SaskTel

Connecting Saskatchewan

2500 MHz MULTIPOINT COMMUNICATIONS SYSTEMS SPECTRUM LICENSE APPLICATION

For Saskatchewan

Learning Plan

SaskTel

Donald R. Ching
President and
Chief Executive
Officer

2121 Saskatchewan Drive
Regina, Saskatchewan
S4P 3Y2

Telephone: (306) 777-2200
Fax: (306) 777-1812

October 12, 1999

Director General
2500 MHz MCS
Radiocommunications and Broadcasting Regulatory Branch
Industry Canada
Room 1514 A -- Jean Edmonds Tower North
300 Slater Street
Ottawa, Ontario
K1A 0C8

Dear Sir:

Please allow this letter and supporting documentation to stand as SaskTel's Learning Plan to accompany our application to implement a Multipoint Communications System (MCS) in the Saskatchewan service area.

SaskTel has always played a role in bringing educational services to the people of Saskatchewan. In partnership with the Department of Education, school boards and divisions, and learning institutions at all levels, we have helped to introduce the electronic media and transmission systems that have revolutionized adult education, distance education, and all modes of learning in the modern era. The high speed Internet services we hope to deliver using Multipoint Communication Systems would enable Saskatchewan's learning institutions, libraries, and private industry to take advantage of the educational opportunities increasingly available online.

SaskTel is particularly proud of its record of bringing world-class telecommunications to rural areas. We are involved in several educational initiatives that use technology to deliver learning opportunities to people across the province, and we have in recent years made great strides in bringing modern telecommunications to Saskatchewan's First Nations communities.

While we have made every effort to submit the kind of Learning Plan that fulfills Industry Canada requirements, we realize that there may be questions or points of clarification required. Please direct your correspondence and requests to Mr. Bob Turner, Director, Strategic Business Development. Mr. Turner can be reached by telephone at (306) 777-3511 or fax at (306) 359-0359.

Sincerely,

Donald R. Ching
President and Chief Executive Officer

SaskTel

Table of Contents

1. Background

SaskTel has a strong history of working with the Saskatchewan educational and learning community to introduce new technologies, specifically the Internet, to educational institutions around the province. The goal is to advance the learning opportunities made available to Saskatchewan students by deploying a leading-edge infrastructure. A fundamental requirement of this goal is equality of access to educational opportunities regardless of geographic location. Because of Saskatchewan's dispersed population, large geographic area and limited provincial resources, achieving this goal of equality has proven to be a significant challenge both to SaskTel and to the educational and learning community.

Initiatives towards achieving the goal of equal educational opportunity have included the following: developing a province-wide Internet access service that provides equality of Internet access for rural and urban residents; participating in projects that explore new technologies such as electronic distribution of educational videos to schools and students homes; and conducting distance learning pilots using videoconferencing technology. SaskTel's specific initiatives also include continually maintaining a technology leadership role in deploying the latest technology to provide the enabling infrastructure.

Some of the more significant initiatives include:

- *Venture Agreement with Saskatchewan School Trustees Association*

In May 1998, SaskTel entered into a framework agreement with the Saskatchewan School Trustees Association, which specifically addressed the unique communications needs of Saskatchewan educational institutions.

1. Background (continued)

- *Internet for Schools Program*

This SaskTel program was implemented in December 1995 after long and extensive discussions with the Saskatchewan education sector. The program provides Internet access to over 400 Saskatchewan schools, 52 of which are First Nations schools. Other schools in Saskatchewan receive Internet service through other SaskTel programs or from other Internet providers. SaskTel's "Internet for Schools Program" offers a preferred rate package, which provides Internet access to all elementary, secondary and post secondary educational institutions and libraries in the province. This program does not recover costs of service but was designed to ensure equality of access to the Internet.

- *Provincial Learning Resource Network*

Recently the government of Saskatchewan tasked the Information Technology Office of Economic and Cooperative Development, Saskatchewan Education, Saskatchewan Post Secondary Education and Skills Training departments, and SaskTel to develop province-wide Internet connectivity and networking capabilities to Saskatchewan's educational and learning community. The proposal was to address the needs of K-12 schools, regional colleges, universities and SIAST locations. A collaborative proposal was developed, called the Provincial Learning Resource Network (PLRN), with a goal to create a communications and resource utility for the educational and learning community. This proposal does not currently include libraries or Aboriginal schools. However, a costing analysis is underway in an effort to include these education institutions in the overall proposal. The PLRN has been agreed to in concept by the provincial Education departments, the Information Technology Office, and SaskTel. Discussions are currently underway with a goal of finalizing an agreement.

- *Computers for Schools Program*

The "Computers For Schools" program was designed to assist schools in making the investment required to equip schools with computers. SaskTel and the SaskTel Pioneers have refurbished and donated over 3,000 computers to schools and libraries throughout the province.

1. Background (continued)

- *First Nations Local Service Improvement Program*

In 1997, SaskTel launched its First Nations Local Service Improvement Program with an investment of $25 million. When completed in 1999, the program will have more than doubled the number of households in First Nations areas which have telephone service. In addition to the expansion of telephone service, this project enables SaskTel to provide First Nations communities with other services including Internet access. As a result of this unique initiative, the First Nations people of Saskatchewan will have one of the highest levels of telecommunications service available in Canada. This program has and will contribute strong economic and social benefits to Saskatchewan First Nations, including First Nations project management and construction participation on the program itself.

- *Universal Internet Access*

SaskTel is at the forefront in Canada in provision of universal Internet to Saskatchewan residents. Since June of 1996, dial-up Internet service has been provided to both rural and urban Saskatchewan residents on a universal basis. The universal rating plan allows rural and remote residents to access the Internet at the same rate as urban residents.

- *Distributed Learning and Research Projects*

SaskTel has contributed significantly and will continue to contribute advice and resources to important distributed learning educational trials in rural Saskatchewan. SaskTel also participates in the provision of a high speed research link between the University of Saskatchewan and the University of Regina.

1. Background (continued)

- *High Speed (DSL) Service*

SaskTel was the first communications company in North America to launch a commercial high speed Internet service using Digital Subscriber Line (DSL) technology. Today, DSL service is available in ten Saskatchewan centres; Regina, White City / Emerald Park, Saskatoon, Moose Jaw, Prince Albert, North Battleford, Swift Current, Weyburn, Estevan and Yorkton. The availability of high speed Internet service in Saskatchewan is second to none in Canada and SaskTel continues to examine further deployment of "high speed" technology for other smaller communities and areas in Saskatchewan. The Regina Catholic School Division is utilizing high speed service today in what has been described as a world-class, leading infrastructure deployment.

- *Industry Canada DirecPC Program*

SaskTel is involved with DirecPC, an Industry Canada-sponsored program that provides satellite-based Internet access to schools across Canada.

SaskTel

2. Summary of Saskatchewan Learning Community Needs

The Saskatchewan Provincial Learning Authority, representing the needs and interests of various members of the educational and learning community, has identified the following areas of need:

Access

- To new learning technologies and opportunities immediately and as they evolve.
- For remote rural and northern communities.
- To affordable bandwidth for educational use.

Financial Support

- To provide a revenue source for enhancing provincial distance education capacity such as investment in capital, course development and training.

Saskatchewan Partners

- To demonstrate a commitment to the province.

Connectivity

- To ensure open standards allowing integration with other digital technologies being utilized to support learners throughout the province.

3. Objectives

The SaskTel approach to satisfying the needs of the educational and learning community will be accomplished by adopting the following goals:

- Increase the potential for equality of access to affordable high-bandwidth services;
- Reduce the financial burden on provincial education budgets; and
- Enable the growing need for new learning technologies.

The specific objectives listed below will incorporate all of the goals wherever possible:

Objective 1—Provide equality of Internet access to rural and remote residents

The equality of Internet access had previously been addressed by the Internet for Schools Program, which provided comparable access for both urban and rural locations. However, with the advent of new emerging applications that require higher bandwidth, this equality is being stressed. This issue has recently been addressed in the PLRN, a collaborative effort between provincial Education departments, the Information Technology Office and SaskTel to ensure a "best solution" approach to deploying high speed access throughout the province. This Learning Plan and the associated MCS spectrum is linked tightly with the PLRN from both a vision and technical infrastructure perspective.

Saskatchewan residents living in rural areas should have access to high quality, advanced data and voice services at rates reasonably comparable to urban residents. Although SaskTel has provided access to the Information Highway for rural markets, access to high-bandwidth services in rural areas is limited in comparison to that offered in urban areas. The MCS spectrum will provide an economical means for SaskTel to achieve its goal of equality of Internet access regardless of geographic location.

This objective is consistent with the direction set by the federal government in the statement:

> The Liberal government believes that rural Canada needs a strong information technology infrastructure. People living in rural Canada should have access to the same enabling tools and information resources as their urban counterparts.[1]

And again, in relation to the Information Highway, the Government of Canada stated that "all Canadians must have affordable access to the Information Highway, no matter where they live."[2]

Objective 2—Enable education institutions in the delivery of online services

The basic access capabilities will allow for the delivery of advanced, higher bandwidth content developed by the educational and learning community to educational institutions and students' homes. The higher speed capabilities of the envisioned MCS-based service will also allow more feature rich services to be available, such as two-way videoconferencing.

The responsibility of enabling the educational institutions with online services requires SaskTel to provide the complete infrastructure, which includes reaching students and teachers in their homes. Distance learning opportunities that are web-based allow for the educational institutions to reach students in their homes—students who may not otherwise have access to educational opportunities.

[1] Liberal Party of Canada, *Securing Our Future Together: Preparing Canada for the 21st Century*, 1997, p. 45.
[2] Government of Canada. *Building the Information Society: Moving Canada into the 21st Century*. (Industry Canada: Distribution Services, 1996), p. 2.

Objective 3—Balance provincial financial and social needs

Saskatchewan is one of the most rural of all Canadian provinces, with 28 per cent of its residents residing on farms and in small towns and villages of less than 1,000 residents. Less than one million people are widely dispersed over a geographic area of 652,000 square kilometres, with less than four households per kilometre of telecommunications infrastructure.[3] These facts coupled with the limited government resources available for education formed the basis for the collaborative efforts between the provincial Education departments, Information Technology Office, and SaskTel to outsource the owning, maintaining and management of the network to SaskTel. This approach focuses provincial education resources on developing and delivering educational content as opposed to building and managing an enabling network. The non-operational complexity and investment of such a network also includes continually researching, testing and, potentially, deploying new technologies, and minimizing capital redundancy. A balanced use of available provincial resources will increase the benefit to the educational and learning community.

Objective 4—Assist in the evolution of education applications

Equality of Internet access is the initial concern that will be addressed by this provincial network, specifically the bandwidth availability. As new learning technologies emerge, such as videoconferencing, the bandwidth requirements increase dramatically from the typical 28.8 kbps speeds available over regular phone lines. As these needs evolve, MCS and other new access technologies will play a larger role in ensuring that the enabling infrastructure is provided by SaskTel.

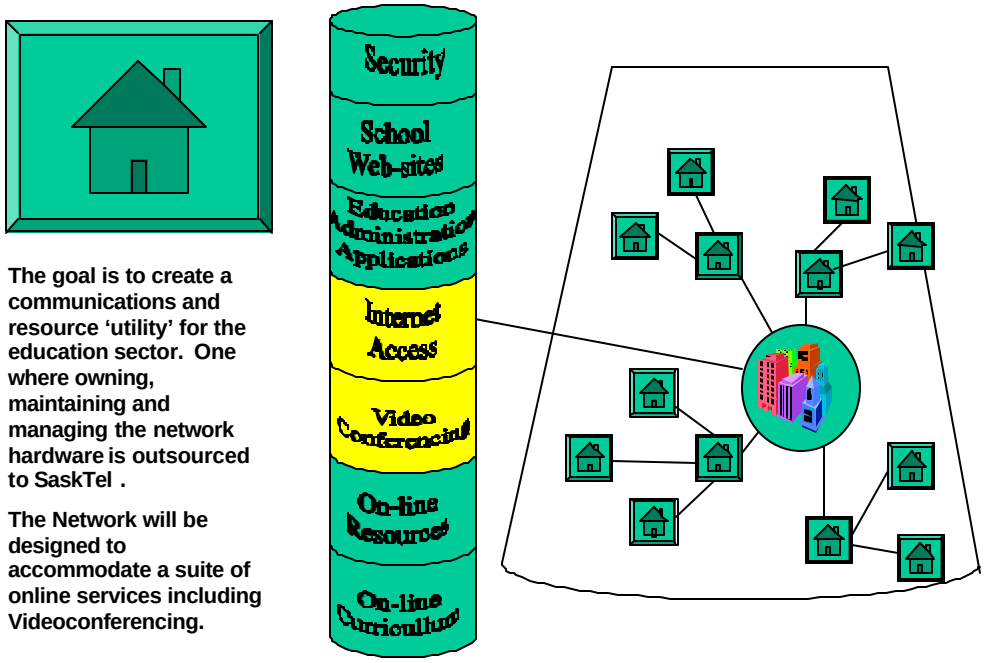
[3] Statistics Canada, 1996 Census of Canada

3. Objectives (continued)

Other applications envisioned in discussions with the educational and learning community include:

- education administration applications,
- school web sites,
- security,
- online resources, and
- online curriculum.

Provincial Learning Resource Network Vision



The goal is to create a communications and resource 'utility' for the education sector. One where owning, maintaining and managing the network hardware is outsourced to SaskTel .

The Network will be designed to accommodate a suite of online services including Videoconferencing.

4. Benefits to Saskatchewan Educational and Learning Community

Need: Access

Benefit: Equality of Access

SaskTel has a history of providing equality of access for both urban and rural customers. The PLRN involves a "best solution" approach that will maximize the bandwidth available by implementing the technology most suited to the geographic location and education application requirements. The MCS spectrum will play a vital role in delivering high-bandwidth access services to a large portion of the province.

Benefit: Extended Reach

SaskTel is viewed as a technology leader in the province with an enabling infrastructure that has the capacity to reach the entire province. Integrated with other SaskTel network deployment initiatives, more specifically, the DSL technology, SaskTel has the backbone, local access network and network management infrastructure required to deliver high speed services to schools, libraries and homes. SaskTel has been involved in several Distributed Learning programs involving web-based access to curriculum. This distributed learning model can be accomplished using the envisioned infrastructure and would allow educational institutions to offer more flexible access to courses.

Need: Financial Support

Benefit: Cost Savings

The most significant benefit to the provincial educational and learning community if the MCS spectrum were awarded to SaskTel is that the overall cost of the PLRN would be reduced. The provincial network designed for the educational and learning community made assumptions regarding access technologies, the application bandwidth requirements, and associated network costs. Due to the uncertainty of whether or not the MCS spectrum would be available to SaskTel as an option, MCS technology was not included in the calculation of the total network costs.

4. Benefits to Saskatchewan Educational and Learning Community (continued)

In the event that SaskTel is successful and is awarded the MCS spectrum, it is SaskTel's current position that high-bandwidth capabilities and two-way functionality should be attainable at a significantly lower cost using the MCS technology. Although factors such as quality of service and advanced education applications have not been finalized, SaskTel's goal, using the MCS spectrum, is to reduce the cost of the PLRN by between 10 and 15 per cent over the proposed six-year period.

Benefit: Reduced financial burden on education budgets

An approach that involves SaskTel investing, maintaining and managing the enabling infrastructure will allow the educational and learning community to focus available resources on creating the content for the learners. This shared approach maximizes the benefit received from the limited provincial resources.

Need: Saskatchewan Partners

Benefit: Saskatchewan commitment

SaskTel's 91 year history of providing the people of Saskatchewan with affordable access to a modern and world-class telephone system speaks for itself.

SaskTel's commitment to the province means that it will use Saskatchewan-based business partners wherever possible. For example, the new wireless technology deployed in SaskTel's MCS pilot was developed by a Saskatoon-based business.

4. Benefits to Saskatchewan Educational and Learning Community (continued)

Need: Connectivity

Benefit: Provincial Network

A provincial approach to building the enabling infrastructure will in itself ensure network connectivity compared to a deployment of multiple systems that are managed by several service providers. A stand-alone MCS system that does not easily integrate with other locations and / or networks will create islands within the educational community and will not address equality of access issues.

Benefit: Open Standards

SaskTel, as a common carrier, has and will continue to adopt an open standards approach to network infrastructure deployment. This requirement is inherent with providing communications services to a diverse market that uses a wide range of technologies.

5. Scope

SaskTel's focus is on the Saskatchewan market with a plan to cover 95 per cent of the provincial population with MCS enabling technology over a three-year period. This deployment will enable services to over 500 schools and libraries throughout the province. The remainder of the schools and libraries not addressed in the plan could be better served by other technologies based on several factors including the bandwidth requirements and geographic location.

A map of the proposed serving areas is included at the end of this document.

6. Service Offerings

In discussions with various provincial Education departments and the Information Technology Office, it was determined that the highest priority services would be equality of high speed Internet access and videoconferencing capabilities. As the needs of the educational institutions evolve, additional infrastructure capabilities and / or services will be added.

High Speed Internet Access Service

SaskTel already has an education-focused offering for Internet access and is serving 400 schools with a dial service. Some schools already have higher speed access but the vision of the PLRN, enabled by the MCS spectrum, is to reach all of the educational institutions in the provincial educational and learning community including K-12, universities, colleges and technical institutions and libraries. The approach of the network deployment will be to offer the "best available" solution to any location.

Videoconferencing

SaskTel has participated in conducting distributed learning pilots, some have evolved to becoming every day components of school delivery. It is the intent of the PLRN to enable two-way videoconferencing where economically viable.

7. Content

SaskTel does not envision entering into educational content production or acquisition. These matters would be best served by the educational and learning community. SaskTel's focus is to provide the enabling infrastructure including developing web-based learning applications and the required application hosting services that allow for the presentation and delivery of educational content.

SaskTel has already participated in, or is involved with, the development of several education applications for web-based distributed learning options. SaskTel's involvement includes both the application development, providing hosting services (server space) and other services required to enable the delivery of the content. The program application and hosting services already developed can be adopted to other courses as a cost-effective means of implementing distributed learning curriculum.

Another potentially exciting application that is progressing towards a pilot with SaskTel is an initiative with DeafTelecom. DeafTelecom is a small Canadian company established to provide cost-effective videoconferencing services targeted specifically to deaf people. The high-bandwidth requirements for the ability to clearly communicate using sign language is accommodated by the proposed bandwidth capabilities of the MCS spectrum. Although the technology is in early stages of development, this opportunity demonstrates that, as enabling infrastructure is deployed, new higher-bandwidth applications will emerge.

SaskTel

8. Funding

SaskTel's capital structure remains one of the strongest in the industry. SaskTel ensures its strong financial position into the future by focusing on the key operating indicators of debt ratio and self-financing of capital spending and dividend requirements.

SaskTel finances its capital program and projects internally from operational cash flows and, when required, borrows additional capital from the Province of Saskatchewan.

During 1998, SaskTel invested $138 million in capital expenditures. The capital expenditure program is primarily for network system upgrading and modernization, and for the introduction of new services. The 1998 capital expenditure program was funded entirely by internally generated funds.

It is expected that capital expenditures required for the introduction of the 2500 MHz MCS spectrum will be funded primarily within the existing SaskTel capital budget and MCS subscriber revenues. If required, additional funds will be borrowed from the Province of Saskatchewan.

The new CANARIE ANAST Funding Program is targeted to the education and training sector to stimulate audio, video and advanced applications that can be deployed on next generation Internet network. It is anticipated that third parties developing educational applications will apply for federal funding with the participation of SaskTel as the network and technology partner. SaskTel's role in this case would be providing hosting and application development services.

9. Implementation Timeframe

After completing the preliminary MCS network design, SaskTel began comparing the work required to install and commission the system against the available number of SaskTel resources. SaskTel proposes to implement the MCS network over a three-year period. This is an ambitious plan, but SaskTel believes that the goals are achievable with the hard working and highly skilled work force it has in place.

SaskTel will assess the costs of various access technologies for a given area and implement the technology that allows for the best balance between cost and future capabilities. The proposed implementation strategy is to begin installations in the most populated serving areas of Saskatchewan. The learning institutions, along with most of the population, are clustered in and around these more densely populated serving areas. Installing the MCS network in these areas first will allow the greatest number of households and schools to receive high speed Internet service as soon as possible. After the most densely populated areas are covered, service will be rolled out in years two and three to the remaining rural areas of the province, region by region, so that high speed Internet service will be available to as many urban and rural resident of this province as can be served economically.

Although current deployment plans do not prioritize specific education institutions or library locations, this will be done in consultation with the provincial education department responsible.

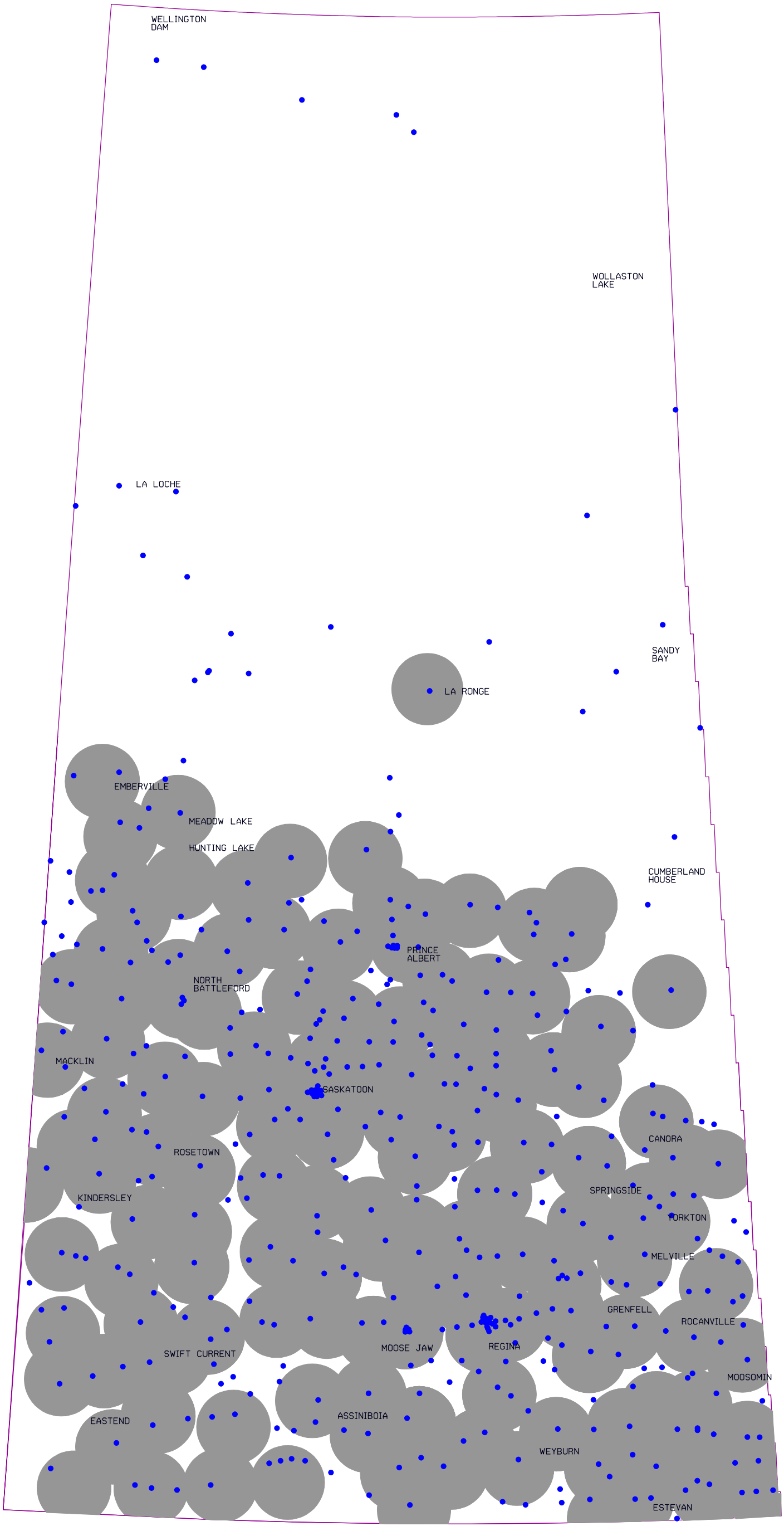
10. Conclusion

The MCS spectrum will greatly increase the ability for SaskTel to improve the inequity between rural and urban communities by offering higher bandwidth access services than may be available with other access technologies. The following list highlights SaskTel initiatives that have brought equality of access to Saskatchewan:

- SaskTel was the first telecommunications company in Canada to offer rural individual line service (ILS) that removed the party line system.
- SaskTel was at the forefront in offering universal Internet access to both rural and urban residents at the same rate.
- The First Nations Local Service Improvement Program will result in First Nations people in Saskatchewan having one of the highest levels of telecommunications services in Canada.

SaskTel's role as the telecommunications provider will provide the capability to support the educational and learning community in the delivery of advanced learning opportunities to Saskatchewan education institutions, libraries and students' homes. Integrating MCS access technology would be the efficient and optimal way of deploying MCS because it would make use of SaskTel's current network infrastructure investment, providing the economies of scale required to reach the majority of the province. The integrated approach will allow for a seamless network that can serve over 95 per cent of the provincial population and, at the same time, reduce the cost of delivering a high speed network.

SaskTel, provincial education departments and the Information Technology Office are working towards a vision of a province-wide learning network that provides equality in the access to learning opportunities in both rural and urban locations. Awarding the MCS spectrum to SaskTel will assist in significantly reducing the overall costs to the provincial educational and learning community in achieving that vision.



Legend

Education/Library Facility

MCS Network Coverage

SaskTel

EDUCATION & LIBRARY FACILITIES
TO BE SERVED BY
PROPOSED MCS NETWORK

CREATED: Sept. 29, 1999 VK/RAB
MODIFIED: Oct. 7, 1999 VK/RAB

SCALE NTS

Plot Request = MCS-Ed-Plan.prf

$$$$$SYTIME$$$$$$$

DGN$SPEC$$$$$$$$$$$$$$$$$$$$$$