Broadband connections enable the sharing of knowledge between individuals within the system, as well as between institutions themselves. However, this will require the institutional wherewithal to recognize the value to the organization and to dedicate the necessary resources.

4.2.4 Overcoming the Barriers

Overcoming the barriers described above will require consultation between a range of stakeholders in order to understand the range of needs within the overall health care system. Within this context there are a variety of roles that can be played to benefit the operation of Canada’s health care network.

Building on existing success stories like the initiatives underway in Newfoundland may prove particularly important. Important programs have been carefully developed and may benefit from the involvement of participants who can provide the capabilities unique to satellite-based technologies. By integrating with existing government programs, it may be possible to build momentum and, consequently, to provide the maximum benefit to individuals and institutions in underserved regions.

Infrastructure, in the form of transponder space or communications hardware, may be required to facilitate communication between stakeholders. In some cases, applications may have been developed that require communication capabilities to bridge geographic barriers. Furthermore, ground-based communication hardware, like satellite dishes, may provide fundamental pieces of the puzzle for existing or emerging programs in the health care sector.
Funding the development of new initiatives or extensions to existing initiatives may spur innovation and empower motivated individuals and institutions to launch services that change the way health care is delivered. New programs could be funded at the community or institutional level.

Supporting pilot projects will help enable innovation in regions that have a great need for new models of health care delivery. It may be desirable to support pilots that test new service delivery concepts or interaction between stakeholders. Because of the high costs involved in supporting fully developed telehealth projects, there may be benefits to focusing on small-scale test beds where support may be more effective overall.

Providing training to various stakeholders is likely to overcome one of the most important barriers – the technical literacy of various stakeholders. Ensuring that individuals and institutions can effectively implement, use and maintain new solutions may prove fundamental to the success of any telehealth application.

4.3 Government Online

The evolution of technology and the Internet is affecting every person and organization in Canada. This change is as true in relation to accessing government services, as it is anywhere else.

As the following chart illustrates, 48% of Canadians have used the Internet to search for information on government programs or services (over a one month period). The percentage of people who rely on the Internet for information or solutions is similar to the percentage of people using the Internet for other purposes.
Similarly, as the chart below shows, a significant number of Canadian Internet users are accessing government programs or services online.

The chart below illustrates that the majority of Canadians feel the Internet is an effective way for governments to communicate with Canadians about the programs and services they offer. The importance of the Internet as a tool for improving government service is highlighted by the fact that two-thirds of Canadians believe the Internet has made it easier to find information about government programs and services.

Source: Ralph Heintzman, Citizens Expectations for Electronic Government – A Canadian Perspective; Ekos 2000

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It is not surprising to learn that individuals believe the government should emphasize delivering services through the Internet above other means, as illustrated by the following chart.

The importance of the government moving quickly to enhance its Internet service delivery is illustrated in the chart to the right. Almost half of Canadians feel the Government is moving too slowly in using new technology to deliver programs and services.

The Treasury Board Secretariat recognizes the implications of the Internet on what citizens will demand of the government. They recognize that “because technology can create instant communication, instant answers are expected. Because technology has the ability to warehouse and organize information, comprehensive, one-stop service has become the acceptable standard. .. [However] this transformation is in its nascent stages.”

The Government has firmly stated its commitment to improving access to Government programs and services through the Internet. According to the 1999 Speech from the Throne, by 2004, Canada will “be known around the world as the government most connected to its citizens with Canadians able to access all government information and service online at the time and place of their choosing.”

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3 Treasury Board of Canada Secretariat, Strategic Directions for Information Management and Information Technology: Enabling 21st Century Service to Canadians.
4 Mel Cappe, Speech at the Assistant Deputy Ministers’ Forum, Ottawa, Ontario, (3 May 2000).
In a speech on the Government’s commitment to “Building a Global, Knowledge-Based Economy/Society for the 21st Century, Doug Hall, Director General of Industry Canada’s Information Highway Applications Branch, highlighted the importance of “leading-edge” Internet strategies in his overview of the basic elements of a knowledge-based economic strategy, as shown on the following page.

The Government has charted an ambitious course for the future.

- **Phase 1**: The Government said it would improve its online presence by providing information about all of its programs and services, provide access to key forms and revamp the Government of Canada portal. This was successfully completed by the end of 2000.
- **Phase 2**: The Government has committed to extending its Web presence from to include interactive services and transactions by the year 2004. These services include secure transactions, electronic filing and electronic payments.
Phase 3: The Federal Government will work with all levels of government to ensure that coverage is cross-jurisdictional and based on client needs. Pilots are being conducted from 2000 to 2004.

In a presentation on “Broadband: Social considerations” to the National Broadband Task Force Social Benefits and Challenges Working Group on January 11, 2001, government was cited as a key application for broadband, citing the following benefits: E-democracy; integrated service delivery; access to high-volume of information anytime, anywhere; improved efficiency, transparency, integration; stronger public interest Internet services; and being a role model for use of broadband. In another presentation to the Group on February 8, 2001, the following objectives and examples were highlighted:

<table>
<thead>
<tr>
<th>Become the government most connected to its citizens, and the citizens most connected to their government, by 2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interaction with government</td>
</tr>
<tr>
<td>• Voting and polling in real time</td>
</tr>
<tr>
<td>• Greater citizen participation: strengthened democracy</td>
</tr>
<tr>
<td>• Improved transparency</td>
</tr>
<tr>
<td>Government information and service delivery</td>
</tr>
<tr>
<td>• Access to high volume of information – anytime, anywhere</td>
</tr>
<tr>
<td>• Role model for use of broadband services</td>
</tr>
<tr>
<td>• Stronger public interest Internet services</td>
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</table>

In a speech on “Building a Global, Knowledge-Based Economy/Society for the 21st Century, Hull identified three economic challenges and two more specific GOL challenges. The Government has specifically noted the critical challenge and importance of ensuring access to rural and low-income people in the broader objective of achieving a knowledge-based economy.

<table>
<thead>
<tr>
<th>The Access Challenge:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Rural communities could be hollowed out in the New Networked Economy, increasing Digital Divide between urban and rural and rich and poor</td>
</tr>
<tr>
<td>• All Canadians (including those with special needs) need a single, simple, customizable tool to access Canadian content</td>
</tr>
<tr>
<td>• Canada’s national network of public access sites needs to be sustained</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>The GOL Challenge:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Low level of public awareness of government on-line services;</td>
</tr>
<tr>
<td>• Need to increase awareness at the community level</td>
</tr>
</tbody>
</table>

Source: Doug Hall, Information Highway Applications Branch, “Building a Global, Knowledge-Based Economy/Society for the 21st Century”.
Several initiatives have been launched to deal specifically with the needs of underserved rural communities.

### Some Provincial Initiatives

- **NWT**
  - Contracted in 1997 for a network to deliver government services electronically by satellite

- **Yukon**
  - Announced “Connect Yukon” in 1999: an $18 million, 2 year public-private partnership to deliver DSL to 85% of homes providing competitive Internet access
  - NorthwesTel is private partner (25% investment)

- **Alberta**
  - SUPERNET: a high speed open network linking schools, health facilities, and government offices in 420 communities
  - Total investment of $300 million of which $193 million is from the Government of Alberta

- **Saskatchewan**
  - Has planned CommunityNet: a high-speed network service public institutions in 250 communities


Among the most successful government programs is the Community Access Program (CAP), that promises “universal connectivity for Canadians by 2001 through 10,000 sites”\(^5\). The following provides highlights of the program, and the following chart illustrates the location of program sites.

- **Goal:** Establish 10,000 Community Access Points in rural, remote, and urban communities across Canada by March 31, 2001
- **Status:** 9100 Total sites
- **Strategy:**
  - Joint funding with provincial and territorial governments
  - Through Community-based organization with in-kind matching
  - Engage local volunteers and youth outreach
  - Joint management, equal cost sharing, equal profile with communities
  - Library and School sites (66%) community centres (25%)
  - Involvement of Business from local ISPs to nation wide-firms
  - Coordinate with federal departments: TBS, HRDC & AgCan, DIAND

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\(^5\) Doug Hull, Director General, Information Highway Applications Branch, “Building a Global, Knowledge-Based Economy/Society for the 21st Century”.
• Rural Cap Usage:
  • 62% of users visit CAP sites 4 or more times per month
  • 60% of users are women
  • 50% of users are ages between 30 and 49
  • 46% of users already use computers
  • 59% of users are employed

4.3.1 What is the potential of high speed?

“The Government of Canada is committed to providing services – at the right time and place – by enhancing and expanding the range of government services available electronically, and by making those services more integrated and accessible.”

6 Treasury Board Secretariat, Strategic Directions for Information Management

6 As Prime Minister Jean Chrétien said at the launch of the new Canada Site, “It is about putting the Internet in the hands of citizens. It is about putting the best information and services on-line. Above all, it is about enhancing the quality of life and prosperity of all Canadians.”

7 Prime Minister of Canada Newsroom Website, “Prime Minister Launches New ‘Canada Site.’”

Ensuring that broadband is available to all Canadians will be key to fully meeting the objective of equal access for all Canadians to government programs and services on-line. Specifically:
Many services rely on high speed to ensure equanimity among users. For example, rural Canadians cannot effectively participate in auctions without high speed service.

The integration of services – a key objective of the Government – requires massive transfers of data in real time. This can only be achieved with broadband services.

Involving citizens in the design and development of policies and programs – another key objective of this government – requires two-way communications that are simply not possible with dial-up access.

“To enhance service delivery, a framework is needed to enable interoperability among government programs, both for information and for transactions.” 8 This framework must be based on an assumption of equal access from anywhere in Canada. The only way to guarantee access from any point in Canada is via satellite.

4.4 Aboriginal Groups

4.4.1 Solutions Reflecting the Needs of Aboriginal Peoples

The infrastructure needs of rural and remote Aboriginal communities are not always the same as the needs of other underserved communities. Aboriginal communities have their own institutions and foster community development and wellness differently than do other communities. Federal, provincial and territorial programs that allow for “autonomous and creative Aboriginal approaches to economic and community development” are the most successful in “supporting Aboriginal efforts to improve social and health conditions.” 9 As a result, it is not always appropriate to address the needs of Aboriginal communities in the same manner as other communities in cross-Canada ventures. Instead, it is often more productive to tailor ventures to the specific needs of Aboriginal communities.

The map on the following page illustrates the location of reservations across Canada.

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8 Treasury Board Secretariat, Strategic Directions for Information Management.
Call for Applications to Develop and Operate Fixed Satellite Space Stations in the 118.7º Longitude Orbital Position
Initiatives like *Aboriginal Business Canada* is a geared in part to helping Aboriginal business owners use technology to improve their “bottom line.” It also seeks to increase the number of Aboriginal knowledge-based businesses. The program recognizes that the integration of existing and emerging technologies into Aboriginal companies is essential to facilitate increased productivity and competitiveness. Nonetheless, targeted individuals do not always have access to the infrastructure needed to support new technologies.

*First Nations SchoolNet*, operated in partnership with the federal, provincial and territorial governments and with the private sector, will connect all First Nations communities to the Internet (even those without schools) by 31 March 2001. It is anticipated that connectivity will enable these communities to use online services to support social, economic and cultural development. Yet as mentioned above, an Internet connection does not guarantee reliable access to the array of educational services now available.

Similar initiatives are underway in the health sector. The *First Nation’s Health Information System* uses multiple distribution technologies to connect in excess of 90% of Aboriginal bands in Canada. Distinct from other such initiatives, the service has been designed to enable Aboriginal groups to communicate directly with each other instead of mediating interaction through Health Canada.

Additional opportunities exist to support health-oriented projects geared towards the unique needs of Aboriginal peoples. According to most indicators, health issues are a pressing priority for First Nations and Inuit communities. Specifically, socio-economic conditions and education levels, negatively afflict the Aboriginal population. As a result, the quality of health for Aboriginal peoples is below that of average Canadians.

For example, while the rate of ischemic heart disease is falling across Canada, hospitalization rates for ischemic heart disease in Aboriginal people have doubled in the past two decades. Moreover, a major contributing risk factor for heat disease is diabetes, which is three times more common among Native people than among the Canadian population at large.\(^{10}\)

While the most effective treatment for these health issues is arguably prevention through education, it is nevertheless necessary to treat these conditions. As treatment becomes increasingly technologically-based, a priority for Aboriginal peoples is accessing “new and emerging medical technology and practices.”\(^{11}\) However, emerging technology can be expensive to acquire and, without communications infrastructure, cannot always live up to its potential. The *First Nations Health Priorities, 2001-2002* notes that the combination of health inequities and gaps in health and social service delivery to First Nations are making the improvement of community infrastructure in itself a priority.\(^{12}\)

Through advanced communications infrastructure, remote and rural communities, including First Nations and Inuit communities, could have improved access both to health services and health-related education and information for health providers and consumers.\(^{13}\)

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\(^{13}\) [www.hd-sc.gc.ca/ohih-bsi/whatfund/hisp/comp_award/telehealth-infrastructure_e.html](http://www.hd-sc.gc.ca/ohih-bsi/whatfund/hisp/comp_award/telehealth-infrastructure_e.html)
4.4.2 Barriers to Broadband

The Final Report of the Advisory Council on Health Infrastructure recognizes that most remote and rural Aboriginal and non-Aboriginal communities lack the communications infrastructure to support reliable high-speed transmission or reception of data, images or text. Few such communities can support reliable transmission at 28.8K, generally considered the minimum for Web browsing.

Technical problems are common among many of the older cable, analog satellite or microwave links used to bring in information to these communities. Most remote communities lack toll-free access to an Internet Service Provider, which makes Internet use too expensive. The Assembly of First Nations (AFN) believes that “the current communications infrastructure in rural and remote Aboriginal communities… [needs to be] assessed as a matter of urgency.”

In addition to barriers resulting from inability to access infrastructure and the costs of connectivity, Native Canadians may also require capacity building and training to fully realize the capabilities of these solutions. That is, technical literacy is required to ensure ones’ active participation in a knowledge-based society and that connectivity is transformed into tangible positive impacts in underserved regions.

4.4.3 Overcoming the Barriers

There appears to be an important link between health and education in aboriginal communities. In the context of building and sustaining First Nations-controlled health care systems, practitioners need training in information technology. At the moment, many Aboriginal health care workers lack to training to use computers and other technology effectively. According to the Assembly of First Nations, there is an “unfamiliarity with and fear of new information technology”, which “is an effective barrier that impedes them from attaining basic computer skills that would enhance understanding and comfort levels with technology.” Not only is training expensive, it can also be difficult for individuals to take the time to attend training sessions. Contributions to such needs stand to make communication infrastructure more available and to create opportunities for Aboriginal communities to design and deliver programs that can be widely delivered and that meet the unique needs of Aboriginal communities.

These opportunities are generally linked to building a health info-structure, which in itself is a Canadian priority. Yet, while the Assembly of First Nations has stated that “control over databases, research and the analytical process of linking health information to policies and program outcomes is essential for Aboriginal communities,” it realizes that without the technological infrastructure to support aspects of the health info-structure it may be difficult for Aboriginal communities to participate as equals in the development of the info-structure. Since building this info-structure is an ongoing and long-term commitment, an increasing number of opportunities to support it are likely to emerge in the future. Contributions to the development of the health info-structure may serve to improve both the reach and effectiveness of this initiative.

A range of programs designed to reflect the needs of Aboriginal peoples for content unique to their cultural and social distinction may also be desirable. For example, content could focus on meeting the

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14 “An Aboriginal Health Infrastructure – Critical Issues and Initiatives,”
15 “An Aboriginal Health Infrastructure – Critical Issues and Initiatives,”
educational objectives of Aboriginal peoples, e.g. conventional education curriculums and public health programs. Another example is

4.4.3.1 Consultation

A range of stakeholder groups represents the First Peoples in Canada. The development of an effective consultation process will benefit from interaction with leaders, councils, bands, chiefs or elders from various regions and Aboriginal groups.

It is worth noting that extensive contact between the Department of Indian Affairs and Northern Development (DIAND) and Aboriginal peoples has resulted in a regionally-based consultation process that emphasizes flexibility. DIAND advocates guiding principals based on openness, honesty, transparency of process as well as on trust and respect for different values and perspectives that are brought to the consultation arena.

<table>
<thead>
<tr>
<th>Region</th>
<th>Aboriginal Representation to DIAND</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atlantic region</td>
<td>Atlantic Policy Congress is the first single institution representing all First Nations in the region (31 in total). The Mi'kMaq Educational Authority discuss and negotiate issues specific to Nova Scotia. The region does not use a standard consultation process. Instead, processes relate to the issue, the actors involved, and the formality of the exercise. Nevertheless, common elements exist between process.</td>
</tr>
<tr>
<td>Quebéc region</td>
<td>The province’s Chiefs are called to discuss important issues.</td>
</tr>
<tr>
<td>Ontario region</td>
<td>The main forum for consultation is the Indian Commission of Ontario (ICO). The ICO is a tripartite council that is a minister/provincial minister/grand chief level consultation forum. The Council meets 3 times a year and all three parties must agree before an issue is raised for discussion</td>
</tr>
<tr>
<td>Manitoba region</td>
<td>The Assembly of Manitoba Chiefs.</td>
</tr>
<tr>
<td>Saskatchewan region</td>
<td>Federation of Saskatchewan Indian Nations.</td>
</tr>
<tr>
<td>Alberta region</td>
<td>The Chiefs of Alberta.</td>
</tr>
<tr>
<td>BC region</td>
<td>The region deals primarily with Tribal Councils and individual First Nations communities, which is a regional Consultation Framework.</td>
</tr>
<tr>
<td>Yukon region</td>
<td>The Council of Yukon First Nations.</td>
</tr>
<tr>
<td>Northwest Territories region</td>
<td>Consultation occurs under both the Indian Affairs Program and the Northern Affairs Program.</td>
</tr>
</tbody>
</table>

A consultation process based on the principles espoused by DIAND and built on the representative groups that have already been developed would enable a process capable of engaging the broader Aboriginal community in a timely and effective manner.
5 Addressing the Needs of Stakeholders in Underserved Regions of Canada

Themes related to the benefits of high-speed connectivity and advanced communications infrastructure, barriers hindering access and how these barriers may be overcome run through the sections above.

While preparing this report, PricewaterhouseCoopers consulted the Public Interest Advocacy Centre (PIAC) to obtain their views on understanding the needs of stakeholders in underserved regions and for insight into the development of an appropriate consultation process. PIAC ideas permeate this document. Moreover, PIAC is also willing to work with our client to further develop a robust consultation process.

PricewaterhouseCoopers also consulted with Michael Williamson, Manager of Program Development for the Office of Learning Technologies at HRDC. Mr. Williamson is also willing to participate in the ongoing development of the consultation process.

5.1 Benefits

A range of benefits has been identified as potentially resulting from the availability of satellite-delivered high-speed Internet access. PricewaterhouseCoopers outlines below some of the major benefits that appeared consistently in secondary research, preliminary stakeholder interviews and as a result of internal analysis. As stated above, benefits yielded from broadband access generally fall into two general categories: the ability to facilitate two-way, real-time video conferencing and the ability to move large, complex files rapidly. As the discussion below shows, however, access to broadband stands to yield other benefits as well.

5.1.1 Benefits From Improved Two-Way Communication

Capacity Building: Training and skills development opportunities help increase the number of individuals able to take advantage of new services and assist in equipping Canada’s workforce for the emerging knowledge-based economy.

Sharing Knowledge: Increased interconnectivity enables the sharing of information, knowledge and experience. This may occur between individuals, communities, institutions, or any combination thereof.

Real-Time Exchange of Media-Rich Content: The sharing of, for example, medical images for the purposes of diagnosis or collaboration between students in various schools, can open new possibilities for individuals in underserved regions.

Overcome Regional Disparities: By providing opportunities for all individuals in all regions of Canada to tap into the same information, to share the same knowledge and to build on the experiences of one another, social and economic disparities may also diminish as access to education, employment and health opportunities improve.
5.1.1.2 **Benefits From Rapid Transfers Of Large Complex Files**

**Effective Distribution of Content and Services:** Satellite-based services are able to provide connectivity to all individuals and institutions regardless of their location in Canada. Everyone has the potential to contribute and receive the benefits of shared content and services.

**Integration of Services:** Where institutional programs may have previously existed in functional silos, advanced communications services may enable stakeholders to integrate services and to provide higher levels of responsiveness to their customers.

**Foster Innovation:** As demonstrated in programs like the *Community Access Program* and *Community Learning Networks*, innovative solutions and approaches, even to identical challenges, can be identified and enabled.

**Respond with Flexibility:** Individuals in underserved regions have different needs. Moreover, even the needs of communities facing the same problems are not always the same. Communities, and the institutions serving them, require the flexibility offered by advanced communications infrastructure to adapt and respond appropriately to the different, and changing, needs of their stakeholders.

5.1.1.3 **Benefits To The Overall Communications System**

**Internet Access:** Connectivity enables all other benefits identified below and holds the potential to deliver a host of opportunities to virtually all stakeholders including individuals, institutional employees, administrators and the communities they occupy. High-speed access provides more than just increased throughput. Media-rich experiences enabled by broadband can provide users with services that are different from narrowband experiences. The level and impact of service can alter significantly based on the form that content takes.

**Improvement of Canada’s Communications Infrastructure:** While most of the benefits identified in this list are targeted to specific institutions, broad-based benefits to the national infrastructure also hold the potential for improved sharing of knowledge, opportunities and experience.

**Employment Opportunities:** As communities undergo economic adjustment, content and services delivered over advanced communications networks may increase the range of occupational opportunities in remote and rural regions.

**Increased Involvement by All Individuals in Canada:** Increase connectivity may eliminate barriers that traditionally hindered the involvement of individuals in, for example, community participation, skills development, and politics at all levels.

The map on the following page illustrates the distribution of health care facilities, schools and reservations that could capitalize on the range of benefits identified above.
Call for Applications to Develop and Operate Fixed Satellite Space Stations in the 118.7° Longitude Orbital Position
5.2 Barriers

As demonstrated in the previous section, the potential benefits of high-speed services stand to affect a broad range of stakeholders and stand to have a positive impact on many aspects of public institutions and their customers. Current barriers, while relatively few in number compared to the benefits, are nonetheless substantial.

- **Access to Infrastructure:** Many stakeholder institutions do not have access to the communications infrastructure required to facilitate high-speed access to the Internet.
- **Cost of Infrastructure:** Related to access is the inevitable aspect of cost. Many institutions simply lack the budget necessary for obtaining access to appropriate technologies.
- **Access to Talent:** Because of the often immense distances involved, remote or underserved regions do not always have a ready pool of experts or technically-skilled individuals to help them develop their strategies and implement or maintain their initiatives.
- **Requisite Skills:** Basic literacy skills and familiarity with computers are often lacking in underserved communities. Moreover, social and technical literacy skills must be developed in order to create community-based tools that meet the needs of remote or rural regions.
- **Usability:** Not all applications are accessible to individuals as a result of the design and configuration of the application. Services need to respect the skills of the users if they are to be used at all.
- **Institutional Wherewithal:** Despite the rapid integration of the Internet into the lives of the majority of Canadians, not all people or institutions have recognized the value it can bring to their organizations.
- **Sustainability:** The launch of an innovative community-based service does not ensure its longevity. As equipment ages, skills change and needs evolve, programs must also evolve.

5.3 Overcoming Barriers

Throughout this document, PricewaterhouseCoopers identifies how to address barriers related to various public institutions. Preliminary consultations, research and analysis, have proven that substantial consultation has already taken place across Canada as it relates to the development and implementation of advanced communications strategies. As such, consensus is beginning to form around the importance of these initiatives as well as around the importance of flexibility to address the unique needs of different communities. An overall approach that builds on this consensus and facilitates the emerging national agenda may bring maximum benefit to the connectivity strategy and so to stakeholders in underserved regions of Canada. The following section identifies factors to consider when developing an appropriate consultation process.
5.3.1.1 Openness

While there does not appear to be a “one-size-fits-all” solution for providing solutions to underserved communities, it is nevertheless important to conduct a consultation process that includes opportunities for communities and institutions to express their changing requirements and that recognizes the different needs of similar communities facing similar challenges.

5.3.1.2 Sustainability

In order to maximize the value of the two percent contribution, it is advisable to seek opportunities to ensure the sustainability of programs and access. This may involve making contributions to initiatives that are facing significant barriers or working with other programs to facilitate long-term success.

5.3.1.3 Avoid Duplication

Duplicated initiatives stand to introduce unnecessary risk to both existing programs and emerging initiatives. By building on existing programs, contributions can capitalize on consultations already conducted with stakeholders and may also extend the range of benefits stemming from a particular program.

5.3.1.4 Build on Existing Stakeholder Groups

Many active stakeholder groups already seem to be active in the institutions we have reviewed in this document. By building on existing local networks or working, for example, with the Office of Learning Technologies to tap into their experience, the consultation process may be able to occur more rapidly but with the same positive impact.

5.3.1.5 Develop Infrastructure

Not only are infrastructural components fundamental to the facilitation of connectivity, but so too is the upkeep and maintenance of this technology. Many hardware components, like computers, become rapidly outdated and require periodic upgrading to ensure they can support the full range of applications and services that will benefit underserved communities.

5.3.1.6 Provide Funding

Initiatives like SchoolNet and the Community Access Program illustrate how relatively small amounts of money can release the potential of a motivated and innovative community. By providing funding to appropriate programs, public institutions may be able to meet critical needs of their stakeholders.
5.3.1.7 Facilitate Capacity Building

Technology is valuable to the extent that stakeholders are able to capitalize on its capabilities. By enabling training and skills development, contributions to public institutions may yield greater results to a larger group of individuals in a wider range of communities. Secondary research and stakeholder interviews both revealed that training is a fundamental success factor in any technology-based initiative.

5.3.1.8 Remain Open to Unforeseen Needs

During both the original consultation process and in ongoing interaction with public institutions and their stakeholders, it may be appropriate to suspend any presumption about their needs and to provide an open, inclusive environment in which they can describe their needs. This will assist in addressing unforeseen needs both today and over the lifespan of the satellite.

5.3.1.9 Respect Regional Differences

Based on interviews conducted by PricewaterhouseCoopers, it appears that attempting to address similar problems in different regions can require different solutions. For instance, during periods of economic adjustment, communities may pursue very different strategies for reskilling.

5.3.1.10 Adopt an Inclusive Approach

Our research consistently found that an inclusive approach is likely to yield the greatest results to institutions in underserved regions. This approach allows for the representation of a cross-section of stakeholders and ideas and also provides an appropriate environment for evaluating these ideas.

5.3.1.11 Keep it Simple

Overly complex communications strategies may provide another barrier instead of removing one. This could also apply to the application and approval processes that are established as part of the contribution process. It may be advisable to ensure sufficient support is available to stakeholders who are seeking funds or in-kind contributions.
PART 2: CONSULTING WITH STAKEHOLDERS IN UNDERSERVED AREAS

6 Developing an Inclusive Consultation Process

As emphasized by a representative from Health Canada among others, the needs of individuals in underserved regions are not yet entirely understood. Other stakeholders stressed the importance of building on existing initiatives and working with a range of stakeholder organizations simultaneously. The delivery of services to underserved regions in an effective manner appears to be contingent on coordinating with a cross-section of institutions whose interests and activities overlap.

To effectively provide broadband access to underserved areas, it may be crucial to develop a transparent, accountable process for allocating funds to those who apply. Understanding the needs of communities, the nature of the stakeholders and ensuring buy-in for this process will be central to the success of this initiative. The overall goal of the consultation process is to agree on the representation of a series of Stakeholder Councils, the processes these councils should adhere to and the relationship between these councils and BSCI.

The consultation process described below allows BSCI to:

- Map the needs of public institutions and citizens in underserved areas;
- Understand the access issues of communities in Canada’s underserved areas;
- Know who the stakeholders are in education, health and Aboriginal groups;
- Initiate a two-way dialogue with stakeholders and citizens in the targeted areas;
- Provide a transparent, inclusive process for contributing funds to applicants; and
- Show its continued commitment to “digital inclusion” in Canada.

Rural and underserved communities are dynamic. The delivery of services to underserved regions in an effective manner appears to be contingent on coordinating with a cross-section of institutions whose interests and activities overlap. The most efficient and successful approach will therefore be to:

- Meet with stakeholders, and listen to their comments, concerns, interests and needs;
- Build on existing initiatives (e.g., SchoolNet, LibraryNet and advisory board working groups); and
- Work with a range of stakeholder organizations simultaneously.

This consultation process has been specifically tailored to the address the issues outlined above in addition to PricewaterhouseCoopers’ experience in conducting national consultations. The elements are as follows:
• Generate Awareness;
• Solicit Input for the Establishment of a Public Review Process; and
• Solicit, Review and Award Projects.

The remainder of this section describes the details of an approach suitable to the consultation process. The figure below depicts the consultation process.

6.1 Generate Awareness

The first step of the consultation process involves Bird Satellite Communications Inc. communicating with stakeholders in underserved areas throughout Canada and raising awareness of the funding available through the contribution process. Possible communication vehicles include:

• Ads (full or half page) in national and regional papers;
• Ads and additional coverage in targeted journals including publications for Unions or other associations including Educational Journal, Medical Publications, etc.;
• Television and radio advertising;
• Programming-related content on public radio and television;
• Targeted discussions with major associations;
• A Web site; and
• Public-speaking engagements (including local champions).

This communication campaign will seek to improve public awareness of the program by reaching as many Canadians (individuals, communities and public institutions) as possible, particularly in underserved regions. It will also lay the groundwork for two-way communication with stakeholders and will build momentum toward milestones like the creation of Stakeholder Councils, acceptance of applications for funding and service launch. The awareness campaign will also highlight the range of opportunities for Canadians and public institutions that may wish to seek funding for their initiatives to stimulate public innovation and creativity to maximize the impact of potential projects.

### 6.2 Solicit Input for the Establishment of a Public Review Process

The awareness campaign will lay the groundwork for those who wish to provide their input into the development of the Consultation Process. BSCI can facilitate a range of communications channels for stakeholders to deliver their ideas. Channels may include Regional Focus Groups, a survey of Canadians in underserved areas, and a chat-enabled Web site.

This stage of the consultation process intends to provide Canadians in underserved areas an opportunity to address all aspects of the Contribution Process, including the composition of Stakeholder Councils, acceptance criteria for proposals, guiding principals, etc.

The consultation process outlined in the remainder of this section is applicable to a wide range of public institutions including health, education and Aboriginal stakeholder groups. We have outlined some of the challenges that may be met as well as possible solutions to these challenges.

Other challenges that need to be considered when undertaking a consultation process with numerous and varied stakeholder groups also include:

• Dealing with conflicting agendas;
• Restricted resource requirements;
• Identifying participants and representatives;
• Establishing trust;
• Building consensus;
• Ensuring linkage to decision-making;
• Dealing with new participants (e.g., replacements);
• Balancing bureaucratic and community responses;
6.2.1 Planning and Coordination

The primary goal of this initial step will be to confirm objectives, refine the workplan and timeframes, and clearly detail communication mechanisms, roles and responsibilities. We will discuss the specifics of progress reporting, address organizational protocol requirements, and develop a common approach to resolve any issues that might arise during the consultation.

6.2.2 Develop Consultation Plan

A detailed process for the consultation that meets all timing and logistics needs will be designed. The design of such a plan is largely influenced by the selected consultation process.

The consultation plan will include:

- An introduction;
- A description of the key consultation phases;
- A description of proposed session venues;
- A description of the anticipated level of hospitality (e.g. coffee breaks, meals);
- A description of the audio-visual, translation, interpretation, security, protocol and transportation requirements for each session;
- A definition of processes for the registration of participants; and
- An updated timeframe for the consultation and scheduling of the sessions.

The report will also include a description of the roles and responsibilities assigned to various team members, suppliers, contractors, etc.

6.2.3 Stakeholder Mapping

This step involves building on current stakeholder groups to ensure that all relevant parties are included. One approach is to facilitate stakeholder-mapping sessions to identify any gaps. The mapping will be
done through a series of telephone interviews with the stakeholders identified during the proposal stage. Appendix B provides a preliminary list of potential stakeholder groups.

These interviews would also identify concerns stakeholders might have and their position on those concerns. This information will become important when tailoring the approach to regional focus groups. After these conversations, a stakeholder database will be prepared, which will be used to invite representatives to the regional focus groups.

### 6.2.4 Develop Draft Focus Group and Facilitator Guide

In preparation for the focus group discussions, it is advisable to create and refine potential questions into a manageable and achievable agenda. the structuring of an agenda for a consultation assignment generally begins with the following major questions:

- What are the expected outcomes from the consultation?
- What are the risks related to the given topic area’s stakeholders? How can these be best addressed?
- What is the most appropriate approach given these expected outcomes?
- What needs to be discussed during the consultation?
- What framework should be established for the consultation report?

Although the agenda for the focus groups is expected to be generic in content across all sessions in each region, provisions can be made for changes in the timing of agenda items to accommodate travel limitations, conflicting events, participant availability, etc. The agenda will also include details about relevant speakers or topic discussion leaders, meals, breaks and any other details that should be noted.

The agenda for the discussions will likely include the following broad aspects:

- Welcome and introductions;
- Plenary presentation outlining the major issues of discussion and background;
- Open discussion and facilitated break-out sessions;
- Additional presentations as appropriate throughout the session; and
- Concluding remarks.

In addition to the agenda, it is advisable to create a flexible facilitation guide that will identify the major questions, sub-questions and probes that can be used throughout the discussion and break-out sessions. The questions in this guide will be set out according to the agenda topics and will be used solely by the facilitation team. Both the agenda and facilitation guide will be developed according to a logical path of progression through the issues and questions being consulted on. This guide will be updated, as required, throughout consultation progresses, without losing the degree of flexibility.
6.2.5 Regional Focus Groups

Focus groups are an excellent way to solicit input, feedback and general perceptions from individuals regarding existing or planned programs, services and initiatives. They also provide an ideal forum for identifying challenges, needs and concerns of sub-groups the population. The group setting enables discussion among participants and comparison of experiences and perceptions. These focus groups will provide an ideal setting for identifying unanticipated issues, views or concerns, because questions will be directed to individuals and institutions that are interested in the opportunities presented by high-speed access in rural areas.

Focus groups involve quite intense discussions around a particular topic area. A group of ten to fifteen participants is led through a structured series of probing questions; members are asked to share views and personal experiences. Larger groups are more difficult to facilitate, and present challenges soliciting input and participation by all participants. Focus groups can be somewhat intimidating for shy or reserved participants. This can be overcome to a certain degree by the skills of an effective facilitator. However, the larger the group the longer it takes to develop a sense of trust with the facilitator and among participants around the table. Large groups often result in mini-conversations among participants, particularly in situations in small communities where focus group participants are much more likely to know each other. For these reasons, we would limit the number of participants in each group to fifteen.

A useful approach to focus groups is to limit the discussion to between two to four hours. It is recommended that focus groups take place in the morning or in the afternoon and do not go over lunch to prevent the loss of momentum of the discussion.

It is often valuable to invite local champions and subject matter experts to focus groups to demonstrate the importance and credibility of the initiative. Depending on the availability of such individuals, we will attempt to include as many such individuals as possible.

6.2.6 Consultation Survey of Canadians in Underserved Areas

In order to acquire widespread input from Canadians in underserved areas and from stakeholders not involved in the in-person consultation events, we propose developing a Consultation Survey. The Consultation Survey may be organized as follows:

- A tool that compliments and is consistent with the focus group discussions while respecting the impact of design on data capture;
• A vehicle by which anyone can have input into the BSCI consultation process, whether through the Internet, through the mail, or via facsimile; and
• Designed to include a relatively short series of relevant questions.

The steps in the process of gathering input based on the Survey are as follows:

• **Survey Questionnaire Development.** We anticipate that the survey will be approximately two to three pages in length. It will include an introductory section. Our approach is to first develop key question areas and then work to refine the wording of the individual questions. The questionnaire and its design will ideally be tested with a small sample of Canadian citizens, public institutions and interest groups before it is administered widely.

• **Distribution/Access Channels.**
  - *Paper based and Web based access.* We will make any relevant information and the questionnaire available in hard copy as well as in downloadable format (Adobe Acrobat) from the Internet. The Survey would be advertised in our awareness campaign at the outset of the initiative.
  - *Distribution database.* We will develop an Access database to track the distribution of the paper-based questionnaire. This will enable us to develop an electronic list of individuals who have indicated an interest in this initiative and to monitor response rates.

• **Submission.** Responses to the survey will be accepted via mail, the Web or by facsimile. We suggest including a postage paid, self-addressed envelope in the paper-based version of the survey.

• **Data Capture.** We will develop an Access database to capture the information submitted by participants. Open ended-comments will be captured verbatim and responses will then be re-coded to aid in analysis activities. Capturing the information in this format will allow us to conduct quick and easy queries and analyses and help facilitate the identification of key issues and trends.

• **Data Coding.** Open-ended comments and responses will be re-coded. This involves the preparation of response code categories. This process will be initiated after approximately 50 responses have been received.

• **Analysis.** We will analyze the information submitted in response to the survey and identify key themes, issues and trends. This can include an examination of the information along different variables, including by stakeholder group, region, gender or age.

• **Reporting.** We will develop a succinct report outlining the key themes, issues and trends. This report will be structured around the survey questions.

### 6.2.7 National Synthesis Round Table

An effective consultation process should culminate with a synthesis round table that clearly validates the process findings from the various input mechanisms and builds a vision for future activities that will be required to move the broader initiative agenda ahead. While a synthesis round table is similar to the stakeholder round tables discussed above, there are some distinct differences, including:
• A **discussion paper** will need to be prepared for this session. The discussion paper should highlight the progress made to date on the initiative and shows an outline the team’s present understanding of the diverse views. The discussion paper should also clearly lay out the issues to be discussed at the session. This will provide participants time to prepare for the session through personal reflection and through liaising with other interested members of their community.

• The **composition of the participants** is critical to the success of this type of session. To ensure that the views are representative, each of the discrete stakeholder sub-groups should be involved. It is important that senior Bird Satellite Communications Inc. representatives are also in attendance to clearly present what has been heard to date and to assure participants that the results of the existing session will be used in a meaningful way. Because of the need to involve all of these participants, this session is usually larger than the focus groups. The larger session has a tendency to have more significance for participants and to attract more attention from observers. The timing of this attention is ideal because the process will have been fine tuned, the different positions and views are largely known and the senior BSCI representatives are likely to have a clearer sense of next steps.

• **Effective management** of the session is also important, as it will influence the facilitators’ ability to manage expectations. While it is important for participants to have a sense that the findings of the session will be used, it is problematic if they believe that specific actions will be taken that do not occur or occur much later than they believe is appropriate. By allowing the stakeholder sub-groups to initially discuss issues that have particular relevance to them in break out groups prior to broadening the discussion, they gain a better understanding of their collective position. Subsequent facilitation sessions that incorporate all of the stakeholder sub-groups provide the participants with an appreciation of the various positions and ideally how their position fits with others placed on the table.

### 6.2.8 Establish Framework

As the active consultation process comes to a close we will consolidate all the information gathered throughout the various activities. BSCI will evaluate and analyze input of all the stakeholders in underserved regions. This open, inclusive process will form the backbone of the establishment of the Stakeholder Councils and the contribution process.

### 6.2.9 Logistics

#### 6.2.9.1 Confirm Facilities and Manage Venue Logistics

Once the consultation plan has been approved, it is necessary to proceed with the preparation of requirement lists and an execution plan for all logistical elements.

**Challenge:** Ensuring a sound awareness of the status of all logistical elements across all sites.

**Suggested Approach:** We will assign an experienced person as a logistics coordinator. S/he will be assigned all tasks associated with ensuring that the logistics are carefully arranged and managed.
Such lists would include facility requirements lists, participant confirmation lists and site inspection lists.

It is also necessary to confirm the pre-selected meeting venues in each of the areas identified. Meeting space can be tentatively reserved pending approval of the consultation plan. All other site-specific logistic arrangements (e.g., room set-up, audio-visual, meal and refreshment, translation, interpretation and access arrangements, etc.) must also be arranged for the sessions.

6.2.9.2 **Develop Participant Feedback and Registration System**

Participation in consultation events is successful when those invited to participate can clearly link the objectives of the event with their own interests or those of their organization. In addition, the communication used to solicit participation should be clear and concise.

6.2.9.3 **Develop Registration Package**

Overall, the most effective approach to confirming participation in consultation events is often to provide participants with a clear indication of the objectives of the session, the reason for their selection and invitation, and simple yet comprehensive steps to follow to confirm their participation. The invitation package sent to them should include:

- A letter of invitation;
- A draft, or ideally, a final agenda;
- A consultation document and/or issues paper; and
- An event registration form.

### Challenge:
Reimbursing participants for expenses.

### Suggested Approach:
We suggest that participant expenses for travel, meals and incidentals be reimbursed. For any speakers or participants that are not on salary, we propose providing an honorarium in line with government guidelines.

6.2.9.4 **Consultation Document and/or Issues Paper**

In order to ensure that invited participants understand the nature and scope of the consultation, their invitation package should include a copy of the consultation document and/or an issues paper that speak to the subject area that will be discussed. The inclusion of this document should incite their interest in the consultation.

### Challenge:
Ensuring that participants are well informed.

### Suggested Approach:
We will send participants a copy of a brief background paper at least two weeks in advance of the session so that they can consider the issues and consult with their peers prior to attending.
6.2.9.5 Confirm Participation

In the letter of invitation, prospective participants should be given two options for confirming their participation or sending their regrets:

- Through the completion and fax-back of the registration form that will be developed and included in the invitation package; or
- Via telephone (through a 1-800 number) directly with the consultation registration desk that we will establish.

Once the relevant information is received by facsimile or over the phone, note of their intention to participate or not will be made in our registration database. As it is identified that an invitee cannot attend, the project manager will have the option of inviting a replacement. All information on participant invitations and registrations will be managed in our registration database. It is also necessary to track all communication with those invited, including any attempts to contact them, questions posed, etc.

In some instances, participant’s intention to attend a session can be confirmed a few days before the consultation event is scheduled to take place. If such an option were chosen, you would conduct follow-up telephone calls with confirmed participants to ensure their participation in the event.

6.2.10 Establish Stakeholder Councils

By building on the input received previously and structured within an appropriate framework, the Stakeholder Councils will be established. There is a range of important factors that must be carefully considered in the creation of these Councils, including:

- Number of Councils;
- Council size;
- Composition;
- Geographic representation;
- Roles and responsibilities;
- Interaction between the Councils (i.e. mechanisms to ensure that cross-sectoral interests are fostered in the development of proposals and considered in the evaluation of projects);
- Interaction of the Councils with BSCI; and,
- The lifecycle of the Councils.

**Challenge:** Ensuring adequate and appropriate attendance.

**Suggested Approach:** In order to ensure adequate and appropriate attendance, we will actively encourage invitees to state their intentions to participate or not by a specified date. If we do not hear from invitees by that time, we will follow-up via telephone to determine their intentions. In the case that they cannot attend, we will draw on our list or database of stakeholders to provide a supplementary list of individuals with similar characteristics to attend the event.
One of the assumptions before going into the consultation process is that there will be one Council for each of the stakeholder group. The suggested groups are as follows:

- Education;
- Health;
- Aboriginal Groups; and
- Potentially other interest groups.

During the consultation process, stakeholders and BSCI may wish to identify other Stakeholder Councils as the needs of public institutions in underserved regions become more evident.

6.2.11 Contribution Criteria

Building on the input from the National Synthesis Round Table, Bird Satellite Communications Inc. will work with the Councils to formulate the criteria that will be used to assess which groups in underserved regions receive funding.

Based on the discussions we have already conducted with thought-leaders in health, education, connectivity and Aboriginal groups, openness and inclusiveness are essential to the process. Other potential guiding principals for accepting proposals and allocating funds may include:

- Innovation and creativity that go beyond existing funding criteria;
- Contribution to the community;
- Facilitation of public institutions’ operations;
- Furthering the economic development of communities and regions; and
- Strategic in terms of supporting larger governmental initiatives.

Once these criteria have been established, it will be necessary to formalize them for general distribution to all interested parties and potential applicants. The stakeholder database developed early on in the process will provide the list of recipients with the criteria. In addition to the criteria, this call for applications should also include any relevant time lines, the process by which the application will be processed and contact names and numbers for any questions and assistance.

It may be advisable to fund one or more pilot projects in each targeted area. Pilot projects demonstrate to potential applicants how an initiative can be used as a tool to raise awareness. In addition, pilots test processes and provide learning opportunities for all interested parties.
6.3  Solicit, Review and Award Projects

6.3.1  Gather Proposals

We see the gathering of proposals as a two-step process.

The primary task is for BSCI and the Stakeholder Councils to actively solicit groups and organizations across Canada for their funding applications. We expect the solicitation of applications to only be necessary in the early days of the service. It will take some time, however, before awareness levels are high enough to ensure a steady flow of applications. Moreover, in the early days, guidance may be necessary for the first groups to submit as Canadians become familiar with the process.

The second task is to ensure that a broad range of communications channels is available to Canadians who wish to submit their applications. While we anticipate conventional methods like facsimile and mail applications will be necessary, it is also advisable to enable application through the Internet and through other methods identified as valuable by Stakeholder Councils or underserved regions. We expect that different application methods will be appropriate for different regions.

6.3.2  Assess Proposals

Applicants will submit their proposals to BSCI, who will route them to the appropriate Stakeholder Council. For example, assuming stakeholder councils are set up sectorally, an application to provide broadband connectivity for an elementary school would be forwarded to the Stakeholder Council focused on Education.

Based on their subject-matter expertise and their representative composition, Stakeholder Councils will evaluate proposals against established contribution criteria. The Councils will then recommend which applications BSCI should fund.

6.3.3  Award Projects

Bird Satellite Communications Inc. will award projects based on the recommendations of the Stakeholder Councils. BSCI will seek to balance geographical and sector representation in the consideration of how projects are awarded including the amount of funding and the contributions the organization is capable of delivering.

The following image provides a visual representation of the process as it has been described. Councils yet to be determined are referred to in the chart as “Other Interests”.

Proposal sent from applicants to Bird Satellite Communications Inc.

Proposals forwarded to their respective Stakeholder Councils for their review

Proposals returned to Bird Satellite Communications Inc. with recommendations for allocation of funds
6.4 Implementation of Projects and Reporting on Performance

6.4.1 Implementation of Projects

The implementation of projects will inevitably take many forms, as the range of requests will undoubtedly be broad. The primary contribution tools BSCI has to offer are transponder space, financial support and in-kind services. Where possible, BSCI should seek opportunities to work in partnership with other organizations both in the private and public sector.

6.4.2 Performance Measures

For each successful application, BSCI may wish to require applicants to provide an assessment of the impact the program or initiative is having in the underserved region. BSCI can collect these assessments and combine them with its own analysis of the effects these programs are having. BSCI can use these assessments as an analysis tool to understand the overall affect of the program and will submit this information to Industry Canada as part of a larger annual submission outlining the impact of the funding dollars in Canada.

6.5 Evaluation of the Award Process and Impact of the Program

The needs of Canadians are bound to change dramatically over the satellite’s fifteen-year lifespan. Fifteen years ago, very few individuals in Canada were aware of the Internet, let alone the impact it would have on how they communicate, work and learn.

In order to address inevitable changes, we would advise BSCI to evaluate the process periodically to ensure that the outputs associated with the operation and criteria of this funding mechanism remain oriented towards the needs of Canadian stakeholders in underserved regions.

6.6 Cost of the Consultation Process

This section presents the costs associated with the consultation process outlined above. Based on our experience conducting national consultations, we believe $ [abridged] million to be a reasonable estimate for this process. Please see the table below for costs per task. Once the consultations commence, costs may shift slightly to address new issues or concerns at that time.

[cost table and assumptions abridged]
Appendix A: Complementary Demographic Data

Percentage of Population whose Mother Tongue is a Non-Official Language

<table>
<thead>
<tr>
<th>Province</th>
<th>Served Population</th>
<th>Underserved Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>NT</td>
<td>20%</td>
<td>72%</td>
</tr>
<tr>
<td>NU</td>
<td>12%</td>
<td></td>
</tr>
<tr>
<td>NS</td>
<td>5%</td>
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</tr>
<tr>
<td>NF</td>
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<td></td>
</tr>
<tr>
<td>BC</td>
<td>10%</td>
<td>24%</td>
</tr>
<tr>
<td>ON</td>
<td>7%</td>
<td>25%</td>
</tr>
<tr>
<td>QC</td>
<td>2%</td>
<td>13%</td>
</tr>
<tr>
<td>NB</td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td>PE</td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td>YK</td>
<td>8%</td>
<td>11%</td>
</tr>
<tr>
<td>AB</td>
<td>11%</td>
<td>17%</td>
</tr>
<tr>
<td>SK</td>
<td>15%</td>
<td></td>
</tr>
<tr>
<td>MB</td>
<td>18%</td>
<td>72%</td>
</tr>
</tbody>
</table>

Total Unemployment Rate for Served and Underserved Regions by Province

<table>
<thead>
<tr>
<th>Province</th>
<th>Served Population</th>
<th>Underserved Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>NT</td>
<td>12%</td>
<td>9%</td>
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<tr>
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<td>BC</td>
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<tr>
<td>AB</td>
<td>7%</td>
<td>6%</td>
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<tr>
<td>MB</td>
<td>8%</td>
<td>6%</td>
</tr>
</tbody>
</table>

Call for Applications to Develop and Operate Fixed Satellite Space Stations in the 118.7° Longitude Orbital Position
Future Broadband Internet Service for the Population by Province & Territory

Canada
Ontario
Quebec
British Columbia
Alberta
Manitoba
Saskatchewan
Newfoundland
New Brunswick
Prince Edward Island
Northwest Territories
Yukon
Territory
Province
Population % Served
Population % Underserved

Total Labour Force Participation for Served and Underserved by Province

Served Total Labour Force Participation
Underserved Total Labour Force Participation
Call for Applications to Develop and Operate Fixed Satellite Space Stations in the 118.7º Longitude Orbital Position

Male Labour Force Participation for Served and Underserved Regions by Province

Female Labour Force Participation for Served and Underserved Regions by Province
Call for Applications to Develop and Operate Fixed Satellite Space Stations in the 118.7º Longitude Orbital Position

Total Unemployment Rate for Served and Underserved Regions by Province

Males Unemployment Rate by Male and Female for Served and Underserved Regions by Province

[Charts showing employment rates by province]
Call for Applications to Develop and Operate Fixed Satellite Space Stations in the 118.7º Longitude Orbital Position
Total Employment Income by work Activity

Male Employment Income for Served and Underserved Regions by Province
Female Employment Income for Served and Underserved Regions by Province

<table>
<thead>
<tr>
<th>Province</th>
<th>Female Employment Income - Underserved</th>
<th>Female Employment Income - Served</th>
</tr>
</thead>
<tbody>
<tr>
<td>NT</td>
<td>$25,000</td>
<td>$30,000</td>
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<tr>
<td>NU</td>
<td>$20,000</td>
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<td>BC</td>
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<td>MB</td>
<td>$0</td>
<td>$5,000</td>
</tr>
</tbody>
</table>

$- $5,000 $10,000 $15,000 $20,000 $25,000 $30,000
7 Appendix B: Who to Consult

Aboriginal Business Canada
Agriculture Canada
Assembly of First Nations
Assembly of Manitoba Chiefs
Association for Yukon Communities
Association of Canadian Community Colleges
Association of Community Futures
Canada Health Infostructure Partnership Program
Canadian Dental Association
Canadian Federation of Agriculture
Canadian Medical Association
Canadian Nurses Association
Canadian Rural Restructuring Foundation
Chiefs of Alberta
Coastal Communities Network
Community Access Program
Community Learning Networks
Computers for Schools
Conseil Cooperatif Acadien de la N.E.
Conseil de Developpement Economique de Manitoba
Council of Yukon First Nations
Department of India Affairs and Northern Development
DigbyNet
Digital Collections Canada
Emergency Medical Attendants Distance Training Program
Federation of Canadian Municipalities
Federation of Saskatchewan Indian Nations
First Nations Health Information System
First Nations SchoolNet
Francocommunauté Virtuelles
Generations Can Connect
GrassRoots
Health Canada, Office of Health and the Information Highway
Health Infostructure Support Program
Hibernia Offshore Telemedicine
HRDC, Office of Learning Technologies
Information Highway Application Branch
LibraryNet
Mi’Kmaq Educational Authority
Nanuvut Cedo
NET Council of Friendship Centres
Nova Scotia Telehealth
Public Interest Advocacy Centre
Quebéc Farmers’ Association
Red Cross
Regional Health Authorities
Rural Doctors Association
Rural Health Unit and Regions
Rural Secretariat
Rural Youth
Saskatchewan Council for Community Development
SchoolNet
Smart Communities
Union des Cultivateurs Franco-Ontariens
Union des Producteurs Agricoles
Victorian Order of Nurses
Women’s Rural Economic Development
appendix c

Canadian Ownership & Control Documentation
appendix d

Technical appendices
appendix e

PricewaterhouseCoopers
Demand Study
appendix f

Business Plan
appendix g

financial commitment letters